PUBLIC SERVICE COMMISSION OF MARYLAND

ENERGY STORAGE PILOT PROGRAM INTERIM REPORT

In compliance with Section 7-216(j) of
the Public Utilities Article,
Annotated Code of Maryland

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I. Introduction

On May 13, 2019, Maryland Governor Lawrence J. Hogan, Jr. signed into law Senate Bill 573 ("SB573"), the Energy Storage Pilot Project Act ("Act"), amending §7-216 of the Public Utilities Article, *Annotated Code of Maryland* ("Pub. Utils."), requiring the Maryland Public Service Commission ("Commission") to establish the Maryland Energy Storage Pilot Program ("Program"). As outlined in the Act, the cumulative size of the pilot projects under the Program shall be between 5 and 10 megawatts ("MW"), with a minimum of 15 megawatt-hours ("MWh"). The statute provides that each investor-owned electric company shall submit applications for Commission approval to deploy energy storage projects from at least two of the following models: (1) a "utility-only" model, (2) a "utility and third-party" model, (3) a "third-party ownership" model, and (4) a "virtual power plant" model, and one of which must be from either the "third-party ownership" or "virtual power plant" models. In addition, the investor-owned proposed projects must also be able to meet the program's timelines and data collection requirements and shall give priority to projects that directly defer or replace an existing or anticipated distribution need. Investor-owned companies may propose projects that do not directly defer or replace an existing or anticipated distribution need, if the project includes grid benefits, ratepayer benefits, or otherwise helps meet the State's policy goals. The investor-owned electric company shall describe in its application whether a project demonstrates an opportunity to reduce system costs.

In accordance with Pub. Utils. §7-216(j) of the Act, the Commission is required to submit an interim report providing its initial evaluation of the projects approved under this section based on: (1) project costs; (2) value streams; (3) any reductions in system costs; (4) any issues encountered in the early implementation phase; and (5) an analysis of any funds generated from the whole market[1] on or before July 1, 2024. This document is submitted to Maryland's General Assembly in accordance with §7-216(j) and serves as the Commission's interim report with its initial evaluation and summary of its implementation of the Energy Storage Pilot Program in accordance with the Act.

[1] The statute uses "wholesale market" at Pub. Utils. §7-216(c)(3)(ii) and (e)(1)(iii).

II. Energy Storage Pilot Program

Pursuant to the Act, the Commission issued Order No. 89240 on August 22, 2019, in Case No. 9619, *In the Matter of the Maryland Energy Storage Pilot Program*, establishing the Energy Storage Pilot Program and directing the Energy Storage Pilot Work Group ("Work Group") to reconvene in order to: (1) develop and propose metrics on environmental and clean energy objectives and impacts on the retail energy market for use in evaluating project proposals; and (2) submit a detailed list of the types of value streams each project application should consider by December 31, 2019. On December 31, 2019, after several meetings amongst Work Group stakeholders, a consensus work group report was filed with the Commission detailing the value streams that each proposed project application should reflect, and a description of the methodology and sample calculations for quantifying each of the value streams which included quantifiable value streams to which dollar amounts could be assigned, quantifiable value streams to which dollar amounts could not be assigned, and qualitative value streams for which the Work Group did not have a recommendation for a methodology for quantifying the value at the time of the report filing.[2] The following is a summary of the value streams recommended by the Work Group used to evaluate the energy storage pilot projects.[3]

A. Quantifiable Value Streams to Which Dollar Amounts Can Be Assigned

1. Environmental and Public Health Metrics
    a. Air Emissions Reduction Value
    b. Values for Public Health Benefits from Load Shifting
2. Distribution Grid Value
    a. Deferral or Avoided Transmission/Distribution System Upgrades
    b. Optionality
3. Peak Demand Reduction
    a. Energy Conservation During Time of Peak

[2] Maillog No. 228020.

[3] A more detailed description of each of the metrics and value streams recommended by the Work Group can be found in the PC 44 Energy Storage Work Group report filed in Case No. 9619, December 31, 2019, Maillog No. 228020.

b. Peak Shaving (Reduction of Zonal Capacity Obligation/Transmission Obligation)

4. PJM Market Activities
5. Distribution Service Improvements
    a. Reliability/Value of Avoided Outages
    b. Service Quality

B. Quantifiable Value Streams to Which Dollar Amounts Cannot Be Assigned

1. NOx (nitrogen oxides) Emissions Reductions
2. Land Use/Avoidance of Impacts

C. Qualitative Value Streams

1. Distributed Generation Hosting Capacity
2. Enhancement of Electric Vehicle Charging Infrastructure
3. Economic Development
4. Learnings
5. Non-Utility Participation
6. Offshore Wind
7. Grid Services - Operational Flexibility Related to Delivery of Electricity
8. Resilience (Higher Value for Select Locations)
9. Other Societal Benefits (Low/Moderate Income, Seniors, and Schools)
10. Third Party Supplier Participation
11. Willingness to Pay (Customer Participants)

Each type of energy storage project will not have a value for each of the value streams. Also, certain benefits fall under more than one of the value streams, so it was important to not double-count benefits.

As provided by Pub. Utils. §7-216(m), the Energy Storage Pilot Program will terminate on December 31, 2026.[4]

[4] In 2023, the Maryland General Assembly enacted HB910, amending §7- 216 and promulgating §7-216.1, which directed the Commission to establish a Maryland Energy Storage Program that provides a competitive energy storage procurement program, with annual deployment targets for energy storage devices in Maryland. To assist in

III. Overview of the Energy Storage Pilot Program Projects

On April 15, 2020, BGE, Pepco, Delmarva, and Potomac Edison filed applications for energy storage projects to be considered for inclusion in the Energy Storage Pilot Program.[5] Each Company submitted two battery energy storage system ("BESS") projects, each utilizing lithium-ion technology, for a total of eight energy storage pilot project proposals. On November 6, 2020, the Commission issued Order No. 89664 in Case No. 9619 approving six of the energy storage project proposals, rejecting Potomac Edison's Little Orleans project and deferred consideration of the Company's Town Hill project. On February 5, 2021, Potomac Edison filed its Urbana Park & Ride ("Urbana Project") project to replace its rejected Little Orleans project proposal. On March 30, 2021, the Commission approved Potomac Edison's Town Hill Project,[6] followed by approval of its Urbana Project on April 21, 2021.[7]

Of the eight projects approved by the Commission, five are currently operational, and two have operational start dates scheduled for fourth Quarter 2024 and first Quarter 2025.[8] **Table 1**, provides an overview of the energy storage projects that were approved by the Commission for inclusion in the Energy Storage Pilot Program.

developing this program, on October 2, 2023, the Commission by Order No. 90823 established the Maryland Energy Storage Program Work Group and opened Case No. 9715, *Maryland Energy Storage Program*.

[5] PSC Case No. 9619, Maillog Nos. 229737 and 229744.

[6] Commission Order No. 89783 in Case No. 9619.

[7] Commission Order No. 89805 in Case No. 9619.

[8] After the Commission granted Pepco's request to remove its National Harbor/Livingston Road Project from inclusion in the Program, Pepco was granted Commission approval to submit the Fairmont Heights Microgrid project for consideration as an alternative project to replace it. The Commission approved Pepco's Fairmont Heights Microgrid project at the June 12, 2024, Administrative Meeting.

Table 1: Energy Storage Pilot Program Projects

	BGE		Potomac Edison		Pepco		Delmarva	
	Fairhaven	Chesapeake	Myersville	Town Hill	Brookville Bus Depot	Fairmont Heights Microgrid	Elk Neck	Ocean City
Business Model	Utility Owned & Operated	Third Party Owned & Utility Operated	Utility Owned & Operated	Third Party Owned & Operated	Third Party Owned & Operated	Utility Owned & Operated	VPP	Utility Owned & Operated
Project Size (MW)	2.5 MW	1.0 MW	0.5 MW	1.75 MW	1.0 MW	0.227 MW	0.5 MW	1.0 MW
Duration (MWh)	4.0 MWh	2.0 MWh	1.328 MWh	8.4 MWh	3.0 MWh	0.292 MWh	1.5 MWh	3.0 MWh
Project Status	Operational	Operational	Operational	Pending	Operational	Pending	Operational	Pending

The Energy Storage Pilot Program currently has a total projected installed capacity of approximately 8.48 MW (5.5 MW currently operational) for a total projected energy output of approximately 23.52 MWh (11.83 MWh currently operational).

A. BGE

Fairhaven Substation Project

BGE's Fairhaven Substation Project is a utility owned and operated project that, in conjunction with the Company's Chesapeake Beach Project, will defer distribution upgrades and undergrounding of wires necessary in order to avoid potential winter overloads. The Project will provide 2.5 MW, a guaranteed 4 MWh over the 10-year life of the Project, and when not providing reliability service, there are plans for the Project to participate in the PJM Regulation Market.

Chesapeake Beach Project

BGE's Chesapeake Beach Project is a third-party owned and operated project that, when combined with BGE's Fairhaven Project, will defer the distribution costs for undergrounding 10 miles of wires and address the same load contingency as the Fairhaven Substation Project. The capacity of the Project is 1 MW and will guarantee an output of 1.5 MWh over the life of the project. BGE plans to utilize the Project to address distribution needs in the winter and will operate the Project in the PJM Regulation Market.

B. Potomac Edison

Myersville Project[9]

Potomac Edison's Myersville Project is a utility owned and operated 0.5 MW and 1.0 MWh energy storage unit that incorporates two electric vehicle ("EV") charging stations located at the Myersville Park & Ride. The Project does not defer any distribution upgrades but is used to serve two DC Fast Chargers ("DCFC") that are currently included in the Commission's approved EV Charging Pilot Program and are each capable of supplying 125 kW.[10] When the battery is not charging the DCFC, Potomac Edison is planning to operate the project in the PJM Regulation Market and Energy Market.

Town Hill Project

Potomac Edison's Town Hill Project is a third-party owned and operated project with a capacity of 1.75 MW and an energy rating of 8.4 MWh. The Town Hill Project is planned to address vegetation related outages that have impacted the reliability of the Company's Town Hill feeder, which has been a poorest performing feeder. The Project will defer the need to perform additional tree trimming for the circuit in addition to having to connect the feeder to another circuit using 7,000 feet of distribution wires and reconductoring five miles of conductor lines at an estimated cost of $1.7 million. The Project will also provide Potomac Edison with the capability to island the feeder at least 50 times each year or whenever an outage may occur.

[9] Potomac Edison's Myersville Project was originally proposed to be located at the Park & Ride in Urbana. By Letter Order issued on June 15, 2022, the Commission granted the Company's request to relocate the Project to the Myersville Park & Ride.
[10] PSC Case No. 9478.

C. Pepco

Montgomery County Bus Depot Storage Project

Pepco's Montgomery County Bus Depot Storage Project is a third-party owned and operated 1.0 MW project with an output of 3.0 MWh over the lifetime of the project. The Project is planned to defer the need to upgrade a feeder in Silver Spring to accommodate incremental loads due to electric bus charging and provide support for bus charging during distribution system outages. The energy storage system is designed to charge from the onsite solar array and will support charging activities at times when the load is too high and Pepco's distribution system is unable to supply the load.

Fairmont Heights Microgrid Project

Pepco's Fairmont Heights Microgrid Project is a utility owned and operated project comprised of two distribution energy resource systems: a 120 kW/186 kWh battery energy storage system ("BESS") connected to six single-family net zero homes with a solar photovoltaic system ("PV") each with 17.9 kW of storage for an additional 107.4 kW/106 kWh, for a total capacity of 227.4 kW with an energy output of 292.2 kWh for the microgrid project. Although the Project does not defer a distribution upgrade, it is expected to provide peak shaving benefits, local resiliency and islanding capabilities, and load management and grid flexibility given that the BESS will serve as a local source of energy for the homes. The Project is not expected to provide PJM Wholesale Market benefits.

D. Delmarva

Elk Neck Project

Delmarva's Elk Neck Project is a virtual power plant ("VPP") with a capacity of 0.5 MW with a guaranteed energy output of 1.5 MWh. Although the Project does not defer any distribution upgrades or address a contingency, the Project helps further the State's clean energy goals by providing the opportunity to learn more about VPPs as behind-the-meter ("BTM") energy storage, explore the capability of residential batteries to accommodate distributed generation, and study how VPPs can participate in the PJM Wholesale Market.

Ocean City Project

Delmarva's Ocean City 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. 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 also support a public library in the Ocean City area that will serve as a resiliency center for the community. When the Project is not providing peak shaving benefits, the Project will participate in the wholesale market.

IV. Initial Evaluation of Energy Storage Pilot Projects

Pursuant to Pub. Utils. §7-216(j), on or before July 1, 2024, in accordance with §2-1257 of the State Government Article, the Commission is to submit an interim report to the General Assembly that provides an initial evaluation of the projects approved under this section based on: (1) project costs; (2) value streams; (3) any reduction in system costs; (4) any issues encountered in the early implementation phase; and (5) an analysis of any funds generated from the wholesale market.

A. Project Costs

At the time of their initial filing for Commission approval of projects to be included in the Program, the Utilities were required to provide their best estimated project costs over the 10-year life of the project. **Table 2** summarizes the estimated costs for all the utility projects, both those currently operational and those that are still pending. Actual costs are the current cost accrued by projects that are operational.

Table 2: Energy Storage Pilot Projects Estimated and Actual Costs[11]

Utility	Project Name	Estimated Cost	Current Actual Costs[12]
BGE			
	Fairhaven	$9,841,000	$16,161,336
	Chesapeake	$2,524,000	$1,880,408
Pepco			
	Bus Depot	$2,683,000	$1,648,026
	Fairmont Heights	$3,664,000	N/A
DPL			
	Elk Neck	$3,964,000	$3,401,954
	Ocean City	$5,320,000	N/A
PE			
	Myersville	$1,431,098	$1,400,000
	Town Hill	$6,600,000	N/A

Of the projects that are currently operational, BGE's Fairhaven project is the only project whose actual costs to date have exceeded the estimated costs for the project. Although Delmarva's Elk Neck project and Potomac Edison's Myersville project actual project costs are nearing the estimated costs, neither project has exceeded the estimated project costs provided at the time of approval.

BGE

When initially proposed, BGE's Fairhaven Project was estimated to cost $9,841,000. Currently, the Company has reported actual costs of $16,161,336. BGE's Chesapeake project was

[11] The Fairmont Heights, Ocean City, and Town Hill projects are not yet operational.
[12] Actual costs represent the project costs as reported by the Utilities at the end of 2023.

estimated to cost $2,524,000 and the Company has currently reported actual costs of $1,880,408 as of May 1, 2023.

Pepco

Pepco's Bus Depot project was estimated to cost $2,683,000 and has reported current actual costs of $1,648,026 as of the end of 2023. Pepco's Fairmont Heights project is estimated to cost $3,664,000 over the life of the project. Actual project cost for the Fairmont Heights project is currently unavailable, as the Project was recently approved by the Commission at its June 12, 2024 Administrative Meeting and Pepco has not begun development of the energy storage unit. The projected operational start date for the Project is the first Quarter of 2025.

Delmarva

Delmarva's Elk Neck project was estimated to cost $3,964,000 and has currently reported actual costs of $3,401,954. The Company's Ocean City project is estimated to cost $5,320,000. Only Delmarva's Elk Neck project is currently operational; the Ocean City project currently has an operational start date of December 30, 2024.

Potomac Edison

Potomac Edison's Myersville project was estimated to cost $1,431,098 and has currently reported actual costs of $3,401,954. PE's Town Hill project is currently estimated to cost $6,600,000 with an operational start date of October 31, 2024.[13]

Increases in vendor costs, equipment shortages, and the installation of IT communications software and equipment have been some of the most notable causes reported by the utility companies for unanticipated increases in project costs. Some ways in which utilities are trying to address increases in project costing have been to standardize the development and implementation of energy storage projects to either reduce overall costs or better control unanticipated cost increases. Although the costs and pricing outlook for energy storage systems shows a decrease in the price of lithium, battery cells, and containers over the next four years,[14] the maturation of new

[13] Potomac Edison's Town Hill Project's scheduled operational start date is currently pending Commission approval as of the time of this report.
[14] "ESS Price Forecasting Report (Q1 - 2024)", Clean Energy Associates, June 2024.

energy storage technologies and the availability of raw materials is expected to continue to impact the implementation and development costs of energy storage projects and the global market.

B. Value Streams

The Work Group established several value streams that the energy storage pilot projects could possibly offer, with distribution deferral, safety and reliability, and emissions benefits being the most common. Distribution deferral refers to the cost savings realized by the avoidance of traditional utility distribution investments needed to address load growth, contingencies, and other distribution grid needs. Safety and reliability refer to the benefits associated with having an electricity grid that experiences fewer interruptions or avoids electricity outages; this is represented by the system average interruption frequency index ("SAIFI") metric. An emissions benefit focuses on the benefits of reducing greenhouse gas emissions ("GHG"), in particular the reduction of CO_2 emissions benefit. The value streams for each project are summarized in **Table 3** below.

Table 3: Utility Projects Value Streams[15]

Utility		Distribution Deferral (Cumulative $)	Distribution Deferral (Time)	Safety / Reliability (SAIFI, 2023)	Emissions Benefit (CO_2 Reduction)
BGE					
	Fairhaven	$ 4,939,000	10 Years	1.16	49.45 Metric tonnes
	Chesapeake	$ 1,080,000	10 Years	1.49	33.77 Metric tonnes
Pepco					
	Bus Depot	$ 6,372,200	N/A	N/A	N/A (uses photovoltaic charging)[16]
	Fairmont Heights	N/A	N/A	N/A	N/A
DPL					
	Elk Neck	N/A	N/A	0.17	N/A
	Ocean City	N/A	N/A	N/A	N/A
PE					
	Myersville	N/A	N/A	N/A	-2.7 metric tonnes
	Town Hill	N/A	N/A	N/A	N/A

Distribution Deferral Benefit

BGE's Fairhaven and Chesapeake projects claim $4,939,000 and $1,080,000 in cumulative distribution deferral benefit, respectively, and are intended to defer traditional utility investments for 10 years. Pepco's Bus Depot claims a cumulative distribution deferral benefit of $6,372,200 for the avoidance of a feeder upgrade that would have been necessary to serve an

[15] The Town Hill, Ocean City, and Fairmont Heights projects are not yet operational, and therefore did not have metrics to report for this data set.

[16] The avoided emissions benefit associated with Pepco's Bus Depot project has yet to be determined by the Company.

electric bus depot. Pepco's Fairmont Heights project and both of Delmarva's projects are not intended to defer any distribution upgrades or provide distribution deferral benefits. Potomac Edison's Myersville project also does not claim any distribution deferral benefits but provides insight as to how battery storage can be leveraged to support electric vehicle chargers by minimizing the impact of demand spikes on the distribution system.

Distribution Service Improvements

Delmarva's Elk Neck project and both BGE's Fairhaven and Chesapeake projects provided reliability benefits in 2023 for their respective electric systems by helping avoid electric outages. For the 2023 calendar year, BGE's Fairhaven project reported a SAIFI benefit of 1.16 avoided outages, while the Company's Chesapeake project reported a SAIFI benefit of 1.49 avoided outages. In 2023, Delmarva reported a loss of power numerous times between three Delmarva feeders associated with the 110 customer battery locations connected to the Company's Elk Neck VPP. The VPP batteries were able to provide a total of 96,600 minutes of backup power and 85.39 avoided outage hours. This is equivalent to a SAIFI benefit of 0.17 avoided outages. Pepco's Bus Depot project has not experienced any service interruptions since the project was placed in service and Potomac Edison's Myersville project does not feed into the distribution grid, so there were no safety and reliability benefits reported by either project. Delmarva's Ocean City project, Pepco's Fairmont Heights project, and Potomac Edison's Town Hill project are not yet operational, so safety and reliability benefits are not yet available.

CO_2 Emissions Reduction Benefits

Several of the projects that are operational have reported emissions benefits, except for Potomac Edison's Myersville project, which reported a net increase in CO_2 emissions of 2.7 metric tonnes due to efficiency losses of the project. BGE's Fairhaven project reduced CO_2 emissions by 49.45 metric tonnes while the Chesapeake project reduced CO_2 emissions by 33.77 metric tonnes. Pepco's Montgomery County Bus Depot project does not produce a reduction in air emissions, but rather an avoided emissions benefit. However, at this time, Pepco has found it difficult to estimate the contribution of avoided emissions provided by charging the BESS from the solar photovoltaic system versus the emissions produced by charging from the distribution grid, as the BESS only charges from the grid in the absence of energy supplied by the solar photovoltaic system. The Company has found it difficult to estimate the contribution of avoided

emissions provided by charging the BESS from the solar photovoltaic system versus the emissions produced by charging from the distribution grid. Since the battery is only charged by the solar photovoltaic system, it would produce a significant amount of greenhouse gas avoided emissions since the solar photovoltaic system does not produce any emissions. Delmarva could not provide emissions benefits data for its Elk Neck Project due to the nature of the project being a VPP with 110 unique locations across three feeders. The Company has had difficulty determining the best accounting methodology to isolate the benefits associated with the project from other grid activities. Delmarva has since contracted a vendor to work with the Company in establishing a reliable accounting methodology that will help track the emissions reductions realized by the various battery locations. Delmarva's Ocean City project and Pepco's Fairmont Heights project are not yet operational and therefore do not have emissions benefits data to report at this time.

It is expected that CO_2 emission reduction metric data for the Town Hill, Fairmont Heights, and Ocean City projects will be available once the projects are fully operational and a consistent method of tracking emissions benefits have been established.

C. Reduction in System Costs

The Work Group defined reductions in system costs as dollars avoided, adjusted for carrying costs per utility approved rate of return ("ROR"). Several projects are expected to reduce system costs by deferring capital investments that address load growth or reliability contingencies on the electric system. BGE's Fairhaven and Chesapeake Beach projects, and Potomac Edison's Town Hill project are the only projects that will provide a reduction in system costs by deferring distribution system upgrades.

Potomac Edison's Town Hill project will defer distribution system upgrades by improving the reliability of a poor performing circuit and avoid the need to reconductor, underground sections of the feeder, install additional distribution automation reclosers and voltage regulators, and create new rights-of-way along the circuit, for an estimated deferral cost benefit of $1.6 million. Collaboratively, BGE's Fairhaven and Chesapeake Beach projects will address reliability contingencies on BGE's electric system. The Company's Fairhaven project is expected to defer distribution upgrades totaling approximately $1.256 million, present value. BGE's Chesapeake

Beach project is expected to defer a capital investment of $271,000, present value. The remaining projects either do not defer distribution system upgrades or are not expected to address a reliability contingency or load growth on the Company's electric distribution system.

D. Issues Encountered During the Implementation Phase

Pub. Utils. §7-216(h)(6) provides:

> (i) except as provided in subparagraph (ii) of this paragraph, on or before February 28, 2022, all approved projects shall become operational, (ii) the Commission may, for good cause shown, grant an extension from the deadline established in subparagraph (i) of this paragraph for unanticipated project development delays, and (iii) the Commission may establish additional interim deadlines.

Since the approval of the energy storage projects in the Program, Utilities have requested several operational deadline extensions due to unanticipated project development delays which have caused implementation issues. The most common issues encountered by the Utilities have been permitting delays, supply-chain disruptions leading to lengthy lead-times for the acquisition of equipment, and engineering redesigns. These impediments to the anticipated development of a number of projects undercut the lessons to be learned from a pilot program. The issues related below are examples of the challenges faced when adopting new technologies, i.e.—difficulties of the proposed projects to meet existing state and local siting permitting requirements, engineering redesigns of projects, and unanticipated matters like a world-wide pandemic. All these factors impeded the timely rollout of projects.

Permitting Delays

Projects in the Program are located in various jurisdictions throughout the State of Maryland and Utilities have reported experiencing permitting issues from municipalities, counties, and state agencies that have led to delays in the implementation of the projects. The most commonly shared causes for permitting delays were project designs not meeting required safety and maintenance or clearance requirements, engineering redesigns that required changes to site plans previously submitted, and underestimation of the time it took to undergo the permitting process. Other issues included municipalities and counties that either lacked existing regulations

that accommodated energy storage technologies, or the municipalities or counties were still in the process of creating new regulations to accommodate these emerging technologies.

Supply-Chain Disruptions & Lead-Times for Equipment

With the onset of COVID-19 in the fall of 2019, the Utilities' vendors reported experiencing unanticipated supply-chain shortage issues related to the acquisition of battery components, transformers, and switchgear equipment resulting in longer than anticipated lead-times which significantly impacted project schedules. Even when vendors were forced to consider other manufacturer equipment with shorter lead-times, Utilities still needed to request and obtain operational deadline extensions from the Commission as shipping delays were unanticipated and historically longer than pre-COVID.

Engineering Redesigns & Equipment Deficiencies

Another commonly reported issue encountered by Utilities during the implementation of the energy storage projects was unanticipated project development delays due to the engineering redesign of projects. With the complexity involved with the development of utility-scale energy storage projects, several Utilities reported having to redesign projects during the commissioning phase of the projects after preliminary analysis was performed by developers or third-party engineering consultants. This often resulted in the Company having to make significant design changes to their initial project plans. In other cases, the engineering process for some Utilities took longer than anticipated after acquiring manufacturer equipment that either did not conform to the Company's design plans or to necessary safety standards.

To better address the various issues encountered by Utilities during the development of the energy storage projects, the Companies have been encouraged to make an increased effort to engage developers and their vendors during the internal project planning phase to get ahead of any potential issues that could lead to project delays. The Utilities have also been proactive in maintaining a list of alternative vendors and equipment manufacturers to address future supply-chain shortage issues and ensure alternative methods of acquiring equipment in a timely fashion.

E. Funds Generated from the PJM Wholesale Market

PJM market revenues refer to revenues generated from participating in the PJM Wholesale Market ("Wholesale Market"). Wholesale Market benefits can be generated from several different revenue streams which include PJM's Regulation Market, Reserve Market, and Energy Market. PJM's Regulation Market involves corrections to fluctuations in the power system so that a frequency of 60 Hertz can be maintained.[17] The Reserve Market is a service where electricity supplies that are not currently being used are reserved for if there is an unexpected loss of generation.[18] PJM's Energy Market provides revenues if the energy storage unit charges energy at a lower price while dispatching energy at a higher price; this is known as arbitrage. Not all the projects have benefits from participating in the Wholesale Market since some of the projects do not directly benefit ratepayers.

Except for BGE's Chesapeake project, none of the projects have yet to report revenues generated from participating in the Wholesale Market.[19] BGE's Chesapeake project had an expected cumulative PJM Wholesale Market revenue benefit of zero; however, the project has since generated net revenue of $6,985 solely from its participation in the Regulation Market. A summary of the Wholesale Market revenues expected and generated by each of the projects are provided below in Table 4.

[17] Regulation Market, PJM Learning Center. PJM, Jun. 6, 2020, https://learn.pjm.com/three-priorities/buying-and-selling-energy/ancillary-services-market/regulation-market.aspx.

[18] Reserves, PJM Learning Center. PJM, Jun. 18, 2020, https://learn.pjm.com/three-priorities/buying-and-selling-energy/ancillary-services-market/reserves.aspx.

[19] Neither of Potomac Edison's projects (Myersville and Town Hill) are expected to participate in PJM's Wholesale Market, as proposed by the Company at filing.

Table 4: Utility Projects PJM Market Revenues

Utility		Expected Benefit		Actual Benefit	
		Present Value	Cumulative Benefit	Gross Revenue	Net Revenue
BGE					
	Fairhaven	$2,387,000	$5,923,000	N/A	N/A
	Chesapeake	$0	$0	$32,180	$6,985
Pepco					
	Bus Depot	$0	$0	N/A	N/A
	Fairmont Heights	$0	$0	N/A	N/A
DPL					
	Elk Neck	$641,000	$1,080,000	N/A	N/A
	Ocean City	$1,512,000	$2,474,000	N/A	N/A
PE					
	Myersville	N/A	N/A	N/A	N/A
	Town Hill	N/A	N/A	N/A	N/A

BGE's Fairhaven project had an expected cumulative Wholesale Market revenue benefit of $5,923,000, and Delmarva's Elk Neck and Ocean City projects had an expected cumulative Wholesale Market revenue benefit of $1,080,000 and $2,474,000, respectively. None of these projects participated in the Wholesale Market in 2023; therefore, there are no actual benefits that have been realized. Pepco's Bus Depot project and Fairmont Heights project both have an expected cumulative Wholesale Market revenue benefit of zero, but neither of the projects participated in the Wholesale Market this past reporting period.

Several Utilities have indicated that delays in their participation in the Wholesale Market participation are the result of the lengthy process of identifying qualified contractors who will act as agents on the company's behalf and finalizing contractual agreements. Another notable cause

of delays in Wholesale Market participation has been the difficulty in aligning company IT communications systems with that of contractors to ensure that all required cybersecurity standards are met. However, behind-the-meter energy storage project owners continue to express interest in opportunities to provide grid services and ratepayer benefits in Maryland's retail market, which has been reinforced by the state's new DRIVE Act[20]. In addition, behind-the-meter energy storage project incentives are being considered in Case No. 9715[21].

V. Conclusion

The Commission appreciates the opportunity to provide the General Assembly with an interim report on the status of Maryland's Energy Storage Pilot Program, in accordance with Pub. Utils. §7-216(j) of the Act. The Commission will continue to monitor the progress of Energy Storage Pilot Program projects, both those operational and those whose operational start dates are scheduled for the fourth Quarter 2024 and first Quarter 2025. A further update will be provided in the Commission's December 31, 2026 report to the General Assembly.

[20] The DRIVE (Distributed Renewable Integration and Vehicle Electrification) Act was introduced as Senate Bill 0959 and signed by the Governor on May 9, 2024.
[21] Case No. 9715, Maryland Energy Storage Program.