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ISSUE BRIEF
State Level Incentives for BTM Storage

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ABSTRACT

As technology costs continue to decrease, end-use customers may increasingly seek out the use of energy storage (ES) technologies to achieve desired financial savings, increased self-consumption, and enhanced resiliency.

ES technologies can be developed at end-use customer locations in two ways: in-front-of-the-meter (FTM) or behind-the-meter (BTM) installations. The distinction between the two types of installations is determined by the location of the energy storage system (ESS) in relation to a meter. Power provided by an FTM ESS must pass through an electric meter before reaching an end-use customer, whereas a BTM ESS provides power that can be used on-site without passing through a meter. This **ISSUE BRIEF** is focused primarily on ES in BTM applications. The installation of ES technologies in BTM scenarios enables an end-use customer to use the energy generated by their ESS before having to use energy supplied from the grid, directly reducing the amount of energy purchased. By far, the predominant ES technology being deployed today in BTM applications utilizes lithium-ion batteries.

Regulatory frameworks typically prevent utilities and end-use customers from being able to monetize the value of ESSs, which can negatively impact project investment decisions and/or restrict development of specific ESS projects. Incentives provided at the state level can serve as a bridge to jumpstart a market while regulatory policies related to ES are developed and adopted. There are presently five ES incentive programs for homeowners and business offered by individual states (California, Maryland, Massachusetts, Nevada, and New York).

New Jersey[1] has currently suspended its ES incentive program, although it was operational in 2018 and 2019. Two states (Hawaii and Iowa) have attempted to develop an incentive, subsidy or investment tax credit (ITC) program and continue to evaluate the value of such programs through legislative and regulatory proceedings.

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[1] ***New Jersey:*** The Renewable Electric Storage program in New Jersey is not funded at this time and is not accepting any new applications. The program appears to have stalled in the wake of Governor Phil Murphy's "Energy Master Plan" that was released in January 2020 with the accompanying claim that New Jersey "is preparing to establish a process and mechanisms to achieve the state's energy storage goals. However, central questions remain, such as those raised by a state analysis that found few economic uses for battery storage in the near term in New Jersey. The New Jersey Board of Public Utilities (BPU) was supposed to launch a storage proceeding six months after the study came out, but it didn't — and the board has recently been focused on responding to COVID-19."On March 7, 2019, the staff of the New Jersey Board of Public Utilities invited all interested parties and members of the public to provide comments on a number of issues to assist the BPU in the preparation of an Energy Storage Analysis.

For background, New Jersey Governor Phil Murphy campaigned in 2017 on a clean energy platform that pushed for a 100 percent clean grid by 2050. When Murphy won and took office, he signed sweeping clean energy legislation in May 2018 that set a target of 35-percent renewable energy by 2020 and 50 percent by 2030. The legislation also requires that 5 percent of the state's energy come from distributed solar by 2021 and set an ES procurement goal of 600 MW by 2021 and 2,000 MW by 2030. Specific policies intended

The purpose of this **ISSUE BRIEF** is to summarize existing state-level incentive programs for BTM ESSs and how such state-specific programs correlate with the state's ES policy.

BACKGROUND:
THE PURPOSE & VALUE OF INCENTIVE PROGRAMS

The use of ESSs at the distribution level, which falls under state-level jurisdiction, offers a number of system benefits, particularly as distribution networks face increasing system demands posed by the proliferation of distributed energy resources (DERs), particularly non-dispatchable generation. Benefits that can be achieved through the use of ESSs at the distribution level include the potential of deferring or avoiding costly distribution system upgrades, increasing power quality on distribution circuits, and increasing circuit and substation hosting capacity. Customer-sited ESSs also provide the ability for customers to better respond to tariff price signals to realize savings on their energy bills and potentially receive other compensation for providing customer-sited generation to serve the broader needs of the grid.

However, there is currently a lack of state-level policy establishing clear mechanisms to identify and capture the full value of ESSs, potentially inhibiting development of ESS applications at the distribution level. In the interim period during which ES policies are defined at the state level, subsidy programs (or other programs that provide financial incentives) are being developed to stimulate the development of ESS solutions in order to realize the benefits of storage.

Incentive programs can help offset the associated costs incurred by developers as they attempt to establish ESS solutions at the distribution level. The associated costs of ESSs include hardware (e.g., inverters, modules), balance of system (e.g., wiring, interconnection fees, ancillary equipment), and engineering procurement and construction (P&C). Balance of system costs and P&C costs are often collectively referred to as "soft costs" and can make up the largest all-in installed costs in immature ES markets with little if any existing deployments of ESSs. Therefore, subsidies at the state level can help offset soft costs and mitigate the financial challenges faced by developers, thereby encouraging market development of ESS technologies.

Incentive programs at the state level can take different forms, based on the regulatory context of the state and the existing level of interest among customers in developing BTM ESSs. Rebates may reflect the most basic form of incentive offered at the state level because they offer the greatest potential to reach the widest number and type of end-use customers.

CURRENT STATE INCENTIVE PROGRAMS

As noted above, there are currently five ES incentive programs that have been adopted at the state level across the U.S. Provided below is a summary of each state's program, along with perspective on related ES policies within the state.

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to enable the achievement of the procurement target are presently being considered within various New Jersey regulatory and legislative proceedings.

In 2018 and 2019, New Jersey's rebate program offered financial incentives for ESSs that are installed with Class 1 Renewable Energy Projects at BTM, non-residential sites. The program was intended to benefit New Jersey ratepayers by supporting the installation of renewable electric storage systems in government, commercial, institutional and industrial entities for the purpose of providing emergency back-up power for essential services, offsetting peak loads by shifting electricity to hours of higher demand and/or helping to stabilize the electric distribution system through the provision of frequency regulation.

California

a. Summary of ES policies in California

With its innovative and ambitious policies, California is a global leader in the development and application of ES technologies. For the last decade, the state has been a frontrunner in both the development of storage technologies and the legislative and regulatory policies needed to enable the growth of a storage marketplace.

California has used a mix of executive directives, legislation, and regulatory decisions to define ES policy, and has relied upon coordinated efforts among the Legislature, the California Public Utilities Commission (CPUC), the California Energy Commission (CEC), and the California Independent System Operator (CA-ISO). The policy initiatives related to ES developed by California policymakers over the last decade have been focused in three key areas:

- Requiring utilities to procure significant amounts of new ES resources
- Evaluating the value of ES through consideration of multiple use applications (MUAs) (i.e., storage's many contributions to grid stability and reliability)
- Developing robust incentives through the Smart Grid Inventive Program that provides customer rebates to enable storage development (totaling about $450 million in 2019)

b. California's ES incentives

California was the first state to create a program to incentivize BTM ESS. Although the program began with other focus areas, California still has the longest-running incentive program in the U.S. that provides subsidies to customers who use on-site power. The state's Self-Generation Incentive Program (SGIP), which is managed by the CPUC, was created in 2006 and was originally intended to provide customers with incentives to reduce their energy use during peak demand times and to promote energy self-sufficiency in response to California's electricity crisis in 2001. In its early days, until the California Solar Initiative was created as a stand-alone program, the SGIP promoted the development of end-use customer solar photovoltaic projects. The SGIP currently emphasizes financial assistance for ES technologies in the form of customer rebates for the installation of battery storage technologies.

Over the years, the SGIP has been revised and extended numerous times, including (1) program modifications to remove solar photovoltaic technologies from the SGIP and move them under the purview of the California Solar Initiative in 2006; (2) add customer ES as an eligible technology; (3) expand the focus of the program to include greenhouse gas (GHG) reduction; and (4) allocate 75 percent of the incentive budget to ES projects. Perhaps most significantly, SB 700, a bill passed by California's legislature in 2018, revamped the SGIP program to extend the program's budget by $800 million. The legislation also changed what was previously a "first come, first serve" model that governed the disbursement of rebates to a lottery system that is weighed toward projects with additional GHG or grid-balancing benefits.

The SGIP's budget is divided between four program administrators: Pacific Gas and Electric Company (PG&E); Southern California Edison (SCE); Center for Sustainable Energy (CSE); and Southern California Gas Company (SoCalGas). While each of the program administrators receives a different allocation of the total SGIP budget, 80 percent of each of their budgets is reserved for ES, and the remaining 20 percent is designated for other distributed generation technologies, such as fuel cells and wind turbines. The ES portion of each SGIP budget has a developer cap, which is intended to prevent any single battery developer from establishing a monopoly in California's ES market.

In order to qualify for SGIP, applicants must either be a commercial, industrial, agricultural, or residential customer of PG&E, SCE, SoCalGas, or San Diego Gas and Electric (SDG&E). (SDG&E customers can apply for the subsidy as SDG&E's role as an administrator is defined).

The SGIP rebate for battery storage is separated into five categories:

1. Large-scale storage systems
2. Residential storage systems
3. Residential equity systems
4. Residential equity resiliency systems
5. Non-residential equity systems

The "equity resiliency" category prioritizes the installation of ESSs for vulnerable customers and "critical facilities" that support community resilience in the event of threatening events such as wildfires. Critical facilities can include such entities as fire stations, nursing homes, and supermarkets serving remote communities. The SGIP's most generous subsidies— $1 per watt-hour, or enough to almost completely cover the upfront costs of a typical residential solar-storage system — are reserved for residents who could face serious deprivation or even death due to multiday threatening events.

Since 2001, the SGIP has provided $1.2 billion in incentives to support development of over 750 MW of distributed generation and 620 MWh of ES.

Maryland

a. Summary of ES policies in Maryland

Maryland represents *a small, slow and steady* market for ES development as it emphasizes its *learning by doing* approach toward developing the regulatory structure for ES 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."

Unlike other states that have opted to mandate the procurement of ES, 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.

In 2019, Maryland lawmakers adopted legislation (HB 650) that required the Maryland Public Service Commission to develop an ES pilot program in which regulated utilities must solicit two ES projects under varying ownership scenarios. State regulators will use the pilot's data to evaluate how to best use the technology in the future. The bill applies only to Maryland's four investor-owned utilities: Potomac Edison; Baltimore Gas and Electric; Delmarva Power and Light; and Potomac Electric Power. Utilities must have applied for Public Service Commission (PSC) approval of their two projects by April 15, 2020, and Sept. 15, 2020, respectively. The approved projects are scheduled to be operational by Feb. 28, 2022.

b. Maryland's ES incentives

In 2017, Maryland became the first state in the U.S. to pass legislation (SB 758) enabling state taxpayers to claim an income tax credit (ITC) for ES devices — whether they were paired with solar or stand-alone storage. Under the management of the Maryland Energy Administration (MEA), the Energy Storage Income Tax Credit Program positions Maryland, as of this writing, as the only state offering a stand-alone ITC specific to ES.

The ITC remains available to residential and commercial taxpayers who have installed an ESS on their residential or commercial property in Maryland during Tax Year 2020 (January 1 - December 31, 2020. All energy systems must store energy for at least one of the following purposes: To use as electrical energy at a later date; or, in a process that offsets electricity use at peak times. Tax credit certificates are awarded to eligible applicants on a first come, first served basis during Tax Year 2020.

Legislators define a residential property as a place that serves as a primary residence and include single-family homes, individual units of multifamily properties, and mixed-use facilities. The state defines a commercial property as a nonresidential property with commercial, industrial, or governmental uses, and also multifamily properties.

The state calculates ES tax credits differently for systems installed on commercial and residential properties. The ITC provides the lesser amount between $5,000 for a residential system, $75,000 for a commercial system, or 30 percent of the total costs for the ES installation. In 2018, in the program's first year, 61 residential customers and one commercial customer in Maryland claimed the ES income tax credit. And while $750,000 is made available under Maryland's ES income tax credit program each year. In the calendar year 2019, just $237,112 was disbursed ES developments that occurred in FY 2018. The program's funding for 2019 was $300,000 for residential systems and $450,000 for commercial systems. Under the enabling statute, MEA may award a total of $750,000 in tax credit certificates during a given tax year.

Program funding not spent in one year cannot be rolled over to future tax years MEA is now accepting applications for the Maryland Energy Storage Income Tax Credit Program for tax year 2020. The deadline to apply is January 15, 2021.

The MEA allows businesses and residences to claim the ES tax credit for the following qualifying systems that store the following types of energy:

1. Thermal energy
2. Electrical energy
3. Chemical energy
4. Mechanical energy

The program is presently scheduled to run through 2022.

Massachusetts

a. Summary of ES policies in Massachusetts

Massachusetts is among a handful of states that is currently on the forefront of establishing ES policies through legislation and regulatory directives. Like California, Hawaii, and New York, Massachusetts has created policy on critical ES issues that now serve as reference points and/or precedents for developing storage policy in other states. In fact, Massachusetts has been a front-runner in developing energy storage policy since 2015 with the creation of an Energy Storage Initiative for the Commonwealth, which included comprehensive studies about the capabilities of ES, funding for storage demonstration projects, and authorization to establish a statewide ES target.

Some of the unique decisions that have framed Massachusetts' precedent-setting ES policy include:

- Massachusetts was one of the first states to adopt a target for storage and has increased the target to its current level of 1,000 MWh by 2025
- Massachusetts is one of the first states to provide comprehensive guidance focused on parting ES with solar panels
- Massachusetts became the first state to allow BTM ES to qualify for energy efficiency incentives

b. Massachusetts' ES incentives

In 2019, the Department of Public Utilities (DPU) in Massachusetts became the first state utility to include ES batteries in an energy efficiency plan. The decision was based on a financial study that concluded battery storage passes the required cost-effectiveness test and therefore qualifies as an energy efficiency measure.

This means that Massachusetts has created a program in which utilities will begin offering electric efficiency performance incentives for BTM ESSs, including battery storage, that play a direct role in demand reduction measures. Evaluated on an annual basis, end-use customers (including both residential and commercial customers) who have effectively used an ESS to reduce their total load can apply for an incentive payment. At the end of each year, they will be paid an incentive payment based on how much they reduced their load (use of electricity) during peak demand times, in response to a signal received from the utility directing the end-use customer to reduce their usage. This program will be offered both to commercial and to residential customers (although a critical mass of residential customers from each area must sign up before the utilities issue contracts). It is anticipated that the program will be marketed to customers by third-party developers.

The performance incentives being offered are $100/kWh average load reduction for a "targeted" dispatch program, and $200/kWh average load reduction for a daily dispatch program (daily dispatch would cycle the battery more frequently than targeted dispatch). For a commercial customer signed up for targeted dispatch, this could provide a modest but significant incentive. For example, a commercial customer installing a 60-kWh battery system might be able to earn $2,000/year or $10,000 over the five-year contract period. Theoretically, the commercial customer would also be able to engage in demand charge management behind the meter for additional savings.

Only new battery installations are eligible for the incentive. There is no requirement that batteries be paired with renewable generation, but customers could take advantage of both the efficiency incentive and the Solar Massachusetts Renewable Target (SMART) program, which includes a storage Adder. The incentive amount is based solely on the energy benefits of storage and do not factor in non-energy benefits such as job creation, reduced land use, reduced grid outages, or higher property values.

Nevada

a. Summary of ES policies in Nevada

The energy sector in Nevada has experienced a tumultuous evolution the last few years. While seeking to make systemic changes to its regulatory structure and its approach toward grid planning and operations, the state has experienced some very public setbacks to its market and policy initiatives for clean energy. Nevertheless, Nevada is currently in the process of developing innovative ES policies while simultaneously supporting what is clearly a rapidly growing sector for clean energy development.

What makes Nevada an important case study today is the extent to which voluntary, business-driven decisions to expand renewables and ESSs has been spearheaded by the primary utilities in the state. This is in contrast to how the development of renewables and ES has evolved in other states, which has typically been driven through policy directives.

In 2019, the Public Utilities Commission of Nevada (PUCN) adopted a procurement regulation that includes biennial ES targets, increasing up to a 1 GW requirement of ES by 2030. The procurement regulation was adopted after lengthy deliberation over more than two years within the PUCN. Described as "goals and not mandates," the adopted regulation nonetheless gives targets to electric utilities with gross annual operating revenue of US$250 million or more in the state and requires them to include ES in their integrated resource plans (IRPs).

b. Nevada's ES incentives

In the state of Nevada, Senate Bill 145 (Effective May 31, 2017) required the PUCN to establish an incentive program for ESSs of 100–1,000 kw. Through this legislation, incentives were established at:

- Residential (4kw -100 kw): up to $3,000 per premise
- Small Commercial (4kw -100kw): up to $50,000 per premise

- Large Commercial (100kw –1,000kw): up to $400,000 per premise (critical infrastructure) or up to $300,000 per premise (non-critical infrastructure)

Sierra Pacific Power and NV Energy, both subsidiaries of Berkshire Hathaway, are vertically integrated utilities with set service territories that serve the northern and southern parts of the state, respectively. The two utilities provide their residential and commercial customers with an incentive program for installing ESSs and pairing the applications to existing solar systems. Customers can join a Time-of-Use (TOU) rate plan and receive incentives via selling energy back to the grid for a higher $/Wh during peak hours, or they can choose to remain in the standard rate.

Certain requirements define which ESSs are eligible for the incentive. Commercial ESSs must offer between 4 kW and 1,000 kW in capacity and residential systems must offer between 4 kW and 100 kW in capacity. For both residential and commercial customers, ESSs eligible for the incentive must be commercially available systems, be UL listed (indicating compliance with safety standards) and be connected to net metering.

Since the program launched in 2018, the two utilities have paid out about $630,000 in incentives across nearly 260 applications, all for residential or small business customers.

New York

a. Summary of ES policies in New York

Supported by a clear vision articulated by the state's governor, actions by the New York Legislature and the New York Public Service Commission (NY PSC) have solidified the role of ES as an important foundation of the state's transition to a clean energy-powered future.

New York is defining ES policy within the broader efforts contained in the Reforming the Energy Vision (REV) initiative, which has been in place since 2015 and aims to make a number of systemic changes to the state's regulatory model and operational requirements. REV's clean energy goals for 2030 include:

- 40 percent reduction in greenhouse gas emissions from 1990 levels
- 50 percent of New York's electricity must come from renewables
- 23 percent reduction in energy consumption from 2012 levels

New York has established one of the most aggressive procurement targets for ES in the country with its pledge to meet a target of 1,500 MW of storage deployed by 2025. By comparison, California has a 1,300 MW by 2020 target; Massachusetts is pursuing a target of 2,00 MW by 2025, and New Jersey recently adopted a 2,000 MW by 2030 target.

b. New York's ES incentives

In New York, a legislative measure enacted in October 2017 (AB 260) amended the property tax exemption in New York state to include ES projects for residential customers. Named the Energy Conservation Improvements Property Tax Exemption, customers who add ES to their house can now have 100% of the value that the ESS added to the residence removed from their property taxes This exemption lasts for 15 years.

In addition, the New York State Energy Research and Development Authority (NYSERDA) offers incentives through its Retail Energy Storage Incentive Program and Bulk Energy Storage Program. NYSERDA must file implementation plan with PSC outlining the use of the incentive funds. The most recent plan, dated January 2020, is organized into two primary initiatives: retail storage market acceleration incentives and bulk storage market acceleration incentives. NYSERDA's Retail Energy Storage Incentive provides commercial customers funding for standalone, grid-connected ES or systems paired with a new or existing clean on-site generation like solar, fuel cells, or combined heat and power.

In 2019, a $280 million bridge incentive mechanism launched to jump-start the market ahead of Gov. Andrew Cuomo's target of having 1,500 MW installed by 2025. The incentives will then taper off so the industry can meet the goal of 3,000 MW subsidy-free by 2030. NYSERDA's Retail Energy Storage Incentive Program is available for projects that are smaller than 5 MW (AC) and are either BTM or interconnected directly to the distribution system. The ESS in question must be capable of maintaining minimum 70 percent round trip efficiency.

To be eligible for the subsidies, ESSs must:

- Be sized up to 5 megawatts (MW) of alternating current (AC) power
- Be new, permanent, and stationary
- Be located in New York State
- Use thermal, chemical, or mechanical commercially available technology primarily operated for electric load management or shifting on-site renewable generation to more beneficial time periods
- Provide value to a customer under an investor-owned utility rate, including delivery charges or New York State's value of distributed energy resources
- Interconnect either behind a customer's electric meter or directly into the distribution system

POTENTIAL STATE INCENTIVE PROGRAMS

Along with the state-level incentives programs that have been officially established (albeit, some have been established but not implemented), other states continue to evaluate the creation of such programs or have initiated legislative or regulatory proceedings.

Hawaii, a state with ideal conditions for renewable energy production (particularly solar), has attempted unsuccessfully several times to enact an ES incentive bill. Legislative efforts have included the following:

- Create a loan program that would include rebates to incentivize renewable ES technology installed simultaneously with solar panels
- Establish a new tax credit for the addition of ES to existing solar photovoltaic systems
- Replace the current renewable energy technology systems tax credit with tax credits for solar, wind and ES

These legislative efforts have not resulted in the adoption of any specific ES incentives into law.

Iowa is another state that has initiated discussions in legislative and regulatory forums to evaluate the potential for a state level subsidy for ES. The Iowa Economic Development Authority has endorsed a tax credit for battery storage to complement the state's wind and solar generation. The storage action plan was prepared by a panel of 17 people appointed by the Economic Development Authority. However, as of this writing the state of Iowa has not formally adopted any financial incentives specific to ES.

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