

**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. 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, 2019.

Distribution Automation (DA)

For the thirty-four circuits with DA, the Companies analyzed the impact of DA on reliability metrics, excluding major storms, using the methodology that was established in Case No. 09-1820-EL-ATA and consistent with the prior four years of reporting. To make this comparison, the Companies analyzed the average of the five-year reliability metrics (SAIDI and SAIFI) for those circuits for years 2005 through 2009, and compared the results to outage data from June 1, 2014 through May 31, 2019. Under this methodology, the approximately 45,000

customers in the Smart Grid pilot area have seen 5% fewer outages and 22% improvement in service restoration, as shown in the table below.

Five Year Annualized Smart Grid Circuit Performance (June 2014 thru May 2019)					
	Customers Interrupted	CMI	Customers Served	SAIFI	SAIDI
5 Yr Avg (2005-2009)	64,281	7,678,800	42,790	1.50	179.45
Smart Grid Circuits (12 Mo. Avg.)	65,058	6,342,173	45,454	1.43	139.53
Savings	-777	1,336,627		0.07	39.92
			% Improvement	5%	22%
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					

With the completion of the initial five-year data collection and study period contemplated in this case, further analysis of the impact of DA in the pilot area is appropriate. Specifically, an analysis of the reliability impacts to customers, with and without the smart grid investments, further demonstrates the benefits of DA in the pilot area. As shown in the table below, customers in this pilot area have seen 58,000 fewer power outages and experienced over 10.6 million fewer customer outage minutes. On average over this five-year period, the customers in the pilot area have seen an annual 46-minute reduction in outage duration. Overall, customers in the pilot area have benefitted from a 15% improvement in outage frequency and a 25% improvement in restoration during this time.

Reliability Saved -- Smart Grid vs. Non Smart Grid (June 2014 thru May 2019)

	Customers Interrupted Savings	% Savings	CMI Savings	% Savings	SG Circuit Savings	
					SAIFI	SAIDI
Year One (Jun '14 thru May '15)	3,770	8%	1,306,759	22%	0.08	29.08
Year Two (June '15 thru May '16)	10,753	13%	2,595,933	27%	0.24	57.71
Year Three (June '16 thru May '17)	7,621	10%	1,380,401	18%	0.17	30.41
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)	25,365	24%	3,534,788	30%	0.55	76.42
Grand Total	58,323	15%	10,658,979	25%		
Average					0.26	46.78

Notes

1. Outages include, Distribution, Substation, and Transmission, excludes major storms
2. SG Circuit Savings - Average yearly savings per customer
3. Includes tap outages

Integrated Volt Var Control (IVVC)

During the period June 1, 2018 through May 31, 2019, the Companies continued to operate and monitor the performance of the IVVC equipment in the Smart Grid pilot area. The Companies analyzed six core substations and eighteen circuits deployed with IVVC over this 12-month period, during which 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 117v low to 120v high.
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 122.5v low to 125v high.

Below is a summary of the performance of the IVVC equipment in the pilot area during this annual period:

- Once each weekday Monday through Friday, at 8:00am the IVVC system was switched from one mode to the other. On weekends the Friday change was maintained until Monday. The IVVC system operated 48% of the time in MnDm and 52% of the time in MaxPQ.
- The overall range of average circuit voltage reduction was between 0.4 and 1.6 volts.
- On average, the IVVC system created kWh savings per circuit of 2.3% or 1,367 kWh/circuit/day by reducing voltage 0.82 volts on average.
- Average peak 4-hour peak demand reduction was 7.1%.
- Average peak 2-hour peak demand reduction was 8.2%.

The Companies continue to make improvements to their data analysis models and tools. In addition, the Companies have made a concerted effort to review and incorporate best practices and outcomes related to IVVC system operation and performance in the industry, including collaboration with other utilities; investigation regarding complementary/performance enhancing technologies; and analytical documentation and report development.

Through five years of operational experience, the Companies continue to explore ways to further enhance the software, reliability, and power quality performance of field devices. These efforts include increasing 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 modify software to get better system performance, and leveraging worst performing circuit mitigation to improve the performance of the thirty-four circuits with DA and IVVC, where applicable.

The Companies will continue to evaluate performance of DA and IVVC in the pilot area and work to optimize benefits to customers.

Respectfully submitted,

/s/ Scott J. Casto
Scott J. Casto (0085756)
FIRSTENERGY SERVICE COMPANY
76 South Main Street
Akron, OH 44308
330) 761-7835
(330) 384-3875 (fax)
scasto@firstenergycorp.com
*Attorney for Ohio Edison Company, The Cleveland Electric
Illuminating Company, and The Toledo Edison Company*

CERTIFICATE OF SERVICE

On August 15, 2019, the foregoing document was filed on the Public Utilities Commission of Ohio's Docketing Information System. The Commission's e-filing system will electronically serve notice of the filing of this document.

*/s/ Scott J. Casto
An Attorney for Ohio Edison Company, The
Cleveland Electric Illuminating Company and
The Toledo Edison Company*

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Summary: Report Interim Report electronically filed by Mr. Scott J Casto on behalf of Ohio Edison Company and The Cleveland Electric Illuminating Company and The Toledo Edison Company