

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the PowerForward : Case No. 18-1596-EL-GRD
Distribution System Planning Workgroup

THE DAYTON POWER AND LIGHT COMPANY'S
CURRENT-STATE ASSESSMENT FOR DISTRIBUTION SYSTEM PLANNING

Pursuant to the Commission's report titled *PowerForward: A Roadmap to Ohio's Electricity Future* ("Roadmap") released August 29, 2018 and consistent with its Finding and Order of February 27, 2019, The Dayton Power and Light Company ("DP&L") submits its Current-State Assessment for Distribution System Planning ("Assessment").

The purpose of this submittal is to provide a current-state assessment of DP&L's distribution system planning approach and processes in conjunction with the subject matter outlined on pages 18 and 19 in the Commission's Roadmap. In order to provide the appropriate context for DP&L's approach to distribution system planning, the Company will provide responses and/or explanations as to its approach or methodology to each of the bulleted topics listed on pages 18 and 19 of the Roadmap in the order listed.

The Company has submitted a plan to modernize its distribution grid in Case No. 18-1875-EL-GRD ("Distribution Modernization Plan", "Plan" or "DMP"). As part of its Plan, the Company will be advancing its distribution system planning capabilities through the implementation of many of the components of its Plan. However, for the purposes of this filing, the Company will focus on its present capabilities. The information provided within this filing applies to DP&L's entire certified territory.

Following are the Company's responses to the Commission's criteria regarding each EDU's current-state assessments.

○ *System characteristics, including:*

- *Total customers served, AMI coverage (percent of customers and percentage of delivered energy), other interval meter or interval data recorder (IDR) coverage (percent of customers and percentage of delivered energy).*
- *Number of circuits and substations, number of circuits serving critical facilities, percent of substations with SCADA, and percent of substations that have been fully or partially automated to IEC 61850 or a comparable standard.*

Response: DP&L serves approximately 520,000 customers in 24 counties throughout West Central Ohio. Less than 1% of DP&L's customers have interval meters (approximately 2,500 meters) which can be interrogated remotely. DP&L presently does not have any Advanced Metering Infrastructure ("AMI") coverage.

To serve DP&L's customers, DP&L has 122 substations providing distribution voltage with 490 circuits. Of those 490 circuits, 269 are serving critical facilities. Critical facilities include, but are not limited to, customers such as hospitals, police and fire stations, 911 dispatch centers, water and sanitation stations, emergency management offices, designated emergency shelters, government offices, and nursing homes.

Although SCADA is installed in 83% of DP&L's distribution substations, a significant number are older and use analog technology that is incompatible with today's grid modernization digital standards. DP&L has adopted Distributed Network Protocol

(“DNP”) as its standard communications protocol for substation SCADA. However, all modern SCADA equipment being installed in its substations is compatible with the IEC 61850 standard.

DP&L’s distribution circuits still have manual equipment that requires field personnel to operate. This includes switches, capacitor banks and voltage regulators. The Company recently installed three smart reclosers in an area serving a suburban hospital as a distribution automation technology pilot.

- *Overview of the distribution planning process, including frequency, duration and roles/responsibilities of stakeholders involved.*

Response: DP&L’s distribution planning process responsibilities primarily reside within the Distribution Planning Group within DP&L. The Distribution Planning Group’s primary role is to assess system performance and make long term recommendations to ensure the continued reliable operation of the DP&L distribution grid. One key aspect to achieve this includes monitoring distribution and substation loading levels on a monthly basis, to keep a historical reference of the system. This information is critical to make informed decisions regarding circuit upgrades and/or reconfigurations that might be needed in the future.

Additionally, the Distribution Planning Group has other “pipelines” of information such as field personnel that report issues they might come across in the field (i.e. conductor or transformer overloads, voltages outside of tolerances, etc.). The Distribution Planning Group pairs this information with engineering assessments to generate new projects that may include substation equipment upgrades, distribution line upgrades, or circuit

reconfigurations. These projects are then prioritized to work within the Company's capital budget. DP&L has also committed to work with Staff and OCC to develop an annual plan – to be submitted to Staff and OCC annually starting December 1, 2019 – emphasizing proactive distribution maintenance that will focus spending on areas having the greatest impact on maintaining and improving reliability for customers.

Once the needed upgrades are identified and validated, the work is passed to the necessary departments for design, review and construction. Those departments include, but are not limited to, Design Engineering, Substation Engineering, Relay and Protection Engineering, Test Department, and Project Management.

As any upgrades or modifications are completed, the Distribution Planning Group verifies that the Company's records are updated including any necessary databases, circuit prints, as well as ensuring customers are appropriately accounted for in the outage management system ("OMS").

- *Categories of projects that result from the planning process, types of projects within each category and percent of expenditures in each category.*

Response: There are a number of different types of projects that result from the Company's distribution planning processes. The main types of projects include but are not limited to:

- Circuit Capacity Increases
 - Overhead conductor size increase

- Installing upgraded line equipment such as line regulators, reclosers, etc.
- Increasing riser cable sizes or paralleling of cables
- Changes in substation circuit breaker relay settings
- Substation Equipment Upgrades
 - Replacement of substation distribution transformers
 - Installation of new or upgraded circuit breakers
 - Upgrading bus/conductors between equipment
- Circuit Reliability Upgrades
 - Installation of line reclosers
 - Review of primary fuses for coordination
 - Motor start flicker analysis for circuit impacts
 - Placement of line voltage regulators as needed
 - Replacement and upgrades to circuit capacitor banks for voltage and VAR support
 - Installation of line sensors, fault indicators and other technologies for engineering analysis and circuit reliability
 - Circuit phase balancing

The percent of expenditures by category varies year-over-year depending on system conditions.

- ***Planning assumptions, including growth rates and design criteria.***

Response: The following are the basic assumptions and design criteria DP&L uses for its distribution system planning guidelines.

- Winter Normal Conductor Ratings are 32° F, Summer Normal are for 95° F using industry accepted standard or manufacture ratings.
- Neutral currents on circuits maintained below 125A as measured at the substation.
- Circuits are more closely monitored when it is discovered that the peak load has exceeded 85% of the capacity of the limiting component.
- Underground mainline cables shall never limit the overhead conductors of the circuit where practicable. Mainline is defined as the three-phase distribution from the substation circuit breaker to the first set of protective devices (i.e. fuses).
- Nameplate ratings are used for most equipment including substation breakers, voltage regulators, and all line switches.
- New light industry customers have an assumed power factor of 80% for engineering calculations unless proven otherwise by meter data or information provided from equipment nameplates.
- Growth rates are challenging to apply generically across the distribution system. However, historical trending is combined with known large customer load changes or significant additions such as residential plats. This information is reviewed at both the substation and circuit level.
- Due to the low penetration of distributed energy resources (“DERs”), assumptions regarding DERs are not factored into circuit assumptions at this time unless they are already known.

- *Load and DERs forecasting methods.*

Response: DP&L forecasts its load on a system-wide basis. For the distribution system the Company does not do load forecasts at a substation or circuit level. It does monitor and trend the peak and continuous loads on its substation transformers and distribution circuits as described in the previous response. As previously mentioned, the Company has an overall low penetration of DERs (<1%) and typically does not have information regarding future DERs on its system; therefore, it does not perform any forecasting of DERs presently.

- *Software tools used for planning, including forecasting, system modeling and mapping, power flow analysis, system protection, and hosting capacity analysis.*

Response: The Distribution Planning Group uses several software tools to assist with its distribution planning functions. Currently the group is using ArcMap, which is the main component of Esri's ArcGIS suite (DP&L uses Esri as its Geographic Information System "GIS"), for their system modeling and mapping. DP&L purchased the CYME software in 2018 and is working to import the GIS database into CYME. The group also uses a database historian software, PI System from OSIsoft, for historical data, load monitoring and load analysis. These existing systems, combined with those software systems and tools proposed in the Company's Distribution Modernization Plan, become the basis for enhancing the Company's forecasting, modeling and analysis capabilities including the future capability of developing and forecasting hosting capacity for DERs.

- *Existing DERs (all types) connected to the distribution system.*

Response: DP&L currently has 15.2MW of DERs installed behind the meter. The total is representative of a variety of DER types, including solar, wind, and biofuel. There are more than 460 individual DER installations interconnected to DP&L's distribution system. However, this represents less than 0.5% of DP&L's peak system load, a relatively low overall level of penetration. Following the installation of a large 4.5MW wind facility in 2018, solar now represents 65% of the DERs reviewed through the formal interconnection process at DP&L.

- *Overview of distributed generation (DG) interconnection processes, including technical screening rules for fast-tracking applications and inclusion of updates to key standards.*

Response: The DG interconnection process is compliant with the process outlined in the Ohio Administrative Code 4901:1-22-06 and captured in the Company's Tariff D35. The Company's DG interconnection process can also be found using the following Internet link:

<https://www.dpandl.com/environment/renewable-energy/install-renewable-energy-at-your-home-or-business/>

Following is an excerpt from the Company's website that outlines the interconnection process:

Eligibility

To be eligible for net metering, you must meet the following requirements:

- Be a DP&L customer;
- Use a renewable resource (solar, wind, biomass, landfill gas, or hydropower) or use a microturbine (combustion turbine) or a fuel cell;
- Have the equipment located on your property;
- Have your system prepared to interconnect "in parallel" with DP&L (an electrician can assist you with this) and
- Intend primarily to offset part or all of your electricity requirements without the intention of generating excessive power.

Before You Install

There are safety and economic issues to consider before you install a generating device. The following are things to consider and steps to make sure you meet eligibility requirements as well as to keep you and your family/neighbors safe.

- Zoning - Check with your local governmental agency on ordinances for zoning.
- Get a Qualified Contractor - Use a contractor that has North American Board of Certified Energy Practitioners certification.
- Sizing - Assuring your generating equipment is sized appropriately is very important to ensure the safety and reliability of the electric system. Consult with an engineer, electrician or other qualified person for help.
- Economic Considerations - Installing equipment to generate power at your home or business can be expensive and is a long-term investment. Review all the economic impacts to make certain your expectations will be met.
- Inspections - Plan to have your installation inspected by the local authority that has jurisdiction for construction in your area. A building permit prior to construction may be required.

Application Steps

1. Considerations - Review the considerations listed above and call 800-253-5801 or [email us](#) **before you install the equipment** to make sure your sizing and other requirements are met.
2. Apply - Review DP&L's "Getting Started Resources" at the bottom of the page and complete the appropriate Interconnection Application based on the capacity of your equipment.*
 - Level 1 - [Apply for 50 kilowatts \(kW\) or less](#) (last revised 8/12)
 - Level 2 - [Apply for 2 megawatts \(MW\) or less](#) (last revised 8/12)
 - Level 3 - [Apply for 20 megawatts \(MW\) or less](#) (last revised 8/12)
3. Review - DP&L will confirm receipt of your application within 3 business days. We will notify you within 10 business days if your application is missing information.
4. Approval - You will receive approval or rejection of your application within 4 weeks of submitting your application to DP&L. Once your Interconnection Application is approved and the equipment is close to being installed, DP&L will write up the Interconnection Agreement (within 5 business days of approval).
5. Sign the Agreement - You have 30 days to sign and return the Interconnection Agreement. After both parties have signed the Agreement, your equipment will be inspected and your meter will be exchanged. – DP&L will provide and install your new, required net meter and send an invoice to your location. The one-time invoice will be separate from your monthly bill.
6. Install - Arrange for the renewable generating equipment to be installed.

* If you already have generating equipment installed at your home but do not have a net metering agreement with DP&L, please fill out the application form based on the capacity of your equipment.

Please refer to the Company's Tariff D35 for the specific technical screening rules for distributed generation interconnections.

- ***Interconnection request volumes and average time to approve applications.***

Response: The number of requests to interconnect has grown steadily in recent years. DP&L received an average of 44 applications annually between 2011 and 2017. In 2018, the number of applications doubled to 97. Consistent with the Ohio Administrative Code 4901:1-22-06, DP&L reviews and approves all Simplified application requests (i.e. <50kW) within 30 days. Larger application requests (i.e. greater than 10% of the circuit's total capacity) typically require detailed sensitivity studies and can take more time. However, experience to-date is that the larger application requests are less frequent.

- ***Organization structure for planning and interconnection, including number of full-time equivalent employees and descriptions of roles and responsibilities.***

Response: Responsibilities for technical evaluation of interconnections rests with the engineers in the Distribution Planning Group. The Distribution Planning Group consists of two full-time engineers that perform the distribution planning functions under the guidance of a manager. The Company also has a resource assigned as its *Interconnection Coordinator* with the responsibility for compliance with all interconnection activities including application review, net meter installation, billing oversight, etc. The *Interconnection Coordinator* role is performed by an employee with additional responsibilities, including commercial and industrial customer account management and other customer engagement responsibilities.

- *Descriptions of existing and planned energy efficiency and demand response programs, and how they are integrated into distribution planning.*

Response: DP&L is currently implementing the energy efficiency and demand response programs as described in the Company's approved Portfolio Plan (Case No. 17-1398-EL-POR). The programs are not granular enough that they can be appropriately integrated into distribution planning (i.e. substation or distribution circuit level information).

- *Proposed use cases, methodology and timeline for hosting capacity analyses (HCA) and other relevant analyses.*

Response: As indicated earlier, interconnection of DERs is evaluated on a case-by-case basis. DP&L does not currently employ a hosting capacity analysis methodology within its distribution planning processes. However, the Company does believe that HCA will need to be developed and incorporated into its distribution planning methodology as it deploys its DMP and as the penetration of DERs increases.

- *Proposed non-wires alternatives (NWA) suitability criteria, identification of candidate capacity, and voltage or reliability projects for NWA pilots.*

Response: The Company currently has an NWA collaborative as part of Case No. 15-1830-EL-AIR. The participants of the collaborative have had initial discussions around identifying suitability criteria as well as potential types of NWA pilot projects. DP&L is

also participating in the Commission's PWG Working Group, that also intends to address NWAs.

- *Any relevant planned technology investments (e.g. AMI, ADMS) and how they will be used to support or improve distribution planning.*

Response: As previously stated, the Company has submitted a plan to modernize its distribution grid in Case No. 18-1875-El-GRD. As part of its Plan, the Company will be advancing its distribution system planning capabilities through the implementation of many of the components of its Plan. This includes, but is not limited to, the deployment of AMI, ADMS (Advanced Distribution Management System), DERMS (Distributed Energy Resource Management System), and an analytics center of excellence. All of the technology investments planned as part of its DMP will support and further advance the Company's distribution planning methods in a manner that supports the accommodation of DERs and similar technologies onto its distribution grid.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing was served on the persons stated below via electronic transmission, this 1st day of April 2019:

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Commission of Ohio Docketing Information System on

4/1/2019 4:43:39 PM

in

Case No(s). 18-1596-EL-GRD

Summary: Report of the Dayton Power and Light Company's Current State Assessment for Distribution System Planning electronically filed by Mr. Robert J Adams on behalf of The Dayton Power and Light Company