MARYLAND ENERGY STORAGE POLICY

STORAGE POLICY SNAPSHOT

Does Maryland have an renewables mandate?	YES; 50 percent by 2030
Does Maryland have a state mandate or target for storage?	NO
Does Maryland have a policy for the strategic deployment of Non-Wires Alternatives or Distributed Energy Resources to defer, mitigate, or obviate the need for certain T&D investments?	
Does Maryland offer financial incentives for energy storage development?	YES
Does Maryland have a policy addressing multiple use applications for storage?	NO
Does Maryland have a policy on utility ownership of storage assets?	NO
Does Maryland allow or mandate the inclusion of energy storage in utility IRPs?	NO
Has Maryland modified its permitting or interconnection requirements specific to energy storage?	YES
Does Maryland allow customer-sited storage to be eligible for net metering compensation?	NO
Has Maryland revised its rate structures to drive adoption of behind-the-meter storage	NO, not at a statewide level; individual utilities in Maryland have adopted TOU rates.
Approximate development of storage capacity in Maryland	To be confirmed.

STORAGE POLICY ASSESSMENT

Maryland represents "a small, slow and steady"—but nevertheless very important—market for energy storage development as it emphasizes its "learning by doing" approach toward developing the regulatory structure for energy storage and incentivizing market growth through state subsidies. Regulators in the state claim that ultimately Maryland will prove to be "one of the states in the union that is most advanced in its efforts to move utility treatment of solar energy, electric vehicles, and other distributed energy resources toward a customer-centric universe."

Maryland began its grid modernization proceeding in October 2016. Early reports indicate that the Maryland Public Service Commission (Maryland PSC) "appears focused on more specific technologies and issues" rather than comprehensive reform of its market structure. The Maryland PSC regulates electric, gas, and combination utilities through the setting of rates, the promulgation of new rules and regulations, and the approval of applications to modify the type or scope of utility service. The primary investor-owned utilities in Maryland are subsidiaries of Exelon Corporation: Baltimore Gas & Electric, Delmarva Power, and Pepco. In addition, Maryland's significant presence in the PJM Interconnection market (the largest wholesale electricity market in the U.S.) provides unique challenges to the state's reform process and will have many states watching closely as it charts its own path.

Unlike other states that have opted to mandate the procurement of energy storage, Maryland has a taken a different approach that is built around providing financial incentives to jumpstart storage development in the state, while simultaneously defining state policies to support the market in real time. With regard to energy storage specifically, Maryland is an important reference point due to the fact that it provides the best (and only) example at this time of a state that has developed a tax credit specifically designed for energy storage. Federal tax incentives are available for storage that is paired with a solar or other specified renewable resource under the federal Investment Tax Credit (ITC) with diminishing tax credits (30 percent if construction on the system begins in 2019; 22 percent if started in 2021; and 10 percent if started in 2022). Stand-alone energy storage systems are not eligible for the federal ITC. With the step-down of the federal ITC, it is expected that state-level incentives will play a more critical role in the growth of energy storage markets across the country.

While other states (California, New Jersey, and Nevada for example) have incentive programs that are available for energy storage system, Maryland is the only state that has an actual tax credit that is provided for developers of energy storage. Thus far, the tax credit has enabled a number of demonstration projects involving storage paired with renewable energy systems.

However, Maryland also provides an example of how state subsidies (or a tax credit, in this case), while an important mechanism to stimulate the development of energy storage, may not

be the only mechanism needed to elevate a state-level market to the upper regions of energy storage development. Despite its status of being the first state to offer an energy storage tax credit, Maryland is also finding that financial subsidies alone may not be enough to jumpstart and energy storage marketplace or achieve its full potential. In other words, the experience in Maryland suggests that state-level subsidies alone, or even state-level subsidies combined with the federal ITC, may not be enough to incentivize energy storage development. Specifically, Maryland does not yet have a revised ratemaking approach that is specific to storage, and it is unclear the extent to which energy storage can participate in the state's net metering, both of which would provide additional economic incentives for storage development.

Other inherent characteristics of Maryland's larger energy market also make the state's approach to storage unique. For instance, Maryland has not experienced constraints on other power sources or a rapid increase of resources stressing its transmission or distribution network. Much of the wind power that is used to meet the states' renewable portfolio requirements originates from other states, thus minimizing the need to pursue storage technologies as a means to build out new solar and wind generation within the state. In addition, unlike other states that have pursued energy storage due to a primary need for economic alternatives to traditional forms of generation (e.g., Hawaii), average electricity rates in Maryland have not been significantly higher than the national average of $13.19/kWh.

Meanwhile, although solar has nearly tripled in Maryland since the mid 2010s and the state ranks in the top quartile for solar deployment, renewables development in the state currently comprises a very small portion of the total generation mix in the state. As we know, the expansion of renewables in a given state can usually be correlated with an increase in storage. Maryland's storage market is unique in that it continues to take shape without having these conditions drive the market development.

Due to all of these factors, Maryland remains a comparatively small storage market. Until regulations and rate design are better defined in the state, which is a primary focus of the current regulatory proceedings, the growth of Maryland's energy storage market may remain on a slow track. That does not diminish, however, the innovative policy work being presently conducted in the state that may end setting market precedents for energy storage in Northeastern U.S. states.

Accordingly, Maryland continues to take the slow and steady approach toward the development of energy storage technologies and the luxury of time to develop proactive (as opposed to reactive) policies for the growing storage market. Perhaps the best example of this approach is that the Maryland PSC is in the midst of an 18-month investigation (Public Conference 44) to consider five grid modernization topics: competitive markets and customer choice; rate design; electric vehicles; interconnection processes; and energy storage. It is one of the most unique aspects about the state in that Maryland is developing energy storage policies even in the absence of traditional market drivers such as resource adequacy concerns, high

demand charges, or required planning and review of generation and transmission proposals. The Maryland PSC is also enacting a storage pilot program as part of the broader Public Conference 44 proceedings.

Presently the largest energy storage unit in Maryland is a 10-MW lithium ion battery, which is owned by Fluence Energy and provides ancillary services to the PJM Interconnection (PJM), which administers the region's wholesale bulk electricity system. There are approximately 12-15 other storage projects in the state, some subsidized by the state tax, which are being implemented to test the diversity of storage technologies and applications.

It is also important to note that the Maryland PSC is not working in a vacuum. Commissioners and staff from the mid-Atlantic region and the wider PJM region regularly meet to discuss initiatives and policies through the Mid-Atlantic Distributed Resources Initiative (MADRI). Each PSC also closely follows each other's formal cases and initiatives. For example, Maryland is watching D.C.'s MEDSIS, D.C. is watching Maryland's PC44, and everyone is watching New York's Reforming the Energy Vision (REV) initiative. Although each faces its own unique challenges, there is much to be gained through collaboration and learning.

EXECUTIVE DIRECTIVES

Steve Hogan (R) is the 62nd governor of Maryland, having assumed office on January 21, 2015. Hogan's predecessor was Martin O'Malley (D), who served as governor from January 2007 to January 2015.

During his tenure as governor, O'Malley doubled the state's renewable portfolio standard (RPS), setting a goal to increase in-state renewable generation to 20 percent by 2022 (this goal was subsequently increased through legislation that was passed under Hogan's administration). Further, O'Malley established the Maryland Commission Change through an executive order in 2007 and tasked the Commission with developing a Climate Action Plan for the state. In 2009, O'Malley signed the Greenhouse Gas Reduction Act, which set a statewide goal of reducing greenhouse gas emissions to 25 percent below 2006 levels by 2020.

Gov. Hogan has continued to offer vocal support for clean-energy initiatives, which is a bit surprising due to the fact that Maryland is a Republican-led state attempting to enact aggressive renewables targets. Hogan has been a vocal critic of the Trump administration on issues pertaining to climate change and has stated that states can lead the way instead of the federal government.

In reality, though, the support provided by Gov. Hogan for clean energy initiatives has been rather mixed. While Gov. Hogan supported the passage of the tax credit program for energy storage in 2017, he did not support the Clean Energy Jobs Act bill which included increases to

the state's RPS. (The veto was subsequently overridden by the Maryland Legislature, and the override of the governor's veto resulted in an increase of the state's RPS to 25 percent.) The reason that Gov. Hogan vetoed the previous Clean Energy Jobs due to concerns about increased costs and the potential for Maryland to lose jobs to other states.

Hogan's public position is that he actually wants Maryland to be more aggressive in establishing its renewables targets and has said he would support legislation that would commit Maryland to 100 percent clean energy within the next 20 years. However, Hogan also supports nuclear power and hydropower as clean energy sources, something that remains controversial—particularly nuclear—due to safety and environmental concerns.

Hogan did not take action on the Clean Energy Jobs Act, even though he has indicated that he endorses its larger goals. In Maryland, if the governor does not sign or veto a bill within a month of it passing the Maryland Legislature, it automatically becomes law.

Instead, Hogan is developing his own proposal that he plans to introduce on the first day of the 2020 legislative session. Hogan's proposal, which he is calling the Clean and Renewable Energy Standard (CARES), will call for 100 percent clean energy by 2040. Additional goals of Gov. Hogan's CARES program include:

- Increasing the strategic use of zero- and low-carbon clean and renewable energy sources;
- Recognizing the clean and safe aspects of nuclear energy;
- Supporting hydropower, coupled directly with maintaining environmental stewardship;
- Advancing emerging technology for carbon capture and storage; and
- Utilizing the role of energy-efficient combined heat and power.

In January 2019, Gov. Hogan signed Executive Order 01.01.2019.09, establishing the Governor's Task Force on Renewable Energy Development and Siting, which will work to develop consensus-based recommendations on the siting of new solar and wind projects in the state. To jumpstart that process, the governor announced new initiatives aimed at advancing solar energy deployment and development on state-managed and -owned properties:

- The Maryland Department of General Services, along with the Maryland Environmental Service, will conduct a first-of-its-kind assessment and inventory of state properties that could be utilized for solar energy.
- The state is pledging an additional $4 million in grants to aid large public institutions, including community colleges and universities, to deploy solar arrays on existing infrastructure—such as parking lots and rooftops—while encouraging state agencies to incorporate solar energy into any future construction.

However, the executive order says little about how his administration would seek to revise provisions of the existing Maryland RPS, which currently incentivizes trash incineration, burning animal waste, and other dirty "renewables" as part of the program. Gov. Hogan also has not opted not to clarify whether or not his Clean and Renewable Energy Standard (CARES) bill will include nuclear energy as a "renewable."

LEGISLATION

Key pieces of legislation in Maryland that have shaped the emerging energy storage market in the state include the following:

HB 773 ("Clean Energy - Energy Storage Technology Study") (2017)

- Requires the Maryland Clean Energy Center and Department of Natural Resources' Power Plant Research Program (PPRP) to conduct a study on energy storage, specifically regulatory reforms and market incentives that may be "necessary or beneficial" to increase the use of energy storage in the state.
- The purpose of the study would be to understand what would be the most effective regulatory reforms and market incentives that can be used to increase the use of energy storage devices in the state. Key components of the study include:
    - How storage technologies can and should be integrated with other programs (e.g., demand-side management);
    - How other states have defined ownership models for energy storage assets, procurement targets, and cost recovery mechanisms;
    - How an increase in energy storage translates into a reduction of fossil fuels; and
    - How interconnection standards need to be revised to support connection of energy storage to the transmission and distribution grids.
- Cost-benefit modeling of state was explicitly excluded from the scope of this study, and is expected to be considered in separate proceedings.
- Prohibits the cost of the study from exceeding $125,000 per fiscal year.
- Cross-filed with SB 715

SB 758 ("Income Tax Credit: Energy Storage Systems") (2017)

- Created the first state tax credit for energy storage in the United States
- Allows a credit against the state income tax for the total installed costs of an energy storage system paid or incurred by a taxpayer that installs an energy storage system and who obtains a tax credit certificate from the Maryland Energy Administration.

- Codifies a 30-percent tax credit on the costs of installing an energy storage system on residential and commercial sites.
- Such installations launched between 1/1/2018 and 12/31/2022 will be eligible for up to a $5,000 tax credit for residential applicants and up to a $75,000 tax credit for commercial applicants.
- Cross-filed with HB 490

SB 573 ("Energy Storage Pilot Project Act") (2019)

- The law codifies a PC-44 Storage Working Group business model proposal, would require the Maryland PSC to establish a storage pilot program.
- The law requires IOUs to solicit two energy storage pilot projects between 5 and 10 MW with a minimum of 15 MWh.
- The law applies to Maryland's four IOUs: Baltimore Gas & Electric; Delmarva Power & Light; Potomac Edison; and Potomac Electric Power.
- All utilities must solicit offers in a least two of four utility ownership models:
    - Utility-only ownership model: Under this model, the utility owns and controls the project for grid reliability and operates it in wholesale markets when it is not providing gird services;
    - Utility and third-party ownership model: Under this model, the utility owns and controls the project for grid reliability and a third party operates it in wholesale markets when it is not providing grid services;
    - Third party only ownership model: Under this model, the utility contracts with a project owned by a third party for grid reliability and allows the third party to operate the project in wholesale markets when the project is not providing grid services.
    - Virtual power plant model: Under this model, the utility aggregates, or uses a third-party aggregator, to receive grid services from distributed energy storage projects owned by customers or a third party. The virtual project would be used by customers or the third party for other applicants when it is not providing grid services.
- By 2/28/2020, each utility must solicit offers under these four models and file proposal to the Maryland PSC for at least two of the models.
- The law sets a due date of 2/28/2021 for the utilities to apply for regulatory approval for solicitations issued publicly, with approved projects becoming operational by 2/28/2022.
- Note that the Energy Storage Working Group formed as part of the Maryland PSC's grid modernization proceedings, proposed to accelerate the legislation's timeline. Under the working group's proposal, utilities file for approval for both of their projects by 4/15/2020, with regulators accepting or rejecting the proposals by 12/15/2020. The

Maryland PSC would then have until 4/15/2021 to decide which projects to select, and then projects would be required to commence operation by 2/28/2022.

- One of the main questions that the pilot is expected to address is whether Maryland IOUs can own energy storage assets if the assets have generation capabilities (as a reminder, Maryland is a deregulated market in which IOUs were required to divest of generation).
- Utility ownership of storage assets presently represents a "grey area" in Maryland policy. The regulatory process that will ultimately implement SB 573 could allow utilities to own and operate energy storage resources to support grid operations and defer traditional investments for capital infrastructure OR to contract with third-party developers for grid reliability services.

HB 683 (Community Solar Energy Generating Systems Pilot Program – Extension) (2019)

- Extends Maryland's community solar pilot program.
- Modifies existing legislation to allow Maryland's community solar market to remain open through 2022 while the Maryland PSC determines a long-term path forward for the program.
- Expands the generating capacity per system and lifts the maximum number of subscribers per project as previously imposed.

SB 516 ("The Clean Energy Jobs Act") (2019)

- Requires that Maryland reach the goal of 50 percent renewable energy by 2030 and 100 percent by 2040.
- Increases funding for would increase funding for capital and loans to help minority, veteran, and women business owners enter and succeed within the renewable energy community.
- Gov. Hogan has maintained that he has "serious concerns" with the legislation, namely over cost and skepticism about job creation potential.
- Gov. Hogan opted not to approve or veto the legislation. His inaction, per Maryland statute, resulted in SB 516 becoming law.

REGULATIONS

The Maryland PSC is empowered to hear and decide matters relating to: (1) rate adjustments; (2) applications to exercise or abandon franchises; (3) applications to modify the type or scope of service; (4) approval of issuance of securities; (5) promulgation of new rules and regulations; and (6) quality of utility and common carrier service.

The Maryland PSC has established six working groups to investigate DERs issues. One of these groups is the Energy Storage Working Group, which has been established to "adopt a learning-by-doing approach, whereby utilities [under the PSC's jurisdiction] will solicit four commercial and regulatory models, to evaluate the efficacy of energy storage assets under multiple application ownership models." Specific goals and objectives for the group are as follows:

- Drive energy storage projects and applications that provide value for ratepayers (goal);
- Deploy projects and enhance learnings that facilitate grid reliability (goal);
- Inform the regulatory process and maximize learnings across stakeholders (goal);
- Test the efficacy of various business models and applications to facilitate storage participation in multiple value steams and ownership structures (objective);
- Identify if any of the models can provide cost-effective grid alternatives to system needs and societal benefits (objective); and
- Acquire a better understanding of the regulatory, economic, and technological aspects of storage projects through a learning-by-doing process (objective).

Public Conference 44 (Transforming Maryland's Electric Grid (PC44)

- The proceeding was opened in 2016 in response to the 2015 approved merger of Exelon Corp. and Pepco Holdings LLC, and the requirement that the combined companies file a plan for revamping the state's electricity distribution system. The proceeding also was intended to build upon two technical conferences on rate design and distributed energy resources.
- The goal of the PC44 is to develop recommendations that could modernize and transform Maryland's grid, while also promoting innovative and customer-centric programming.
- New policies for interconnection, billing, rate design, electric vehicles, and market competition all fall within the proceeding's scope.
- The proceeding is focused on achievable goals and metrics, including:
    - Setting just and reasonable rates;
    - Developing electric vehicle rate options;
    - Enhancing competitive markets and customer choices;
    - Improving and streamlining the interconnection process;
    - Exploring and better utilizing energy storage; and
    - Focusing on future distribution system planning. Each area is being addressed through a separate workgroup which is open to public participation.

Multi-year rate plans (Order opened 8/9/2019)

Maryland law authorizes the Maryland PSC to adopt alternative forms of rate regulation, which the PSC has implemented on a case-by-case basis for utilities, approving the use of decoupling

mechanisms, riders and surcharges. The new proceeding at the PSC was opened to examine how multi-year rate plans might be used to enable the greater use of distributed energy resources, including storage.

- Created a working group of stakeholders to determine how best to implement a method for multi-year rate plans.
- The method would set rates for a maximum of three years into the future.
- Maryland currently sets rates on a 12-month period that are based on a historical test years and allow utilities to obtain a certain rate of return.
- Utilities in the state had lobbied for this measure based on the argument that the traditional approach toward rate setting in Maryland produces a "regulatory lag" that prevents them from achieving returns on investments in a timely manner. As a result, the utilities end up submitting multiple rate increase requests, which provides uncertainty for both the utilities themselves and their customers.
- Multi-year rate plans are intended to improve all utility performance in controlling costs and with less frequent rate cases, and provide more predictable rates for customers and more predictable revenue recovery for utilities.
- The order is also intended to explore the application of performance-based ratemaking principles to renewables, DERs and energy storage initiatives. This is similar to the approach that is being evaluated in Hawaii, in which utilities would have the opportunity to receive incentives if they meet certain metrics or goals such as integrating specific amounts of renewables, reducing timelines for interconnecting distributed resources to the grid, encouraging peak demand reductions, and facilitating the growth of energy storage.

THE FUTURE OF ENERGY STORAGE IN MARYLAND

As noted there are a few issues that appear to be stalling rapid growth of the energy storage market in Maryland. Perhaps the most critical issue that remains a market barrier is the question of utility ownership of storage assets. For starters, the state prohibits third party ownership of energy storage assets and yet, due to the provisions of the state's energy competition / deregulation policies, it is unclear whether utilities can own generation assets either if the assets include generation capabilities. Nothing in Maryland law explicitly prohibits utilities in the state from owning and operating storage assets. However, Maryland statute does prohibit "the generation, supply, and sale of electricity, including all related facilities and assets" from being regulated as an electric company service or function. The relevance is that, depending on how storage is classified, questions of cost recovery through rates and storage's eligibility to participate in broader wholesale markets remain unanswered.

Thus, it's an ambiguous grey area within the state's energy storage policy that will need to be resolved in order to provide market clarity that is essential for potential investors. With the regulatory mandate to develop energy storage pilot program at the utility level (with various ownership scenarios), Determining whether utilities may own storage, whether it's behind the

meter or in front of the meter, would resolve a major source of uncertainty among utilities and third-party developers.

it is anticipated that the state of Maryland will resolve this ambiguity, but it may not be for a couple of years. If Maryland were to expand eligibility for the tax credit to allow for third-party ownership of energy storage systems, the market in the state would like see significant gains. Whether or not state law is changed to allow third-party-ownership of energy storage assets, or when, remains to be seen.

In addition, the other potential barrier to broader deployment of energy storage solutions across the state is the fact that, while innovative in its approach, the state tax credit for energy storage does not appear to be enough to address the array of financial considerations with the deployment of an energy storage system.

Policy questions relevant to energy in Maryland that still to need to be resolved include:

- *Rate design:* Maryland's basic retail electricity rates fold demand-related expenses into per-kWh charges and do not reflect the true cost of energy. The result is that customers have little incentive to minimize their energy usage at peak demand, thus diluting one of the primary reasons that end-use customers explore storage in the first place. Revised rate design will likely be necessary to Maryland to explore time of use rates, real-time pricing, or other innovative tariffs designed specifically to address the needs to storage customers.

- *Wholesale market participation:* It remains unclear in Maryland whether storage can provide capacity services or transmission deferral services to PJM based on market rules. In addition, there are limits on how BTM storage can participate in PJM, limiting it to a demand-response resource only. Definitions of how storage should be classified and thus its opportunities to provide other multiple use applications will need to be determined by the Maryland PSC in conjunction with PJM rules.

- *Interconnection rules:* Like many other states, Maryland is finding that its legacy interconnection rules will need to be revised to address the anticipated growth of storage. One question addresses whether an interconnection study of a specific project should be evaluated on the basis of gross or net capacity. Other questions will likely address the level of utility review that is required for interconnected projects and the cost and time needed to interconnect energy storage projects.

- *Market value of storage:* Regulatory proceedings in Maryland are also expected to address the universal issue of how to determine compensation levels for storage across multiple use applications. It is agreed that many of the uses of storage can result in system-wide benefits, but at the present time there is no established market value for these services, in Maryland or elsewhere. Moreover, due to the nascency of the storage market, there may be additional benefits (and costs) that result from energy storage

projects. Maryland, along with other state regulatory jurisdictions, recognizes the need for a comprehensive valuation methodology for storage.

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