PUBLIC SERVICE COMMISSION OF MARYLAND

ELECTRIC SYSTEM PLANNING ANNUAL REPORT

In compliance with §7-802 of
the Public Utilities Article,
Annotated Code of Maryland

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I. Background

The Maryland Climate Solutions Now Act (CSNA) of 2022 is legislation to reduce statewide greenhouse gas (GHG) emissions through the use of various measures, including the alteration of statewide GHG goals; the development of certain energy efficiency and emission reduction requirements for certain buildings, requiring electric companies to increase their annual incremental gross energy savings through certain programs and services; requiring the Public Service Commission (Commission) to implement and administer the pilot program; authorizing investor–owned electric companies to apply to the Commission to implement an electric school bus pilot program with a participating school system if the pilot program meets certain standards; authorizing investor-owned electric companies to recover certain costs under the pilot program, subject to the approval of the Commission; and establishing certain State policy goals with regard to the state's electric distribution system.

The CSNA also added Subtitle 8 (Electric Distribution System Planning) to Title 7 of the Public Utilities Article (PUA) of the Annotated Code of Maryland that required annual reports on electric distribution planning to the General Assembly. Subsequently House Bill 1393 for Electric System Planning – Scope and Funding (HB1393) was enacted in 2024 that modified Subtitle 8 to focus on electric system planning in place of electric distribution planning and to also require that the Commission report on the projects to promote specific State policy goals in its annual report, among other things. Specifically, §7-802 directs the Commission to submit a report, in accordance with §7-1257 of the State Government Article, to the General Assembly, by December 1 each year, with information regarding the status of projects designed to promote the goals listed below, including information on planning processes and implementation that promote the specific goals:

(1) measures to decrease greenhouse gas emissions incident to electric distribution, including high levels of distributed energy resources and electric vehicles;
(2) giving priority to vulnerable communities in the development of distributed energy resources and electric vehicle infrastructure;
(3) energy efficiency;
(4) meeting anticipated increases in load;
(5) incorporation of energy storage technology as appropriate and prudent to:
    a. support efficiency and reliability of the electric system; and
    b. provide additional capacity to accommodate increased distributed renewable electricity generation in connection with electric transmission and distribution system modernization;
(6) efficient management of load variability;
(7) electric system resiliency and reliability;
(8) bi-directional power flows;
(9) demand response and other non-wire and non-capital alternatives;
(10) increased use of distributed energy resources, including electric vehicles;
(11) transparent stakeholder participation in ongoing electric system planning processes; and

(12) any other issues the Commission considers appropriate.

Prior to the enactment of the CSNA and HB1393, the Commission held a legislative-style hearing to discuss recommendations contained in the final Task Force[1] on Comprehensive Electricity Planning Report. On June 23, 2021, the Commission issued Order No. 89865, formally establishing a Distribution System Planning (DSP) docket in Case No. 9665 and initiating a DSP Workgroup (Workgroup).[2] The Workgroup was tasked with conducting a comprehensive evaluation of distribution system planning in Maryland and providing input into possible reforms of the distribution planning process. The DSP Workgroup convened on March 3, 2022, and has since produced several reports in response to the Commission directives. The first Workgroup status report[3] was filed on February 6, 2023, and provided an initial assessment of the relevance and applicability of the Jade Process Map to Maryland.[4]

On August 24, 2023, the Commission issued Order No. 90777 after reviewing the Workgroup's status report and receiving stakeholder feedback. In Order No. 90777, the Commission directed the Workgroup to continue its review of the Jade Process Map and consider its relevance and application to Maryland's electric grid and develop and propose any modifications to the Jade Process Map to best align with Maryland's public policy goals and existing processes, including interactions with existing dockets on electric reliability and the EmPOWER program.[5] As expressed in Order No. 90777, the Commission's goal is to develop an integrated DSP[6] process for each utility that incorporates planning for the entire distribution network, including but not limited to wired and non-wired solutions, interconnections, electric vehicles, and demand response.

The Commission directed the Workgroup to develop a consensus set of Maryland DSP practices.[7] As required by the Order, the Workgroup leader filed a status report by January 12, 2024, and a final report on April 30, 2024.[8] [9]

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[1] The Task Force on Comprehensive Electricity Planning is a forum for the development of state-led pathways towards a more resilient, efficient, and affordable grid and provided by the National Association of Regulatory Utility Commissioners (NARUC) and the National Association of State Energy Officials (NASEO), in partnership with the U.S. Department of Energy.

[2] Order 89865 at 1.

[3] Maillog No. 301185.

[4] The Jade Roadmap is a representation of a state's electric utility structure in which the state's investor-owned utilities do not own generation assets, the state is located within an RTO/ISO market, and the state is seeking to increase transparency around distribution system planning and is responsive to State policy. Maryland's structure was best represented in this Jade Roadmap classification.

[5] Order 89865 at 5.

[6] As described by the Regulatory Assistance Project, Integrated DSP "is a process that systematically develops plans for the future of a distribution grid using inputs supplied by the electric utility, the Commission and interested stakeholders. The planning process is integrated in the sense that all possible solutions to distribution system needs are considered. The objective of the final plan is a distribution system that operates for the public good, meeting the objectives set out by stakeholders in a cost-effective manner." Integrated DSP will look to the interconnected relationships of the PUA §7-802 policy goals to lead to more effective grid investments.

[7] Order 90777 at 8.

[8] Order 90777 at 12.

[9] See Workgroup Status Report (Maillog No. 307072) and Workgroup Final Report (Maillog No. 309337).

On July 30, 2024, the Commission issued Order No. 91256, after reviewing the final Workgroup report filed on April 30, 2024, and stakeholder comments. In Order No. 91256, the Commission directed each electric utility to file, by November 15 of each year, beginning in 2024, a report using a common framework for utility reporting developed within the Workgroup with information regarding the current status of projects designed to promote State policy goals identified in PUA §7-802. The Commission also directed the Workgroup leader to file a status report on its progress by November 15, 2024. Baltimore Gas and Electric Company[10] (BGE), Potomac Electric Power Company and Delmarva Power Company (PHI Companies[11]), The Potomac Edison Company[12] (PE), and the Southern Maryland Electric Cooperative, Inc.[13] (SMECO) all filed their annual electric system planning reports on November 15, 2024, using a common template developed by the Workgroup, listing processes and projects, and as directed by the Commission. The Workgroup leader also filed a status report on November 15, 2024.[14]

The next sections of this report summarize the Companies' annual electric system planning reports filed with the Commission.

II. BGE

According to BGE, the initiatives outlined in this CSNA Annual Report present a comprehensive approach to integrating renewable energy sources, enhancing energy efficiency, and facilitating the transition to electric vehicles.[15] BGE also states that these initiatives align with the framework established by the CSNA and drive BGE's contribution to Maryland's climate goals and fostering a resilient energy future.[16] Consistent with the DSP Workgroup developed template, BGE provides a description of the projects intended to support the specific CSNA goals, how the project connects to and helps achieve the specific CSNA goals and the reasons for the selection of the project, and progress of implementation of indicators. BGE notes that this section may be removed from a report if indicators have not been established.

- Goal 1 – Measures to decrease greenhouse emissions from the electric distribution system

    i. DRIVE Program

BGE reported that it plans to submit, on or before July 1, 2025, proposals for virtual power plant (VPP) and vehicle-to-grid charging (V2G) pilots to the Commission in accordance with the Maryland DRIVE Act. The DRIVE Act pilots will explore ways to coordinate customer-owned distributed energy resources with renewable on-site generation for electric

[10] Maillog No. 313654.
[11] Maillog No. 313650.
[12] Maillog No. 313651.
[13] Maillog No. 313658.
[14] Maillog No. 313631
[15] BGE's Annual Climate Solutions Now Act Report, 2024/Distribution Planning System Report, 2024 (Maillog No. 313654).
[16] BGE Annual Distribution Planning System Report, 2024 (Maillog No. 313654).

distribution system support services. The intended mandates being tested include system peak load reduction, GHG emissions reduction, and acting on signals mirroring an electric distribution system need that is non-coincident with system peak and understanding customer sentiment to program design and compensation/participation structure. Implementation of the DRIVE Act supports customer interconnections for all storage which exports energy, both mobile and stationary, along with bi-directional DERs that may run in parallel with the grid. Finally, the DRIVE Act mandates that the utilities propose time-of-use (TOU) rates for appropriate customer classes and will be addressed by leveraging the learnings from and building upon the recent delivery and supply TOU rate pilot that is currently an option for all residential customers. BGE plans to engage customers and increase participation through marketing campaigns. BGE asserts that the DRIVE program will help enable CSNA goals 1, 4, 5, 6, 9, and 10. The Company states that it will comply with the reporting requirements for DRIVE included in Commission Order No. 91218.

ii. BGE EV Charging Program

EVs produce zero tailpipe emissions, directly mitigating air pollution and enhancing public health by improving air quality. BGE states that the integration of EVs also supports the increased utilization of renewable energy sources, as utilities can optimize charging times to coincide with peak renewable generation, thereby promoting energy efficiency in the transportation sector. BGE reported that its current suite of EV programs has been and will continue to play a crucial role in the adoption of EVs, successfully educating customers about benefits and opportunities associated with EVs and EV charging, promoting EV adoption, and managing grid impacts. BGE stated that it plans to submit its second phase proposals for the next portfolio on or before December 20, 2024.[17] By investing in and expanding the necessary charging infrastructure, BGE facilitates greater access to EV charging stations, thereby encouraging consumers to transition to electric vehicles. Utilities can also leverage their expertise in grid management to ensure that the electric grid can accommodate the increased demand from EV charging, integrating advanced technologies such as smart grid systems and energy storage solutions.

BGE stated that it is an active member of the Zero Emission Electric Vehicle Infrastructure Council (ZEEVIC) and the Commission's PC44 EV Work Group, in which a joint utility proposal was submitted to the Commission in early 2018 for a robust program offering electric vehicle incentives and infrastructure. Over the past five years, BGE's EVsmart portfolio, composed of residential, commercial, and BGE-operated programs, has pursued goals in alignment with the State's policy directives. BGE's pilot was designed to coordinate seamlessly with Maryland policy initiatives such as the Advanced Clean Cars Act II and the CSNA, driving towards a future and resulting in substantial reductions in greenhouse gas emissions. BGE's programs focused on further EV adoption throughout the State by expanding public charging availability and focused on ensuring an equitable investment in transportation electrification. BGE promoted early EV adoption within the State through rebates and incentives for residential, multifamily and commercial customers and expanded EV public charging availability throughout central Maryland.

[17] *In the Matter of the Petition of the Electric Vehicle Workgroup for Implementation of a Statewide Electric Vehicle Portfolio*, Case No. 9478, Order No. 91297, p. 21 (August 23, 2024).

BGE reports that its EV Charging Programs will help enable CSNA goals 1, 2, and 10. BGE further states that additional monitoring information will be updated annually consistent with Case No 9478.[18]

Connection to State policy goals

iii. Conservation Voltage Reduction (CVR) Program

CVR saves energy by lowering the voltages provided to customers within an acceptable voltage bandwidth, resulting in a reduction in energy demand and associated greenhouse gases. This is possible because the voltage provided for normal 120V service can be between 114 V and 126 V. Some loads like incandescent and CFL lighting, refrigerators, heat pumps, and AC units (though notably not LED lighting) run more efficiently at lower voltages, which results in energy savings to the grid and the consumer. According to BGE, it uses switched capacitor banks and single-phase operation to lower service voltage dynamically at approximately 900 circuit feeders across 123 substations. BGE's assets with CVR installed have a combined summer peak load of 5,800 MW and a winter peak of 5,000 MW, representing approximately 90% of the peak load for the BGE service territory, meaning CVR deployment is nearly territory wide. BGE forecasts its CVR Program will reduce lifecycle carbon dioxide equivalent (CO2e) emissions from 2024-2036 by 97,479 metric tons.

BGE asserts that the CVR program reduces GHG emissions in the electric distribution system and enables CSNA Goal 1. According to BGE, CVR implementation is expected to reach saturation of available feeders for CVR implementation at the end of 2024, and no further opportunities for implementation have been identified on the BGE distribution system. Forecasted lifecycle CO2e reductions (metric tons) will continue to be reported in this section.

iv. Path to Clean

According to BGE, the Path to Clean is an ongoing program voluntarily being implemented by the company. There are two pillars to the Path to Clean strategy: reducing the company's operational emissions and empowering customers to take part in the clean energy transition. Path to Clean is an initiative overseen by Exelon, BGE's parent company, in support of jurisdictional goals of each of Exelon's operating companies. Operational emissions are those that the utility directly controls, including emissions associated with its buildings, fleet vehicles, use of SF_6 insulating gas, and the company's gas distribution system infrastructure. In the near term, BGE is focusing on aspects of its business that the company has direct control over through evolved work practices, building and fleet vehicle investments, alternative fuel strategies, and deployment of new and expected future technologies. As of year-end 2023, Exelon has reduced operational GHG emissions by 40%.

With regard to empowering customers and communities, BGE reported that it continues to implement strategies that will facilitate customer's decarbonization goals by enabling the delivery of lower GHG emissions energy and reducing customer's direct emissions through electrification. The company notes that renewable natural gas (RNG), produced from the capture,

[18] *In The Matter of the Petition of the Electric Vehicle Work Group for Implementation of a Statewide Electric Vehicle Portfolio,* Case No. 9478.

refining, and reuse of methane, is the most market-ready of these options today, and BGE has already established interconnection standards and tariff provisions to connect RNG to its system. BGE reached a major milestone in 2022 after completing the interconnection of RNG through its gas distribution system. This RNG came from a newly constructed RNG plant owned and operated by Bioenergy Devco. Located in Howard County, the plant is Maryland's flagship anaerobic digestion facility, which produces RNG from food waste. BGE is also exploring emerging hydrogen technology options via R&D partnerships and industry collaborations in a way that can be delivered through existing gas infrastructure, helping reduce gas customers' carbon footprint. BGE is developing an isolated hydrogen blending pilot at its Spring Gardens facility to study the impacts on its distribution system and simulated customer appliances. The estimated start of this pilot is in the second quarter of 2025.

According to BGE, the Path to Clean programs help enable CSNA Goals 1 and 3. BGE stated that it will continue to develop new programs and report on the achievement of program GHG reduction goals.

v. Working for Accessible Renewable Maryland Thermal Heat (WARMTH) Act Network Geothermal Pilot

BGE is developing a networked geothermal pilot to align with the requirements of the WARMTH Act. BGE will submit a pilot proposal to the Commission by July 1, 2025, identifying two communities with 80% low to moderate-income customers who are currently served by natural gas. BGE plans to retrofit the residential and commercial properties for geothermal heating and cooling to reduce emissions from natural gas usage. The company plans to also weatherize the homes and replace all natural gas appliances with electric appliances. BGE conducted a feasibility study for the use of this technology in its service territory, which found the pilot should feasibly achieve 49-71% electric peak reductions, 45% annual energy savings, and 62% emissions reductions. In addition, the proposed pilot program will include a Workforce Development program. The WARMTH Pilot helps enable CSNA Goals 1 and 4.

- Goal 2 – Giving Priority to Vulnerable Communities in the Development of Distributed Energy Resources (DERs) and Electric Vehicle Infrastructure

i. BGE Community Solar Pilot Program

Community solar energy generating systems (CSEGS) provide access to solar-generated electricity without the need for property ownership. Customers can participate by purchasing a subscription for a portion of the energy generated by a CSEGS from a Subscriber Organization. Once the CSEGS is producing electricity, customers who want to participate must pay a monthly subscription fee to the Subscriber Organization. In return, they will receive a monthly credit on their electric bill that reflects their subscribed share of the CSEGS energy production.

According to BGE, its Community Solar Pilot Program has been in operation since 2017, and as of October 2024, the Company has over 80 MW of in-service community solar generation in its service territory with over 190 MW of reserved capacity in development, and over 14,000 BGE customers have a community solar subscription. By 2026, BGE plans to deploy a new

community solar portal, which will be integrated with the company's customer care and billing system and used to automate the program processes. The portal will be the new interface for Subscriber Organizations to enroll or disenroll subscribers, specify subscription allocations, and provide access to reports. It will also allow Subscriber Organizations to opt-in to utilize Consolidated Billing. According to BGE, the Community Solar Energy Generating Systems helps enable CSNA Goals 2 and 10. BGE will provide annual updates regarding community solar deployment and customers impacted.

- Goal 3 – Energy Efficiency

    i. BGE EmPOWER Maryland (EmPOWER) Program

BGE is required to file an EmPOWER Maryland semi-annual report with the Commission, which provides EmPOWER Maryland program portfolio information and results. The report contains both narrative updates and highlights for each program, along with program data such as participants, measures, budget and spend, MWh and Therm savings, and megawatt (MW) reduction resulting from the EmPOWER suite of energy savings programs. According to the company, since its inception, BGE's multiple award-winning EmPOWER Maryland programs have: (1) Provided BGE customers nearly $1.4 billion in rebates and bill credits; (2) Performed over 512,000 home energy audits and check-ups; and (3) Achieved annualized energy savings of over 7.1 million MWh of electricity.

BGE's EmPOWER portfolio of programs continued its success from 2023 into 2024. For the year 2024, as of June, BGE's EmPOWER program portfolio is on target to meet its 2% legislatively established 2024 goal for the EmPOWER programs. Also, as of June, the EmPOWER program portfolio achieved 51% of the 2% annual MWh savings goal using only 26% of the overall 2024 program budget. With regard to the MWh savings targets established in the company's 2024-2026 EmPOWER cycle filing, the portfolio achieved 50% of the 2024 filed target as of June. This places the portfolio in the "On Target" category for 2024. The entire portfolio achieved nearly 324,000 MWh in annualized electric energy savings. Natural gas savings as of June were over 1.5 million therms. In addition to the energy savings realized and associated environmental benefits customers generated by choosing more efficient alternatives, BGE stated that customers received incentives and bill credits of approximately $62 million. Estimated savings on customer bills over the life of measures installed in 2024 are $214 million.

BGE highlighted energy efficiency programs that have exceeded their YTD June 2024 targets. The HVAC tune-up program and the Quick Home Energy Check-Up program in the residential portfolio attained over 60% of the target in the first six months of 2024. The commercial energy efficiency programs that exceeded target expectations for YTD June 2024 are the Custom Program, the Small Business Program, and the Prescriptive Program which all achieved over 60% of their 2024 targets by June 2024.

BGE stated that in its revised EmPOWER filing for program years 2025 and 2026 (filed on August 1, 2024, and currently under Commission review), proposed the introduction of higher incentives for customers switching from delivered fuels or natural gas space and water heating equipment to electric equipment. These beneficial electrification offers also include incentives

for make-ready work that can support the enablement of electrification in customers' homes and businesses. These incentives will be delivered through existing energy efficiency program channels such as HVAC, Appliance Rebates, Home Performance with ENERGY STAR®, and Business Instant Discounts and will provide highly cost-efficient GHG savings on a CO2e basis.

In addition, BGE stated that its revised EmPOWER filing for program years 2025 and 2026, proposed providing increased incentives for customers residing in Environmental Justice (EJ) census tracts, as identified by the Maryland Department of the Environment's EJ Screening Tool. BGE's analysis shows that one-third of BGE's customers are in the greater than 75th percentile statewide identified as overburdened and underserved communities and therefore experience reduced access to both economic and environmental investments. BGE proposes that customers within census tracts at or above the 75th percentile of total EJ Score and who are ineligible for DHCD's EmPOWER programs will be eligible for an increased incentive for space and water heating measures such as heat pumps and heat pump water heaters through BGE's EmPOWER residential programs including HVAC Rebates, Appliance Rebates, and Home Performance.

BGE stated that commercial customers such as restaurants, non-profits, laundromats, convenience stores, and other businesses who operate in EJ census tracts are critical members of these communities. These commercial customers provide important local jobs and services. Therefore, in its revised filing, BGE proposed to add dedicated field representatives to focus on these commercial customers with the goal of building trust and guiding these customers through the application processes. Their mission will be to strengthen EmPOWER's relationship with the community, including multi-lingual communities and communities where English may not be the first language. These representatives will increase program awareness on-the-ground and help commercial customers that operate in these EJ areas adopt more energy efficient measures. Investments made through EmPOWER provide benefits to commercial customers such as reducing their operating and maintenance costs, improving their bottom line, and upgrading the look and comfort of their buildings to help them continue to attract and serve residents in these communities. BGE also stated that it participates in several relevant work groups to address the Commission's concerns. According to BGE, the EmPOWER program enables CSNA Goal 3. The Company will provide annual updates regarding the EmPOWER programs and benefits consistent with the EmPOWER docket.

- Goal 4 – Meeting Anticipated Increases in Load

    i. Ten-Year Distribution Capacity Plan

According to BGE, the existing annual forecasting process is a multi-part activity that incorporates numerous data sources to project growth on the distribution system over multiple timescales. BGE produces forecasts for approximately 230 substations, nearly 500 substation transformers, and over 1,500 feeders. The BGE system includes feeders and substations with summer peaks in electricity demand driven by air conditioning, like most utilities, as well as winter peaks in demand driven by electric heating, generally in regions with no natural gas service.

At BGE, the planning process begins as the prior years' process concludes, preparing for the forecast to review known future load additions and planned distribution system changes. In September, SCADA (Supervisory Control and Data Acquisition), AMI (advanced metering infrastructure), and weather station systems data is analyzed to determine baseline feeder and substation peak load behavior. From October to December, the utility begins developing the 15-year forecast with the current forecasting tool, including known load additions, distribution system reconfiguration, and anticipated system load growth. The 15-year forecast outlines the peaks on each feeder, transformer, substation, and equipment, and compares peaks with equipment ratings to identify capacity constraints. Based on the findings from the 15-year forecast, from January to May, the utility develops solutions for identified constraints within the next 10 years. Concurrently, the utility creates short-term summer and winter plans to address load and feeder issues for the next year to maintain the safety and reliability of the system.

According to BGE, the distribution system planning process is anchored in the company's customer load and DER forecasts and the investments needed to support the anticipated increasing load and deployment of DERS. This represents just one part of the company's overall investment plan (approximately 5-15%). See below for improvements being made to BGE's load forecasting and capacity planning processes and timelines.

ii. DER and Load Forecasting System Project

BGE stated that the Distributed Energy Resources and Load Forecasting (LF) System Project is the deployment of an advanced distribution planning system intended to meet the evolving needs of the distribution grid as Maryland transitions to a more electrified and decarbonized future. The company noted that its existing load forecasting system is an in-house-built application that is more than 20 years old. The tool uses observed feeder loads and historical weather to develop a weather-normalized seasonal peak demand for each feeder and substation transformer. This peak value serves as a baseline to which known new customer load and distribution configuration changes are added to derive a forecast. This system did not contemplate the widespread adoption of photovoltaics (PV), electric vehicles (EV), or forecast more than the peak seasonal (winter/summer) hour load. As such, the existing load forecasting system no longer meets the future distribution planning needs, and the DER and LF system is selected as a solution.

According to BGE, the DER & LF System Project implements three key capabilities: First, it produces a load forecast of representative peak days (monthly peak days) up through every hour of the entire year, expanding on the legacy forecasting for only the peak hour of the season. This is key to forecasting different technologies, their daily/seasonal load curve, and their impacts on feeder/substation behavior. Second, is the spatial allocation of future development or technology adoption, allowing future load changes to be reflected in areas and along feeders where they are more likely to occur rather than dividing system-level impacts evenly across the entire system. Third, is the ability to perform multiple forecast scenarios. Leveraging those three capabilities creates an intelligent forecasting system that understands future grid constraints and informs potential solutions. This intelligent forecasting is essential for achieving many of the CSNA goals, particularly goals 4, 5, 9, and 10. The DER & LF system is anticipated to be implemented in early 2025, followed by a period of configuration and calibration, and targets 2026 for the solution to be incorporated into the distribution planning process. As outlined

above, the capabilities of this new forecasting system can be transformative but also exceedingly complex. BGE stated that transitioning a utility planning organization from single scenario peak hour net load forecasting to hourly multi-scenario net and gross load forecasting will be an ongoing process.

iii. Distribution Planning Guidelines Evolution Initiative

The Distribution Planning Guidelines Evolution Initiative is the expansion of guidelines to account for increased distributed generation and load growth on the system. As noted above in the DER and Load Forecasting System Project, BGE stated that it plans to expand its DER and load forecasting capabilities to include hourly forecasting of both DER and load on the system. BGE stated that this advanced capability is foundational to the evolution of the planning guidelines.

According to the company, the primary purpose of the distribution planning process is to forecast the load, compare it to existing equipment ratings, identify if the load is expected to exceed those capabilities (under normal or certain contingency situations), and initiate action to mitigate the violation before it occurs. Historically, with one-directional energy flows on the distribution system (i.e., from substation to feeder to customer), peak load forecasting was sufficient to accomplish this task. The peak load forecasting was based on observed loading at the head of the feeder, which represented the total gross load on that feeder.

BGE stated that, as distributed generation penetration increases, observed load at the head of the feeder is no longer the true gross load on the feeder. Instead, it is now net loading minus gross load minus the contribution of the distributed generation. As the distribution system evolves, the distribution planning guidelines that are the purpose of this project must also evolve. The Distribution Planning Guidelines initiative will extend capacity planning guidelines to include the load masking effects of DER when making decisions about system adequacy by considering both gross and net loading under normal and contingency situations. Included in these criteria are: ensuring net load remains below rating capacity of components; contributions of DERs can be a solution to maintaining feeder loading below normal rating; and, loading should not exceed component emergency rating for contingency scenarios, including loss of a portion of distributed generation.

According to the company, the Distribution Planning Guidelines Evolution helps enable CSNA Goals 1, 4, 5, and 8. The updated Distribution Planning Guidelines are enabled by the deployment of the DER and Load Forecasting Application. As noted in the DER and LF application description, it is being deployed in 2025, followed by a period of configuration and calibration, and incorporated into the Planning Process in 2026. The expanded planning guidelines rollout will occur concurrently and follow the same timeline.

iv. DER Management System (DERMS) Project

BGE stated that the Distributed Energy Resources Management System (DERMS) Project is the deployment of an advanced distribution control system functionality intended to meet the evolving needs of the distribution grid as Maryland transitions to a more interactive distribution grid with high deployment rates of generation and dispatchable resources. The

company noted that there are limits to the amount of DER interconnected to a feeder without coordination of at least a percentage of the resources in order to maintain the distribution system within operating limits. BGE further noted that its existing capabilities for coordinating DERs are limited and have generally involved "bespoke" or "one-off" solutions that are unsuited to scale to broad system deployment because they are costly and time-consuming to implement and hard to maintain after deployment.

The DERMS project implements a scalable centralized coordination system closely tied to the existing distribution monitoring and control system with the goal of having repeatable and maintainable implementations for coordinating DER systems on a feeder. According to BGE, the DERMS project will be implemented over several years in multiple phases. The initial deployment phase is focused on DERMS system deployment and establishing basic capabilities such as battery energy storage system (BESS) control and estimating unmetered PV system outputs. Subsequent phases will expand the number of integrations and allow the DERMS to provide visibility and dispatch to more types of DERs, working to align with the Distribution Planning Guidelines Evolution initiative to manage DER contributions to maintain the feeder loading below normal ratings. Exelon has been selected for a $100 million U.S. Department of Energy (DOE) Grid Resilience and Innovation Partnerships Program (GRIP) grant that will deploy software capabilities, including DERMS improvements and unbalanced load flow (UBLF) in the distribution monitoring and control systems to enable the real-time operations in a DER-enabled future across all the Exelon territories.

According to the company, DERMS will allow the coordination of DERs on the distribution grid, which will allow for more refined utility management of peak loads, thereby mitigating the impacts of load growth. Specifically, DERMS help enable CSNA Goals 1, 4, 5, 6, 8 and 10. BGE noted that the initial phase of the DERMS project is currently in active development and is planned to go live by the third quarter of 2025. This initial phase is focused on DERMS system deployment and establishing basic capabilities such as BESS control and estimating unmetered PV system outputs. Following the initial deployment, a second project phase is planned to start with the goal of expanding the number of integrations, allowing the DERMS to provide visibility and dispatch signals to more types of DERs, including managed EV charging and demand response vendors. The second phase of the DERMS project is planned to be completed in 2027.

- Goal 5 – Incorporation of Energy Storage Technology as appropriate

    i. Hosting Capacity Maps

BGE currently publishes a quarterly PV Hosting Capacity Map that provides information on how much solar generation can be added to an area before the feeders supplying that area reach capacity without needing significant system upgrades. The map displays the sum of the remaining capacity in kilowatts (kW) up to a quarter square mile. This remaining capacity is based on feeder constraints after accounting for in-service and approved DERs on each feeder. BGE also publishes a Restricted Circuits Map that displays circuits that are limited to PV interconnections of certain sizes without making significant system upgrades at the customer's or

developer's expense. Limits on circuits are based on circuit-specific analysis and are intended to provide allowance to accommodate residential-scale or smaller commercial applications.

As customer adoption of DER increases, BGE stated that it will need to collaborate more with customers to enable smooth interconnections, and the company continues to listen to feedback from customers and developers on what information they would like to view on the maps. BGE is working to advance its planning tools and capabilities to facilitate more targeted and granular distribution system analyses. Increasing penetrations of DER will require a better understanding of the conditions of the distribution system at a more detailed temporal and locational level. Distribution Planning is updating the current planning models and tools used by reducing the number of applications used. Currently, multiple software applications are used to run analyses on the distribution system, and manual updates and information handoffs are required. BGE notes that consolidating to one application reduces the complexities and time required to maintain multiple models. BGE is also adding new modules to existing distribution system modeling applications to perform more advanced analyses, increasing its capabilities to help meet current and future planning requirements established by the Commission and the legislature.

By utilizing the additional granular data from the DER and Load Forecasting tool, BGE stated that it will analyze historical and forecasted loads to evaluate various scenarios and assess non-wires solutions (NWS). Current tools only capture annual peak load at a feeder or substation level and getting more granular locational and temporal data enables the company to make more accurate decisions regarding investment needs and options. For example, with more data, the utility can find where the minimum and maximum loads are during the day and further analyze the load and generation forecast down to the sub-feeder level to provide more specific guidance for necessary grid upgrades or NWS needs. According to the Company, Hosting Capacity Maps help enable CSNA Goal 4. BGE stated that improvements to the Hosting Capacity Maps will be reported here as they are developed.

ii. Distributed Battery Energy Storage Program

The Distributed Battery Energy Storage Program (DBESS) is a new program to develop a repeatable, standardized utility-owned and operated BESS system design that will allow BGE to efficiently deploy distribution front-of-meter storage as a solution. The program is focused on sourcing one-sized battery assets (0.5 MW/1 MWh) that can be connected to distribution feeders in an area where they will be most impactful. These standardized units can be grouped to provide additional storage where needed and integrated with DERMS (see above).

BGE stated that its current experience with BESS installations has been individual, tailored projects that were engineered, procured, and constructed by suppliers. While these initial installations have provided customer benefits and increased BGE familiarity with energy storage solutions, BGE stated that continuing the practice of individual solutions is inefficient for utility deployment. The company is developing this standardized approach to drive efficiencies in procurement, engineering and design, construction standards, operation and maintenance, and integration with internal IT systems. In turn, these systems become a standardized "tool in the toolbox" to address forecasted capacity constraints via peak shaving on feeders and on the

substation transformer. As standards develop, technology matures, and customer benefits are quantified, additional use cases for DBESS are anticipated, such as resilience.

BGE has also been selected for up to $50 million in grant funding from DOE's GRIP Program for its BGE Interconnection Readiness and Deployment of Storage (BIRDS), which will deploy an anticipated 11 MW of scalable battery energy storage solutions across BGE's distribution system, amplifying foundational monitoring and control through substation upgrades, and enabling through BGE's subrecipients up to 3 MW of customer-owned solar + storage and electric vehicle charging stations. BGE notes that the DBESS Program will help enable CSNA Goals 1, 4, 5, 6, and 9. BGE anticipates that initial deployments of the DBESS program will occur in 2026. Deployments in subsequent years will be determined by grid needs and the development of additional use cases

- Goal 6 – Efficient Management of Load Variability

    i. Smart Charge Management (SCM) Demonstration Project

Exelon is conducting a Smart Charge Management (SCM) demonstration across numerous customer segments (residential, commercial, and public) to determine optimal managed charging structures for grid value. According to BGE, the project will evaluate the impact of wide-scale EV charging on electric grid stability and the ability to control EV charging load (demand response) based on various grid conditions. By reviewing EV charging and its effects on the grid, the project will also evaluate the costs to maintain a stable and reliable electric system as EV adoption progresses. There are currently over 4,000 residential customers enrolled in the SCM demonstration program.

BGE notes that, so far, Exelon and Shell Recharge Solutions conducted 31 public charging demand response events across their public charging network. One demand response event reflected a 33% decrease in peak demand from EV charging by shifting charging to off-peak hours. This reduced EV charging load from a 750kW peak to a 500kW peak. BGE also notes that Exelon is partnering with Argonne National Laboratory, Smart Electric Power Alliance, Shell Recharge Solutions, WeaveGrid, and EVmatch on this demonstration project. BGE reported that the SCM Project helps enable CSNA Goals 1, 4, 6, and 10, and is currently under development.

- Goal 7 – Electric System Resiliency and Reliability

    i. BGE's Resiliency and Reliability Programs

BGE's reliability objectives are focused on minimizing the number and duration of electric service outages experienced by customers each year. BGE tracks this performance through system-wide reliability metrics, including SAIFI, SAIDI, and CAIDI. It is BGE's intention to meet or exceed the standards established by the Commission. In order to meet these standards, BGE has established a variety of projects and programs that address outage issues at

the system, feeder, community and individual customers reliability improvement programs including cable and pole replacement programs, distribution circuit asset replacement program, 4kV feeder conversion program, etc.

Additionally, under Case No. 9353, BGE is actively discussing resilience in a work group in which BGE is developing the framework for resilience-based projects and metrics that support the ability to prepare for and adapt to changing conditions, withstand, recover from, and minimize the magnitude and/or duration of disruptive extreme events. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents.

According to the company, the reliability and resilience programs help enable CSNA Goal 4. BGE stated that reliability metrics will continue to be reported annually consistent with Case No. 9353[19], and resilience metrics are currently under consideration also in Case No. 9353.

- Goal 8- Bi-directional Power Flows

    i. BGE's Distribution System Enables Bi-directional Power Flows

BGE stated that its distribution system, generally, already allows for bi-directional power flows at the feeder and substation level, and as such there are no programs or projects directly targeted at feeder or substation upgrades to allow for bi-directional power flow. There are thermal, voltage, and operational constraints that can limit the amount of load or generation on a particular feeder, transformer, or substation. However, those constraints will exist regardless of the direction of power flow. The exception to allowance for bi-directional flows is on BGE's secondary network system. This secondary voltage network system supplies approximately 900 customers in the downtown Baltimore area. Bi-directional power flow between the low voltage secondary network and the 13 kV supply feeders is not permitted due to system operational limitations. While the BGE system is generally capable of handling bi-directional power flow, how that bi-directional power flow is measured, managed, and forecasted is evolving, as noted below in the Monitoring section.

According to the company, the bi-directional power flow capabilities enable CSNA Goal 8. BGE has been selected for up to $50 million in grant funding from DOE's GRIP Program for its BIRDS project, a portion of which will amplify foundational monitoring and control through substation upgrades that support bi-directional power flows. BGE will report on the progress of these upgrades in future reports.

[19] *In the Matter of the Review of Annual Performance Reports on Electric Service Reliability filed Pursuant to COMAR 20.50.12.11,* Case No.9353.

- Goal 9 – Demand Response and other Non-Wire and Non-Capital Alternatives

i. BGE's Demand Response (DR) Programs

BGE implements a range of DR programs to reduce the burden on the electrical grid during periods of peak demand by reducing residential customer's HVAC energy use. According to the company, these programs have evolved to meet customer needs and expectations, address technological advancements, and have ultimately been successful in educating customers about the benefits of load management and effectively managing their impact on the electrical grid. On August 15, 2024, BGE filed a supplemental DR program that is currently under review that includes plans for winter peak reductions, showcases innovation in DR by proposing and testing flexible load management strategies (daily, weekly, or monthly DR dispatch with minimal comfort impact to customers), and explore locational DR to avoid capital investments. For additional details regarding demand response programs, *see* BGE's EmPOWER Annual Reports. Both BESS projects also participate in PJM markets and all revenues to BGE are used to defray customer rates.

According to the company, DR programs help enable CSNA Goals 4, 6 and 9, and additional details regarding demand response programs will be included in the EmPOWER Annual Reports.

ii. BGE Battery Storage Pilots

BGE has implemented two Battery Storage Pilot projects. According to the company, these projects mitigate a system constraint identified on a 34kV feeder in southern Anne Arundel County that could experience a winter post-contingency overload of up to 3.5 MW. Specifically, if BGE were to lose two of its Marriott Hill sub-transmission circuits, both on a single right-of-way and shared pole line, customer load at three BGE substations would be transferred to an alternate Marriott Hill circuit. At peak load, this would result in the Marriott Hill alternate circuit exceeding its emergency rating. In February 2015, this contingency resulted in rotating customer load shed. To address this overload, BGE considered possibly undergrounding approximately 10 miles of one of the Marriott Hill circuits to separate the 34kV circuits on the shared pole line. BGE instead used the Chesapeake BESS (a 1MW/2MWh project owned and operated by Ameresco, Inc.), and the Fairhaven BESS (a 2.5MW/9.74MHh project owned and operated by BGE) to mitigate the system constraints and the projects went into service in 2023. Both BESS projects also participate in PJM markets and all revenues to BGE are used to defray customer rates.

According to BGE, the BESS Pilots help enable CSNA Goals 9 and 10, and detailed metrics about the Pilots are filed annually in PSC Case No. 9619.[20]

[20] *In the Matter of the Maryland Energy Storage Pilot Program,* Case No. 9619.

- Goal 10 – Increased Use of DERs, including EVs

    i. Maryland Cost Allocation Method (MCAM) Implementation

BGE notes that the implementation of Maryland's Cost Allocation Model (MCAM) in 2025 will change the DER Interconnection process from a "Causer Pays" model to support a reduction in cost obstacles for interconnections. According to the company, MCAM helps enable CSNA Goal 10. Reporting requirements for MCAM are included in COMAR 20.50.09.14C.

    ii. FERC 2222 Implementation

Implementation of FERC Order 2222 will enable smaller DERs to aggregate together and, in doing so, be able to participate directly in PJM's wholesale markets (energy, capacity, and ancillary services). BGE stated that FERC Order 2222 implementation will help enable CSNA Goal 1. BGE further notes that its MCAM proposal has not yet been filed but is under development. Reporting requirements related to FERC Order 2222 are being considered in drafts of COMAR 20.50.13.12 – Grid Services Reporting Requirements but are not yet finalized.

- Goal 11- Transparent Stakeholder Participation in ongoing Electric System Planning Processes

    i. Large Customer Service (LCS) Smart Energy Council

The BGE Smart Energy Council (SEC) is made up of a diverse group of customers from varying industries that the company invites to come together to share ideas, provide feedback on both current and future programs and initiatives, and offer suggestions on energy-related topics. The Council's purpose is to inform and educate about BGE initiatives; provide guidance to shape and develop proposals that might impact BGE's commercial customers; and obtain feedback and guidance that will assist BGE in identifying future enhancements for current products and services or creating new and innovative products and services that will support current and future business.

BGE also listed the monthly Questline Newsletter that the company uses to provide managed customers with articles of interest including articles on BGE's efforts on Path to Clean and customer projects supporting the State's goals. In addition, BGE engages community leaders through its Local Community Advisory Council (LCAC), which is a voluntary group of key community leaders across the BGE service territory comprised of neighborhood associations, faith-based organizations, representation from jurisdictions, and more. On June 28 and August 29, 2024, BGE provided the LCAC with an overview of the pilot program, the benefits of network geothermal, and the WARMTH Act requirements about which it received significant interest from community leaders. Furthermore, BGE stated that it hosted and will continue to host outreach events regarding the Brandon Shores Retirement Mitigation project. The Company reports that the LCS Programs enable CSNA Goals.

III. The PHI Companies (Pepco and Delmarva)

1. Goal 1 – Measures to decrease greenhouse emissions from the electric distribution system

i. Path to Clean Strategy

The Path to Clean strategy is an Exelon-wide quantitative and aggregate commitment to reduce Scope 1 and 2 operations-driven greenhouse gas (GHG) emissions[21] by 50 percent by 2030 from a 2015 baseline and to achieve net-zero operations-driven GHG emissions by 2050. Operations-driven emissions are those that the PHI Utilities directly control, including those associated with buildings, fleet vehicles, and the use of SF_6 insulating gas. According to PHI, in the near term, it is focusing on aspects of the business where it can directly control GHG emissions through evolved work practices, building and fleet vehicle investments, alternative fuel strategies and deployment of new and expected future technologies to meet climate goals.

The PHI companies stated that they are beginning to explore GHG offsets and recognize that they will be needed to meet the 2050 net-zero goal for emissions that cannot be otherwise reduced (currently estimated at 20 percent of the expected operations-driven GHG emission inventory in 2050). The PHI companies state that they recognize that the science and guidance around the use of GHG offsets is still emerging (with a current focus being placed on carbon removal and/or sequestration offsets).

The PHI utilities stated that they also recognize that there are opportunities to influence emissions beyond operations (Scope 3) as detailed in other sections of the report. The PHI companies also stated that they continue to work on strategies to EmPOWER customers and support communities to further reduce GHG emissions by exploring efficient grid and energy management and grid modernization technologies to minimize system losses; advance transportation electrification and efficiency as well as conservation programs for customers; and partner with communities to develop and implement clean infrastructure solutions that are accessible to all customers. PHI reported that the initiative aims to assist jurisdictions in achieving their climate and clean energy objectives by providing necessary resources and guidance. It also focuses on investing in and supporting small businesses that are addressing climate change challenges within local communities. Additionally, the strategy seeks to leverage digital solutions to facilitate the integration of clean technologies, enhancing efficiency and driving innovation in the transition to a sustainable energy future.

ii. Electric Vehicles (EVs) Discussion

PHI stated that, under Maryland's current administration, EVs registrations have increased by more than 59 percent, rising from 64,395 at the end of January 2023 to 102,530 as of April 30, 2024. With newer EV models rolling out in 2024, tax credits at point-of-sale and continued IRA incentives, continued growth is projected to reach 51 percent EV sales in the U.S. by 2030 (or 8.2 million EVs) with approximately 42 million EVs on the road (or 17 percent of all on road vehicles), according to Bloomberg New Energy Finance. PHI stated that the transition

[21] Operations-driven emissions include 100 percent of Scope 1 GHG emissions and the portion of Scope 2 GHG emissions associated with building energy use.

to EVs is instrumental in advancing the objectives of the CSNA in Maryland, particularly in achieving substantial reductions in GHG emissions. As the transportation sector constitutes one of the largest sources of GHG emissions in the state of Maryland, promoting EV adoption is critical to the CSNA's goals.

By integrating EVs with time-of-use (TOU) rates, the PHI utilities enable customers to charge during off-peak hours, helping support a cleaner, more efficient energy system. The CSNA encourages the development of extensive EV charging infrastructure, fostering economic growth through job creation while facilitating greater accessibility for Maryland residents. In addition, prioritizing EV adoption in underserved communities aligns with the CSNA's commitment to environmental justice, ensuring equitable benefits from cleaner transportation options. Furthermore, the CSNA helps support the requirements of the Advanced Clean Cars II rule, which stipulates an increased share of new cars must be electric, up to 100% in 2035.

The PHI utilities play a crucial role as partners in the adoption of EVs, contributing significantly to the development of a sustainable transportation ecosystem. By investing in and expanding the necessary charging infrastructure, the PHI utilities facilitate greater access to EV charging stations, thereby encouraging consumers to transition to EVs. PHI also stated that utilities also leverage their expertise in grid management so the electric grid can accommodate the increased demand from EV charging, integrating advanced technologies such as smart grid systems and energy storage solutions.

iii. PHI Utilities' EV Infrastructure and Incentives

This section provides an overview of the history and strategic plans surrounding EV infrastructure and rebate programs aimed at promoting EV adoption. The PHI utilities stated that they are an active member of the Commission PC44 EV Work Group in which a joint utility proposal was submitted to the Commission in early 2018 for a robust program offering electric vehicle incentives and infrastructure. The PHI utilities are also a member of the Zero-Emission Electric Vehicle Infrastructure Council (ZEEVIC), formed by legislation in 2011 to overcome barriers to EV adoption in the state. The PHI utilities engage through EVIC on coordinated EV utility marketing plans with other Maryland state agencies.

According to PHI, the initial program offerings include special time of use and whole house rates for customers with an electric vehicle as well as a discounted installation of a smart Level 2 charging station. Smart charging stations are also being proposed for workplace, multi-dwelling-unit dwellings, and community public spaces. Direct-current fast chargers (DCFC) and Level 2 chargers are also offered for strategic placement throughout the area as public access charging stations for customers and visitors. On January 14, 2019, the Commission issued Order No. 88997 approving the following offers: Utility-owned public chargers – DCFC and Level 2; discounted Level 2 chargers for multi-unit dwelling locations; discounted level 2 chargers for residential customers; $300 residential rebates for a Level 2 charger; EV rates/credits for off peak charging including a whole-house time of use rate; and a customer education and outreach fund.

In May 2021, the Commission approved the PHI utilities' provision of an off-bill credit incentive to customers who charged their vehicles during off-peak times through the Off-Peak Off-Bill Incentive. In January 2022, the Commission, through the Mid-Course Report, issued corrected Order No. 90036 approving the following program modifications: $50 annual incentive

credit for continued participation in data collection; make ready and 100% incentive for multi-unit dwelling participants; fleet calculator tool, and the Workplace Charging Rebate Program.

In August 2022, the Commission approved the modifications proposed by the PHI utilities to: increase the maximum number of enrollees from 750 to 1,500 for Pepco's $50 residential annual incentive program; increase the education and outreach budget by $100,000 - $50,000 for Pepco and $50,000 for Delmarva Power; and rebalance the overall program budget.

In September 2022, the Commission approved the consensus fleet proposals of the Exelon Utilities' as filed and reflected in Appendix B of the June 30, 2022 Fleet Subgroup Summary Report. Approval included the following: Fleet online calculator extension; fleet assessments; make-ready incentives; electric vehicle supply equipment (EVSE) incentives; education and outreach costs; and project administrative costs.

PHI stated that it filed its implementation plan on April 19, 2019, and launched its EVsmart program on July 1, 2019. Since then:

- The utilities' EVsmart initiatives have expanded their network of utility-owned and operated public EV chargers, provided EV smart charger incentives to consumers and implemented innovative EV-only TOU rates. The Maryland Exelon utilities have supplemented these state programs with federal funding for additional programs, including advancing smart charge management and deploying EV rideshare fleets and infrastructure.

- Pepco's first public charging station was completed in September 2019 in Takoma Park, Maryland. As of June 19, 2024, the PHI Utilities have commissioned 302 Level 2 (215 Pepco, 87 Delmarva Power) and 30 DC Fast Charging stations (17 Pepco, 13 Delmarva Power). In March 2023, the Commission approved the Utilities' request to extend the utility owned public charger program to December 31, 2025.

- The $300 residential rebates for a Level 2 charger, $50 annual incentive, and Off-Peak Off-Bill Incentive programs ended in 2023. As of June 19, 2024, 891 PHI Utilities residential rebates (740 Pepco, 141 Delmarva Power), 1,713 $50 annual incentives (1,557 Pepco, 156 Delmarva Power) and $49,740 in off-peak off-bill incentives ($37,045 Pepco, $12,695 Delmarva Power) were provided.

- The Discounted Level 2 chargers for Residential Customers program ended in 2023. 75 PHI Utilities' customers (62 Pepco and 13 Delmarva Power) enrolled in the program.

- The Multi-Unit Dwelling Program and Workplace Charging Rebate Program ended in 2023. As of June 19, 2024, the PHI Utilities have rebated 91 charging stations/163 ports (76 stations/144 ports Pepco, 15 stations/19 ports Delmarva Power) and continues to work with customers toward completion of an additional multi-unit dwelling station in Pepco and Delmarva Power's service territories.

- The whole-house time-of-use rate (R-PIV rate) remains available to PHI Utilities' customers. The PHI Utilities also offer a rate schedule for their public facing charging stations including a discounted fleet rate for customers that have five or more EVs registered in Maryland.

- The Fleet program offerings[22] launched August 31, 2023. As of June 19, 2024, the PHI utilities have completed one assessment (Delmarva Power), two make-ready incentives (Pepco) and one EVSE incentive (Pepco).

According to PHI, the next phase will focus on ensuring a reliable public charging infrastructure, improving load management, and offering targeted incentives for small businesses and underserved communities. Objectives include managing grid demand with load management programs and ensuring accessible, reliable public charging for those without residential options, with final proposed program details expected by December 2024.

iv. PHI Utilities' EV Fleet

As part of the Path to Clean program, the PHI Utilities stated that they are electrifying their fleet as part of its efforts to reduce GHG emissions and contribute to the state's climate goals. Maintaining a reliable vehicle fleet is a critical component of supporting the operation of a safe and reliable grid. Investments in fleet electrification is an important strategic initiative for the companies, as it helps support both Maryland's climate change initiatives as well as the companies' Path to Clean initiatives. PHI Utilities reported that they currently have a total of 432 EVs as part of their fleet.

v. Distributed Energy Resources (DER) Limits

On October 1, 2024, the PHI Utilities stated that they removed the larger DER limits by voltage class, removed the 750KW Direct Transfer Trip (DTT) requirement for DER, and removed the hard length limits of express circuit requirements from their technical interconnection requirements (TIR). All three will allow for more DER integration into the grid and allow more DER usage. In addition to these changes, the PHI Utilities stated that they are also working to enhance its public facing maps to improve the customer experience and to provide more information on grid conditions to customers prior to interconnection applications. The survey was completed in September, and the team is currently focused on internal alignment to identify which enhancement suggestions to prioritize. The plan is to finalize and implement these improvements by the second quarter of 2025. Additionally, the PHI Utilities stated that they recently revised their hosting capacity analysis methodology, which has resulted in increased feeder hosting capacity trends. As demand for renewable energy grows, an accurate and optimized hosting capacity analysis allows the utilities to assess and enhance the grid's ability to handle additional energy from decentralized sources without risking stability or reliability. This improved capacity is particularly important in meeting regulatory clean energy goals. By January 1, 2025, in accordance with COMAR 20.50.09.06P requirements, the PHI

[22] The Fleet program offerings for EVs typically refer to a set of incentives, services, or infrastructure provided by utility companies, governments, or other organizations to encourage the adoption and use of EVs in commercial or public fleets. These programs aim to reduce emissions, promote sustainability, and support climate goals.

Utilities stated that they will implement the flexible interconnection process. The PHI Utilities will post their limited export agreement on their websites to allow more DER integration.

vi. Interconnections

The PHI Utilities stated that they are committed to providing transparent, efficient, and clear processes for review and approval of interconnection to the utilities' distribution systems of proposed renewable-energy projects and other distributed energy resources (DERs).

As interconnection applications continue to accelerate in both volume and total capacity (MW) across the country, there is an increasing need to streamline the interconnection application review process to minimize delays, decrease operating issues, and improve the overall customer interconnection experience. The review process also ensures safe and reliable operation of the distribution system and that no customers are detrimentally impacted by the introduction of DERs operating in parallel with the distribution system.

The PHI Utilities indicated that they work together to identify and implement best practices in both the DER application review processes as well as effectively integrating DERs to the electric distribution systems. The following table presents interconnection data including applications received and approved, number of active systems, and number and MW of systems connected to the PHI system by the end of 2023.

Table 1: Interconnection Data for PHI Companies - Year-end 2023

	Pepco	Delmarva Power
Number of interconnection applications received/approved		
Number of Applications Received	3,924	638
Number of Applications Approved	3,756	569
Number of Active Systems and MWs Connected in 2023		
Number of Active Systems Connected in 2023	3,281	480
MW from New Systems Connected in 2023	48.029	11.183
Total Number of Active Systems and MW Connected as of December 31, 2023		
Total Connected Systems as of December 31, 2023	32,409	6,592
Total MW from New Connected Systems as of December 31, 2023	387.449	132.483

According to PHI, these metrics provide transparency by tracking the expansion of renewable energy systems and their integration into the grid. The number of interconnections received and approved reflects the growth in renewable energy projects, while the active systems and MW connected demonstrate the scale of renewable energy generation and the state's capacity to reduce carbon emissions. Cumulatively, these metrics offer a view of the state's achievements in renewable energy deployment, helping to evaluate the effectiveness of policies so Maryland remains on track to meet its climate targets.

vii. Conservation Voltage Reduction (CVR) Program

Conservation Voltage Reduction (CVR) is a strategic approach to improve energy efficiency by optimizing the voltage delivered to customers. Through CVR, the PHI Utilities stated that they reduce voltage levels to the lower end of the acceptable range while still maintaining reliable service, which results in lower overall energy consumption without affecting the performance of most electrical devices. CVR is achieved through the use of advanced technologies such as advanced metering infrastructure (AMI) voltage control systems, and real-time monitoring. CVR not only helps utilities reduce operational costs by decreasing energy demand but also benefits consumers by lowering electricity bills. The reduced energy consumption also contributes to a reduction in GHG emission, supporting broader climate objectives such as those outlined in the CSNA. By managing grid loads more effectively, CVR also enhances grid reliability, particularly during peak demand periods, reducing the need for costly infrastructure upgrades. Overall, CVR serves as a cost-effective and environmentally sustainable tool in modernizing the grid and achieving energy efficiency goals. Below is a summary of Pepco's and Delmarva Power's CVR implementation. Additional information can be found in Delmarva Power's EmPOWER Maryland Report YTD Q1 and Q2 2024 Energy Efficiency and Conservation (EE&C) and Demand Response (DR) Programs.[23]

Pepco CVR Implementation

Pepco deployed CVR beginning in August 2013 across seven substations, and soon after increased the count to 43. At the end of 2023, Pepco estimates that over 80% of its customers are served by a distribution asset controlled by CVR. Pepco operated CVR on 43 substations serving approximately 428,654 customers during Q1/Q2 2024. When capped at 20% of YTD reported portfolio savings, the reported savings for this program are 16,272 MWh of energy for the year. However, without the 20% cap, this program saved 53,852 MWh of energy for the year.

Delmarva Power CVR Implementation

Delmarva Power shares the same assumptions and methodologies with Pepco, but a smaller share of its distribution circuits is controlled by CVR due to the more rural nature of the service territory. Delmarva Power operated CVR on 41 substations serving approximately 68,947 customers during Q1/Q2 2024. When capped at 20% of YTD reported portfolio savings, the reported savings for this program were 6,451 MWh of energy for the year. However, without the 20% cap, this program saved 8,290 MWh of energy for the year.

2. Goal 2 – Giving Priority to Vulnerable communities in the development of distributed energy resources (DERs) and electric vehicle infrastructure

The PHI Utilities stated that they invest in communities in a way that advances equity and affordability and supports economic development and environmental and sustainability goals in the jurisdictions they serve. Successful inclusion of low- and moderate-income (LMI) households in electrification efforts will require strong collaboration between Maryland utilities, the Department of Housing and Community Development (DHCD), and the Maryland Energy Administration (MEA). These stakeholders must work together to effectively deploy state and

[23] See Case No. 9705 (Mailllog No. 311713).

federal funding opportunities, especially those from the Inflation Reduction Act of 2022 (IRA), which offers incentives for EVs, home electrification, and energy-efficient appliances.

According to the PHI Utilities, as of the August 15th filing, MEA had not yet advanced to the point of discussing integration of IRA programs. Moving forward, the focus should be on aligning federal funds with state programs to ensure LMI households can access available resources. This will involve targeted outreach, streamlined application processes, and coordination with community organizations to raise awareness and facilitate participation. Additionally, utilities will need to invest in infrastructure and grid upgrades to accommodate increased electrification in these communities. By aligning federal and state resources, Maryland can ensure that LMI households benefit from the transition to clean energy.

i. Pepco's Strategies to Promote Electrification to LMI Households

The PHI Utilities stated that Pepco employs targeted strategies to promote electrification among (LMI) households, aiming to make clean energy more accessible and affordable for these communities. One key approach is providing rebates and financial incentives to help offset the upfront costs of electric technologies, such as heat pumps and electric water heaters, which can otherwise be a barrier to adoption for LMI households. According to PHI, Pepco also partners with local organizations to increase awareness of energy efficiency programs and the benefits of electrification, including reduced emissions and improved indoor air quality. To address bill impacts, Pepco integrates load management initiatives, such as TOU rates and Smart Charge Management for electric vehicle charging, which encourage off-peak usage and help customers avoid higher energy costs. In addition, Pepco offers energy efficiency education and resources that help customers manage and reduce their energy consumption, maximizing the cost savings potential of electrification technologies. Through these strategies, Pepco supports equitable access to clean energy solutions while working to minimize the financial burden on LMI customers, advancing both sustainability and affordability goals.

ii. Delmarva Power's Strategies to Promote Electrification to LMI Households

PHI stated that equity in Maryland's energy transition is critically important to Delmarva Power. Given the myriad impacts of climate change on the state, the challenges of high energy burdens on LMI households, and the health and energy benefits of heat pump adoption, Delmarva Power recognizes that LMI households must not fall behind in building electrification.

Delmarva Power has proposed an EJ incentive bonus for its electrification measures that is designed to specifically encourage participation from communities that carry a disproportionate energy and environmental burden. Although Delmarva Power does not directly target limited income customers, in alignment with DHCD's approach, EJ bonuses are designed to address the complex interactions between housing and environment that can create increased burdens. These bonuses, along with significantly higher incentives for electrification overall (as compared to non-fuel-switching incentive levels), are designed to help offset incremental costs for heat pumps and limit the impacts from increased electricity costs that may be applicable in certain situations.

iii. Climate Change Investment Initiative

Since 2019, the Exelon Foundation and Exelon Corporation have been growing the $20 million Climate Change Investment Initiative (2c2i) to cultivate innovative climate-solution startups. 2c2i portfolio companies are developing and deploying new technologies and products to reduce GHG emissions and address climate change in Exelon's territories. The 2c2i program blends the social and environmental impact objectives of the Exelon Foundation with the investment objectives of venture capital by investing in startups that focus on climate change, clean energy and the environment. Under 2c2i, the Exelon Foundation will invest $10 million in startups over 10 years and Exelon Corporation will provide those startups with up to $10 million of in-kind services, such as access to Exelon networks and expertise to scale their businesses. At the end of 2023, 66 percent of Exelon Foundation's 2c2i investments were in minority and women-led startups and 41 percent were headquartered in a city in Exelon's footprint.

3. Goal 3 – Energy Efficiency

PHI stated that energy efficiency plays a critical role in CSNA, as it is a key strategy for reducing GHG emissions and achieving the Act's climate goals. By improving energy efficiency, PHI can help lower overall energy consumption, reduce the demand for electricity generation, and decrease reliance on fossil fuels. This reduction in energy demand not only helps to cut GHG emissions but also supports the transition to a cleaner, more sustainable energy grid.

PHI noted that encouraging the adoption of energy-saving technologies and practices among residential, commercial, and industrial customers is critical. These programs may include rebates for energy efficient appliances, lighting, and HVAC systems, as well as incentives for building retrofits and improvements. In addition, demand-side management initiatives help balance energy usage during peak demand periods, reducing the need for additional power generation and lowering emissions. Ultimately, energy efficiency not only helps electric distribution utilities meet regulatory requirements under the CSNA but also enhances grid reliability, lowers costs for consumers, and contributes to a sustainable energy future.

i. EmPOWER Maryland (EmPOWER)

The passage of HB864 in the latest legislative session marks a pivotal shift for the EmPOWER Maryland program, transitioning its focus from reducing electricity demand to cutting GHG.

Pepco's EmPOWER Portfolio - PHI reported that Pepco's total EmPOWER portfolio reported 97,632 MWh energy savings in the first half of 2024.[24] The reported energy savings made up 33.5% of the 2% annual savings mandate of the EmPOWER program and 32.6% of forecasted energy savings for the first half of 2024. The savings in the first half of 2024 were achieved using 20% of the total annual energy efficiency and demand response budget. PHI also stated that Pepco's residential energy efficiency portfolio in the first half of 2024 reported 48% of the total energy savings. Energy savings from their commercial and industrial energy

[24] Potomac Electric Power Company - its EmPOWER Maryland Report YTD Q1 and Q2 2024 Energy Efficiency and Conservation (EE&C) and Demand Response (DR) Programs. Case No. 9705 (Mailllog No. 311718) page 1.

efficiency portfolio made up 34% of total gross energy savings. Other programs, including CVR and demand response, made up 18% of total savings. Pepco utilized 27% of the annual residential portfolio budget and 18% of the annual commercial and industrial portfolio budget.

PHI stated that Pepco reported a total of 123,212 metric tons of lifecycle CO_2 emissions in the first six months of 2024.

Delmarva Power's EmPOWER Portfolio - PHI reported that, between January and June 2024, Delmarva reported electricity savings of 38,706 MWh, 46% of the 2% EmPOWER electricity savings target, and 43% of the predicted energy saving for the year. Twenty-eight percent (28%) of the total 2024 EmPOWER portfolio budget was spent in the first half of 2024. Delmarva reported that the residential portfolio resulted in 8,501 MWh electricity savings, 22% of total savings in the reported period. The commercial and industrial portfolio reported 60% of total electricity savings, amounting to 38,706 MWh. Demand response programs saved 48 MWh in 2024. Other programs such as CVR accounted for 6,749 MWh, 17% of total energy savings. Twenty-six percent (26%) of the 2024 residential portfolio budget was expended in the first half of 2024, while 31% of the commercial and industrial portfolio budget was expended. For demand response programs, 14% of the annual budget was expended in the first half of 2024.

Delmarva Power reported a total of 70,866 metric tons of lifecycle CO_2 emissions in the first six months of 2024.

4. Goal 4 – Meeting Anticipated Increases in Load

PHI noted that the electric grid is becoming more complex as centralized, fossil-based generators are replaced by renewable, inverter-based resources, such as solar PV. The inherent variability of renewable generation introduces uncertainty to electrical power system operations that can challenge grid stability. New models capable of leveraging real-time data from advanced monitoring and communications infrastructure to ensure grid reliability and resilience can help with uncertainty. PHI further noted that an Advanced Distribution Management System (ADMS) plays a key role in meeting Goal (4) of the CSNA, which is to address anticipated increases in load. ADMS enables utilities to manage and optimize the distribution grid more effectively as demand grows, especially with the rising adoption of EVs, heat pumps, and other electrification measures.

i. Management of Growing DERs

PHI stated that the increasing adoption of DERs among customers highlights the need for Advanced Distribution Management Systems (ADMS), which are essential for enabling the seamless integration and management of these decentralized energy sources. PHI also notes that ADMS is fundamental to enabling a Distributed Energy Resource Management System (DERMS) by providing essential real-time visibility, automation, and control capabilities across the distribution grid. ADMS integrates data from grid assets, allowing DERMS to monitor and manage distributed energy resources (DERs). In 2023, the ADMS project deployed for production use Release 1 – SCADA and executed design work for Release 2– OMS (Outage Management System)/DMS (Distribution Management System)/SOM (Switch Order Management). The ADMS project full implementation is scheduled to be completed in 2027.

Exelon's "Renewable-Aware" project, funded with $100 million through the DOE's GRIP Program, is designed to enhance grid resilience and clean energy integration. This initiative will deploy technologies such as Distributed Energy Resources Management Systems (DERMS) and Unbalanced Load Flow (UBLF) tools to optimize renewable energy use and improve grid reliability, with a focus on underserved communities. PHI stated that Exelon's project is part of a national push to strengthen grid infrastructure and advance sustainable energy solutions across vulnerable regions.

ii. 10-year Distribution Capacity Plan

The PHI Utilities noted that planning for future load growth starts with the development of load growth projections. A forward-looking, 10-year peak load forecast is developed and maintained for each distribution system component such as feeders, substation transformers, and substations to plan for longer duration projects. Short-term, summer-peak forecasts are developed for three years to address the more frequent changes from new building construction and customer load growth that occurs across the distribution system in the shorter-term. Long range forecasting is used to develop advance plans for longer duration projects or construction projects that require more than two-three years to complete, and to identify future capital projects in the construction budget forecast process.

According to PHI, forecasting begins with the examination of the summer historical loads for each feeder and substation on a two-year cycle. Furthermore, actual new customer loads from submitted class of service forms and other available development reports, planned changes in feeder configuration and emergency transfers, and reductions due to DERs are also analyzed. The individual feeder and feeder group loads for each year are calculated and adjusted to produce the substation load predictions for each year of the plan.

The PHI Utilities currently use a forecasting software package that compares the historical weather patterns for the previous year against a 30-year record of weather patterns. Feeder and substation loads during the summer and winter periods are adjusted to match the values expected during temperature extremes projected to occur once in a 10-year period. These historical values are projected by the program into the upcoming 10-year period by adding new customer load requests submitted by the developers and anticipated area growth trends beyond the submitted requests, including anticipated electric vehicle charging loads and fossil fuel heating system conversions. The forecasted loads do not include prospective electrification projects driven by legislative actions that have not been finalized. The program also incorporates the anticipated load reductions anticipated from DER submittals, DER predicted installations, and general demand response commands. The planners review these before case load projections for predicted overloads of the feeders and substations and use the program to identify likely corrective actions, including non-wire alternatives, which can be used to relieve the facility overload for several years. These types of measures can reduce the peak power demand but will increase energy use on the feeder or substation during off-peak periods, which must be analyzed to assure proper operation of the distribution system throughout the following day.

iii. DER and Load Forecasting System Project

The Distributed Energy Resources and Load Forecasting (LF) System Project is the deployment of an advanced distribution planning system, intended to meet the evolving needs of

the distribution grid as Maryland transitions to a more electrified and decarbonized future. According to PHI, the project will introduce an advanced and customized forecasting software package across each Exelon company.

The PHI Utilities' existing forecasting tool has been used to produce long-range, peak forecasts for over five years. This package introduced software-based, weather normalized forecasting and allowed greater integration of DERs and energy efficiency metrics into long-range plans. The Distributed Energy Resources (DER) and Load Forecasting (DERLF) System Project and its novel software will allow for: greater input hourly load shape processing, data cleaning and weather normalization; typical load year models and customer profile generation; spatial load allocation, regional growth and technology adoption calculations; scenario based planning and forecast flexibility for jurisdictional and technical targets; and DER projections and long-term impacts, optimal mix outputs and DER benefit-cost analyses

These initiatives will allow the PHI Utilities to better integrate AMI and SCADA data sources to produce hourly forecasts, predict localized weather impacts, observe projected impacts of regional growth and DER adoption and provide more accurate forecasts. PHI stated that leveraging these advanced capabilities creates an intelligent forecasting system that understands future grid constraints and informs potential solutions. This intelligent forecasting is essential for achieving many of the CSNA goals. The DERLF project is currently in the development and testing phase, with an expected launch in 2025.

5. Goal 5 – Incorporation of Energy Storage Technology as appropriate

PHI stated that Wood Mackenzie projected that DERs—including distributed solar, storage and flexible loads—will comprise up to 49 percent of total U.S. capacity additions from 2022 to 2027. The outlook estimated that solar will represent 46 percent of DER capital expenditures and EVs 26 percent. Meanwhile, third-party companies are introducing tools to aggregate DER in a manner that can benefit the grid, customers and operations.

The price of energy storage technologies has been dropping rapidly, and increased use of energy storage is anticipated by customers, other parties, and utilities. PHI stated that energy storage systems can be installed in a variety of configurations, each of which will have different impacts and implications for the distribution grid. Various technical and regulatory issues will need to be addressed to provide safe and reliable integration of energy storage systems into the distribution grid in an efficient manner to not inhibit growth in energy storage development.

The PHI Utilities stated that they are actively seeking opportunities to site and implement energy storage where it makes sense to mitigate a power quality issue, increase reliability, increase hosting capacity or load factor on a distribution feeder(s) or to defer the need for capacity.

Pepco and Delmarva Power, along with BGE, are participating in the PC 44 Maryland Energy Storage Initiative (MESI) Working Group which is considering issues relating to energy storage deployment in Maryland. Pepco and Delmarva Power both supported the Energy Storage Pilot Project Act (HB650/SB573), which passed during the 2019 legislative session and was signed into law. Pepco and Delmarva Power proposed a total of four pilot storage projects through an April 15, 2020 joint filing with BGE to the Commission.

Each of the four pilot project proposals represents a different storage business model, as described in the Energy Storage Pilot Project Act. Approval to proceed with the pilot projects was issued on November 6, 2020. Each of the four pilot projects have vendor contracts signed and design initiated. Two of the four projects are in service as of June 2023, one in each utility's service territory.

i. Pepco's Energy Storage Projects

There are two Pepco BESS projects: the Fairmount Heights Microgrid Project in Prince George's County and the Brookville Bus Depot Project in Montgomery County.

1) Fairmount Heights Microgrid Project in Prince George's County

The Fairmount Heights Microgrid Project is a 227.4kW/292.2kWh utility-owned/-operated BESS in Prince George's County. According to PHI, the Fairmount Heights Microgrid project is a forward-looking energy infrastructure initiative focused on enhancing energy resilience and sustainability for the local community. This microgrid will serve as a reliable, decentralized energy system capable of operating independently from the main grid, thereby providing critical backup power during outages and reducing reliance on traditional energy sources. By integrating renewable energy technologies—such as solar panels and battery storage—the microgrid is designed to support clean energy goals and reduce greenhouse gas emissions, aligning with Maryland's broader environmental and resilience objectives.

PHI also stated that the Fairmount Project aims to support equitable access to clean energy by improving energy reliability and stability within Fairmount Heights, which is particularly important for underserved communities that may experience higher vulnerability to power disruptions. In addition to bolstering grid resilience, the microgrid provides economic and educational benefits to the community. It fosters local job opportunities in installation and maintenance while creating a platform for educational programs to promote community awareness around clean energy technologies. As one of the pioneering microgrid projects in Prince George's County, the Fairmount Heights Microgrid serves as a model for sustainable, community-focused energy solutions and demonstrates the potential for localized renewable energy systems to strengthen both environmental and social outcomes. MEA provided a $200,000 grant to a partnership between Pepco and Emera Technologies for this project. The initiative aims to establish a community solar and battery energy storage system to serve six low-to-moderate income households. The Fairmount Heights Project is projected to be operational by March 31, 2025.

2) The Brookville Bus Depot Project in Montgomery County

The Brookville Bus Depot Project is a 1 MW/3 MWh third party-owned/third party-operated project at the Brookville Bus Depot in Montgomery County, which went into service in October 2022. The Depot Project is a significant initiative aimed at enhancing sustainable public transportation infrastructure. As an essential hub for the county's transit system, the depot will support the storage, maintenance, and charging of an expanding electric bus fleet. According to PHI, this infrastructure is crucial as the county works to reduce emissions and transition toward cleaner energy sources, aligning with both Montgomery County's and Maryland's environmental goals.

A key focus of the Brookville Bus Project is the development of electric bus infrastructure, with charging stations and energy management systems tailored to accommodate a fully electric fleet over time. The shift toward electric buses aligns with broader sustainability objectives, reducing GHG emissions and fostering environmentally responsible transit options. According to PHI, the depot project enhances operational efficiency for public transportation services in the region, with dedicated space for bus storage, maintenance, and refueling. This improved infrastructure supports reliable, timely bus services, directly benefiting Montgomery County residents. PHI noted that, beyond operational benefits, the Brookville Bus Depot project also has a positive impact on the community, creating jobs in both construction and long-term facility operations. It also plays a critical role in strengthening the county's transit offerings for residents, particularly those who rely on public transportation. PHI asserts that this project is a model for sustainable urban transit infrastructure, representing a forward-looking investment in public transportation aligned with state and county environmental initiatives.

ii. Delmarva Power's Energy Storage projects

Delmarva Power has two energy storage projects, the Elk Neck Virtual Power Plant (VPP) and the Ocean City BESS.

1) Elk Neck Virtual Power Plant (VPP)

The Elk Neck VPP is a 0.5 MW/1.5 MWh virtual power plant (aggregated BTM residential batteries) that is a third party-owned-/ third party-operated project at Elk Neck, an isolated peninsula in the Chesapeake Bay. The Elk Neck VPP that went into service in July 2022.

According to PHI, the Elk Neck VPP is an innovative energy project designed to enhance grid reliability and support the integration of renewable energy in Maryland. This project leverages advanced technology to create a network of DERs, including residential solar panels, battery storage systems, and smart thermostats, which can be aggregated and managed as a single, flexible resource. By coordinating these individual systems, the Elk Neck VPP enables the region to optimize energy use, reduce demand during peak periods, and provide backup power during outages, thereby improving the overall resilience and efficiency of the grid.

PHI further notes that this project plays a critical role in advancing Maryland's clean energy goals by facilitating the integration of renewable energy sources, such as solar power, into the grid while minimizing the environmental impact of conventional energy production. It also offers economic benefits to participating homeowners by providing incentives for the installation of DERs and enabling them to potentially earn revenue through demand response programs. The Elk Neck VPP aligns with Maryland's commitment to creating a more sustainable, decentralized energy system and provides a scalable model for future VPP initiatives across the state, enhancing energy security and driving the transition to a cleaner, more resilient power grid.

PHI stated that the Elk Neck VPP was installed in Delmarva's northeast Maryland region to increase the electricity reliability for the end users on the peninsula. PHI further states that the VPP and the batteries within it have proven for the better part of 2.5 years that the reliability for the critical loads of each of the residences has been significantly improved.

The Elk Neck VPP pilot project is a good demonstration of the benefits of incorporating energy storage technology to support the reliability of the electric system. During 2023, varying

combinations of the batteries at the 110 customer locations were triggered due to loss of power 467 times, totaling 96,600 minutes of backup power supplied. Delmarva Power Maryland feeders MD 3454, 3484 & 3487 supply the customers at the VPP. PHI stated that the battery usage resulted in an overall CAIDI (Customer Average Interruption Duration Index) benefit of 85.39 outage hours saved. Furthermore, PHI stated that the battery usage resulted in an overall SAIFI (System Average Interruption Frequency Index) benefit of 17 outages and SAIDI (System Average Interruption Duration Index) benefit of 38.41 outage hours saved. In 2023 across all three feeders, on average the batteries prevented an additional 17 outages on the system, ~ 38hrs of power on the system as well as an additional ~85 hrs of power per customer.

2) Ocean City BESS

The Ocean City BESS Project is a utility owned and operated storage facility with a capacity of 1 MW with an energy output of 3.0 MWh over the lifetime of the project. According to PHI, the Ocean City Project is aimed at enhancing the reliability and efficiency of Maryland's energy grid while supporting the state's transition to renewable energy. Located in Ocean City, Maryland, the BESS is designed to store excess energy generated by renewable sources, such as solar and wind, and discharge it during periods of high demand or when renewable generation is low. This system helps to stabilize the grid by providing quick-response backup power, reducing the need for traditional, fossil fuel-based peaking power plants.

PHI stated that by integrating energy storage with renewable generation, the Ocean City BESS not only improves grid reliability but also contributes to reducing carbon emissions and advancing Maryland's clean energy goals. PHI further states that the Ocean City BESS enables a more flexible, resilient grid capable of incorporating a higher share of renewable energy, which is essential for meeting the state's ambitious climate targets. The project also benefits local communities by providing energy security, particularly during extreme weather events or other grid disruptions. As a part of Maryland's broader strategy to modernize its energy infrastructure, the Ocean City BESS represents a significant step toward building a more sustainable and reliable energy future for the state. According to PHI, the project does not defer any distribution upgrades but is expected to provide peak shaving capabilities during periods of high winter or summer loads and during emergency grid conditions, reducing the number of customer outages. The project will however support a public library in the Ocean City area that will serve as a resiliency center for the community. PHI noted that when the project is not providing peak shaving benefits, it will participate in the wholesale market.

The Ocean City Project was originally projected to be operational in February 2022, but was granted two extensions by the Commission, first to December 2023 and then to December 2024. The Ocean City Project is now projected to be operational by April 30, 2025.

iii. Hosting Capacity

The PHI Utilities stated that they currently publish a hosting capacity map which is updated monthly that provides information on how much solar generation can be added to a network area or radial feeder before the grid reaches its capacity without needing significant system upgrades to address system constraints. The map displays the sum of the remaining capacity in kW. The capacity is based on feeder constraints not being violated and accounts for in-service and approved DERs on each feeder.

The PHI Utilities stated that they update the hosting capacity map monthly and have added timestamps to the feeder profiles to inform customers of the most recent updates, enabling them to make informed pre-application decisions. Territory boundaries have been added to the hosting capacity maps so developers can be guided on which jurisdiction they should send their applications for customers that are around cross border feeders. In August 2024, the PHI Utilities held a consultative meeting with developers on public facing maps enhancements, among other suggestions and are working on making additional enhancements on the maps to improve the developers' experience.

The PHI Utilities recently implemented new Hosting Capacity analysis calculations which includes a new methodology of reserving hosting capacity on feeders for small DERs. These measures have had the effect of significantly increasing the hosting capacity on each feeder thereby allowing larger DERs to interconnect without upgrades.

The PHI Utilities stated that they provide distribution system restricted circuit and/or hosting capacity maps to build awareness about locations on the systems with sufficient capacity for more renewable energy. Going forward, the PHI Utilities stated that they will refine these tools to provide even more useful information to customers, including augmenting distribution map resources with information on EV charging and battery storage. The hosting capacity map gives an indication of how much generation (expressed in kW) can be added to a feeder before the feeder reaches capacity or other limitations that reduce the reliability of service to electric customers on the feeder. Although the values are meant to provide the user with a general idea of availability, space on the desired feeder is not guaranteed and/or may change at any time. All applications for interconnection will still require a full review and may also require additional interconnection costs.

6. Goal 6 – Efficient Management of Load Variability

The increased integration of variable renewable energy sources like solar and wind power necessitates strategies to balance supply and demand. PHI states that managing load variability is crucial for maintaining grid stability, preventing disruptions, and ensuring a reliable power supply. Additionally, optimizing energy consumption through demand response and other measures can lead to significant cost savings for both consumers and utilities. Finally, by reducing overall energy consumption and enabling the electrification of transportation and buildings, efficient load management contributes to greater resource efficiency and reduced environmental impact.

i. PHI Utilities' Managed Charging Program

PHI stated that managed charging programs play an important role as EV adoption continues to gain traction, and utilities across the country are conducting research and hosting pilots to learn how to maximize grid and customer benefits. In the summer of 2020, DOE awarded funding to Exelon for three of their Maryland operating utilities - BGE, Delmarva, and Pepco—to carry out their Smart Charge Management (SCM) pilot program. The objective of this project is to research, develop, and conduct a widescale demonstration of a utility SCM system to determine optimal managed charging structures for grid value, assess the impact of EV charging on local distribution utility operations, and evaluate the utilities' ability to control EV charging load based on grid conditions.

PHI noted that the program seeks to: understand and reduce grid impacts of EV charging on the utility's distribution and transmission systems; lessen Exelon customers' capital investment required to manage EV charging demand as EV ownership grows; identify potential cybersecurity risks and vulnerabilities of EVSEs and vehicle telematics software; design managed charging plans for residential, commercial, and public customers that can be shared industry wide. According to PHI, the early findings of this project indicate that leveraging research and customer feedback to build and amend managed charging programs will ultimately lead to a flexible program that meets driver and grid needs. Additionally, project partners recommend performing internal functional testing to ensure that the DR events will occur as intended before customers participate in a managed charging program. The team also found that automating program functions and proactively mitigating potential cybersecurity vulnerabilities maximizes efficiency, security, and scalability of the program.

The automation of EV charging to maximize benefits for the EV drivers and the grid is a technology that is still evolving conceptually and technically. By spearheading this pilot program now, the PHI Utilities stated that they can derive learnings at a micro level, make any necessary adjustments, and then implement a full-scale managed charging program upon the pilot's conclusion in 2024. The findings have been positive and will lend themselves to a program that will be beneficial for both the utility and their customers. During Phase 2, the project team will conduct the second year of the managed charging demonstration. At the end of the Phase 2, the team will share a detailed report of results from customer behavioral analysis and the quantification of the benefits of demonstration.

ii. Time of Use Rate (TOU) Plan Pepco

Pepco's residential TOU rate plan for electric vehicle (EV) owners allows customers to reduce their electricity bills by charging EVs during off-peak hours, when demand is lower and rates are cheaper. This rate structure encourages EV charging at night or on weekends, promoting efficient energy use and supporting grid stability. By shifting energy use to off-peak times, participants can save money while also helping to reduce peak load on the grid. For more information, please visit Pepco's TOU Rate page.

iii. Time of Use Rate (TOU) Plan Delmarva Power

Delmarva Power's TOU Rates in Maryland provide a strategic approach for residential customers to manage energy costs and contribute to grid efficiency. Through this program, electricity prices vary throughout the day based on demand, with lower rates offered during off-peak times, such as early morning and late evening, and higher rates during peak periods when demand is highest. This structure encourages customers to shift energy-intensive activities—like running appliances or charging EVs—to times when electricity is less expensive.

By adjusting their energy usage patterns, customers can reduce their monthly bills and ease pressure on the electric grid, helping to support reliability and sustainable energy practices. Additionally, by lowering peak demand, the TOU program promotes a cleaner energy future, as it enables a more balanced grid capable of incorporating renewable energy sources. This rate structure empowers Delmarva Power customers to take control of their energy expenses while supporting Maryland's environmental and energy efficiency goals.

7. Goal 7 – Electric System Resiliency and Reliability

i. Reliability

Reliability and resiliency are critical to effectively implementing the CSNA, as they provide a stable and dependable energy supply while facilitating the integration of renewable energy resources. Reliability guarantees that consumers have continuous access to electricity, which is essential for supporting economic activities and maintaining public trust in the energy system. Resiliency, on the other hand, enables the grid to withstand and quickly recover from disruptions, such as extreme weather events or cyberattacks, which are increasingly relevant in a changing climate. While reliability and resiliency will be discussed separately, it is important to note that they are interrelated; a reliable grid enhances resiliency by providing a solid foundation for integrating diverse energy sources, while a resilient infrastructure ensures that reliability is maintained even in challenging circumstances. Together, they are vital for achieving the ambitious climate and energy goals set forth in the CSNA.

PHI stated that widespread reliability is more important to customers than ever given increasingly frequent storm activity, the post-pandemic hybrid work environment, and the increased local, regional, and national expectation of overall electrification to enable a cleaner carbon-free future. The CSNA emphasizes reducing GHG emissions and accelerating the adoption of renewable energy sources, which depend on the seamless integration of variable generation like solar and wind. A reliable grid guarantees that PHI Utilities can manage these renewable sources efficiently, maintain stability, and prevent outages that could undermine the progress toward climate goals. Additionally, strong reliability supports customer trust, COMAR 20.50.12.02 regulatory compliance, and the long-term viability of sustainability initiatives, reinforcing the utility's role in meeting both environmental objectives and public expectations for continuous service.

According to PHI, the improvements in reliability performance based on data excluding major outage events under COMAR exclusion data criteria provides evidence that customers are continuing to benefit from reliability investments. On average, customers are now experiencing fewer outages and better restoration times than in the past.

Reliability in Maryland is measured primarily through two key performance indicators: SAIFI (System Average Interruption Frequency Index) and SAIDI (System Average Interruption Duration Index). SAIFI measures the average number of interruptions a customer experiences over a given period, reflecting the frequency of service disruptions. SAIDI, on the other hand, measures the total duration of interruptions that a customer experiences, providing insight into the length of outages. Together, these metrics are critical in evaluating the reliability of an electric utility's service, as they highlight both the consistency and duration of power delivery. In Maryland, utilities are required to track and report these indices to ensure they meet regulatory standards and deliver dependable service to customers. Pepco and Delmarva Power have met or exceeded their reliability SAIFI and SAIDI COMAR requirements. PHI stated that, since 2021, both Pepco and Delmarva Power are also in the top quartile of their electric utility peers for reliability.

Pepco has implemented automated switching technology across Maryland’s grid, enabling the system to automatically reroute power around faults and minimize outage times. PHI asserts that this technology has been effective in responding to localized outages, allowing

crews to identify and address issues more swiftly. Furthermore, Pepco has smart meters for Maryland customers, which aid in quickly detecting outages and providing real-time data to support faster restoration efforts. Pepco and Delmarva Power have over 1.6 million smart meters installed and activated for over the air meter reading, remote provisioning and interval data provided to customers via My Account.

ii. Resilience

Resilience is a key focus of the CSNA, as it helps Maryland's energy infrastructure withstand and recover from the growing impacts of climate change, such as extreme weather events and rising sea levels. The Act emphasizes strengthening the grid through investments in technologies like energy storage, microgrids, and grid modernization, which improve reliability and support renewable energy integration. By prioritizing resilience, the Act protects vulnerable communities and enables the state to meet its clean energy goals while maintaining grid stability and public safety.

PHI notes that the Commission ordered stakeholders to initiate a workgroup to consider the implementation of resiliency standards and objectives, metrics by which to measure the effectiveness of resiliency investments, resiliency reporting requirements and the penalties for failure to meet the agreed upon resiliency standards.[25] The workgroup is preparing to submit an interim report in December 2024, with the goal of filing the final report by June 2025.

8. Goal 8- Bidirectional Power Flows

PHI noted that bi-directional power flows are crucial as they directly support enhanced grid reliability and resilience. Unlike traditional one-way power flows, bi-directional systems allow electricity to flow both to and from the grid, enabling greater integration of DERs such as rooftop solar, battery storage, and EVs. DER integration is critical to reducing the dependence on centralized fossil fuel based power generation. Moreover, bi-directional flows contribute to the grid.

i. PHI Utilities' Distributional System Enables Bidirectional Power Flows

PHI stated that its utilities already enable bi-directional energy flow and are now evaluating ways to provide additional capability and support to accommodate bi-directional energy flows onto the grid. The utilities recognize the advantages of a bi-directional grid in maximizing the value of DER on the grid. Accordingly, the PHI Utilities stated that they are investing in the technologies that will accommodate bi-directional flow, allowing real and reactive power to be exchanged at an interface between customer-to-utility without compromising system reliability, safety or power quality.

Pepco's ability to accommodate bi-directional flow on underground networked feeders

According to PHI, on underground networked feeders within the Pepco electric distribution system, the ability to accommodate bi-directional flow is dependent on the load within the network and the aggregated size of the DER systems within the network. Interconnection to network systems, which are designed to enhance reliability through redundant

[25] See Case No. 9702. Order No. 91181.

service, present a greater challenge with respect to bi-directional energy flow when compared to radial interconnections because reverse power can result in disconnection from the grid and the loss of service. Prevention of reverse power in network protectors is essential to avoid loss of grid connections serving network load. For larger systems connected to networks, telemetry is needed to support feeder monitoring and service status.

For most PHI Utilities' feeders and substations, the ability to accommodate bi-directional flow depends on the equipment used to regulate voltage and the Distribution Automation (DA) equipment used to maintain system power quality and reliability. To maintain acceptable voltage along the feeder, regulators, capacitors, and substation load tap changers are generally not allowed to accommodate bidirectional flow unless the equipment is specifically designed for that function. Likewise, to maintain system reliability, substation transformer relays, substation feeder relays, and recloser driven DA schemes generally are not allowed to accommodate bi-directional flow unless they are specifically designed for that function. Finally, large bi-directional flows will increase the capacity factor of equipment such as power transformers or underground cables. While this increase in capacity factor results in better equipment utilization, it will result in de-rating the equipment's normal and emergency power ratings because the PHI Utilities pro-rates equipment when the 24-hour energy utilization is higher than manufacturer recommended nameplate ratings.

PHI states that, despite these challenges to bi-directional flow, the PHI Utilities seek to identify opportunities to upgrade the electric distribution system via customer- or utility-funded projects. The PHI Utilities can upgrade regulators and capacitors to make the equipment bi-directional and their control systems capable of regulating voltage appropriately in both directions. At some substations the PHI Utilities have upgraded Load Tap Changer (LTC) controller and relay protection equipment on the distribution substation power transformers to accommodate up to 40% of reverse power flow without significantly de-rating the transformers' normal and emergency rating.

From a DA and secondary network standpoint, the PHI Utilities require and use DER remote monitoring, as well as remote monitoring of reclosers and network protectors, to promote bidirectional flow without decreasing the reliability of the DA system and secondary networks. The PHI Utilities are also investigating increasing bi-directional penetration on its distribution system by improving electrical models (inclusive of DERs and their facility equipment) that could be used to conduct planning and system protection analysis. The PHI Utilities are considering opportunities to standardize and develop these types of electrical models that could enable a more optimized and less conservative approach when evaluating hosting capacity and technical impacts of bi-directional flow.

9. Goal 9 – Demand Response and other Non-Wire and Non-Capital Alternatives

Demand Response (DR) and other non-wire and non-capital alternatives are pivotal in enhancing grid reliability and reducing the need for traditional infrastructure investments, and the DRIVE Act and CSNA emphasize the integration of these alternatives as key components of a sustainable and resilient energy future. DR programs incentivize customers to adjust their energy usage during peak demand periods, helping to alleviate grid stress without additional infrastructure. Similarly, non-wire alternatives (NWAs), such as energy storage, distributed generation, and energy efficiency measures, offer cost-effective, environmentally friendly

solutions that reduce the need for costly grid upgrades. By advancing these strategies, the PHI Utilities can align with climate goals, promote renewable energy integration, and improve overall grid resilience.

i. Demand Response

In 2023, the Commission approved the PHI Utilities' Energy Efficiency and Demand Response programs for the 2024–2026 EmPOWER Maryland cycle. Pepco and Delmarva Power filed comprehensive EmPOWER plans in August 2023, which included customer incentives and rebates for transportation and building electrification.

Demand Response (DR) programs are operated by PJM and/or utility companies to elicit energy savings to reduce demand during an emergency and provide customers with opportunities to save money by curtailing usage. Energy efficiency (EE) programs available to customers are designed to lower overall energy consumption and reduce peak demand. Some of these programs are administered by utility companies, typically pursuant to state utility commission-approved plans, while other programs are administered by external agencies. Dynamic Pricing programs provide residential customers the ability to receive a bill credit for reducing use during critical peak hours as called by the utility.

Demand Response Pepco

Pepco has been implementing both dispatchable and non-dispatchable demand response initiatives to lower overall peak demand through its Energy Wise Rewards and Peak Energy Savings Credit programs. According to PHI, since 2020, Pepco has initiated 13 demand response events. The company currently has approximately 230MW of dispatchable load and has awarded more than $9 million annually in participation rebates. These demand response programs are working to reduce Pepco's peak demand during critical times to the system.

Demand Response Delmarva Power

Like Pepco, Delmarva Power has been implementing both dispatchable and non-dispatchable demand response initiatives to lower overall peak demand through its Energy Wise Rewards and Peak Energy Savings Credit programs. Since 2020, Delmarva Power has initiated 11 demand response events. The company currently has approximately 39MW of dispatchable load and has awarded more than $1.7 million annually in participation rebates. These demand response programs are working to reduce Delmarva Power's peak demand at times critical to the system.

ii. Distributed Renewable Integration and Vehicle Electrification Act (DRIVE Act)

Maryland has recently passed the Distributed Renewable Integration and Vehicle Electrification Act (DRIVE Act), which mandates the establishment of bi-directional electric vehicle (EV) charging programs and virtual power plants (VPPs). This legislation requires utilities to enable EVs to not only draw power from the grid but also supply it back, effectively allowing them to act as mobile energy storage units. The Commission must develop regulations

to facilitate these changes by May 2025. Delmarva Power energized the first VPP in the PJM region in 2022, partnering with PJM and Sunnova to leverage the capabilities of behind-the-meter batteries to supply energy to the grid. Please see section 5.2 for discussion.

10. Goal 10 – Increased Use of DERs, including EVs

Delmarva Power VPP (DRIVE Act):

Delmarva Power is working on developing VPP pilot demonstrations as required from the DRIVE Act. Pilots are to be filed with the Commission no later than July 1, 2025.

Pepco's VPP (DRIVE Act):

Pepco is working to develop VPP pilot demonstrations as required by the DRIVE Act. Pilots are to be filed with the Commission no later than July 1, 2025.

The DRIVE Act is set to significantly enhance the adoption of DERs, including EVs by supporting the infrastructure, incentives, and regulatory frameworks needed to expand these technologies. Through targeted investments and policy support, the Act encourages the integration of DERs such as solar, wind, and battery storage, making it easier for consumers and businesses to adopt these sustainable energy solutions. For EVs, the DRIVE Act promotes the development of a more robust charging network and offers incentives that help reduce barriers to ownership. By enabling bidirectional power flows and fostering grid modernization while improving grid stability, allowing DERs and EVs to be integrated efficiently. Overall, the DRIVE Act positions DERs and EVs as essential elements of a resilient, low-carbon energy system, supporting both economic growth and environmental goals.

i. Delmarva Power's Vehicle-to-grid Initiative (V2G)

On Oct. 2, 2024, the University of Delaware, Delmarva Power and collaborating industry partners PJM Interconnection and Ford Motor Company showcased how vehicle-to-grid (V2G) power can support the electric grid or provide backup during power failures at a demonstration event in Newark, Delaware. The pilot project leverages batteries in parked Ford Mach-E EVs that are part of Delmarva Power's transportation fleet to effectively store and contribute energy to the grid in a way that meets all standards and regulations. Linked together, the Ford Mach-E EV batteries form a virtual power plant, allowing the vehicle batteries to store energy when the grid has too much, such as during off-peak hours, and then return it to help the grid balance demands for electricity when it is needed during peak energy use — all with zero emissions and minimal impact on the planet. A key advantage of V2G technology is its ability to support grid stability by allowing EVs to supply power back to the grid during peak demand, reducing strain on the grid and enhancing reliability.

ii. Pepco's Vehicle-to-Grid Initiative (V2G)

Pepco and Toyota Motor North America (Toyota) are working together on V2G research for battery electric vehicles (BEVs) using a Toyota bZ4X. This collaborative effort will explore bi-directional power flow technology that will allow BEV owners to not only charge their vehicle's battery but also send power back to the local energy grid. V2G technology has the potential to support and provide benefits to customers through improved energy reliability and resilience, the integration of renewables, and the possibility of reduced electricity costs.

This collaboration aims to understand the needs of EV owners through their charging habits and vehicle usage, which will be crucial in driving widespread adoption of V2G technology. Nearly 80 percent of owners currently charge their EVs at home overnight when demand for energy is lower. With bi-directional capability, these vehicles could send power back to the local energy grid during peak demand hours or at other critical times, such as severe weather.

Pepco is committed to driving the clean energy transition by embracing innovative technologies. By partnering with Toyota to explore V2G technology, Pepco aims to enhance grid reliability, improve customer service, and contribute to a more sustainable future. This collaboration will provide valuable insights into the potential benefits of V2G technology and its role in a decarbonized energy landscape.

The V2G research will take place at Pepco's Watershed Sustainability Center, located at the company's Rockville Service Center in Montgomery County, Maryland, using a bi-directional charger. Pepco will lead the effort to design and evaluate a variety of EV charging and discharging use-cases that can potentially provide grid and customer benefits. The demonstration project will also assist Pepco in understanding the infrastructure needed to enable the rapid growth of EV charging infrastructure and the nuances of interconnecting large numbers of V2G assets to the grid to better prepare the utility to implement requirements of the DRIVE Act and support customer adoption of this technology.

iii. Community Solar

Maryland's Community Solar Energy Generating System Program established a pilot program under the authority of the Commission, which became permanent in 2023. BGE, Pepco and Delmarva have collectively integrated over 120 MWs of operational community solar projects for the benefit of over 19,000 subscribers.

Through subscription-based community solar, customers subscribe to a portion of the electricity generated and receive credits on their bill for the solar energy produced by the community solar generating system. For additional information visit the Community Solar Resources page[26].

[26] *See* https://www.pepco.com/smart-energy/my-green-power-connection/developerscontractors/community-solar-resources/community-solar-resources-md.

11. Goal 11 - Transparent Stakeholder Participation in Ongoing Electric System Planning Processes

Transparent stakeholder participation can lead to better decision-making by providing valuable insights into local energy needs, potential barriers to implementation, and innovative approaches to integrating renewable energy resources. By facilitating open dialogue and collaboration, utilities can identify opportunities for co-benefits, such as economic development, job creation, and enhanced resilience, which align with the goals of the CSNA. Furthermore, public involvement is crucial for building broader support for clean energy initiatives and policies, ultimately leading to more sustainable outcomes. The increased use of DERs, including EVs, is reshaping Maryland's distribution system planning. As DERs grow, the PHI Utilities must adapt to allow grid stability and support the state's climate goals under CSNA.

i. Distribution System Planning (DSP)

Through regular engagement with its stakeholders, the PHI Utilities improve their understanding of emerging trends affecting the business. The PHI Utilities leverage stakeholder feedback to inform sustainability strategies and business plans. The PHI Utilities periodically facilitate specialized forums with individual stakeholder groups to discuss their sustainability interests and concerns.

- The DSP Order No. 91256 established an annual DSP filing and conference, and a planning process focused on transparent stakeholder participation that is flexible for utilities.
- A DSP generally keeps a focus on the medium- and long-term initiatives because effective stakeholder participation necessitates it to largely occur earlier in the planning process.

The Maryland Exelon utilities participate in eight workgroups developing policy recommendations to help the state achieve CSNA targets.

ii. Exelon's Partnership with Ceres

Since 2008, Exelon has engaged with Ceres to provide an external perspective on important areas of shared interest to help Exelon advance sustainability performance as part of its participation with Ceres as a Company Network Member.

Ceres has worked with Exelon to convene 16 external stakeholder engagements, since Exelon became a Company Network Member, to discuss topics of shared interest. The partnership with Ceres in recent years has also included direct engagement with Ceres staff in the development of Supplier Code of Conduct and Human Rights and Environmental Justice Principles. In May 2022, Exelon engaged stakeholders in discussions on Path to Clean climate change goals, as well as a plan and approach to sustainability reporting. In March 2024, the Ceres stakeholder engagement focused on the important topic of equity in the energy system transition.

During the 2024 meeting, Exelon asked stakeholders to share their priorities for the energy system transition, as well as their views on the role that Exelon can play in facilitating energy transition outcomes in areas such as access and affordability, environmental justice, investment and growth, energy efficiency and innovation, inclusion and representation, education and empowerment and related metrics for measuring progress in these areas.

iii. Large Customer Service (LCS) Outreach

The PHI Utilities' Large Customer Services (LCS) team aims to serve as a trusted energy advisor, providing a world class experience to meet and exceed customer expectations. LCS proactively helps meet operational, financial and business needs of Pepco and Delmarva Power's large commercial and industrial customers, including supporting their environmental and energy sustainability goals. To that end LCS conducts direct outreach to managed customers. During annual meetings, LCS provides information about available programs offered that the customer may take advantage of at their business. LCS seeks to understand customer's energy plans as they seek to interconnect renewable energy sources, enhance energy efficiency, and facilitate the transition to EVs. LCS talks to customers about the processes to work with the utility and connects customers with the appropriate applications and / or subject matter experts. LCS also publishes newsletters and hosts webinars.

Pepco and Delmarva also successfully implemented the new Energy Usage Data System (EUDS) to help building owners and building managers better understand their whole building energy usage through benchmarking reports. Pepco and Delmarva have also implemented a Large Customer Services Hub which is a new launching point for improved online educational resources including information available for new construction and services, understanding rates, commercial vehicle electrification, and solar and renewables. Additional digital tools include a Program Finder, which is an all-in-one destination with a comprehensive list of programs and incentives and an EV Fleet and Charging Infrastructure Calculator which is a page that outlines several things to consider when transitioning to an electric fleet infrastructure. Customers can discover who to contact, commercial electric vehicle types, available chargers, and potential strategies.

IV. Potomac Edison Company (PE)

1. Goal 1 – Measures to decrease greenhouse emissions from the electric distribution system

PE stated that it has a long history of providing energy efficiency programs to customers that not only help customers save energy and money, but also decrease greenhouse gas emissions. The Company's initiatives below are designed to decrease greenhouse gas emissions incident to electric distribution. The Company's energy efficiency programs are discussed in detail later in this report.

i. Conservation Voltage Reduction (CVR) Program

PE stated that it aims to reduce greenhouse gas emissions through the CVR program and through system upgrades that reduce line losses. Under the CVR program, the Company reported that it will implement, monitor, and maintain the reduction of voltage at select substations and distribution circuits, on an annual basis, across its service territory to achieve additional energy savings. The program will be implemented at the selected substations and distribution circuits by Company employees who will perform the voltage set point changes. Potomac Edison's CVR program has reported 59,685 MWh of incremental annual energy savings for the program to date. An additional 19,895 MWh of incremental annual savings are projected for 2024.

ii. High Efficiency Transformer Replacement Program

PE stated that it continues to purchase and implement energy efficient transformers in its Maryland service territory. According to the Company, the analysis of energy and demand savings relative to other energy efficiency requirements shows that the High Efficiency Transformer Replacement program has reported 7,261 MWh of incremental annual energy savings for the program to date. Information on 2024 results will be available in the second quarter of 2025.

iii. High Efficiency Street Lighting Program

PE reported that it has street lighting tariffs that provide for the installation of more efficient lighting fixtures which result in energy savings over standard street lighting installations. For example, Potomac Edison completed seven streetlight replacement projects in the first half of 2024, which amounted to 108 MWh in gross wholesale incremental annual energy savings for 553 LED replacements.[27] Potomac Edison's High Efficiency Street Lighting program has also reported 1,220 MWh of incremental annual energy savings for the program to date.[28]

iv. Utility Distribution/Transmission Improvement Program

This program captures system upgrades that reduce line losses including reconductoring lines with larger wires that will reduce the impedance of the distribution system and capacitor additions that will provide power factor correction on the distribution system. These improvements can result in significant energy savings. PE reported that there was one distribution project reported during the first half of 2024 which amounted to 13,582 MWh in gross wholesale energy savings. Potomac Edison's Utility Distribution/Transmission Improvements program has reported 30,635 MWh of incremental annual energy savings for the program to date.[29]

[27] Case Number 9705, Maillog No. 311694.
[28] Case Number 9705, Maillog No. 311694.
[29] Case Number 9705, Maillog No. 311694.

v. Planning Criteria

PE reported that it started a comprehensive review of its distribution planning criteria in 2024 along with its parent company FirstEnergy Corp. Some of the primary drivers for this review were related energy efficiency and demand response trends and to better integrate distributed energy resources (DER) in planning along with potential changes due to the integration of electric vehicle or other electrification load additions which are potentially changing the load profile and needing more granularity of time analysis. Another topic reviewed is appropriately sizing primary conductors for new lines or line upgrade projects; minimizing line losses is one of the factors considered when selecting the conductor size based on circuit characteristics while enabling stronger circuit ties to support neighboring feeders with bi-directional power flow. Updates to the planning criteria are anticipated to take effect during 2025 and 2026.

vi. Electric School Bus Pilot

Potomac Edison's Electric School Bus Pilot program, if approved by the Commission, will result in decreased greenhouse gas emissions by incentivizing the deployment of electric school buses to replace diesel buses, with the benefit of testing vehicle-to-grid technologies to provide distribution grid services. If approved as proposed, the pilot program will measure, track, and report on several emissions metrics including reductions in greenhouse gases, nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter of 2.5 microns or less in diameter (PM2.5).

vii. Fleet Electrification

FirstEnergy has communicated a goal to electrify 30% of its light-duty and aerial truck fleets by 2030 and 100% by 2050. Potomac Edison stated that it has made progress towards this goal by purchasing its first fleet electric vehicle in 2019 to assist in operating and promoting its EV Driven program and has recently taken delivery of three electric trucks to be used in utility operations.

2. Goal 2 – Giving Priority to Vulnerable communities in the development of distributed energy resources (DERs) and electric vehicle infrastructure

i. Grid Resilience and Innovation Partnerships (GRIP) Grant

Potomac Edison has stated that it has applied for and received a grant from DOE's GRIP Program. The projects funded by this grant will target upgrades benefiting disadvantaged communities. These projects will focus on improving reliability and resilience of circuits in disadvantaged communities to enable distribution automation and will increase circuit capacity and enable electrification of buildings and transportation.[30] The Company stated that approximately $3.5 million will be dedicated to Potomac Edison's distribution service territory in western Maryland.

[30] See Public Conference 56, Potomac Edison Monthly Report on IIJA Applications (filed Nov. 1, 2024).

ii. Electric School Bus Pilot Program

If approved by the Commission, Potomac Edison's Electric School Bus Pilot program will consider, when selecting school systems to participate, the health and economic effects on low-income and minority communities. In addition, all participating school systems will be required by law, when deploying buses, to consider criteria that benefit students who are eligible for free and reduced-price meals.[31]

iii. Electric Vehicle Charging Pilot Program

PE stated that, throughout the first phase of its EV charging pilot, it has installed 59 public electric vehicle charging stations across its service territory. While placing stations in defined areas representing vulnerable communities, the Company made clear efforts to install stations in each county and municipality that expressed interest in the program. According to PE, this resulted in a network of charging stations that was not only focused on installations where the majority of electric vehicles are registered, but also in areas where the adoption may be lagging

3. Goal 3 – Energy efficiency

PE highlighted below programs that are part of its Energy Efficiency and Conservation Plan for the 2024-2026 EmPOWER Maryland program cycle. The Company stated that the plan was designed to achieve the incremental annual energy savings targets established in the CSNA. The Company's revised plan for the 2024-2026 program cycle, which continues these programs with modifications to increase the focus on achieving lifecycle GHG savings targets, was filed on August 15, 2024, and is currently pending approval by the Commission. Full details of the overall programs and plan are included in the Company's August 15, 2024 filing in Case No. 9705.[32]

i. The Energy Efficient Products – Appliance Recycling Subprogram

This subprogram provides an incentive for pick-up and recycle services to customers for turning in qualifying, inefficient, appliances. Qualifying appliances will be picked up at the customer's residence. Periodic events may be offered at centralized drop-off locations where the customer can drop off qualified inefficient appliances. PE stated that it may partner with second-hand retailers to pick up and recycle units to remove them from the market.

ii. The Residential – ENERGY STAR for New Homes Program

This program provides a rebate to builders for achieving energy efficiency savings and targets through a combination of building shell and installed measures, including appliance and equipment upgrades with updated incentive amounts, expanded focus on installation of additive measures (e.g., smart thermostats, heat pump water heaters and central air conditioners and heat pumps). To qualify for this program, the builder must construct the home to qualify to meet the energy efficiency requirements established by the ENERGY STAR program, specifically tiers

[31] PUA § 7-217; Case No. 9741, Brief of the Potomac Edison Company (Maillog No. 313124).
[32] See Maillog No. 311732.

established that meet or exceed the current ENERGY STAR requirements including the NextGen tier, or a Code+ tier. To further encourage participation, the Company stated that it intends to make builders and developers aware of other potential federal and state incentives, rebates and tax credits for specific measures included in this program including but limited to programs offered as a result of the Inflation Reduction Act for energy efficient homes meeting legislative requirements.

iii. The Small Business Solutions Direct Install Program

This program provides an audit with the installation of direct install measures including, but not limited to, high efficiency lighting, heating ventilation and air conditioning (HVAC), and refrigeration measures to small business customers. This program also provides incentives for the implementation of comprehensive energy efficiency improvements, including electrification of space heating equipment and water heaters with heat pumps, including wiring upgrades, that are recommended as part of the audit. This subprogram continues an expanded focus on installation of complementary measures (HVAC, food service, appliance replacement and recycling, controls, building envelope and weatherization, updated incentive structure and enhanced targeted customer outreach) with the addition of beneficial electrification.

iv. The Energy Solutions for Business – Prescriptive Subprogram

This subprogram provides incentives to commercial and industrial customers to purchase and install qualifying energy efficient equipment. Prescriptive incentives are offered to reduce the customer's investment for qualifying energy efficient measures to overcome first cost barriers to participation and to encourage the adoption of higher efficiency equipment. This program cycle, pending Commission approval, adds rebates for the electrification of space heating equipment and water heaters with heat pumps and wiring upgrades.

v. The Energy Solutions for Business – Custom Subprogram

This program provides incentives to commercial and industrial customers to purchase and install qualifying energy efficient equipment or retrofit specialized processes and applications to higher efficiency processes and applications or implements qualifying high efficiency building shell or systems improvements. Calculated or performance-based incentives are offered to reduce the customer's investment for qualifying energy efficient measures or projects to overcome first cost barriers to participation and encouraging the adoption of higher efficiency equipment, processes, and buildings.

4. Goal 4 – Meeting Anticipated increases in load

In addition to the energy efficiency programs discussed above, Potomac Edison has the following processes to ensure that it meets anticipated increases in load.

i. Electrification

Potomac Edison stated that it is monitoring potential loads from electrification (transportation, heating, and industrial). The Company stated that it has partnered with the Electric Power Research Institute on the eRoadMAP^{TM} initiative to identify approximate

demands of energy needs at a local level to electrify transportation for light-, medium-, and heavy-duty electric vehicles. It is anticipated that this data will be added to Potomac Edison's feeder level load forecasts to help identify constraints and needs in the future.

ii. Winter Peak and Electrifications

PE stated that its distribution system typically sees its annual demand peak during the winter season. This is due in part to the limited access to natural gas in portions of its service territory, resulting in more customers heating their homes with electricity. As temperatures drop, system demand increases due to this heating load and as load diversification on the system reduces dramatically causing a system peak. This peak typically occurs at around 6 a.m. and slowly decreases as the sun rises and temperatures increase. In this way, Potomac Edison has experience operating an electrical system more similar to those expected to exist after significant electrification. The Company stated that this experience of operating a winter peaking territory and specific areas that do not have natural gas has prepared it to handle heating electrification in the future.

iii. Load Forecasting

Potomac Edison stated that it uses a circuit specific load forecasting tool to project future loads utilizing historical data and adding additional site-specific loads to the forecast. A load forecast for each distribution substation power transformer is derived from historical peak loads recorded using Supervisory Control and Data Acquisition (SCADA) systems where available and also utilizing manual readings of substation load recording equipment. Substation readings are validated and transferred into FirstEnergy's standard forecasting tool, Load Forecasting Data Management System (LFDMS), to summarize historical and forecasted peak load patterns for each substation transformer and circuit exit. This tool accounts for general load growth in an area that happens over time (such as residential EV adoption) and spot load additions like a new large customer load which may not be representative of area load growth.

PE noted that load on the Company's distribution system is weather sensitive. During the summer, peak loads are higher during extended hot weather and lower during cooler periods. Because these variations do not reflect positive or negative growth, FE adjusts historic peaks to compensate for abnormally hot and cool summer weather so that future peak loads are forecasted based on more typical seasonal temperatures. Using the Cumulative Cooling Degree Day (CCDD) method, past summer and winter peak loads are adjusted to an 80/20 weather condition. This method normalizes the load forecast with the assumption that, on average, 80% of the past weather conditions were less extreme and 20% were more extreme.

iv. Planning Criteria

The Company stated that the distribution planning criteria used by PE standardizes the process for identifying limiting circuit components and recommending cost effective projects to mitigate constraints in a timely manner based on predicted load growth. Adjustments were made in 2023 to FirstEnergy's criteria to adjust project timelines with the longer lead times experienced across the industry for substation power transformers. The comprehensive review of the distribution planning criteria in 2024 was initiated to make sure Potomac Edison has procedures and systems in place to track projected demand with appropriate granularity for

changing loads. The Company noted that the review of this document is still ongoing, but changes are expected to take effect during 2025 and 2026.

v. Managed Electric Vehicle Charging

As part of its revised Electric Vehicle Phase II program, PE stated that it intends to propose an active managed charging pilot for residential customers. This proposal will allow the Company to test how effectively residential electric vehicle charging can be spread out during off-peak periods while prioritizing convenience for participating drivers. The Company stated that, by managing this load and not just simply pushing it to off-peak hours, utilities can work to smooth out daily distribution demand curves and potentially reduce capital investments that may otherwise have been needed to accommodate transportation electrification.

5. Goal 5 – Incorporation of Energy Storage Technology as appropriate

i. Energy Storage Pilot Projects

As part of the energy storage pilot program directed by the Commission, PE completed two battery storage projects in 2022 and 2024. The Company stated that it will continue to evaluate the ability, reliability, and benefits of the pilot program. Options to use energy storage as appropriate will be considered based on the pilot evaluation.

ii. Hosting Capacity Maps

With the anticipated approval of the MCAM in November 2024, PE stated that it will be pursuing a model-based procedure to calculate hosting capacity on affected feeders. Information learned from this process can then be used to improve available data on publicly available hosting capacity maps.

iii. Customer Energy Storage Installations

As part of its generator interconnection process, Potomac Edison stated that it allows customers to operate energy storage devices in parallel with its distribution system. Since the Company began tracking these interconnections, Potomac Edison reported that it has connected 329 systems for a total storage capacity of 5.3 MW. While customers operating these systems are not permitted by Maryland regulations to output energy to the grid, they may use them to offset load behind their retail electricity meter.

6. Goal 6 – Efficient Management of Load Variability

i. Smart Inverters

At the beginning of 2024, utilities were required to start requiring interconnecting customers to use smart inverters with utility-specified smart inverter settings under UL-1741-SB. The settings are intended to conform to IEEE 1547-2018. Settings other than these defaults, within the ranges of allowable settings in IEEE 1547-2018, may be required on a case-by-case basis and are subject to review and approval by Potomac Edison. PE stated that it has worked

with developers on a case-by-case basis when site specific settings would reduce additional hosting capacity upgrades to implement the project.

ii. Voltage Control

PE stated that it uses multiple devices paired together to control voltage levels on the distribution system. PE further stated that transformer load tap changers are utilized at the larger substations to regulate the voltage and single-phase voltage regulators are used at smaller substations. Single-phase voltage regulators are also used as necessary on the distribution lines to regulate the voltage levels of the system.

iii. Power Factor Control

PE stated that it utilizes capacitor banks that are both fixed and switched based on local conditions to regulate the power factor of the system. This is done both at the substation level as well as dispersed throughout the distribution lines as required.

7. Goal 7 – Electric System Resiliency and Reliability

i. Reliability

In addition to its energy efficiency programs discussed above, PE stated that it has various explicit projects and programs that improve system resiliency and reliability. These projects and programs are detailed in the Company's Annual Reliability Report filed pursuant to COMAR 20.50.12.02(E). Specifically, they are described in section 20.50.12.11(A)(5) of that report. For Potomac Edison's most recent report, see Case No. 9353, 2023 Annual Performance Report filed April 1, 2024.[33]

ii. Resilience

In accordance with COMAR 20.50.12.15(B), the Company also stated that it has a resilience plan to prepare for and recover from various credible events. Additionally, PE is actively participating in the Electric Resiliency Work Group, which is required to file an interim report by December 31, 2024, in accordance with Commission Order No. 91307.

8. Goal 8- Bi-directional Power Flows

i. Bi-directional Power Flows

According to PE, while the majority of its feeders were initially designed for one-way power flow, engineers now have a handful of mitigation techniques to allow bi-directional flows. These are used to solve issues identified during DER interconnection technical reviews. Most of the time this involves replacing power system component controllers or protective relays. PE stated that it is working towards standardizing on models capable of bi-directional power flow for new equipment installations, when appropriate.

[33] See Maillog No. 308661.

ii. Distribution Automation

In addition to enabling bi-directional current flow to optimize DER installations, PE stated that it continuously looks for opportunities to implement distribution automation as a reliability improvement tool. Since 2017, the Company stated that it has installed equipment intended to automatically isolate a fault and then restore unaffected portions of the circuit from the opposite direction and an alternative feeder on 15 pairs of distribution feeders. And since July 2018, these operations have avoided approximately 39,000 customer outages and have saved almost 6 million customer minutes of interruption

9. Goal 9 – Demand Response and other Non-Wire and Non-Capital Alternatives

i. Demand Response

As directed by the Commission in Order No. 90957 in Case No. 9702, page 86, PE stated that it has proposed an expansion of its current approved Residential Demand Response Program to include winter peak load reductions. The Residential Demand Response Program is designed to now target reduction of winter peak loads in addition to summer peak loads, through control of connected devices. The program will market and enroll customer program eligible connected devices, initially including customers' smart thermostats, for control of air conditioning and heat pumps or other connected equipment to reduce peak loads. The program includes two opportunities, one for summer only participation and the second for annual participation (including both summer and winter seasons). See Section 5.0 of the Company's Revised 2024-2026 EmPOWER Maryland Plan filed on August 15, 2024, for additional details.[34]

ii. Battery Storage Projects

As required by the Energy Storage Pilot Program, Potomac Edison proposed two battery storage projects in its service territory. Each project utilizes a different ownership model and value streams. While the Company continues to develop its experience in this area, it filed a report on learnings from the pilot in May 2024.[35]

According to the Company, since that filing, it has interconnected the Town Hill Energy Storage Project. PE reported that this project specifically has led to a better understanding of how to implement and the benefits available for battery storage projects in Potomac Edison's service territory. The Company noted that the project required utilization of flexible interconnections to reduce the need for additional system upgrades to implement the battery project. PE stated that it will utilize the experience with each of the projects to better determine additional use cases and locations to install battery storage projects in the future.

[34] See Maillog No. 311732.

[35] See Case No. 9619. The Potomac Edison Company – Learnings on the Development of Battery Energy Storage Systems Report (Maillog No. 309420).

10. Goal 10 – Increased Use of DERs, including EVs

i. Electric Vehicle Pilot Program Phase I

PE has reported that it has delivered on its offerings in its Electric Vehicle Pilot Phase I program to increase electric vehicle adoption and the availability of electric vehicle supply equipment (EVSE). In this program, PE noted that it issued 1,000 rebates for residential Level 2 (L2) chargers, implemented an EV-only time-of-use (TOU) rate with 810 customers enrolled as of January 31, 2024, installed three utility-owned chargers at multi-unit dwelling (MUD) locations, and installed 59 publicly accessible utility-owned chargers, 20 of which are DC fast chargers with the remaining 39 being L2 chargers. Details of the Phase I program can be found in the final Case No. 9478 semi-annual report filed March 12, 2024.

ii. Electric School Bus Pilot

In accordance with PUA § 7-217, PE stated that it has submitted a proposal to implement an Electric School Bus Pilot program which is currently pending a final order from the Commission. If approved, the pilot would aid local school systems with the adoption of electric school buses in Potomac Edison's service territory. According to the Company, the program is designed to incentivize the deployment of 28 electric school buses which will reduce greenhouse gas emissions and other emissions such as PM2.5, NOx, and SOx by reducing the number of vehicle-miles traveled by diesel buses. Furthermore, PE stated that the batteries of the buses funded under the pilot will be available for use as vehicle-to-grid resources which will be studied for their potential as a distributed energy resource to reduce constraints on the distribution system. Additional information is found in Case No. 9741.

iii. EV Phase II

On March 1, 2024, Potomac Edison stated that it filed a request with the Commission to implement a second phase of the Electric Vehicle Pilot Program.[36] In this request, the Company introduced new offerings such as a charging-as-a-service (CaaS) program to help with MUD EVSE adoption, updating utility-owned charging stations with charging ports that reflect the current market of EVs, and various fleet programs (grant writing assistance, site assessments, and make-ready incentives) for government and public serving entity fleets. In addition, PE stated that the filing intended to build on Phase I programs such as the EV-Only TOU rate, multifamily incentives, and its public charging network. The Company stated that it intends to file an updated Phase II of its EV program by the December 21, 2024, deadline set forth by the Commission in Order No. 91297, where the Company will explore the potential of additional program elements such as an active managed charging program. The Company also intends to continue to leverage data collected from these various programs to help with distribution planning purposes.

[36] See Maillog No. 307940.

iv. Distributed Renewable Integration and Vehicle Electrification (DRIVE) Act Implementation

The DRIVE Act requires utilities to submit pilot programs for electric distribution system support services to the Commission for approval that include distribution system peak load reduction. PE stated that it is developing its program offerings to meet this requirement and plans to submit a request to the Commission ahead of the July 1, 2025, deadline.

v. MCAM

In November 2024, the Commission adopted regulations requiring electric companies to implement a cost sharing system intended to socialize the cost of system upgrades required to interconnect DER systems among current and future interconnection customers. Potomac Edison stated that it is analyzing how to best streamline the implementation of the MCAM in its territory.

vi. Meter Collar Adapters

The Commission approved regulations requiring electric companies to approve meter collar adapters for installation by residential customers. PE stated that it is in the process of analyzing and approving several meter collar adapter models that have been requested for approval. PE states that this will potentially reduce customer costs for incorporating DER or electrification upgrades to their home electrical system.

vii. Interconnection Portal

PE stated that it is in the development stages of a new online customer interconnection portal. The portal intends to enhance the customer experience of the interconnection process by providing a central and standardized approach to interconnection applications. The Company noted that the interconnection portal will reduce queue times through the interconnection process while opening visibility to the customer on where their application is in the process. The Company also believes that the portal will also help Potomac Edison establish a DER database which will assist engineering in any future electric planning processes.

viii. Flexible Interconnections

PE stated that it has and continues to utilize flexible interconnections as needed in order to reduce the need for Hosting Capacity upgrades or wires solutions for battery storage projects.

11. Goal 11- Transparent Stakeholder Participation in ongoing Electric System Planning Processes

PE stated that as part of the DSP Workgroup, electric companies including the Company introduced a straw proposal for a future distribution system planning process that includes specific steps for stakeholder participation. This includes, at minimum, an opportunity for stakeholders to view the utilities' plans and participate in an annual technical conference. PE stated that it will continue to work with the Workgroup and interested stakeholders to

continuously refine this process in order to allow for meaningful stakeholder participation in determining the future of its distribution system.

V. SMECO

- Goal 1 – Measures to decrease greenhouse emissions from the electric distribution system

According to SMECO, it has a variety of programs that help to decrease greenhouse gas (GHG) emissions incident to electric distribution. Examples of such programs include the Smart Temp (demand response), Smart Home Pilot (demand response), and various residential and commercial programs as part of the Cooperative's EmPOWER Maryland portfolio. SMECO states that these programs include energy efficiency measures, as discussed above, and select electrification offerings currently under consideration by the Commission Case No. 9705.[37] Additionally, SMECO is deploying conservation voltage reduction (CVR) on select feeders.

SMECO also stated that it has been operating a Residential EV Pilot since December 2023, which includes three different offerings: Residential Managed Charging, Residential Off-Peak Savings, and Residential Charging Data Access. The Residential EV Pilot is scheduled to end in December 2025, and a Phase II proposal is currently being considered. Other ongoing efforts SMECO is undertaking to support electric vehicles include the SMECO EV Recharge program, utility-owned public charging stations located on government properties, a multiunit dwelling (MUD) utility-owned electric vehicle charging program, and time-of-use (TOU) rates. Below is a summary of these offerings, but additional detail can be found in SMECO's most recent EmPOWER Maryland and Electric Vehicle Portfolio semi-annual reports.[38]

i. Smart Temp (Demand Response) Program

SMECO stated that its SmartTemp Program is a voluntary Bring Your Own Device (BYOD) residential demand response program for residential members who have eligible smart thermostats connected to their central air conditioner or heat pump. Participants agree to brief thermostat adjustments of 1-4 degrees or less during peak electric demand periods or times of higher energy costs. Unless there is a system emergency, peak periods do not occur on weekends or holidays. Enrollment options include year-round or summer only, and adjustments to thermostats occur on weekdays only. The adjustment durations are typically 15-minutes to one hour, lasting no more than four hours. Participation is voluntary, and members retain control of their thermostat and can easily opt out of an event for any reason. SMECO stated that marketing will continue to drive program enrollments. Direct mail and social media marketing will continue to play a key role while other media and events will continue to be used. SMECO stated that it will continue cross-marketing its demand response and energy efficiency programs. All marketing materials and program collateral will continue incorporating the EmPOWER Maryland logo and tagline.

[37] The 2024-2026 EmPOWER Maryland Program, see Maillog No. 311740.
[38] See Maillog Nos. 311742 and 311362.

ii. Smart Home Pilot – Phase 3 (Demand Response Pilot)

SMECO stated that this successful flexible load management pilot continues to evolve after the initial launch of the latest iteration in 2022 as a demand response program testing more granular demand control strategies for residential members. The Phase 3 pilot is exploring the overall orchestration of multiple grid-connected devices with a focus on connected water heaters.

iii. Residential Electrification

SMECO reported that, while SMECO is already made up of a majority of electric-only members, the Cooperative has incorporated electrification measures related to heating and water heating into its EmPOWER portfolio as a response to the passing of HB864 and subsequent Commission orders. If approved by the Commission, SMECO will offer rebates for electrification through the existing delivery channels of the energy efficiency programs.

iv. Conservation Voltage Reduction (CVR) Program

SMECO's CVR program aims to reduce the substation bus voltage by 2 volts (on a 120V base) at select transformer/feeders where the functionality and system topology permit CVR operation. Distribution feeders with CVR enabled operate in "constant on" mode 24/7, and the CVR can be disabled when needed to support switching operations or under other abnormal conditions. The Cooperative stated that the current iteration of the CVR program was initiated in 2024 as part of a three-year evaluation cycle to quantify program benefits. The forecasted annualized energy savings attributable to the CVR program for 2024 is 8,476 MWh.

v. Residential Managed Charging

SMECO's Managed Charging Pilot offers incentives to residential EV owners for enrolling their device and allowing SMECO to control EV charging schedules. The Managed Charging program has yet to call any demand response events, but according to the Cooperative's program team is currently strategizing on how that might look. Additionally, the program team is working on flexible load management strategies, which enables SMECO to place

vi. Residential Off-Peak Savings (EV-TOU)

SMECO's EV Time-of-Use rate offers monthly bill corrections (bill credits) to residential EV owners who enroll their device in the program. This is an EV-only rate and calculates bill credits based on EV time-of-use consumption only.

vii. Residential Charging Data Access

SMECO's Charging Data Access (Data Share) program offers incentives to residential EV owners who enroll their devices in the program and allow SMECO to intake their charging data. According to SMECO, this program does not exhibit any control over EV charging and is meant to serve as a control group to measure effectiveness of Managed Charging and EV-TOU.

viii. SMECO EV Recharge

SMECO stated that it engaged a third-party vendor, Shell Recharge, to install up to 60 charging stations throughout SMECO's service territory. Locations for the SMECO EV Recharge stations are being considered with the support of state, municipal, and local governments. The installations will include Level 2 chargers and Direct Current Fast Chargers (DCFC). There are currently 40 sites in operation as of this report, four of which are DCFC sites.

ix. Multi-Unit Dwelling (MUD) Charging Program

SMECO stated that, under the MUD program, it will own, install, and operate up to 35 Level 2 charger installations on MUD member properties. The Cooperative stated that it will be responsible for all equipment, installation, and ongoing operations and maintenance costs. MUD members partnering with SMECO will not contribute any capital to the project but must meet certain eligibility requirements to proceed to an application process.

x. Time of Use Rates

The TOU program offers a lower rate during off-peak times, thus encouraging customer-members to shift their energy usage to off-peak times. A benefit of shifting energy usage from on-peak hours to off-peak hours will reduce the need to run on-peak generation to serve load, which will contribute positively to reducing energy portfolio emissions. Customers with an eligible electric vehicle or Level 2 EV charger can enroll in the SMECO Residential Off-Peak Savings (EV-TOU) Pilot which offers bill credits based on seasonal (summer/winter) on-peak and off-peak rates specific to EV charging. Residential customer-members, and some commercial customer-members, can also elect to enroll in SMECO's "whole-building" TOU rate as an alternative to the Standard Offer Service (SOS) rate.

- Goal 2 – Giving Priority to Vulnerable communities in the development of distributed energy resources (DERs) and electric vehicle infrastructure

SMECO stated that it recognizes the importance of including low and moderate-income communities in its energy efficiency portfolio and acknowledges the challenges in reaching limited-income members. The Cooperative stated that building on its previous collaboration with DHCD, it has committed dedicated funds to the DHCD Coordination Program in the 2024-2026 EmPOWER program cycle. This new program aims to connect low-income members with DHCD programs and includes a marketing budget to enhance existing outreach efforts to educate members about these resources.

The DHCD Coordination Program also features the Affordability Solution, launched in September 2024. This solution is designed to assist members facing a high energy burden and to increase awareness of available assistance programs, with a primary focus on those offered by DHCD. SMECO members who may have a limited income or are energy-burdened are directed to the Savings Hub tab in their SMECO Online Account Manager tool. The Savings Hub includes a brief six-question survey that collects basic demographic and participation data from members. The results of this survey help curate and display various energy assistance and financial programs tailored to each member's needs, guiding them to the most beneficial options.

According to the Cooperative, while the Affordability Solution and Energy Savings Hub are specifically targeted at members experiencing high energy burdens, they remain accessible to all residential members.

SMECO stated that customer-member participation rates in EmPOWER programs is consistent across all census tracts, including those qualifying as being in the top 60th percentile for "overburdened communities" as calculated through the Four Indicators used when assigning a Maryland Energy Justice score. SMECO stated that it has also invested in public EV charging infrastructure, of which a total of 13 chargers have been installed in census tracts qualifying as being in the top 60th percentile for "overburdened communities."

In addition to SMECO's offerings in support of distributed energy resources and electric vehicle infrastructure, SMECO has also been awarded a substantial federal grant through the DOE GRIP Program to improve grid resiliency in southern Maryland. Completion of the GRIP projects will directly benefit Census Tract 24017850901 in Charles County, Maryland, a formally designated Justice40 Disadvantaged Community identified by the White House Climate and Economic Justice Screening Tool (CEJST).

- Goal 3 – Energy efficiency

SMECO has a variety of energy efficiency offerings across the residential, commercial, and industrial sectors. SMECO's energy efficiency offerings are summarized below, but additional detail can be found in the EmPOWER Maryland semi-annual report.[39].

i. Residential Portfolio

Residential Energy Efficient Products

This program consists of two sub-programs, Appliance Rebates and Appliance Recycling. These programs offer rebates through multiple delivery channels for energy efficient home appliances and an opportunity to recycle old, inefficient appliances recognizing both energy savings from taking those appliances off the grid as well as non-energy GHG reductions through responsible recycling of appliance materials and refrigerants.

Home Optimization and Retrofit

This program consists of four sub-programs, serving existing homes with energy efficiency opportunities and incentives. (1) the Home Energy Improvement Program (HEIP) - offers home energy analysis appointments, incentivized home retrofit upgrades, and HVAC tune-up services; (2) HVAC Midstream -incentivizes the purchase of energy efficient HVAC equipment; (3) My Energy Target - engages customer-members with a custom energy consumption target, unique to their home and needs; (4) Energy Efficiency Kits - offers a group of low cost, easy to install energy efficiency measures for homeowners to install in their own homes.

Residential New Construction

[39] See Maillog No. 311742.

This program offers incentives for builders to construct more efficient new homes with tiers for multiple levels of the ENERGY STAR® Certified New Homes program and other measures.

Home Energy Reports (Behavior Based)

This offering motivates members to consume less energy by providing mailed and emailed reports offering information on their energy use along with personalized energy saving advice.

Schools and Education

This program encourages energy efficiency at home among diverse populations, sets behaviors for long-term adoption of energy efficient behaviors, and introduces low- or no-cost energy efficiency measures to students, parents, teachers, and school leaders.

Residential Demand Response Transition

SMECO's DR Transition Program is designed to transition households participating in SMECO's Cool Sentry Demand Response program that sunset recently into one of the SmartTemp programs. Participants in the DR Transition program will agree to sign up for the SmartTemp program and receive an upgraded smart thermostat and HVAC tune-up to ensure their system is working in the most efficient capacity.

ii. Commercial and Industrial (C&I) Portfolio

Small Business Solutions

This program offers direct-installation services and retrofit energy efficiency opportunities to small business members.

Business Solutions Efficient Buildings

The Business Solutions Efficient Buildings program offers a suite of energy efficiency rebates and technical support services upgrading buildings with simple, proven energy conservation measures, as well as more complex systems and energy efficiency projects. The program also includes retro commissioning to help buildings and building operators fine-tune their existing buildings to make them operate optimally and more efficiently through scheduling, sequencing, controls programming, and optimizing setpoints.

Combined Heat and Power

This program provides incentives for installation of combined heat and power (CHP) systems for non-residential members with high electric and thermal energy requirements where this efficient technology is economically beneficial.

Instant Savings for Business

This midstream program extends discounted pricing to SMECO commercial members for qualifying energy efficient products.

- Goal 4 – Meeting Anticipated increases in load

According to SMECO, the Cooperative's load forecast uses historical summer and winter seasonal load information in conjunction with the Maryland Department of Planning forecast statistics to develop a 20-year base forecast for customer-member accounts, including a forecast of MWH energy sales, and summer and winter seasonal system peak demands. SMECO works with local area developers to understand where new load centers are likely to be built, and the forecasted system-wide load is allocated to distribution substation and feeder loads based on anticipated local area load growth. The Cooperative states that the distribution system model includes load profiles to enable system studies for peak loading conditions as well as during other times of day. These load profiles are built for every month of the year, by load class, and include profiles for weekday, weekend, peak day, and minimum day loading over a 24-hour load cycle. Existing net energy metering (NEM) customer-members with rooftop solar are explicitly factored into the distribution model.

To enhance capabilities for monitoring DERs and loads, SMECO is working to commission a Distribution Management System (DMS) real-time power flow model. Further detail on these plans are described below in efficient management of load variability discussion. SMECO is also exploring opportunities to enhance its forecasting procedures to include modeling of electric vehicle growth adoption and projected usage for electric vehicle charging.

- Goal 5 – Incorporation of Energy Storage Technology as appropriate

SMECO evaluates non-wire and battery energy storage solutions when developing its capital improvement project list and developing the Construction Work Plan (CWP). SMECO states that the business cases for incorporating such solutions have not demonstrated cost effectiveness at this time, and SMECO does not own or operate any battery energy storage on its electric system today. Two reports have been recently filed with the Commission stemming from the Storage Working Group (MESI Phase I Final Report, filed October 1, 2024) and the Unified Benefit Cost Analysis Working Group (UBCA Framework, MDPSC Case No. 9674, filed May 17, 2024), which may offer further guidance for potential future applications of battery storage systems on SMECO's electric system.

The Cooperative states that it spent significant time and effort in mid-2023 to propose a solar-battery storage option to serve Saint Margaret's Island power needs. Saint Margaret's Island sits within the Potomac River about 1,100 feet off the Saint Mary's County Bushwood, Maryland shoreline. The island is served by an aging water crossing pole line with the first takeoff pole now sitting approximately 75 to 100 feet in the water due to an eroding shoreline. SMECO proposed to replace the pole line with the solar-battery storage option; however, the island owner was not interested in converting the island's existing electric service, and as such, the project never moved forward.

SMECO maintains a public-facing online solar hosting capacity map at ArcGIS which provides a high-level overview of SMECO's electric distribution system and how much solar generation can safely and reliably be introduced to different line sections throughout SMECO's service territory. SMECO's main distribution feeder backbone utilizes overhead conductor and underground cables rated for a nominal 10 MVA per feeder, and studies have not identified any

hosting capacity limitations (thermal, voltage, other) for interconnecting DERs to-date. The Cooperative has not identified the need for any hosting capacity expansion plans at this time.

- Goal 6 – Efficient Management of Load Variability

To help manage variability on the system, SMECO has established smart inverter settings as required by COMAR 20.50.09.06 (O). SMECO has implemented settings for a primary volt-var control with a secondary fail-safe volt-watt control, and these settings can be found online at Solar & Net Metering –Southern Maryland Electric Cooperative. These settings have been implemented since January 1, 2024, with the expectation that these settings will contribute positively to regulating local area voltage profiles.

SMECO states that it offers time-of-use (TOU) rates which can also contribute positively to management of load variability as these programs encourage customer-members to shift their energy use to off-peak times (Peak times are weekdays: 2-7 pm in summer; 6-9 am and 5-8 pm in winter). The TOU programs are available to residential and some commercial customer-members, and SMECO offers a rate comparison tool through "account manager" that allows customer-members to compare rates and make an informed decision. SMECO notes that the TOU rates are not available for customer-members who are purchasing energy from an alternate supplier.

Additionally, SMECO operates a variety of demand response programs to help manage variability on the system. SMECO is also operating a Residential Managed Charging Pilot which will explore the opportunity to manage charging load for distribution benefit (e.g. avoiding equipment overloads). The Cooperative's residential EV-TOU Pilot is exploring the effectiveness of shifting loading to off-peak times, which may also help mitigate equipment overloads. Furthermore. SMECO stated that it is working to commission a distribution management system (DMS) by Q2 2025. The Cooperative states that the initial DMS application will provide near real-time distribution system power flow modeling for Distribution Operations personnel. Operations personnel will be able to monitor loading and voltage profiles across the distribution system from the main feeder head-end to the last customer-member location at the end of a tap line. This modeling will help the distribution operator identify potential load-related issues on the distribution system so corrective actions can be taken before the issue causes reliability issues on the distribution system. According to SMECO, the DMS is a key investment to enable efficient management of load variability on the system.

SMECO stated that it will consider implementation of advanced DMS functionality and the prospect of an Enterprise Distributed Energy Resources Management System (DERMS) in future years once the power flow application has been fully vetted in a production environment. The advanced DMS functionality may include volt-var control (VVC), Feeder Reconfiguration (FR), Fault Location Isolation and Service Restoration (FLISR), and Switch Order Management (SOM).

The DMS is the fundamental building block upon which a future Enterprise Distributed Energy Resources Management System (DERMS) will be built. Enterprise DERMS will provide insights into third-party developer distributed energy resources such as wind, solar, BESS, and demand response. This enhanced visibility will enable the utility to better integrate behind-the-meter generation and Distributed Energy Resources (DERs) into the operation of the electric

distribution system. SMECO will evaluate a future Enterprise DERMS implementation once the DMS power flow application is fully vetted in a production environment.

- Goal 7 – Electric System Resiliency and Reliability

SMECO stated that it completed a 12-year Electric System Plan (ESP) study document in March 2023. The ESP provides a guide to ensure SMECO's distribution system has the capacity and operational flexibility to provide reliable, quality service to its members at a reasonable cost. The ESP is a fiscally responsible living document intended to help guide the orderly development of SMECO's electric system over the longer-term horizon.

In addition to the ESP, SMECO also develops a Construction Work Plan (CWP) every three years. The CWP is developed using guidance embedded within the 12-year ESP including load forecasts and power flow model analysis that readily identifies potential facility overload conditions or marginal voltage areas. The CWP development process ensures the SMECO electric system has sufficient capacity to reliably serve existing and future customer-member loads over the near-term horizon. According to the Cooperative, the most recent CWP identifies capital projects out to the year 2025, and an updated plan will be released in November 2025 which will outline projects planned for 2026-2028. In addition to investment in system capacity, the CWP analysis process also considers investments to improve system reliability and to address potential power quality related issues.

Specific actions & programs to support reliability and resiliency include:

- SMECO has been awarded a grant through DOE's Grid Deployment Office to improve grid resiliency in southern Maryland. With the support of this grant award, SMECO will strategically underground existing distribution feeders, replace aging conductors, and replace/harden four transmission lines to make the system less susceptible to outages resulting from severe weather in heavily wooded areas.
- SMECO considers its vegetation management program to be a key component in providing reliable electric service to its members. Calendar year 2023 was year three of a four-year vegetation management cycle. SMECO performed vegetation management on 21% of its distribution line miles during this third year of the cycle in 2023.
- SMECO continues to perform annual infrared inspection of all switching stations, substations, and overhead distribution circuits accessible by truck. Any facility demonstrating abnormal heating characteristics is photographed and documented in SMECO's electronic system inspection application "GoSync". Each electronic record is later reviewed and assigned to a field crew for follow-up repairs as needed. Infrared inspections help identify potential overhead distribution circuit issues that could lead to a future customer-member outage event if not proactively addressed. These inspections are inputs to the distribution system planning process so that proactive replacements and upgrades can be prioritized before failures cause reliability problems.

- SMECO continuously monitors cable failure outage events to identify cable section areas that warrant a proactive cable replacement project to best prevent future area outages. Such events can derive from deteriorating neutral or phase conductor issues on either 15 kV primary or 600-volt secondary rated cable. SMECO's most recently published 2023-2025 CWP identified specific areas of focus for non-jacketed cable replacement in locations that impact a large number of customer members and where the outage history indicated multiple fault locations.
- In September 2024, SMECO completed a multi-year project to replace aging hydraulic line recloser sectionalizing devices with modern electronic line recloser devices. The new devices minimize maintenance requirements and include electronic log files to verify device operation and aid in event investigations. On a similar note, SMECO is embarking on a multiple-year project to replace and update distribution shunt capacitors to avoid potential failure of the aging assets, thus supporting reliable operation for power factor control and system efficiency.

- Goal 8- Bi-directional Power Flows

SMECO operates a total of 54 substation site locations comprising 75 distribution power transformers, all of which are Supervisory Control and Data Acquisition (SCADA) enabled and actively monitored. Upon implementation of a DMS, downstream feeder visibility will be enhanced in the real-time operations model and operators will have greater awareness of bidirectional power flows.

According to the Cooperative, reverse power flow on the system has not yet been an issue. SMECO line regulation and switched capacitor controllers are bi-directional capable, and the main distribution feeder backbone utilizes large overhead conductor and underground cables rated for a nominal 10 MVA per feeder. SMECO has also implemented volt-var and secondary fail-safe volt-watt smart inverter settings to help manage feeder voltage profiles which can be impacted by bi-directional power-flow. SMECO stated that it will continue to monitor DER growth and will take corrective action where future increases in reverse power flow suggest the need for operating or design changes.

- Goal 9 – Demand Response and other Non-Wire and Non-Capital Alternatives

SMECO stated that it is presently operating demand response pilots and programs, which include the Smart Temp Program, Smart Home Pilot, and Residential Managed Charging Pilot further described above in discussion of CSNA Goal 1. Additional details regarding the Cooperative's demand response programs are included in Case Number 9705, EmPOWER Program.

Beyond its demand response programs, SMECO stated that it evaluates non-wire and battery energy storage solutions when developing its Construction Work Plan (CWP) capital improvement project list. Because the business cases for incorporating such solutions have not yet demonstrated cost effectiveness, SMECO has not implemented any non-wire solutions. An

example of a study that was performed for a non-wire solution is provided in the response to CSNA Goal 5 discussion above. Reports have been filed through the Storage Working Group (MESI Phase I Final Report, filed October 1, 2024) and the Unified Benefit Cost Analysis Working Group (UBCA Framework, PSC Case No. 9674, filed May 17, 2024) which may offer further guidance on consideration of non-wire and noncapital alternatives pending stakeholder feedback.

- Goal 10 – Increased Use of DERs, including EVs

With the increased use of DERs on the system, including electric vehicles, SMECO stated that it recognizes the importance of appropriate cost allocation for interconnections. SMECO met internally on September 25, 2024, to review pending Maryland Cost Allocation Methodology (MCAM) requirements. The Commission is also holding a rule making session on November 6, 2024, to approve changes to COMAR 20.50.09 which includes language on the MCAM implementation. Utilities are required to implement MCAM within one year of the COMAR 20.50.09 effective date. SMECO stated that it will work throughout 2025 to develop an appropriate tariff Rider to support MCAM implementation.

- Goal 11- Transparent Stakeholder Participation in ongoing Electric System Planning Processes

The 2023 Grid Resilience Investment Partnership (GRIP) award for SMECO's work to rebuild a 69-kV line and approximately 30 segments of distribution feeders will follow a rigorous community benefits plan, in accordance with requirements established by the U.S. Department of Energy as a condition for receipt of funding. SMECO stated that it will host an open forum for public comments while also communicating the work and benefits to the public on its website and other communication channels. This work is derived from the existing construction work plan; therefore, the related community engagement effort will provide stakeholder participation in SMECO's planning process for planned work as well as future planning.

Within the EmPOWER Maryland Program, SMECO stated that it collaborated on scenario development using the input of multiple stakeholders. Over a period of two years prior to the development of the 2024-2026 scenarios, SMECO collaborated with Commission Staff, other EmPOWER utilities, evaluation providers, and other stakeholders. SMECO also stated that it was also deeply involved in the Future Programming Working Group (FPWG,) the Evaluation Advisory Group (EAG), and the overall EmPOWER planning process which provided information and feedback during the development of these scenarios. Commission Staff, Office of People's Counsel, the Maryland Energy Administration, the Maryland Department of Housing and Community Development, and other organizations provided invaluable feedback and guidance during the planning process. Implementation vendors, service providers, and other industry experts helped to inform measure selection and overall program designs.

In addition, the Cooperative worked with the Evaluation, Measurement and Verification (EM&V) stakeholders during scenario development in the EmPOWER Maryland Program. This work with the EM&V members ensured that measures and scenarios maintain consistency with

the other EmPOWER utilities to provide cost effective energy savings for SMECO members who participate in the offered programs.

Pursuant to Commission Order No. 90546, Commission Staff hosted the EmPOWER Utility Planning and Stakeholder Collaboration Meeting which provided utilities with a forum to engage with stakeholders. An additional EmPOWER Stakeholder Technical Conference was also organized by the Commission Staff.

Finally, SMECO noted that, as an electric cooperative, SMECO is governed by a Board of Directors that is democratically elected by customer-members. The Board has visibility across all of SMECO's operations, including electric system planning, and ample opportunity to provide feedback to management on the direction of electric system planning from the customer-member perspective. SMECO further noted that this opportunity for direct and extremely transparent stakeholder participation is unique to SMECO as an electric cooperative.