



An AEP Company

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February 12, 2020

Tanowa Troupe  
Docketing Division Chief  
Public Utilities Commission of Ohio  
180 East Broad Street  
Columbus Ohio 43215-3793

*Re: In the Matter of the Annual Portfolio Status Report Under  
Rule 4901:1-39-05(C), Ohio Administrative Code, by Ohio  
Power Company, Case No. 21-139-EL-EEC.*

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Dear Ms. Troupe:

Ohio Power Company (AEP Ohio) submits the enclosed 2020 Portfolio Status Report, pursuant to Rule 4901:1-39-05(C), Ohio Administrative Code (OAC).

Thank you for your attention to this matter.

Respectfully Submitted,

/s/ Steven T. Nourse

# 2020 Portfolio Status Report of the Energy Efficiency and Peak Demand Response Programs

Volume I: Main Report, Affidavit of Jon Williams, and Appendices A  
through R

Ohio Power Company  
Gahanna, Ohio  
February 12, 2021

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## INTRODUCTION

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In Docket No. 08-888-EL-UNC, the Public Utilities Commission of Ohio (“the Commission”) approved Rules for Energy Efficiency and Peak Demand Reduction Programs of electric utilities (“the Green Rules”). These Green Rules first became effective December 10, 2009. In accordance with Amended Substitute Senate Bill 221 (S.B. 221), the Rules require that each electric utility in the Commission’s jurisdiction implement energy efficiency and peak demand reduction programs and file an annual Portfolio Status Report, originally due March 15 of each year but extended to May 15 in the January 18, 2017 order in Docket No. 16-0574-EL-POR for AEP Ohio.

In 2012, the General Assembly enacted Senate Bill 315 (S.B. 315) which, among other items, classified combined heat and power projects as energy efficiency projects. In 2014, the General Assembly then enacted Senate Bill 310 (S.B. 310) which froze energy efficiency targets at the 2014 levels for two years. After the freeze expired, the targets have resumed and AEP Ohio is operating under an approved 2017-2020 four-year plan.

Per Ohio Administrative Code (OAC) 4901:1-39-05(C), these Status Reports are required to address all approved energy efficiency and peak demand reduction (EE/PDR) programs’ performance over the prior calendar year. The Ohio Power Company (“the Company” or “AEP Ohio”) filed a Program Portfolio Plan for 2017-2020 under Docket No. 16-0574-EL-POR, which the Commission approved January 18<sup>th</sup>, 2017.

AEP Ohio submits this 2020 Portfolio Status Report in compliance with the above-cited Rules. In accordance with OAC 4901:1-39-05(C)(2)(b), AEP Ohio has contracted with Guidehouse Consulting, Inc. (“Guidehouse”), formerly Navigant, to review the Company’s programs; perform the impact and process evaluations; and provide evaluation, measurement, and verification reports.

This report is divided into two major sections: The first section covers how the Company has met all the requirements in the Green Rules in 2020 and achieved its H.B. 6 benchmark requirements. The second section reviews each of AEP Ohio’s EE/PDR programs and how they have performed this past year

Attached with this report are 18 appendices: Appendix A lists individual units incented and measures installed, at a detailed level, under each of Ohio Power Company’s EE/PDR programs. Appendices B through P contain the Evaluation Reports of each program from Guidehouse. Appendix Q contains the comprehensive process evaluation for the C&I sector. Finally, Appendix R contains the joint utility standardized reporting template that contains performance information at a program level.

## DEMONSTRATION OF COMPLIANCE

### BENCHMARK UPDATES

AEP Ohio filed its Initial Benchmark Report on February 8, 2010<sup>1</sup> and has made regular updates in its intervening Portfolio Status Reports for both energy usage and peak demand. The Company has adjusted both its gross energy sales and peak demand to include the impacts of mercantile<sup>2</sup> customers' energy efficiency resource commitments and economic development. These adjusted figures are shown in Figures 1 and 2 below.

The annual benchmark target is calculated as the average of the prior three years' adjusted load, multiplied by the yearly statutory benchmark requirements from H.B 6. The amounts for 2020 are 1.0 percent incremental energy reduction and 9.25 percent cumulative demand reduction.

For purposes of this compliance filing, the 2020 benchmark adjustments include the following: Economic growth exclusions, the associated opt outs legislated under S.B. 310<sup>3</sup>, and the load generated by the Combined Heat and Power projects that existed during the period used to establish the baseline<sup>4</sup>. Figure 1 shows the calculation of the adjusted 2020 benchmark for energy usage savings: 353.3 gigawatt-hours (GWh). Figure 2 shows the calculation for the adjusted 2020 benchmark for peak demand savings: 688.3 megawatts (MW).

FIGURE 1: ADJUSTED ENERGY USAGE BASELINES

Year	Actual Retail Sales	Econ. Devel. Adj.*	S.B. 310 Opt Out*	Combined Heat and Power*	2013-19 Merc. Savings	2020 Merc. Savings	Adjusted Retail Sales
<b>2017</b>	42,715.2	0.0	-8,441.7	95.7	19.8	0.2	34,389.2
<b>2018</b>	44,568.6	0.0	-8,460.2	136.3	21.6	2.0	36,268.4
<b>2019</b>	43,530.9	0.0	-8,388.2	173.9	21.8	2.0	35,340.4
<b>Three-Year Average:</b>							<b>35,332.6</b>
<b>Benchmark Rate:</b>							<b>1.00%</b>
<b>2020 Benchmark Target:</b>							<b>353.3</b>

All figures are in GWh - Docket 20-501-EL-FOR.

<sup>1</sup> *In the Matter of the Initial Benchmark Report of Columbus Southern Power Company and Ohio Power Company*, Case No. 10-153-EL-EEC, February 8, 2010.

<sup>2</sup> "Mercantile customer" means a commercial or industrial customer if the electricity consumed is for nonresidential use and the customer consumes more than seven hundred thousand kilowatt hours per year or is part of a national account involving multiple facilities in one or more states. See Ohio Revised Code § 4928.01(A)(19).

<sup>3</sup> <http://codes.ohio.gov/orc/4928.6611v1>

<sup>4</sup> <http://codes.ohio.gov/orc/4928.66v1> - See Ohio Revised Code §4928.66(A)(2)(c)



\*This baseline differs from the AEPS baseline filed in 20-0738-EL-ACP to reflect the above adjustments.

FIGURE 2: ADJUSTED PEAK DEMAND BASELINES

Year	Coincident Peak Demand	Econ. Devel. Adj.*	S.B. 310 Opt Out*	Combined Heat and Power*	2013-19 Merc. Savings	2020 Merc. Savings	Adjusted Peak Demand
2017	8,349.0	0.0	-1,029.8	9.2	3.1	0.0	7,331.6
2018	8,599.0	0.0	-982.1	13.8	3.6	0.4	7,634.7
2019	8,332.0	0.0	-995.6	18.0	3.6	0.4	7,358.4
<b>Three-Year Average:</b>							<b>7,441.6</b>
<b>Benchmark Rate:</b>							<b>9.25%</b>
<b>2020 Benchmark Target:</b>							<b>688.3</b>

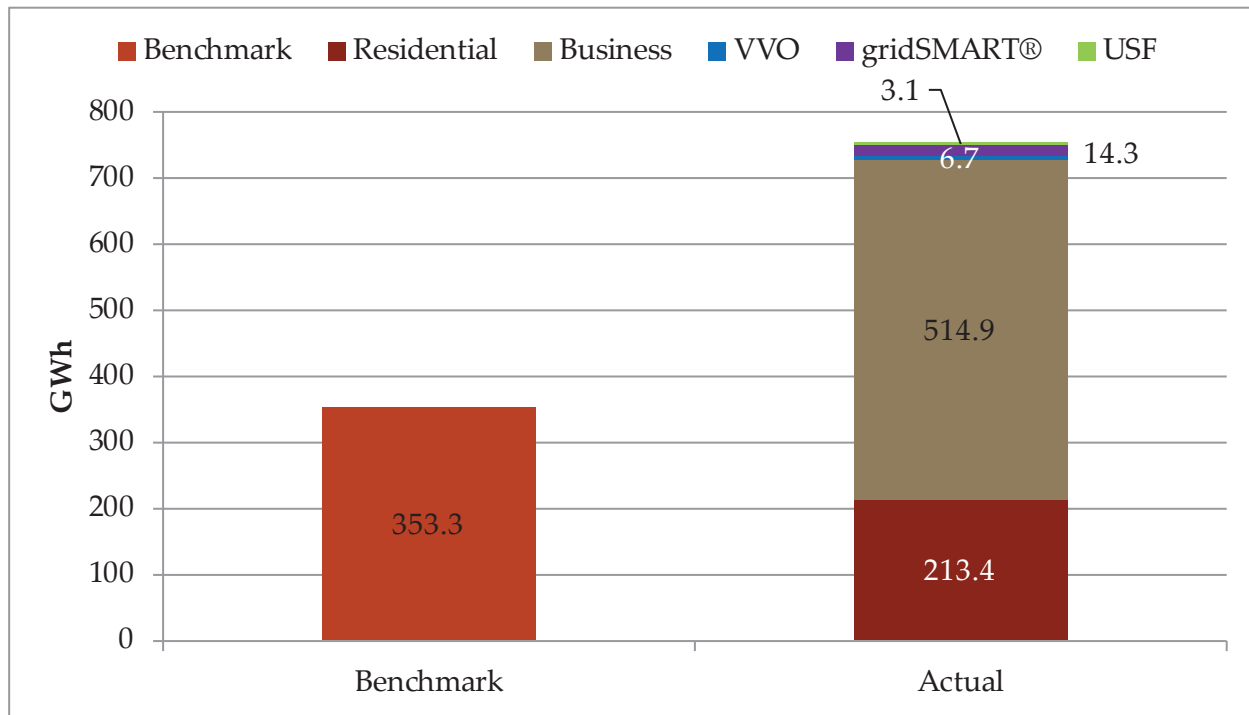
All figures are in MW - Docket 20-501-EL-FOR.

### ACHIEVED SAVINGS

The Company has met all its EE/PDR benchmarks for both energy and demand savings for 2020, with all of Ohio Power's EE/PDR programs saving a combined 728.3 GWh of energy.

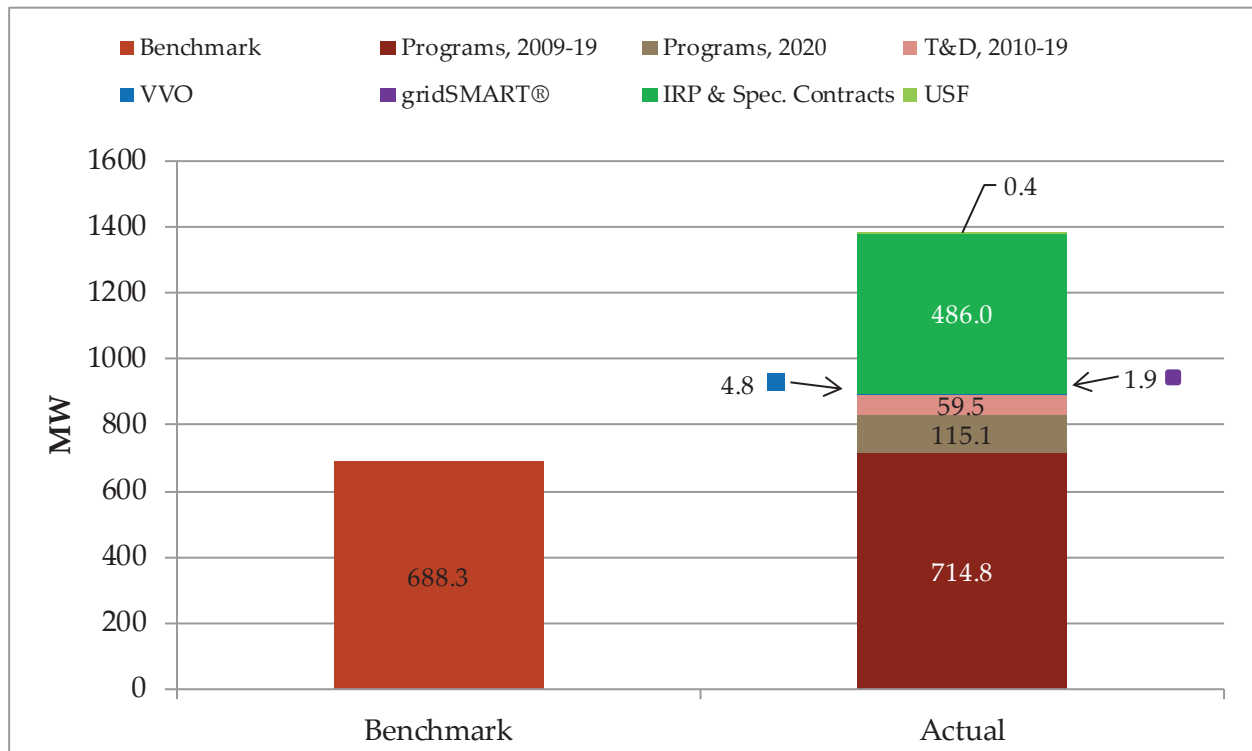
AEP Ohio is also allowed to claim savings from the Universal Service Fund established by section 4928.51 of the Revised Code that benefits low-income customers, these savings are 3.1 GWh. Additionally, 2020 savings from Home Energy Reports for gridSMART® Phase I/II customers totaled 14.3 GWh. Finally there was an additional 6.7 GWh for implementing Volt Var Optimization (VVO) savings. Together this yielded a grand total of 752.3GWh, well above the benchmark target. Figure 3 illustrates the breakout of these savings between residential programs, business programs, VVO savings, the Universal Service Fund, and gridSMART®. The majority of energy savings in 2020 came from business programs (68.4 percent). Residential programs, gridSMART®, VVO savings, and Universal Service Fund accounted for 28.4 percent, 1.9 percent, 0.9 percent, and 0.4 percent of the total, respectively.

FIGURE 3: ACHIEVED ANNUAL ENERGY SAVINGS, BY SEGMENT, 2020



The Company's portfolio yielded 115.1 MW in permanent peak demand reductions in 2020, shown in Figure 4. The cumulative permanent peak demand reduction impact of programs from 2009 through 2019 was 714.8 MW. Combined with other sources of demand reduction, including past year T&D projects (59.5 MW), VVO demand savings (4.8 MW), special contracts and interruptible tariffs (486 MW), the Universal Service Fund (0.4 MW), and gridSMART® Phase I/II (1.9 MW) AEP Ohio reduced peak demand by 1382.4 MW in total.

FIGURE 4: ACHIEVED PEAK DEMAND SAVINGS, BY SOURCE, 2020



### COST EFFECTIVENESS

The Company's portfolio of EE/PDR programs has been cost-effective. There are four common tests to determine cost effectiveness, differing in which costs and benefits are included and for whom:

- **Participant Test (PCT):** Participation is cost effective from this perspective if the reduced electric costs to the participating customer from the measure exceed the after-incentive cost of the measure to the customer.
- **Utility Cost Test (UCT):** Programs are cost effective from this perspective if the costs avoided by the program's energy and demand savings are greater than the utility's EE/PDR program costs to promote the program, including customer incentives.
- **Ratepayer Impact Measure (RIM) Test:** Programs are cost effective from this perspective if their avoided costs are greater than the sum of the EE/PDR program costs and the "lost revenues" caused by the program.
- **Total Resource Cost (TRC) Test:** Programs are cost effective from this perspective if their avoided costs are greater than the sum of the measures cost and the EE/PDR program administrative costs.

Figure 5 shows benefit-cost ratios for each of the cost effectiveness tests listed above. These ratios are based on *ex ante* savings. A ratio higher than one indicates that net benefits are greater

than net costs, and the portfolio is beneficial by the test's standards. Also included is the TRC levelized cost of energy.

FIGURE 5: PORTFOLIO EX ANTE BENEFIT-COST RATIOS AND TRC LEVELIZED COST, 2020

Test	Ratio or Cost
Total Resource Cost	1.4
Participant Cost	3.4
Ratepayer Impact	0.6
Utility Cost	5.6
TRC Levelized Cost per kWh (¢)	3.7

Total resource cost ratios and levelized energy costs for each individual program are shown in Figure 6. Again, a ratio greater than one indicates that the program's benefits exceed its costs. Note that the ratios presented in this table are based on *ex ante* savings and may differ from the *ex post* figures contained in Appendices B through P.

FIGURE 6: TOTAL RESOURCE COST RATIOS AND LEVELIZED COSTS, 2020

Program	Benefit- Cost Ratio	Levelized Cost per kWh (¢)
Efficient Products	3.1	1.8
Appliance Recycling	1.4	3.0
<i>e<sup>3</sup> smart</i> <sup>SM</sup>	1.3	3.7
Community Assistance	0.2	34.6
EfficiencyCrafted <sup>SM</sup> New Homes	1.1	6.7
Manu. New Homes	0.6	11.9
Home Energy Reports	2.5	1.7
It's Your Power	0.1	79.4
Efficient Products for Bus.	1.0	5.2
Process Efficiency	1.1	4.4
Self Direct	1.4	4.0
Business New Construction	1.1	4.9
Express	0.9	5.9
Data Center	1.1	5.1
Continuous Energy Improvement	1.5	2.8
Combined Heat and Power	2.4	2.3

## BANKING OF ENERGY EFFICIENCY ACHIEVEMENTS

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In accordance with Senate Bill 310 Section 4928.662(G)<sup>5</sup>, AEP Ohio presents its banking methodology. The Company reserves the right to bank all achievements exceeding the benchmark. At a minimum for 2020, Ohio Power is banking all achievement in excess of 115 percent of benchmark, shown in Figure 7.

FIGURE 7: BANKING OF ENERGY EFFICIENCY ACHIEVEMENTS

Year	GWh
2009	141.9
2010	103.3
2011	148.7
2012	252.6
2013	186.5
2014	182.2
2015	72.7
2016	152.2
2017	125.7
2018	125.9
2019	157.2
2020	346.0
<b>Total</b>	<b>1,648.9</b>

## SUMMARY

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In 2020, Ohio Power Company met its benchmark targets for both energy usage and peak demand. The Company's EE/PDR portfolio as a whole was cost-effective.

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<sup>5</sup> <http://codes.ohio.gov/orc/4928.662><sup>8</sup> In the Matter of the Protocols for the Measurement and Verification of Energy Efficiency and Peak Demand Reduction Measures, Case No. 09-512-GE-UNC, August 6, 2010.

## PROGRAM ACTIVITY DESCRIPTIONS

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This section of the report discusses program activity from January 1 through December 31, 2020. AEP Ohio operated sixteen programs this year, not counting T&D improvements:

### Residential Programs:

- Efficient Products
- Appliance Recycling
- *e<sup>3</sup>smart*<sup>SM</sup>
- Intelligent Home & DR
- Community Assistance
- EfficiencyCrafted<sup>SM</sup> New Homes
- New Energy Efficient Manufactured Home
- Home Energy Reports

### Business Programs:

- Efficient Products for Business
- Process Efficiency
- Self Direct
- Business New Construction
- Express
- Continuous Energy Improvement
- Data Center
- Combined Heat & Power

Figure 8 summarizes each program's direct and allocated department costs to AEP Ohio; the number of participants or units sold; and ex ante energy and demand savings. Descriptions of each program follow Figure 8. Not all figures seen below may sum due to rounding.

FIGURE 8: SUMMARY OF DIRECT PROGRAM COSTS AND BENEFITS, 2020

Program	Customer Incentives	Third Party Costs	Utility Admin. Costs*	Total Costs	Number of Participants / Units	Coincident Peak MW Saved	Annual GWh Saved
Efficient Products	\$7,394.9	\$2,810.2	\$1,150.1	\$11,355.2	4,488,231	22.6	125.7
Appliance Recycling	399.5	258.3	170.4	828.2	3,746	0.8	5.3
<i>e<sup>3</sup> smart</i> <sup>SM</sup>	361.9	227.9	93.5	683.3	27,339	0.3	2.2
Intelligent Home & DR	731.1	167.3	544.6	1,443.0	81,765	2.2	1.8
Community Assistance	1,757.3	377.5	350.5	2,485.3	1,958	0.2	1.2
Residential New Homes	1,178.2	783.0	197.6	2,158.9	1,864	2.5	5.9
Manu. New Homes	52.0	136.0	30.7	218.7	47	0.1	0.3
Home Energy Reports	0.0	1,054.6	120.9	1,175.5	520,133	9.2	71.1
Efficient Products for Bus.	12,826.3	2,935.4	2,680.9	18,442.6	5,274	35.9	193.5
Process Efficiency	1,249.4	691.6	300.3	2,241.3	81	3.1	26.3
Self Direct	91.2	90.7	72.1	254.0	27	0.5	2.4
Bus. New Construction	3,665.8	991.4	790.1	5,447.2	223	9.5	55.9
Express	2,159.3	0.0	412.2	2,571.6	299	1.6	7.9
Retro-Commissioning	0.0	0.0	0.0	0.0	0	0.0	0.0
Data Center	3,467.2	661.4	395.5	4,524.2	21	13.6	103.7
Demand Response	0.0	0.0	0.0	0.0	0	0.0	0.0
CEI	453.0	1,225.8	247.7	1,926.5	78	2.9	19.6
Combined Heat & Power	5,689.7	0.0	718.2	6,407.9	3	10.1	105.7
<b>Total</b>	<b>\$41,477.0</b>	<b>\$12,411.2</b>	<b>\$8,275.2</b>	<b>\$62,163.3</b>	<b>5,131,089</b>	<b>115.1</b>	<b>728.3</b>

Education and Media	328.2
Pilot Programs, Research & Development	1,939.7
<b>Grand Total</b>	<b>\$64,431.2</b>

\*Programs' utility administrative costs include allocated departmental, evaluation, and capital carrying charge costs. All cost figures are in thousands of dollars. Columns may not sum due to rounding.

## RESIDENTIAL PROGRAMS

### EFFICIENT PRODUCTS

This program provides incentives and marketing support through retailers to encourage purchases of ENERGY STAR®-approved lighting and appliances. The Efficient Products program contains multiple savings paths: The first is customer rebates at the point of sale. Over 200 participating retailers in the Company's service territory are equipped to offer instant rebates on certain ENERGY STAR®-approved lighting devices. Other retailers without the capability to offer electronic markdowns may also offer retailer-reimbursed rebates on these same approved lighting products. These products include various Light Emitting Diode (LED)

bulbs. In addition, the program offers customers the opportunity to mail-in rebate applications for refrigerators, smart thermostats, pool pumps, clothes washers, dehumidifiers, HVAC replacements, and heat pump water heaters. These applications are available from the retailer, on the AEP Ohio website, or the AEP Ohio Marketplace. These rebates and incentives range from approximately one dollar each for 6-watt LEDs to \$400 for heat pump water heaters.

As available technologies and ENERGY STAR® standards continue to evolve over time, AEP Ohio maintains and regularly updates the list of qualifying devices.

In addition, AEP Ohio offers marketing support to retailers. These services include in-store signage to promote efficient devices and training for sales associates to help them understand the benefits of energy-efficient lights and appliances.

In the 2017-2020 plan approved stipulation, AEP Ohio has combined the In Home program with the Efficient Products program. AEP Ohio offers the *Online Energy Checkups*, a free online tool available on AEP Ohio's website that customers may use to quickly identify their home energy costs, receive recommendations on how to save energy, and learn how to qualify for a kit of free energy-saving items. AEP Ohio provided 22,219 kits to Energy Checkup participants in 2020. This is a noticeable increase from prior years, likely due to the Energy Checkup being utilized as an option for communities to meet their Energy Saver's goals. Another option that is cost shared with Columbia Gas is the *In-Home Energy Assessments* for customers with dual fuel. This offering includes an in-home visit, visual inspection, prioritized suggestions for efficiency improvements, and installation of several energy-saving devices such as LEDs, programmable thermostats, or low-flow showerheads, at a subsidized price. In 2020, 283 customers had In-Home Assessments. This decrease year over year is due to COVID-19 and halting in home assessments for a number of months.

Additionally, program implementers work with property managers in multi-family housing complexes to schedule home assessments and installations with residents, as well as to identify potential savings in common areas. All individually metered residential multi-family housing in AEP Ohio's service territory is eligible to participate. This part of the program receives some marketing assistance from property manager associations around the state. Due to COVID-19, AEP Ohio was only able to provide 20 properties with assessments, for a total of 1,313 units having measures installed.

Figure 9 below shows the number of products for which AEP Ohio provided incentives or distributed at no cost in 2020. Please see Appendix A for a detailed measure listing.



FIGURE 9: EFFICIENT PRODUCTS INCENTED OR PROVIDED, 2020

Product	Number	kWh	kW
Lighting	3,434,244	122,218,556	21,706.0
Appliances	3,265	690,078	98.6
HVAC	343	354,681	68.6
Hot Water	7,162	621,373	80.7
Thermostats	2,384	800,215	161.1
Pool Pumps	288	335,790	496.5
Air Sealing	1,038,949	671,195	2.3
Audits	1,596	0	0.0
<b>Total</b>	<b>4,488,231</b>	<b>125,691,888</b>	<b>22,613.8</b>

Energy and demand savings were calculated using the Draft Ohio Technical Resource Manual (TRM)<sup>8</sup> when calculations were presented. The Draft Ohio TRM does not provide energy savings for smart thermostats. The calculations for smart thermostats are taken from the Illinois TRM, page 152<sup>9</sup>.

The Company's Action Plan goals for 2020 were 65.6 GWh of savings in energy consumption and 7.3 MW of savings from peak demand. Figure 10 below shows the Efficient Products program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 10: EFFICIENT PRODUCTS PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	125.7	65.6	191.6%
Demand Savings (MW)	22.6	7.3	309.8%
Program Costs (\$M)	11.4	13.5	84.1%
First Year Cost per kWh Saved (¢)	9.0	20.6	43.9%

The Efficient Products program exceeded its goals for both energy and demand savings in 2020. The program saved 125.7 GWh of energy, 91.6 percent more than what was planned. The program also reduced peak demand by 22.6 MW, 209.8 percent more than planned. The

<sup>8</sup> In the Matter of the Protocols for the Measurement and Verification of Energy Efficiency and Peak Demand Reduction Measures, Case No. 09-512-GE-UNC, August 6, 2010.

<sup>9</sup> [https://s3.amazonaws.com/ilsag/IL-TRM\\_Effective\\_010119\\_v7.0\\_Vol\\_3\\_Res\\_092818\\_Final.pdf](https://s3.amazonaws.com/ilsag/IL-TRM_Effective_010119_v7.0_Vol_3_Res_092818_Final.pdf)

program came in below budget at \$11.4 million, yielding an average first year cost of 9.0 cents per kWh saved.

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### APPLIANCE RECYCLING

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This program seeks to remove functioning but inefficient refrigerators and freezers from the power grid. Often, older appliances, especially refrigerators, remain in use as second or “backup” appliances—still plugged in and using an inordinate amount of energy. By removing these high-usage appliances from the grid, the Company reduces unnecessary load and usage. This program’s primary focus is on these second refrigerators, but recycling for stand-alone freezers is also available. In return for recycling appliances, AEP Ohio paid the customer an incentive of \$50 in 2020. For the first three months of 2020, the appliance replacement for the Community Assistance Program has been included into the Appliance Recycling Program. With this economy of scale, AEP Ohio was able to procure a low cost source with all products from a large Ohio manufacturer. This scale also gave AEP the ability to extend the warranty provided for the measures to three years. The COVID-19 pandemic caused this implementer to declare bankruptcy, and we worked to bring on another vendor when the state opened back up.

Customers enroll in the program either through the Company’s website or over the phone, and schedule an at-home pickup. Figure 11 shows the number of appliances that were recycled through this program in 2020. Energy and demand savings were calculated using the Draft Ohio TRM. Please see Appendix A for a detailed measure listing.

FIGURE 11: APPLIANCES RECYCLED, 2020

Appliances	Number	kWh	kW
Freezers	688	856,147	137.6
Refrigerators	3,210	4,417,442	706.2
<b>Total</b>	<b>3,898</b>	<b>5,273,589</b>	<b>843.8</b>

The Company’s Action Plan goals for 2020 were 11.9 GWh of savings in energy consumption and 1.8 MW of savings from peak demand. Figure 12 shows the Appliance Recycling program’s energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 12: APPLIANCE RECYCLING PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	5.3	11.9	44.3%
Demand Savings (MW)	0.8	1.8	46.9%
Program Costs (\$M)	0.8	3.3	25.1%
First Year Cost per kWh Saved (¢)	15.7	27.7	56.6%

The Appliance Recycling program missed its goals for energy and demand savings for 2020. The program saved 5.3 GWh of energy, 55.7 percent below target. The program also reduced peak demand by 0.8 MW, 53.1 percent below goal. The program spent less than budgeted at \$0.8 million, yielding an average first year cost of 15.7 cents per kWh saved.

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*e<sup>3</sup>smart<sup>SM</sup>*

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AEP Ohio offers an educational program covering energy efficiency for students in grades 4 through 12, which are in schools throughout the Company's service territory. It includes a curriculum designed to meet state and national science standards for these grades, teacher training, and supplies for classroom instruction. Students served by the program will learn about different forms of energy, their sources, and how electric power reaches their homes. Students are then given a box of energy-efficient devices—Light Emitting Diode (LED) bulbs, LED night lights, low-flow showerheads, faucet aerators, and weather-stripping—to install at home with their parents' or guardians' supervision. Kits also include tools students can use to measure energy use and efficiency losses.

In the 2019-2020 school year, there were 27,339 kits distributed to students in *e<sup>3</sup>smart<sup>SM</sup>*. (Of these, 12,998 students returned surveys.) Figure 13 shows how many of which items were included in their kits. Please see Appendix A for a detailed measure listing.

FIGURE 13: ITEMS INCLUDED IN *e<sup>3</sup>smart<sup>SM</sup>* KITS, 2020

Item	Number	kWh	kW
Faucet Aerators	2,951	222,807	27.8
Hot Water Temp. Setback	391	31,906	3.5
Lighting	19,766	586,602	90.7
Low-Flow Showerheads	1,859	521,003	66.7
Weather-Stripping	5,054	56,099	4.0
Allocated Kits*	14,341	750,188	102.2
<b>Total</b>	<b>44,362</b>	<b>2,168,606</b>	<b>294.9</b>

\*These are kits for participants who had not returned surveys; AEP Ohio reduced the installation rates of these cases.

Energy and demand savings were calculated using the Draft Ohio TRM when calculations were available. The Draft Ohio TRM does not include calculations for LED nightlights or weather-stripping.

The calculation for LED nightlights is taken from the 2012 Portfolio Status Report, Navigant Program Evaluation (“2012 Navigant Evaluation”).<sup>10</sup>

The formula for weather-stripping is shown below, where  $\Delta E$  is energy savings in kWh;  $x_1$  is maximum energy savings potential from weatherization measures;  $y_1$  is average annual energy usage in all-electric residences;  $y_2$  is average annual energy usage in non-all-electric residences;  $e$  is the percentage of homes that are all-electric;  $L_{\text{shell}}$  is the fraction of air leaks through windows, doors, ceilings, walls, and floors;  $L_{\text{HT}}$  is the fraction of total heat transfer due to air leaks;  $Q$  is total inches of weather-stripping applied;  $L_{\text{wid}}$  is the average width of the leakage area in inches; and  $L_{\text{area}}$  is the average leakage area per house in inches.

$$\Delta E = x_1 \times \left( (y_1 \times e) + (y_2 \times (1 - e)) \right) \times L_{\text{shell}} \times L_{\text{HT}} \times \frac{Q \times L_{\text{wid}}}{L_{\text{area}}}$$

AEP Ohio’s Action Plan goals for 2020 were 6.9 GWh of savings in energy consumption and 0.5 MW of savings from peak demand. Figure 14 below shows the *e<sup>3</sup>smart<sup>SM</sup>* program’s energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 14: *e<sup>3</sup>smart<sup>SM</sup>* PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	2.2	6.9	31.4%
Demand Savings (MW)	0.3	0.5	59.0%
Program Costs (\$M)	0.7	1.2	56.9%
First Year Cost per kWh Saved (¢)	31.5	17.4	181.2%

The *e<sup>3</sup>smart<sup>SM</sup>* program did not meet either its energy or demand goals for 2020. The program saved 2.2 GWh of energy, 68.6 percent below goal. The program also reduced peak demand by 0.3 MW, 41.0 percent below goal. The program came in under budget at \$0.7 million, yielding an average first year cost of 31.5 cents per kWh saved.

<sup>10</sup> *In the Matter of the Annual Portfolio Status Report Under Rule 4901:1-39-05(C), Ohio Administrative Code, by Ohio Power Company*, Case No. 13-1182-EL-EEC, May 15, 2013, Appendix E, page 22.

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## INTELLIGENT HOME & DR

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AEP Ohio offered its Intelligent Home and DR program titled “It’s Your Power” in 2020. This program offers a mobile smartphone application (app) that customers may download for information to illustrate electricity consumption patterns, how their decisions and actions influence their usage, how that usage affects their energy bill, and actions they may take to manage and reduce their usage. Specifically targeting AMI customers, this app features a weather overlay, estimated billing based on usage, energy project and tip tracking. In addition, AEP Ohio offers a smart hub (Energy Bridge) that can communicate with the AMI meter and with the app to give customers near real-time, highly granular usage information, and a platform through which customers may control various smart devices.

Coupled with the AEP Ohio “It’s Your Power” app this offers customers control of electric space cooling and heating load using a thermostat with two-way communication capabilities. Load control is achieved through temperature set point adjustments on individual thermostats for both cooling and heating loads and/or through cycling of compressors. The app will enable customers to change heating and cooling settings remotely. AEP Ohio had program to date adoption of 81,765 customers download the mobile app. From this participant segment, 23,972 customers have bound an energy bridge. For 2020, AEP Ohio has continued to exclude the randomized control group as it was negatively impacting customer satisfaction to disallow them opportunities to participate. AEP Ohio implemented the savings values from the 2018 evaluation to assign per unit savings for Energy Bridges and Connected Thermostats.

FIGURE 15: MEASURES INSTALLED THROUGH THE INTELLIGENT HOME, 2020

Item	Number	kWh	kW
Energy Bridge	23,972	1,043,252	163.2
AMI Mobile App	81,765	0.0	0.0
Connected Thermostat	6,011	773,586	2,002.2
<b>Total</b>	<b>111,748</b>	<b>1,816,839</b>	<b>2,165.3</b>

With a paired energy bridge, a customer is then eligible for a communicating thermostat, this allows for additional control and functionality for the It’s Your Power program. This engagement resulted in 6,011 customers installed a communicating thermostat.

FIGURE 16: INTELLIGENT HOME PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	1.8	36.1	5.0%
Demand Savings (MW)	2.2	75.0	2.9%
Program Costs (\$M)	1.4	3.4	42.4%
First Year Cost per kWh Saved (¢)	79.4	9.4	843.3%

The It's Your Power program did not meet its energy or demand savings goals, in 2020. The program saved 1.8 GWh of energy and reduced peak demand by 2.2 MW. The program came in under budget at \$1.4 million, yielding an average first year cost of 79.4 cents per kWh saved. Unlike other residential programs, this program only has a one-year measure life.

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### COMMUNITY ASSISTANCE

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This program offers energy efficiency services to those AEP Ohio customers with limited income to assist them in reducing their electric energy use and making their utility bills more manageable. Residential customers with incomes up to 200 percent of the federal poverty level are eligible to participate.<sup>11</sup> The program offers services such as home assessments, efficient lighting, appliance replacement, HVAC replacement, water heating upgrades, health and safety repairs, and weatherization; at no cost to the customer. The appliance replacement portion of the CAP program is running through one single implementer. With this economy of scale, AEP is able to provide: Lower pricing, better quality product sourced from an Ohio manufacturer, and a 3 year warranty. The appliance recycling implementer does the recycling portion; this gives certainty that the appliance was recycled in an environmentally friendly manner.

In 2020, there were 1,958 accounts serviced in the Community Assistance program. The decrease from previous years is attributable to the COVID-19 pandemic, which required AEP Ohio to pause on site visits due to safety concerns. Figure 17 below shows which measures were installed. Please see Appendix A for a detailed measure listing.

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<sup>11</sup> In 2020, this came to roughly \$52,400 per year for a family of four. See U.S. Department of Health and Human Services, "2020 Poverty Guidelines," <https://aspe.hhs.gov/2020-poverty-guidelines>.

FIGURE 17: MEASURES INSTALLED THROUGH COMMUNITY ASSISTANCE PROGRAM, 2020

Item	Number	kWh	kW
Fridges & Freezers	455	42,695	7.7
Audits	1,458	0	0.0
Appliance Metering	458	0	0.0
HVAC	1,324	16,247	2.2
Hot Water	843	55,483	6.4
Lighting	21,739	778,706	135.4
Other	387	44	0.0
Smart Strips	1,285	104,468	0.0
Air Sealing & Insulation	57,477	153,215	1.5
<b>Total</b>	<b>85,426</b>	<b>1,150,859</b>	<b>153.1</b>

Energy and demand savings were calculated using the Draft Ohio TRM when calculations were available. The savings for replaced fridges and freezers is the assumed savings for the new Energy Star unit when compared to a baseline model.

Ohio Power's Action Plan goals for 2020 were 8.5 GWh of savings in energy consumption and 0.8 MW of savings from peak demand. Figure 18 below shows the Community Assistance program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 18: COMMUNITY ASSISTANCE PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	1.2	8.5	13.5%
Demand Savings (MW)	0.2	0.8	19.1%
Program Costs (\$M)	2.5	5.1	48.7%
First Year Cost per kWh Saved (¢)	215.9	60.0	359.9%

The Community Assistance program did not meet its energy or demand savings goals in 2020. The program saved 1.2 GWh of energy and reduced peak demand by 0.2 MW. The program came in under budget at \$2.5 million, yielding an average first year cost of 215.9 cents per kWh saved.

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### EFFICIENCYCRAFTED<sup>SM</sup> NEW HOMES

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EfficiencyCrafted<sup>SM</sup> New Homes (formerly known as ENERGY STAR® New Homes) seeks to effect the construction of single-family residences that meet specific ENERGY STAR® or EnergyPath<sup>SM</sup> standards. Such structures use at least 20 percent less energy than residences built



to the minimum code requirements. AEP Ohio will pay various incentives to participating builders of single-family residences to help offset incremental construction costs. In addition, builders receive training, marketing, including site signage, consumer brochures, model home displays, advertising, and other consumer education tools. All new single-family and multifamily residential construction that meets these standards are eligible. In 2020, this program incented the construction of 1,783 efficient single-family homes, and 81 efficient multifamily homes. Energy and demand savings were calculated as the difference between a baseline residence constructed at the applicable code and the as-built *REM/Rate* model. *REM/Rate* is software that analyzes energy usage in residential buildings.

The Company's Action Plan goals for 2020 were 6.1 GWh of savings in energy consumption and 1.2 MW of savings from peak demand. Figure 19 below shows the program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 19: EFFICIENCYCRAFTED<sup>SM</sup> NEW HOMES PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	5.9	6.1	96.4%
Demand Savings (MW)	2.5	1.2	208.0%
Program Costs (\$M)	2.2	2.8	77.1%
First Year Cost per kWh Saved (¢)	36.7	45.9	80.0%

The EfficiencyCrafted<sup>SM</sup> New Homes program exceeded its demand savings goal, but missed the energy savings goal in 2020. The program saved 5.9 GWh of energy. The program also reduced peak demand by 2.5 MW, 108 percent over the annual goal. The program came in under budget at \$2.2 million, yielding an average first year cost of 36.7 cents per kWh saved.

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#### NEW ENERGY EFFICIENT MANUFACTURED HOME

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The New Energy Efficient Manufactured Home Program will improve the energy performance of manufactured homes. AEP Ohio utilizes the retail channel of manufactured homes by giving an incentive for the more efficient manufactured homes. In addition, since the HVAC unit is installed after the manufactured home has been delivered, HVAC dealers/contractors were incentivized to supply the home with an efficient heat pump instead of an electric furnace.

This program incented the construction of 47 efficient manufactured homes in 2020. Energy and demand savings were calculated as the difference between a baseline residence constructed at the applicable code and the as-built *REM/Rate* model. *REM/Rate* is software that analyzes energy usage in residential buildings. We then adjust savings based on the applicable climate region in Ohio.



AEP Ohio's Action Plan goals for 2020 were 2.5 GWh of savings in energy consumption and 0.1 MW of savings from peak demand. Figure 20 below shows the New Energy Efficient Manufactured Home program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 20: NEW ENERGY EFFICIENT MANUFACTURED HOME, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	0.3	2.5	12.0%
Demand Savings (MW)	0.1	0.1	124.1%
Program Costs (\$M)	0.2	0.5	43.7%
First Year Cost per kWh Saved (¢)	72.7	20.0	363.5%

The New Energy Efficient Manufactured Home program did not meet energy savings goals, but exceeded the demand savings goals. The program saved 0.3 GWh of energy, 88 percent below target. The program also reduced peak demand by 0.1 MW, this amount was 24.1 percent above the goal. The program came in below budget at \$0.2 million, yielding an average first year cost of 72.7 cents per kWh saved.

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## HOME ENERGY REPORTS

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This program targets high-usage and/or low-income customers in the Company's service territory to receive a comparison mailing of how occupied homes of similar size and heating source use electricity. This is designed to spur these selected customers to save energy and use electricity more efficiently. Customers who wish to opt out of receiving these reports may call a toll-free number to do so. In 2020 there were 520,133 customers receiving reports.

Savings calculations for this program begin with the vendor using a proprietary model. Each year, AEP Ohio analysts compare participation in other residential EE/PDR programs between these two groups to determine whether savings in these other programs are being double-counted. This year, a significant difference was found, indicating report recipients participated in certain programs at higher levels than the control group. Savings in both energy and demand were therefore adjusted downward by 148,646 kWh and 18.7kW, in aggregate for all programs as noted in the *ex post* Appendix I report. AEP Ohio will continue to run cross participation tests to validate and remove double counted savings.

AEP Ohio's Action Plan goals for 2020 were 75.0 GWh of savings in energy consumption and 3.8 MW of savings from peak demand. Figure 21 below shows the Home Energy Report program's

energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 21: HOME ENERGY REPORTS PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	71.1	75.0	94.8%
Demand Savings (MW)	9.2	3.8	243.2%
Program Costs (\$M)	1.2	1.4	84.0%
First Year Cost per kWh Saved (¢)	1.7	1.9	88.6%

The Home Energy Report ended September 30<sup>th</sup> per commission order, thus the program did not exceed its energy savings goal, but did exceed the demand savings goals for 2020. The program saved 71.1 GWh of energy, 5.2 percent below goal. The program also reduced peak demand by 9.2 MW, 143.2 percent above goal. The program came in just under budget at \$1.2 million, yielding an average first year cost of 1.7 cents per kWh saved; however, unlike other residential programs, this program only has a one-year measure life.

## BUSINESS PROGRAMS

### EFFICIENT PRODUCTS FOR BUSINESS

This program offers fixed incentives for the installation and implementation of certain pre-approved types of energy efficient lighting; heating, ventilation, and air conditioning (HVAC) systems; variable frequency drives (VFDs); motors; controls; refrigeration equipment; and compressed air systems, among other commercial- and industrial-grade equipment. Incentive amounts offered to customers typically range between 10 and 50 percent of the incremental cost to purchase energy-efficient equipment. All non-residential customers in AEP Ohio's service territory are eligible to participate.

In 2020, there were 5,274 projects completed in the Efficient Products for Business program. Figure 22 shows which measures were installed through these projects. A single project may involve multiple measures. Please see Appendix A for a detailed measure listing.

FIGURE 22: MEASURES INSTALLED THROUGH THE EFFICIENT PRODUCTS FOR BUSINESS, 2020

Type	Number	kWh	kW
Agriculture	27	38,643	9.0
Compressed Air	5,293	1,656,768	229.7
Comm. Kitchen	8	66,671	6.3
HVAC	2,635,203	7,933,863	1,514.1
Controls	1,253,149	1,674,557	171.5
Advanced Lighting	2,843,467	7,945,933	1,657.2
Lighting	1,211,819	170,744,827	31,722.6
Other	16	56,028	14.8
Process/Motors	132	1,188,836	268.5
Refrigeration	5,594	2,165,696	335.7
<b>Total</b>	<b>7,954,708</b>	<b>193,471,821</b>	<b>35,929.3</b>

Energy and demand savings for prescriptive measures were calculated using the vendor-internal Technical Reference manual that is consistent with the Draft Ohio 2010 Technical Reference Manual.

The Company's Action Plan goals for 2020 were 99.1 GWh of savings in energy consumption and 25.6 MW of savings from peak demand. Figure 23 shows the Efficient Products for Business program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 23: EFFICIENT PRODUCTS FOR BUSINESS PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	193.5	99.1	195.2%
Demand Savings (MW)	35.9	25.6	140.3%
Program Costs (\$M)	18.4	17.0	108.5%
First Year Cost per kWh Saved (¢)	9.5	17.2	55.6%

The Efficient Products for Business program met its energy and demand goals for 2020. The program saved 193.5 GWh of energy, 95.2 percent above goal. The program also reduced peak demand by 35.9 MW, 40.3 percent above goal. The program came in above budget at \$18.4 million, yielding an average first year cost of 9.5 cents per kWh saved.

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## PROCESS EFFICIENCY

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This program is for cost-effective energy efficiency improvements in existing buildings that reduce energy consumption or peak demand and have more complicated measures that are not included in the Efficient Products for Business program. All non-residential customers in the Company's service territory are eligible to participate. Customers work closely with their Ohio Power account managers and other employees to determine measure eligibility and verify energy savings. Customers receive an incentive customized to the specific results of the energy savings technologies implemented. Program management will assist commercial and industrial customers with the analysis and selection of high-efficiency equipment or processes.

There were 81 Process Efficiency projects completed in 2020. Figure 24 summarizes the measures installed in these projects. A single project may involve multiple measures. Please see Appendix A for a detailed measure listing.

FIGURE 24: MEASURES INSTALLED THROUGH THE PROCESS EFFICIENCY PROGRAM, 2020

Type	Number	kWh	kW
Compressed Air	1,210	2,056,470	326.3
Building System	1	173,030	37.1
HVAC	41	4,410,159	637.1
Lighting	1	27,184	0.0
Process	21	13,479,987	1,805.3
VFD	8	6,122,681	333.6
<b>Total</b>	<b>1,282</b>	<b>26,269,510</b>	<b>3,139.5</b>

Energy and demand savings in the Process Efficiency program were individually computed for each measure in each project using methodologies consistent with the Draft Ohio TRM.

The Company's Action Plan goals for 2020 were 38.1 GWh of savings in energy consumption and 6.1 MW of savings from peak demand. Figure 25 below shows the Process Efficiency program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 25: PROCESS EFFICIENCY PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	26.3	38.1	68.9%
Demand Savings (MW)	3.1	6.1	51.5%
Program Costs (\$M)	2.2	4.5	49.8%
First Year Cost per kWh Saved (¢)	8.5	11.8	72.2%

The Process Efficiency program missed both its energy and demand savings goals for 2020. The program saved 26.3 GWh of energy, 31.1 percent below goal. The program also reduced peak demand by 3.1 MW, 48.5 percent below goal. The program came in below budget in 2020 at \$2.2 million, yielding an average first year cost of 8.5 cents per kWh saved.

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### SELF DIRECT

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This program is designed for large customers able to internally administer their own energy management initiatives. Participants design their own energy efficiency programs and submit an application documenting their energy savings. Customers may apply for inclusion in the Self Direct program up to three years after implementing their energy efficiency measures. All applications are subject to approval by both Ohio Power and the Commission. If approved, participants may either receive a one-time payment, up to 75 percent of an equivalent incentive under the Efficient Products for Business or Process Efficiency programs, or an equivalent EE/PDR rider exemption. (The accounts may not participate in any other EE/PDR programs while under such an exemption.)

Participation in this program is limited to mercantile customers. In 2020, Ohio Power submitted 27 Self Direct applications to the Commission. Figure 26 below shows which measures were installed under these projects. A single project may involve multiple measures. For a detailed measure listing, see Appendix A.

FIGURE 26: MEASURES INCENTED THROUGH SELF DIRECT PROGRAM, 2020

Type	Number	kWh	kW
HVAC	74	192,661	48.3
Controls	25,960	24,918	1.1
Lighting	14,640	2,107,656	421.9
Misc. Motors & Process	12	56,376	8.2
Refrigeration	53	25,150	9.0
<b>Total</b>	<b>40,739</b>	<b>2,406,762</b>	<b>488.5</b>

Energy and demand savings in the Self-Direct program are calculated using the same methods employed in the Efficient Products for Business and Process Efficiency programs.

AEP Ohio's Action Plan goals for 2020 were 13.4 GWh of savings in energy consumption and 1.9 MW of savings from peak demand. Figure 27 below shows the Self Direct program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 27: SELF DIRECT PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	2.4	13.4	18.0%
Demand Savings (MW)	0.5	1.9	25.7%
Program Costs (\$M)	0.3	0.8	31.7%
First Year Cost per kWh Saved (¢)	10.6	6.0	176.7%

The Self Direct program did not meet either its energy or demand savings goals in 2020. The program saved 2.4 GWh of energy, 82.0 percent below goal. The program also reduced peak demand by 0.5 MW, which is 74.3 percent below the target level. The program came in under budget at \$0.3 million, yielding an average first year cost of 10.6 cents per kWh saved.

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#### BUSINESS NEW CONSTRUCTION

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This program targets non-residential customers who are either building new facilities or making major renovations to existing sites, encouraging building owners, designers, and architects to exceed requirements in current construction practices and codes—specifically, measures that exceed the ASHRAE 90.1-2010 minimum requirements. Because of the lag time associated with new construction, any project certified before the ASHRAE 90.1 2010 code adoption is required to exceed the former ASHRAE 90.1 2007 requirements. The program includes incentives for the installation of high-efficiency lighting, HVAC systems, building envelopes, industrial refrigeration equipment, and other equipment and controls. The New Construction program offers four tracks: prescriptive and custom, similar to what is offered in those respective programs, a “whole building” approach based on building simulation modeling, and a “My Solutions” track that is based on a prescriptive model for smaller new construction customers. All non-residential customers building new facilities are eligible to participate.

There were 223 New Construction projects completed in 2020. Figure 28 below shows which measures were installed under these construction projects. A single project may involve multiple measures. A detailed measure list is available in Appendix A.

FIGURE 28: MEASURES INSTALLED THROUGH BUSINESS NEW CONSTRUCTION PROGRAM, 2020

Type	Number	kWh	kW
Compressed Air	3	22,961	3.5
Comm. Kitchen	61	270,704	19.2
HVAC	7,489	4,070,757	656.4
Controls	457,729	430,408	100.4
Lighting	5,697,003	27,318,129	3,939.7
Other	47	291,961	21.6
Misc. VFD	40	10,086,677	1,386.4
Whole Building Models	29	11,762,928	3,220.3
Prescriptive Model	524,491	235,009	47.5
Refrigeration	92	1,303,929	115.1
Shell Insulation	149,429	61,194	9.5
<b>Total</b>	<b>6,836,413</b>	<b>55,854,656</b>	<b>9,519.6</b>

Energy and demand savings were calculated using the same methods as employed in the Efficient Products for Business and Process Efficiency programs, the ENERGY STAR® website, or with simulation calculations in projects using whole building models.

The Company's Action Plan goals for 2020 were 28.8 GWh of savings in energy consumption and 6.3 MW of savings from peak demand. Figure 29 below shows the New Construction program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 29: BUSINESS NEW CONSTRUCTION PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	55.9	28.8	193.9%
Demand Savings (MW)	9.5	6.3	151.1%
Program Costs (\$M)	5.4	5.5	99.0%
First Year Cost per kWh Saved (¢)	9.8	19.1	51.1%

The Business New Construction program exceeded its energy and demand goals for 2020. The program saved 55.9 GWh of energy, 93.9 percent over goal. The program reduced peak demand by 9.5 MW, which equates to 51.1 percent above goal. The program was under budget this year at \$5.4 million, yielding an average first year cost of 9.8 cents per kWh saved.



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EXPRESS

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This program provides a streamlined, one-stop, turn-key energy efficiency service for small businesses. The program implementer first conducts a free on-site assessment to identify potential energy-saving opportunities. Based on recommendations from this assessment the implementer provides the participant with a proposal for installing energy efficiency measures. If the customer approves, the implementer then hires local contractors to perform the installation work. Once the work is completed, and after the customer has signed off on the work performed, the implementer bills the participant directly, after applying incentives from AEP Ohio. Incentive levels are generally higher in this program than in the Efficient Products for Business or Process Efficiency programs, up to 80 percent of project cost. This program is designed for small business customers with annual energy consumption levels no greater than 400 MWh or peak billing demands no higher than 100 kW.

Figure 30 below shows the number of measures installed through the Express program. Again, a single project may involve multiple measures. In total, there were 299 projects completed. See Appendix A for a complete listing of installed measures.

FIGURE 30: MEASURES INSTALLED THROUGH EXPRESS PROGRAM, 2020

Type	Number	kWh	kW
Delamping	6	1,860	0.5
LEDs	22,275	7,628,972	1,575.2
T5/T8	173	31,415	4.3
Exit Signs	62	10,133	2.1
Controls	408	50,395	0.0
Refrigeration	188	227,135	28.5
<b>Total</b>	<b>23,112</b>	<b>7,949,910</b>	<b>1,610.5</b>

Due to the granularity with respect to small business types, energy and demand savings are calculated using the New York TRM<sup>12</sup> and the Pennsylvania TRM<sup>13</sup>.

The Company's Action Plan goals for 2020 were 14.7 GWh of savings in energy consumption and 4.0 MW of savings from peak demand. Figure 31 below shows the Express program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

<sup>12</sup> New York State Department of Public Service, *New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs: Residential, Multi-Family, and Commercial/Industrial Programs*, version 2, December 10, 2014.

<sup>13</sup> State of Pennsylvania, *Technical Reference Manual, Act 129 Energy Efficiency and Conservation Program & Act 213 Alternative Energy Portfolio Standards*, June 2016.



FIGURE 31: EXPRESS PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	7.9	14.7	54.1%
Demand Savings (MW)	1.6	4.0	40.3%
Program Costs (\$M)	2.6	4.1	62.7%
First Year Cost per kWh Saved (¢)	32.3	27.9	116.0%

The Express program did not meet either the energy or the demand savings goals for 2020. The program saved 7.9 GWh of energy, 45.9 percent below goal. The program also reduced peak demand by 1.6 MW, 59.7 percent below its goal. The program came in below budget at \$2.6 million, yielding an average first year cost of 32.3 cents per kWh saved.

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#### CONTINUOUS ENERGY IMPROVEMENT

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The Continuous Energy Improvement Program (CEI) is designed to target industrial customers and institutional facilities served by AEP Ohio. Like Retro-Commissioning, CEI focuses on low-cost or no-cost measures to reduce usage, primarily through system efficiency and process optimization. Participants join a targeted cohort of 10 to 20 companies, with care taken to avoid placing competitors in the same cohort, to protect participants' trade secrets. Each participant designates an internal team to act as *energy champions* and coordinate efforts within their companies to implement changes. Over a period of one year, energy champions attend workshops and work closely with program implementers to understand how their facilities' loads change and identify opportunities for reducing energy usage. Program implementers, using information on electric consumption, weather, and participants' internal metrics (such as production levels), develop a predictive model of energy usage for each participant. Subsequent usage levels below model predictions are counted as savings. First-year energy savings pay an incentive of 2 cents per kWh.

At the close of 2020, there were 37 participating customers with a combined 78 accounts in three cohorts in the CEI program. Savings were estimated based on individual regression models for each participant and, in some cases, multiple premises.

The Company's Action Plan goals for 2020 were 23.1 GWh of savings in energy consumption and 0.5 MW of savings from peak demand. Figure 32 shows the CEI program's energy savings, demand savings, program costs, and average cost per first-year energy savings during calendar year 2020.

FIGURE 32: CONTINUOUS ENERGY IMPROVEMENT PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	19.6	23.1	85.0%
Demand Savings (MW)	2.9	0.5	574.6%
Program Costs (\$M)	1.9	1.9	101.4%
First Year Cost per kWh Saved (¢)	9.8	8.2	119.2%

The CEI program did not meet its energy savings goal, but did meet the demand savings goal for 2020. The program saved 19.6 GWh of energy, 15 percent below the target level. The program had 2.9 MW in demand savings, 475 percent above goal. The program came in above its budget at \$1.9 million, yielding a first year cost of 9.8 cents per incremental kWh saved.

#### DATA CENTER

The Data Center program is a capital improvement program specially geared toward the unique needs of business IT operations and space. Such equipment can be highly energy-intensive, incorporate heavy HVAC loads, and have strict uptime requirements. Measures covered under this program may include ENERGY STAR® servers and telecommunications equipment; high-efficiency uninterruptible power supplies; high-efficiency power rectifiers; server virtualization; high-efficiency computer room air conditioner units; variable-speed drives on chilled water pumps; and airflow management and controls to optimize data center cooling. An additional track covers IT load growth when measured against an industry standard baseline.

Figure 33 below shows which measures were implemented through the Data Center program. A single project may involve multiple measures. In total, there were 21 projects completed. Please see Appendix A for a complete list of installed measures.

FIGURE 33: MEASURES INSTALLED THROUGH DATA CENTER PROGRAM, 2020

Type	Number	kWh	kW
HVAC	19	3,284,342	355.4
IT Equipment	22	1,261,534	144.0
Whole Building Model	13	99,141,038	13,051.8
<b>Total</b>	<b>54</b>	<b>103,686,914</b>	<b>13,551.2</b>

Energy and demand savings were modeled individually for each project by the program implementer.

The Company's Action Plan goals for 2020 were 14.3 GWh of savings in energy consumption and 1.3 MW of savings from peak demand. Figure 34 below shows the Data Center program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 34: DATA CENTER PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	103.7	14.3	725.1%
Demand Savings (MW)	13.6	1.3	1042.4%
Program Costs (\$M)	4.5	3.5	129.3%
First Year Cost per kWh Saved (¢)	4.4	24.5	17.8%

The Data Center Program exceeded both its energy and demand savings goals for 2020. The program saved 103.7 GWh of energy, 625.1 percent above goal. The program also reduced peak demand by 13.6 MW, 942.4 percent above the goal. The program came in over budget at \$4.5 million, yielding an average first year cost of 4.4 cents per kWh saved.

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#### COMBINED HEAT AND POWER

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The Combined Heat and Power program is a cogeneration strategy that involves the generation of both electricity and useful heating (and/or cooling). CHP is a thermodynamically efficient method of generating electricity because it utilizes waste heat for local heating and/or cooling. The CHP Program is focused on incentivizing and enabling development of efficient CHP systems for large customers typically in the industrial, institutional, and healthcare sectors. All incentive payments are subject to AEP Ohio approval and are based on measured production kWh generated by the CHP/WER project. The minimum total CHP system efficiency is 60 percent with a minimum 20 percent useful thermal energy.

For 2020, there were three project completed for the Combined Heat and Power program. The Company's Action Plan goals for 2020 were 106.0 GWh of savings in energy consumption and 15.1 MW of savings from peak demand. Figure 35 below shows the Combined Heat and Power program's energy savings, demand savings, program costs, and average cost per first year energy savings during calendar year 2020.

FIGURE 35: COMBINED HEAT AND POWER PROGRAM SUMMARY, 2020

	Actual	Goal	Percent of Goal
Energy Savings (GWh)	105.7	106.0	99.7%
Demand Savings (MW)	10.1	15.1	66.8%
Program Costs (\$M)	6.4	2.4	267.0%
First Year Cost per kWh Saved (¢)	6.1	2.3	267.8%

The Combined Heat and Power program did not meet its energy and demand savings goals for 2019. The program saved 105.7 GWh of energy, 0.3 percent below goal. The program also

reduced peak demand by 10.1 MW, 33.2 percent below the goal. The program came in over budget at \$6.4 million, yielding an average first year cost of 6.1 cents per kWh saved.

## CUSTOMER OUTREACH CHANNELS

### ENERGY EFFICIENCY AUCTION

The Energy Efficiency Auction is a unique reverse auction in which pre-qualified non-residential customers and solution providers can submit bids to deliver energy savings at a price per annual kilowatt-hour saved or watts reduced, either at a single site or spread out among multiple sites. The Energy Efficiency Auction is ideal for larger projects. Bidding processes are conducted online, with competing bids placed in real time and the winning bid being that with the lowest cost per kilowatt-hour. The participant or participants with the winning bid or bids are then eligible to receive incentive payments for their projects' completion at the winning price. Auctions are typically conducted in the fall of the year for projects to be submitted through the Efficient Products for Business or Process Efficiency program during the following calendar year.

Because the projects are submitted to the Efficient Products for Business or Process Efficiency program using auction incentive pricing, the energy and demand savings from these projects were evaluated in those programs. The auction simply serves as a pricing vehicle for these larger projects. The energy efficiency auction follows the standard Efficient Products for Business and Process Efficiency policies and procedures. Therefore, AEP Ohio is not submitting a separate evaluation report for this pricing alternative.

Figure 36 below shows which measures utilized the Energy Efficiency Auction. A single project may involve multiple measures. In total, there were 119 projects completed. These savings are captured in the Efficient Products for Business and Process Efficiency programs. This figure is for informative purposes only.

FIGURE 36: MEASURES INSTALLED THROUGH ENERGY EFFICIENCY AUCTION, 2020

Type	Number	kWh	kW
Compressed Air	2	807,209	100.8
HVAC	736,454	3,430,917	523.6
Lighting Controls	137,767	146,944	40.6
Lighting	118,883	35,904,460	5,844.4
Process	45	18,751,822	1,904.4
Refrigeration	1,154	456,476	52.1
<b>Total</b>	<b>994,305</b>	<b>59,497,827</b>	<b>8,465.8</b>

Energy and demand savings in the Energy Efficiency Auction are calculated using the same methods employed in the Efficient Products for Business and Process Efficiency programs.

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## AGRICULTURE

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The main focus of the Agriculture Outreach is targeted outreach to the agricultural customers in AEP Ohio's service territory. The agricultural community is hard to reach, particularly residential farms, which may not be identified as such in AEP Ohio customer information. The agricultural market sector has not had strong historical participation with the EE/DR program, and will be approached through an outreach strategy that demonstrates understanding of the agricultural business and concerns.

Because the projects are submitted to the Efficient Products for Business, Process Efficiency, or New Construction program through the standardized application process, the energy and demand savings from these projects were evaluated in those programs. The Agriculture outreach follows the standard policies and procedures of the business programs, thus AEP Ohio is not submitting a separate evaluation report.

Figure 37 below shows which measures were utilized through the Agriculture outreach. A single project may involve multiple measures. In total, there were 27 projects completed. The savings for these measures are captured in the Efficient Products for Business, Process Efficiency, and Business New Construction programs. This figure is for informative purposes only.

FIGURE 37: MEASURES INSTALLED THROUGH AGRICULTURE OUTREACH, 2020

Type	Number	kWh	kW
Agriculture	37	48,308	10.9
HVAC	468	661,350	116.4
Lighting Controls	6,583	7,098	1.2
Lighting	45,800	598,033	83.7
VFD	4	54,251	6.8
<b>Total</b>	<b>52,892</b>	<b>1,369,039</b>	<b>219.0</b>

Energy and demand savings in the Agriculture outreach are calculated using the same methods employed in the Efficient Products for Business, Process Efficiency, and Business New Construction programs.

## EX POST COST EFFECTIVENESS

Per Ohio Administrative Code 4901:1-39-05(A)(2)(b) AEP Ohio has utilized a third party evaluator to analyze the programs and cost effectiveness. Please see the below figures for the consolidated inputs and tests by program.

FIGURE 38: EX POST SAVINGS SUMMARY, 2020

Program	Energy Savings(kWh)	Demand Savings(kW)	EUL	Third-Party Implementation Costs	Utility Administration Costs	Utility Incentive Costs	Participant Contribution to Incremental Measure Costs
Efficient Products	125,169,440	22,512	16	\$ 2,810,161	\$ 1,150,129	\$ 7,394,918	\$ 9,378,654
It's Your Power	442,105	3,550	1	\$ 167,290	\$ 544,560	\$ 731,142	\$ -
Appliance Recycling	5,273,589	844	8	\$ 258,337	\$ 170,355	\$ 399,549	\$ 157,869
Home Energy Report	75,843,304	9,860	1	\$ 1,054,622	\$ 120,917	\$ -	\$ -
Efficiency Crafted New Homes	5,882,046	2,487	25	\$ 783,006	\$ 197,648	\$ 1,178,200	\$ 2,310,148
Manufactured Homes	300,919	140	18	\$ 136,049	\$ 30,693	\$ 52,000	\$ 138,650
e3smart	2,805,214	374	13	\$ 227,881	\$ 93,495	\$ 361,945	\$ -
Community Assistance Program	1,036,038	146	16	\$ 377,519	\$ 350,473	\$ 1,757,271	\$ 1,258,902
Efficient Products for Business	217,911,774	36,855	14	\$ 2,935,378	\$ 2,680,922	\$ 12,826,346	\$ 85,291,929
Process Efficiency	27,584,269	3,475	13	\$ 691,607	\$ 300,261	\$ 1,249,416	\$ 7,432,830
Non-Res New Construction	56,874,737	9,299	15	\$ 991,389	\$ 790,050	\$ 3,665,766	\$ 18,685,274
Express	5,939,427	1,490	13	\$ -	\$ 412,216	\$ 2,159,335	\$ 1,357,934
Self Direct	3,279,315	498	15	\$ 90,730	\$ 72,071	\$ 91,154	\$ 621,713
Continuous Energy Improvement	19,197,970	2,608	5	\$ 1,225,771	\$ 247,712	\$ 453,004	\$ -
Data Center	107,866,812	13,031	19	\$ 661,421	\$ 395,521	\$ 3,467,219	\$ 50,320,131

Using the values above, these are then applied to the standard battery of cost tests as defined in the Cost Effectiveness section of this report. Figure 39 displays the benefit-cost ratios by program, for each of the cost effectiveness tests listed above. These ratios are based on *ex post* savings. A ratio higher than one indicates that net benefits are greater than net costs, and the portfolio is beneficial by the test's standards.

FIGURE 39: EX POST COST EFFECTIVENESS TESTS, 2020

Program	Utility Cost Test	Total Resource Cost Test	Participant Cost Test	Ratepayer Impact Measure Test
Efficient Products	5.6	3.1	11.5	0.4
It's Your Power	0.1	0.1	N/A	0.1
Appliance Recycling	1.7	1.4	22.7	0.3
Home Energy Report	2.6	2.6	N/A	0.3
Efficiency Crafted New Homes	2.3	1.1	2.7	0.5
Manufactured Homes	0.9	0.6	2.2	0.4
e3smart	1.7	1.7	N/A	0.3
Community Assistance Program	0.2	0.1	2.1	0.1
Efficient Products for Business	5.4	1.1	2.6	0.5
Process Efficiency	5.1	1.2	2.6	0.6
Non-Res New Construction	5.0	1.1	2.6	0.5
Express	1.0	0.7	5.1	0.4
Self Direct	6.2	1.8	4.2	0.6
Continuous Energy Improvement	1.8	1.8	N/A	0.4
Data Center	13.4	1.1	2.1	0.6

**Williams Affidavit\_Final.docx**

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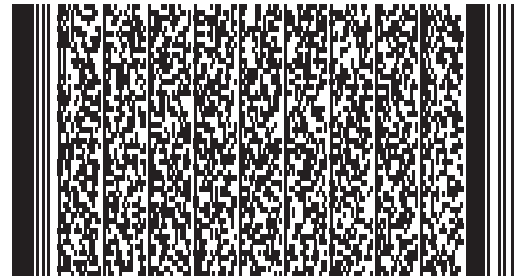
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**E-Signature Summary****E-Signature 1: Jon F Williams (JFW)**

February 12, 2021 07:12:20 -8:00 [65093EC18BD7] [103.25.230.58]  
jfwilliams@aep.com (Principal) (Personally Known)

**E-Signature Notary: S. Smithhisler (SRS)**

February 12, 2021 07:12:20 -8:00 [FFF43233515B] [167.239.221.83]  
srsmithhisler@aep.com  
I, S. Smithhisler, did witness the participants named above electronically sign this document.





## AFFIDAVIT OF JON F. WILLIAMS

State of Ohio :  
: ss  
County of Franklin :

Jon F. Williams, being first duly cautioned and sworn, states as follows:

1. I am the Managing Director of Customer Experience & Distribution Technology & Innovation for AEP Ohio.
2. I am responsible for the design, development and implementation of customer programs relating to Energy Efficiency (EE) and Peak Demand Reduction (PDR) for AEP Ohio, including overseeing compliance with the rules adopted by the Public Utilities Commission of Ohio (Commission) for inclusion in Ohio Administrative Code Chapter 4901:1-39 (Green Rules).
3. Based on my understanding of the Commission's Green Rules, AEP Ohio's energy baseline to be used for the 2020 reporting year is 35,333 GWh.
4. Based on my understanding of the Commission's Green Rules, AEP Ohio's 1.00% EE benchmark for the 2020 reporting year is 353.3 GWh.
5. Based on my understanding of and the Commission's Green Rules, AEP Ohio complied with the EE benchmark for the 2020 reporting year.
6. Based on my understanding of the Commission's Green Rules, AEP Ohio's demand baseline to be used for the 2020 reporting year is 7,441.6 MW.
7. Based on my understanding of the Commission's Green Rules, AEP Ohio's 9.25% PDR benchmark for the 2020 reporting year is 688.3 MW. On that basis, AEP Ohio could achieve compliance for 2020 by either implementing programs (including programs offered through a tariff) designed to achieve a cumulative

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peak demand reduction of 688.3 MW in 2020 or if peak demand is less than 6,753.3 MW (*i.e.*, 7,441.6 MW less 688.3 MW).

8. Based on my understanding of the Commission's Green Rules, AEP Ohio complied with the PDR benchmark for the 2020 reporting year.

FURTHER AFFIANT SAYETH NAUGHT.

  
Signed on 2021/02/12 07:12:20 -8:00

Jon F. Williams

Sworn to before me and subscribed in my presence this 12<sup>th</sup> day of February, 2021.

  
Signed on 2021/02/12 07:12:20 -8:00

Notary Public



**This foregoing document was electronically filed with the Public Utilities**

**Commission of Ohio Docketing Information System on**

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**in**

**Case No(s). 21-0139-EL-EEC**

Summary: Report -In the Matter of the Annual Portfolio Status Report Under  
Rule 4901:1-39-05(C), Ohio Administrative Code electronically filed by Mr. Steven T Nourse  
on behalf of Ohio Power Company