

BEFORE THE
PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Filing by Ohio Edison)
Company, The Cleveland Electric)
Illuminating Company, and The Toledo)
Edison Company for a Distribution Platform)
Modernization Plan)
)

Case No. 17-2436-EL-UNC

DIRECT TESTIMONY OF

MARK J. VALLO

ON BEHALF OF

**OHIO EDISON COMPANY
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
THE TOLEDO EDISON COMPANY**

December 1, 2017

1 **Q. PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.**

2 A. My name is Mark J. Vallo. I am employed by FirstEnergy Service Company as Manager,
3 Smart Grid Programs. My business address is 76 S. Main Street, Akron, OH 44308.

4 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND, PROFESSIONAL**
5 **QUALIFICATIONS, AND EMPLOYMENT EXPERIENCE.**

6 A. I graduated with a Bachelor of Electrical Engineering from Cleveland State University in
7 1985. I began my career with The Cleveland Electric Illuminating Company (“CEI”) in
8 1984, and I have subsequently held numerous engineering and supervisory positions at CEI
9 and other subsidiaries of FirstEnergy Corp. (“FirstEnergy” or “FE”), including twelve
10 years as the Smart Grid Manager, Distribution Engineering Manager, and Sr. Engineer in
11 the Operations Control Center of the FirstEnergy distribution utilities. I have also spent
12 eighteen years with FE Generation, Power Plant Control Systems, and three years with FE
13 Sales & Marketing as an Energy Engineer. I was named to my current position in 2017. I
14 am a Registered Professional Engineer in the State of Ohio. I also represent FirstEnergy’s
15 distribution operating companies at various meetings and other stakeholder sessions
16 regarding grid modernization and smart grid technologies. During my tenure, FirstEnergy
17 has been recognized for its work in these areas. Most recently, in February 2017, my team
18 received an EPRI Technology Transfer Award for advanced Distribution Automation.

19 **Q. PLEASE DESCRIBE YOUR CURRENT ROLES AND RESPONSIBILITIES.**

20 A. As Manager, Smart Grid Programs, I am responsible for studying, developing, and
21 implementing grid modernization and smart grid programs across the FirstEnergy
22 distribution utilities, including Ohio Edison Company, CEI, and The Toledo Edison
23 Company (collectively, the “Companies”).

1 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

2 A. The purpose of my testimony is to describe and support certain projects included in the
3 Distribution Platform Modernization (“DPM”) Plan, which is attached to the Companies’
4 Application as Attachment A. These projects include the circuit ties, circuit
5 reconductoring, recloser installations, and Supervisory Control and Data Acquisition
6 (“SCADA”), as well as the selection of circuits on which these improvements will be made.
7 I sponsor and incorporate into my testimony the details behind each of these categories of
8 work in the sections of the DPM Plan titled “Circuit Selection”, “Creating New Circuit
9 Ties and Reconductoring”, “Remote Controlled Reclosers”, “Data Acquisition Systems”,
10 and “Estimated Costs”. For each of these categories of work, the DPM Plan provides a
11 detailed explanation of the work, the estimated scope of the work, the associated customer
12 benefits, and the estimated capital costs. Companies’ witness Beutler sponsors the
13 quantification of these estimated benefits to customers.

14 **Q. HOW DID THE COMPANIES CHOOSE THE CIRCUITS INCLUDED IN THE**
15 **DPM PLAN?**

16 A. As described in the DPM Plan, the Companies conducted an analysis of all circuits in their
17 service territories and identified those that are estimated to benefit most from DPM Plan
18 investments in terms of improved reliability and opportunity for supporting future grid
19 modernization investment. In order to ensure that the DPM Plan investments are made on
20 the circuits where the most customer benefits can be achieved, the Companies will continue
21 to monitor, review, and update the list of circuits included in the DPM Plan. Even with the
22 ongoing review of the circuit list, the Companies would still be subject to the overall cost
23 estimates of the DPM Plan included in the Application. The Companies’ adherence to the

1 DPM Plan, including the associated costs, can be reviewed in the annual audit of Rider
2 AMI, as described in the DPM Plan and the direct testimony of Companies' witness
3 McMillen.

4 **Q. WHAT ARE CIRCUIT TIES AND HOW DO THEY BENEFIT CUSTOMERS?**

5 A. As discussed in the DPM Plan, circuit ties are investments to physically connect, or tie
6 together, individual circuits and create alternative paths for power flow. Circuit ties reduce
7 outage duration by allowing customers to be served from multiple sources instead of having
8 to rely solely on the circuit on which the customer is physically located. When circuit ties
9 are in place, the Companies have the ability to partially restore a circuit by isolating a
10 circuit fault and re-energizing a large number of customers. This is shown in the illustration
11 on page 3 of the DPM Plan. These "re-energized customers" see a significant reduction in
12 outage duration.

13 **Q. WHAT IS RECONDUCTORING AND HOW DOES IT BENEFIT CUSTOMERS?**

14 A. Reconductoring increases the wire size on the Companies' circuits to facilitate additional
15 power flows. This work mitigates power flow ampacity¹ from multiple sources.
16 Reconductoring accommodates potential increases in load associated with rerouting of
17 power without overloading smaller conductors that typically are at the ends of circuits.
18 Also, the larger diameter wire required of reconductoring is inherently stronger and better
19 able to withstand adverse weather conditions. Larger wires strengthen the circuits and
20 decrease the likelihood that the wires will come down or be taken out of service during a
21 storm.

¹ Ampacity is the maximum amount of electric current a conductor can carry before sustaining immediate or progressive deterioration.

1 **Q. WHAT ARE RECLOSERS AND HOW DO THEY IMPROVE RELIABILITY FOR**
2 **CUSTOMERS?**

3 A. A recloser is a mid-line circuit breaker that can automatically close the breaker after it has
4 been opened due to a fault. Reclosers effectively divide the distribution circuit into smaller
5 sections, which isolates faults to smaller groups of customers and, as a result, minimizes
6 the impacts of outages on customers. Reclosers are used on overhead distribution systems
7 to detect and interrupt momentary faults. Since many short-circuits on overhead lines clear
8 themselves, a recloser improves service continuity by automatically restoring power to the
9 line after a momentary fault. Approximately 80% of faults on overhead power lines are
10 transient and can be cured by a recloser going through a trip and reclose sequence. For the
11 other 20% of sustained fault conditions, a recloser opens up and remains open to isolate
12 the fault condition. Reclosers isolate outages to fewer numbers of customers and provide
13 for quicker restoration in conjunction with SCADA.

14 **Q. WHAT IS SCADA AND WHAT BENEFIT DOES IT PROVIDE FOR**
15 **CUSTOMERS?**

16 A. SCADA is a software platform that collects and provides critical system information such
17 as voltage levels and power flow within the substation and at various locations along the
18 distribution system. SCADA provides distribution system operators (“DSOs”) increased
19 visibility of their distribution system with high quality data that can be used in deciding
20 how to affect the best possible system restoration. SCADA also enables DSOs’ remote
21 control of distribution field devices, thereby significantly reducing outage duration for
22 customers.

1 **Q. HOW WERE THE COST ESTIMATES FOR THESE CATEGORIES OF WORK**
2 **INCLUDED IN THE DPM PLAN DERIVED?**

3 A. The estimated capital costs for the circuit ties, reconductoring, reclosers, and SCADA
4 included in the DPM Plan, along with the estimated Operations and Maintenance expenses,
5 are based on the Companies' experience and consultation with Accenture, an industry
6 expert in grid modernization. Beginning in 2009, the Companies studied smart grid
7 technologies in a pilot area within CEI's service territory through their "Smart Grid
8 Modernization Initiative" ("SGMI Project"). The Companies deployed and studied the
9 impact of various grid modernization investments, including circuit ties, reconductoring,
10 reclosers, and SCADA. While this pilot is currently in the performance assessment phase,
11 significant investments were made during the 2010-2015 timeframe. The Companies used
12 their direct experience with construction of circuit ties and reconductoring, along with
13 significant investment in reclosers and SCADA in the SGMI Project, to aid in the
14 development of the cost estimates for the DPM Plan. In addition, the Companies have
15 recently conducted a broader review of their distribution system and potential grid
16 modernization investments in the development of their Grid Modernization Business Plan
17 (Case 16-481-EL-UNC). This filing included three potential scenarios for larger-scale
18 deployment of grid modernization investments, and also included significant platform
19 modernization work, largely similar to what is included in the DPM Plan. The Companies
20 engaged Accenture to assist in the development of this filing, which included identification
21 of necessary platform work to start to modernize the Companies' system and enable future
22 grid modernization. I also relied on this work, and subsequent consultation with Accenture,
23 to develop the cost estimates included in the DPM Plan.

1 **Q. PLEASE SUMMARIZE THE ESTIMATED COSTS FOR THESE CATEGORIES**
2 **OF WORK.**

3 A. Based on the methodologies discussed above, the Companies estimated the following
4 capital costs over the three-year term of the DPM Plan: circuit ties = \$110 million; circuit
5 reconductoring = \$130 million; recloser installations = \$150 million; and SCADA = \$30
6 million. Annual operations and maintenance (O&M) expenses are: Year 1 = \$6 million;
7 Year 2 = \$9 million; Year 3 = \$12 million; and years 4 and beyond = \$13 million annually.
8 These estimated costs are used in the cost/benefit analysis described in the testimony of
9 Companies' witness McMillen.

10 **Q. ARE THESE PROJECTS IN THE DPM PLAN INCREMENTAL TO THE**
11 **COMPANIES' BASE LEVEL OF SPEND?**

12 A. Yes. As discussed in the direct testimony of Companies' witness Karafa, the Companies
13 have necessary capital expenditures that are made every year to maintain safe and reliable
14 service to customers. These base expenditures allow the Companies to operate, maintain,
15 and expand where needed, their distribution system under its existing architecture and
16 design. The projects included in the DPM Plan, on the other hand, will modernize and
17 transform the Companies' system to make it capable of supporting further grid
18 modernization and interconnection with end use technologies. As described in the DPM
19 Plan, circuit ties, circuit reconductoring, reclosers, and SCADA are needed to modify and
20 modernize the Companies' distribution system. These modifications create alternate
21 power flow paths that are remotely controlled via SCADA. These grid modernization
22 investments included in the DPM Plan go beyond maintaining the Companies' current

1 distribution system under its existing design and are outside of the scope of the Companies’
2 base capital expenditures.

3 **Q. DO THESE PROJECTS PROVIDE IMMEDIATE BENEFITS TO CUSTOMERS?**

4 A. Yes. These investments will provide immediate reliability benefits to customers in
5 response to circuit faults by reducing outage frequency and restoration times. They also
6 will improve system response to outages associated with major storms and other events.
7 Quicker restoration times for customers served on the circuits included in the DPM Plan
8 will also allow the Companies to direct resources to other areas on their system, which
9 should benefit all customers. These benefits will continue independent of any additional
10 grid modernization investments that may be made by the Companies in the future.

11 **Q. WOULD CUSTOMERS BE ABLE TO REALIZE THE FULL BENEFITS OF GRID**
12 **MODERNIZATION WITHOUT THESE INVESTMENTS AS PART OF THE DPM**
13 **PLAN?**

14 A. No. The investments in circuit ties, circuit reconductoring, reclosers, and SCADA included
15 in the DPM Plan are needed to modernize the architecture of the Companies’ distribution
16 system and to create a platform for future grid modernization investments. These
17 investments provide immediate customer benefits regardless of future grid modernization
18 investment.

19 **Q. WILL THESE INVESTMENTS SUPPORT FUTURE GRID MODERNIZATION**
20 **OUTSIDE OF THE DPM PLAN?**

21 A. Yes. The investment made as part of the DPM Plan will serve as the foundation for further
22 investments the Companies will make in distribution automation, integrated Volt/VAR
23 control (IVVC), distributed generation technologies and other customer facing

1 technologies that require a versatile grid. Distribution automation requires the multiple
2 paths created by circuit ties, reconductoring, and remote controlled reclosers to reroute
3 power. IVVC requires the SCADA to provide the ability to monitor voltage levels at
4 various points on the system. SCADA also provides the ability to manage outages,
5 changing power flows and voltage levels caused by distributed generation and other
6 customer facing technologies. The grid modernization investments made as part of the
7 DPM Plan will provide immediate benefits to customers, and are needed for customers to
8 realize the full benefits of future grid modernization investments.

9 **Q. DO THE COMPANIES FORESEE A RISK THAT THESE INVESTMENTS WILL**
10 **BECOME OBSOLETE PREMATURELY?**

11 A. No. The infrastructure installed with circuit ties, circuit reconductoring, and the remote
12 controlled reclosers do not rely on new or emerging technologies. Rather, these are
13 investments that modernize the Companies' distribution system and that will continue to
14 provide benefits to customers as long as the Companies are delivering power to customers
15 on their distribution system. These investments will transform the underlying architecture
16 of the Companies' distribution system using infrastructure that has an estimated useful life
17 of approximately 30 years. The Companies acknowledge the potential risk of obsolescence
18 associated with the communication system needed to facilitate the operation of the SCADA
19 devices. However, the Companies have taken mitigation measures by investing in a 700
20 MHz proprietary radio bandwidth to use for communicating with SCADA-enabled
21 devices. The 700 MHz communication frequency acquisition is not a component of the
22 DPM Plan, but the radios that will utilize the bandwidth are in the DPM Plan. By
23 controlling this frequency, the Companies are protected against the risk of premature

1 obsolescence of equipment installed as part of the DPM Plan and have mitigated the need
2 to rely on external telecommunications companies (i.e. cellular).

3 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.**

4 A. The work included in the DPM Plan associated with circuit ties, circuit reconductoring,
5 recloser installations, and SCADA will provide significant self-sustaining benefits to
6 customers in terms of improved reliability and storm outage restoration. These grid
7 modernization investments are outside the scope of the Companies' base capital
8 expenditures needed to maintain safe and reliable service, and are necessary to enable
9 future grid modernization. These investments, along with the ADMS as discussed in the
10 direct testimony of Companies' witness Rouse, should be approved as soon as possible so
11 that customers can start to realize the benefits.

12 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

13 A. Yes; however, I reserve the right to supplement my testimony.

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Summary: Testimony of Mark J. Vallo electronically filed by Mr. James F Lang on behalf of Ohio Edison Company and The Cleveland Electric Illuminating Company and The Toledo Edison Company