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## Memorandum

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R-132-1107

**To:** The Honorable Michael P. Duffey  
Ohio House of Representatives

**From:** Russ Keller, Senior Economist *RK*

**Date:** July 20, 2017

**Subject:** Comparison of electricity charges billed by AEP and NEP

In response to your inquiry, LSC researched American Electric Power (AEP) Ohio's electric tariffs in order to draw comparisons between its residential standard service offer and the rates paid by actual end users subject to submetering. Initially, LSC contacted Nationwide Energy Partners (NEP) for assistance in acquiring information about their electricity billings, but the company declined. In the absence of their company-provided information, LSC relied upon two electric bills from a NEP customer, Mark Whitt, that were filed in conjunction with a Public Utilities Commission (PUCO) docket. In addition to this public resource, LSC relied upon multiple electric bills from a single customer, which were provided by your office.

All seven electric bills showed NEP charges that exceeded the comparable AEP Ohio rate for the same amount of metered usage. In dollar terms, the NEP charges were higher by amounts between \$4.50 and \$38.08 per month. In percentage terms, the NEP charges were between 9.8% and 25.4% higher. In a conversation with NEP, the company told LSC that charges for common area electricity are reflected in customers' bills, though they are not categorized as metered usage. Consequently, the company does not regard a comparison with residential rates for the same amount of metered usage as stated on the end user's bill as a true apples-to-apples comparison.

The second part of this memorandum attempts to quantify the savings realized by an electric customer that operates a 350-unit apartment complex. Substantial variation exists in electricity consumption patterns for these types of customers. For this reason, all assumptions are presented in detailed fashion. After compiling this

hypothetical apartment owner's electric bill, LSC concluded that the commercial customer purchases electricity at a 24.7% discount as compared to the cumulative spending of the building owner's tenants, if they were to purchase the same quantity of electricity from AEP Ohio under the residential standard service offer. The conclusion is similar to one submitted by AEP Ohio to PUCO in a commission-ordered investigation on submetering, in which the utility estimated the bulk savings discount to be 31.0%.

### **Nationwide Energy Partners customer bills compared to AEP Ohio rate**

The comparisons between actual NEP customer charges and the residential rate a customer would otherwise pay under AEP Ohio's standard service offer are presented below. Tables 1-7 present summaries of the various electric charges rather than detailed lists of all charges and riders recovered from the customer.<sup>1</sup> Although your office asked for a full inventory of the charges and riders paid by the NEP customer, that level of detail is not provided on NEP bills, and the company did not assist LSC in estimating these specific charges.<sup>2</sup> Furthermore, NEP stated the end user's electric charges include common area electric charges that are not reflected in the end user's metered usage. The electricity bills obtained by LSC lack explicit mention of common area electricity usage, as expressed in kilowatt-hours (kWh). For these reasons, the comparison tables should be interpreted with caution.

<b>Table 1. Comparison for Mark Whitt for Service Date, 11/20/2014 to 11/24/2014 Service Address: 300 W. Spring St. #507, Columbus, OH 43215</b>		
<b>Electric Bill Component</b>	<b>NEP Customer Actual Amount Charged</b>	<b>AEP Ohio SSO Comparable Residential Rate</b>
Metered Usage	392 kilowatt-hours	392 kilowatt-hours
Generation	\$34.22	\$21.69
Transmission	\$7.37	\$5.58
Distribution	\$26.05	\$25.45
Other Riders, Charges, and Discounts	\$0	\$1.20
<b>Total</b>	<b>\$67.64</b>	<b>\$53.92</b>
<b>NEP Higher/Lower (%)</b>	<b>\$13.72 (25.4%)</b>	<b>n/a</b>

<sup>1</sup> The AEP Ohio residential standard service offer has a monthly customer charge (\$8.40), which is regarded by AEP Ohio as a distribution charge. For this reason, the customer charge on the NEP customer bill is combined with other distribution charges, which should enable a more apt comparison between the two columns in each table. The "other" category of charges represents winter discounts granted to NEP customers and two riders that are not categorized by AEP Ohio – the retail stability rider and the power purchase agreement rider.

<sup>2</sup> However, all of these charges and riders are presented in full detail in the second part of this memorandum when simulating July 2017 electric bills paid by residential customers and a commercial customer for a hypothetical 350-unit apartment complex.

<b>Table 2. Comparison for Mark Whitt for Service Date, 2/15/2015 to 3/15/2015 Service Address: 300 W. Spring St. #507, Columbus, OH 43215</b>		
<b>Electric Bill Component</b>	<b>NEP Customer Actual Amount Charged</b>	<b>AEP Ohio SSO Comparable Residential Rate</b>
Metered Usage	2,741 kilowatt-hours	2,741 kilowatt-hours
Generation	\$215.72	\$151.67
Transmission	\$25.22	\$39.00
Distribution	\$145.75	\$108.15
Other Riders, Charges, and Discounts	-\$41.34	\$8.45
<b>Total</b>	<b>\$345.35</b>	<b>\$307.27</b>
<b>NEP Higher/Lower (%)</b>	<b>\$38.08 (12.4%)</b>	<b>n/a</b>

<b>Table 3. Comparison for John Doe for Service Date, 2/16/2015 to 3/15/2015 Service Address: 220 Liberty St. #10108, Columbus, OH 43215</b>		
<b>Electric Bill Component</b>	<b>NEP Customer Actual Amount Charged</b>	<b>AEP Ohio SSO Comparable Residential Rate</b>
Metered Usage	1,418 kilowatt-hours	1,418 kilowatt-hours
Generation	\$111.60	\$78.46
Transmission	\$13.05	\$20.18
Distribution	\$82.81	\$61.71
Other Riders, Charges, and Discounts	-\$13.16	\$4.37
<b>Total</b>	<b>\$194.30</b>	<b>\$164.72</b>
<b>NEP Higher/Lower (%)</b>	<b>\$29.58 (18.0%)</b>	<b>n/a</b>

<b>Table 4. Comparison for John Doe for Service Date, 9/14/2015 to 10/15/2015 Service Address: 220 Liberty St. #10108, Columbus, OH 43215</b>		
<b>Electric Bill Component</b>	<b>NEP Customer Actual Amount Charged</b>	<b>AEP Ohio SSO Comparable Residential Rate</b>
Metered Usage	497 kilowatt-hours	497 kilowatt-hours
Generation	\$29.62	\$27.50
Transmission	\$7.19	\$7.07
Distribution	\$35.81	\$29.14
Other Riders, Charges, and Discounts	\$0	\$1.54
<b>Total</b>	<b>\$72.62</b>	<b>\$65.25</b>
<b>NEP Higher/Lower (%)</b>	<b>\$7.37 (11.3%)</b>	<b>n/a</b>

<b>Table 5. Comparison for John Doe for Service Date, 10/15/2015 to 11/15/2015 Service Address: 220 Liberty St. #10108, Columbus, OH 43215</b>		
<b>Electric Bill Component</b>	<b>NEP Customer Actual Amount Charged</b>	<b>AEP Ohio SSO Comparable Residential Rate</b>
Metered Usage	360 kilowatt-hours	360 kilowatt-hours
Generation	\$21.45	\$19.92
Transmission	\$5.21	\$5.12
Distribution	\$29.41	\$24.29
Other Riders, Charges, and Discounts	\$0	\$1.11
<b>Total</b>	<b>\$56.07</b>	<b>\$50.44</b>
<b>NEP Higher/Lower (%)</b>	<b>\$5.63 (11.2%)</b>	<b>n/a</b>

<b>Table 6. Comparison for John Doe for Service Date, 11/15/2015 to 12/15/2015 Service Address: 220 Liberty St. #10108, Columbus, OH 43215</b>		
<b>Electric Bill Component</b>	<b>NEP Customer Actual Amount Charged</b>	<b>AEP Ohio SSO Comparable Residential Rate</b>
Metered Usage	282 kilowatt-hours	282 kilowatt-hours
Generation	\$16.80	\$15.60
Transmission	\$4.08	\$4.01
Distribution	\$25.63	\$21.54
Other Riders, Charges, and Discounts	\$0	\$0.86
<b>Total</b>	<b>\$46.51</b>	<b>\$42.01</b>
<b>NEP Higher/Lower (%)</b>	<b>\$4.50 (10.7%)</b>	<b>n/a</b>

<b>Table 7. Comparison for John Doe for Service Date, 12/15/2015 to 1/15/2016 Service Address: 220 Liberty St. #10108, Columbus, OH 43215</b>		
<b>Electric Bill Component</b>	<b>NEP Customer Actual Amount Charged</b>	<b>AEP Ohio SSO Comparable Residential Rate</b>
Metered Usage	460 kilowatt-hours	460 kilowatt-hours
Generation	\$26.28	\$25.46
Transmission	\$6.65	\$6.55
Distribution	\$34.36	\$27.86
Other Riders, Charges, and Discounts	\$0	\$1.42
<b>Total</b>	<b>\$67.29</b>	<b>\$61.29</b>
<b>NEP Higher/Lower (%)</b>	<b>\$6.00 (9.8%)</b>	<b>n/a</b>

## Dialogue with Nationwide Energy Partners

LSC contacted NEP to obtain information for a true apples-to-apples comparison. NEP did not provide the requested information, but a company representative spoke in general terms about the company's role and its methodology.

NEP regards the condo association, homeowner association, or property owner of the multi-family real estate as its customer. NEP informed LSC that it has no direct contractual relationship with an individual tenant (i.e., an end user of electricity). NEP stated that it does not take title of the electricity; instead, the local electric distribution utility (or competitive retail electric supplier, if applicable) delivers electricity directly to the multi-family complex's property owner. Because the property owner is the title owner of the electricity, NEP bills on their behalf.

NEP expressed concerns about generating a comparison table of an end user's electricity charges (i.e., Tables 1-7 of this memorandum). NEP maintains that they do not have a standard rate, but instead bill the end user of electricity at a usage rate that is equal to or less than the host utility's standard service offer (e.g., AEP Ohio). However, the property owner retains some discretion in what is billed to the end user. For example, a multi-family residential unit's property owner may offer discounts during certain months.

NEP stated that business arrangements differ from customer to customer, so the implied electricity charges (on a \$-per-kWh basis) paid by one end user in a given property are not necessarily indicative of those billed by NEP at other properties. Also, NEP noted that the bill received by an end user states the metered usage, but the amount of kWh for common areas may not be identified on the billing statement. Nevertheless, electricity usage in common areas is reflected in the charges. Therefore, an implied electricity cost as measured by dividing the electricity charges by the metered usage would not illustrate true cost of electricity on a price per kilowatt-hour basis.

LSC does not possess sufficient information to evaluate the statements by NEP, and the company did not provide the necessary supporting information when asked by LSC.

### **Cost basis comparison of a July 2017 electric bill**

The two tables below contain both assumptions and conclusions for similarly situated residences. The analysis relies on kilowatt (kW) demand information from the residential load profiles supplied by AEP Ohio for July 2016.<sup>3</sup> The kilowatt-hour multi-family real estate electricity consumption for a typical residential customer is sourced from Commonwealth Edison Company data for July 2016,<sup>4</sup> which is the largest electric utility in Illinois. Assumptions regarding load factors were referenced from a whitepaper released by the Colorado Springs Utilities, which stated the average load factor for a commercial

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<sup>3</sup> <https://www.aepohio.com/account/service/choice/cres/LoadProfiles.aspx>.

<sup>4</sup> Commonwealth Edison, or "ComEd," is the largest electric utility in Illinois, and should be comparable to residential usage in Ohio because of similarity in weather patterns affecting the two geographic areas, <https://www.comed.com/DoingBusinessWithUs/Pages/EnergySuppliers.aspx>.

customer involved in multi-family housing is between 50% and 65%.<sup>5</sup> The methodology for estimating peak demand from the load factor and kWh consumption information is based on the Energy Sentry newsletter released by the Brayden Automation Corporation.<sup>6</sup>

<b>Table 8. Assumptions for Billing Comparison Between a Single Residential Customer and a Commercial Customer Purchasing Electricity for a 350-unit Apartment Complex</b>		
<b>AEP Ohio Tariff</b>	<b>Schedule R-R</b>	<b>Schedule GS-2</b>
Tariff Description	Residential Bundled Service	General Service – Bundled Secondary Voltage
Rate Zone	Columbus Southern Power	Columbus Southern Power
Electricity consumption per customer	1,000 kWh	350,000 kWh
Number of Customers	350	1
Total Consumption	350,000 kWh	350,000 kWh
Hours per month (average), for billing purposes	730 hours	730 hours
On-peak hours per month	280 hours	280 hours
Off-peak hours per month	450 hours	450 hours
Electricity consumption, during on-peak hours	430 kWh	150,500 kWh
Electricity consumption, during off-peak hours	570 kWh	199,500 kWh
Load factor, during on-peak hours	65.2%	65.2%
Load factor, during off-peak hours	59.2%	59.2%
Load factor, entire month	58.1%	58.1%
Peak demand (calculated), during on-peak hours	2.36 kW	825 kW
Peak demand (calculated), during off-peak hours	2.14 kW	750 kW
kW demand for entire month (maximum)	2.36 kW	825 kW
Peak Demand, past 12 months (per load profile)	3.00 kW	1,050 kW
<p><b>Notes:</b> According to AEP Ohio, "the on-peak billing period is defined as 7 a.m. to 9 p.m. local time for all weekdays, Monday through Friday. The off-peak billing period is defined as 9 p.m. to 7 a.m. for all weekdays, all hours of the day on Saturdays and Sundays, and the legal holidays of New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.</p> <p>Load factor = <math>\frac{\text{\# of kilowatt hours consumed during period}}{\text{peak kW demand during period} * \text{\# of hours in period}}</math></p> <p>Peak kW demand during period = <math>\left( \frac{\text{Load factor} * \text{\# of hours in period}}{\text{\# of hours consumed during period}} \right)^{-1}</math></p>		

<sup>5</sup> Refer to "Hidden Costs of Low Load Factor Whitepaper," <https://www.csu.org/Pages/whitepapers.aspx>.

<sup>6</sup> <http://energysentry.com/newsletters/load-factor-calculations.php>.

The bill calculation spreadsheet on AEP Ohio's website was used to compile the hypothetical electric bill amounts in Table 9.<sup>7</sup> The concluding rows of Table 9 show that an apartment owner with a master meter would spend \$10,339 less (a savings of 24.7%) during July 2017 by buying in bulk as compared to the cumulative amount spent by all of the tenants. The conclusions are generally consistent with those submitted by AEP Ohio in a PUCO filing dated January 6, 2017.<sup>8</sup> AEP Ohio provided an abridged example by which a submetering entity spends \$8,749 for electricity in a 100-unit apartment complex while tenants would otherwise be charged \$12,677 per month. The commercial customer saves \$3,928 by buying in bulk, which represents a 31.0% discount to the residential standard service offer.<sup>9</sup>

<b>Table 9. Billing Comparison Between a Single Residential Customer and a Commercial Customer Purchasing Electricity for a 350-unit Apartment Complex, Using AEP Ohio's July 2017 Tariff</b>			
<b>Electric Bill Component</b>	<b>Computation, if different, GS-2 Specific</b>	<b>Schedule R-R Amount</b>	<b>Schedule GS-2 Amount</b>
Base charge – Customer	\$8.40 per month (R-R), \$9.04 per month (GS-2)	\$8.40	\$9.04
Base charge – Distribution	\$0.0182747 per kWh, \$4.033 per kW demand	\$18.27	\$3,327.23
<b>Riders:</b>			
Universal Service Fund	\$0.0001430 per kWh	\$0.14	\$50.05
kWh Tax (first 2,000 kWh)	\$0.00465 per kWh	\$4.65	\$9.30
kWh Tax (next 13,000 kWh)	\$0.00419 per kWh	n/a	\$54.47
kWh Tax (in excess of 15,000 kWh)	\$0.00363 per kWh	n/a	\$1,216.05
Residential Distribution Credit	-3.5807% of base charges	-\$0.95	n/a
Pilot Throughput Balancing Adjustment	\$0.0017283	\$1.73	n/a
Deferred Asset Phase-In	7.73% of base charges	\$2.06	\$257.90
Generation Energy	\$0.04048 per kWh	\$40.48	\$14,168.00
Generation Capacity	\$0.01484 per kWh, \$0.01317 per kWh	\$14.84	\$4,609.50
Auction Cost Reconciliation	-\$0.0017248 per kWh	-\$1.72	-\$603.68
Power Purchase Agreement	\$0.0015404 per kWh, \$0.0012189 per kWh	\$1.54	\$426.62

<sup>7</sup> <https://www.aepohio.com/account/bills/rates/AEPOhioRatesTariffsOH.aspx>.

<sup>8</sup> Case No. 15-1594-AU-COI, filed by Mr. Steven Nourse on behalf of Ohio Power Company.

<sup>9</sup> The AEP filing viewed the \$3,928 bulk discount savings through the prism of a submetering business, which is why they regarded it as a nearly a 45% profit margin for the submetering entity. If the conclusions in Table 2 are viewed in the same manner, the 24.7% bulk discount savings can be otherwise regarded as a 32.8% profit margin.

<b>Table 9. Billing Comparison Between a Single Residential Customer and a Commercial Customer Purchasing Electricity for a 350-unit Apartment Complex, Using AEP Ohio's July 2017 Tariff</b>			
<b>Electric Bill Component</b>	<b>Computation, if different, GS-2 Specific</b>	<b>Schedule R-R Amount</b>	<b>Schedule GS-2 Amount</b>
Basic Transmission Cost, kWh basis	\$0.0142293 per kWh, \$0.0003466 per kWh	\$14.23	\$121.31
Basic Transmission Cost, kW basis	\$3.43 per kW	n/a	\$2,829.75
Energy Efficiency and Peak Demand Reduction, kWh basis	\$0.003117 per kWh, \$0.0002912 per kWh	\$3.12	\$101.92
Energy Efficiency and Peak Demand, kW basis	\$0.79 per kW	n/a	\$651.75
Economic Development Cost Recovery	2.81125% of base charges	\$0.75	\$93.79
Enhanced Service Reliability	7.34119% of base charges	\$1.96	\$244.92
gridSMART Phase 1	\$0.18 per month, \$0.73 per month	\$0.18	\$0.73
gridSMART Phase 2	-\$0.63 per month, -\$2.13 per month	-\$0.63	-\$2.13
Retail Stability (first 833,000 kWh)	\$0.0015421 per kWh, \$0.0072504 per kWh	\$1.54	\$2,537.64
Distribution Investment	28.9875% of base charges	\$7.73	\$967.10
Alternative Energy	\$0.0017401 per kWh	\$1.74	\$609.04
Significant Excess Earnings Test Credit	-\$0.0004659 per kWh	-\$0.47	-\$163.07
Total Charges per customer		\$119.59	\$31,517.23
Electricity cost per kWh		11.96 ¢ per kWh	9.00 ¢ per kWh
Total Charges for 350,000 kWh consumption		\$41,856.50	\$31,517.23
Monthly savings of GS-2 customer relative to equivalent R-R customers		\$10,339.27 (24.7%)	

I hope you find this information helpful. Please call me if you have questions. My telephone number is (614) 644-1751.