BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company for Approval of Ohio Site Deployment of the Smart Grid Modernization Initiative and Timely Recovery of Associated Costs	**Case No. 09-1820-EL-ATA** **Case No. 09-1821-EL-GRD** **Case No. 09-1822-EL-EEC** **Case No. 09-1823-EL-AAM**

REPORT

On May 28, 2015, the Commission issued a Finding and Order ("Order") granting Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company's (collectively, the "Companies") Application to complete studies related to the Ohio Site Deployment of the Smart Grid Program ("Smart Grid Pilot"). In that Order, the Commission ordered the Companies to file an interim report regarding the data obtained from the Volt Var Optimization and Distribution Automation studies annually. The Companies hereby submit their annual interim report for the period ending May 31, 2020.

Distribution Automation (DA)

For the 34 circuits with DA, the Companies analyzed the impact of DA on reliability metrics, excluding major storms, and also performed a separate analysis for major storms only. To make this comparison, the Companies analyzed the average of the five-year reliability metrics (SAIDI and SAIFI) for those Smart Grid Pilot circuits for years 2005 through 2009 and

compared the results to outage data from June 1, 2014 through May 31, 2020. The results, excluding major storms, are shown in the table below.

Annualized Smart Grid Pilot Performance Excluding Major Storms (June 2014 – May 2020)

	Customers Interrupted	CMI	Customers Served	SAIFI	SAIDI	
5 Yr Avg (2005-2009)	63,331	6,769,606	42,790	1.48	158.20	
Smart Grid	64,474	6,105,688	45,593	1.41	133.92	***Annualized***
Savings	**-1,143**	**663,918**		**0.07**	**24.29**	
			% Improvement	***4%***	***15%***	

Notes
1. Outages include, Distribution, Substation, and Transmission, excludes major storms
2. Outages capped at 24 hours
3. Includes tap outages that would not have been affected by Smart Grid facilities

When comparing 6 years of operation (2014-2020) to the 5-year benchmark, 2005-2009, the approximately ~45,000 customers in the Smart Grid Pilot area have seen on average 4% fewer outages and 15% improvement in service restoration.

The Companies also analyzed reliability impacts to customers on DA circuits in the Smart Grid Pilot area with and without the smart grid investments, excluding major storms. Over the last 6 years, customers in this pilot area have avoided over 57,000 power outages and saved nearly 10 million customer outage minutes. On average the customers in the Smart Grid Pilot area have seen a 36-minute reduction in average annual outage duration.

Reliability Saved -- Smart Grid vs. Non Smart Grid (June 2014 thru May 2020)

					SG Circuit Savings	
	Customers Interrupted Savings	% Savings	CMI Savings	% Savings	SAIFI	SAIDI
Year One (Jun '14 thru May '15)	5,425	***11%***	783,922	***15%***	0.12	17.44
Year Two (June '15 thru May '16)	4,448	***6%***	883,757	***11%***	0.10	19.65
Year Three (June '16 thru May '17)	7,207	***10%***	1,384,650	***18%***	0.16	30.51
Year Four (June '17 thru May '18)	10,814	***14%***	1,841,098	***25%***	0.24	40.28
Year Five (June '18 thru May '19)	23,502	***22%***	3,315,636	***29%***	0.51	71.68
Year Six (June '19 thru May '20)	6,198	***10%***	1,689,989	***25%***	0.13	36.51
Grand Total	**57,594**	***13%***	**9,899,052**	***21%***	**0.21**	**36.19**

Notes
1. Outages include, Distribution, Substation, and Transmission, excludes major storms
2. Includes tap outages that would not have been affected by Smart Grid facilities

The Companies also continued to analyze the performance of the DA during major storms, as compared to the baseline from 2005-2009. Over the 6-year period, June 2014 – May 2020, customers have experienced average annual improvements of 15% in SAIFI and 31% in SAIDI during major storms, as summarized in the table below.

Annualized Smart Grid Pilot Performance During Major Storms (June 2014 – May 2020)

	Customers Interrupted	CMI	Customers Served	SAIFI	SAIDI	
5 Yr Avg (2005-2009)	20,716	8,714,088	42,790	0.48	203.65	
Smart Grid	18,799	6,442,219	45,593	0.41	141.30	***Annualized***
Savings	**1,918**	**2,271,870**		**0.07**	**62.35**	
			% Improvement	***15%***	***31%***	

Notes
1. Outages include, Distribution, Substation, and Transmission
2. Outages capped at 24 hours
3. Includes tap outages that would not have been affected by Smart Grid facilities

Integrated Volt Var Control (IVVC)

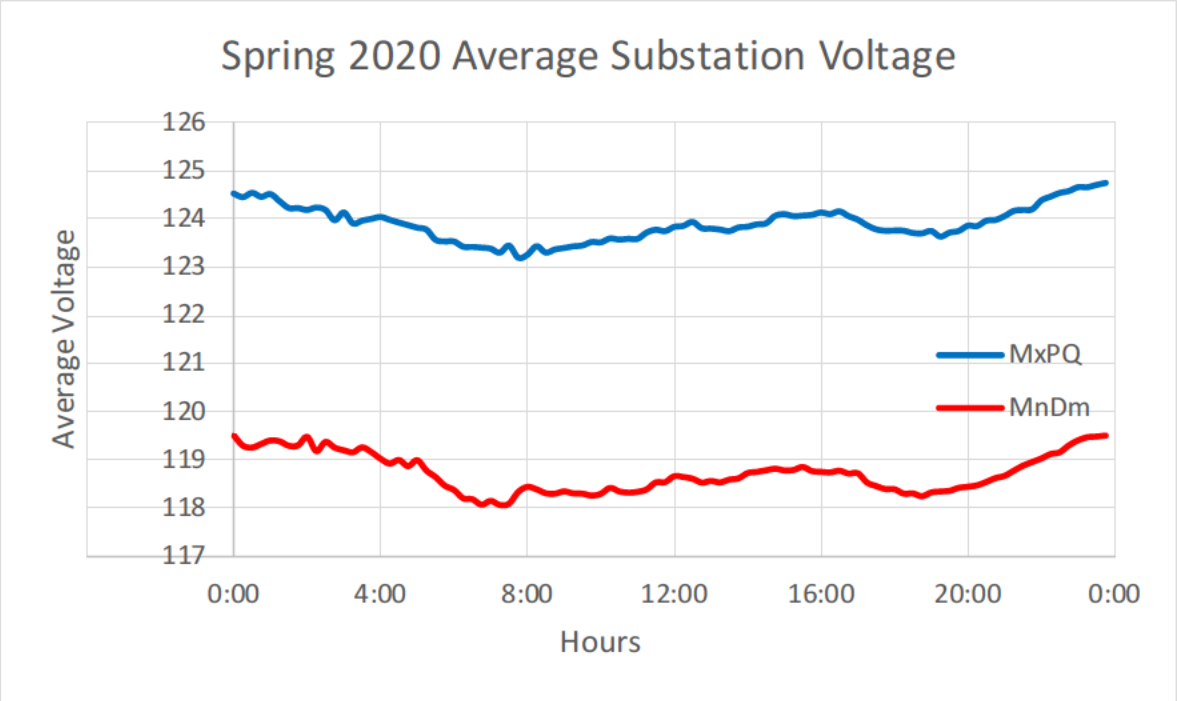
During this reporting period (June 1, 2019 through May 31, 2020), the Companies continued to operate and monitor the performance of the IVVC equipment in the Smart Grid Pilot area. The Companies analyzed 6 core substations and 18 circuits deployed with IVVC during the 12-month period. During this period, two primary operational modes for the IVVC were used:

1. Minimize Demand (MnDm): This operational setting is used to reduce customer usage and to minimize peak demand, both on a circuit and substation level. This setting will lower circuit voltages to the lower end of the allowable range and could impact power quality. The target voltage range for MnDm is 117 to 120 volts.
2. Maximum Power Quality (MxPQ): This operational setting is used to mitigate power quality issues that may be created following operational switching to restore customers or by one customer that impacts other customers on the circuit. This setting typically causes voltage to increase. The target voltage range for MxPQ is 123 to 125 volts.

IVVC System Performance: Voltage Separation

Voltage Separation is an important metric to evaluate the performance of IVVC equipment by measuring the system's ability to respond to operational commands to lower voltage. The greater the system's ability to reduce distribution voltage while still maintaining compliance within the American National Standards Institute (ANSI) standard (114 to 126 volts), the greater the potential performance in terms of minimizing demand and energy consumption.

The graph below shows the combined average voltage for all 6 IVVC core substations in the Smart Grid Pilot area during the spring 2020 evaluation period (March, April and May). Over this period the system was operated for 24-hour periods in Maximize Power Quality (MxPQ) for 29 days and in Minimize Demand (MnDM) for 27 days. The blue line represents the average voltage when the operating mode was set to MxPQ. The red line represents the average voltage when the Operating Mode was set to MnDM. Although results from each core substation were similar, variations occurred among the core substations due to system characteristics such as the types of customers that are being served on the circuits and the length of the circuits. Overall, for all hours of operation during the study period, the average voltage separation between MxPQ and MnDm operating modes across these six core substations was approximately 4 volts.



IVVC System Performance: Conservation Voltage Reduction (CVR)

Conservation Voltage Reduction (CVR) is the long-term practice of controlling distribution voltage levels within the lower range of ANSI standard acceptable service entrance voltage levels in order to reduce demand and energy consumption. The table below shows the combined results of the Companies' CVR analysis for all 6 IVVC core substations in the Smart Grid Pilot area during the spring 2020 evaluation period (March, April and May), where the system was operated for 24-hour periods in Maximize Power Quality (MxPQ) for 29 days and in Minimize Demand (MnDM) for 27 days.

Spring 2020 Core Substaton Composite CVR Analysis Table											
Substation	Temp Avg (Degrees F)		PF Days		Average Voltage		Weighted CVRf	Voltage Reduction (Volts)	Voltage Reduction (Per Unit)	Average kWh/Weekday Reduction	Average kWh Savings %
	MnDm	MxPQ	MnDm	MxPQ	MnDm	MxPQ					
Core Substations	46.3	46.0	27	29	119.5	123.5	1.33	4.04	0.0337	41,696	4.48%

Overall for all hours of operation during this study period, the average voltage reduction of approximately 4.0 volts due to Voltage Separation discussed above led to kWh savings of approximately 4.5%, while maintaining voltage well within the expected range.

Summary

The investments in the Smart Grid Pilot area have produced solid results and benefits for customers. In addition, the Companies continue to look for opportunities to improve, which might include collaborating with other utilities, investigating new technologies, and working to develop new analytical tools. For example, as part of their IVVC deployment, the Companies undertook a small pilot of Grid Edge technologies that utilize Static Var Compensation (SVC) to study how to further enhance CVR benefits by raising the lowest served voltages on distribution circuits. The Companies also continue to explore ways to further enhance both the software and the reliability and power quality performance of field devices. This includes increasing the application of single phase trip, where possible, to lower the number of customer interruptions caused by single phase faults, working with the Companies' DA/IVVC vendor to customize software to receive better system performance, and leveraging worst performing circuit mitigation to improve the performance of the 34 circuits with DA and IVVC, where applicable.

In 6 years of operation in the Smart Grid Pilot area, the Companies have gained significant knowledge and lessons learned on how DA and IVVC can be deployed to benefit customers. Effective practices the Companies have identified include grounding improvements with smart devices, using settings on device controls, conducting real time analysis of circuits to gain better CVR, and implementing DA and IVVC along with associated software systems together in an integrated fashion to drive benefits for customers.

The Companies will continue analyzing the performance of the DA and IVVC investments in the Smart Grid Pilot area.

Respectfully submitted,
/s/ Christine E. Watchorn

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CERTIFICATE OF SERVICE

I hereby certify that the foregoing Report was filed electronically through the Docketing Information System of the Public Utilities Commission of Ohio on this 14th day of August 2020. The PUCO's e-filing system will electronically serve notice of the filing of this document on counsel for all parties, and the undersigned has served electronic copies to the following parties:

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Summary: Report electronically filed by Ms. Christine E. Watchorn on behalf of Ohio Edison Company and The Cleveland Electric Illuminating Company and The Toledo Edison Company