Energy Storage Association

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April 12, 2018

David J. Collins, Executive Secretary
Maryland Public Service Commission
William Donald Schaefer Tower
6 St. Paul Street, 16th Floor
Baltimore, Maryland 21202

RE: In the Matter of Revisions to COMAR 20.50.02 and 20.50.09 – Small Generator Facility Interconnection Standards (RM 61)

Dear Mr. Collins:

The Energy Storage Association ("ESA") respectfully submits the attached comments in response to the Public Service Commission's ("Commission") Notice of Rulemaking and Notice of Rulemaking Session filed on March 20, 2018.

ESA was established 28 years ago to foster development and commercialization of energy storage technologies. Since then, its mission has been the promotion, development and commercialization of competitive and reliable energy storage delivery systems for use by electricity suppliers and their customers across the United States. ESA members represent a diverse group of entities, including electric utilities, energy service companies, independent power producers, project developers, technology manufacturers and component suppliers.

ESA's comments aim to supplement written comments made by ESA on January 17, 2018 and oral comments made by ESA at the RM 61 hearing on January 23, 2018, and to provide an update on progress made in the Interconnection Workgroup on changes to regulations for small generator facility interconnection processes and standards (Code of Maryland Regulations 20.50.02 and 20.50.09) related to energy storage.

Sincerely,

Nitzan Goldberger
State Policy Director
Energy Storage Association

BEFORE THE PUBLIC SERVICE COMMISSION OF MARYLAND

In the Matter of Revisions to COMAR 20.50.02 and 20.50.09 – Small Generator Facility Interconnection Standards	**)** **)** **)** **)** **)** **)**	**Administrative Docket RM 61**

COMMENTS OF THE ENERGY STORAGE ASSOCIATION

Pursuant to the Maryland Public Service Commission's ("Commission") Notice of Rulemaking and Notice of Rulemaking Session filed on March 20, 2018, the Energy Storage Association ("ESA") respectfully submits the following comments for the Commission's consideration in Rulemaking ("RM") 61.

In these comments, ESA's provides supplemental information to written comments made by ESA on January 17, 2018 and oral comments made by ESA at the RM 61 hearing on January 23, 2018. These supplemental comments include a response to questions raised at the hearing on January 23, 2018, related to safety and inadvertent export and an update on progress made in the Interconnection Workgroup on changes to regulations for small generator facility interconnection processes and standards (Code of Maryland Regulations 20.50.02 and 20.50.09) related to energy storage.

I. ABOUT THE ENERGY STORAGE ASSOCIATION

ESA was established 28 years ago to foster the development and commercialization of energy storage technologies. Since then, its mission has been the promotion, development and commercialization of competitive and reliable energy storage delivery systems for use by

electricity suppliers and their customers. ESA's office is located in the District of Columbia. ESA members represent a diverse group of entities, including electric utilities, energy service companies, independent power producers, technology developers -- of advanced batteries, flywheels, thermal and compressed air energy storage, pumped hydro, and supercapacitors -- and component suppliers. ESA engages in regulatory and legislative policy efforts and includes leaders in the energy storage marketplace among its members.

II. RESPONSE TO SAFETY QUESTION IN JANUARY 23, 2018 HEARING

During the hearing, Commissioner O'Donnell requested additional information about the safety capabilities of energy storage devices installed behind-the-meter, most notably in relation to the proposal of ESA and others to define and allow inadvertent export. The Commissioner expressed concern that inadvertent export could harm linemen and anyone else exposed to the distribution system during an outage event may be harmed. With these comments, ESA clarifies that energy storage devices, like solar photovoltaic ("PV") systems, are equipped with inverters with anti-islanding functionality, which do not allow *any energy* to be exported when the distribution system is de-energized, e.g., during an outage, in order to protect utility personnel and anyone else that may come into contact with the distribution system, such as emergency responders. Under ESA's proposal, inadvertent export would *only* occur when the distribution system is energized and operational; it would *never* occur during an outage event. In this way, the rules for storage would remain consistent with the rules today for solar PV systems.

In our work across the United States, ESA is committed to advancing rules and regulations governing energy storage that ensure the continued safety and reliability of the grid. In fact, it is our belief that the deployment of energy storage can enhance grid safety and reliability. ESA believes that the proposed language ESA has recommended for inclusion in the small generator facility interconnection processes and standards (Code of Maryland Regulations

20.50.02 and 20.50.09) submitted to the Commission on January 17, 2018, ensures grid safety. We offer the following comments in support of that claim.

Energy storage systems, whether they are discharging energy in response to a utility program or wholesale markets, or through inadvertent export as discussed in written comments and at the January 23, 2018 meeting, are not a threat to grid safety and the safety of those workers who maintain the grid. Inverters deployed with the system ensure that the system responds immediately when there are changes to the grid, including grid de-energization. There is no difference between inverters deployed on solar PV and energy storage systems. Like solar systems, grid-connected energy storage systems are prevented from exporting electricity when the distribution system is de-energized, such as during an outage event, to ensure that those persons working on repairing damage to electricity infrastructure and anyone else that may be exposed to the grid, such as emergency responders, are not harmed in the process.

This functionality, which is built into the inverter, is called anti-islanding protection. To answer Commissioner O'Donnell's question directly: anti-islanding protection is triggered any time the distribution system is de-energized, such that all exports, including inadvertent export, cease from that time until it is safe for the facility to be deliberately re-connected to the grid. As a result, inadvertent export poses no risk to linemen working on a grid that is down. Inadvertent export would only be allowed when the grid is energized.

National standards, tests, and certifications, namely IEEE 1547.1, UL 1741, and UL 1741SA, govern anti-islanding functions, and we provide those references in this document as additional background. Inverters get tested for anti-islanding using either the IEEE 1547.1 test (older inverters) or the UL 1741SA test (advanced inverters). Both IEEE 1547.1 and UL 1741 are explicitly incorporated into COMAR. ESA does not propose any changes to these anti-islanding provisions, nor does any other party. Relevant provisions include:

- IEEE 1547-2003 4.4.1: “For an unintentional island in which the DR [Distributed Resource] energizes a portion of the Area EPS [Electric Power System] through the PCC [Point of Common Coupling], the DR interconnection system shall detect the island and cease to energize the Area EPS within two seconds of the formation of an island.”
- UL 1741 40.1 and 46.1: “A utility-interactive inverter and interconnection system equipment (ISE) shall comply with the Standard for Interconnecting Distributed Resources With Electric Power Systems, IEEE 1547, and the Standard for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems, IEEE 1547.1, excluding the requirements for Interconnection Installation Evaluation, Commissioning Tests, and Periodic Interconnection Tests.”
- UL 1741SA 1.1: “…These Grid Support Functions may impact an inverter’s anti-Islanding functionality; therefore Anti-islanding testing will be conducted with these functions enabled as described in the applicable sections below.”
- UL 1741SA 8.1.1 “This unintentional islanding test procedure addresses unintentional islanding evaluation on the Equipment Under Test (EUT) with grid support functions enabled. This test differs from IEEE 1547.1-2005, Section 5.7.1, by including grid support functions, i.e. commanded active power level, commanded reactive power level, voltage/frequency ride-through functions, and autonomously implemented voltage and frequency grid support functions.”
- COMAR 20.50.09.07: “(A) An interconnection request may be eligible for expedited interconnection review if the small generator facility uses lab-certified or field-approved interconnection equipment. (B) Interconnection equipment shall be considered to be lab-certified upon establishment of the following: … (7) The interconnection equipment is: (a) Evaluated by a NRTL in accordance with the following codes and standards: (i) IEEE

Standard 1547, including use of IEEE Standard 1547.1 testing protocols to establish conformity, which are incorporated by reference in COMAR 20.50.02.02; and… (b) Certified by Underwriters Laboratories under UL Standard 1741."

As indicated in our written and oral comments, ESA continues to believe that the Commission should define inadvertent export and otherwise incorporate the concept into COMAR (recognizing that this would only occur when the distribution system is energized, and at quantities and durations deemed safe). Our previous comments describe in detail the need for energy storage to the success of energy storage in Maryland, including energy storage paired with solar generation.

III. UPDATE ON WORKGROUP PROGRESS ON STORAGE ISSUES

The following comments are intended to provide an update on progress made to address non-consensus items related to energy storage in the interconnection workgroup.

Inadvertent Export

As we noted previously in written and oral comments, ESA believes that several non-consensus items related to energy storage can be incorporated into the new regulations without compromising grid safety and reliability. ESA's recommendations align with proposals or existing distribution interconnection standards in Arizona, Nevada, California, New York, Colorado, and Hawaii and are based on robust stakeholder input. As noted in earlier comments, incorporating a definition for inadvertent export for systems that are non-exporting enables customers to deploy non-exporting systems that are intended to help manage load behind the meter, while recognizing that there are times when those systems will inadvertently export small amounts of power for very short durations when there is an unexpected fluctuation of load that

causes a mismatch between system output and load consumption, so long as the grid is energized. Inadvertent export would be limited in those instances to quantities and durations that have been determined in robust regulatory processes in other states to have no negative impact on the system. As we noted in the previous section, no inadvertent export would occur if the grid is not energized due to anti-islanding functionality. ESA initially proposed the following definition for consideration:

> **Inadvertent Export:** The unscheduled export of real power from the small generating facility in any single event for a duration exceeding 30 seconds and of a magnitude no more than the generating facility's gross nameplate rating multiplied by 0.1 hours per day over a rolling 30-day period. (e.g., for a 100 kVa gross nameplate generating facility, the maximum energy allowed to be exported for a 30 day period is 300 kWh).

Based on informal conversations and feedback through the Interconnection Workgroup forum, as well as additional calls with interested stakeholders on storage-specific issues, following the January 23, 2018 hearing, ESA revised the original proposed language to the following new language.

> **Inadvertent Export:** The unscheduled export of active power from a Generating Facility, beyond a specified magnitude and for a limited duration, generally due to fluctuations in load-following behavior.

This new definition ensures the inclusion of a definition of inadvertent export in the standards but provides the utilities with an opportunity to determine appropriate technical specifications in separate filings to reflect the needs of their system.

ESA has recommended in previous comments that this definition be incorporated into the procedures for Level 3 study, since the inadvertent export proposal applies specifically to systems that are otherwise non-exporting. However, stakeholders in the group have provided feedback indicating that no export can be allowed under a Level 3 review. To be responsive to stakeholder concerns, we propose that instead the concept of inadvertent export be incorporated in the Level 1 study. Since inadvertent export are

particularly important for residential systems, incorporating it into a Level 1 review would provide greater opportunities for residential customers seeking to install non-exporting systems to size their systems closer to load without interruption to system operation when there are unexpected and rate fluctuations in load. At the same time, the size restriction of the Level 1 study also addresses utility concerns regarding the impact of multiple cases of coincident inadvertent export, despite this being an unlikely event considering the non-coincident nature of residential load fluctuations.

Net System Capacity

ESA and other stakeholders have proposed the Net System Capacity[1] as an alternative method of determining study assumptions for energy storage systems in the Workgroup and have engaged in lengthy discussions on the topic. We believe that there are clear ways that regulators and utilities can reform interconnection rules and procedures to better capture the operational profile of an energy storage system while still maintaining the safe and reliable operation of the grid. This will require understanding for each project how the customer intends to control and use the system and the unique configuration of the system ("Proposed Use"). As described in more detail in prior comments, incorporating a net system capacity definition is the only way to prevent onerous and unnecessary study timelines and potentially high upgrade costs for energy storage system behaviors that are unlikely since they would violate operational controls.[2] Moreover, ESA's proposed language is conservative and would only apply in certain circumstances—namely, it provides sufficient provisions for the utility's discretion in applying this approach only to systems where it does not see any potential for negative impact on the grid.

[1] Energy Storage Association comments in response to the Maryland Public Service Commission's Notice of Rulemaking and Notice of Rulemaking Session in Rulemaking 61, January 17, 2018.
[2] Reference our language in 1/17/2018 comments

ESA has no update to provide the Commission on this proposal, since the Interconnection Workgroup has not had time to address this issue since the January 23, 2018 hearing.

IV. CONCLUSION

The regulations for small generator facility interconnection processes and standards currently in place in the State of Maryland were created without energy storage in mind. Unfortunately, the proposed revisions of the interconnection standards submitted for the Commission's consideration in this docket do not include the critical components that are needed to protect customers interested in adopting energy storage technology from unnecessarily long interconnection timelines and high system upgrade costs. The manner in which systems are studied under current rules does not reflect the true impact on the grid of energy storage systems, particularly systems paired with solar PV.

ESA appreciates the opportunity to provide these supplemental comments in support of our proposals for revisions to regulations for small generator facility interconnection processes and standards (Code of Maryland Regulations 20.50.02 and 20.50.09), and looks forward to continuing to work with the Commission and Interconnection Workgroup stakeholders to update the regulations in a way that better reflects the energy policy priorities of the State of Maryland.

RESPECTFULLY SUBMITTED this 12th day of April, 2018.

By_____

Nitzan Goldberger
State Policy Director
Energy Storage Association