

**ORDER NO. 90454**

In the Matter of the Maryland Energy  
Storage Pilot Program

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BEFORE THE  
PUBLIC SERVICE COMMISSION  
OF MARYLAND

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Case No. 9619  
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**Issue Date: December 27, 2022**

**ORDER ON REPORT OF ENERGY STORAGE WORKING GROUP**

1. On November 26, 2020, the Commission issued Order No. 89664, approving six pilot energy storage projects. That Order also directed the Public Conference 44 (“PC44”) Energy Storage Working Group (the “Working Group”) to reconvene to develop updated recommendations on data collection, metrics, and related pilot parameters for each project approved and, for presently unquantified value streams, to propose realistic metrics in anticipation of improved valuation methods in the future. On March 31, 2021, the PC44 Energy Storage Working Group filed a Report (the “Report”) containing updated recommendations.
2. On April 2, 2021, the Commission invited stakeholder comments on the Report. The Commission received comments from the Institute for Policy Integrity at NYU School of Law (the “IPI”), The Potomac Edison Company (“Potomac Edison”), and Commission Staff (“Staff”).
3. After consideration of the Report and the comments of stakeholders, the Commission approves the recommendations of the Report, as described below. The

Commission also directs that the piloting utilities<sup>1</sup> shall install power quality measurement equipment at each storage project, and that the Working Group shall file with the Commission, at least 90 days in advance of July 1, 2026, a report addressing whether the projects altered the quality and availability of electricity supply.

### **I. The Report**

4. Preliminarily, the Working Group recommends that the utilities continue to use the Commission-approved EmPOWER Maryland (“EmPOWER”) values, metrics, and methodologies and that the Commission require the utilities to consult with the EmPOWER Evaluation Advisory Working Group at least annually before preparing their reports to assess and determine whether any EmPOWER values, metrics, or methodologies used in their evaluations have changed.

5. The Report recommends that if a utility incorporates a subsequent change to any value, metric, or methodology into a storage project evaluation, the utility should be required to provide an explanation of the resulting change in its analysis.

6. The Report recommends that the Working Group should convene once a year each January to review the utilities’ analyses and confirm the EmPOWER metrics contained within the analyses, in advance of the annual reporting.

7. The remainder of the Report is divided into two sections, one addressing updated metrics for previously unquantified value streams, and another addressing data reporting requirements.

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<sup>1</sup> The energy storage piloting utilities include Baltimore Gas and Electric Company, the Potomac Electric Power Company, Delmarva Power & Light Company, and the Potomac Edison Company. Southern Maryland Electric Cooperative received approval to implement an energy storage pilot program but has not yet submitted a project proposal for Commission review and approval.

## **A. Updated Metrics**

8. The Report states that the Working Group reviewed and made modifications to the metrics and value streams previously addressed by the Commission. The Report recommends three categories of modifications: (1) changes to the proposed calculations and data for emissions value streams where new information or data has been made available, (2) clarifications on methodology and approaches to quantifying previously identified value streams, and (3) new proposals or refinements for methods to quantify value streams for which no dollar value had been previously determined. The Report also identifies a list of value streams that remain unquantified and specifies challenges to quantifications where possible.

### **1. Changes to Emissions Metrics**

9. The Report states that PJM Interconnection, LLC (“PJM”) has developed more granular methods of tracking CO<sub>2</sub>, NO<sub>x</sub>, and SO<sub>2</sub> emissions. The Report recommends that emissions changes be reported separately for CO<sub>2</sub>, NO<sub>x</sub>, and SO<sub>2</sub>. The Report recommends that, although EmPOWER currently uses a composite value for NO<sub>x</sub> combined with SO<sub>2</sub> and particulate matter, if in the future the EmPOWER value for NO<sub>x</sub> is separated out from the other pollutants, the Working Group should convene to discuss how to incorporate that individualized value.

10. The Report recommends that the above-referenced new PJM emissions data should be incorporated in the quantification of the carbon dioxide and NO<sub>x</sub> emissions reductions benefits of the energy storage projects in Maryland due to peak shifting. The Report recommends this peak-shifting measure be reported for the critical peak event hours

declared for each utility annually. The Report included sample calculations in an attachment.

11. The Report recommends that emissions impacts from storage assets operating in a frequency regulation mode (within the PJM markets) – which are calculated by analyzing round-trip emissions losses from charging and discharging within the same time period – be reported separately from impacts during non-frequency regulation mode periods. The Report further recommends tracking the average emissions for all three PJM pollutant emissions factors for both charging and discharging. If average hourly emissions are not available, the Report recommends using marginal unit hourly emissions rates during frequency regulation periods. The Report included sample calculations in an attachment.

12. The Report states that the Environmental Protection Agency (“EPA”) is revising its public health quantification tool – for measuring pollution reduction per kWh of energy efficiency or renewable energy – to be directly applicable to energy storage projects. The Report recommends that, if the EPA makes this tool available during the pilot project period of this case, the Working Group should convene and provide any recommendations. Until then, the Working Group recommends waiting to measure this public health value stream.

## **2. Clarifications to Quantified Value Streams**

13. The Report recommends that utilities report annually additional utility investments related to load growth on the feeders/substations impacted by the storage projects when the planned investment equals or exceeds \$500,000 in aggregate within the time frame covered by the utilities’ claimed deferral period costs. If a utility’s storage projects are deferring infrastructure projects unrelated to load growth, the Report recommends that the utility

should report the appropriate metrics instead, such as measures of reliability or resiliency. The Report recommended that, as part of that filing, utilities should include a discussion of the progress and status of any identified projects being deferred or avoided for each energy storage project with the goal to better understand if a storage project enables utilities to defer planned upgrades, or if the deferral is due to external factors.

14. The Report recommends that, in order to better quantify and understand the value of optionality for the pilot storage projects – savings from deferring or avoiding traditional distribution system investments due to changes in anticipated load forecasts – the utilities will report annually the actual peak electric loads (not normalized for weather) and the distribution planning load forecast (90/10) for the substations and feeders affected by each project.

15. The Report recommends that utilities should remove any distribution benefits from the EmPOWER Maryland avoided capacity assumptions while maintaining the avoided costs values for generation, transmission, and DRIPE (demand reduction induced price effect) as quantified values because the utilities have already determined if the projects will avoid a distribution upgrade.

## **B. Proposals for Previously Unquantified Value Streams**

### **1. Reliability**

16. The Report recommends including MAIFI (Momentary Average Interruption Frequency Event Index) in the metrics used for quantifying the improved distribution reliability resulting from energy storage systems. The Report recommends that the SAIDI (System-Average Interruption Duration Index), SAIFI (System-Average Interruption Frequency Index), and MAIFI metrics should have no Major Outage Event exclusions and

should be measured by the feeders that are affected by the system on a daily, monthly, and annual basis, and that the utilities provide reasons for abnormal site metrics where applicable.

17. The Report recommends that utilities report any potential adverse impacts on the grid resulting from technical issues such as unintentional islanding. Such reports should include a description of the event, the time and date, the duration, and the cause.

## **2. Resilience**

18. The Report does not make any recommendation as to the appropriate dollar values to quantify resilience benefits from deploying energy storage. The Report recommends that utilities report, as a measure of customer resiliency, the minutes of energy provided by energy storage assets in islanding mode while grid power is unavailable. The Report also recommends that utilities report, as a measure of grid resiliency, the amount of time (hours or days) for restoration of feeders/circuits and for the entire grid after a major outage event.

## **3. The Value of Avoided Land Use from Deployment of Energy Storage Projects**

19. The Report states that the Working Group does not believe the methodology it outlined in its December 31, 2019, report will capture the value of avoided land use associated with the pilot storage projects because of their small size. The Report recommends that, for the purposes of the pilot program, land use impacts be quantified by demonstrating avoided land use from the distribution deferral of the energy storage projects (e.g., new right-of-way for distribution plant), with utilities tracking avoided land use and acreage for each project where greater than 0.25 acres has been directly avoided. The Report does not make a recommendation as to the appropriate dollar valuation of this impact.

### **C. Qualitative Value Streams without Quantitative Proposals**

20. The Report states that the Working Group was unable to develop any improved proposals for quantifying five areas: (1) distributed generation hosting capacity, (2) enhancement of electric vehicle charging infrastructure, (3) economic development, (4) non-utility participation, and (5) third-party supplier participation.

### **D. Data Reporting**

21. The Report provides recommended updates to the data reporting requirements necessary to meet the statutory requirements of the pilot, and categorizes those updates as relating to costs, quality or availability of electricity supply, and site operation metrics. The Report includes a comprehensive list of data reporting recommendations in Exhibit A.

22. For cost reporting, the Report recommends differentiating the cost reporting requirements based on the business model employed by the project. For projects where the utility has visibility into the total costs of the energy storage system, the Report recommends the costs should be itemized based on the different cost components of the system. For projects where the utility has contracted with a third-party, the Report recommends the costs should be the dollar value of the contracted services or payment terms. For projects using the Virtual Power Plant model where the utility is working with a third-party to deploy customer-sited storage, the Report recommends that the cost of the energy storage system should be required to be reported to the Commission.

23. For reporting on the quality and availability of electricity supply, the Report states that Staff believes Public Utilities Article (“PUA”), *Annotated Code of Maryland*, § 7-216(k)(1)(ix) requires tracking power quality for each project and that the Working Group concluded, based on utility information, that it would cost approximately \$30,000 per

project to track detailed power quality data, such as Total Harmonic Distortion, Total Demand Distortion, System Average RMS Variation Frequency, and SARF170. The Report states that Staff recommends that utilities provide daily, monthly, and annual data on power quality where possible and provide reasons for any abnormal power quality metrics. Staff also recommends that the utilities install power quality meters before the energy storage units are built in order to establish a baseline that can be used to determine the effects of energy storage on the power quality of each of the impacted circuits. The Report states the utilities believe that power quality can be assessed during the pilot period by examining periods of charging, discharging, and inactivity. Consequently, there was no consensus on the extent to which PUA § 7-216(k)(1)(ix) requires power quality metering equipment.

24. For reporting on-site operation metrics, the Report states that the utilities have agreed to install a power quality meter at one of each of the utilities' projects, and to provide hourly data for charging and discharging by use type for all projects.

## **II. The Stakeholder Comments**

### **A. IPI**

25. The IPI states that it supports the Report's recommendation to modify the calculation of avoided air pollution and public health value streams. It also encourages the Commission to recognize that it can, and should, apply more broadly the same principles that inform the Working Group's recommendation to use marginal emissions rates reported by PJM to assess the net emissions impacts of energy storage projects. The IPI argues that, even if PJM delays or alters its plans for emissions reporting, the Commission could still direct utilities to use alternative methodologies to assess how marginal emissions rates



interact with the net emissions impacts of storage. The IPI suggests that the Commission could explore options for making net emissions impacts a factor that informs incentives to deploy and compensate distributed energy resources.

### **B. Potomac Edison**

26. Potomac Edison states that it does not utilize smart meters, so it cannot report MAIFI<sub>E</sub>, as recommended in the Report.

27. Potomac Edison also states that it is concerned that the Report recommends the disclosure of certain commercially sensitive third-party data, such as information about discharge profiles or technology and software. Potomac Edison asks that the Commission make clear that parties may designate information as confidential when circumstances warrant.

### **C. Staff**

28. Staff is concerned that there is no firm agreement by the participating utilities to provide the operational, reliability, and power quality data in the template formats circulated by Staff as part of the Working Group. The Report includes Attachment A, a spreadsheet that captures the Working Group's updated recommendations on data collection, metrics, and related Pilot parameters. The Report states that Staff circulated initial draft templates, for reporting purposes, for the Working Group's consideration, though these were not filed with the Commission.

### III. Commission Decision

29. The Commission finds the Working Group’s recommendations to be reasonable and will help achieve the goals of PUA § 7-216. The Commission directs that the piloting utilities shall begin data collection and reporting in accordance with those recommendations. The Commission also directs that, as recommended by Staff, utilities shall install power quality measurement equipment for each storage project and shall work with the other Working Group members to agree on data reporting templates. The Working Group shall file with the Commission a report addressing whether the projects altered the quality and availability of electricity supply at least 90 days in advance of July 1, 2026.

30. The Commission notes the concerns raised by Potomac Edison that it is not able to track MAIFI at this time and that parties may need to make confidential filings. The MAIFI requirement is waived as to Potomac Edison until such time as it is able to track MAIFI. Parties should make confidential filings, if necessary, consistent with standard Commission practice and PUA § 7-216(h)(7)(ii).

*/s/ Jason M. Stanek*  
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*/s/ Michael T. Richard*  
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*/s/ Anthony J. O’Donnell*  
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*/s/ Odogwu Obi Linton*  
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*/s/ Patrice M. Bubar*  
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Commissioners