BEFORE THE

PUBLIC UTILITIES COMMISSION OF OHIO

THE DAYTON POWER AND LIGHT COMPANY

CASE NO. 16-0395-EL-SSO

CASE NO. 16-0397-EL-AAM

CASE NO. 16-0396-EL-ATA

2016 ELECTRIC SECURITY PLAN

VOLUME 5 OF 8 – TESTIMONY

WITNESSES HALE, HALL, HARRISON, AND JACKSON

Dayton Power and Light Company

DP&L Case No. 16-0395-EL-SSO

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DIRECT TESTIMONY
OF CLAIRE E. HALE

- □ **MANAGEMENT POLICIES, PRACTICES, AND ORGANIZATION**
- □ **OPERATING INCOME**
- □ **RATE BASE**
- □ **ALLOCATIONS**
- □ **RATE OF RETURN**
- ■ **RATES AND TARIFFS**
- □ **OTHER**

BEFORE THE

PUBLIC UTILITIES COMMISSION OF OHIO

DIRECT TESTIMONY OF

CLAIRE E. HALE

ON BEHALF OF
THE DAYTON POWER AND LIGHT COMPANY

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I. **<u>INTRODUCTION</u>**

Q. Please state your name and business address.

A. My name is Claire E. Hale. My business address is 1065 Woodman Drive, Dayton, OH 45432.

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

A. I am employed by The Dayton Power and Light Company ("DP&L" or the "Company") as a Rate Analyst II.

Q. What are your responsibilities in your current position?

A. I am responsible for assisting in the development, analyses, revision, and administration of the Company's tariff schedules, rate designs, and policies. This includes participating in the development of the Company's rate cases and having responsibility for the administration of certain riders, specifically the Transmission Cost Recovery Riders, the Reliability Pricing Model Rider, and the Storm Cost Recovery Rider.

Q. Will you describe briefly your educational and business background?

A. I received a Bachelor of Science degree in Mathematics from The Ohio State University in June 2008. Prior to my position at DP&L, I was a Technical Analyst at Accenture, where I worked on the Service Oriented Architecture Team providing client support on middleware applications. I joined DP&L as a rate analyst in January 2011.

Q. Have you previously provided testimony before the Public Utilities Commission of Ohio ("PUCO" or the "Commission")?

A. Yes. I sponsored testimony before the PUCO in Case No. 12-426-EL-SSO as well as in Case No. 15-1830-EL-AIR.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of this testimony?

A. The purpose of this testimony is to support and explain the Reliable Electricity Rider ("RER") rate design, Company obligations regarding the RER, and the Clean Energy Rider.

Q. Do you support any exhibits attached to your testimony?

A. Yes. I am supporting Exhibit CEH-1, RER Rate Design.

III. RELIABLE ELECTRICITY RIDER

Q. Please explain the Reliable Electricity Rider.

A. As described by Company Witness Jackson, the Reliable Electricity Rider will help to ensure that Ohio customers continue to receive reliable service. The RER will be billed on a service-rendered basis beginning January 2017 and will be updated annually. DP&L will file an updated rate by November 1st of each year, which will become effective January 1st of the following year unless otherwise ordered by the Commission. This rider will be billed to all customers on a non-bypassable basis.

Q. How will the RER revenue requirement be calculated each year?

A. Each year updated projections of the next year's revenue requirement and expected market revenues will be determined. The projected net of costs and revenues will be used to determine the projected value of the RER for the following year. For the first year of the RER, this projected amount will be the total value of the RER. In future years, DP&L will add a true-up component using the most recent actual data. Specifically, DP&L will track and defer on a monthly basis the net costs and credits from Ohio Genco's revenue requirement and market revenues, as well as retail revenues from the RER. The monthly over or under collection will be recorded as an asset or liability on the Company's books. Carrying charges will accrue on the asset or liability at DP&L's cost of long-term debt. The cumulative balance of this deferral as of September 30th each year will be combined with the annually updated projections to determine the value of the RER for the next year.

Q. Please describe DP&L's RER rate design.

A. DP&L proposes to use a modified version of its current Service Stability Rider ("SSR") rate methodology for the basis of the structure for the RER rate design. Using the current SSR rates as a starting point promotes the retail rate stability intended by the RER. The modifications to the SSR rates bring the RER rates in line with DP&L's more recent rate design, as proposed in its distribution rate case (see Company Witness Parke testimony in Case No. 15-1830-EL-AIR) and within this case (see Company Witness Brown testimony). The modifications also simplify the rate structure with minimal inter- and intra-class impact. All rate design changes will be implemented in the first year of the RER and then held steady, with rates adjusted only to reflect the updated RER revenue requirement. <u>Exhibit CEH-1</u> attached to this testimony shows the calculation of the RER rates. Page 1 of this exhibit shows the calculation of the proposed 2017 RER rates by beginning with SSR rates, applying the rate design modifications, and scaling those rates to meet the 2017 RER revenue requirement. The remaining pages of the exhibit show the calculation of future years' rates simply by applying a scaling factor for the next year's RER revenue requirement.

Q. Can you describe the calculation of the 2017 RER rates more fully?

A. Yes. As noted above and shown in Exhibit CEH-1, the calculation begins with SSR rates applied to the distribution forecast (supported by Company Witness Adams) for 2017. This creates an SSR revenue requirement by tariff class. The desired rate design changes are then applied to each class's rates. These rate design changes impact the revenue calculated for each class, so the new rates are then scaled up or down to bring the revenue for each class back in line with that originally calculated from the SSR rates. This prevents rate design changes from causing any inter-class shifts in revenue. Finally, a factor is calculated based on the 2017 RER revenue requirement and the calculated 2017 SSR revenues. This factor is applied to the modified rates to determine 2017 RER rates.

Q. What modifications are you proposing to the rate design?

A. For Residential, the rate design changes are intended to bring the rates more in line with those proposed for the Standard Offer Rate. Specifically, the blocked rates for Residential are removed to create a straight kWh rate, and the Residential Heating discount is also modified to a lower rate for all kWh in the winter months. For the Secondary class, the rate design changes accomplish a few different objectives: exchange the blocked kWh rates for a straight kWh rate; incorporate current School customers into the Secondary class (in accordance with the elimination of that tariff in 2017); eliminate the first five "free" kW by implementing a straight kW rate for all kW; and implement the max charge rate changes discussed by Company Witness Parke. The rate design changes for the Primary class also incorporate current School customers and the proposed max charge rate changes. Finally, the Private Outdoor Lighting rates are changed to a consistent kWh charge, rather than a varying per lamp charge. However, tariffed rates are still shown on a per lamp basis for the convenience of customers. No rate design changes are proposed for the Primary Substation, High Voltage, or Street Lighting classes. All of these rate design changes employ average rates in order to minimize any intra-class shifts. In the end, these changes simplify the rates for customers while maintaining rate stability.

Q. Have you proposed rates for the RER for 2017?

A. Yes. For 2017, Exhibit CEH-1 Page 1 shows the proposed rates for implementation in January 2017.

Q. Have you provided estimated rates for the RER for the remaining term of the Electric Security Plan?

A. Yes. For the years 2018-2026, Exhibit CEH-1 Pages 2-5 show the rates consistent with the current projections for both the RER revenue requirement and distribution load. However, as discussed above, those rates are illustrative based on the current view of the market in future years. Tariffed RER rates will be updated on an annual basis using revised projections and a reconciliation of actual costs and revenues. Ultimately, with the reconciliation component, customers will only be charged or credited the net of the actual revenue requirement and revenues.

IV. COMPANY OBLIGATIONS REGARDING THE RELIABLE ELECTRICITY RIDER

Q. Does DP&L intend to meet certain obligations established by the Commission?

A. Yes. The Commission has established certain obligations for utilities, as outlined in Case Nos. 13-2385-EL-SSO, 14-1297-EL-SSO, and 14-841-EL-SSO. As explained below, the Company plans to fulfill all such obligations.

Q. How does DP&L plan to ensure that the Staff and Commission have sufficient oversight and review and audit rights regarding the Reliable Electricity Rider?

A. The Company commits to rigorous Commission oversight of the Reliable Electricity Rider by proposing two key methods to ensure adequate oversight and review. First, the Company will provide to the Commission a full accounting of the financial results of the generating plants included in the RER. These financial records will include the operating costs of the facilities and OVEC contract, the revenues received selling capacity, energy and ancillary services into the PJM wholesale market, and the revenue received under the RER. It will also include a calculation of the resulting return on equity for the plants in question. Second, the Company proposes that the Staff have the ability to audit the inputs to and operation of the RER using the same process it has to review the fuel clause.

Q. What other data will be shared with the Staff and Commission?

A. The Company will also share the results of its participation in PJM's Reliability Pricing Model ("RPM") process, and the level of any true-up to the RER based on the clearing level of the RPM auction. The Company commits to full information sharing with Staff during its annual audit process of the Reliable Electricity Rider.

Q. How are the financial risks of wholesale market prices and the generation portfolio shared between ratepayers and the Company?

A. As discussed more fully in the testimony of Company Witness Jackson, financial risk will be shared between the Company and its distribution customers. In years that the revenues earned by the facilities exceed the revenue requirement, that difference will be credited to customers. As described in the testimony of Company Witness Malinak, the Company expects customers to receive benefits over the term of the plan. Based on the expert view that market prices are expected to rise significantly during the RER term (see the testimony of Company Witness Meehan), the RER is expected to be a charge to customers in the early years and a credit to customers in later years.

V. CLEAN ENERGY RIDER

Q. Does the Company propose any new riders or deferrals regarding environmental costs?

A. Yes, the Company proposes a new Clean Energy Rider that will facilitate future investment in renewable and advanced technologies consistent with state and federal policies. This rider, set initially at zero, will recover any currently unknown environmental compliance costs, including but not limited to green energy initiatives, environmental expenses, and decommissioning costs. Once those costs are known, the Company will apply for recovery of those costs through the non-bypassable Clean Energy Rider in a separate proceeding. The timing of recovery will be on a case-by-case basis for each expense.

Q. What is the nature of these environmental expenses?

A. Many existing, pending, and future regulations aim to achieve a clean energy policy at both the state and national level. Encouraging the use of renewables, reducing pollutants in both air and water, and environmentally sound long-term solutions are all part of that overall policy goal. To that end, the Company expects it will incur environmental costs as a result of its current ownership of generation assets. It also expects that, consistent with state and federal policies, new renewable requirements will be imposed by future regulations. Therefore the Company wishes to establish the Clean Energy Rider as a mechanism to enable that investment and recover the related costs for compliance with those currently unknown or unquantifiable clean energy obligations.

Q. Can you provide an example of the type of environmental expenses that DP&L expects to incur?

A. Yes. As discussed in Company Witness Collier's testimony, there are a number of pending regulations related to environmental compliance. As she explains more fully, the generation plants are subject to a number of new environmental regulations that are not yet finalized. Examples include revisions to the Cross State Air Pollution Rule ("CSAPR") and implementation of the Resource Conservation and Recovery Act ("RCRA") including the potential closing of existing ash ponds.

Q. Why is it appropriate for the Company's customers to pay for these expenses?

A. Certain environmental and decommissioning expenses are related to activities involved in serving the Company's customers and were caused when the generation assets were owned by the regulated entity and were for the benefit of DP&L's customers. It is appropriate that these expenses are recovered on a non-bypassable basis because DP&L's ownership of these assets benefitted all of DP&L's distribution customers. In fact, those generation assets were originally placed in service years, and sometimes decades, before the generation market was deregulated. Therefore, such environmental and decommissioning expenses are related to customers' prior use of and benefit from those generation assets. Additionally, any efforts to comply with clean energy obligations will benefit all of the Company's customers, making non-bypassable recovery appropriate.

VI. CONCLUSION

Q. Please summarize your testimony.

A. In summary, the RER rate design described above maintains rate stability while still updating rates for consistency across DP&L's tariffs. Additionally, the RER true-up mechanism and Clean Energy Rider proposed above is reasonable and should be approved.

Q. Does this conclude your direct testimony?

A. Yes, it does.

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Reliable Electricity Rider
Allocation and Rate Design

Line	Class/Description		2017 LTFR Distribution Forecast[1]	SSR Rate	SSR Revenue	SSR Rate Design Changes[2]	SSR Rate Design Revenue	Scale Rates to SSR Level[3]	SSR Revenue Under New Rate Design	RER Revenue	RER Rate	RER Revenue
(A)	(B)		(C)	(D)	(E) = (C) * (D)	(F)	(G) = (C) * (F)	(H)	(I) = (C) * (H)	(J) = (H) * Line 1	(K) = (H) * (J) Line 2	(L) = (C) * (K)
1	Total Distribution Sales Forecast				$ 111,826,908		$ 113,123,025		$ 111,826,908	$ 130,824,709		$ 130,824,709
2	All kWh		14,031,554,971		$ 86,110,417		$ 87,406,535			117%		$ 100,572,967
3	All kW		23,306,413		$ 25,716,491		$ 25,716,491					$ 30,251,742
4												
5	**Total Residential**			**43.9%**	**$ 49,112,514**	**44.9%**	**$ 50,782,662**	**43.9%**	**$ 49,112,514**	**$ 57,456,032**	**43.9%**	**$ 57,456,032**
6	Residential Non-Heating							96.7%				
7	0-750	kWh	2,396,350,143	$ 0.0103362	$ 24,769,154	$ 0.0097807	$ 23,437,891	$ 0.0094590	$ 22,667,062		$ 0.0110659	$ 26,517,873
8	> 750	kWh	1,145,798,410	$ 0.0084287	$ 9,657,591	$ 0.0097807	$ 11,206,667	$ 0.0094590	$ 10,838,100		$ 0.0110659	$ 12,679,339
9	Residential Heating					*15.27%*	*Residential Heating Discount*					
10	0-750 (S)	kWh	345,989,049	$ 0.0103362	$ 3,576,212	$ 0.0097807	$ 3,384,002	$ 0.0094590	$ 3,272,708		$ 0.0110659	$ 3,828,695
12	> 750 (S)	kWh	201,572,803	$ 0.0084287	$ 1,698,997	$ 0.0097807	$ 1,971,515	$ 0.0094590	$ 1,906,676		$ 0.0110659	$ 2,230,593
11	0-750 (W)	kWh	536,635,193	$ 0.0103362	$ 5,546,769	$ 0.0082871	$ 4,447,123	$ 0.0080145	$ 4,300,866		$ 0.0093761	$ 5,031,521
13	> 750 (W)	kWh	764,501,600	$ 0.0050540	$ 3,863,791	$ 0.0082871	$ 6,335,464	$ 0.0080145	$ 6,127,102		$ 0.0093761	$ 7,168,010
14	**Total Secondary**			**30.5%**	**$ 34,139,229**	**29.9%**	**$ 33,798,614**	**30.5%**	**$ 34,139,229**	**$ 39,938,999**	**30.5%**	**$ 39,938,999**
15	Standard							*101.0%*	*Secondary Scale Factor*			
16	0-5	kW	2,651,142	$ -	$ -	$ 0.9566038	$ 2,536,093	$ 0.9662442	$ 2,561,651		$ 1.1303954	$ 2,996,839
17	> 5	kW	10,379,155	$ 1.2104318	$ 12,563,260	$ 0.9566038	$ 9,928,739	$ 0.9662442	$ 10,028,799		$ 1.1303954	$ 11,732,549
18	0-1,500	kWh	506,147,901	$ 0.0101459	$ 5,135,326	$ 0.0050927	$ 2,577,670	$ 0.0051440	$ 2,603,647		$ 0.0060179	$ 3,045,970
19	1,501-125,000	kWh	2,857,901,199	$ 0.0044547	$ 12,731,092	$ 0.0050927	$ 14,554,493	$ 0.0051440	$ 14,701,171		$ 0.0060179	$ 17,198,690
20	> 125,000	kWh	639,241,240	$ 0.0037842	$ 2,419,017	$ 0.0050927	$ 3,255,477	$ 0.0051440	$ 3,288,285		$ 0.0060179	$ 3,846,918
21	Max Charge											
22	0-5	kW	186,303	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -
23	> 5	kW	815,285	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -
24	0-1,500	kWh	26,754,464	$ 0.0248410	$ 664,608	$ 0.0164054	$ 438,917	$ 0.0165707	$ 443,340		$ 0.0193858	$ 518,658
25	1,501-125,000	kWh	13,623,777	$ 0.0248410	$ 338,428	$ 0.0164054	$ 223,503	$ 0.0165707	$ 225,756		$ 0.0193858	$ 264,108
26	> 125,000	kWh	0	$ 0.0248410	$ -	$ 0.0164054	$ -	$ 0.0165707	$ -		$ 0.0193858	$ -
27	School											
28	0-5	kW	5,026	$ -	$ -	$ 0.9566038	$ 4,808	$ 0.9662442	$ 4,857		$ 1.1303954	$ 5,682
29	> 5	kW	97,867	$ -	$ -	$ 0.9566038	$ 93,620	$ 0.9662442	$ 94,563		$ 1.1303954	$ 110,628
30	0-1,500	kWh	1,498,096	$ 0.0079018	$ 11,838	$ 0.0050927	$ 7,629	$ 0.0051440	$ 7,706		$ 0.0060179	$ 9,015
31	1,501-125,000	kWh	34,329,210	$ 0.0079018	$ 271,263	$ 0.0050927	$ 174,829	$ 0.0051440	$ 176,591		$ 0.0060179	$ 206,591
32	> 125,000	kWh	556,642	$ 0.0079018	$ 4,398	$ 0.0050927	$ 2,835	$ 0.0051440	$ 2,863		$ 0.0060179	$ 3,350
33	**Total Primary**			**16.5%**	**$ 18,464,534**	**16.3%**	**$ 18,431,119**	**16.5%**	**$ 18,464,534**	**$ 21,601,396**	**16.5%**	**$ 21,601,396**
34	Standard							*100.2%*	*Primary Scale Factor*			
35	All	kW	6,060,996	$ 1.4208780	$ 8,611,937	$ 1.4115752	$ 8,555,552	$ 1.4141343	$ 8,571,063		$ 1.6543757	$ 10,027,165
36	All	kWh	2,844,019,169	$ 0.0033887	$ 9,637,528	$ 0.0034129	$ 9,706,425	$ 0.0034191	$ 9,724,023		$ 0.0040000	$ 11,375,996
37	Max Charge											
38	All	kW	99,018	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -
39	All	kWh	3,758,822	$ 0.0249517	$ 93,789	$ 0.0160619	$ 60,374	$ 0.0160910	$ 60,483		$ 0.0188246	$ 70,759
40	School											
41	All	kW	39,944	$ -	$ -	$ 1.4115752	$ 56,384	$ 1.4141343	$ 56,487		$ 1.6543757	$ 66,083
42	All	kWh	15,348,509	$ 0.0079018	$ 121,281	$ 0.0034129	$ 52,383	$ 0.0034191	$ 52,478		$ 0.0040000	$ 61,394
43	**Primary Substation**			**3.4%**	**$ 3,768,335**	**3.3%**	**$ 3,768,335**	**3.4%**	**$ 3,768,335**	**$ 4,408,522**	**3.4%**	**$ 4,408,522**
44	All	kW	1,117,795	$ 1.5092978	$ 1,687,085	$ 1.5092978	$ 1,687,085	$ 1.5092978	$ 1,687,085		$ 1.7657060	$ 1,973,697
45	All	kWh	640,739,483	$ 0.0032482	$ 2,081,250	$ 0.0032482	$ 2,081,250	$ 0.0032482	$ 2,081,250		$ 0.0038000	$ 2,434,825
46	**High Voltage**			**5.5%**	**$ 6,105,978**	**5.4%**	**$ 6,105,978**	**5.5%**	**$ 6,105,978**	**$ 7,143,297**	**5.5%**	**$ 7,143,297**
47	All	kW	1,853,880	$ 1.5395867	$ 2,854,209	$ 1.5395867	$ 2,854,209	$ 1.5395867	$ 2,854,209		$ 1.8011406	$ 3,339,099
48	All	kWh	971,373,227	$ 0.0033476	$ 3,251,769	$ 0.0033476	$ 3,251,769	$ 0.0033476	$ 3,251,769		$ 0.0039163	$ 3,804,198
49	**Street Lighting**			**0.1%**	**$ 149,230**	**0.1%**	**$ 149,230**	**0.1%**	**$ 149,230**	**$ 174,582**	**0.1%**	**$ 174,582**
50	All	kWh	55,270,421	$ 0.0027000	$ 149,230	$ 0.0027000	$ 149,230	$ 0.0027000	$ 149,230		$ 0.0031587	$ 174,582
51	**Private Outdoor Lighting (lamp)**			$0.0007788	**$ 87,086**							
52	9500 L HPS	lamp	12,232	$0.1107400	$ 1,355							
53	28000 L HPS	lamp	7,946	$0.2468800	$ 1,962							
54	7000 L Mercury	lamp	272,640	$0.2129700	$ 58,064							
55	21000 L Mercury	lamp	52,552	$0.3960400	$ 20,813							
56	2500 L Incand.	lamp	64	$0.2630200	$ 17							
57	7000 L Fluor.	lamp	161	$0.3707200	$ 60							
58	4000 L PT Mercury	lamp	8,138	$0.5918600	$ 4,816							
59	**Private Outdoor Lighting (kWh)**					**0.1%**	**$ 87,086**	**0.1%**	**$ 87,086**	**$ 101,881**	**0.1%**	**$ 101,881**
60	9500 L HPS	kWh	477,059			$ 0.0028889	$ 1,378	$ 0.0028889	$ 1,378		$ 0.0033796	$ 1,612
61	28000 L HPS	kWh	762,861			$ 0.0028889	$ 2,204	$ 0.0028889	$ 2,204		$ 0.0033796	$ 2,578
62	7000 L Mercury	kWh	20,448,028			$ 0.0028889	$ 59,071	$ 0.0028889	$ 59,071		$ 0.0033796	$ 69,107
63	21000 L Mercury	kWh	8,093,009			$ 0.0028889	$ 23,380	$ 0.0028889	$ 23,380		$ 0.0033796	$ 27,351
64	2500 L Incand.	kWh	4,087			$ 0.0028889	$ 12	$ 0.0028889	$ 12		$ 0.0033796	$ 14
65	7000 L Fluor.	kWh	10,640			$ 0.0028889	$ 31	$ 0.0028889	$ 31		$ 0.0033796	$ 36
66	4000 L PT Mercury	kWh	349,929			$ 0.0028889	$ 1,011	$ 0.0028889	$ 1,011		$ 0.0033796	$ 1,183

[1] Exhibit RJA-2

[2] Residential/Residential Heating (Summer): Sum Col (F) / Sum Col (D), Lines 7 thru 11

[2] Residential Heating (Winter): Residential Heating (Summer) * (1 - Residential Heating Discount)

[2] Secondary (kW): Sum Col (F) / Sum Col (D), Lines 16, 17, 28, 29

[2] Secondary (kWh): Sum Col (F) / Sum Col (D), Lines 18 thru 20, 30 thru 32

[2] Secondary (Max Charge): Sum Col (F) / Sum Col (D) * 2, Lines 16 thru 20, 28 thru 32

[2] Primary (kW): Sum Col (F) / Sum Col (D), Lines 35, 41

[2] Primary (kWh): Sum Col (F) / Sum Col (D), Lines 36, 42

[2] Primary (Max Charge): Sum Col (F) / Sum Col (D) * 2.5, Lines 35, 36, 41, 42

[2] Private Outdoor Lighting: Col (G) Line 59 / Sum (C), Lines 60-66

[3] Residential/Residential Heating: Col (F) * Col (H), Line 6

[3] Secondary: Col (F) * Col (H), Line 15

[3] Primary: Col (F) * Col (H), Line 34

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Reliable Electricity Rider
Proposed Rates

Line	Tariff Class/Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
		Page 1, Col (K)	Col (C) * Page 4, Col (D), Line 1	Col (D) * Page 4, Col (E), Line 1	Col (E) * Page 4, Col (F), Line 1	Col (F) * Page 4, Col (G), Line 1	Col (G) * Page 4, Col (H), Line 1	Col (H) * Page 4, Col (I), Line 1	Col (I) * Page 4, Col (J), Line 1	Col (J) * Page 4, Col (K), Line 1	Col (K) * Page 4, Col (L), Line 1
			2018 - 2026 Based on Current Projections - Will Be Updated Annually								
1	Residential Non-Heating										
2	All kWh	$ 0.0110659	$ 0.0089040	$ 0.0058587	$ 0.0011834	$ (0.0045873)	$ (0.0079925)	$ (0.0120630)	$ (0.0175071)	$ (0.0101388)	$ (0.0133348)
3	Residential Heating										
4	All kWh (S)	$ 0.0110659	$ 0.0089040	$ 0.0058587	$ 0.0011834	$ (0.0045873)	$ (0.0079925)	$ (0.0120630)	$ (0.0175071)	$ (0.0101388)	$ (0.0133348)
5	All kWh (W)	$ 0.0093761	$ 0.0075443	$ 0.0049640	$ 0.0010027	$ (0.0038868)	$ (0.0067720)	$ (0.0102209)	$ (0.0148336)	$ (0.0085905)	$ (0.0112984)
6	Secondary										
7	All kW	$ 1.1303954	$ 0.9095540	$ 0.5984693	$ 0.1208859	$ (0.4686008)	$ (0.8164436)	$ (1.2322486)	$ (1.7883690)	$ (1.0356906)	$ (1.3621620)
8	All kWh	$ 0.0060179	$ 0.0048422	$ 0.0031861	$ 0.0006436	$ (0.0024947)	$ (0.0043465)	$ (0.0065602)	$ (0.0095208)	$ (0.0055138)	$ (0.0072518)
9	Max Charge	$ 0.0193858	$ 0.0155985	$ 0.0102635	$ 0.0020731	$ (0.0080363)	$ (0.0140017)	$ (0.0211326)	$ (0.0306698)	$ (0.0177617)	$ (0.0233605)
10	Primary										
11	All kW	$ 1.6543757	$ 1.3311661	$ 0.8758821	$ 0.1769210	$ (0.6858146)	$ (1.1948955)	$ (1.8034416)	$ (2.6173445)	$ (1.5157718)	$ (1.9935747)
12	All kWh	$ 0.0040000	$ 0.0032185	$ 0.0021177	$ 0.0004278	$ (0.0016582)	$ (0.0028890)	$ (0.0043604)	$ (0.0063283)	$ (0.0036649)	$ (0.0048201)
13	Max Charge	$ 0.0188246	$ 0.0151469	$ 0.0099664	$ 0.0020131	$ (0.0078037)	$ (0.0135964)	$ (0.0205208)	$ (0.0297820)	$ (0.0172475)	$ (0.0226843)
14	Primary Substation										
15	All kW	$ 1.7657060	$ 1.4207463	$ 0.9348241	$ 0.1888268	$ (0.7319662)	$ (1.2753054)	$ (1.9248033)	$ (2.7934774)	$ (1.6177748)	$ (2.1277313)
16	All kWh	$ 0.0038000	$ 0.0030576	$ 0.0020119	$ 0.0004064	$ (0.0015753)	$ (0.0027446)	$ (0.0041424)	$ (0.0060119)	$ (0.0034817)	$ (0.0045791)
17	High Voltage										
18	All kW	$ 1.8011406	$ 1.4492581	$ 0.9535844	$ 0.1926162	$ (0.7466554)	$ (1.3008985)	$ (1.9634306)	$ (2.8495375)	$ (1.6502407)	$ (2.1704311)
19	All kWh	$ 0.0039163	$ 0.0031512	$ 0.0020734	$ 0.0004188	$ (0.0016235)	$ (0.0028286)	$ (0.0042692)	$ (0.0061959)	$ (0.0035882)	$ (0.0047193)
20	Street Lighting										
21	All kWh	$ 0.0031587	$ 0.0025416	$ 0.0016723	$ 0.0003378	$ (0.0013094)	$ (0.0022814)	$ (0.0034433)	$ (0.0049973)	$ (0.0028941)	$ (0.0038063)
22	Private Outdoor Lighting (kWh)										
23	9500 L HPS	$ 0.0033796	$ 0.0027194	$ 0.0017893	$ 0.0003614	$ (0.0014010)	$ (0.0024410)	$ (0.0036842)	$ (0.0053468)	$ (0.0030965)	$ (0.0040726)
24	28000 L HPS	$ 0.0033796	$ 0.0027194	$ 0.0017893	$ 0.0003614	$ (0.0014010)	$ (0.0024410)	$ (0.0036842)	$ (0.0053468)	$ (0.0030965)	$ (0.0040726)
25	7000 L Mercury	$ 0.0033796	$ 0.0027194	$ 0.0017893	$ 0.0003614	$ (0.0014010)	$ (0.0024410)	$ (0.0036842)	$ (0.0053468)	$ (0.0030965)	$ (0.0040726)
26	21000 L Mercury	$ 0.0033796	$ 0.0027194	$ 0.0017893	$ 0.0003614	$ (0.0014010)	$ (0.0024410)	$ (0.0036842)	$ (0.0053468)	$ (0.0030965)	$ (0.0040726)
27	2500 L Incand.	$ 0.0033796	$ 0.0027194	$ 0.0017893	$ 0.0003614	$ (0.0014010)	$ (0.0024410)	$ (0.0036842)	$ (0.0053468)	$ (0.0030965)	$ (0.0040726)
28	7000 L Fluor.	$ 0.0033796	$ 0.0027194	$ 0.0017893	$ 0.0003614	$ (0.0014010)	$ (0.0024410)	$ (0.0036842)	$ (0.0053468)	$ (0.0030965)	$ (0.0040726)
29	4000 L PT Mercury	$ 0.0033796	$ 0.0027194	$ 0.0017893	$ 0.0003614	$ (0.0014010)	$ (0.0024410)	$ (0.0036842)	$ (0.0053468)	$ (0.0030965)	$ (0.0040726)

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Reliable Electricity Rider
Distribution Sales Forecast - Condensed from Exhibit RJA-2

Line	Tariff Class/Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
			2018 - 2026 Based on Current Projections - Will Be Updated Annually								
1	Residential Non-Heating										
2	All kWh	3,542,148,553	3,545,867,271	3,534,909,285	3,515,681,059	3,497,198,798	3,508,346,872	3,523,221,742	3,543,490,280	3,548,325,799	3,548,325,799
3	Residential Heating										
4	All kWh (S)	547,561,852	548,136,709	546,442,772	543,470,383	540,613,309	542,336,630	544,636,058	547,769,263	548,516,759	548,516,759
5	All kWh (W)	1,301,136,793	1,302,502,789	1,298,477,593	1,291,414,492	1,284,625,406	1,288,720,427	1,294,184,410	1,301,629,649	1,303,405,880	1,303,405,880
6	Secondary										
7	All kW	13,133,191	13,146,979	13,106,350	13,035,057	12,966,531	13,007,864	13,063,016	13,138,165	13,156,094	13,156,094
8	All kWh	4,039,674,288	4,043,915,331	4,031,418,201	4,009,489,201	3,988,410,945	4,001,124,866	4,018,089,039	4,041,204,471	4,046,719,180	4,046,719,180
9	Max Charge	40,378,241	40,420,632	40,295,718	40,076,528	39,865,843	39,992,923	40,162,487	40,393,535	40,448,658	40,448,658
10	Primary										
11	All kW	6,100,941	6,107,346	6,088,472	6,055,354	6,023,520	6,042,721	6,068,341	6,103,252	6,111,580	6,111,580
12	All kWh	2,859,367,678	2,862,369,580	2,853,523,843	2,838,002,030	2,823,082,390	2,832,081,574	2,844,089,179	2,860,450,776	2,864,354,205	2,864,354,205
13	Max Charge	3,758,822	3,762,768	3,751,140	3,730,736	3,711,123	3,722,953	3,738,737	3,760,246	3,765,377	3,765,377
14	Primary Substation										
15	All kW	1,117,795	1,118,968	1,115,510	1,109,443	1,103,610	1,107,128	1,111,822	1,118,218	1,119,744	1,119,744
16	All kWh	640,739,483	641,412,162	639,429,971	635,951,776	632,608,518	634,625,094	637,315,811	640,982,188	641,856,885	641,856,885
17	High Voltage										
18	All kW	1,853,880	1,855,826	1,850,091	1,840,028	1,830,354	1,836,189	1,843,974	1,854,582	1,857,113	1,857,113
19	All kWh	971,373,227	972,393,021	969,387,982	964,114,972	959,046,530	962,103,698	966,182,875	971,741,172	973,067,230	973,067,230
20	Street Lighting										
21	All kWh	55,270,421	55,328,447	55,157,462	54,857,432	54,569,041	54,742,992	54,975,094	55,291,357	55,366,809	55,366,809
22	Private Outdoor Lighting (kWh)										
23	9500 L HPS	477,059	477,560	476,084	473,494	471,005	472,506	474,510	477,240	477,891	477,891
24	28000 L HPS	762,861	763,661	761,301	757,160	753,180	755,581	758,784	763,150	764,191	764,191
25	7000 L Mercury	20,448,028	20,469,495	20,406,237	20,295,237	20,188,543	20,252,898	20,338,768	20,455,773	20,483,688	20,483,688
26	21000 L Mercury	8,093,009	8,101,506	8,076,469	8,032,537	7,990,309	8,015,780	8,049,766	8,096,075	8,107,123	8,107,123
27	2500 L Incand.	4,087	4,092	4,079	4,057	4,036	4,048	4,066	4,089	4,095	4,095
28	7000 L Fluor.	10,640	10,651	10,618	10,561	10,505	10,539	10,583	10,644	10,659	10,659
29	4000 L PT Mercury	349,929	350,296	349,214	347,314	345,488	346,589	348,059	350,061	350,539	350,539
30											
31	Total kWh	14,031,554,971	14,046,285,971	14,002,877,969	13,926,708,969	13,853,494,969	13,897,655,970	13,956,579,968	14,036,869,969	14,056,024,968	14,056,024,968
32	Total kW	22,205,806	22,229,119	22,160,423	22,039,881	21,924,015	21,993,903	22,087,154	22,214,218	22,244,532	22,244,532

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Reliable Electricity Rider
Ratio of Previous and Current Years' Revenue Requirements

Line	Tariff Class/Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
		Page 1, Col (E)	Page 2, Col (C) * Page 3, Col (D)	Page 2, Col (D) * Page 3, Col (E)	Page 2, Col (E) * Page 3, Col (F)	Page 2, Col (F) * Page 3, Col (G)	Page 2, Col (G) * Page 3, Col (H)	Page 2, Col (H) * Page 3, Col (I)	Page 2, Col (I) * Page 3, Col (J)	Page 2, Col (J) * Page 3, Col (K)	Page 2, Col (K) * Page 3, Col (L)
			2018 - 2026 Based on Current Projections - Will Be Updated Annually								
1	Revenue Requirement Ratio (Line 2 / Line 4)	117%	80%	66%	20%	-388%	174%	151%	145%	58%	132%
2	Revenue Requirement per Year	$ 130,824,709	$ 105,376,459	$ 69,121,443	$ 13,886,019	$ (53,544,633)	$ (93,588,252)	$ (141,850,520)	$ (207,052,756)	$ (120,073,224)	$ (157,922,817)
3											
4	Total Revenue Under Prior Year Rates (Sum Lines 6 thru 33)	$ 111,826,908	$ 130,962,055	$ 105,050,808	$ 68,745,455	$ 13,813,019	$ (53,715,318)	$ (93,985,052)	$ (142,666,564)	$ (207,335,304)	$ (120,073,224)
5	Residential Non-Heating										
6	All kWh	$ 34,426,745	$ 39,238,364	$ 31,474,932	$ 20,597,258	$ 4,138,605	$ (16,093,984)	$ (28,159,452)	$ (42,745,225)	$ (62,121,032)	$ (35,975,893)
7	Residential Heating										
8	All kWh (S)	$ 5,275,209	$ 6,065,649	$ 4,865,542	$ 3,184,020	$ 639,765	$ (2,487,883)	$ (4,353,019)	$ (6,607,756)	$ (9,602,959)	$ (5,561,321)
9	All kWh (W)	$ 9,410,560	$ 12,212,339	$ 9,796,090	$ 6,410,580	$ 1,288,077	$ (5,009,006)	$ (8,764,197)	$ (13,303,795)	$ (19,334,218)	$ (11,196,945)
10	Secondary										
11	All kW	$ 12,563,260	$ 14,861,284	$ 11,920,933	$ 7,801,082	$ 1,567,471	$ (6,095,495)	$ (10,665,215)	$ (16,189,485)	$ (23,527,951)	$ (13,625,643)
12	All kWh	$ 20,572,934	$ 24,336,057	$ 19,521,093	$ 12,774,642	$ 2,566,808	$ (9,981,663)	$ (17,464,796)	$ (26,511,051)	$ (38,528,136)	$ (22,312,638)
13	Max Charge	$ 1,003,036	$ 783,588	$ 628,553	$ 411,326	$ 82,648	$ (321,396)	$ (562,343)	$ (853,620)	$ (1,240,553)	$ (718,436)
14	Primary										
15	All kW	$ 8,611,937	$ 10,103,844	$ 8,104,767	$ 5,303,776	$ 1,065,687	$ (4,144,187)	$ (7,251,034)	$ (11,006,858)	$ (15,996,111)	$ (9,263,761)
16	All kWh	$ 9,758,809	$ 11,449,397	$ 9,184,099	$ 6,010,092	$ 1,207,607	$ (4,696,078)	$ (8,216,672)	$ (12,472,667)	$ (18,126,351)	$ (10,497,438)
17	Max Charge	$ 93,789	$ 70,833	$ 56,818	$ 37,182	$ 7,471	$ (29,053)	$ (50,833)	$ (77,163)	$ (112,140)	$ (64,943)
18	Primary Substation										
19	All kW	$ 1,687,085	$ 1,975,769	$ 1,584,857	$ 1,037,134	$ 208,391	$ (810,380)	$ (1,417,913)	$ (2,152,350)	$ (3,127,980)	$ (1,811,494)
20	All kWh	$ 2,081,250	$ 2,437,381	$ 1,955,138	$ 1,279,446	$ 257,079	$ (999,715)	$ (1,749,189)	$ (2,655,218)	$ (3,858,790)	$ (2,234,725)
21	High Voltage										
22	All kW	$ 2,854,209	$ 3,342,604	$ 2,681,260	$ 1,754,622	$ 352,556	$ (1,371,001)	$ (2,398,823)	$ (3,641,344)	$ (5,291,913)	$ (3,064,684)
23	All kWh	$ 3,251,769	$ 3,808,192	$ 3,054,730	$ 1,999,021	$ 401,663	$ (1,561,966)	$ (2,732,953)	$ (4,148,543)	$ (6,029,019)	$ (3,491,560)
24	Street Lighting										
25	All kWh	$ 149,230	$ 174,766	$ 140,188	$ 91,739	$ 18,433	$ (71,682)	$ (125,421)	$ (190,385)	$ (276,684)	$ (160,235)
26	Private Outdoor Lighting (kWh)										
27	9500 L HPS	$ 1,378	$ 1,614	$ 1,295	$ 847	$ 170	$ (662)	$ (1,158)	$ (1,758)	$ (2,555)	$ (1,480)
28	28000 L HPS	$ 2,204	$ 2,581	$ 2,070	$ 1,355	$ 272	$ (1,059)	$ (1,852)	$ (2,812)	$ (4,086)	$ (2,366)
29	7000 L Mercury	$ 59,071	$ 69,179	$ 55,492	$ 36,314	$ 7,297	$ (28,375)	$ (49,647)	$ (75,362)	$ (109,523)	$ (63,427)
30	21000 L Mercury	$ 23,380	$ 27,380	$ 21,963	$ 14,373	$ 2,888	$ (11,230)	$ (19,649)	$ (29,827)	$ (43,347)	$ (25,104)
31	2500 L Incand.	$ 12	$ 14	$ 11	$ 7	$ 1	$ (6)	$ (10)	$ (15)	$ (22)	$ (13)
32	7000 L Fluor.	$ 31	$ 36	$ 29	$ 19	$ 4	$ (15)	$ (26)	$ (39)	$ (57)	$ (33)
33	4000 L PT Mercury	$ 1,011	$ 1,184	$ 950	$ 621	$ 125	$ (486)	$ (850)	$ (1,290)	$ (1,874)	$ (1,085)

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Reliable Electricity Rider
Annual Revenue Based on Proposed Rates

Line	Tariff Class/Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
		Page 2 * Page 3	Page 2 * Page 3	Page 2 * Page 3	Page 2 * Page 3	Page 2 * Page 3	Page 2 * Page 3	Page 2 * Page 3	Page 2 * Page 3	Page 2 * Page 3	Page 2 * Page 3
			2018 - 2026 Based on Current Projections - Will Be Updated Annually								
1	Total Revenue (Sum Lines 3 thru 30)	$ 130,824,709	$ 105,376,459	$ 69,121,443	$ 13,886,019	$ (53,544,633)	$ (93,588,252)	$ (141,850,520)	$ (207,052,756)	$ (120,073,224)	$ (157,922,817)
2	Residential Non-Heating										
3	All kWh	$ 39,197,213	$ 31,572,502	$ 20,709,910	$ 4,160,477	$ (16,042,844)	$ (28,040,564)	$ (42,500,725)	$ (62,036,376)	$ (35,975,893)	$ (47,316,247)
4	Residential Heating										
5	All kWh (S)	$ 6,059,288	$ 4,880,625	$ 3,201,434	$ 643,146	$ (2,479,978)	$ (4,334,641)	$ (6,569,960)	$ (9,589,873)	$ (5,561,321)	$ (7,314,366)
6	All kWh (W)	$ 12,199,531	$ 9,826,457	$ 6,445,642	$ 1,294,885	$ (4,993,089)	$ (8,727,195)	$ (13,227,699)	$ (19,307,870)	$ (11,196,945)	$ (14,726,456)
7	Secondary										
8	All kW	$ 14,845,698	$ 11,957,887	$ 7,843,748	$ 1,575,755	$ (6,076,126)	$ (10,620,187)	$ (16,096,883)	$ (23,495,888)	$ (13,625,643)	$ (17,920,731)
9	All kWh	$ 24,310,535	$ 19,581,607	$ 12,844,510	$ 2,580,373	$ (9,949,945)	$ (17,391,061)	$ (26,359,409)	$ (38,475,631)	$ (22,312,638)	$ (29,346,048)
10	Max Charge	$ 782,766	$ 630,501	$ 413,576	$ 83,084	$ (320,375)	$ (559,968)	$ (848,737)	$ (1,238,863)	$ (718,436)	$ (944,903)
11	Primary										
12	All kW	$ 10,093,248	$ 8,129,892	$ 5,332,784	$ 1,071,319	$ (4,131,018)	$ (7,220,421)	$ (10,943,899)	$ (15,974,312)	$ (9,263,761)	$ (12,183,892)
13	All kWh	$ 11,437,390	$ 9,212,569	$ 6,042,963	$ 1,213,989	$ (4,681,156)	$ (8,181,981)	$ (12,401,324)	$ (18,101,650)	$ (10,497,438)	$ (13,806,450)
14	Max Charge	$ 70,759	$ 56,994	$ 37,385	$ 7,510	$ (28,960)	$ (50,619)	$ (76,722)	$ (111,988)	$ (64,943)	$ (85,415)
15	Primary Substation										
16	All kW	$ 1,973,697	$ 1,589,770	$ 1,042,806	$ 209,493	$ (807,805)	$ (1,411,927)	$ (2,140,039)	$ (3,123,718)	$ (1,811,494)	$ (2,382,515)
17	All kWh	$ 2,434,825	$ 1,961,198	$ 1,286,444	$ 258,438	$ (996,538)	$ (1,741,804)	$ (2,640,030)	$ (3,853,532)	$ (2,234,725)	$ (2,939,157)
18	High Voltage										
19	All kW	$ 3,339,099	$ 2,689,571	$ 1,764,218	$ 354,419	$ (1,366,644)	$ (2,388,696)	$ (3,620,515)	$ (5,284,702)	$ (3,064,684)	$ (4,030,736)
20	All kWh	$ 3,804,198	$ 3,064,199	$ 2,009,954	$ 403,786	$ (1,557,003)	$ (2,721,415)	$ (4,124,813)	$ (6,020,803)	$ (3,491,560)	$ (4,592,173)
21	Street Lighting										
22	All kWh	$ 174,582	$ 140,622	$ 92,241	$ 18,531	$ (71,454)	$ (124,891)	$ (189,296)	$ (276,307)	$ (160,235)	$ (210,744)
23	Private Outdoor Lighting (kWh)										
24	9500 L HPS	$ 1,612	$ 1,299	$ 852	$ 171	$ (660)	$ (1,153)	$ (1,748)	$ (2,552)	$ (1,480)	$ (1,946)
25	28000 L HPS	$ 2,578	$ 2,077	$ 1,362	$ 274	$ (1,055)	$ (1,844)	$ (2,795)	$ (4,080)	$ (2,366)	$ (3,112)
26	7000 L Mercury	$ 69,107	$ 55,664	$ 36,513	$ 7,335	$ (28,284)	$ (49,437)	$ (74,931)	$ (109,374)	$ (63,427)	$ (83,421)
27	21000 L Mercury	$ 27,351	$ 22,031	$ 14,451	$ 2,903	$ (11,195)	$ (19,566)	$ (29,657)	$ (43,288)	$ (25,104)	$ (33,017)
28	2500 L Incand.	$ 14	$ 11	$ 7	$ 1	$ (6)	$ (10)	$ (15)	$ (22)	$ (13)	$ (17)
29	7000 L Fluor.	$ 36	$ 29	$ 19	$ 4	$ (15)	$ (26)	$ (39)	$ (57)	$ (33)	$ (43)
30	4000 L PT Mercury	$ 1,183	$ 953	$ 625	$ 126	$ (484)	$ (846)	$ (1,282)	$ (1,872)	$ (1,085)	$ (1,428)

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Reliable Electricity Rider
Calculation of Private Outdoor Lighting Charges

Line	Description	kWh/Fixture		2017 RER		2017 RER Charge/Fixture/Month
				$/kWh		$/Fixture/Month
(A)	(B)	(C)		(D)		(E)
						(E) = (C) * (D)
1	**Private Outdoor Lighting**					
2	9,500 Lumens High Pressure Sodium (HPS)	39	$	0.0033796	$	0.1318057
3	28,000 Lumens High Pressure Sodium (HPS)	96	$	0.0033796	$	0.3244448
4	7,000 Lumens Mercury	75	$	0.0033796	$	0.2534725
5	21,000 Lumens Mercury	154	$	0.0033796	$	0.5204636
6	2,500 Lumens Incandescent	64	$	0.0033796	$	0.2162966
7	7,000 Lumens Fluorescent	66	$	0.0033796	$	0.2230558
8	4,000 Lumens PT Mercury	43	$	0.0033796	$	0.1453243

BEFORE THE

PUBLIC UTILITIES COMMISSION OF OHIO

THE DAYTON POWER AND LIGHT COMPANY

CASE NO. 16-0395-EL-SSO
CASE NO. 16-0397-EL-AAM
CASE NO. 16-0396-EL-ATA

DIRECT TESTIMONY
OF KEVIN L. HALL

- □ **MANAGEMENT POLICIES, PRACTICES, AND ORGANIZATION**
- □ **OPERATING INCOME**
- □ **RATE BASE**
- □ **ALLOCATIONS**
- □ **RATE OF RETURN**
- □ **RATES AND TARIFFS**
- ■ **OTHER**

BEFORE THE

PUBLIC UTILITIES COMMISSION OF OHIO

DIRECT TESTIMONY OF

KEVIN L. HALL

ON BEHALF OF
THE DAYTON POWER AND LIGHT COMPANY

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Kevin L. Hall. My business address is 1900 Dryden Rd., Dayton, Ohio 45439.

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

A. I am employed by AES U.S. Services, LLC ("AES Services"), an affiliate of The Dayton Power & Light Company ("DP&L"), as Director of Transmission and Distribution Engineering.

Q. How long have you been in your present position?

A. I assumed my present position in July of 2013. Prior to that time, I was Director of Operations for DP&L with responsibility for distribution engineering, drafting, real estate services, facilities and telecommunications.

Q. What are your responsibilities in your current position?

A. In my current position, I am responsible for the safe and economic design of the distribution systems for both The Dayton Power & Light Company and the Indianapolis Power & Light Company. Additionally, I am responsible for the drafting, real estate, and right-of-way functions of both companies. Specific to Dayton Power & Light, I have responsibility for the distribution planning and transmission engineering functions, along with budgeting oversight for both capital and Operations and Maintenance ("O&M") activities within the DP&L Customer Operations organization.

Q. Will you describe briefly your educational and business background?

A. I earned a Bachelor of Science degree in Electrical Engineering from the University of Cincinnati in 1991 and a Masters in Business Administration from the University of Dayton in 2005. I am a Senior Member of the Institute of Electrical and Electronics Engineers ("IEEE") and am a registered Professional Engineer ("P.E.") in the states of Ohio and Indiana.

Since June 1991, I have been continuously employed by DP&L or its affiliate(s). From 1991 through 1995, I was assigned to the substation and transmission maintenance and construction groups as a maintenance engineer, project manager and finally a group leader. In 1996, I was promoted to Manager of System Operating and had the responsibility of leading the real-time grid operations team through wholesale transmission access change.

Between 1999 and 2003 I was Manager of Control Area Services, responsible for the start-up of processes and systems that supported both wholesale and retail settlements in the context of retail choice within the State of Ohio.

During 2004, I led the Company's integration into the PJM Regional Transmission Organization ("RTO"). Also in 2004, I was a member of the North American Electric Reliability Corporation ("NERC") Readiness Audit Team that conducted a Control Area Readiness Audit on FirstEnergy. In 2005, I was promoted to Director of Design Engineering, with responsibility for the design and engineering of the Company's distribution facilities. During the time period from 2007 through 2009, I was a member of the project team responsible for the development of DP&L's smart grid plan which was included as part of Case No. 08-1094-EL-SSO.

Q. Have you previously provided testimony before the Public Utilities Commission of Ohio ("PUCO" or the "Commission"), any other state utilities commission, or the Federal Energy Regulatory Commission ("FERC")?

A. Yes. I sponsored testimony before the PUCO in several cases, including Case No. 08-1094-EL-SSO and most recently Case No. 15-1830-EL-AIR. I have also provided written testimony before the FERC on DP&L's Open Access Transmission Tariff.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of this testimony?

A. The purpose of this testimony is to support and explain DP&L's request for a Distribution Investment Rider ("DIR"). I will provide an overview of the DIR plan and outline some of the specific projects proposed along with their estimated costs.

Q. Are you supporting any exhibits or workpapers?

A. I am not supporting any exhibits. I am supporting the following workpaper:

- Confidential Workpaper KLH-1 (DIR Project Estimates)

III. OVERVIEW OF DP&L'S DISTRIBUTION INVESTMENT RIDER

Q. Please describe the proposed Distribution Investment Rider ("DIR").

A. DP&L is proposing a Distribution Investment Rider as a mechanism to implement incremental capital investment as well as the O&M necessary to address its aging distribution infrastructure along with supporting additional key technical resources for the future of DP&L. This DIR represents DP&L's infrastructure modernization plan consistent with Ohio Revised Code 4928.143(B)(2)(h) and O.A.C. 4901:1-35-03(C)(9)(g) as part of its Electric Security Plan ("ESP"). The proposed DIR is a balanced approach to addressing specific infrastructure needs and vulnerabilities while continuing to provide safe and affordable energy delivery to its customers. Company Witness Adams explains how the DIR will work from a revenue requirement and rate perspective and how adjustments will be made.

Q. How has DP&L's distribution infrastructure performed, as measured by the Company's PUCO approved reliability standards?

A. DP&L has performed well. DP&L's distribution system consistently exceeds the CAIDI and SAIFI reliability standards approved by the Commission pursuant to Ohio Adm. Code Section 4901:1-10-10(B)(2).

Q. Does DP&L measure or attempt to quantify customer expectations as it relates to the Company's reliability standards?

A. Yes. As required by Ohio Adm. Code Section 4901:1-10-10(B)(4)(b), the Company performs a customer perception survey under PUCO Staff oversight. The objective of the survey is to measure customer perceptions, including, but not limited to expectations and achievements of electric service reliability.

Q. Can you describe briefly the results of DP&L's latest residential customer perception survey as it pertains to sustained outages experienced?

A. Yes. The results of the survey indicated that 45% of the residential sample did not experience a sustained outage over the survey period. This measure outperforms the 25% of residential respondents who indicated that zero sustained outages was acceptable. This result illustrates that the Company's performance is in line with customer expectation.

Q. What are the goals for DP&L's Distribution Investment Rider?

A. DP&L, along with other utilities across the nation, has assets that make up its delivery system infrastructure that are in excess of 30 years of age. Typical electric distribution infrastructure is designed for a useful life of approximately 30 years. However, it is nearly impossible, either operationally or financially, to proactively address all aging infrastructure. An asset performing within design specifications in the field and preventatively maintained can outlast its design life. Proactively replacing such an asset would be premature unless the asset owner had an indication that its near-term performance and life was at risk.

An asset remains in service until it experiences a failure, requires forced maintenance or repair, or a preventive maintenance activity indicates replacement is necessary. The risk in this, particularly with the older assets, is that they may fail and require replacement before giving any indication of possible problem. The older the assets get, the higher the probability of failure without sufficient indication or warning. As the overall infrastructure ages, there is a higher probability of failures across the system. This could certainly have a negative impact on reliability which will translate into both poorer customer satisfaction as well as declining reliability metrics, including SAIFI and CAIDI.

Q. What is DP&L’s approach to defining the content of its proposed DIR?

A. The DIR is designed to address three areas of growing risk that are concerns today across the utility industry.

1. Equipment or conditions with industry-wide known failure risks;
2. Technology migration; and

3. Workforce adaptation.

The primary objective of the DIR is to make specific investments in the distribution system to replace assets at greatest risk of failure and to augment technical resources in such a way as to improve safety while maintaining and enhancing reliability and customer satisfaction. The systematic and focused approach that DP&L has developed for the DIR addresses the areas of greatest risk for the reliable operation of its distribution system. This includes developing a methodology for identification and replacement in order to prioritize the types of and locations of assets to replace.

Q. What methodology will DP&L use to prioritize the DIR investments?

A. DP&L is proposing its DIR to place a strong focus on equipment that has known industry-wide failure modes as well as replacement of older assets where the distribution system can benefit from newer technologies or replacement of technical obsolescence. DP&L will review asset performance and operating trends both within the utility itself as well as across the entire industry. Specifically, there are industry-wide equipment problems where products are known to be pre-disposed to certain modes of failure or have identified design concerns, which can result in certain types of equipment failure. There are also assets with older technology where the operation of the asset is more prone to failure or operates ineffectively due to the type of technology and design of the asset.

DP&L is proposing its DIR to place a strong focus on equipment that has known industry-wide failure modes as well as replacement of older assets where the distribution system can benefit from newer technologies or replacement of technical obsolescence. While there are no guarantees that there will be improvement in specific reliability metrics or increased customer satisfaction scores with the replacement of aging infrastructure, DP&L's goal with this program is to prevent additional outages and the erosion of reliability and/or customer satisfaction. Both would be sure to suffer should the Company not take action on these identified assets.

Additionally, DP&L is proposing a human resource aspect to its DIR. Presently, the entire industry is facing the loss of highly skilled, technical talent due to the "aging" of its workforce. The types of positions and skills required to fill these roles takes a combination of both post-secondary education as well as many years of training, both formal and on-the-job. Replacing employees in these specific jobs on a one-for-one basis will not be enough to ensure DP&L has the highly trained and competent workforce prepared to operate and maintain the distribution infrastructure going forward. Therefore, as part of its DIR, DP&L is proposing a "Workforce Adaptation" plan to hire and train the anticipated number of employees to fill these imminent future vacancies. Hiring in groups promotes efficiencies in training and more easily facilitates transition of institutional knowledge.

Q. Please describe the first part of the DIR program, "Equipment or conditions with industry-wide known failure risks."

A. The first area of growing risk for DP&L's distribution system is equipment or conditions with industry-wide known failure risks. This includes assets or field conditions that have demonstrated a specific at-risk condition that has contributed to equipment failure and/or outages over an extended period of time.

Q. Please provide examples of equipment or conditions with industry-wide known failure risks.

A. A specific example is underground cable with a bare concentric neutral. This type of cable has been widely observed across the industry to experience deterioration of the neutral due to exposure directly to the earth. Such deterioration ultimately results in a fault or failure of the cable, which necessitates repairing or replacing the cable.

A second example is danger trees. Danger trees are trees located outside of the right-of-way or easement that have experienced disease and decay so that environmental conditions such as wind and storms places the tree at risk of falling into nearby power lines. Wide-spread diseases including the emerald ash borer and the elm bark beetle are making danger trees a significant concern across the industry. Trees outside of the right-of-way are not managed within the scope of the typical utility vegetation management program. DP&L addresses trees outside of the right-of-way where such tree poses an imminent danger to its distribution system. However, with the tree diseases mentioned above, the number of danger trees continues to grow and the number of outages caused by danger trees is increasing.

Other examples of such equipment include porcelain cut-outs, a family of network protectors, certain types of transformer bushings and some older design substation transformers.

Q. What specific projects or programs are being proposed as part of Equipment or Conditions with Industry-Wide Known Failure Risks?

A. Capital projects proposed as part of this program include replacement of underground cable having the bare concentric neutral technology, network protector replacements and cutout replacements. O&M activities that are proposed as part of this plan include danger tree removals and replacement of bushings in substation transformers. A total of [redacted] in capital and [redacted] in O&M is proposed over a five-year period within this category.

Q. Please describe the second part of the DIR program, "Technology Migration."

A. Technology Migration is the second area of identified risk for DP&L's aging infrastructure. This portion of the DIR program will include replacement of outdated, and/or inefficient equipment or equipment that is prone to operational problems with technology that is more efficient and reliable. An example of Technology Migration is the conversion of DP&L's 4kV system to a standard 12kV configuration. The 4kV system was installed over 50 years ago and the design is less efficient than a 12kV system. Conversion of the 4kV system will provide benefits such as lower line losses.

Q. What specific projects or programs are being proposed as part of Technology Migration?

A. There are three primary projects proposed: conversion of the 4kV system to 12kV, replacement of electromechanical relays with digital relays, and upgrading substation remote terminal units ("RTUs"). The proposed capital investment totals [redacted] over the planned five-year period.

Q. Please describe the third part of the DIR, "Workforce Adaptation."

A. Workforce Adaptation refers to the need for a workforce in the future that can install, maintain and repair a utility's more technically advanced and complex distribution system. It is no secret that the industry is experiencing an aging workforce and DP&L is no exception. An analysis of current staffing reveals that retirements could leave large gaps of engineering and technical knowledge, particularly if DP&L replaces those employees on a one-by-one basis. Formal training for many of the engineering and technician positions spans three to five years and longer, in some cases.

Additionally, the installation of equipment with newer technology will require additional technical skills that today's workforce is beginning to learn. The workforce of the future will have stronger and more demanding educational and training requirements than its predecessor. To stave off the impact of the anticipated large departure of technical talent, hiring and training a "class" of engineering and technical talent now is essential to minimize any negative impacts of the loss of institutional knowledge as retirements occur.

Q. What is DP&L proposing for its Workforce Adaptation plan?

A. DP&L is proposing the hiring and formal training of twenty (20) full-time employees to fill engineering and technical positions. These 20 positions will be a combination of engineers, engineering technicians, protection and control specialists and IT-related positions. These identified positions will be a combination of both exempt and union hires. Based on an anticipated five-year formal job-specific training period, DP&L anticipates a total projected cost of [redacted] which includes salaries and costs for training.

IV. <u>CONCLUSION</u>

Q. Please summarize your testimony.

A. This testimony supports DP&L's request for a Distribution Investment Rider. The proposed DIR represents DP&L's infrastructure modernization plan consistent with Ohio Revised Code 4928.143(B)(2)(h) and O.A.C. 4901:1-35-03(C)(9)(g) and consists of a three-part plan that addresses assets and resources in a systematic and focused manner. Implementing this infrastructure modernization plan will reduce the risk associated with aging infrastructure that is an industry-wide area of concern. Continuing to operate older assets that have been identified with potential failure risks could pose a higher likelihood of outages, thereby eroding reliability and customer satisfaction.

The DIR is a five-year plan that includes [redacted] in capital and [redacted] in O&M. The program is focused on three areas that pose significant operational or reliability risk to DP&L and its customers: Equipment or conditions with industry-wide known failure risks, technology migration, and workforce adaptation.

Q. Does this conclude your direct testimony?

A. Yes, it does.

Distribution Investment Rider Project Estimates

	Cost ($000)					
Project	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Category 1. Equipment or Conditions with Industry-Wide Known Failure Risks						
Capital						
Underground Cable with BCN	[redacted]					
Substation Risers with BCN						
Cutout Replacements						
Network Protector Replacements						
Total Capital - Category 1						
O&M						
Danger Trees	[redacted]					
Substation Transformer Bushings						
Total O&M - Category 1						
Category 2. Technology Migration						
Capital						
RTU Upgrades - Distribution substations	[redacted]					
Digital Relays						
4kV System Conversion						
Total Category 2						
Category 3. Workforce Adaptation						
O&M						
New Hires - Labor & Training	[redacted]					
Total Category 3						
Total All Projects						
Capital	[redacted]					
O&M						

BEFORE THE

PUBLIC UTILITIES COMMISSION OF OHIO

THE DAYTON POWER AND LIGHT COMPANY

CASE NO. 16-0395-EL-SSO
CASE NO. 16-0397-EL-AAM
CASE NO. 16-0396-EL-ATA

PUBLIC

DIRECT TESTIMONY
OF DAVID HARRISON

- □ **MANAGEMENT POLICIES, PRACTICES, AND ORGANIZATION**
- □ **OPERATING INCOME**
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I. INTRODUCTION, EXPERIENCE, PURPOSE AND SUMMARY

Q. PLEASE STATE YOUR NAME, CURRENT POSITION, AND BUSINESS ADDRESSES.

A. My name is David Harrison, Jr. I am an economist and a Senior Vice President at NERA Economic Consulting ("NERA"), an international firm of economists specializing in microeconomics. Established in 1961, NERA has earned wide recognition for its work in energy, environmental economics and regulation, antitrust, public utilities regulation, transportation, health care, and international trade. The work is performed by more than 500 professional staff members qualified in economics, statistics, mathematics, computer applications, and business administration. NERA operates in numerous offices across North America, Europe, Asia and Australia. My business address is 200 Clarendon Street, Boston, Massachusetts. I am filing testimony on behalf of The Dayton Power and Light Company ("DP&L").

Q. PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE AND EDUCATIONAL BACKGROUND.

A. Over the more than 25 years I have been at NERA, I have directed numerous studies to evaluate the economic effects of major energy and environmental policies as well as of various types of infrastructure investments, including large energy and transportation facilities. These economic studies have included cost-benefit and cost-effectiveness assessments as well as evaluations of effects on electricity and energy markets, on local and state economies and on the U.S. as a whole. I have testified on the results of these studies in numerous regulatory proceedings, court proceedings, Congressional hearings, other public and private forums, and the media.

Before joining NERA, I was an Associate Professor at the John F. Kennedy School of Government at Harvard University, where I taught economics, regional economic development, energy and environmental policy, and other subjects. I was a member of the Faculty Steering Committee of the Energy and Environmental Policy Center at Harvard University, and a member of the Advisory Board of the Interdisciplinary Program in Health at the Harvard School of Public Health.

I earlier served as a Senior Staff Economist on the President's Council of Economic Advisors, where my areas of responsibility included energy and environment policy, economic development, transportation and other topics. I also have worked at the U.S. Department of Transportation, the U.S. Department of Housing and Urban Development, and the National Bureau of Economic Research.

I have served as a consultant to many public and private organizations in the United States and abroad, including the U.S. Environmental Protection Agency, the U.S. Department of Transportation, the Organization for Economic Cooperation and Development ("OECD", Paris), the European Commission, the Italian Ministry of the Environment, the UK Department for Environment, Food and Rural Affairs ("DEFRA"), the UK Department of Trade and Industry, the Conference Board of Canada, the National Academy of Science, various state and local governments as well as many individual companies and trade associations.

I received a Ph.D. in Economics from Harvard University, where I was a Graduate Prize Fellow. I also hold a B.A. magna cum laude in Economics from Harvard College, where I was a member of Phi Beta Kappa, and a M.Sc. in Economics from the London School of Economics, where I was the Rees Jeffreys Scholar.

My curriculum vitae, which provides information on my experience and publications, is provided in Exhibit DH-1.

Q. PLEASE SUMMARIZE YOUR EXPERIENCE RELATED TO ECONOMIC IMPACT ASSESSMENTS.

A. I have evaluated the economic impacts of many governmental policies and individual projects, both public and private, including major electricity and other energy facilities. I have led more than 50 economic impact studies related to energy and environment policies and infrastructure programs. These studies have involved a wide range of economic models, including those developed by Regional Economic Models, Inc. ("REMI"), the IMPLAN model developed by MIG, Inc., the RIMS model, developed by the U.S. Bureau of Economic Analysis, the National Energy Model System ("NEMS") developed and maintained by the U.S. Department of Energy, and N_{ew}ERA, NERA's proprietary electricity sector and macroeconomic model.

These modeling studies have been developed for numerous areas in the U.S. and abroad, including all 50 U.S. states and the United States as a whole as well as France, Spain, the European Union, the Bahamas, Japan, and countries in Africa and the Middle East. I have presented the results of these economic impact assessments to various regulatory bodies, to Congressional committees, and to the media.

Q. PLEASE SUMMARIZE YOUR EXPERIENCE RELATED TO THE ELECTRICITY SECTOR.

A. Most of the economic impact studies I have done have included the electricity sector. Both the N_{ew}ERA model and the NEMS model include a detailed representation of the electricity sector, and thus the economic impact and other studies I have directed or co-directed using these models involve the electricity sector. Many of the benefit-cost studies I have directed involve specific power plants or the electricity sector. In addition, some of these studies have involved estimating the effects of regulations on electricity cost and reliability using detailed electricity market models for various regions of the United States. My work assisting the European Commission on the implementation of the European cap-and-trade program for carbon dioxide involved a detailed assessment of the implications of the program for the electric sector.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by DP&L to estimate the potential impacts to the Ohio economy if various DP&L electric generating units were to retire in 2017, which I refer to as the "retirement scenario." Collectively referred to as "the Facilities," the Facilities involved in the retirement scenario include the following seven coal-fired power plants: Clifty Creek, Conesville, JM Stuart, Killen, Kyger Creek, Miami Fort, and WH Zimmer. Table 1 provides an overview of these seven plants, including the number of units, location and total capacity.

TABLE 1. DP&L FACILITIES

Plant	Units	County	Capacity
Clifty Creek	6	Jefferson, IN	1,228
Conesville #4	1	Coshocton	775
JM Stuart	4	Adams	2,308
Killen #2	1	Adams	600
Kyger Creek	5	Gallia	1,028
Miami Fort	2	Hamilton	1,020
WH Zimmer	1	Clermont	1,300

Notes and Source: capacity values in megawatts (MW). Information on number of units and capacity from AURORAxmp database, as referenced in the companion testimony of Mr. Eugene Meehan. County is in Ohio unless indicated otherwise.

The economic impacts to Ohio under the retirement scenario are due primarily to two major types of *direct* effects:

1. *Electricity price increases.* If the Facilities were not available to the electricity system, retail electricity prices faced by Ohio consumers—including residential, commercial and industrial customers—would be higher. Higher rates would mean Ohio households have less money to spend on other goods and services and businesses would face higher costs, reducing their competitiveness. The increases in Ohio customer electricity prices depend in part on the availability and cost of the generating units that would provide replacement energy and capacity.
2. *Employment and expenditure changes.* If the Facilities were not available, their employment and expenditures would not add to the local economy and their tax revenues would no longer be available to local and state governments. (For purposes of this proceeding, I exclude Clifty Creek from this portion of the analysis since it is located in Indiana.) On the other hand, the electricity services that replace those lost from the Facilities would have increased expenditures in Ohio that would offset to some extent the reductions in expenditures at the Facilities. Because the direct effects include both gains and losses, I refer to these as "changes" to reflect the fact that my analysis includes both positive and negative direct effects.

These two *direct* impacts—higher Ohio electricity prices and changes in Ohio electricity plant employment and expenditures—in turn will lead to additional economic impacts due to the "multiplier" effects that occur as the initial changes percolate through the economy.

Q. COULD YOU SUMMARIZE YOUR RESULTS?

A. Table 2 summarizes the total estimated net losses to the Ohio economy due to the retirement scenario. These estimates include the direct electricity price and plant employment/expenditure impacts as well as the "multiplier" effects that I have estimated using the REMI model, a state-of-the-art regional economy model that was adapted and calibrated specifically for this project. Economic impacts are measured in terms of reductions in Ohio employment, Ohio gross state product ("GSP"), Ohio disposable personal income, and population. The table shows average annual real impacts over the period from 2017 to 2026 as well as totals over the ten-year period (with the dollar values discounted at a (real) rate of 5 percent and employment and population in terms of total job-years and person-years). Note that the results take into account the positive impacts of expenditures related to replacement generation.[1]

TABLE 2: ESTIMATED OHIO ECONOMIC LOSSES DUE TO THE RETIREMENT SCENARIO

	Ohio Economic Impacts	
Item	**Average**	**Present Value**
Employment (job years)	-18,735	-187,349
Gross State Product (millions of 2015 dollars)	-3,168	-25,322
Personal Income (millions of 2015 dollars)	-1,797	-14,268
Population (person years)	-26,430	-264,301

Source: Calculations using the REMI model as explained in the testimony. Present values of real dollar amounts are calculated using a discount rate of 5% (real) as of January 1, 2017 for values over the period from 2017-2026. The cumulative values for employment and population are for job-years and person-years, respectively.

[1] Replacement generation is measured as the amount that existing facilities ramp up their generation in the retirement scenario, making up for the lost generation provided by the DP&L Facilities in the baseline. Note that this only assumes existing facilities will increase their generation, not that new facilities will be built. For purposes of the economic impact analysis, we only include the change in generation from units in Ohio. The increase in generation sourced from units in Ohio represents approximately 8 percent of total replacement generation.

These results indicate that the retirement of the Facilities—and the various adjustments in the electricity system and the Ohio economy that would result from the retirement scenario—is predicted to lead to an average annual reduction of almost 19,000 jobs per year in Ohio, or a total of about 189,000 job-years over the ten-year period. To put these losses in perspective, the annual average loss in jobs would be equal to about 40 percent of the average annual jobs *growth* projected for the Ohio economy over the period from 2012 to 2022 by the Ohio Bureau of Labor Market Information.[2] In terms of GSP—which measures the value of all final goods and services produced in Ohio and thus is a comprehensive economic impact measure—the retirement of the Facilities would lead to an average loss to the Ohio economy of almost $3.2 billion per year, or a discounted loss of about $25 billion over the ten-year period. Personal income losses are a similar order—about $1.8 billion per year or over $14 billion over the ten-year period. The loss in Ohio population is projected to be about 26,000 per year or about 264,000 person-years over the period.

The retirement scenario also would lead to reductions in government tax revenues in Ohio, losses that would need to be offset by increases in other tax revenues, decreases in government expenditures, or some combination of the two. Table 3 shows estimates of these losses. The estimated total loss in Ohio government revenue averages about $189 million per year. Over the ten-year period from 2017 to 2026, the present value of the estimated loss in annual tax revenues totals approximately $1.5 billion.

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[2] Ohio Bureau of Labor Market Information. *2022 Ohio Job Outlook Employment Projections*. December 2014. http://ohiolmi.com/proj/Projections/Ohio_Job_Outlook_2012-2022.pdf

TABLE 3: ESTIMATED OHIO ECONOMIC TAX REVENUE LOSSES DUE TO THE RETIREMENT SCENARIO (MILLION $2015)

	Ohio Economic Impacts	
Item	**Average**	**Present Value**
Income Tax Revenues (Federal) (millions of 2015 dollars)	-23	-180
Income Tax Revenues (State) (millions of 2015 dollars)	-96	-760
Property Tax Revenues (millions of 2015 dollars)	-31	-238
Sales Tax Revenues (millions of 2015 dollars)	-40	-314
Total	**-189**	**-1,491**

Source: Calculations using the REMI model and other data as explained in the testimony. Values do not sum to total due to rounding. Note that the estimate of the Federal tax loss includes only the small fraction of revenue that would have to be made up by Ohio federal taxpayers. Present values estimates of real dollar amounts are calculated using a discount rate of 5% (real) as of January 1, 2017 for values over the period from 2017-2026.

Q. WHAT SUMMARY CONCLUSIONS DO YOU DRAW FROM THE RESULTS OF YOUR STUDY?

A. The results of my study indicate that the retirement scenario would lead to substantial losses to the Ohio economy. The estimated increases in retail electricity rates would mean less income available to Ohio households to spend on other goods and services and would make Ohio businesses less competitive with those in other states. The loss of the employment and expenditures from the plants and the increased electricity costs would take spending power out of the State economy, effects that are offset in part by increases related to replacement generation. These initial net losses in spending power would be magnified by "multiplier effects" throughout the economy, including the additional losses from the net reductions in supplier payments and employee wages. These multiplier effects mean that *all* sectors of the Ohio economy would be affected, not just those that experience the initial losses from higher electricity costs and losses in plant jobs and expenditures. This includes the Ohio government sector, which would lose local and state revenue that would have to be made up by increasing personal taxes or decreasing government services.

In summary, these estimates mean that the Ohio economy would be much less robust without these seven plants to constrain Ohio retail electricity prices, to provide local employment, and to support other expenditures.

II. OVERVIEW OF ECONOMIC IMPACT METHODOLOGY

A. DEFINITION OF ECONOMIC IMPACT ASSESSMENT AND CATEGORIES OF ECONOMIC IMPACTS

Q. PLEASE PROVIDE A BRIEF SUMMARY OF ECONOMIC IMPACT ANALYSIS AND HOW IT IS USED.

A. An economic impact analysis measures the changes in economic activity in a given region—which could be a city, state or the county as a whole—due to some program or activity. Economic activity can be measured in various ways. The following are the five Ohio economic impact measures used in this study.

- *Employment.* This impact category is sometimes measured in terms of total jobs (including full-time and part-time) and sometimes in terms of full-time equivalents (in which case part-time jobs are converted to full-time equivalents). The REMI model is based on total Ohio jobs.
- *Gross state product ("GSP").* This impact category is a state counterpoint to the nation's gross domestic product ("GDP") and represents the sum of the value added for goods and services produced in Ohio
- *Personal income*. This impact category includes the money paid to Ohio employees in the form of salaries and wages as well as other income received by Ohio residents (e.g., dividends from businesses).
- *Population*. This impact category includes the population of Ohio.

- *Government Revenue*. This impact category includes the taxes paid by Ohio residents, including local and state taxes in Ohio as well as the Ohio share of federal taxes.

Economic impact analysis is used to assess the effects of a particular policy or program on a regional or state economy (and in some cases on the national economy). The assessment typically compares the economy as it would be under the particular policy/program against what it would be without the policy/program, with all other influences on the economy the same.

Q. HOW ARE THE SOURCES OF ECONOMIC IMPACTS MEASURED IN ECONOMIC IMPACT ANALYSIS?

A. The economic impacts of a given project or policy on the regional economy can be classified in various ways, depending on the specific methodology used. One common approach is to group impacts into two broad categories. With respect to my study of the economic impacts of the retirement scenario, these two categories can be summarized as follows.

1. *Direct effects*. Direct effects include the direct impacts on electricity prices faced by various consumers as well as the net direct effects of the loss of the Facilities' employment and expenditures and offsetting gains from replacement generation.
2. *Multiplier effects.* Multiplier effects reflect the subsequent rounds of economic activity that occur as the direct effects percolate through the economy. Key elements include effects of the subsequent rounds of spending for those receiving income from direct expenditures (usually referred to as "indirect" impacts) as well as for employees receiving wages and other income (usually referred to as

"induced" impacts). The relatively simple models—such as the IMPLAN model—are limited to taking a snapshot summary of these multiplier effects at a single point in time. More complex economic impact models—such as REMI—also include dynamic effects on local wage rates, prices, and other economic variables. The REMI model also can model the effects of higher electricity prices, an effect that cannot be modeled using IMPLAN and the simpler models.

B. DATA SOURCES

Q. PLEASE PROVIDE AN OVERVIEW OF THE DATA SOURCES YOU USED AS INPUTS TO THE ECONOMIC IMPACT ANALYSIS.

A. For the direct electricity price impacts, I relied upon the results of detailed electricity market modeling developed by a NERA colleague, Eugene Meehan. Mr. Meehan developed estimates of the impacts of the retirement scenario on retail rates for residential, commercial and industrial customers in four service territories in Ohio based on detailed modeling of wholesale energy markets and the regional capacity market. These impacts were calculated for each of the four Ohio investor-owned utility service territories and separately for residential, commercial and industrial customers. Mr. Meehan developed estimates of price impacts in terms of dollars per mega-watt hour ("$/MWh"). I converted the dollar impacts developed by Mr. Meehan into percentage increases in retail rates and developed separate estimates for the two REMI regions, as I discuss below.

The information I used on direct employment and expenditure impacts also is based upon Mr. Meehan's electricity market modeling, supplemented by some information I received from DP&L. The set of information includes estimates of the employment and expenditures at the Facilities that would no longer operate under the retirement scenario as well as estimates from the electricity modeling of the increased expenditures at facilities in Ohio whose generation would increase to replace the lost generation.

Q. DID MR. MEEHAN ALSO PROVIDE ESTIMATED CONSUMER ELECTRICITY RATE IMPACTS FOR SENSITIVITY RETIREMENT CASES?

A. Yes. Mr. Meehan also provided retail rate impacts for two sensitivity cases in which the estimated increase in capacity prices was changed to reflect uncertainty. As explained in his testimony, he developed sensitivity cases that result in retail electricity price impacts that are both higher and lower than the base retirement scenario results. I develop estimates of Ohio economic impacts using these two sensitivity cases. These sensitivity cases provide information on the range of possible economic impacts of the retirement scenario as a result of uncertainty in capacity price impacts.

C. REMI MODEL

Q. PLEASE DESCRIBE THE REMI MODEL YOU USED IN THIS STUDY

A. I have used the REMI Policy Insight Plus ("PI+") model to develop estimates of the impacts on the State of Ohio due to the direct impacts. REMI is a state-of-the-art regional economic tool that has been developed and refined by researchers over more than twenty-five years. It is widely used by federal, state, and local agencies, as well as analysts in the private sector and academia, to estimate the effects of major projects and policies including forecasting and planning, economic development, transportation, energy and natural resources, taxation, budget and welfare, and environmental policies.

The core of the REMI model is a set of input/output (“I/O”) relationships among different industries. These relationships show how industries are related to one another, in terms of both inputs and outputs. (Wassily Leontief received the Nobel Prize in Economics in 1973 based on his work related to input-output analysis.) Thus, the input/output relationships allow one to estimate how changes in one industry will affect demand for other industries (those that provide inputs to the industry in question) or supply (those that purchase outputs from the industry in question). In addition, I/O models can be used to trace the effects that result from changes in the incomes of workers in the affected industries.

The REMI model, however, goes well beyond the standard I/O relationships to incorporate other important feedback effects. The model includes demographic components, because the population of an area over a long span of time depends in part on the available economic opportunities. Changes in population in turn have feedback effects on the local economy, affecting the demand for housing and other goods. Other feedback effects include changes in wages as the result of changes in economic activity. If employment increases, for example, wages will tend to rise, affecting the competitive position of the region relative to other areas.

REMI is regularly updated both to include the newest empirical information and to integrate the most up-to-date theoretical framework. For example, REMI has incorporated a component known as the “new economic geography,” which allows different sub-regions in the model to interact in a manner consistent with the most recent economic theory. These additions to the model provide even greater abilities to capture the complicated geographic interactions that influence the levels of economic activity in various regions.

An appendix to my testimony contains a more detailed description of the REMI model.

Q. HOW RELIABLE ARE ECONOMIC IMPACT FORECASTS USING THE REMI MODEL?

A. The REMI model is based on baseline forecasts of economic data that are of course uncertain. Actual future economic conditions in Ohio over the period from 2017 to 2026 may differ substantially from the predictions of these baseline forecasts. The uncertainties in the baseline forecasts in theory could affect the estimates of the economic impacts of the retirement of the Facilities, but this is a second-order effect. I believe that the results and conclusions of this study are reliable since I am estimating *changes* in the Ohio economy due to the loss of the Facilities—as opposed to the absolute level of economic activity in Ohio—and I have found that estimates of these changes are relatively consistent across differences in in the baseline forecast.

Q. WHAT SPECIFIC REMI MODEL WAS DEVELOPED FOR THIS STUDY?

A. Each version of the REMI PI+ model is custom-built for the regions of interest, which can range from small areas to entire countries. The model custom-built for this project was compiled in December, 2015 with version 1.7.11 of REMI's PI+ application and includes historical data based upon the most recent U.S. Census (2010), recent reports of the U.S. Bureau of Economic Analysis ("BEA") and the U.S. Bureau of Labor Statistics ("BLS"), as well as various other sources.

The REMI model can be developed at the county, state or even national levels. The model developed for this study is an Ohio state model divided into the following two regions:

1. Counties in which the Facilities are located or directly adjacent to ("Facility Counties") specifically Hamilton, Clermont, Brown, Highland, Adams, Gallia, Meigs, Muskingum, and Coshocton counties; and
2. All other Ohio counties ("Other Counties").

This breakdown allows for the inputs related to the employment and other expenditures associated with the Facilities to be assigned to a specific Ohio region, with the electricity price impacts and the employment/expenditure changes from replacement generation included in both regions.

It is important to note that this is a multi-region model rather than a model that disaggregates results from a larger region to sub-regions. The multi-region model takes into account interactions among the two regions. Thus, inputs for the Facility Counties lead to economic impacts in Other Counties, and vice versa. I use the results of the two regions to develop estimates of the combined economic impacts of the retirement scenario in the State of Ohio.

D. OVERVIEW OF STEPS TO ESTIMATE ECONOMIC IMPACTS

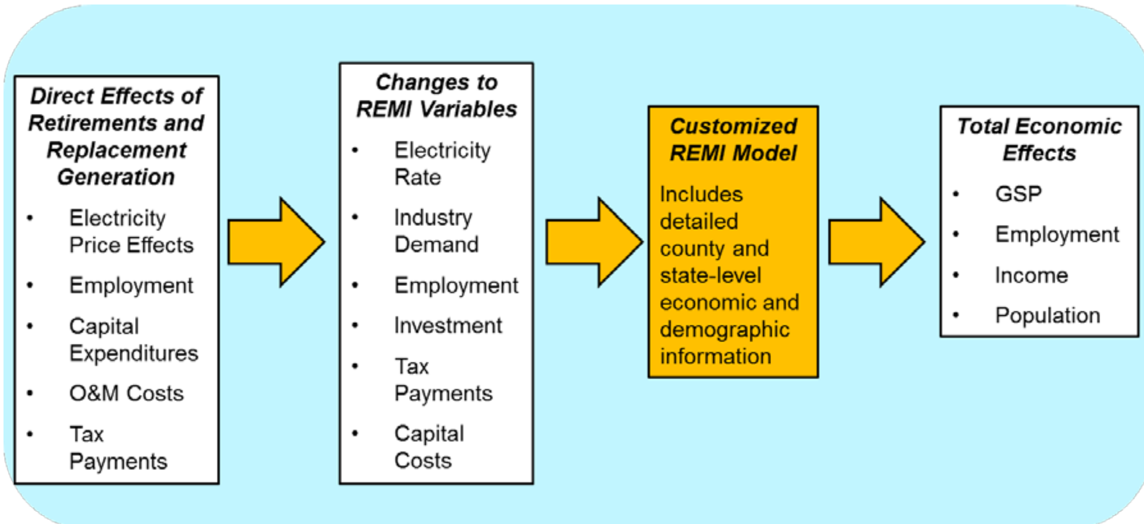
Q. COULD YOU PROVIDE AN OVERVIEW OF THE MAJOR STEPS YOU USED TO DEVELOP REMI MODEL ECONOMIC IMPACT ESTIMATES?

A. Yes. The use of the REMI model to estimate the impacts of the Facilities retirement can be viewed as a two-step process. The first step is to develop a baseline simulation of the Ohio economy over time. This baseline simulation assumes that the Facilities are in place, including the operations and economic activity related to the Facilities as well as the baseline electricity market conditions. The baseline simulation includes values for the principal Ohio economic variables, including jobs, tax revenues, personal income, and gross state product. I assume the baseline for the electricity market modeling is equivalent to the baseline conditions in the REMI model.

The second step is to develop an alternative simulation in which the economic variables in the REMI model are changed to reflect the *direct* effects of the retirement scenario. I then use the REMI model to simulate the economic activity under this alternative simulation, including the multiplier effects I explained earlier. The differences in economic activity between this alternative simulation and the baseline simulation provide estimates of the changes in the Ohio economy due to the retirement scenario.

Figure 1 provides a visual depiction of how the direct effects of the Facilities and Ohio replacement generation are translated into estimates of total impacts on economic activity in Ohio. As discussed below, I use outputs of the REMI modelling and other information to estimate the impact on taxes.

FIGURE 1. REMI MODEL FLOW CHART



III. DIRECT ELECTRICITY PRICE IMPACTS FROM RETIREMENT OF THE FACILITIES

A. DEVELOPMENT OF ELECTRICITY PRICE IMPACTS

Q. COULD YOU SUMMARIZE THE INFORMATION YOU DEVELOPED ON THE PERCENT CHANGES IN RETAIL ELECTRICITY PRICES TO VARIOUS OHIO CONSUMERS DUE TO THE FACILITIES' CLOSURES IN YOUR BASIC CASE?

A. Yes. As I mentioned earlier, I began with the information developed by Eugene Meehan and explained in his testimony regarding the estimated retail rate impacts of the retirement scenario in the four Ohio service territories (see Table 5 and Table 6 of Mr. Meehan's testimony). As Mr. Meehan explains, he developed estimates of the increases in retail rates due to changes in wholesale electricity energy and capacity markets in the relevant four service territories in Ohio under the retirement scenario. These energy and capacity price increases are reproduced below—by year, customer class and service territory—in Table 4 and Table 5, respectively.

TABLE 4. INCREASES BY CUSTOMER CLASS IN RETAIL ELECTRICITY PRICES DUE TO WHOLESALE ENERGY PRICE IMPACTS OF THE RETIREMENT SCENARIO ($/MWH)

REDACTED

Notes: All values are in nominal dollars.
Source: Eugene Meehan Testimony, Table 5.

TABLE 5. INCREASES BY CUSTOMER CLASS IN RETAIL ELECTRICITY PRICES DUE TO WHOLESALE CAPACITY PRICE IMPACTS OF THE RETIREMENT SCENARIO ($/MWH)

REDACTED

Notes: All values are in nominal dollars. Capacity price impacts are presented for the “Mid” capacity price sensitivity.
Source: Eugene Meehan testimony, Table 6.

The information provided from Mr. Meehan—specifically the sum of increases in energy and capacity prices over time—become the numerators (“deltas”) in estimating the percentage electricity price increases due to the retirement scenario by customer class for each service territory. I first convert his estimates in nominal dollars into real 2015 dollars.[3]

To develop the estimated projections of baseline prices—the denominators—I rely on publicly available data. I first estimate retail rates in 2014 (the latest year for which data are available) by customer class and service territory using information from the U.S. Energy Information Administration ("EIA") Form 826, which provides utility-level monthly data on utility revenues and sales.[4] I then project baseline retail electricity prices in 2017-2026 using the 2014 information as the starting points and projections developed by EIA in the *Annual Energy Outlook* (AEO 2015) for the Reliability First Corporation/West region,[5] which is the smallest reported area that includes Ohio. Specifically, EIA projects end-use electricity prices by region and customer class, and I use the growth rate of these region-level price projections by customer class as the expected growth rate of my service territory-level prices.

The following table summarizes the average percentage increases (relative to the baseline values) for each of four electricity retail regions averaged over the period from 2017 to 2026 in the basic case using the methodology I have outlined above. Note that for ease of exposition, the table shows average annual percentage increases over the

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[3] I convert all expenditures into constant 2015 dollars for purposes of inputting data into the REMI model. The REMI model provides for various alternatives of inputting expenditures including constant dollars as of other years or nominal dollars. For consistency, I convert all dollar values into 2015 dollars using the GDP deflator forecast from the Office of Management and Budget ("OMB"), Mid-Session Budget Review 2015 (FY 2016), Table 2.

[4] U.S. Energy Information Administration (EIA). 2015. *Form EIA-826 Detailed Data*. Accessed on January 14, 2016. http://www.eia.gov/electricity/data/eia826/

[5] U.S. Energy Information Administration (EIA). 2015. *Annual Energy Outlook 2015*. Data tables. April. http://www.eia.gov/forecasts/AEO/pdf/0383%282015%29.pdf.

decade (2017-2026); however, the REMI inputs are the percentage increases in each year and thus I relied on each year's percentage price increase in the actual modeling.

TABLE 6. PERCENTAGE INCREASE IN RETAIL ELECTRICITY PRICES BY SERVICE TERRITORY

REDACTED

Note: Percent increases rely on "Mid" capacity price impacts.
Source: Calculations based on Eugene Meehan testimony and NERA calculations using EIA information as described in testimony.

For purposes of the REMI analysis, I translated these percentage increases by service territory into average percent increases for customers in the two Ohio REMI regions, the Facilities Counties and the Other Counties. The Facilities Counties comprise nine counties (which I have listed above) that lie within two of the Ohio service territories (Duke and AEP). I assigned each of the nine counties to either the AEP or the Duke service territory, and then I generated weighted averages of the two zone impacts for each customer class using relevant U.S. Census data. The weights used in the residential price calculations are based on county-level Census population estimates,[6] and the weights used in the commercial and industrial price calculations are based on county-level employment data (for non-manufacturing and manufacturing positions, respectively).[7]

[6] Of the nine counties in the DPL Facility Area, I identify three counties as predominately Duke and six counties as predominately AEP. As an example, to develop average rate increases for residential customers, I sum the total population in AEP counties (as the sum of the populations in the three counties) and the total population in Duke counties (as the sum of the other six countries) and calculate the fractions of total population that are AEP and Duke. I weight the rate impacts using these fractions.

[7] U.S. Census Bureau. 2013. *2013 County Business Patterns (NAICS).* Accessed January 26, 2016. Table Browser: http://censtats.census.gov/cgi-bin/cbpnaic/cbpsect.pl

For the larger “Other Counties” region—which includes all four service territories—I developed weighted-average increases using 2014 electricity sales for each service territory, obtained from the EIA Form 826 data described above. Before calculating the weights, I make adjustments to the sales for AEP and Duke to subtract sales in the Facilities Counties in order to avoid double counting these sales.

The table below shows the resulting estimates of the percentage increases (relative to the projected annual baseline values) in retail electricity prices for the three customer classes and the two REMI Ohio regions over the period from 2017 to 2026.

TABLE 7. OHIO RETAIL ELECTRICITY PRICE IMPACTS OF THE RETIREMENT SCENARIO BY CUSTOMER CLASS BY OHIO REGION

REDACTED

Source: NERA calculations as explained in testimony.

Q. COULD YOU PROVIDE THE RETAIL ELECTRICITY PRICE INCREASES FOR THE TWO SENSITIIVTY CASES YOU DISCUSSED EARLIER?

A. Table 8 and Table 9 below show the equivalent retail price estimates for the two sensitivity cases, which include sensitivities for smaller and larger capacity price increases, as discussed in the testimony of Mr. Meehan.

U.S. Census Bureau, Population Division. 2015. *Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2014.* Accessed January 26, 2016. Table Browser: http://www.census.gov/popest/data/counties/totals/2014/CO-EST2014-01.html

TABLE 8. HIGH SENSITIVITY - OHIO RETAIL ELECTRICITY PRICE IMPACTS BY CUSTOMER CLASS BY OHIO REGION

REDACTED

Source: NERA calculations as explained in testimony.

TABLE 9. LOW SENSITIVITY - OHIO RETAIL ELECTRICITY PRICE IMPACTS BY CUSTOMER CLASS BY OHIO REGION

REDACTED

Source: NERA calculations as explained in testimony.

B. TRANSLATION OF ELECTRICITY PRICE IMPACTS INTO REMI VARIABLES

Q. COULD YOU INDICATE HOW YOU USED THE CHANGES IN ELECTRICITY PRICES IN OHIO AS INPUTS TO REMI?

A. I entered price effects into REMI in terms of the percentage change in total retail electricity prices to residential, commercial and industrial customers. I used the REMI variable "Consumer Price of Electricity" for residential customers, "Electricity (Commercial Sectors) Fuel Cost" for commercial customers, and "Electricity (Industrial Sectors) Fuel Cost" for industrial customers.

IV. DIRECT ECONOMIC LOSSES FROM RETIREMENT OF THE FACILITIES AND OFFSETTING GAINS FROM OHIO REPLACEMENT GENERATION

Q. COULD YOU PROVIDE AN OVERVIEW OF THE CATEGORIES OF DIRECT EMPLOYMENT AND EXPENDITURES THAT ARE RELEVANT FOR THE FACILITIES AS WELL AS THE REPLACEMENT GENERATION?

A. I developed information on the loss of employment at the Facilities as well as losses in expenditures of the Facilities in the following six categories: (1) labor expenditures; (2) capital expenditures; (3) fuel expenditures; (4) non-fuel variable operating and maintenance expenses ("VOM"), (5) fixed operating and maintenance expenses ("FOM"); and (6) tax payments. I also developed equivalent information on the gains due to replacement generation for the categories in which those gains would occur, specifically in the employment, fuel expenditure, non-fuel VOM, and tax payment categories. Together these effects reflect the direct impacts of the retirement scenario.

Q. COULD YOU PROVIDE AN OVERVIEW OF THE REPLACEMENT GENERATION FOR WHICH YOU DEVELOPED ECONOMIC IMPACT INFORMATION?

A. Because my study focuses on economic impacts in Ohio, I focused on the replacement generation from Ohio facilities. (As with the losses from Retirement Facilities in which I excluded a plant that was not located in Ohio, I assumed that changes in facilities outside Ohio would not have economic impacts in Ohio.) The following table shows the total replacement generation estimated by Mr. Meehan as well as the replacement generation from Ohio units by type fuel—divided into coal, natural gas and oil—over the period from 2017-2026. Natural gas-fired and coal-fired units represent more than 99 percent of the Ohio replacement generation. As a whole, the Ohio replacement generation represents about 8 percent of the total replacement generation over the period of the analysis.

TABLE 10. REPLACEMENT GENERATION IN OHIO BY UNIT TYPE

Unit Type	Increase in Generation MWh (2017-2026)	Percent of Total
Coal	13,075,739	28.0%
Natural Gas	33,217,220	71.1%
Oil	418,898	0.9%
Total	**46,711,857**	**100.0%**

Source: Calculations based on the Aurora modeling explained in the testimony of Eugene Meehan

A. __DIRECT EMPLOYMENT IMPACTS__

Q. HOW DID YOU DETERMINE THE DIRECT LOSSES OF EMPLOYMENT AT THE FACILITIES?

A. I obtained information from DP&L on employment at the five relevant facilities for which data were available and supplemented it with an estimate I developed for the one facility for which data were not available. Table 11 shows this combined information for the six plants that are located in Ohio.[8] (As I mentioned above, I assumed that the employment and expenditures at the seventh facility—which is located outside the state—would not have impacts in Ohio.) The Facilities together employ approximately 1,000 Ohio employees. These jobs contribute to local employment, and the employees of the Facilities spend their salaries on a variety of goods and services in Ohio counties. The

[8] DP&L provided employment (jobs) for five plants (Conesville, JM Stuart, Killen, Miami Fort, and WH Zimmer). DP&L did not provide information for Kyger Creek. I developed estimates for all of the variables needed (employment, capital expenditures and property tax expenditures) for Kyger Creek using the data for the other plants. In particular, I assume that each expenditure category is proportional to the capacity of the unit. I therefore assume that Kyger Creek plant's shares of total employment, capital expenditures and property tax expenditures represent approximately 15 percent of the totals for all of the DP&L facilities.

REMI model provides estimates of the average compensation for employees in the utilities sector and that information is used to model the labor expenditure impacts.

TABLE 11. EMPLOYMENT BY DP&L FACILITY

Plant	Employees
Conesville	92
JM Stuart	375
Killen	110
Miami Fort	131
WH Zimmer	181
Kyger Creek	152
Total	**1,041**

Source: Employment values based on DP&L data and NERA calculations as explained below.

Q. HOW DID YOU DETERMINE THE DIRECT GAINS IN EMPLOYMENT AT THE REPLACEMENT FACILTIES?

A. The Aurora model used by Mr. Meehan does not provide information on employment impacts of increases in generation at Ohio units providing replacement power and I wanted to account for the possibility that additional generation would lead to additional employees. To provide estimates of possible employment impacts of replacement generation, I developed information on employment, generation and capacity at 361 fossil-fuel units in the U.S. from U.S. Federal Energy Regulatory Commission ("FERC") Form 1 data and estimated relationships between generation and employment for the two types of units that represent the vast majority of Ohio replacement generation—namely, natural gas units (including gas turbines and combined cycle plants) and coal-fired steam units.[9] Employment at power plants is correlated with power plant size. In order to estimate the isolated effect of increased generation on facility employment (i.e., holding

[9] Federal Energy Regulatory Commission (FERC). Form 1. Accessed January 27, 2016. http://www.ferc.gov/docs-filing/forms/form-1/data.asp

constant unit size), I prepared a statistical analysis by type of generation to develop estimates of the independent effect of generation on employment. These results indicate that a 1 million MWh increase in generation is associated with 3.3 additional jobs at natural gas facilities and 12.6 additional jobs at coal facilities, holding unit capacity constant. I used these relationships to estimate the additional employment due to Ohio replacement generation.[10]

B. DIRECT EXPENDITURE IMPACTS

Q. COULD YOU SUMMARIZE THE ESTIMATES YOU USED OF EXPECTED FUTURE EXPENDITURES FOR VARIOUS GOODS AND SERVICES AT THE FACILITIES?

A. Yes. As I mentioned, the Facilities also contribute to the Ohio economy as a result of their expenditures for various products and services. Table 12 summarizes my estimates of the average annual expenditures for four of the six expenditure categories—other than labor expenditures and taxes, which are estimated in REMI—over the period from 2017 to 2026. Overall expenditures at the Facilities are projected to be almost $1.9 billion per year on average over the ten-year period from 2017-2026. The impacts of these expenditures on the Ohio economy depend in large part on the fraction that is spent on Ohio goods and services—referred to as the regional purchase coefficient ("RPC"). The REMI model includes estimates of the RPC's for the various categories of expenditures in the model.

[10] I also considered the relationship between generation and employment for fuel oil units, but the estimated effect of generation on employment at fuel oil units was statistically insignificant. Since fuel oil's share of replacement generation is less that 1 percent of the total replacement generation, any omission of a potential employment impact from these units would not have a significant impact on the results of my analysis.

TABLE 12. AVERAGE ANNUAL EXPENDITURES BY PLANT (MILLION $2015)

REDACTED

Source: Capital costs are based on information from DP&L and NERA calculations.
Fuel, Variable and Fixed O&M costs are inputs estimated from the Aurora model.
All values are average annual values over the period from 2017-2026 reported in millions of 2015 dollars.

Q. COULD YOU PROVIDE INFORMATION ON THE SOURCES OF DATA FOR YOUR ESTIMATES OF FUTURE CAPITAL EXPENDITURES AT THE FACILITIES?

A. Capital expenditures contribute to the Ohio economy by increasing the capital stock and raising the demand for local workers and materials that are used to carry out these improvements. Reductions due to the retirement scenario thus will lead to reductions in the Ohio capital stock and reductions in the demand for Ohio workers and materials.

My estimates of future capital costs for the Facilities are based on expenditure projections from DP&L for 2016 through 2020.[11] For years beyond 2020, I assume that capital expenditures would continue at the same average annual value as for the five-year period for which DP&L provided information. The average annual capital costs are about $135 million.

[11] Note that as discussed above in the explaining my methodology for estimating changes in employment, I received information for five of the Facilities and estimated capital expenditures for Kyger Creek based on its share of capacity. I exclude capital expenditures related to the Clifty Creek plant.

Q. COULD YOU PROVIDE INFORMATION ON THE SOURCES OF DATA FOR FUEL EXPENDITURES?

A. Output from Mr. Meehan's Aurora modeling analysis provides annual unit-level total fuel expenditures. I used information on total fuel costs for each of the Facilities from Mr. Meehan's Aurora electricity market model, which is explained in his testimony. For the Facilities, these fuel costs would not occur in the retirement scenario.

Q. COULD YOU PROVIDE INFORMATION ON THE SOURCES OF DATA FOR YOUR ESTIMATES OF THE TWO CATEGORIES OF OPERATING AND MAINTENANCE COSTS AT THE FACILITIES?

A. As with fuel expenses, I used information from Mr. Meehan's Aurora electricity market modelling to obtain estimates of operating and maintenance costs. The model output provides annual VOM costs and FOM costs for each unit. I aggregated VOM and FOM costs for the facilities on an annual basis for use in my analysis. For the Facilities, these expenses would not occur in the retirement scenario.

Q. COULD YOU PROVIDE INFORMATION ON THE SOURCES OF DATA FOR YOUR ESTIMATES OF THE TAX PAYMENTS?

A. I obtained information on various types of taxes paid by the Facilities. These taxes include property tax, and state as well as federal corporate income tax. (Note that I exclude federal payroll taxes because these taxes are likely to be borne by employees rather than by the employer.) The following are the sources for my estimates of these tax categories.

- *Property tax*. DP&L provided property taxes paid by the Facilities for 2013 to 2015.[12] I assume property taxes in the future will be constant on a real dollar basis, and I use the average of property taxes paid over this three year period to develop estimates of total annual property tax payments.
- *State income taxes*. I estimated state income tax payments, which are not available on the state level, by calculating the net revenues from the Aurora model outputs and applying the state corporate income tax rate to the change in net revenues.[13]
- *Federal income taxes*. I estimate federal income tax payments by calculating net revenues from the Aurora model and applying the federal corporate income tax rate. I then assume the reduction in federal tax payments would result in a decrease in federal government spending in Ohio on a population basis (i.e., proportional to Ohio's share of national population, which is about 3.6 percent).[14]

Table 13 shows the resulting estimates of direct tax losses due to retirement of the Facilities. The owners of the Facilities pay significant amounts in taxes each year to the local, state and federal governments that are attributable to the operations of the plants, about $25 million per year. These tax payments contribute to the economy by either funding additional local government services or by decreasing the tax burden on

[12] I received property tax information for the five units noted above and extrapolate the property tax expenditures for the Kyger Creek units using the relative share of capacity, as explained above with respect to employment.

[13] Net revenues are calculated using output from the Aurora modeling performed by Mr. Meehan. I calculate the net revenues as change in total revenues less total variable operation and maintenance costs, total emissions costs, and total fuel costs. This calculation is performed on the unit-level.

[14] U.S. Census Bureau, Population Division. 2015. *Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2014.* Accessed January 26, 2016. Table Browser: http://www.census.gov/popest/data/counties/totals/2014/CO-EST2014-01.html

individuals and businesses. If the Facilities were to retire, these tax revenues would not be available to the government entities and thus services would need to be curtailed or taxes would need to be increased (or some combination of these two responses).

TABLE 13. ANNUAL TAX PAYMENTS FROM THE FACILITIES (THOUSAND $2015)

Tax Expenditure	DPL Plant Counties	Rest-of-State Ohio	Total
Local Property Taxes ($000)	$25,854	$0	$25,854
State Corporate Income Taxes ($000)	$160	$1,264	$1,423
Federal Corporate Income Taxes ($000)	$1,201	$9,516	$10,717
Total	**$27,214**	**$10,780**	**$37,994**

Source: Local property taxes are based on DP&L data and NERA calculations as explained in testimony. Corporate income taxes are based on NERA calculations of net revenues based on the Aurora modeling.
Values are reported in thousands of 2015 dollars.

Annual property taxes are about $26 million for the Facilities. Based on the Aurora modeling of the net revenues of these units, I estimate that the annual federal income taxes attributable to the Facilities that would not return to Ohio would be almost $11 million, and that the annual state income taxes are about $1.4 million. I presume that these values apply to the years from 2017-2026.

Q. **COULD YOU PROVIDE AN OVERVIEW OF THE INFORMATION YOU USED TO DETERMINE INCREASES IN EXPENDITURES RELATED TO REPLACEMENT POWER AND HOW YOU ALLOCATED THESE EXPENDITURES TO THE TWO REMI REGION?**

A. As I mentioned above, I rely on the results of Mr. Meehan's Aurora electricity market modeling for information on replacement generation. In particular, I obtained information that allows me to estimate increased expenditures for fuel, VOM, and income taxes at Ohio replacement facilities using the same methodologies as explained above for the Facilities. I assume that the two other categories of expenditures—capital costs and FOM costs—would not change in any significant way because they are largely fixed cost that would not change due to the relatively small changes in output represented by the replacement power at any one Ohio facility.

Q. COULD YOU PROVIDE INFORMATION YOU USED TO ESTIMATE INCREASES IN FUEL EXPENDITURES AND INCREASES IN OPERATING AND MAINTENANCE EXPENDITURES AT REPLACMENT FACILITIES?

A. The Aurora modeling results developed by Mr. Meehan provide information on fuel expenditures and VOM expenditures. I obtained the results for the baseline and retirement scenarios for all of the replacement generation facilities in Ohio. I then calculated the difference between these two results. This difference represents the estimate of the increase in fuel and VOM due to the increase in generation at each of the Ohio replacement generation units.

Q. COULD YOU PROVIDE INFORMATION YOU USED TO ESTIMATE INCREASES IN TAX PAYMENTS AT REPLACMENT FACILITIES

A. I wanted to include the possibility that increased income at replacement facilities would lead to additional tax payments in order to avoid underestimating the potential positive impacts of replacement generation. Thus, I calculate increases in tax payments assuming the increases in net revenue between the baseline and retirement cases for all the Ohio replacement facilities will be taxed at the same rates as described above for the Facilities. Additional property taxes are also calculated as a function of net revenues. I calculate the average property taxes paid by the Facilities and divide the sum by the sum of the net revenues of the Facilities to develop an estimate of the tax amount per dollar of net revenue.[15] I apply this factor to the cumulative net revenues of the replacement generation to estimate the increases in property taxes paid in Ohio.

C. TRANSLATION OF EXPENDITURE IMPACTS INTO REMI VARIABLES

Q. COULD YOU SUMMARIZE THE VARIOUS EMPLOYMENT AND EXPENDITURE CATEGORIES AND HOW THEY WERE INPUT INTO THE REMI MODEL?

Table 14 provides a summary of the annual employment, expenditure and tax payments of the Facilities, as well as the corresponding REMI variables used to enter these direct impacts into the model. Note that for all categories except for income taxes (State and Federal), all of the direct negative impacts occur in the Facilities Counties region. Table 15 provides an equivalent summary for replacement power expenditures. In contrast to the direct negative impacts, most of the direct positive impacts occur in the REMI region that does not include the Facilities, the "Other Counties" region. Note that the estimates of tax increases for replacement generation take into account the effects of increases in energy and capacity prices in the replacement scenario on revenues that are estimated by Mr. Meehan.

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[15] I calculated the average annual property tax payment of the Facilities in Ohio, which is approximately $4.31 million per plant. I then calculated the average net revenues for those plants using the baseline Aurora model results provided by Mr. Meehan. The average annual net revenues totaled approximately $66.7 million per plant. The ratio of these values, $4.31/$66.7 = 0.065, indicates that on average for every dollar of net revenue, a plant's property tax increases by about six and a half cents. I apply this ratio to the change in net revenues from the replacement generation to develop my estimate of the increases in property tax payments at Ohio replacement units.

TABLE 14. AVERAGE ANNUAL REMI MODEL INPUTS FOR THE RETIRMENT OF THE FACILITIES

REDACTED

Source: DP&L data and NERA Calculations; NERA Aurora modeling
Notes: All dollar values are presented in 2015 dollars.
Expenditure inputs are annual averages in thousands of dollars.
Tax payment inputs are annual averages in thousands of dollars.

TABLE 15. AVERAGE ANNUAL REMI MODEL INPUTS FOR OHIO REPLACEMENT GENERATION

REDACTED

Source: DP&L data and NERA calculations as explained in testimony; Aurora modeling explained in testimony of Eugene Meehan.
Notes: All dollar values are presented in 2015 dollars.
Expenditure and tax inputs are annual averages in thousands of dollars.

As I mentioned earlier, I estimate the contributions of the Facilities by comparing a REMI baseline simulation of the economy with an alternative REMI simulation under the retirement scenario. The baseline in REMI is assumed to include the contributions of the Facilities as well as the initial levels of the electricity output at the Ohio replacement plants. The alternative REMI simulation is created by removing the expenditures and employment of the Facilities (so the employment and expenditures in Table 14 are input in the model as negative values) and adding in the expenditures and employment of Ohio replacement generation (so the employment and expenditures in Table 14 are input to the model as positive values).

Q. COULD YOU SUMMARIZE HOW EMPLOYMENT LOSSES FROM THE FACILITIES WERE INPUT INTO REMI?

A. As I discussed above, I developed information from DP&L on the number of full-time-equivalent employees of most of the Facilities and supplemented the information to develop a complete data base for all relevant Facilities. These workers add to local employment, and they also spend their income on a variety of goods and services, leading to additional economic activity both locally and across the state. I input the number of employees working at the Facilities into REMI as reductions in the "Industry Employment (Industry Sales/Exogenous Production)" policy variable in the "Utilities" sector.

REMI's default response to changes in employment is to assume changes in intermediate purchases and capital investment. Because I explicitly input the expenses related to facility operations and intermediate purchases using data provided in the Aurora model, supplemented by extrapolation, I make adjustments to the model to avoid the double counting of these expenditures. Specifically, I use the "Nullify Intermediate Inputs Induced by Employment" variable to avoid double-counting the reduction in purchases of materials, and the "Nullify Investment Induced by Employment" variable to avoid overstating the negative impacts on investment. Both of these variables are input for the "Utilities" sector.

Using the same methodology as for the Facilities, I input the employment gains at the Ohio facilities that are predicted to increase generation to replace the generation previously provided by the Facilities.

Q. COULD YOU SUMMARIZE HOW LOSSES OF CAPITAL EXPENDITURES OF THE FACILITIES WERE INCLUDED AS REMI INPUTS?

A. These estimates of annual capital expenditure revenues are entered into REMI as reductions in “Investment Spending” in “Equipment Products.” The reductions decrease the capital stock of the region and decrease the demand for local workers and materials. I presume that these capital expenses would have been financed by the relevant investor-owned utilities, with the costs ultimately borne by company shareholders, the vast majority of whom are not located in Ohio. Thus, I assume there is no offsetting increase in economic activity in Ohio related to the reduced need for capital financing on the part of these companies.

Q. COULD YOU DESCRIBE HOW CHANGES IN FACILITY FUEL AND OPERATING AND MAINTENANCE EXPENDITURES FOR THE FACILITIES AND REPLACEMENT FACILITIES WERE INPUT INTO REMI?

A. As I have described, I obtained information on the changes in fuel and variable O&M and fixed O&M expenditures of the Facilities and the replacement generation facilities from the results of Mr. Meehan’s Aurora modeling. I input the fuel expenditures for the Facilities—excluding expenditures from the Clifty Creek plant, which is located in Indiana—as expenditure reductions in the model using the REMI policy variable “Exogenous Final Demand” in the “Mining (except oil and gas)” sector. Fuel expenditures for the replacement generation are input as increases in expenditures using the “Exogenous Final Demand” policy variable in the “Mining (except oil and gas)” sector for coal expenditures and in the “Oil and gas extraction” sector for oil and gas fuel expenditures. I input the VOM expenditures into the REMI model as changes in

"Exogenous Final Demand" split evenly between the sectors for "Professional, Scientific, and Technical Services" and "Repair and Maintenance." I input the FOM expenditures as changes in the REMI model using the policy variable for "Exogenous Final Demand" in the "Repair and Maintenance" sector. As with fuel expenditures, changes in VOM and FOM expenditures decreases due to assumed retirement of the Facilities are input as decreases in demand and expenditures increases from the replacement generation are input as increases in demand. Using plant-specific data, I categorized expenditures by REMI sector and region based on the county location of each plant.

Q. COULD YOU DESCRIBE HOW THE CHANGES IN VARIOUS TAX PAYMENTS FROM THE FACILITIES AND THE REPLACEMENT FACILITIES WERE INPUT INTO REMI?

A. I entered the Facilities' income taxes in REMI as changes in "Personal Taxes." Ohio state income taxes are entered directly into the model for Ohio. In particular, State and Federal income taxes are input into the REMI model as changes in the "Personal Taxes" policy variable. For federal income taxes, only the percentage that would be required to be made up by Ohio residents is included in the modeling (In particular, I assume 3.6 percent of federal tax payments lead to increases in personal taxes in the two Ohio REMI model regions because Ohio has 3.6 percent of the total U.S. population). I assume that decreases in tax payments for the Facilities would lead to increased tax burdens on Ohio citizens and that the increases in tax payments from Ohio replacement generation would lead to decreased tax burdens on Ohio citizens.

I assume that the reductions in the Facilities' property tax payments (and the increases due to replacement generation) would lead to increases (decreases due to replacement generation) in property tax payments for residents and businesses in order to maintain the same levels of local government expenditures. I therefore input the property tax payments into REMI as changes in the "Consumer Price" of "Consumer Housing Products" for residents and as changes in "Capital Costs" for businesses. I used REMI's "spreader tool" to appropriately allocate these changes in "Capital Cost" among the various industries based on their percentage of total value added in Ohio. To allocate these effects between residents and businesses, I used historical data on the tax bases from the Ohio Department of Taxation, which indicates that 75 percent of the change in property tax is allocated to residents and 25 percent to businesses.[16] I input the additional tax burden to residents in REMI as an increased cost using the policy variable "Consumer Price" in the "Imputed rental of owner-occupied nonfarm housing" sector. I input the additional tax burden to the business as an increase in the "Capital Cost" policy variable. I spread the burden across all 66 sectors in the model based on their relative contributions to the economy in the Facilities Counties and the Other Counties.

V. <u>ECONOMIC IMPACTS IN OHIO FROM THE RETIREMENT SCENARIO</u>

Q. COULD YOU SUMMARIZE THE RESULTS OF YOUR STUDY, SHOWING THE NET ECONOMIC IMPACTS IN OHIO OF THE RETIREMENT SCENARIOS AS ESTIMATED IN REMI USING THE INPUTS DESCRIBED ABOVE?

A. Table 16 shows the net effects of all direct impacts noted above as well as the multiplier effects due to REMI modeling for Ohio. (This table is the same as Table 2 above.) Note

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[16] Ohio Department of Taxation. *Commercial Activity Tax*. Accessed January 14, 2016. http://www.tax.ohio.gov/Portals/0/communications/publications/annual_reports/2014_annual_report/2014_AR_Section_2_Commercial_Activity_Tax.pdf

that although I developed inputs for the two REMI regions, I report results for the entire state that are the sum of the two regions. The table shows the average annual results and present value results over the period from 2017 to 2026 for employment, GSP, personal income and population.

TABLE 16. ESTIMATED OHIO ECONOMIC LOSSES DUE TO THE RETIREMENT SCENARIO

	Ohio Economic Impacts	
Item	**Average**	**Present Value**
Employment (job years)	-18,735	-187,349
Gross State Product (millions of 2015 dollars)	-3,168	-25,322
Personal Income (millions of 2015 dollars)	-1,797	-14,268
Population (person years)	-26,430	-264,301

Source: Calculations using the REMI model as explained in the testimony. Present values of real dollar amounts are calculated using a discount rate of 5% (real) as of January 1,2017 for values over the period from 2017-2026. The cumulative values for employment and population are for job-years and person-years, respectively.

These results indicate that the retirement of the Facilities—and the various adjustments in the electricity system and the Ohio economy that would result from the retirement scenario—is predicted to lead to an average annual reduction of almost 19,000 jobs per year in Ohio, or a total of about 189,000 job-years over the ten-year period. To put these losses in perspective, the annual average loss in jobs would be equal to about 40 percent of the average annual jobs *growth* projected for the Ohio economy over the period from 2012 to 2022 by the Ohio Bureau of Labor Market Information.[17] In terms of GSP—which measures the value of all final goods and services produced in Ohio and thus is a comprehensive economic impact measure—the retirement of the Facilities would lead to an average loss to the Ohio economy of almost $3.2 billion per year, or a discounted loss of about $25 billion over the ten-year period. Personal income losses are

[17] Ohio Bureau of Labor Market Information. *2022 Ohio Job Outlook Employment Projections*. December 2014. http://ohiolmi.com/proj/Projections/Ohio_Job_Outlook_2012-2022.pdf

a similar order—about $1.8 billion per year or over $14 billion over the ten-year period. The loss in Ohio population is projected to be about 26,000 per year or about 264,000 person-years over the period.

Q. COULD YOU SUMMARIZE THE POTENTIAL IMPACTS OF THE RETIREMENT SCENARIO ON OHIO GOVERNMENT REVENUES AND PROVIDE AN OVERVIEW OF HOW THE REVENUE IMPACTS WERE CALCULATED?

A. The retirement scenario would result in substantial losses in tax revenues that would need to be made up for by Ohio residents and businesses. Table 17 summarizes my estimates. (This table is the same as Table 3 above.)

TABLE 17. ESTIMATED OHIO TAX REVENUE LOSSES DUE TO THE RETIREMENT SCENARIO (MILLION $2015)

	Ohio Economic Impacts	
Item	**Average**	**Present Value**
Income Tax Revenues (Federal) (millions of 2015 dollars)	-23	-180
Income Tax Revenues (State) (millions of 2015 dollars)	-96	-760
Property Tax Revenues (millions of 2015 dollars)	-31	-238
Sales Tax Revenues (millions of 2015 dollars)	-40	-314
Total	**-189**	**-1,491**

Source: Calculations using the REMI model and other data as explained in the testimony. Values do not sum to total due to rounding. Note that the estimate of the Federal tax loss includes only the small fraction of revenue that would have to be made up by Ohio federal taxpayers. Present values estimates of real dollar amounts are calculated using a discount rate of 5% (real) as of January 1, 2017 for values over the period from 2017-2026

Under the retirement scenario, Ohio tax revenue losses are estimated to total about $189 million on an annual basis and about $1.5 billion on a present value basis over the ten-year model period. Assuming a federal corporate income tax rate of 35 percent (about 3.6 percent of which would come back to the state assuming its share of national population), the loss in federal tax revenue that would need to be made up by

Ohio residents would total over $20 million annually and about $180 million on a present value basis over the ten-year period from 2017 to 2026.

The state of Ohio would lose tax revenues through three other sources—state income taxes, property and sales taxes. Assuming a state income tax rate of 5.4 percent, the state of Ohio is estimated to lose $96 million annually in foregone income tax revenues, or a total of about $760 million on a present value basis over the model period. The average amount of property tax paid to the state of Ohio per person totaled $1,174 in 2012.[18] Using REMI model estimates of the changes in state population, I estimate losses in property tax of about $31 million per year, or almost $240 million over the ten-year period on a discounted present value basis. Finally, I estimate foregone sales tax revenues assuming roughly 30 percent of personal income is spent and subject to state and local taxes, with an effective state sales tax rate of 7.1 percent.[19] Estimated annual lost sales taxes are about $40 million per year, or a total of about $314 million over the ten-year period on a present value basis.

Q. COULD YOU PROVIDE SOME INDICATION OF THE SIGNIFICANCE OF THESE ESTIMATED ECONOMIC IMPACTS?

A. It is useful to put these impacts into some context. As one example, the annual job losses can be compared to the average job growth predicted by the Ohio government. As noted above, annual loss in jobs of almost 19,000 per year would be equal to about 40 percent of the average annual jobs growth projected for the Ohio economy over the period from

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[18] Tax Foundation. *The Facts on Ohio's Tax Climate: Property Tax Collections Per Capita*. Accessed January 28, 2016. http://taxfoundation.org/state-tax-climate/ohio

[19] Tax-Rates.org. *The 2016 Ohio State Sales Tax.* Accessed January 28, 2016. http://www.tax-rates.org/ohio/sales-tax

2012 to 2022 by the Ohio Bureau of Labor Market Information. It seems clear that the retirement scenario would have a substantial impact on the robustness of the Ohio economy over the next decade.

Q. COULD YOU PROVIDE INFORMATION ON THE SECTORAL BREAK DOWN OF THE OHIO JOB LOSSES?

A. All sectors of the Ohio economy would lose employment as a result of the direct and multiplier effects of the retirement scenario, but the impacts would be greater in some sectors. Table 18 presents the potential annual job losses by REMI sector, showing the five sectors with the greatest losses. The sectors predicted to lose the most jobs include: Other Services (except Public Administration); Construction; Retail Trade; Professional, Scientific, and Technical Services; and Health Care and Social Assistance. These five sectors account for about two-thirds of the annual job losses in Ohio under the retirement scenario.

TABLE 18. AVERAGE ANNUAL LOSSES OF JOBS IN OHIO BY SECTOR DUE TO THE RETIREMENT SCENARIO

Sector	Average Annual Losses (Jobs)
Other Services, except Public Administration	-3,940
Construction	-3,029
Retail Trade	-1,927
Professional, Scientific, and Technical Services	-1,733
Health Care and Social Assistance	-1,470
Other	-6,635
Total	**-18,735**

Notes: Impacts represent average annual changes to the level of employment in Ohio due to the retirement scenario over the period from 2017 to 2026.
All impacts are in estimated numbers of jobs.
Source: NERA calculations as explained in testimony.

Q. COULD YOU PROVIDE INFORMATON ON THE SECTORAL BREAK DOWN OF THE IMPACTS ON THE OHIO GSP LOSSES?

A. As with employment, all sectors of the Ohio economy would face declines in GSP, although some sectors will face larger losses than others. Table 19 presents the sectoral contribution to losses in GSP, showing specific results for the five sectors with the greatest losses. The greatest losses occur in: Utilities; Other Services; Mining; Construction; and Professional, Scientific and Technical Services. Losses in these five sectors total nearly $2 billion of the total $3.2 billion in estimated average annual loss in GSP due to the retirement scenario.

TABLE 19. ANNUAL GSP LOSSES IN OHIO BY SECTOR FROM THE RETIREMENT SCENARIO (MILLION $2015)

Sector	Average Annual Losses ($Millions)
Utilities	-906
Other Services, except Public Administration	-305
Mining	-282
Construction	-262
Professional, Scientific, and Technical Services	-213
Other	-1,200
Total	**-3,168**

Source: NERA calculations as explained in testimony.

Q. COULD YOU PROVIDE THE RESULTS OF THE SENSITIVITY CASES BASED ON THE HIGHER AND LOWER RETAIL ELECTRICITY PRICE IMPACTS

A. Table 20 and Table 21 show the results for the higher and lower electricity price impacts, respectively. The Ohio economic impacts differ somewhat as a result of these two sensitivity cases, suggesting a range of possible impacts. In the case of employment impacts, for example, the estimated reduction in annual average jobs ranges from about 17,000 jobs to almost 21,000 jobs. These sensitivity results do not change the overall conclusion that the replacement scenario would lead to substantial adverse impacts on the Ohio economy.

TABLE 20. ESTIMATED OHIO ECONOMIC LOSSES DUE TO THE RETIREMENT SCENARIO BASED ON THE "HIGH ELECTRICITY PRICE" SENSITIVITY CASE

	Ohio Economic Impacts	
Item	**Average**	**Present Value**
Employment (jobs)	-20,927	-209,275
Gross State Product (millions of 2015 dollars)	-3,489	-27,748
Personal Income (millions of 2015 dollars)	-2,010	-15,867
Population	-30,760	-307,604

Source: Calculations using the REMI model as explained in the testimony.

TABLE 21. ESTIMATED OHIO ECONOMIC LOSSES DUE TO THE RETIREMENT SCENARIO BASED ON THE "LOW ELECTRICITY PRICE" SENSITIVITY CASE

	Ohio Economic Impacts	
Item	**Average**	**Present Value**
Employment (jobs)	-17,176	-171,759
Gross State Product (millions of 2015 dollars)	-2,939	-23,582
Personal Income (millions of 2015 dollars)	-1,645	-13,121
Population	-23,292	-232,915

Source: Calculations using the REMI model as explained in the testimony.

VI. CONCLUSIONS

Q. COULD YOU SUMMARIZE YOUR CONCLUSIONS FROM THIS STUDY?

A. The impacts of the retirement scenario on the Ohio economy are projected to be substantial. The primary results I have developed indicate that retirement of the Facilities—and the various adjustments in the electricity system and the Ohio economy that would result from these retirements—would lead to an average annual reduction of almost 19,000 jobs per year in Ohio, or a total of about 189,000 job-years over the ten-year period. In terms of GSP—which measures the value-added of all final goods and services produced in Ohio and thus is a comprehensive economic impact measure—the retirement of the Facilities would lead to an average loss to the Ohio economy of about $3.2 billion per year, or a discounted loss of more than $25 billion over the ten-year period. The results also show substantial losses in Ohio government revenues—including local, state and federal (Ohio share) tax revenues—equal on average to nearly $190 million per year or nearly $1.5 billion net present value over the 10-year period.

These economic impacts affect all sectors of the Ohio economy because of the multiplier effects of the direct impacts of increased Ohio consumer electricity rates and reduced electricity sector expenditures in Ohio. Finally, the results of the sensitivity cases indicate that the conclusions of this study are robust with respect to uncertainties on the electricity price impacts; the results of the sensitivity case thus reinforce the conclusion that the retirement scenario would have substantial adverse impacts on the Ohio economy.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

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Dr. David Harrison is a Senior Vice President at NERA Economic Consulting and Co-Head of NERA's Global Environmental Group. He has extensive experience evaluating the economic effects of a wide range of energy and environmental and other policies and programs as a consultant, academic and government official.

Dr. Harrison has analyzed the impacts of many major energy and environmental policies on national, state and local economies. Recent national assessments have included studies of the U.S. Environmental Protection Agency's (EPA's) proposed and final Clean Power Plan to reduce carbon dioxide emissions, EPA's proposed Federal Plan (FP) for the Clean Power Plan, EPA's potential regulations for ambient air quality standards for ozone, EPA's proposed water effluent guidelines, the cumulative effects of EPA air, coal combustion residuals, and cooling water regulations, and a potential carbon tax, all of which were based upon the use of the N_{ew}ERA model, NERA's integrated electricity, energy and macroeconomic model. Dr. Harrison has directed studies of the local and state economic impacts of energy infrastructure (power plants, natural gas pipelines and others), transportation infrastructure (airports, highways), manufacturing and mining activities (including mining, chemical, petrochemical, automotive and many others), and large commercial and retail developments. These local and state assessments have used IMPLAN, Regional Economic Models, Inc. (REMI) as well as customized models based upon available data. The projects have been developed for numerous regions and virtually all states in the U.S. as well as individual countries and regions in Africa, Europe, and the Caribbean.

Dr. Harrison has been active in the development and economic assessment of climate change policies around the world, including evaluations of the potential "social cost of carbon" developed by the U.S. government. He participated in the development or evaluation of major greenhouse gas emission trading programs and proposals in the United States, including those in California, the Northeast, the Midwest and various federal initiatives, as well as programs in Europe and Australia. He and his colleagues assisted the European Commission and the UK government with the design and implementation of the European Union Emissions Trading Scheme and national European programs related to climate change, renewable policies, and energy efficiency policies. He also has directed numerous projects for individual companies and trade associations—including those in electricity, oil and gas, refining, petrochemical, pulp and paper, cement, iron and steel, chemical, aluminum and other sectors—to evaluate the potential effects of potential federal and regional climate change policies. Dr. Harrison and colleagues have used NERA's proprietary energy-macroeconomic model (N_{ew}ERA) to evaluate the potential economic impacts of various climate change policies in the United States and in individual states. In addition, he has evaluated the global economic impacts of global strategies to mitigate and adapt to climate change, including assessments of the residual environmental damages of these global policies. Dr. Harrison has lectured frequently on climate change and related topics at numerous conferences in the U.S. and abroad.

Dr. Harrison has extensive experience over more than three decades evaluating the costs and benefits of air quality regulations under the Clean Air Act and other social regulatory policies, including various health and safety regulations. These studies have been done for a large number of sectors, including electricity, automobile, trucking, marine, chemical, iron and steel, petroleum, pulp and paper, small utility engines, small handheld equipment, snowmobiles, construction equipment, and others. He and his colleagues have worked closely with company officials and collaborated with various technical consultants in the development of information on these programs. The results of these analyses have been presented to company officials, government agencies, and the media.

Dr. Harrison has directed benefit-cost analyses for numerous electric power plants under Section 316(b) of the Clean Water Act and other regulations related to water quality. These have included facilities on the major water bodies, including the Atlantic Coast, the Great Lakes, the Pacific Coast, and various rivers. The power plants have included numerous nuclear and fossil units. These assessments have included estimates of the potential impacts on electricity cost and reliability using detailed electricity market models in various electricity regions of the United States. Dr. Harrison has testified regarding these cost-benefit assessments in numerous state workshops and administrative hearings. He also has assisted the Utility Water Act Group (UWAG), the Edison Electric Institute (EEI) and individual utilities in their evaluation of the EPA 316(b) regulations as well as of EPA effluent guideline regulations. He has presented the results of these assessments to senior EPA and OMB officials. Dr. Harrison was a co-signer of an Amicus Brief submitted to the Supreme Court of the United States regarding the comparison of benefits and costs under Section 316(b) of the Clean Water Act.

Before joining NERA, Dr. Harrison was an Associate Professor at the John F. Kennedy School of Government at Harvard University, where he taught microeconomics, energy and environmental policy, cost-benefit analysis, transportation policy, regional economic development, and other courses for more than a decade. He also served as a Senior Staff Economist on the U.S. government's President's Council of Economic Advisors, where he had responsibility for environment and energy policy issues. He is the author or co-author of two books on environmental policy and numerous articles on various topics in professional journals.

Dr. Harrison received a Ph.D. in Economics from Harvard University, where he was a Graduate Prize Fellow. He holds a B.A. *magna cum laude* in Economics from Harvard College, where he was a member of Phi Beta Kappa, and a M.Sc. in Economics from the London School of Economics, where he was the Rees Jeffreys Scholar.

Education

Harvard University
Ph.D., Economics, 1974
M.A., Economics, 1972

London School of Economics and Political Science
M.Sc., Economics, 1968

Harvard University
B.A., Economics, *magna cum laude,* 1967

Professional Experience

National Economic Research Associates, Inc.
1988- *Senior Vice President, Vice President.* Directs projects in the economics of the environment, energy, transportation, regional economic development and other areas.

Putnam, Hayes & Bartlett, Inc.
1987-1988 *Senior Associate*. Directed projects in the economics of energy, antitrust, and other areas.

Dun & Bradstreet Technical Economic Services
1985-1987 *Director of Product Development*. Directed economic studies in energy, transportation, and industrial location.

John F. Kennedy School of Government, Harvard University
1980-1985 *Associate Professor*. Areas of instruction: microeconomics; benefit-cost analysis; environment; energy; natural resource economics; urban economics; public finance; transportation; law and economics. Participant, Harvard Faculty Project on Regulation. Faculty Steering Committee, Energy and Environmental Policy Center. Principal investigator in research grants.

President's Council of Economic Advisors
1979-1980 *Senior Staff Economist*. Worked with other White House staff and agency officials on domestic issues. Areas of responsibility included energy, environment and transportation. Principal staff on the Regulatory Analysis Review Group. Principal White House staff for the review of Administration policy regarding the automotive industry.

	Department of City and Regional Planning, Harvard University
1974-1979	*Assistant and Associate Professor*. Areas of instruction: microeconomics; statistics; econometrics; transportation; environment; urban development; and housing policy. Participant, MIT-Harvard Joint Center for Urban Studies. Faculty Chairman, Concentration in Land Use and Environment.
	National Bureau of Economic Research
1974	*Research Associate*. Co-author of benefit-cost study of automotive air pollution prepared by the National Academy of Sciences for the Committee on Public Works, U.S. Senate.
	U.S. Department of Transportation
1973-1974	*Economist*. Performed economic studies of transportation issues, including urban mass transportation, automobile emission and safety programs, and highway finance.
	Department of Economics, Harvard University
1970-1974	*Teaching Fellow and Assistant Head Tutor*. Areas of instruction: microeconomics; macroeconomics; econometrics; transportation; public finance; environmental policy; and housing policy.
	The Urban Institute
1971	*Research Economist*. Participated in econometric studies as participant in the Program on Local Public Finance.
	U.S. Department of Housing and Urban Development
1969	*Economist*. Participated in economic evaluations of HUD infrastructure programs, primarily the water and sewer grant program.

Honors and Professional Activities

Summa Cum Laude, Senior Honors Thesis, Harvard University.

Phi Beta Kappa, Harvard University.

Rees Jeffreys Scholar in the Economics of Transport, London School of Economics.

Graduate Prize Fellowship, Harvard University.

Member, American Economic Association.

Member, Association of Environmental and Resource Economists.

Member, International Association of Energy Economists.

Member, Public Policy for Surface Freight Transportation Study, Transportation Research Board, National Research Council.

Member, Advisory Committee, Massachusetts Department of Environmental Quality Engineering.

Member, Peer Review Panel, National Acid Precipitation Assessment Program.

Member, Public Health and Socio-Economic Task Force, South Coast Air Quality Management District (Los Angeles).

Member, Marketable Permits Advisory Committee, South Coast Air Quality Management District (Los Angeles).

Member, Socioeconomic Technical Review Committee, South Coast Air Quality Management District (Los Angeles).

Member, Harvard Graduate Society Council.

Member, RECLAIM Advisory Committee (Los Angeles).

Member, Board of Trustees, Cambridge Health Alliance (Harvard Medical School Teaching Hospital).

Participant, Aspen Institute Dialogue on Climate Change.

Member, U.S. Government Accountability Office Expert Panel on International Greenhouse Gas Emissions Trading.

Consultant to the following public and private organizations:

U.S. Environmental Protection Agency; U.S. Department of Transportation; Massachusetts Port Authority; Organization for Economic Cooperation and Development (OECD, Paris); European Commission Directorate-General Environment; Civil Aeronautics Board; Italian Ministry of Environment; Massachusetts Department of Environmental Protection; UK Department of Transport; UK Department for Environment, Food and Rural Affairs, UK Department of Trade and Industry, City of Chicago Department of Aviation; Conference Board of Canada; South Coast Air Quality Management District; Massachusetts Department of Environmental Management; and numerous state and local governments, trade associations, and private firms.

Reviewer for the following professional journals:

American Economic Review; Review of Economics and Statistics; Journal of Political Economy; Journal of Environmental Economics and

Management; Journal of Urban Economics; Journal of Regional Science; Journal of Policy Analysis and Management; and Public Policy.

I. Publications

A. Books

Who Pays for Clean Air. Cambridge, MA: Ballinger Publishing Company, 1975.

The Automobile and the Regulation of Its Impact on the Environment (co-author). Norman, OK: Oklahoma University Press, 1975.

B. Articles and Published Reports

Economics in Environmental Decision-Making: US Environmental Protection Agency Provides for Site-Specific Cost-Benefit Analysis in Setting 316(b) Clean Water Standards (with Noah Kaufman), NERA Economic Consulting, May 2014.

"Economic Policy Instruments for Reducing Greenhouse Gas Emissions" (with Andrew Foss, Per Klevnas, and Daniel Radov), chapter in *Oxford Handbook of Climate Change*, edited by David Schlosberg, John Dryzek, and Richard Norgaard, August 2011.

Climate Change Risks and Opportunities: How Companies Can Develop Information to Comply with SEC Guidance Regarding Climate Change Disclosure (with Andrew Foss), NERA Economic Consulting, February 2010.

A Victory for Economic and Environmental Rationality: Supreme Court Allows Cost-Benefit Analysis in Setting Important Clean Water Act Standards, NERA Economic Consulting, May 2009.

What Every Company Should Do to Prepare for a Mandatory US Greenhouse Gas Cap-and-Trade Program, in *Climate Policy Economics Insights*, NERA Economic Consulting, March 2009.

Now the Hard Work: How to Get the "Biggest Bang for the Buck" from the Federal Economic Stimulus Package, NERA Economic Consulting, February 2009.

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"Experience for Member States in Allocating Allowances: United Kingdom" (with Dan Radov) in *Allocation in the European Emissions Trading Scheme.* A. Denny Ellerman, Barbara K. Buchner and Carlo Carraro, Cambridge, UK: Cambridge University Press, 2007.

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Interactions of Greenhouse Gas Emission Allowance Trading with Green and White Certificate Schemes, European Commission Directorate-General Environment, November 2005.

Carbon Markets, Electricity Prices and "Windfall Profits"—Emerging Information from the European Union Emissions Trading Scheme, Electric Power Research Institute, September 2005.

Economic Instruments for Reducing Ship Emissions in the European Union, European Commission, Directorate-General Environment, June 2005.

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"Ex Post Evaluation of the RECLAIM Emissions Trading Program for the Los Angeles Air Basin," National Policies Division, OECD Environment Directorate, June 2003.

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IV. Presentations

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"Design Elements for Potential Canadian GHG Cap-and-Trade Program," presented at the Cap and Trade Working Group Retreat, Toronto, Ontario, January 31, 2008.

"Allocation in the EU ETS: What Have We Learned?" presented at the MIT workshop on EU ETS, Washington, DC, January 24, 2008.

"Emissions Trading: Background, Prior Programs and Implications for a U.S. Carbon Cap-and-Trade Program," presented at ALI-ABA Course on Clean Air: Law, Policy and Practice, Washington, DC, November 9, 2007.

"Overview of the European Union Emissions Trading Scheme for Carbon Dioxide," presented at EEI's 2007 Fall Legal Conference, Napa, California, October 4, 2007.

"Evaluating the Financial Impacts of Potential Carbon Cap-and-Trade Programs on Electricity Companies: What Every Electricity Company Should Do to Get Ready for Mandatory Climate Change Policy," presented at the Carbon Constraint Conference, Chicago, September 13, 2007.

"EU ETS Allocation Options: Reconciling Complexities and Simplicity/Transparency," presented before the IETA-CEPS Climate Change Conference, Brussels, Belgium, June 26, 2007.

"Overview of Allocation Methodologies and Principles," presented before the European Climate Change Programme working group on emissions trading, Brussels, Belgium, May 21, 2007.

"Allocation Choices for a Carbon Trading Program," presented at the Carbon Expo, Cologne, Germany, May 3, 2007.

"Allocation Choices and International Considerations," presented to Senate staff members, Washington, DC, February 2, 2007.

"Carbon Financial Analyses for Electricity Companies," presented at the Electric Utilities Environmental Conference, Tucson, Arizona, January 23, 2007.

"Carbon Emissions and State Electric Utility Regulation," presented at the Electric Utilities Environmental Conference, Tucson, Arizona, January 22, 2007.

"European Union Emissions Trading Scheme for Carbon Dioxide: Lessons and Implications," presented at North America and The Carbon Markets Conference hosted by Point Carbon and Pew Center on Global Climate Change, Washington, DC, January 18, 2007.

"Policy Design Side By Side: What Elements Matter," presented at North America and the Carbon Markets Conference hosted by Point Carbon and Pew Center on Global Climate Change, Washington, DC, January 17, 2007.

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"Carbon Markets, Linking, and Cost Containment," presented at the IEA/IETA/EPRI 6th Annual Emissions Trading Workshop, Paris, France, September 27, 2006.

"Auctioning Experience in Other Sectors and Implications for Designing a Carbon Auction," presented at the IETA Workshop on Allocation Methodologies, Paris, France, September 25, 2006.

"European Carbon Markets and Implications for a US Carbon Constrained Future," presented at Preparing for a Carbon Constrained Future Conference hosted by Electric Utility Consultants, Inc., Arlington, Virginia, June 28, 2006.

"Overview of the European Union Emissions Trading Scheme," presented to staff of the Senate Committee on Energy and Natural Resources, Washington, DC, June 16, 2006.

"Policies to Address Potential EU ETS Impacts on Power Prices and Industrial Competitiveness," presented at the CEPS/IETA Climate Change Conference, Brussels, Belgium, May 30, 2006.

"Learning from Experience: First Year of the European CO_2 Emissions Trading Scheme," presented to New Prospects for Climate Change Regulation Panel organized by Harvard Law School, March 10, 2006.

"Carbon Policies and Electric Utility Rate Cases," presented at the Managing the Modern Utility Rate Case Conference organized by Law Seminars International, Las Vegas, NV, February 14, 2006.

"Beyond Cost: Carbon Markets, Electricity Prices and 'Windfall Profits,'" presented to Electric Utilities Environmental Conference, Tucson, AZ, January 23, 2006.

"European CO_2 Emissions Trading Scheme: First Year Accomplishments and Implications," presented at an International Emissions Trading Association side event at the 11th Conference of the Parties to the Kyoto Protocol, Montreal, December 5, 2005.

"Allocation Choices for a U.S. Carbon Dioxide Emissions Trading Scheme," presented to National Commission on Energy Policy, Workshop on Allowance Allocation, Washington, DC, September 30, 2005.

"Carbon Markets, Electricity Prices and Windfall Profits: Emerging Information on the European Union Emissions Trading Scheme" presented to IEA-IETA-EPRI Emissions Trading Workshop, Paris, September 27, 2005.

"U.S. State-level Climate Regimes: Lessons from the U.S. and Europe, presented to Fourth Annual Green Trading Summit, New York, NY, May 2, 2005.

"Overview of Allocation Choices: Alternatives and Implications," presented to Stakeholder Workshop, Regional Greenhouse Gas Initiative, Boston, MA, October 14, 2004.

"Emissions Trading: Concepts, Experience, Lessons, and Implications Greenhouse Gas Programs," presented to Iberdrola, Cambridge, MA, March 25, 2004.

"How CEPCO Can Gain from CO_2 Trading," presented to Chubu Electric Power Co., Inc., Nagoya, Japan, November 25, 2003.

"The Rise of Emissions Trading in Air Quality and Climate Change Policy," presented to EPRI Environmental Sector Council, San Antonio, Texas, September 12, 2003.

"Greenhouse Gas Emissions Trading and Firm Risk Management Behavior", presented to the ARPEL-IPIECA Workshop, A Practical Approach to Identifying Emission Reduction Opportunities: Examples under the Kyoto Mechanisms in Latin America and the Caribbean, San Jose, Costa Rica, December 3, 2002.

"Initial Allocations in Various Systems of Emissions Trading" presented to the Exploring New Approaches in Regulating Industrial Installations (ENAP) Workshop on Emissions Trading for NO_X and SOx in Europe, The Hague, Netherlands, November 22, 2002.

"Overview of Alternative Allocations for European GHG Trading Program," presented to IEA-EPRI-IETA Workshop on Greenhouse Gas Emissions Trading, Paris, September 17, 2002.

"Evaluation of Alternative Allocations for European GHG Trading Program," presented to IEA-EPRI-IETA Expert Meeting: Allocation of GHG Objectives, Paris, September 16, 2002.

"Greenhouse Gas Emission Trading Programs," presented to Chubu Electric Company, Cambridge, MA, July 16, 2002.

"Evaluation of Alternative Allocations for European GHG Trading Program," presented to Chubu Electric Company, Cambridge, MA, July 16, 2002.

"Corporate Strategies and Practices for GHG Emission Reduction," presented to Chubu Electric Company, Cambridge, MA, July 15, 2002.

"Emission Trading: Concepts, Experience, and Lessons from Non-Greenhouse Gas Programs," presented to Chubu Electric Company, Cambridge, MA, July 15, 2002.

"Prospects for the EU Greenhouse Gas Trading Program," presented to EPRI Global Climate Change Research Seminar, Washington, DC, June 4, 2002.

"Evaluation of Alternative Allocations for European GHG Trading Program," presented to European Commission, Brussels, Belgium, November 13, 2001.

"Evaluation of Alternative Allocations for European GHG Trading Program," presented to ENVECO, Brussels, Belgium, November 13, 2001.

"CO_2 Permit Allocations: Evaluation of Alternatives for the EC," presented to the European Commission, Brussels, Belgium, March 5, 2001.

"Setting Baselines for Greenhouse Gas Trading: Lessons from Experience," presented to United Nations Framework Convention on Climate Change, Bonn, Germany, June 10, 2000.

"Setting Baselines for Greenhouse Gas Programs: Lessons from Experience," presented at the EPRI Global Climate Change Research Seminar, Washington, DC, May 18, 2000.

"Emissions Trading and Developing Countries: Implications of U.S. Experience and World Bank Role," presented at World Bank – Energy Week 2000, Washington, DC, April 13, 2000.

"Domestic GHG Trading: Assessing Impacts on Electric Utilities," presented to Electric Power Research Institute, Washington, DC, February 17, 2000.

"Energy-Environmental Policy Integration & Coordination (E-EPIC), U.S. Economic Growth & Health," presented to Electric Power Research Institute, Washington, DC, May 13, 1999.

"Priorities for the Development of GHG Trading Programs: Implications of the United States Experience," presented to the EPRI Global Climate Change Area Meeting, San Diego, California, January 26, 1999.

"Priorities for the Development of GHG Trading Programs: Implications of the United States Experience," presented to the Air & Waste Management Association Specialty Conference on Global Climate Change, Washington, DC, October 14, 1998.

"International Greenhouse Gas Trading," presented to the American Council for Capital Formation, Washington, DC, September 23, 1998.

"International Greenhouse Gas Emission Trading: Promise and Performance," presented to the EPRI Global Climate Change Research Seminar, Washington, DC, May 27, 1998.

"International Greenhouse Gas Trading: A 'Silver Bullet' Train?" presented to Sidebar Meeting, United Nations Framework Convention on Climate Change, Bonn, Germany, October 23, 1997.

"International Greenhouse Gas Trading," presented to the American Council for Capital Formation Conference on Global Warming, Washington, DC, September 24, 1997.

"International Greenhouse Gas Trading," presented to the National Association of Manufacturers, Washington, DC, September 17, 1997.

"International Greenhouse Gas Trading," presented to the American Automobile Manufacturers Association, Washington, DC, May 1, 1997.

"Emission Trading: Alternative Approaches, Experience and Implications for CO_2," prepared for the AAMA Climate Change Task Force, Washington, DC, September 27, 1996.

"Treatment of Greenhouse Gas Emissions in Electric Utility Resource Planning," prepared for the Third Conference on External Costs, *Internalization of Social Costs of Energy Conservation and Transportation in the United States and Europe for a Sustainable Development*, Ladenburg, Germany, May 29, 1995.

"Distributive Impacts of Economic Instruments for Greenhouse Gas Abatement," presented at the Air & Waste Management Association International Specialty Conference *Global Climate Change: Science, Policy and Mitigation Studies*, Phoenix, Arizona, April 6, 1994.

"New Approaches for Controlling Global Warming," presented to the Conference on Global Warming, Vermont Law School, South Royalton, Vermont, February 16, 1990.

B. Air Quality

Economic Impacts of a 65 ppb National Ambient Air Quality Standard for Ozone, *Webinar*, (with Anne E. Smith), prepared for the Association of Air Pollution Control Agencies, March 2, 2015.

"Cost-Effectiveness of Alternative Wood Stove New Source Performance Standards,"(with Andrew Foss), presentation to the U.S. Environmental Protection Agency, Raleigh, NC, February 28, 2013.

"Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations," presented to the U.S. Environmental Protection Agency, November 21, 2011.

"Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations," presented to the U.S. Office of Management and Budget, November 8, 2011.

"Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations," presented to the U.S. Treasury Department, October 26, 2011.

"Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations," presented to the White House Office of Public Engagement, October 25, 2011.

"Economic Effects of State Restrictions on Interstate Mercury Trading," presented at the Electric Utilities Environmental Conference, Tucson, Arizona, January 22, 2007.

"Using Emissions Trading to Regulate Mercury Emissions in Montana," presented at a Public Hearing, Billings, Montana, June 1, 2006.

"Developing an Emissions Trading Program for Regional Haze," presented to Midwest RPO Regional Air Quality Workshop, Chicago, IL, June 28, 2005.

"Developing an Emissions Trading Program for Regional Haze," presented to the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), via conference call from Boston, MA, June 1, 2005.

"Economic and Environmental Analyses of CARB Tier 3 Non-Handheld Exhaust Emission Regulations," presented to the California Air Resources Board staff in Sacramento, CA via videoconference from Boston, MA, September 18, 2003.

"Market Based Instruments and Shipping Emissions," presented to conference sponsored by DG Environment, Brussels, September 5, 2003.

"Economic and Environmental Analyses of CARB Tier 3 Non-Handheld Emission Regulations: Status Report and Preliminary Results", presented to Outdoor Power Equipment Institute and Engine Manufacturers Association (OPEI & EMA), Washington, DC, August 26, 2003.

"Ex Post Evaluation of the RECLAIM Emissions Trading Program for the Los Angeles Air Basin", presented to OECD Workshop on Ex Post Evaluation of Tradable Permits: Methodological and Policy Issues, Paris, January 21, 2003.

"Emissions and Cost-Effectiveness of the Pull-Ahead Requirements for Heavy Heavy-Duty Diesel Engines," presented to U.S. Office of Management and Budget, Washington, DC, July 24, 2002.

"Economic Analysis of Alternative EPA Snowmobile Regulations," presented to U.S. Environmental Protection Agency Office of Mobile Sources, Ann Arbor, Michigan, May 1, 2002.

"Impacts of ZEV Sales Mandate on California Fleet Emissions," presented to the California Air Resource Board, Sacramento, CA, September 7, 2000.

"Economic Assessment of the Cost-Effectiveness of Alternative MACT Standards for the Metal Coil Surface Coating Industry," presentation to the U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, August 2, 2000.

"Economics and Environmental Regulation: Opportunities and Obstacles," presented to Crowell & Moring, LLP, Washington, DC, March 22, 2000.

"RECLAIM: A Comprehensive Approach to Air Quality Regulation," presented to Edison Electric Institute, Washington, DC, March 6, 2000.

"Economic Assessment of the Cost-Effectiveness of Alternative Phase 2 Regulations for Handheld Engines," presented to the U.S. Environmental Protection Agency and Office of Management and Budget, Washington, DC, February 14, 2000.

"Economic Assessment of the Cost-Effectiveness of Alternative Phase 2 Regulations for Handheld Engines," presented to the U.S. Environmental Protection Agency, Office of Mobile Sources, Washington, DC, October 12, 1999.

"Economic Assessment of the Cost-Effectiveness of Alternative Phase 2 Regulations for Handheld Engines," presented to the U.S. Environmental Protection Agency, Office of Mobile Sources, Ann Arbor, Michigan, October 8, 1999.

"Costs & Benefits of Fish Protection Alternatives at the Salem Generating Facility," presented to the New Jersey Department Environmental Protection, Trenton, New Jersey, May 4, 1999.

"Economic Impacts of ARB Staff Proposed Marine Emission Standards," presented to the California Air Resources Board Hearing, Sacramento, California, December 10, 1998.

"Cost-Benefit Analysis of MACT Standards for Boat Manufacturing," presented to the National Marine Manufacturers Association, Tampa, Florida, October 15, 1998.

"Economic Analyses of Alternative California Standards for Exhaust Emissions from Marine Engines," presented to California Air Resources Board, Sacramento, California, October 9, 1998.

"Tradable Permits for Air Pollution Control: The United States Experience," presented to the Organization for Economic Cooperation and Development Workshop on Domestic Tradable Permit Systems for Environmental Management, Paris, September 24, 1998.

"NO_X Trading Program to Implement EPA's SIP Call," presented to Indiana Department of Environmental Management, Indianapolis, Indiana, May 4, 1998.

"Economic Analysis of Alternative EPA Standards for Large CI Non-Road Engines: Draft NERA Results," presented to the Engine Manufacturers Association and the Equipment Manufacturers Institute, Chicago, Illinois, September 4, 1997.

"Cost-Effectiveness of ARB Small Off-Road Engine Regulations: Preliminary Results," presented to the California Air Resources Board, Sacramento, California, May 2, 1997.

"RECLAIM: Turning Theory Into Practice for Emissions Trading in the Los Angeles Air Basin," presented to the NERA Seminar on Tradable Permits, London, United Kingdom, April 11, 1997.

"RECLAIM: Turning Theory Into Practice for Emissions Trading in the Los Angeles Basin," presented to the *International Workshop on Tradable Permits, Tradable Quotas and Joint Implementation*, University of Sussex, Brighton, United Kingdom, April 9, 1997.

"Economic Analyses of Alternative ARB Regulatory Requirements for Small SI Non-Handheld Engines," presented to the California Air Resources Board staff, El Monte, California, February 4, 1997.

"Cost-Effectiveness of Alternative Emission Control Technologies for Small Utility Engines," presented to California Air Resources Board staff, El Monte, California, December 18, 1996.

"Emission Regulations for Non-Road Engines," presentation to the U.S. Environmental Protection Agency, Ann Arbor, Michigan, July 17, 1996.

"Valuation of Externalities: Methods and Examples," presented to the PSP&ED Advisory Group of the Hawaiian Electric Company, Honolulu, Hawaii, April 3, 1996.

"Valuation of Externalities: Experience and Methods," presented to the Hawaiian Electric Company Externalities Advisory Group, Honolulu, Hawaii, January 31, 1996.

"Emission Regulations for Small Utility Engines," presented to Small Non-Road Engine Regulatory Negotiations, Ann Arbor, Michigan, December 13, 1995.

"Economic Evaluation of Alternative Regulations of Exhaust Emissions from Small Utility Engines," presented to U.S. Environmental Protection Agency, Ann Arbor, Michigan, November 28, 1995.

"Emission Regulations for Small Utility Engines," presented to California Air Resources Board staff, El Monte, California, October 3, 1995.

"Briggs & Stratton/NERA Phase 2 Economic Study," presented to U.S. Environmental Protection Agency, Ann Arbor, Michigan, September 22, 1995.

"RECLAIM: Turning Theory Into Practice for Emissions Trading in the Los Angeles Basin," presented to the Stanford Law School Environmental Markets Seminar, Stanford, California, March 8, 1995.

"Emission Trading for NO_X: Experience with RECLAIM," presented to Edison Electric Institute, Washington, DC, May 26, 1994.

"Emission Trading for NO_X: The RECLAIM Experience," presented to Edison Electric Institute, May 13, 1994.

"Projecting the Price of RECLAIM Trading Credits for NO_X," presented at a California Energy Commission Workshop, Sacramento, California, February 4, 1994.

Comments on "Presumptive Pigouvian Tax: Complementing Regulation to Mimic an Emissions Fee," presented to the Conference on Market Approaches to Environmental Protection, Stanford University, Palo Alto, California, December 3, 1993.

"Economic Effects of Regulatory Requirements to Protect Grand Canyon Visibility," presented to the Grand Canyon Visibility Transport Commission, Salt Lake City, Utah, October 21, 1993.

"Evolving Role of Externalities in Utility Activities," presented to the Electric Power Research Institute Energy Analysis Task Force, Nashville, Tennessee, September 29, 1993.

"External Costs of Electricity Generation in Southern Nevada," presented on behalf of Nevada Power Company, at a workshop sponsored by the Nevada Public Service Commission, Las Vegas, Nevada, May 19, 1993.

"Environmental Externalities," presented to Central and Southwest Corporation, Dallas, Texas, May 4, 1993.

"Creating Markets for Environmental Protection: Overview of Experience with Tradable Permit Systems," presented at The Claremont Institute

Conference *Environmental Protection Through Market Incentives: A Strategy for the Future*, Los Angeles, California, January 20-21, 1993.

"Tradable Permits and Social Costing: The California Experience," presented at the American Economic Association and Allied Social Science Association Meetings, Anaheim, California, January 6, 1993.

"The Distributive Impacts of Economic Instruments for Environmental Policy," presented to the OECD Group on Economic and Environmental Policy Integration, Paris, November 19, 1992.

"Emissions Trading: A Better Way to Incorporate Environmental Costs in Electric Utilities Resource Planning," presented at the Pace University

Center for Environmental Legal Studies Conference on *Incorporation of Social Costs of Energy in Resource Acquisition Decisions,* Racine, Wisconsin, September 8-11, 1992.

"Banking and Trading of Air Emission Reduction Credits," presented to the State of Connecticut Office of Policy and Management Meeting on Emissions Trading, Hartford, Connecticut, July 22, 1992.

"The Distributive Effects of Economic Instruments for Environmental Policy," presented to the OECD Group on Economic and Environmental Coordination, Paris, June 18, 1992.

"A Marketable Permits Program for the Los Angeles Air Basin," prepared for MIT Center for Energy and Environmental Policy Research *1992 New Developments Workshop*, Cambridge, Massachusetts, April 30, 1992.

"The Road From Theory to Practice: Developing a Marketable Permits Program for the Los Angeles Air Basin," seminar presented to the MIT Center for Energy and Environmental Policy Research, Cambridge, Massachusetts, March 11, 1992.

"Southern California Edison Damage-Based Values for Residual Emissions Valuation," presented to the California Energy Commission ER 92 Committee Workshop on Air Emission Damage Functions, Sacramento, California, January 29, 1992.

"Turning Theory Into Practice: Developing a Marketable Permits Program for the Los Angeles Basin," prepared for Project 88 -- Round II Seminar, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts, December 11, 1991.

"Workshop on Economic Instruments," prepared for Imperial Oil Ltd., Toronto, Canada, October 1-2, 1991.

"Market-Based Approaches to Air Quality Improvement," presented to the Board of Directors of the California Council for Environmental and Economic Balance, San Diego, California, July 1991.

"Environment and Equity," presented to the Board of Directors of the California Council for Environmental and Economic Balance, San Diego, California, July 1991.

"Contribution of Economists to Environmental Policy: Comments on the Gruenspect-Lave Critical Review," presented to the Air and Waste Management Association, Vancouver, British Columbia, June 19, 1991.

"Airports and Economic Development," presented to the Southeast Chicago Development Commission, Chicago, Illinois, May 24, 1991.

"Environmental Economics in the 1990s," presented to the OECD Group of Economic Experts, Paris, May 16, 1991.

"The Clean Air Act: How to Make the Mandate Worth the Effort," presented to the Workshop on Emerging Environmental Policies and Business, North Carolina State University, Raleigh, North Carolina, April 18, 1991.

"Market-Based Approaches to Managing Air Emissions in California's South Coast Basin," presented to Workshop on Market Incentives, South Coast Air Quality Management District, El Monte, California, January 29, 1991.

"Market-Based Approaches to Managing Air Emissions in California's South Coast Basin," presented to the Steering/Advisory Committee on Market Incentives, South Coast Air Quality Management District, Los Angeles, California, December 11, 1990.

"How Environmental Policies Influence Natural Gas Markets," presented to the Conference on Emerging Competition in California Gas Markets, sponsored by the California Energy Commission, San Diego, California, November 9, 1990.

"Air Quality and Electric Vehicles," presented to the Electric Vehicle Symposium, sponsored by the Western Energy Supply and Transmission Associates, Ontario, California, November 8, 1990.

"Incorporating Environmental Impacts in Public Utility Commission Regulation," presented to the Energy Research Group, Washington, DC, November 6, 1990.

"The Promise and Performance of the Acid Rain Allowance Program," presented to the Conference on the New Acid Rain Legislation: Capitalizing on a Market-Based Approach, sponsored by Public Utilities Reports, Inc., Washington, DC, October 24, 1990.

"What Environmental Legislation Means for Crude Oil Marketers: A U.S. Overview," prepared for the Oxford College of Petroleum Studies, Long Beach, California, presented October 1, 1990.

"Market-Based Approaches for Environmental Improvement," presented to the Eleventh Annual Antitrust and Trade Regulation Seminar, sponsored by National Economic Research Associates, Santa Fe, New Mexico, July 5-7, 1990.

"Using Market-Based Approaches in the Energy Sector," presented to the OECD Economic Incentives Working Group, Paris, June 19-20, 1990.

"Emissions Trading: Concepts and Experience," prepared for The Canadian Electrical Association and presented at the *Workshop on Tradable Permits*, Toronto, Canada, June 13, 1990.

"Prototypical Trading Policy: Stationary Sources of NO_X," prepared for NO_X/VOC Task Force and presented at the *Workshop on Flexible Mechanisms*, Montreal, Canada, June 6-7, 1990.

"Emissions Trading: An Overview of Concepts and Experience," prepared for NO_X/VOC Task Force and presented at the *Workshop on Flexible Mechanisms,* Montreal, Canada, June 6-7, 1990.

"Market-Based Approaches for Environmental Improvement," presented to the Board of Directors, The Conference Board of Canada, Edmonton, Canada, May 30, 1990.

"Market-Based Approaches for Environmental Protection: Lessons from the U.S. Experience," presented to the Advisory Board, Research Program on Business and the Environment, The Conference Board of Canada, Toronto, Canada, April 24, 1990.

"Ozone and Economics," presented to the Air and Waste Management Association, Los Angeles, California, March 20, 1990.

"Clear Thinking on Clear Air: Agenda for the 1990's," paper and panel discussion presented at the American Enterprise Institute's Thirteenth Annual Policy Conference, Washington, DC, December 4, 1989.

"The Acid Rain Allowance Program," presented to the Energy Research Group, Washington, DC, November 3, 1989.

C. Water Quality

"Cost-Benefit Assessments for 316(b): Some Implementation Issues," presented at UWAG Webinar on 316(b) Implementation Issues, August 5, 2015.

"Benefit-cost Assessment of Section 316(b) Entrainment Alternatives," presented at the EUCI Conference on 316(b), Providence, Rhode Island, October 8, 2014

"Benefit-Cost Analysis in Section 316(b) BTA Determinations: The Road Ahead," presented at the American Fisheries Society Symposium, Seattle, Washington, September 6, 2011.

"Cost-Benefit Analysis for Fish Impingement and Entrainment Reduction at Pickering Nuclear Generating Station," presented to Canadian Nuclear Safety Commission, Ottawa, Canada, October 29, 2009.

"Cost-Benefit Analysis for Fish Impingement and Entrainment Reduction at Pickering Nuclear Generating Station," presented at Ontario Power Generation Inc. Stakeholder Workshop, Ontario, Canada, September 29, 2009

Uncertainty in §316(b) Compliance Demonstration: Case Study Including Monte Carlo Analysis," presented at the UWAG/EPRI Conference on Technologies and Techniques for §316(b) Compliance, Atlanta, Georgia, September 7, 2006.

"Electricity System Impacts of Nuclear Shutdown Alternatives," presented to New York City Council, New York, NY, May 7, 2002.

"Electricity System Impacts of Nuclear Shutdown Alternatives," presented to Westchester County Board of Legislators Committee on Environment and Health, Westchester, New York, April 29, 2002.

"An Economic Approach to 316(b) BTA Determination," presented to the UWAG 316(b) Technical Workshop for the Environmental Protection Agency, Annapolis, Maryland, January 25, 2001.

"Methodology for Cost-Benefit Assessment of Fish Protection Alternatives for the Mercer Facility," presentation to the Mercer 316(b) Permit Team, Newark, New Jersey, August 8, 2000.

"Roadmap for Costs & Benefits of Fish Protection Alternatives for the Salem Facility," presented to the Monitoring Advisory Committee, Mt. Laurel, New Jersey, December 9, 1999.

"Natural Resource Damage Assessments: Economic Techniques," presented to PSE&G, Newark, New Jersey, December 9, 1997.

"Use of Economic Analysis in Environmental Impact Statements and Other Regulatory Proceedings," presented to Hudson River Utilities, New York, New York, November 19, 1997.

"Combining Science and Economics: The Case of Superfund," presented to ENVIRON, Princeton, New Jersey, May 16, 1995.

"Social Costing: Policy Overview," presented to the British Columbia Utilities Commission Social Costing Workshop, Vancouver, British Columbia, March 29, 1995.

D. Economic Impact

Economic Impacts of a 65 ppb National Ambient Air Quality Standard for Ozone, Webinar, (with Anne E. Smith), prepared for the Association of Air Pollution Control Agencies, March 2, 2015.

"Cumulative Energy Market Impacts of Various Environmental Regulations," presented at Law Seminars International, Utility Rate Case Issues and Strategies 2013, Las Vegas, Nevada, February 21, 2013.

"Financial Implications of a US Cap-and-Trade Program for Sectors and Companies," presented at 2nd Annual Carbon Trading Summit, New York City, January 13, 2010.

"Evaluating the Impact of Future E.U. Chemical Policy on the French Economy," presented to REMI Northeast Policy Analysis and Users' Conference, Boston, MA, January 31, 2006.

"Background on NERA Study 'Socioeconomic Effects of the Niagara Power Project and Local NYPA Presence'," presented to Niagara Power Project Relicensing Stakeholder Meeting, Niagara Falls, NY, November 13, 2003.

"Economic Benefits to the Chicago Region from the Whitecap Energy System," presented to the Illinois Department of Natural Resources, Springfield, Illinois, January 30, 2001.

"Fueling Electricity Growth for a Growing Economy," presented to Edison Electric Institute, Palm Springs, California, January 13, 2000.

"Economic Impact Analyses with REMI: Two Case Studies," presented to the REMI Seminar, Miami, Florida, October 6, 1997.

"Impacts on the Hawaii Economy of Alternative Resource Plans for Oahu," presented to the Hawaiian Electric Company IRP Advisory Group, Honolulu, Hawaii, July 24, 1997.

"Economic and Environmental Effects in Maine of the Maritimes & Northeast Pipeline Project," presented to the Maine Economic Development Council, Rockland, Maine, February 12, 1997.

"Economic and Environmental Effects of the Maritimes & Northeast Pipeline Project," presented to a media conference and Editorial Boards of the *Bangor Daily News*, the *Portland Press Herald,* and the *Kennebec Journal*, Bangor and Augusta, Maine, November 21, 1996.

"Assessing the Economic Impacts of Alternative HECO Resource Plans," presented to the PSP&ED Advisory Group of the Hawaiian Electric Company, Honolulu, Hawaii, July 3, 1996.

"The Lake Calumet Airport and Chicago's Economic Future," presented to the Lake Calumet Airport Advisory Committee, Chicago, Illinois, July 2, 1991.

"Socioeconomic Impacts of Proposed Rule 431.2," prepared for Southern California Edison and presented to the South Coast Air Quality Management District, Los Angeles, California, May 4, 1990.

"An Economist Looks at the Federal Regulation of Biotechnology," presented to the Conference on Emerging Issues in Biotechnology, sponsored by Boston University Law School, Boston, Massachusetts, March 2, 1990.

Overview of REMI

This overview is based on text prepared by Regional Economic Models, Inc. More detailed information is available from REMI PI+.[1]

REMI PI+ is a structural economic forecasting and policy analysis model. It integrates input-output, computable general equilibrium, econometric, and economic geography methodologies. The model is dynamic, with forecasts and simulations generated on an annual basis and behavioral responses to compensation, price, and other economic factors.

The model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, and other detail in the specific model being used. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Compensation, Prices, and Costs, and (5) Market Shares.

The Output and Demand block consists of output, demand, consumption, investment, government spending, exports, and imports, as well as feedback from output change due to the change in the productivity of intermediate inputs. The Labor and Capital Demand block includes labor intensity and productivity as well as demand for labor and capital. Labor force participation rate and migration equations are in the Population and Labor Supply block. The Compensation, Prices, and Costs block includes composite prices, determinants of production costs, the consumption price deflator, housing prices, and the compensation equations. The proportion of local, inter-regional, and export markets captured by each region is included in the Market Shares block.

Models can be built as single region, multi-region, or multi-region national models. A region is defined broadly as a sub-national area, and could consist of a state, province, county, or city, or any combination of sub-national areas.

Single-region models consist of an individual region, called the home region. The rest of the nation is also represented in the model. However, since the home region is only a small part of the total nation, the changes in the region do not have an endogenous effect on the variables in the rest of the nation.

Multiregional national models also include a central bank monetary response that constrains labor markets. Models that only encompass a relatively small portion of a nation are not endogenously constrained by changes in exchange rates or monetary responses.

The following sub-sections describe the five blocks of the REMI PI+ model in more depth.

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[1] See http://www.remi.com/index.php?page=documentation&hl=en_US.

A. Block 1: Output and Demand

This block includes output, demand, consumption, investment, government spending, import, commodity access, and export concepts. Output for each industry in the home region is determined by industry demand in all regions in the nation, the home region's share of each market, and international exports from the region.

For each industry, demand is determined by the amount of output, consumption, investment, and capital demand on that industry. Consumption depends on real disposable income per capita, relative prices, differential income elasticities, and population. Input productivity depends on access to inputs because a larger choice set of inputs means it is more likely that the input with the specific characteristics required for the job will be found. In the capital stock adjustment process, investment occurs to fill the difference between optimal and actual capital stock for residential, non-residential, and equipment investment. Government spending changes are determined by changes in the population.

B. Block 2: Labor and Capital demand

The Labor and Capital Demand block includes the determination of labor productivity, labor intensity, and the optimal capital stocks. Industry-specific labor productivity depends on the availability of workers with differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to a specialized labor force.

Labor intensity is determined by the cost of labor relative to the other factor inputs, capital and fuel. Demand for capital is driven by the optimal capital stock equation for both non-residential capital and equipment. Optimal capital stock for each industry depends on the relative cost of labor and capital, and the employment weighted by capital use for each industry. Employment in private industries is determined by the value added and employment per unit of value added in each industry.

C. Block 3: Population and Labor Supply

The Population and Labor Supply block includes detailed demographic information about the region. Population data is given for age, gender, and ethnic category, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. These participation rates respond to changes in employment relative to the potential labor force and to changes in the real after-tax compensation rate. Migration includes retirement, military, international, and economic migration. Economic migration is determined by the relative real after-tax compensation rate, relative employment opportunity, and consumer access to variety.

D. Block 4: Compensation, Prices, and Costs

This block includes delivered prices, production costs, equipment cost, the consumption deflator, consumer prices, the price of housing, and the compensation equation. Economic geography concepts account for the productivity and price effects of access to specialized labor, goods, and services.

These prices measure the price of the industry output, taking into account the access to production locations. This access is important due to the specialization of production that takes place within each industry, and because transportation and transaction costs of distance are significant. Composite prices for each industry are then calculated based on the production costs of supplying regions, the effective distance to these regions, and the index of access to the variety of outputs in the industry relative to the access by other uses of the product.

The cost of production for each industry is determined by the cost of labor, capital, fuel, and intermediate inputs. Labor costs reflect a productivity adjustment to account for access to specialized labor, as well as underlying compensation rates. Capital costs include costs of non-residential structures and equipment, while fuel costs incorporate electricity, natural gas, and residual fuels.

The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include housing prices. Housing prices change from their initial level depending on changes in income and population density.

Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

E. Block 5: Market Shares

The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include housing prices. Housing prices change from their initial level depending on changes in income and population density. Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

BEFORE THE

PUBLIC UTILITIES COMMISSION OF OHIO

THE DAYTON POWER AND LIGHT COMPANY

CASE NO. 16-0395-EL-SSO
CASE NO. 16-0397-EL-AAM
CASE NO. 16-0396-EL-ATA

DIRECT TESTIMONY
OF CRAIG L. JACKSON

- □ **MANAGEMENT POLICIES, PRACTICES, AND ORGANIZATION**
- □ **OPERATING INCOME**
- □ **RATE BASE**
- □ **ALLOCATIONS**
- □ **RATE OF RETURN**
- □ **RATES AND TARIFFS**
- ■ **OTHER**

BEFORE THE

PUBLIC UTILITIES COMMISSION OF OHIO

DIRECT TESTIMONY OF

CRAIG L. JACKSON

ON BEHALF OF
THE DAYTON POWER AND LIGHT COMPANY

TABLE OF CONTENTS

I. INTRODUCTION

Q. Please state your name, employer and business address.

A. My name is Craig L. Jackson. I am employed by AES US Services, LLC, which is the service company that serves The Dayton Power and Light Company ("DP&L" or the "Company"). My business address is One Monument Circle, Indianapolis, IN 46204.

Q. What is your position and professional relationship with DP&L?

A. I am DP&L's Chief Financial Officer and Director, Vice President, and Chief Financial Officer of AES US Services, LLC ("AES Services").

Q. How long have you been in your present position?

A. I have been the Chief Financial Officer of DP&L since May 2012 and the Vice President, Director and Chief Financial Officer of AES Services since May 2013.

Q. What are your responsibilities in your current position?

A. In my current position, I report to the President of AES Services. I have direct responsibility and oversight for accounting, tax, financial planning, treasury, risk management, and internal audit functions of DP&L and other AES affiliates.

Q. Will you describe briefly your educational and business background?

A. I received a Bachelor of Science degree in Business Administration from Bloomsburg University in 1996. I also earned a Masters of Business Administration degree in Finance from Wright State University in 2001.

I joined DP&L in February 2000 as Financial Analyst, Corporate Modeling. In December 2002, I accepted the position of Team Leader, Independent System Operator

("ISO") Settlements, with PPL Corporation. In June 2004, I returned to DP&L as Manager, Financial Planning and Analysis, reporting to the Chief Financial Officer. From June 2004 to May 2012, I was promoted through several positions of increasing responsibility within the Treasury organization, the last of which was as Vice President and Treasurer. In May 2012, I was promoted to Chief Financial Officer at DP&L. In May 2013, I accepted my current position.

Prior to joining DP&L in February of 2000, I served in the United States Air Force ("Air Force") as a Finance Technician. I began my service with the Air Force in May 1996.

Q. Have you previously provided testimony before the Public Utilities Commission of Ohio ("PUCO" or the "Commission"), any other state commission or the Federal Energy Regulatory Commission ("FERC")?

A. Yes. I have sponsored testimony before the PUCO in Case No. 12-426-EL-SSO et al (DP&L's last Electric Security Plan proceeding). I have also provided testimony before the Indiana Utility Regulatory Commission in Cause No. 44339 (IPL Replacement Generation Projects) and Cause No. 44576 (IPL Basic Rate Case).

II. PURPOSE OF TESTIMONY

Q. What are the purposes of this testimony?

A. The purposes of my testimony in this proceeding are to: (1) support the Company's pro forma financial projections for the period of this Electric Security Plan filing (January 2017 through December 2026); (2) address the future uncertainty of the Company's Coal Generation Plants; (3) address the Reliable Electricity Rider ("RER"), including the economic viability and retail electric service certainty it will provide; and (4) support the Company's long-term cost of debt calculations.

Q. What workpapers and exhibits are you supporting?

A. I am sponsoring the following workpapers and exhibits, which satisfy the requirements set forth in Ohio Administrative Code 4901:1-35-03:

(1) Exhibit CLJ-1: Projected Statements of Income – DPL Inc.

(2) Exhibit CLJ-2: Projected Balance Sheet – DPL Inc.

(3) Exhibit CLJ-3: Projected Statements of Cash Flow – DPL Inc.

(4) Exhibit CLJ-4: Projected Statements of Income – Dayton Power and Light

(5) Exhibit CLJ-5: Projected Balance Sheet – Dayton Power and Light

(6) Exhibit CLJ-6: Projected Statements of Cash Flow – Dayton Power and Light

(7) Exhibit CLJ-7: Section D from The Company's Distribution Rate Case filing before the PUCO (Case No. 15-1830-EL-AIR et al) as sponsored or co-sponsored by Company Witness MacKay.

Q. Please summarize the results from the pro forma financial statements.

A. The pro forma Income Statement, Balance Sheet, and Cash Flow for DPL Inc. and DP&L for the 2017 through 2026 period are provided on Exhibits CLJ-1 through CLJ-6. In summary, the projections reflect the effect of (a) the RER on DPL Inc. beginning in 2017, (b) a distribution rate increase, as filed by the Company, beginning in 2017 (Case No. 15-1830-EL-AIR et al) along with a future distribution rate increase in 2022 to recover costs, (d) effectuating generation separation by January 1, 2017, (e) realizing the 50% / 50% capitalization structure at DP&L per the PUCO's Generation Separation Order, and (f) utilizing cash available, after paying all costs and necessary capital investments at the generation and Transmission and Distribution ("T&D") businesses, to reduce and retire debt at DPL Inc.

Q. Which of the Company's Coal Plants are included in the Company's RER?

A. The Company's Coal Plants ("Coal Plants"), which will be transferred to an unregulated affiliate ("Ohio Genco") upon separation, are included in the Company's proposed RER. The Coal Plants included in the rider are:

(1) Stuart Units 1 – 4
(2) Killen
(3) Miami Fort Units 7 & 8
(4) Zimmer
(5) Conesville Unit 4
(6) Ohio Valley Electric Corporation ("OVEC")

Q. Are these Coal Plants owned solely by DP&L?

A. No. DP&L does not solely own any of the Coal Plants. All of DP&L's Coal Plants are co-owned.

Q. Please summarize the justification for the Company's proposed RER.

A. The proposed RER is critical for the Company as it will (a) ensure the long term economic viability of the Coal Plants and (b) ensure the Coal Plants continue to provide a stable and reliable energy supply for customers. Based on the forward commodity price forecast supported by Company Witness Meehan, the Rider would result in a significant financial benefit to customers over the 10-year forecast period (2017 – 2026).

Additionally, the RER will enable the Company and its parent, DPL Inc., to maintain their financial integrity as described in Company Witness Malinak's testimony, and recapitalize their balance sheets as required by the Commission.

III. FINANCIAL STATEMENTS

Q. Does DP&L's Application comply with Ohio Administrative Code 4901:1-35-03, and if so, how?

A. Yes. In seeking approval for the Electric Security Plan ("ESP"), the Company must meet certain filing requirements as described in OAC 4901:1-35-03. These requirements include providing pro forma financial projections for the filing period (2017 through 2026) as well as calculations of its projected return on equity for each year of the ESP. The OAC also requires Balance Sheet and Income Statement information along with methodology and assumptions for these projections. DP&L satisfies these requirements by providing Balance Sheet, Income Statements, Cash Flow Statements, and return on equity projections for every year of the filed ESP period (2017 through 2026). The pro forma financial statements and projections for DP&L are included in Exhibits CLJ-4, CLJ-5 and CLJ-6.

Q. What methodology and associated processes were used to develop the financial statements?

A. The pro forma financial statements included in Exhibits CLJ-1 through CLJ-6 reflect the projected financial effect of the Company's filed ESP and were developed consistently with the methodology and process used by the Company for preparing its normal operating forecast. This methodology is a "bottom up" approach to forecasting that requires input and assumptions from a variety of areas within the Company. The assumptions, which include distribution sales, Standard Service Offer sales, generation plant characteristics, operating cost projections, capital expenditures and financing assumptions, among others, are reviewed with the business areas to determine the most reasonable set of assumptions to be incorporated into the forecast. As we progress through the business year, we track and monitor actual results compared to the forecast. Based on actual results combined with potential changes in business and market conditions, the forecast is adjusted as needed. The process makes the forecast a reliable one.

Q. What are the major components of the financial forecast?

A. The inputs and assumptions received are used to derive the following major components of the forecast:

(1) Distribution baseline sales volumes;
(2) Commodity and capacity price forecast;
(3) Generation dispatch forecast;
(4) Retail and wholesale revenue estimates;
(5) Operations and maintenance expense forecast;
(6) Capital expenditures forecast; and
(7) Financing Assumptions

Q. How are each of the above components developed?

A. The development and methodology for each of these major components are as follows:

(1) <u>Distribution Baseline Sales Volumes</u> – The distribution baseline sales volumes are consistent with the Company's most recent Long-Term Forecast Report filing, Case No. 15-0663-EL-FOR.

(2) <u>Commodity and Capacity Price Forecast</u> – Consistent with the Commission's stated guidelines, the Company has utilized commodity and capacity price forecasts from an independent third party. The commodity and capacity price forecasts are described in Company Witness Meehan's testimony.

(3) <u>Generation Dispatch Forecast</u> – The generation dispatch forecast and the associated revenues (energy, capacity and ancillary) and fuel and emissions costs are provided by Company Witness Meehan.

(4) <u>Retail and wholesale revenue estimates</u> – The retail revenues reflected in the Company's pro forma financial statements include tariff rates as proposed in DP&L's recently filed Distribution Rate Case (Case No. 15-1830-EL-AIR et al), revenues associated with the Company's filed RER in this case, and the distribution baseline sales volume described earlier. Additionally, retail revenues incorporate the impacts from the Competitive Bid Process ("CBP"), which are completely offset by a corresponding expense.

Wholesale revenue estimates are provided by Company Witness Meehan and are based on forecasted generation output and his view of future wholesale market prices.

(5) <u>Operations and Maintenance ("O&M") Expense Forecast</u> – O&M expenses are forecasted by (and reviewed with) all of the business areas within the Company.

Underlying the O&M forecasts are assumptions for various items such as projected salary increases and inflationary factors. Each area's O&M forecast includes staffing plans, labor costs, and other operational costs necessary to perform the functions of the specific area.

(6) <u>Capital Expenditures Forecast</u> – Capital expenditures are forecasted by (and reviewed with) all of the business areas within the Company, although a substantial portion of the forecast is driven by the Company's operational groups: Transmission, Distribution, and Generation. The forecast includes specific projects with estimated in-service dates as well as dollars to fund smaller projects under a blanket capital budget. The capital expenditures and related in-service dates are used to estimate depreciation (book and tax) and capitalized interest.

(7) <u>Financing Assumptions</u> – Financing assumptions, including but not limited to assumptions related to new financings, refinancings, debt retirements, and overall capitalization targets, are provided by DP&L's Treasury organization and reviewed by the finance leadership team. The forecasts include specific plans related to (a) known and measurable events, including the refinancing of near term debt obligations and (b) targeted use of excess (or discretionary) cash flows for debt reductions / retirements.

Q. What assumptions did you make since the Company now supplies 100% of the Standard Service Offer through the Competitive Bid Process ("CBP")?

A. As of January 1, 2016, the Company sources 100% of its standard service offer through the CBP. The CBP is consistent with the timeline ordered by the PUCO in DP&L's

previous ESP proceeding. Therefore, there are no financial impacts related to the CBP in the Company's pro forma financial statements.

Q. Do your pro forma financial statements account for generation separation?

A. Yes. The pro forma financial statements assume that generation separation is effectuated as of January 1, 2017 in accordance with the timeline ordered by the PUCO in Case No. 12-426-EL-SSO.

Q. Do you anticipate issuing incremental long-term debt at DP&L over the forecast period?

A. No, not at this time. In fact, the Company will be reducing debt to meet the PUCO's 50% debt to total capitalization requirement.

IV. <u>RELIABLE ELECTRICITY RIDER</u>

Q. What entity will control and determine the operations of the included plants?

A. The Ohio Genco will continue to operate Stuart and Killen, and participate as a non-operating co-owner in the development of budgets and operating and capital investment decision making. The plants will continue to be operated in accordance with standard utility practice.

Q. Can you explain how the RER would operate?

A. Yes. Prior to the start of each calendar year, projections will be made of annual variances between (1) the revenue requirement for the fleet of Coal Plants (including return on and of invested capital, income taxes, and fixed O&M), and (2) the revenues expected to be earned by that fleet from the sale of capacity (net of capacity penalties), energy (net of fuel, emission allowance costs, and variable operating costs), and ancillary services to

PJM markets. The annual variance would be transferred between DP&L and Ohio Genco. That amount would either be a credit or a charge to customers.

Q: Please explain how the revenue requirement would be calculated.

A: The initial revenue requirement proposed here is based on the rate base of the assets, plus known and measurable changes in investments, of the Company's Coal Plants, multiplied by a rate of return on investment plus a projection of O&M costs and other costs traditionally recognized by the Commission in establishing a revenue requirement.

Prior to the start of each calendar year, the revenue requirement and market revenues will be projected based on then-current information for the next calendar year, and the payments between DP&L and Ohio Genco as well as the level of the Rider will be determined for the one year period.

Q: Would the RER operate counter-cyclically with capacity prices and net energy revenues?

A: Yes. If the PJM capacity prices increase and net energy revenues increase, then the Rider charge would decrease (or the Rider credit would increase), and vice-versa. Because capacity auctions have taken place within PJM for the 2016-17, 2017-18 and 2018-19 planning years (June 1 – May 30) and capacity prices in those later two periods are higher than in the first period, one can already project that that component of the Rider will be reduced relative to what is proposed for calendar year 2017. Net energy margins will also influence the size of the proposed Rider for those periods and Company Witness Meehan sponsors projected market prices and calculations of DP&L's resulting margins. The projections of revenues and costs are subject to uncertainty. That uncertainty is a primary reason that DP&L proposes to adjust the Rider each year to take more current projections of capital expenditures, operating costs and net energy margins into account and for DP&L's proposal to true-up the Rider after the end of the year to reflect actual capacity prices, net energy and ancillary service margins, and actual fixed costs.

Q. How have market dynamics affected the Coal Plant operations?

A. There are a number of factors affecting the Company's coal portfolio. Recent auctions for PJM's reliability pricing market ("RPM") capacity market have produced prices well below the "Net Cost of New Entry," despite large numbers of new combined-cycle power plants clearing, along with substantial demand-side resources and energy efficiency providers. In addition, the price of natural gas has dropped to historically low prices, allowing combined cycle gas plants to increase their production and causing coal plant output to fall in turn. Load growth has been anemic at best with the combination of a slow economic recovery and increased energy efficiency holding down demand for electricity. All of these factors have strained the financial performance of the Coal Plants and have reduced the financial resources available to the Company to optimally invest in the continued maintenance and reliability of the Coal Plants.

Q. Will these market dynamics continue in both the near and long-term?

A. Forward natural gas prices suggest that electric energy prices will continue to be held down over the next couple of years. NERA is projecting that they will rise in the later years, as explained by Company Witness Meehan, which would bring relief for the Coal Plants. Capacity prices are known through 2018/19. Beyond that, pricing will be driven by future load growth, new plant entry economics and the extent of continued entry by demand resources.

Q. Has PJM's Capacity Performance product improved market certainty?

A. Not really. The Capacity Performance ("CP") product was introduced for the 2018/19 auction with transitional auctions for earlier years. It has led to higher prices than were previously seen but also introduces substantial penalties for non-performance in critical peak times in the summer or winter. While the CP market will produce higher prices than what is now known as the Reliability Pricing Model ("RPM"), its pricing outcomes have the same uncertainties and carry much more performance risk.

Q. Are the market dynamics specific to the Company's Coal Plants?

A. No. These dynamics are affecting all coal plants as well as nuclear power plants in PJM.

Q. Are premature retirements a likely outcome of current regulatory policies?

A. Yes. In just the past three years, DP&L has retired 365 MW of capacity at its Hutchings Station, which had a workforce of approximately 60 employees in 2011. DP&L owned half of Beckjord Unit 6 (207 MW our share), which Duke retired in October 2014 along with several other Beckjord units. Although not a retirement, DP&L sold its 138 MW share of East Bend Unit 2 to Duke Energy Kentucky (its co-owner) which is operating under a traditional cost-of-service form of regulation and, therefore, can continue to recover 100% of its prudently incurred costs.

Across the state of Ohio, other utilities have retired 6,018 MWs since 2011. Throughout PJM, power plants totaling 24,289 MWs have been retired during this same period. The

PJM RTO has approved the requested retirement of an additional 3,876 MWs between 2016 and 2020[1].

Q. What is the near to long-term viability of the Coal Plants if the RER is not approved?

A. Abnormally low natural gas prices over the past few years, a function of the gas fracking boom have had a significant adverse effect on coal-fired power plant revenues in two specific ways: (1) Reduction in volume: dispatch is done within PJM based primarily on marginal costs. When natural gas prices fall far enough, the highest-efficiency combined-cycle gas-fired units in PJM will be dispatched prior to coal-fired units. The "first-dispatched" wind and solar energy and increased dispatch of gas-fired generation, mean that coal-fired units that traditionally ran 24 hours a day as base load units are often dispatched for fewer hours during the day. (2) Reduction in dark spreads; the dark spread, or the difference between per unit cost necessary to generate energy and the per unit price of which that energy can be sold, represents the margin a coal generator earns on energy. As natural gas prices fall, darks spreads compress and reduce revenue from energy sales for coal plants. According to the price forecast provided by Company Witness Meehan, the effect on both volume and dark spreads, is expected to diminish over the long-term as natural gas prices come back to more normal levels.

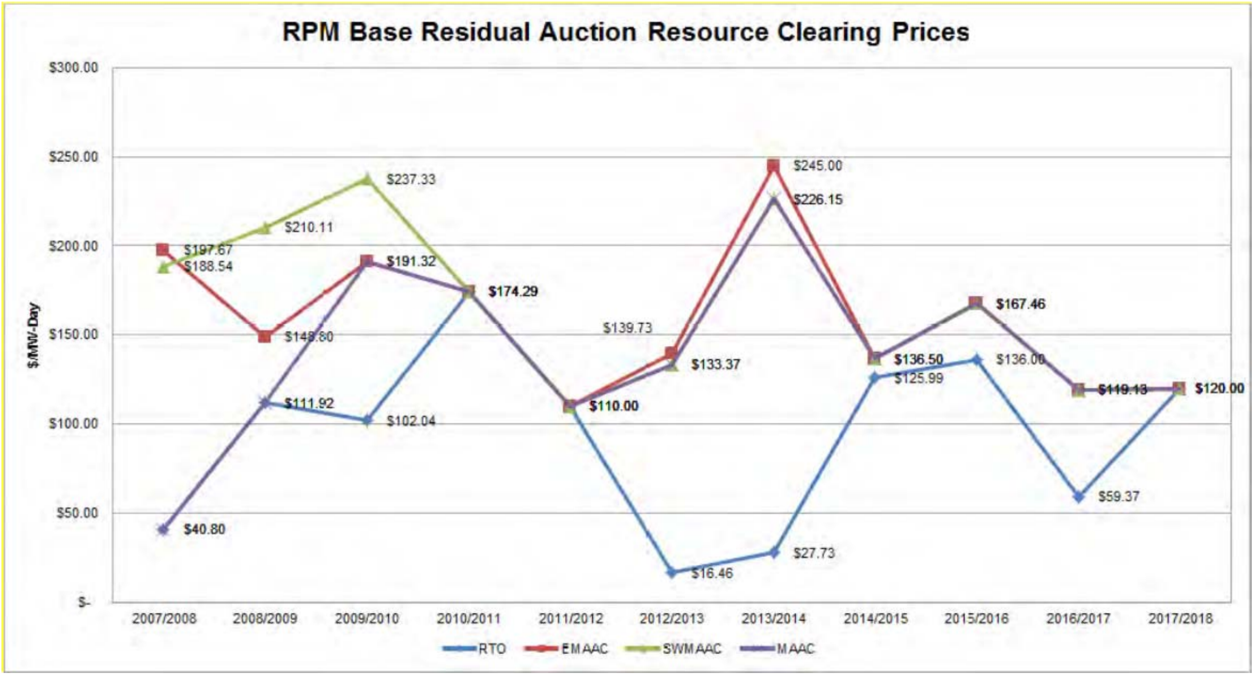
In the near term, the projections suggest that the generating portfolio will have difficulty generating positive cash flow, especially considering the requirement that they cover an allocated portion of the interest expense incurred at DPL Inc. An unexpected failure,

[1] Source: http://pjm.com/planning/generation-deactivation/gd-summaries.aspx

downturn in price or new environmental obligation could require cash infusions that would be difficult to provide. Additionally, and just as important, because the generation portfolio has had difficulty generating positive cash flow, the level of capital expenditures in the generation assets will continue to be reduced. Without the RER, there are simply not enough financial resources to invest at a level necessary to optimally maintain the Coal Plants in the short-term. According to the price forecast provided by Company Witness Meehan, the plants' financial profile would improve in the long term; however, notwithstanding the RER, the plants are financially challenged in the near term which will result in not only under investment and poor reliability performance, but also put long-term viability at risk. The decision to shut down a plant is complicated and involves numerous considerations. Management takes a holistic approach to any shutdown decision, including, but not limited to the financial effects in the short and long-term. A loss in an individual year may not cause a shutdown, just as a profit in another might not preclude a shutdown.

Q. Can you elaborate on why more stable prices are important to the process of deciding to make investment decisions that will extend the operational life of the power plants?

A. Yes. One of the fundamental problems that DP&L and other generation owners have faced over the past several years is the extreme volatility of capacity prices as established through PJM annual auctions. The chart below illustrates the problem.



The capacity prices that DP&L's generation units have been receiving are shown on the blue line at the bottom. Capacity prices were $40.80 per MW-day for 2008-09, rose to as high as $174.29 per MW-day for 2010-11, plummeted to $16.46 per MW-day and $27.73 per MW-day in the 2012-13 and 2013-14 periods, and bounced up and then down and up again the following three years. As a point of reference, the number of megawatts owned by DP&L is such that every dollar difference in price equates to about $1 million in annual revenue. Thus, the $157.93 per MW-day difference between 2010-11 and 2012-13 equals a revenue drop of over $155 million.

Long-term investment cannot be made when faced with this price volatility. If a proposed Environmental Protection Agency ("EPA") regulation cost $50 million in compliance costs on top of all our other operational costs, then the costs could be justified if there were more certainty of the future income and cash flow associated with this investment, and more specifically, the ability to recover and earn a return on the invested capital. However, volatility in current capacity markets undermine predictability related to future cash flow, and without this predictability, it is fiscally irresponsible to make significant and required investments in the generation business.

The Rider, because it operates counter-cyclically, will greatly reduce that volatility. If PJM capacity prices are $250 per MW-day and if gross energy margin and ancillary service revenues cover all variable costs of operation, then the Rider will be negative, because Ohio Genco will be making an intra-corporate transfer to DP&L, which would be passed on to customers. Yet the net revenues retained by Ohio Genco would still be positive. Similarly, if PJM capacity prices were $100 per MW-day or if gross energy margins and ancillary service revenues did not cover the variable costs of operation, the Rider would provide additional funds to Ohio Genco that would be sufficient to keep the plants operating. This price stability over the next ten years will allow justification of capital investments to ensure continued stability and reliability of energy supply, and ultimately to extend the operational life of the units beyond the expiration of the Rider.

I should note that even this level of RER supported price stability cannot guarantee continued operations under all circumstances. If, for example, an environmental regulation were to be enacted that would require a substantial investment in incremental compliance costs to be incurred at Killen Station, then it is unlikely that that Station could be kept operational beyond the compliance deadline.

Q. Does the Company propose an alternative to the RER?

A. Yes. As an alternative to the RER, the Commission should approve a ten-year nonbypassable rider that would recover a fixed amount each year with no true-up. That amount would be based upon the estimated market price for 2017 and the same ROE as supported within DP&L's application. The alternative rider would thus be $130 million per year. The Commission should approve the alternative rider for the same reasons that it should approve the RER -- namely, that without these amounts, the generation plants would be at risk, the closure of those plants would have significant adverse effects in Ohio, and the financial health of DPL Inc. and DP&L would be threatened.

Q. Does the Company commit to a severability provision with respect to the Electric Security Plan ("ESP") and the RER?

A. Yes, for any period that the RER is held to be unlawful, (a) the alternative to the RER as described in the prior answer would be implemented; and (b) the other terms of the ESP requested by DP&L would remain in effect.

Q. Is that severability provision reasonable?

A. Yes; in the event that an RER were to be ruled unlawful, that severability provision ensures that the generation plants would stay open, which would have the benefits for customers shown elsewhere in DP&L's filing. That provision would also ensure that the remaining beneficial aspects of DP&L's ESP filing were available, including preservation of DP&L's financial integrity.

V. SIGNIFICANTLY EXCESSIVE EARNINGS TEST

Q. Can you explain the method that DP&L proposes should be used for the significantly excessive earnings tests in Ohio Rev. Code 4928.143 (E) & (F)?

A: Yes. If the RER is in place as proposed, any collections or credits to customers will be offset by payments to or from Ohio Genco. Thus, there will be no effect on the SEET for

DP&L, and the SEET threshold will remain 12% as established in DP&L's last ESP Case (Case No. 12-426-EL-SSO).

Q. What changes would be necessary to the SEET if, as contemplated above, the alternative nonbypassable charge were implemented?

A. Since the proceeds would not flow directly to Ohio Genco, but rather to DPL Inc. through DP&L, for the purpose of maintaining the financial stability of DPL Inc., the alternative nonbypassable charge revenues should be excluded from the calculation of the SEET.

Q: Can you explain why you believe that this method is reasonable?

A: Yes. The financial stability of DP&L, and its ability to fund future investments in accordance with Ohio energy policy, is dependent on the financial strength of its parent DPL Inc. If the SEET included these funds, there would be no assurance that these funds would be available to (a) refinance and/or retire debt principal obligations, (b) make interest payments due on its debt, and/or (c) recapitalize its balance sheet and ensure the long term viability of DPL Inc. and DP&L.

VI. COST OF LONG-TERM DEBT

Q. What is the Company's average cost of debt?

A. The Company's embedded cost of debt ("CoD"), as of September 30, 2015, was 2.72%.

Q. What is the basis for the Company's average cost of debt calculation?

A. Exhibit CLJ-7 details the Company's average cost of debt calculation as of September 30, 2015. It is a function of the Company's long-term debt carrying value and its annualized debt interest expense.

Q. Is DP&L's existing cost of debt reasonable for setting rates?

A. No, as supported and further described by Company Witness MacKay in the Company's Distribution Rate Case filing before the PUCO (Case No. 15-1830-EL-AIR et al).

Q. What cost of long-term debt are you proposing for the purpose of setting rates?

A. As supported and further described by Company Witness MacKay in the Company's Distribution Rate Case filing before the PUCO (Case No. 15-1830-EL-AIR et al), the Company is proposing an adjusted total CoD equal to 5.29%, versus the current and embedded cost of 2.72%.

VII. WORKPAPERS AND EXHBITS

Q. Please identify and describe Exhibit CLJ-1.

A. Exhibit CLJ-1 is the pro forma Statements of Income for the DPL Inc., the parent Company of The Dayton Power and Light Company, for the years ending December 31, 2017 through 2026.

Q. Please identify and describe Exhibit CLJ-2.

A. Exhibit CLJ-2 is the pro forma Balance Sheet for DPL Inc. for the years ending December 31, 2017 through 2026.

Q. Please identify and describe Exhibit CLJ-3.

A. Exhibit CLJ-3 is the pro forma Statements of Cash Flow for DPL Inc. for the years ending December 31, 2017 through 2026.

Q. Please identify and describe Exhibit CLJ-4.

A. Exhibit CLJ-4 is the pro forma Statements of Income for The Dayton Power and Light Company for the years ending December 31, 2017 through 2026.

Q. Please identify and describe Exhibit CLJ-5.

A. Exhibit CLJ-5 is the pro forma Balance Sheet for The Dayton Power and Light Company for the years ending December 31, 2017 through 2026.

Q. Please identify and describe Exhibit CLJ-6.

A. Exhibit CLJ-6 is the pro forma Statements of Cash Flow for The Dayton Power and Light Company for the years ending December 31, 2017 through 2026.

Q. Please identify and describe Exhibit CLJ-7.

A. Exhibit CLJ-7 includes the schedules and workpapers sponsored or co-sponsored by Jeffrey K. MacKay in the Company's Distribution Rate Case filing before the PUCO (Case No. 15-1830-EL-AIR et al).

Q. Are the pro forma statements included in Exhibits CLJ-1, CLJ-2, CLJ-3, CLJ-4, CLJ-5, CLJ-6 and CLJ-7 accurate?

A. Based on the various assumptions and input received, and the review completed by the Company, yes, the statements are accurate.

VIII. CONCLUSION

Q. Please summarize your testimony.

A. In summary, the Company is committed to short and long-term reliability and economic viability of the coal generation business, its T&D business and DPL Inc, the ultimate parent. This commitment includes facilitating on-going investments in the Coal Plants, refinaning and/or retiring debt principal obligations, making interest payments due on its debt, and recapitalizing the balance sheet. The RER, or the alternative described herein, would provide the cash flow certainty that will result in such reliability and economic viability.

Q. Does this conclude your direct testimony?

A. Yes, it does.

The Dayton Power and Light Compan
Case No. 16-0395-EL-SSO
Projected Statements of Income (unaudited) ($ in millions) - DPL Inc
2017 - 2026

Data: Forecasted | Exhibit CLJ-1
Type of Filing: Revised | Page 1 of 1
Work Paper Reference No(s).: None | Witness Responsible: Craig Jackson

Line No.	Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Source
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	Operating Revenues											
2	Retail	[redacted]										Internal Documents
3	Reliable Electricity Rider	$ 131	$ 105	$ 69	$ 14	$ (54)	$ (94)	$ (142)	$ (207)	$ (120)	$ (158)	Internal Documents
4	Wholesale	[redacted]										Internal Documents
5	Capacity Revenues, net of penalties and bonus payments											Internal Documents
6	Other Revenues											Internal Documents
7	Total Revenues											Sum Lines 2 thru 6
8												
9	Fuel and Purchased Power											
10	Fuel Costs	[redacted]										Internal Documents
11	Purchased Power											Internal Documents
12	Total Fuel and Purchased Power											Line 10 + Line 11
13												
14	Gross Margin	[redacted]										Line 7 - Line 12
15												
16	Operating Expenses											
17	Operation and Maintenance	[redacted]										Internal Documents
18	General Taxes											Internal Documents
19	Depreciation and Amortization											Internal Documents
20	Total Operating Expenses											Sum Lines 17 thru 19
21												
22	Operating Income	[redacted]										Line 14 - Line 20
23												
24	Interest Expense	[redacted]										Internal Documents
25	Other Income (Deductions)											Internal Documents
26												
27	Earnings Before Income Tax	[redacted]										Line 22 + Line 24 + Line 25
28												
29	Income Tax	[redacted]										Internal Documents
30												
31	Net Operating Income	[redacted]										Line 27 - Line 29
32												
33	(Less) Preferred Dividend	[redacted]										Internal Documents
34												
35	Available for Common	[redacted]										Line 31 - Line 35
36												
37												
38												
39	Projections do not include implementation of the Distribution Investment Rider											
40	The schedule above may contain minor rounding differences											
41												

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Projected Balance Sheet (unaudited) ($ in millions) - DPL Inc
2017 - 2026

Data: Forecasted — Exhibit CLJ-2
Type of Filing: Revised —
Work Paper Reference No(s).: None — Witness Responsible: Craig Jackson

Line No.	Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Source
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	Assets											
2	Total Current Assets	[redacted]										Internal Documents
3												
4	Property, Plant and Equipment											
5	Property, Plant and Equipment	[redacted]										Internal Documents
6	Accumulated depreciation and amortization											Internal Documents
7	Total Property, Plant and Equipment											Line 5 + Line 6
8												
9	Total Other Noncurrent Assets	[redacted]										Internal Documents
10												
11	Total Assets	[redacted]										Line 2 + Line 7 +Line 9
12												
13												
14	Liabilities and Shareholder's Equity											
15	Current and Non Current Liabilities	[redacted]										Internal Documents
16												
17	Capitalization											
18	Common Shareholder's Equity	[redacted]										Internal Documents
19	Preferred Stock											Internal Documents
20	Total Long Term Debt											Internal Documents
21	Total Capitalization											Sum Lines 18 thru 20
22												
23	Total Liabilities and Shareholder's Equity	[redacted]										Line 15 + Line 21

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Projected Statements of Cash Flows (unaudited) ($ in millions) - DPL Inc
2017 - 2026

Data: Forecasted — Exhibit CLJ-3
Type of Filing: Revised — Page 1 of 1
Work Paper Reference No(s).: None — Witness Responsible: Craig Jackson

Line No.	Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Source
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1												
2	Net cash provided by operating activities	[redacted]										Internal Documents
3												
4	Net cash used for investing activities	[redacted]										Internal Documents
5												
6	Net cash used for financing activities	[redacted]										Internal Documents
7												
8	Cash and Cash Equivalents:											
9	Net Change	[redacted]										Line 2 + Line 4 +Line 6
10	Balance at beginning of period											Prior column, Line 11
11	Cash and cash equivalents at end of period											Line 9 + Line 10
12												
13												
14	Projections do not include implementation of the Distribution Investment Rider											
15	The schedule above may contain minor rounding differences											

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The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Projected Statements of Income (unaudited) ($ in millions) - Dayton Power and Light
2017 - 2026

Data: Forecasted | Exhibit CLJ-4
Type of Filing: Revised | Page 1 of 1
Work Paper Reference No(s).: None | Witness Responsible: Craig Jackson

Line No.	Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Source
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	<u>Operating Revenues</u>											
2	Utility Revenues	[redacted]										Internal Documents
3												
4	<u>Cost of Revenues</u>	[redacted]										Internal Documents
5												
6	Gross Margin	[redacted]										Line 4 - Line 2
7												
8	<u>Operating Expenses</u>											
9	Operation and Maintenance	[redacted]										Internal Documents
10	General Taxes											Internal Documents
11	Depreciation and Amortization											Internal Documents
12	Total Operating Expenses											Sum Lines 9 thru 11
13												
14	Operating Income	[redacted]										Line 6 - Line 12
15												
16	Interest Expense	[redacted]										Internal Documents
17	Other Income (Deductions)											Internal Documents
18												
19	Earnings Before Income Tax	[redacted]										Line 14 + Line 16 + Line 17
20												
21	Income Tax	[redacted]										Internal Documents
22												
23	Net Operating Income	[redacted]										Line 19 - Line 21
24												
25	(Less) Preferred Dividend	[redacted]										Internal Documents
26												
27	Available for Common	[redacted]										Line 23 - Line 25
28												
29	Common Shareholder's Equity	[redacted]										CLJ-5, Line 18
30												
31	Average Annual Return on Equity (ROE)*	[redacted]										Line 27 / Line 29
32	5-Year Average Return on Equity	n/a	n/a	n/a	n/a							Average of Line 27 / Line 29
33												
34												
35	Projections do not include implementation of the Distribution Investment Rider											
36	The schedule above may contain minor rounding differences											

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Projected Balance Sheet (unaudited) ($ in millions) - Dayton Power and Light
2017 - 2026

Data: Forecasted — Exhibit CLJ-5
Type of Filing: Revised — Page 1 of 1
Work Paper Reference No(s).: None — Witness Responsible: Craig Jackson

Line No.	Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Source
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	Assets											
2	Total Current Assets	[redacted]										Internal Documents
3												
4	Property, Plant and Equipment											
5	Property, Plant and Equipment	[redacted]										Internal Documents
6	Accumulated depreciation and amortization											Internal Documents
7	Total Property, Plant and Equipment											Line 5 + Line 6
8												
9	Total Other Noncurrent Assets	[redacted]										Internal Documents
10												
11	Total Assets	[redacted]										Line 2 + Line 7 +Line 9
12												
13												
14	Liabilities and Shareholder's Equity											
15	Current and Non Current Liabilities	[redacted]										Internal Documents
16												
17	Capitalization											
18	Common Shareholder's Equity	[redacted]										Internal Documents
19	Preferred Stock											Internal Documents
20	Total Long Term Debt											Internal Documents
21	Total Capitalization											Sum Lines 18 thru 20
22												
23	Total Liabilities and Shareholder's Equity	[redacted]										Line 15 + Line 21

The Dayton Power and Light Company
Case No. 16-0395-EL-SSO
Projected Statements of Cash Flows (unaudited) ($ in millions) - Dayton Power and Light
2017 - 2026

Data: Forecasted — Exhibit CLJ-6
Type of Filing: Revised — Page 1 of 1
Work Paper Reference No(s).: None — Witness Responsible: Craig Jackson

Line No.	Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Source
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1												
2	Net cash provided by operating activities	[redacted]										Internal Documents
3												
4	Net cash used for investing activities	[redacted]										Internal Documents
5												
6	Net cash used for financing activities	[redacted]										Internal Documents
7												
8	Cash and Cash Equivalents:											
9	Net Change	[redacted]										Line 2 + Line 4 +Line 6
10	Balance at beginning of period											Prior column, Line 11
11	Cash and cash equivalents at end of period											Line 9 + Line 10
12												
13												
14	Projections do not include implementation of the Distribution Investment Rider											
15	The schedule above may contain minor rounding differences											
16												

Section D
Rate of Return

The Dayton Power & Light Company

Case No.: 15-1830-EL-AIR

Test Year: Twelve Months Ending May 31, 2016

Date Certain: September 30, 2015

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Proforma Regulated Business Rate of Return Summary
As of September 30, 2015

Data: Actual as Adjusted
Type of Filing: Original
Work Paper Reference No(s).: None

Schedule D-1a
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Description	Schedule Reference	($) Amount	($) Adjustment	($) Proforma	% of Total	(%) Cost	Weighted Cost (%)
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I) = (G) * (H)
1	Long-Term Debt[(1)]	D-3, Line 7	$ 729,172,129	$ 246,979,791	$ 482,192,338 [2]	47.80%	5.29%	2.53%
2								
3	Preferred Stock	D-4, Line 10	$ 22,158,362	$ -	$ 22,158,362	2.20%	3.91%	0.09%
4								
5	Common Equity	D-1.1, Line 1	$ 1,177,923,549	$ 673,538,032	$ 504,385,517	50.00%	10.50%	5.25%
6								
7	Total Capital		$ 1,929,254,040	$ 920,517,824	$ 1,008,736,216	100.00%		7.86%
8								
9	Deferred Income Taxes							
10	Account 190	B-6, Line 17	$ 19,736,594					
11								
12	Deferred Income Taxes							
13	Account 281	B-6, Line 18	$ -					
14								
15	Deferred Income Taxes							
16	Account 282	B-6, Line 19	$ (615,410,717)					
17								
18	Deferred Income Taxes							
19	Account 283	B-6, Line 20	$ (32,496,796)					

[1] Excludes WPAFB debt
[2] Schedule D-3a, Line 5 Column J

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Regulated Business Rate of Return Summary
As of September 30, 2015

Data: Actual
Type of Filing: Original
Work Paper Reference No(s).: None

Schedule D-1
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Description	Schedule Reference	($) Amount	% of Total	(%) Cost	Weighted Cost (%)
(A)	(B)	(C)	(D)	(E)	(F)	(G) = (E) * (F)
1	Long-Term Debt[(1)]	D-3, Line 7	$ 729,172,129	37.80%	2.72%	1.03%
2						
3	Preferred Stock	D-4, Line 10	$ 22,158,362	1.15%	3.91%	0.04%
4						
5	Common Equity	D-1.1, Line 1	$ 1,177,923,549	61.06%	10.50%	6.41%
6						
7	Total Capital		$ 1,929,254,040	100.00%		7.48%
8						
9	Deferred Income Taxes					
10	Account 190	B-6, Line 17	$ 19,736,594			
11						
12	Deferred Income Taxes					
13	Account 281	B-6, Line 18	$ -			
14						
15	Deferred Income Taxes					
16	Account 282	B-6, Line 19	$ (615,410,717)			
17						
18	Deferred Income Taxes					
19	Account 283	B-6, Line 20	$ (32,496,796)			

[1] Excludes WPAFB debt

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Common Equity
As of September 30, 2015

Data: Actual
Type of Filing: Original
Work Paper Reference No(s).: None

Schedule D-1.1
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Description	Schedule Reference	Common Stock Amount	Paid-In Capital Amount	Retained Earnings Amount	Other Miscellaneous Common Equity Amount	Intercompany Eliminations Amount	Total Common Equity Amount
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I) = (D) + (E) + (F) + (G) + (H)
1	Dayton Power and Light		$ 411,722	$ 804,318,969	$ 406,855,051	$ (33,662,193)	$ -	$ 1,177,923,549
2								
3	Total Parent - DPL Inc.		$ -	$ 2,237,663,307	$ (2,037,668,415)	$ 13,367,370	$ -	$ 213,362,262

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Embedded Cost of Short-Term Debt
As of September 30, 2015

Data: Actual
Type of Filing: Original
Work Paper Reference No(s).: None

Schedule D-2
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Description	Amount Outstanding	Interest Rate	Interest Requirement
(A)	(B)	(C)	(D)	(E) = (C) * (D)
1	DP&L Revolving Line of Credit	$ 10,000,000	2.20%	$ 220,000

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Proforma Embedded Cost of Long-Term Debt
As of September 30, 2015

Data: Actual as Adjusted
Type of Filing: Original
Work Paper Reference No(s).: WPD-3.2a, WPD-3.4a

Schedule D-3a
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Description	Date Issued (Mo/Day/Yr)	Maturity Date (Mo/Day/Yr)	Principal Amount	Face Amount Outstanding	Unamort (Discount) or Premium	Unamort Debt Expense	Unamort Gain or (Loss) On Reacquired Debt	Carrying Value	Annual Interest Cost[1]
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J) = (F)+(G)-(H)+(I)	(K)
1	First Mortgage Bonds:									
2										
3	Total DP &L Company LT Debt			$ 500,234,375	$ 500,234,375	$ -	$ 6,754,854	$ (11,287,183)	$ 482,192,338	$ 25,504,699
4										
5	Subtotal				$ 500,234,375	$ -	$ 6,754,854	$ (11,287,183)	$ 482,192,338	$ 25,504,699
6										
7	Other Long-Term Debt:									
8										
9	WPAFB Loan	02-01-11	02-01-61	$ 18,136,119	$ 18,136,119	$ -	$ -	$ -	$ 18,136,119	$ 764,019
10										
11	TOTALS				$ 518,370,494	$ -	$ 6,754,854	$ (11,287,183)	$ 500,328,457	$ 26,268,718
12										
13	**EMBEDDED COST OF LONG-TERM DEBT**									**5.25%**
14										
15	**EMBEDDED COST OF LONG-TERM DEBT (excluding WPAFB Loan)[2]**									**5.29%**

[1] Annualized interest expense plus (or minus) amortization of discount or premium plus amortization of issue costs minus (or plus) amortization of gain (or loss) on reacquired debt.

[2] Equals Line 5 Column K / Column J

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Embedded Cost of Long-Term Debt
As of September 30, 2015

Data: Actual
Type of Filing: Original
Work Paper Reference No(s).: WPD-3.1, WPD-3.2, WPD-3.3

Schedule D-3
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Description	Date Issued (Mo/Day/Yr)	Maturity Date (Mo/Day/Yr)	Principal Amount	Face Amount Outstanding	Unamort (Discount) or Premium	Unamort Debt Expense	Unamort Gain or (Loss) On Reacquired Debt	Carrying Value	Annual Interest Cost[1]
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J) = (F)+(G)-(H)+(I)	(K)
1	First Mortgage Bonds:									
2										
3	PCB 4.80 OH FGD	9-13-06	9-01-36	$ 100,000,000	$ 100,000,000	$ -	$ 1,252,749	$ -	$ 98,747,251	$ 4,860,049
4	PCB Variable Rate OH Series A & B	8-3-15	8-1-20	$ 200,000,000	$ 200,000,000	$ -	$ 2,662,301	$ -	$ 197,337,699	$ 2,791,889
5	FMB- 1.875% Series Due 2016	9-30-13	9-15-16	$ 445,000,000	$ 445,000,000	$ (247,256)	$ 2,464,716	$ (9,200,849)	$ 433,087,179	$ 12,160,125
6										
7	Subtotal			$ 745,000,000	$ 745,000,000	$ (247,256)	$ 6,379,766	$ (9,200,849)	$ 729,172,129	$ 19,812,063
8										
9	Other Long-Term Debt:									
10										
11	WPAFB Loan	02-01-11	02-01-61	$ 18,136,119	$ 18,136,119	$ -	$ -	$ -	$ 18,136,119	$ 764,019
12										
13	TOTALS				$ 763,136,119	$ (247,256)	$ 6,379,766	$ (9,200,849)	$ 747,308,248	$ 20,576,082
14										
15	**EMBEDDED COST OF LONG-TERM DEBT**									**2.753%**
16										
17	**EMBEDDED COST OF LONG-TERM DEBT (excluding WPAFB Loan)[2]**									**2.717%**

[1] Annualized interest expense plus (or minus) amortization of discount or premium plus amortization of issue costs minus (or plus) amortization of gain (or loss) on reacquired debt.

[2] Equals Line 7 Column K / Column J

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Embedded Cost of Preferred Stock
As of September 30, 2015

Data: Actual
Type of Filing: Original
Work Paper Reference No(s).: None

Schedule D-4
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Description	Date Issued (Mo/Day/Yr)	Dollar Amounts Outstanding at Par Value	Premium or (Discount)	Issue Expense	Gain or (Loss) on Reacquired Stock [1]	Net Proceeds	Annual Dividends
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H) = (D)+(E)-(F)+(G)	(I)
1	3.750% Series A $100 Par Value	6/01/47	$ 9,328,000	$ -	$ -	$ 101,959	$ 9,429,959	$ 349,800
2	3.750% Series B $100 Par Value	6/01/47	$ 6,939,800	$ -	$ -	$ 79,968	$ 7,019,768	$ 260,243
3	3.900% Series C $100 Par Value	6/01/50	$ 6,583,000	$ -	$ -	$ 108,058	$ 6,691,058	$ 256,737
4	7.700% Series E $100 Par Value	3/23/71	$ -	$ -	$ -	$ (175,439)	$ (175,439)	$ -
5	7.375% Series F $100 Par Value	5/17/73	$ -	$ -	$ -	$ (200,321)	$ (200,321)	$ -
6	8.625% Series H $100 Par Value	4/06/78-6/01/78	$ -	$ -	$ -	$ (135,624)	$ (135,624)	$ -
7	9.375% Series I $100 Par Value	5/16/79-8/08/79	$ -	$ -	$ -	$ (150,228)	$ (150,228)	$ -
8	11.60% Series J $100 Par Value	7/16/80	$ -	$ -	$ -	$ (320,811)	$ (320,811)	$ -
9								
10	TOTAL		$ 22,850,800	$ -	$ -	$ (692,438)	$ 22,158,362	$ 866,780
11								
12	**DP&L EMBEDDED COST OF PREFERRED STOCK [2]**							**3.912%**

[1] Source - General ledger balances at September 30, 2015
[2] Equals Line 10 Column I / Column H

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Comparative Financial Data
($000)

Data: 4 Months Actual & 8 Months Estimated
Type of Filing: Original
Work Paper Reference No(s).: WPC-2.1, WPC-10.2, WPD-5

Schedule D-5
Page 1 of 4
Witness Responsible: Karin M. Nyhuis

Line		Test	Most Recent Ten Calendar Years									
No.	Description	Year	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	PLANT DATA (Electric-As of Date Certain):											
2	Intangible Plant	$ 71,852	$ 90,694	$ 85,769	$ 76,827	$ 62,599	$ 54,842	$ 48,642	$ 38,113	$ 36,119	$ 34,157	$ 32,173
3	Production	$ 3,077,844	$ 2,962,754	$ 3,006,560	$ 3,216,310	$ 3,385,103	$ 3,330,924	$ 3,309,403	$ 3,193,039	$ 2,814,596	$ 2,556,399	$ 2,520,546
4	Transmission	$ 440,134	$ 432,940	$ 417,220	$ 409,329	$ 396,001	$ 388,985	$ 383,829	$ 378,683	$ 376,720	$ 371,997	$ 370,131
5	Distribution	$ 1,642,324	$ 1,592,743	$ 1,552,139	$ 1,503,519	$ 1,393,668	$ 1,278,652	$ 1,228,340	$ 1,166,165	$ 1,124,442	$ 1,068,933	$ 986,860
6	General & Other	$ 34,169	$ 35,239	$ 36,263	$ 35,047	$ 32,257	$ 31,980	$ 32,495	$ 33,607	$ 33,083	$ 35,698	$ 34,891
7	Construction Work in Progress	$ 69,409	$ 75,370	$ 60,864	$ 87,830	$ 150,703	$ 119,574	$ 87,929	$ 152,990	$ 363,783	$ 375,184	$ 165,118
8	Total Utility Plant - Gross	$ 5,335,731	$ 5,189,740	$ 5,158,815	$ 5,328,862	$ 5,420,331	$ 5,204,957	$ 5,090,638	$ 4,962,597	$ 4,748,743	$ 4,442,368	$ 4,109,719
9	Held for Future Use	$ 1,059	$ 1,059	$ 1,646	$ 2,141	$ 2,141	$ 2,141	$ 2,141	$ 2,141	$ 2,141	$ 2,141	$ 2,141
10	Less: Accum. Provision for Depr. And Amort.	$ 2,788,767	$ 2,614,972	$ 2,562,006	$ 2,627,331	$ 2,680,278	$ 2,559,973	$ 2,468,781	$ 2,264,481	$ 2,158,079	$ 2,078,399	$ 1,972,756
11	Net Utility Plant	$ 2,548,023	$ 2,575,827	$ 2,598,455	$ 2,703,672	$ 2,742,194	$ 2,647,125	$ 2,623,998	$ 2,700,257	$ 2,592,805	$ 2,366,110	$ 2,139,104
12												
13	Percentage Of Construction Expenditures											
14	Financed Internally	100.00%	89.93%	79.79%	91.97%	73.15%	100.00%	100.00%	100.00%	84.40%	69.20%	95.52%
15												
16	CAPITAL STRUCTURE (As of Date Certain):											
17	Long-Term Debt (Incl. portion due within one year)	$ 729,172	$ 839,608	$ 835,567	$ 866,400	$ 864,463	$ 862,252	$ 860,041	$ 857,640	$ 844,918	$ 754,169	$ 653,537
18	Preferred Stock (Incl. portion due within one year)	$ 22,158	$ 22,037	$ 21,875	$ 21,713	$ 21,551	$ 21,389	$ 21,227	$ 21,066	$ 20,999	$ 20,914	$ 20,828
19	Common Equity	$ 1,177,924	$ 1,144,187	$ 1,204,827	$ 1,300,299	$ 1,359,184	$ 1,380,944	$ 1,404,234	$ 1,455,311	$ 1,371,213	$ 1,233,175	$ 1,081,386

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Comparative Financial Data
($000)

Data: 4 Months Actual & 8 Months Estimated
Type of Filing: Original
Work Paper Reference No(s).: WPC-2.1, WPC-10.2, WPD-5

Schedule D-5
Page 2 of 4
Witness Responsible: Karin M. Nyhuis

Line		Test	Most Recent Ten Calendar Years									
No.	Description	Year	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	CONDENSED INCOME STATEMENT DATA:											
2	Operating Revenues	$ 1,525,100	$ 1,786,399	$ 1,576,389	$ 1,566,393	$ 1,741,894	$ 1,790,968	$ 1,606,889	$ 1,656,572	$ 1,507,576	$ 1,385,249	$ 1,276,889
3	Operating Expenses (excluding income taxes)	$ 1,387,248	$ 1,556,951	$ 1,449,815	$ 1,381,834	$ 1,405,742	$ 1,354,032	$ 1,197,483	$ 1,208,187	$ 1,131,716	$ 982,627	$ 908,725
4	Income Tax (current)	$ 46,847	$ 35,015	$ 39,066	$ 53,260	$ 55,826	$ 78,127	$ (75,268)	$ 89,561	$ 93,935	$ 146,289	$ 132,154
5	Deferred Income Tax, net	$ (19,276)	$ 7,545	$ (17,393)	$ 4,456	$ 50,853	$ 54,194	$ 200,155	$ 40,513	$ 21,143	$ (13,940)	$ (8,558)
6	Investment Tax Credit, net	$ (2,393)	$ (2,506)	$ (2,506)	$ (2,506)	$ (2,506)	$ (2,784)	$ (2,784)	$ (2,784)	$ (2,811)	$ (2,866)	$ (2,866)
7	Operating Income	$ 112,674	$ 189,394	$ 107,407	$ 129,349	$ 231,979	$ 307,399	$ 287,303	$ 321,095	$ 263,593	$ 273,139	$ 247,434
8	AFDC (Borrowed + Other)	$ 2,342	$ 1,498	$ 1,452	$ 3,955	$ 4,451	$ 3,379	$ 3,143	$ 10,016	$ 22,285	$ 13,260	$ 2,054
9	Other Income (net)	$ (4,958)	$ (45,465)	$ 14,156	$ (64)	$ (671)	$ 8,161	$ 11,614	$ 6,906	$ 63,926	$ 22,072	$ 32,130
10	Extraordinary Item (Exp./Inc.)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (3,234)
11	INCOME AVAILABLE FOR FIXED CHARGES	$ 110,058	$ 145,427	$ 123,015	$ 133,240	$ 235,759	$ 318,939	$ 302,060	$ 338,017	$ 349,804	$ 308,471	$ 278,384
12	Interest Charges (Excl. ABFUDC)	$ 28,166	$ 30,406	$ 39,402	$ 42,118	$ 42,544	$ 41,265	$ 43,233	$ 52,229	$ 78,224	$ 66,037	$ 66,674
13	Net Income	$ 81,892	$ 115,021	$ 83,613	$ 91,122	$ 193,215	$ 277,674	$ 258,827	$ 285,788	$ 271,580	$ 242,434	$ 211,710
14	Preferred Dividends and Capital Stock Expense	$ 865	$ 867	$ 867	$ 865	$ 867	$ 867	$ 867	$ 867	$ 867	$ 795	$ 867
15	Earnings Available for Common Equity	$ 81,026	$ 114,154	$ 82,746	$ 90,257	$ 192,348	$ 276,807	$ 257,960	$ 284,921	$ 270,713	$ 241,639	$ 210,843
16	AFDC - % of Earnings Available for Common Equity	2.89%	1.31%	1.75%	4.38%	2.31%	1.22%	1.22%	3.52%	8.23%	5.49%	0.97%
17	COST OF CAPITAL:											
18	Embedded Cost of Long-Term Debt %	2.72%	3.52%	3.53%	5.00%	5.08%	4.94%	4.99%	5.10%	5.46%	5.51%	5.62%
19	Embedded Cost of Preferred Stock	3.91%	3.93%	3.96%	3.99%	4.02%	4.05%	4.08%	4.11%	4.13%	3.80%	4.16%
20	FIXED CHARGE COVERAGE:											
21	Pre-tax Interest Coverage	4.65	5.92	3.51	4.35	7.77	10.74	9.67	8.54	5.78	6.39	5.88
22	Pre-tax Interest Coverage (excluding AFDC)	4.66	5.93	3.54	4.39	7.82	10.79	9.73	8.71	6.05	6.59	5.91
23	After-tax Interest Coverage	3.91	4.78	3.12	3.16	5.54	7.73	6.99	6.47	4.47	4.67	4.18
24	After-tax Fixed Charge Coverage	3.79	4.65	3.05	3.10	5.43	7.57	6.85	6.37	4.42	4.62	4.12
25	INDENTURE PROVISIONS											
26	Debt to Capitalization (must be <.65:1)	0.38	0.42	0.41	0.40	0.39	0.38	0.38	0.37	0.38	0.38	0.37
27	EBIDTA to Interest Charges (must be >2.5:1)	9.70	10.83	9.32	9.72	11.14	14.03	12.93	11.34	7.50	8.59	7.83
28	Total Equity to Total Capitalization (must be >.5:1)	0.62	0.58	0.59	0.60	0.61	0.62	0.62	0.63	0.62	0.62	0.63

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Comparative Financial Data
($000)

Data: 4 Months Actual & 8 Months Estimated
Type of Filing: Original
Work Paper Reference No(s).: WPC-2.1, WPC-10.2, WPD-5

Schedule D-5
Page 3 of 4
Witness Responsible: Jeffery K. MacKay & Karin M. Nyhuis

Line		Test	Most Recent Ten Calendar Years									
No.	Description	Year	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	STOCK AND BOND RATINGS											
2	Moody's Bond Rating	Baa2	Baa2	Baa1	A3	A3	Aa3	Aa3	A2	A2	A3	Baa1
3	S&P Bond Rating	BBB-	BBB-	BBB-	BBB-	BBB+	A	A	A-	A-	BBB	BBB-
4	Moody's Preferred Stock Rating	Ba2	Ba2	Ba1	Ba1	Ba1	Baa1	Baa1	Baa2	Baa2	Baa3	Ba1
5	S&P Preferred Stock Rating	B+	B+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6												
7	COMMON STOCK RELATED DATA:											
8	Shares Outstanding - Year End (000)	41,172	41,172	41,172	41,172	41,172	41,172	41,172	41,172	41,172	41,172	41,172
9	Shares Outstanding - Weighted Average (monthly)	41,172	41,172	41,172	41,172	41,172	41,172	41,172	41,172	41,172	41,172	41,172
10	Earnings Per Share - Weighted Average	$ 1.97	$ 2.77	$ 2.01	$ 2.19	$ 4.67	$ 6.72	$ 6.27	$ 6.92	$ 6.58	$ 5.87	$ 5.12
11	Dividends Paid Per Share	$ 1.21	$ 3.86	$ 4.61	$ 3.52	$ 5.34	$ 7.29	$ 7.89	$ 3.76	$ 3.04	$ 2.43	$ 3.64
12	Dividends Declared Per Share	$ 1.21	$ 3.86	$ 4.61	$ 3.52	$ 5.34	$ 7.29	$ 7.89	$ 3.76	$ 3.04	$ 2.43	$ 3.64
13	Dividend Payout Ratio (declared basis)	0.62	1.39	2.30	1.61	1.14	1.08	1.26	0.54	0.46	0.41	0.71
14	Market Prices - High, (Low)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	1st Quarter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	2nd Quarter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	3rd Quarter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	4th Quarter	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Book Value Per Share (year end)	$ 28.61	$ 27.79	$ 29.26	$ 31.58	$ 33.01	$ 33.54	$ 34.11	$ 35.35	$ 33.30	$ 29.95	$ 26.27

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Comparative Financial Data
($000)

Data: 4 Months Actual & 8 Months Estimated
Type of Filing: Original
Work Paper Reference No(s).: WPC-2.1, WPC-10.2, WPD-5

Schedule D-5
Page 4 of 4
Witness Responsible: Karin M. Nyhuis

Line		Test	Most Recent Ten Calendar Years									
No.	Description	Year	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	<u>RATE OF RETURN MEASURES:</u>											
2	Return On Average Common Equity	6.98%	9.72%	6.61%	6.79%	14.04%	19.88%	18.04%	20.16%	20.79%	20.88%	38.99%
3	Return On Average Total Capital	5.59%	7.15%	5.79%	6.01%	10.46%	14.02%	13.08%	14.79%	16.48%	16.39%	31.71%
4	Return On Average Net Utility Plant-in-service	4.40%	7.32%	4.05%	4.75%	8.62%	11.67%	10.80%	12.14%	10.64%	12.14%	23.16%
5	- Total Company											
6												
7	<u>OTHER FINANCIAL AND OPERATING DATA:</u>											
8	Mix of Sales (%)											
9	Electric	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
10	Gas	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
11												
12	Mix of Fuel (%)											
13	Electric	Requested waiver of this standard filing requirement										
14	Gas	Requested waiver of this standard filing requirement										
15												
16												
17	Composite Depreciation Rates:											
18	Production	2.20%	2.40%	5.20%	4.90%	2.20%	2.30%	2.40%	2.30%	2.50%	3.00%	3.00%
19	Transmission	2.40%	2.30%	2.30%	2.40%	2.40%	2.50%	2.40%	2.40%	2.40%	2.40%	2.60%
20	Distribution	3.30%	3.50%	3.50%	3.40%	3.40%	3.40%	3.70%	3.70%	3.60%	3.80%	3.40%
21	General	8.60%	6.70%	6.20%	5.40%	4.10%	3.70%	3.10%	7.20%	8.90%	7.50%	9.50%

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Unamortized Issue Expense on Long-Term Debt
Embedded Cost of Long - Term Debt

Data: Actual as Adjusted — WPD-3.1a
Type of Filing: Original — Page 1 of 1
Work Paper Reference No(s).: WPD-3.1 — Witness Responsible: Jeffery K. MacKay

Line No.	Debt Issue Type, Rate, Date	Monthly Amortization	Annual Amortization	Unamortized Issue Expense Balance
(A)	(B)	(C)	(D)	(E)
1	UNAMORTIZED ISSUE EXPENSE - ACCOUNT 181			
2				
3	FIRST MORTGAGE BONDS:			
4				
5	PCB 4.80 OH FGD 2036	$ 5,004	$ 60,049	$ 1,252,749
6				
7	2015 Series A and Series B	$ 43,159	$ 517,909	$ 2,662,301
8	NEW 2016 FMB	$ 16,841	$ 202,097	$ 6,062,906
9	Total Unamortized Issue Expense	$ 65,005	$ 780,055	$ 9,977,956

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Unamortized Issue Expense on Long-Term Debt
Embedded Cost of Long - Term Debt

Data: Actual
Type of Filing: Original
Work Paper Reference No(s).: None

WPD-3.1
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Debt Issue Type, Rate, Date	Monthly Amortization	Annual Amortization	Unamortized Issue Expense Balance
(A)	(B)	(C)	(D)	(E)
1	UNAMORTIZED ISSUE EXPENSE - ACCOUNT 181			
2				
3	FIRST MORTGAGE BONDS:			
4				
5	PCB 4.80 OH FGD 2036	$ 5,004	$ 60,049	$ 1,252,749
6				
7	FMB 1.875% Series Due 2016	$ 214,279	$ 2,571,343	$ 2,464,716
8	2015 Series A & B OAQDA bonds	$ 43,159	$ 517,909	$ 2,662,301
9	Total Unamortized Issue Expense	$ 262,442	$ 3,149,301	$ 6,379,766

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Unamortized (Discount) or Premium, Unamortized Gain or (Loss)
Amended Mortgage Amortization on First Mortgage Bonds
Embedded Cost of Long-Term Debt

Data: Actual as Adjusted
Type of Filing: Original
Work Paper Reference No(s).: WPD-3.2

WPD-3.2a
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Debt Issue Type, Rate, Date	Monthly Amortization	Annual Amortization	Unamortized Balance
(A)	(B)	(C)	(D)	(E)
1	UNAMORTIZED (DISCOUNT) or PREMIUM on Debt - ACCOUNT 226			
2				
3	FIRST MORTGAGE BONDS:			
4				
5	Disc FMB 1.875% Series Due 2016	$ -	$ -	$ -
6	Disc NEW 2016 FMB	$ -	$ -	$ -
7	Account 226	$ -	$ -	$ -
8				
9	UNAMORTIZED GAIN OR (LOSS) ON REACQUIRED DEBT - ACCOUNT 189			
10				
11	LOSS FMB 1.875% Series Due 2016	$ 82,257	$ 987,079	$ (9,200,849)
12	LOSS on NEW 2016 FMB	$ 5,795	$ 69,544	$ (2,086,334)
13	Account 189	$ 88,052	$ 1,056,624	$ (11,287,183)

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Unamortized (Discount) or Premium, Unamortized Gain or (Loss)
Amended Mortgage Amortization on First Mortgage Bonds
Embedded Cost of Long-Term Debt

Data: Actual
Type of Filing: Original
Work Paper Reference No(s).: WPD-3.1

WPD-3.2
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Debt Issue Type, Rate, Date	Monthly Amortization	Annual Amortization	Unamortized Issue Expense Balance
(A)	(B)	(C)	(D)	(E)
1	UNAMORTIZED (DISCOUNT) or PREMIUM on Debt - ACCOUNT 226			
2				
3	FIRST MORTGAGE BONDS:			
4				
5	Disc FMB 1.875% Series Due 2016	$ 21,496	$ 257,953	$ (247,256)
6	Account 226	$ 21,496	$ 257,953	$ (247,256)
7				
8	UNAMORTIZED GAIN OR (LOSS) ON REACQUIRED DEBT - ACCOUNT 189			
9				
10	LOSS FMB 1.875% Series Due 2016	$ 82,257	$ 987,079	$ (9,200,849)
11	Account 189	$ 82,257	$ 987,079	$ (9,200,849)

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Annual Interest Cost Calculation
As of September 30, 2015

Data: Actual as Adjusted
Type of Filing: Original
Work Paper Reference No(s).: WPD-3.1a, WPD-3.2a, WPD-3.3

WPD-3.3a
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Issue	Face Amount Outstanding	Annualized Interest Cost	Annual Interest Expense	Annual Amortization of Issue Expense	Annual Amortization Of Amended Mortgages	Annual Amortization of (Discount) or Premium	Annual Amortization of Gain or (Loss) on Reacquired Debt
(A)	(B)	(C)	(D) = (E)+(F)+(G)-(H)-(I)	(E)	(F)	(G)	(H)	(I)
1	First Mortgage Bonds:							
2								
3	2015 Series A & B OAQDA bonds	$ 200,000,000	$ 2,791,889	$ 2,273,980	$ 517,909	$ -	$ -	$ -
4	PCB 4.80 OH FGD	$ 100,000,000	$ 4,860,049	$ 4,800,000	$ 60,049	$ -	$ -	$ -
5	NEW 2016 FMB	$ 445,000,000	$ 30,628,720	$ 29,370,000	$ 202,097	$ -	$ -	$ (1,056,624)
6								
7	Other Long-Term Debt:							
8								
9	WPAFB Loan	$ 18,136,119	$ 764,019	$ 764,019	$ -	$ -	$ -	$ -
10								
11	Totals	$ 763,136,119	$ 39,044,677	$ 37,207,999	$ 780,055	$ -	$ -	$ (1,056,624)

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Annual Interest Cost Calculation
As of September 30, 2015

Data: Actual
Type of Filing: Original
Work Paper Reference No(s).: None

WPD-3.3
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Issue	Face Amount Outstanding	Annualized Interest Cost	Annual Interest Expense	Annual Amortization of Issue Expense	Annual Amortization Of Amended Mortgages	Annual Amortization of (Discount) or Premium	Annual Amortization of Gain or (Loss) on Reacquired Debt
(A)	(B)	(C)	(D) = (E)+(F)+(G)-(H)-(I)	(E)	(F)	(G)	(H)	(I)
1	First Mortgage Bonds:							
2								
3	2015 Series A & B OAQDA bonds	$ 200,000,000	$ 2,791,889	$ 2,273,980	$ 517,909	$ -	$ -	$ -
4	PCB 4.80 OH FGD	$ 100,000,000	$ 4,860,049	$ 4,800,000	$ 60,049	$ -	$ -	$ -
5	FMB- 1.875% Series Due 2016	$ 445,000,000	$ 12,160,125	$ 8,343,750	$ 2,571,343	$ -	$ (257,953)	$ (987,079)
6								
7	Other Long-Term Debt:							
8								
9	WPAFB Loan	$ 18,136,119	$ 764,019	$ 764,019	$ -	$ -	$ -	$ -
10								
11	Totals	$ 763,136,119	$ 20,576,082	$16,181,749	$ 3,149,301	$ -	$ (257,953)	$ (987,079)

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Embedded Cost of Long-Term Debt
As of September 30, 2015

Data: Actual as Adjusted
Type of Filing: Original
Work Paper Reference No(s).: WPD-3.1a, WPD-3.1, WPD-3.2a, WPD-3.3a

WPD-3.4a
Page 1 of 1
Witness Responsible: Jeffery K. MacKay

Line No.	Debt Issue Type, Coupon, Rate	Date Issued (Mo/Day/Yr)	Maturity Date (Mo/Day/Yr)	Principal Amount	Face Amount Outstanding	Unamort (Discount) or Premium	Unamort Debt Expense	Unamort Gain or (Loss) On Reacquired Debt	Carrying Value	Annual Interest Cost
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J) = (F)+(G)-(H)+(I)	(K)
1	First Mortgage Bonds:									
2										
3	2015 Series A & B OAQDA bonds	8/3/2015	8/1/2020	$ 200,000,000	$ 200,000,000	$ -	$ 2,662,301	$ -	$ 197,337,699	$ 2,791,889
4	PCB 4.80 OH FGD	9/13/2006	9/1/1936	$ 100,000,000	$ 100,000,000	$ -	$ 1,252,749	$ -	$ 98,747,251	$ 4,860,049
5	NEW 2016 FMB	10/1/2016	10/1/1946	$ 445,000,000	$ 445,000,000	$ -	$ 6,062,906	$ (11,287,183)	$ 427,649,911	$ 30,628,720
6										
7	Total								$ 723,734,861	$ 38,280,658
8										
9	EMBEDDED COST OF LONG-TERM DEBT (excluding WPAFB Loan)									**5.29%**

The Dayton Power and Light Company
Case No. 15-1830-EL-AIR

Comparative Financial Data Workpaper
For the Twelve Months Ended May 31, 2016
($000)

Data: 4 Months Actual & 8 Months Estimated
Type of Filing: Original
Work Paper Reference No(s).: WPC-2.1, WPC-10.2

WPD-5
Page 1 of 1
Witness Responsible: Karin M. Nyhuis

Line No.	Description	Test Year	Most Recent Ten Calendar Years									
			2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
1	Allowance for Borrowed Funds 432 (line 69, p117 of FERC)	$ 337	$ 346	$ 1,020	$ 1,903	$ 2,175	$ 1,782	$ 2,664	$ 9,100	$ 21,968	$ 12,908	$ 2,040
2	Total Taxes on Other Income & Deductions (line 59, p117 of FERC)	$ -	$ -	$ 372	$ 437	$ (274)	$ 5,959	$ 5,096	$ (2,812)	$ 16,658	$ 2,337	$ 372
3	Depreciation Expense 403 (line 6, p114 of FERC)	$ 125,763	$ 131,694	$ 217,784	$ 214,736	$ 130,892	$ 128,245	$ 133,198	$ 123,231	$ 119,585	$ 124,434	$ 118,105
4	Deprec. Exp. For Asset Retirement Costs 403.1 (line 7, p114 of FERC)	$ 4,028	$ 4,100	$ 484	$ 355	$ 452	$ 165	$ 48	$ (40)	$ (330)	$ 240	$ 282
5	Amort. & Depl. Of Utility Plant 404-405 (line 8, p114 of FERC)	$ 8,313	$ 7,973	$ 6,970	$ 6,043	$ 2,705	$ 2,133	$ 1,477	$ 3,874	$ 5,062	$ 4,955	$ 4,627
6	Common Stock Dividends(line 36, p118 of FERC)	$ 50,000	$ 159,000	$ 190,000	$ 145,000	$ 220,000	$ 300,000	$ 325,000	$ 155,000	$ 125,000	$ 100,000	$ 150,000
7	Provision for Deferred Income Taxes 410.1 (line 17, p114 of FERC)	$ (19,276)	$ 7,545	$ (17,393)	$ 4,456	$ 50,853	$ 54,194	$ 200,155	$ 40,513	$ 21,143	$ (13,940)	$ (8,558)
8	Investment Tax Credit Adj 411.4 (line 19, p114 of FERC)	$ (2,393)	$ (2,506)	$ (2,506)	$ (2,505)	$ (2,506)	$ (2,784)	$ (2,784)	$ (2,784)	$ (2,812)	$ (2,865)	$ (2,866)
9	Gross Additions to Utility Plant (line 26, p120 of FERC)	$ 91,249	$ 114,280	$ 122,130	$ 180,639	$ 207,638	$ 152,443	$ 154,699	$ 229,885	$ 337,213	$ 361,444	$ 180,415
10	Allowance for Other Funds 419.1 (line 38, p117 of FERC)	$ 2,005	$ 1,153	$ 432	$ 2,052	$ 2,276	$ 1,597	$ 479	$ 916	$ 317	$ 352	$ 14