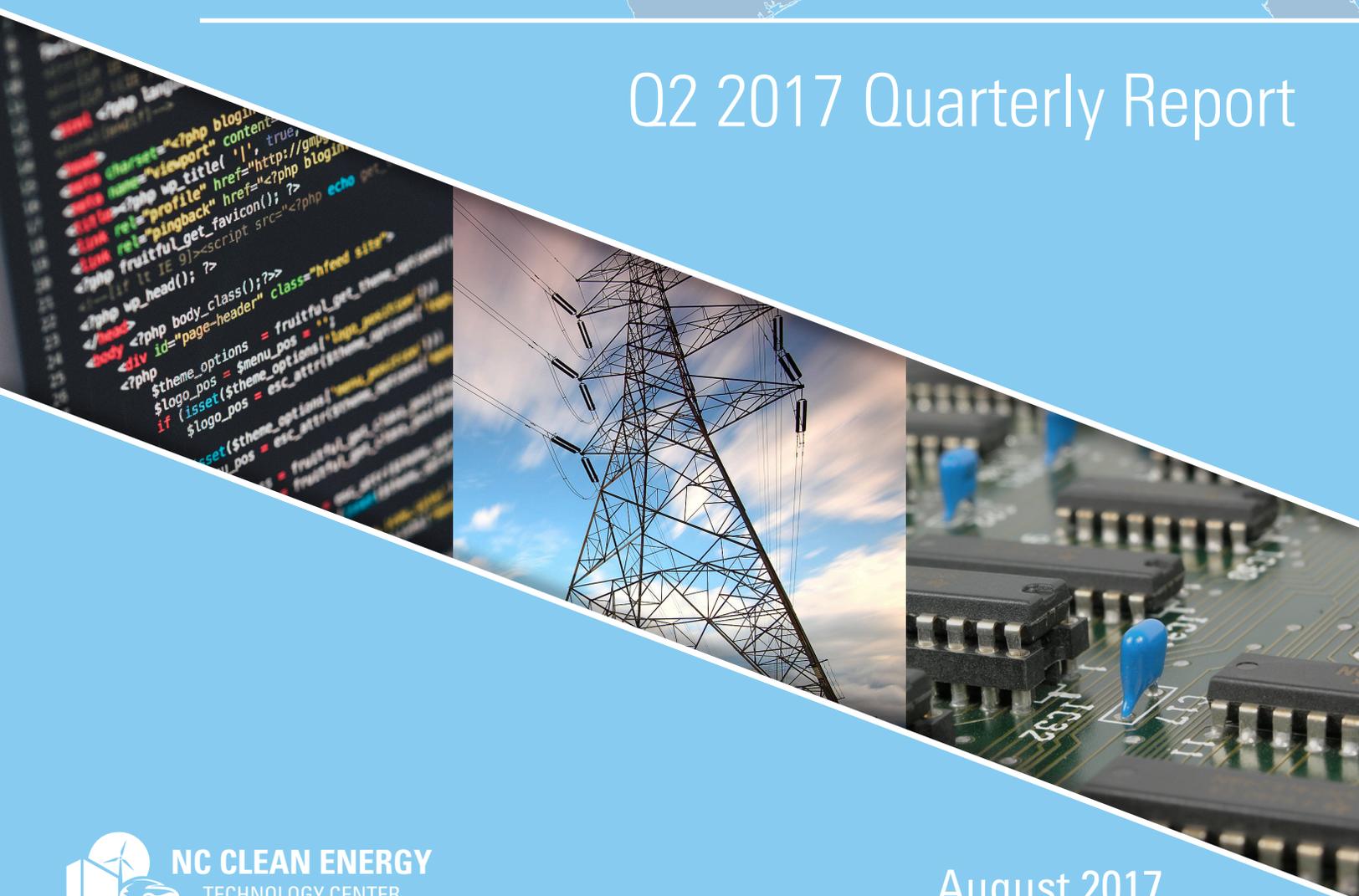


# 50 States of GRID MODERNIZATION

Q2 2017 Quarterly Report



## AUTHORS

Autumn Proudlove  
Brian Lips  
David Sarkisian  
Achyut Shrestha

The [NC Clean Energy Technology Center](#) is a UNC System-chartered Public Service Center administered by the College of Engineering at North Carolina State University. Its mission is to advance a sustainable energy economy by educating, demonstrating and providing support for clean energy technologies, practices, and policies. The Center provides service to the businesses and citizens of North Carolina and beyond relating to the development and adoption of clean energy technologies. Through its programs and activities, the Center envisions and seeks to promote the development and use of clean energy in ways that stimulate a sustainable economy while reducing dependence on foreign sources of energy and mitigating the environmental impacts of fossil fuel use.

## CONTACT

Autumn Proudlove ([afproudl@ncsu.edu](mailto:afproudl@ncsu.edu))

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- Q1 2017: [Full Report](#) | [Executive Summary](#)

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- [Q1 2017 Executive Summary](#)
- [Q4 2016 and 2016 Policy Review – Executive Summary](#)
- [Q3 2016 Executive Summary](#)
- [Q2 2016 Executive Summary](#)
- [Q1 2016](#)
- [Q4 2015 and 2015 Policy Review](#)
- [Q3 2015](#)
- [Q2 2015](#)
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## GLOSSARY OF ABBREVIATIONS

ALJ	Administrative Law Judge
d/b/a	Doing Business As
DER	Distributed Energy Resource
DG	Distributed Generation
FERC	Federal Energy Regulatory Commission
IOU	Investor-Owned Utility
IRP	Integrated Resource Plan
GW	Gigawatt
kW	Kilowatt
kWh	Kilowatt-Hour
MW	Megawatt
NEM	Net Energy Metering
PACE	Property Assessed Clean Energy
PPA	Power Purchase Agreement
PV	Photovoltaics
REC	Renewable Energy Credit
RPS	Renewable Portfolio Standard
TOU	Time-of-Use

# OVERVIEW

## WHAT IS GRID MODERNIZATION?

Grid modernization is a broad term, lacking a universally accepted definition. In this report, the authors use the term grid modernization broadly to refer to actions making the electricity system more resilient, responsive, and interactive. Specifically, in this report grid modernization includes legislative and regulatory actions addressing: (1) smart grid and advanced metering infrastructure, (2) utility business model reform, (3) regulatory reform, (4) utility rate reform, (5) energy storage, (6) microgrids, and (7) demand response.

## PURPOSE

The purpose of this report is to provide state lawmakers and regulators, electric utilities, the advanced energy industry, and other energy stakeholders with timely, accurate, and unbiased updates about how states are choosing to study, adopt, implement, amend, or discontinue policies associated with grid modernization. This report catalogues proposed and enacted legislative, regulatory, and rate design changes affecting grid modernization during the most recent quarter.

The 50 States of Grid Modernization report series provides regular quarterly updates of grid modernization policy developments, keeping stakeholders informed and up to date.

## APPROACH

The authors identified relevant policy changes and deployment proposals through state utility commission docket searches, legislative bill searches, popular press, and direct communications with stakeholders and regulators in the industry.

## Questions Addressed

This report addresses several questions about the changing U.S. electric grid:

- How are states adjusting traditional utility planning processes to better allow for consideration of advanced grid technologies?
- What changes are being made to state regulations and wholesale market rules to allow market access for distributed energy resources?
- How are states and utilities reforming the traditional utility business model and rate designs?

- What policy actions are states taking to grow markets for energy storage and other advanced grid technologies?
- Where and how are states and utilities proposing deployment of advanced grid technologies, energy storage, microgrids, and demand response programs?

## Actions Included

This report focuses on cataloguing and describing important proposed and adopted policy changes related to grid modernization and distributed energy resources, *excluding policies specifically intended to support only solar technologies*. While some areas of overlap exist, actions related to distributed solar policy and rate design are tracked separately in the 50 States of Solar report series, and are generally not included in this report.

In general, this report considers an “action” to be a relevant (1) legislative bill that has been introduced or (2) a regulatory docket, utility rate case, or rulemaking proceeding. Only statewide actions and those related to investor-owned utilities are included in this report. Specifically, actions tracked in this issue include:

### Studies and Investigations

Legislative or regulatory-led efforts to study energy storage, grid modernization, utility business model reform, or alternative rate designs, e.g., through a regulatory docket or a cost-benefit analysis.

### Planning and Market Access

Changes to utility planning processes, including integrated resource planning, distribution system planning, and evaluation of non-wires alternatives, as well as changes to state and wholesale market regulations enabling market access.

### Utility Business Model and Rate Reform

Proposed or adopted changes to utility regulation and rate design, including performance-based ratemaking, decoupling, time-varying rates, and residential demand charges.

Time-varying rate and residential demand charge proposals are only documented if they are being implemented statewide, the default option for all residential customers of an investor-owned utility, or a notable pilot program intended to soon become a default option. Actions related to inclining or declining block rates are not included in this report.

## Grid Modernization Policies

New state policy proposals or changes to existing policies related to grid modernization, including energy storage targets, interconnection standards, customer data access policies, and energy storage compensation rules.

## Financial Incentives for Energy Storage and Advanced Grid Technologies

New statewide incentives or changes to existing incentives for energy storage, microgrids, and other advanced grid technologies.

## Deployment of Advanced Grid Technologies

Utility-initiated requests, as well as proposed legislation, to implement demand response programs or to deploy advanced metering infrastructure, smart grid technologies, microgrids, or energy storage.

## Actions Excluded

This report excludes utility proposals for grid investments that do not include any specific grid modernization component, as outlined above, as well as projects that have already received legislative or regulatory approval. Actions related exclusively to pumped hydroelectric storage or electric vehicles are not covered by this report. While actions taken by municipal utilities and electric cooperatives are not comprehensively tracked in this report, particularly noteworthy or high-impact actions will be covered. The report also excludes changes to policies and rate design for distributed generation customers; these changes are covered in the 50 States of Solar quarterly report.

# THE U.S. ELECTRICITY SYSTEM IN TRANSITION

The U.S. electricity grid is in a state of transition. The system has traditionally been a “one-way street”, with power flowing from utility-owned centralized generation, via utility-owned transmission and distribution lines, toward end-use customers. However, the electric system is increasingly becoming more of an interconnected web, with small but growing numbers of end-use customers also generating electricity with small-scale, distributed systems that are capable of providing various services to the grid.

Technology is making rapid advancements, continuing to offer new benefits to the electric system. Policy, however, has not kept pace with the speed of technical energy advancements, with most U.S. electricity policy still focused primarily on the traditional one-way, centralized system model and its institutions. This is changing, though, with more and more states initiating investigations into advanced grid technologies and proposing legislative and regulatory changes intended to enable the development of a modern electric system.

## Grid Modernization

Grid modernization is an expansive topic, capturing the many individual pieces of the transition occurring in our nation’s energy system. A major element of this transition is the deployment of new technologies, such as advanced metering infrastructure and smart grid technologies, including communications and control technologies for managing distributed energy resources of all kinds. These technologies offer the opportunity to bring new benefits to both utilities and consumers, including economic, environmental, reliability, security, and consumer experience benefits.

The deployment of advanced grid technologies is already underway. The market for distributed generation, namely solar photovoltaics, is already scaling rapidly, while the energy storage market is expected to grow from an expected 6 GW of annual installed capacity in 2017 to over 40 GW in 2022.<sup>1</sup> Utilities had already deployed nearly 65 million smart meters by the end of 2015, covering over 50% of U.S. households, and more installations are underway.<sup>2</sup>

But before advanced grid technologies can be utilized to their fullest extent, regulatory structures must be examined to determine whether current regulations are resulting in unintended barriers to deployment. By reevaluating regulatory frameworks, business models, and rate designs, an energy system that allows for fair evaluation of technological options, greater market participation, and full and open compensation may be created.

Over half of U.S. states are currently examining these regulatory frameworks or actively working to deploy advanced grid technologies. This activity is expected to continue, much like the ongoing evaluation of state solar policies, as states and utilities conduct studies, try new approaches, and learn from each other about how best to achieve the many benefits of a more modern grid.

## OVERVIEW OF Q2 2017 POLICY CHANGES

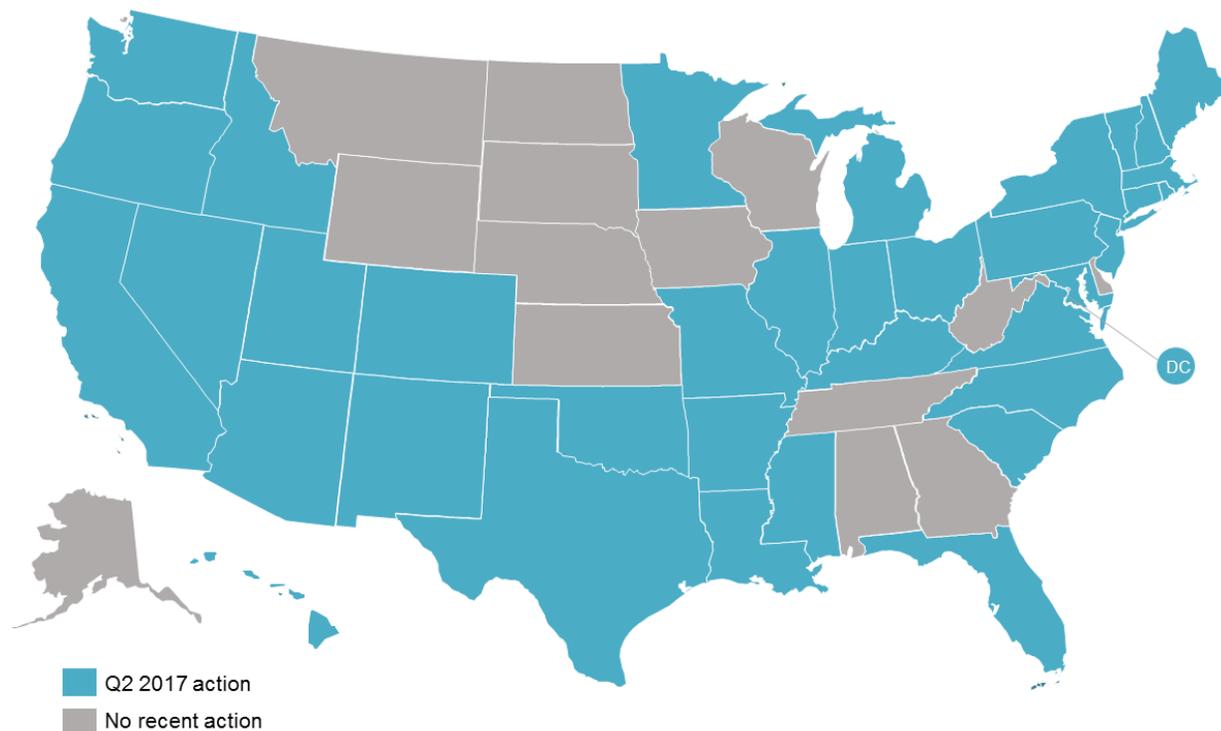
Table 1 provides a summary of state actions related to grid modernization occurring during Q2 2017. Of the 181 actions catalogued, the most common were those related to deployment of advanced grid technologies (40), followed by policies (38), and studies and investigations (29). The actions occurred across 36 states plus DC in Q2 2017 (Figure 1). Box 1 highlights some of the key actions of Q2 2017, described in greater detail in the following sections.

**Table 1.** Summary of Grid Modernization Actions (Q2 2017)

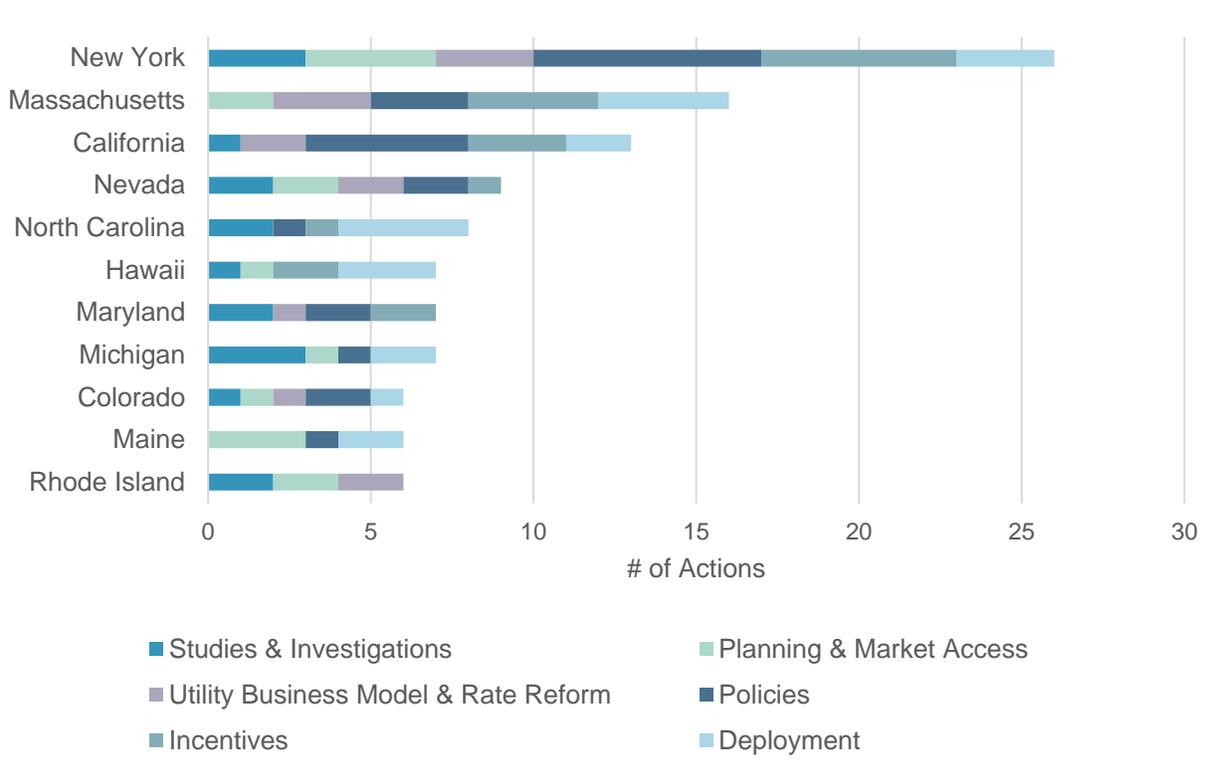
Type of Action	# of Actions	% by Type	# of States
Deployment	40	22%	20
Policies	38	21%	19
Studies and Investigations	29	16%	19 + DC
Planning and Market Access	28	15%	15 (+ 3 RTOs)
Financial Incentives	24	13%	11
Business Model and Rate Reform	22	12%	14
<b>Total</b>	<b>181</b>	<b>100%</b>	<b>36 States + DC</b>

Note: The “# of States/ Districts” total is not the sum of the rows because some states have multiple actions. Percentages are rounded and may not add up to 100%.

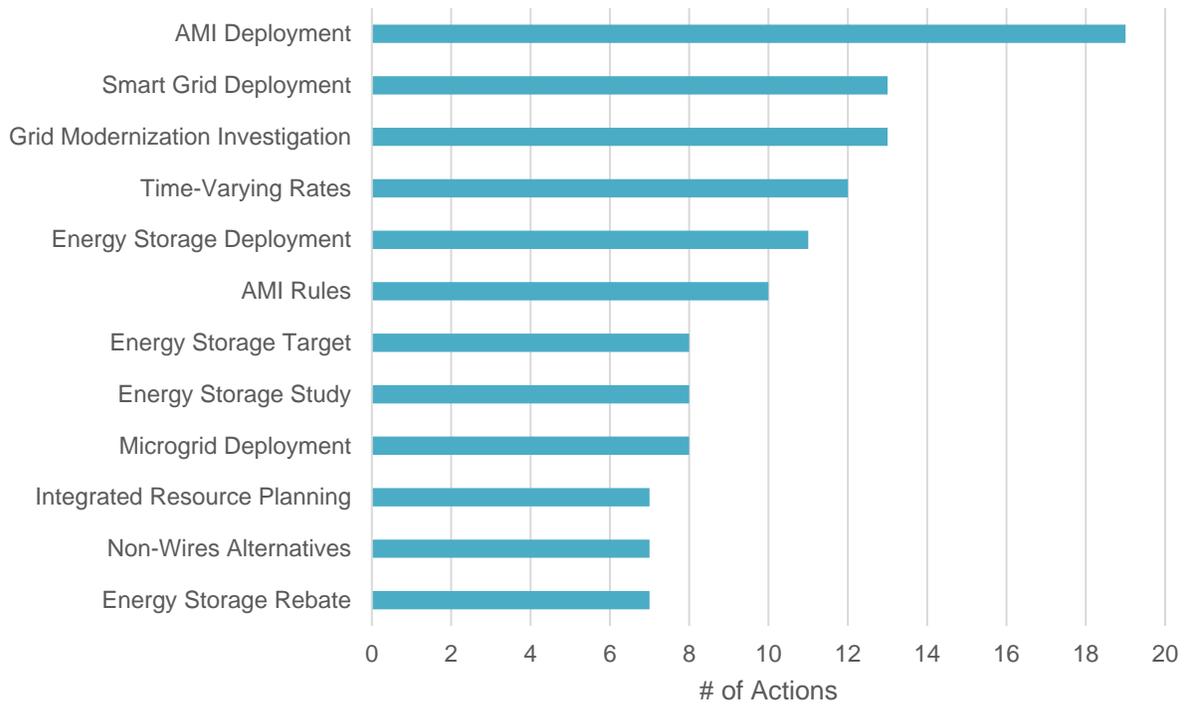
**Figure 1.** Legislative and Regulatory Action on Grid Modernization (Q2 2017)



**Figure 2. Most Active States of Q2 2017**



**Figure 3. Most Common Types of Actions Taken in Q2 2017**



## Box 1. Top Five State Grid Modernization Developments of Q2 2017

### Massachusetts DOER Adopts 200 MWh Energy Storage Target

In June 2017, following the completion of a detailed [energy storage study](#), the Massachusetts Department of Energy Resources [adopted](#) a mandatory energy storage target of 200 MWh to be met by January 2020. [Pending legislation](#) calls for the Department to establish a subsequent target to be reached by January 2025 and 2030. Massachusetts is the third state to adopt a formal energy storage target.

### Nevada Enacts Suite of Energy Storage and Grid Modernization Bills

In Q2 2017, Nevada's Governor signed multiple bills relating to energy storage and grid modernization into law. The enacted legislation includes an [energy storage study](#), a potential [energy storage target](#), an energy storage [rebate program](#), and amendments to the [integrated resource planning](#) process.

### Vermont Launches Grid Modernization Proceeding

Vermont became the latest state to [initiate](#) a grid modernization proceeding, with the Public Utility Commission (formerly the Public Service Board) [opening a docket](#) in June 2017. The Commission is looking to reexamine the state's regulatory structure in response to recent transformations in technology, state policy, and more.

### Maryland and North Carolina Initiate Energy Storage Studies

In June 2017, the North Carolina state legislature passed [H.B. 589](#), a broad solar policy reform bill which also includes a directive for the North Carolina Policy Collaboratory to conduct an energy storage study upon raising \$75,000 in non-state matching funds. In late July, Governor Cooper signed H.B. 589 into law. The Maryland legislature also initiated an energy storage study with the signing of [H.B. 773](#) in May. Maryland's study will examine regulatory reforms and market incentives to encourage storage deployment.

### Hawaii Utilities File Revised Grid Modernization Plan

In late June 2017, Hawaii's investor-owned utilities submitted their [revised grid modernization plan](#), after the Public Utilities Commission rejected the utilities' original plan in January 2017. The new plan comes in at about \$205 million, as opposed to the \$340 million estimated for the original plan. The new plan includes a near-term (2018-2023) Grid Modernization Roadmap, which focuses on mitigating current service quality issues to allow for greater adoption of distributed energy resources.



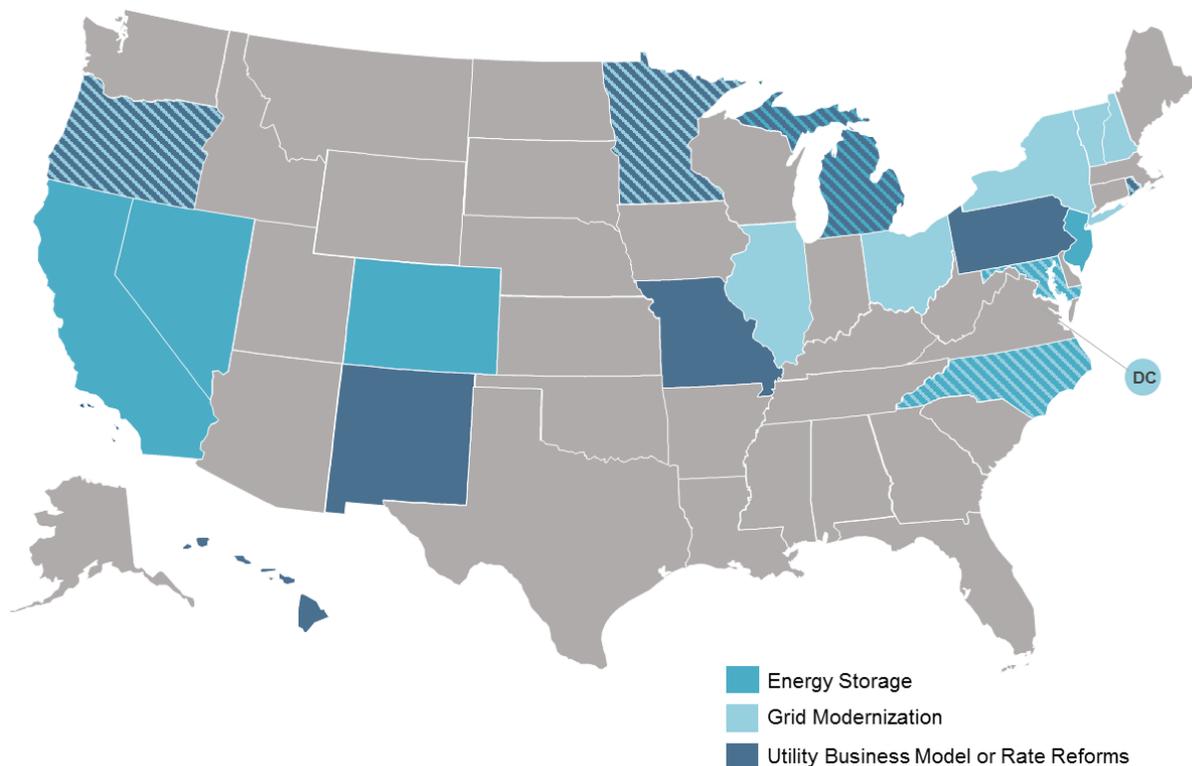
whether it is in the public interest to adopt energy storage procurement requirements for the state’s utilities. The legislature in a third state – North Carolina – passed legislation initiating an energy storage study, which was signed by the Governor in late July. The bill tasks the North Carolina Policy Collaboratory with conducting a comprehensive study on energy storage, examining both technical feasibility and policy recommendations.

### Box 2. Categorizing Studies and Investigations

Actions included within Studies and Investigations do not include a defined policy proposal or a directive to make a policy or regulatory change. Once a specific proposal is introduced, the action will be included in the more specific category pertaining to that particular type of change, such as Grid Modernization Planning, Utility Business Models, Rate Reforms, or the specific categories listed under Grid Modernization Policies, such as interconnection rules, changes to renewable portfolio standards, energy storage targets, and AMI rules.

Q2 2017 also saw the completion of a new study related to grid modernization. In April 2017, a stakeholder group in Rhode Island released the final version of a report which includes a detailed benefit-cost framework for evaluating distributed generation programs, alternative rate designs, and grid modernization projects.

Figure 5. Action on Studies and Investigations by Topic (Q2 2017)



**Table 2. Updates on Grid Modernization Studies & Investigations (Q2 2017)**

State	Type of Study	Description	Source
CA	Energy Storage	California has an ongoing proceeding examining the value of DERs to the distribution system. Utilities have proposed a range of demonstration projects to examine various scenarios related to the location on the grid and technology options, some of which include storage. In a February 2017 decision, the California Public Utilities Commission (CPUC) granted approval to some demonstration projects, rejected others, and approved only some elements of other projects. The utilities filed revisions to their proposed projects, which the CPUC approved in June 2017.	<a href="#">Docket No. R. 14-08-013</a>  <a href="#">Decision No. 17-06-012</a>
CO	Energy Storage	H.B. 1299 would require the Transportation Legislative Review Committee to hold a hearing on the economic costs and benefits of requiring the Public Utilities Commission to adopt an energy storage target for utilities to incorporate into their resource acquisition plans. The bill passed the House in April 2017, but died in the Senate.	<a href="#">H.B. 1299 (D)</a>
DC	Grid Modernization	In June 2015, the DC Public Service Commission initiated a proceeding to identify technologies and policies that can modernize its energy delivery system for increased sustainability, reliability, efficiency, cost-effectiveness, and interactivity. In January 2017, the staff presented its Modernizing the Distribution Energy Delivery System for Increased Sustainability (MEDSIS) report. The Commission accepted comments on the report through April 2017.	<a href="#">Formal Case No. 1130</a>  <a href="#">MEDSIS Staff Report</a>
HI	Utility Business Model	H.B. 1700 of 2016 appropriated funds for the Hawaii Energy Office to commission a study of alternative utility and regulatory models to enable the state to (1) meet its energy goals; (2) maximize consumer savings; (3) enable a competitive distribution system; and (4) eliminate or reduce conflicts of interest in energy resource planning, delivery, and regulation. The Energy Office released an RFP in September 2016 and selected London Economics International, LLC to begin the project in Q2 2017. The estimated project completion date is December 2018.	<a href="#">H.B. 1700 (2016)</a>  <a href="#">Study Website</a>
IL	Grid Modernization	In March 2017, the Illinois Commerce Commission opened the "NextGrid" proceeding following the passage of legislation in December 2016 that makes comprehensive changes to various aspects of Illinois energy policy. This will be a collaborative process between stakeholders and will involve a broad array of topics, some related to grid modernization (one of the four main subject areas mentioned is "grid	<a href="#">Docket No. 17-0142</a>  <a href="#">NextGrid</a>

		design, digital networks and markets." On June 30, 2017, the Commission issued a request for information regarding the selection of an independent facilitator for the process; responses were due by July 14 <sup>th</sup> .	
MD	Energy Storage	H.B. 773 directs the Power Plant Research Program to conduct a study to determine what regulatory reforms and market incentives are necessary or beneficial to increase energy storage deployment in the state in a way that is fair and open to all stakeholders. The bill was signed by the governor in early May 2017.	<a href="#">H.B. 773 (E)</a>
	Grid Modernization	In September 2016, the Maryland Public Service Commission (PSC), as part of the Exelon-PHI merger condition, initiated a grid modernization proceeding to ensure that the electric distribution system in Maryland is customer-centric, affordable, reliable, and environmentally sustainable. The proceeding is addressing rate design, electric vehicles, competitive markets and customer choice, the interconnection process, energy storage, and distribution system planning. The PSC held an initial public hearing in December 2016 and issued a detailed schedule in January 2017. Proposed pilot programs for time-varying rates are to be developed between February and June 2017, with pilot programs occurring between July 2017 and June 2018. Regarding competitive markets and customer choice, a statewide standard data sharing format and changes to retail choice will be considered. A rulemaking to define residential energy storage and how it is interconnected and classified in PSC rules, as well as criteria for utility evaluation of energy storage as a distribution grid investment will be considered. The PSC also intends to hold a technical conference on distribution system planning. The Public Staff has organized working groups to study (1) rate design, (2) competitive markets and consumer choice, (3) interconnection, and (4) energy storage.	<a href="#">Public Conference No. 44</a>
MI	Demand Response	Legislation enacted in December 2016 directs the Public Service Commission (PSC) to assess the use of demand response (DR) in Michigan. In March 2017, the PSC released a draft plan for the scope of the study. The study will assess DR potential for the 20-year period beginning in 2018. The PSC opened a docket in May 2017 to evaluate cost recovery options for DR investments. Commission staff will convene a working group to develop a regulatory framework for evaluation and cost recovery of DR investments. Staff recommendations are due by August 31, 2017.	<a href="#">Docket No. 18369</a>  <a href="#">Michigan Demand Response Potential Study</a>  <a href="#">S.B. 437 (2016)</a>  <a href="#">S.B. 438 (2016)</a>

	Energy Storage	<p>Legislation enacted in December 2016 directs the Public Service Commission (PSC) to conduct a study on an appropriate DG tariff that reflects an equitable cost of service for utility revenue requirements. At the initial DG working group meeting in March 2017, the PSC staff provided details on its plan to implement the legislation. The PSC staff proposed limiting the scope of the study to solar and solar plus battery storage. The PSC will conduct a cost of service study, and PSC staff will aim to prepare a report on the study by January or February 2018, with a final report being published in March or April 2018. Parties will also be able to file their own studies and tariff filings for the PSC to consider. The study and tariff development must be completed by April 20, 2018. A working group meeting was held in June 2017, and in mid-July, the PSC issued guidelines for new DG programs. Utilities will submit new DG tariffs as part of their rate cases after June 1, 2018; until then, the current net metering program will remain active, and customers who begin net metering under the current program will be able to do so for ten years.</p>	<p><a href="#">Docket No. 18383</a></p> <p><a href="#">Distributed Generation Study</a></p> <p><a href="#">S.B. 437 (2016)</a></p> <p><a href="#">S.B. 438 (2016)</a></p>
	Utility Business Model	<p>Legislation enacted in December 2016 directs the Public Service Commission (PSC) to conduct a study on performance-based regulation, under which a utility's authorized rate of return is dependent on achievement of targeted policy outcomes. The study is due by April 20, 2018. A stakeholder forum was held on July 24, 2017.</p>	<p><a href="#">Performance-Based Regulation Report</a></p> <p><a href="#">S.B. 437 (2016)</a></p> <p><a href="#">S.B. 438 (2016)</a></p>
MN	Grid Modernization	<p>The Public Utilities Commission (PUC) opened a docket in May 2015 to consider the development of policies related to grid modernization. The proceeding features broad stakeholder engagement and numerous workshops. In April 2017, the PUC issued a request for comments from Xcel Energy, Minnesota Power, and Otter Tail Power (cooperative and municipal utilities were encouraged but not required to respond) related to the following questions: (A) How do Minnesota utilities currently plan their distribution systems? (B) What is the status of each utility's current plan? and (C) Are there ways to improve or augment utility planning processes? The utilities were given until June 21<sup>st</sup> to file reply comments for questions A and B, and other stakeholders were given until July 21<sup>st</sup> to file reply comments. The comment period for question C opens in July 2017.</p>	<p><a href="#">Docket No. 15-558</a></p>
	Rate Reform	<p>The Public Utilities Commission (PUC) initiated a stakeholder proceeding in July 2015 to consider alternative rate designs for Xcel Energy. The</p>	<p><a href="#">Docket No. 15-662</a></p>

		proceeding has held workshops and heard from various speakers about alternative rate design implementation across the country. In April 2017, Xcel Energy presented on its ongoing development of an alternative rate design pilot. During Q2 2017, the PUC solicited comments on Xcel's rate design pilot, whether this generic docket should continue in parallel to the Xcel pilot development, and other related issues. The PUC received comments from stakeholders during May 2017. A Commission meeting is scheduled for August 10 <sup>th</sup> .	
MO	AMI, Rate Reform	In March 2017, the Missouri Public Service Commission opened a proceeding to gather information on issues including AMI installation, PACE financing programs, and alternative rate design proposals. A workshop was held in May 2017, where these issues were discussed. On July 10, 2017, the Commission staff filed a report with recommended next steps. The report recommends that workshops be held to discuss several issues, including new rate designs, particularly time-of-use rates and inclining block rates. However, as no significant issues related to AMI were identified during the comment period or workshop, the staff did not recommend additional workshops on AMI.	<a href="#">Docket No. EW-2017-0245</a>  <a href="#">Staff Report</a>
NC	Energy Storage	H.B. 589 commissions the North Carolina Policy Collaboratory at UNC Chapel Hill to conduct a study on energy storage. The Collaboratory would first have to raise at least \$75,000 in non-state funds to match the \$75,000 allocated by the state before the Collaboratory would be obligated to complete the study. The study would address how energy storage technologies may or may not provide a benefit to North Carolina consumers based on a number of factors, the feasibility of storage in the state, and policy recommendations for energy storage. The Collaboratory is to provide the results of its study to the North Carolina Energy Policy Council by December 1, 2018. In late July 2017, the Governor signed the bill into law.	<a href="#">H.B. 589 (E)</a>
	Grid Modernization	S.B. 619 would require the Joint Legislative Commission on Energy Policy to complete a comprehensive study of known and measurable benefits of grid modernization. The bill was introduced in April 2017 and did not advance from the Senate.	<a href="#">S.B. 619 (D)</a>
NH	Grid Modernization	In July 2015, the New Hampshire Public Utilities Commission (PUC) opened a docket on grid modernization, pursuant to H.B. 614 of 2015. The PUC convened a formal working group to develop recommendations on several issues, including	<a href="#">Docket No. IR 15-296</a>  <a href="#">NH Grid Modernization</a>

		distribution system planning, advanced metering functionality, rate design, customer data and education, and utility cost recovery and financial incentives. In March 2017, the working group submitted its final report to the Commission, and comments on the final report were accepted through May 19th.	<a href="#">Working Group Document Repository</a>  <a href="#">Final Report</a>
NJ	Energy Storage	Companion bills A.B. 4728 and S.B. 3064 would require the Board of Public Utilities to conduct a study on energy storage, identifying needs and opportunities for the state. The study would consider implementation of storage technologies, benefits and costs to ratepayers, and an optimum target.	<a href="#">A.B. 4728 (I)</a>  <a href="#">S.B. 3064 (I)</a>
NM	Regulatory/Rate Reform	In March 2017, the New Mexico Public Regulation Commission initiated an investigation to determine whether it should standardize or change its ratemaking policies. Specifically, the Commission is requesting information related to developing a standardized method for determining return on equity (ROE), whether ROE should be adjusted under an incentive/disincentive mechanism, providing access to proprietary software used by utilities to support positions in rate cases to all intervenors and staff, defining regulatory assets, and recovery of certain regulatory case expenses. The public workshop planned for August has been rescheduled for September 14th. Initial comments were accepted through July 10th.	<a href="#">Docket No. 17-00046-UT</a>
NV	Energy Storage	The Public Utilities Commission of Nevada (PUCN) opened an investigatory docket in January 2016 to explore energy storage technologies. The PUCN convened a series of meetings and workshops throughout 2016, and in Q1 2017 held a stakeholder meeting and a workshop to discuss interconnection issues related to energy storage. In April 2017, NV Energy submitted a redlined version of its Rule 15 tariffs to accommodate the interconnection of energy storage, and received comments from the Interstate Renewable Energy Council, which provided its own redlined version.	<a href="#">Docket No. 16-01013</a>
	Energy Storage	S.B. 204 requires the Public Utilities Commission of Nevada (PUCN) to determine whether it is in the public interest to adopt annual requirements for the procurement of energy storage by utilities. In making the determination, the PUCN must study all measurable costs and benefits. The bill was signed by the Governor in May 2017.	<a href="#">S.B. 204 (E)</a>
NY	Microgrids	A.B. 6134 directs the New York Public Service Commission to develop recommendations regarding the establishment of microgrids in the state.	<a href="#">A.B. 6134 (I)</a>

		Specifically, the Commission is to submit a report with recommendations on: (1) the use of microgrids for critical infrastructure facilities, (2) prioritization of certain geographical areas based on the probability of storm damage, and (3) funding mechanisms to pay for microgrid projects.	
	Grid Modernization	The "New York Grid Modernization Act" (A.B. 7480) would establish a Smart Grid Advisory Council, which would be tasked with conducting a study on the feasibility of establishing a statewide smart grid system. The smart grid system envisioned would include AMI, incorporate consumer products, promote DERs, and protect privacy and security. The comprehensive bill includes provisions for cost allocation, workforce development, low-income programs, and more.	<a href="#">A.B. 7480 (I)</a>
	Grid Modernization	As part of the New York Public Service Commission's May 2017 decision approving Con Edison's tariff amendment allowing for the export of electricity from battery storage systems to the distribution grid, the Commission directed the state's IOUs to study the impacts of DERs, including energy storage, participating in the Dynamic Load Management program exporting electricity to the distribution grid. The utilities are to publish the analysis in their Dynamic Load Management program annual reports.	<a href="#">Docket No. 17-E-0104</a>
OH	Grid Modernization	The Public Utilities Commission of Ohio (PUCO) announced the launch of its PowerForward grid modernization investigation in March 2017. PUCO intends to use the study to chart a path forward for future grid modernization projects and innovative regulations that can improve the consumer experience. PowerForward is scheduled to occur in three phases, with Phase 1 beginning in April 2017 with a three-day "Glimpse of the Future" speaker series. The investigation continued in July 2017 with Phase 2: Exploring Technologies, and will continue in Q1 2018 with Ratemaking and Regulation.	<a href="#">PowerForward Website</a>
OR	Grid Modernization, Utility Business Model	Amendments made to S.B. 978 during Q2 2017 would require the Public Utility Commission to establish a public process to investigate the impact of developing industry trends, technologies, and policy drivers on the existing regulatory system and utility incentives. The bill directs the Commission to investigate many specific topics, including the increasing presence and cost-effectiveness of DERs, customer desire for energy service options and management tools, transportation electrification, regional transmission markets, advances in distribution system communication and control	<a href="#">S.B. 978 (P2)</a>

		technologies, the replacement of aging distribution system equipment, and performance-based incentives. The bill was passed in early July 2017 and is awaiting a decision from the Governor.	
PA	Rate Reform	In December 2015, the Pennsylvania Public Utility Commission (PUC) opened a proceeding to investigate alternative ratemaking methodologies. A hearing was held in March 2016, and the PUC issued an order in March 2017 requesting further input from stakeholders on their experiences with different types of alternative rate methodologies, including decoupling, lost revenue adjustment mechanisms, straight fixed/variable pricing, surcharges and riders, choice of test years, multi-year rate plans, demand charges, standby and backup charges, and demand-side management performance incentives. The PUC is also requesting comments regarding whether the Commission should adopt policy statements identifying preferred alternative rate methodologies or initiate rulemakings to require specific methodologies. Comments were accepted during Q2 2017.	<a href="#">Docket No. M-2015-2518883</a>
RI	Grid Modernization, Rate Reform	In January 2016, the Public Utilities Commission (PUC) approved National Grid's request to withdraw its proposed alternative rate design. However, the PUC determined that it was important to continue to review the issues raised in the proceeding. In March 2016, the PUC opened a docket to identify and measure the costs and benefits of net metering and DERs. The stakeholder group's was managed by a third-party consultant, and the group met nine times between May 2016 and March 2017. The group released a final draft of the report in late March, and submitted a complete final version in early April. The working group developed a detailed Benefit-Cost Framework that may be used to evaluate DG programs, alternative rate designs, and grid modernization projects. The working group organized technical sessions to review the stakeholder report during Q2 2017.	<a href="#">Docket No. 4600</a> <a href="#">Stakeholder Process Document Repository</a> <a href="#">Final Working Group Report</a>
	Grid Modernization	In March 2017, the Governor of Rhode Island directed the Public Utilities Commission, Office of Energy Resources, and Division of Public Utilities and Carriers to design a new regulatory framework for Rhode Island's electric system. Work sessions on utility business models, grid connectivity and functionality, distribution system planning, and beneficial electrification were held during Q2 2017.	<a href="#">Power Sector Transformation Initiative</a>
VT	Grid Modernization	In June 2017, the Vermont Public Utility Commission (formerly the Public Service Board) opened an investigation into utility regulation in the state,	<a href="#">Docket No. 17-3142-PET</a>

following a request from the Department of Public Service. Specifically, the Commission is looking to reexamine Vermont's regulatory structure in response to recent transformations in technology, state policy, and other areas. A workshop is scheduled for August 8th, and comments on topics to discuss in the workshop were accepted through July 18th.

[Media Release](#)

Legislative Status Key: I = Introduced, P1 = Passed One Chamber, P2 = Passed Both Chambers, E = Enacted, D = Dead. Bill statuses are up to date as of early May 2017.

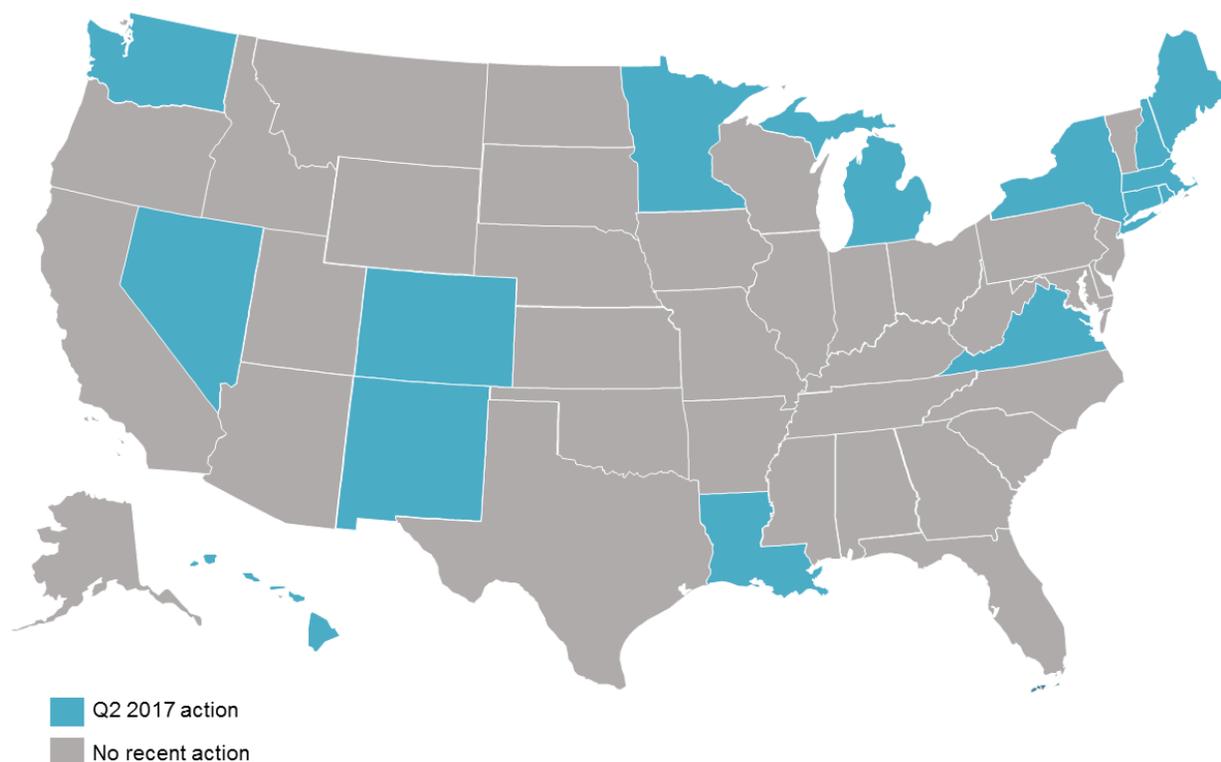
## PLANNING AND MARKET ACCESS

### Key Takeaways:

- In Q2 2017, 15 states considered changes to utility planning processes and state regulations enabling market access.
- Three ISOs/RTOs took action related to wholesale market rules for energy storage, while five states took action regarding evaluation of non-wires alternatives.
- Legislation enacted in Nevada will require the Commission to give preference to resources providing the greatest economic and environmental benefits to the state.

As the role of energy storage and other distributed energy resources increases within our energy system, many are realizing that current utility planning methods do not adequately capture the full costs and benefits of these resources. For example, energy storage systems are capable of producing many benefits on a sub-hourly basis, but traditional integrated resource planning evaluates options only on the basis of hourly or less frequent time intervals.

**Figure 6. State Action on Planning and Market Access (Q2 2017)**



In Q2 2017, 15 states considered changes to planning processes or market access rules. Seven states – Colorado, Louisiana, Michigan, Minnesota, Nevada, New Mexico, and Washington – considered adjustments to the integrated resource planning (IRP) process. New Mexico and Washington are examining how to better evaluate energy storage alongside other

resources in the IRP process. In Nevada, legislation was enacted during Q2 2017 that requires the Commission to give preference to resources providing the greatest economic and environmental benefits to the state.

Other states are considering changes related to distribution system or grid modernization planning. As distribution-level resources increase, greater attention is being paid to planning and modernizing the electric distribution system. Connecticut, Massachusetts, Nevada, New York, Rhode Island, and Washington are all considering ways to improve distribution system planning or putting new focus on planning requirements specifically aimed at modernizing the grid.

As distributed energy resources come down in cost, an emerging area of attention from states and utilities is the evaluation of non-wires or non-transmission alternatives. Strategic deployment of distributed energy resources can sometimes obviate the need for new transmission or distribution lines. Multiple states are currently exploring these opportunities or processes to evaluate non-wires alternatives alongside proposed transmission or distribution investments.

In New Hampshire, a recent Commission order calls for a non-wires alternatives pilot program, in which the state's investor-owned utilities will install distributed generation systems in place of distribution system upgrades. Proposed legislation in both Maine and Massachusetts would create independent state entities to facilitate the fair evaluation of non-wires alternatives when new transmission or distribution projects are proposed.

Regional transmission operators are also addressing rules regarding participation of energy storage resources in wholesale markets. As storage systems may act as both supply-side and demand-side resources and provide multiple types of services, establishing appropriate market access and compensation can be a complex task. This issue is currently being addressed by the MidContinent Independent System Operator. The California Independent System Operator is also evaluating opportunities for greater market participation by DERs, as well as how to better coordinate transmission and distribution system planning.

**Table 3. Updates on Planning and Market Access (Q2 2017)**

State/RTO	Sub-Topic	Description	Source
CAISO	Grid Modernization Planning	A working group consisting of California ISO, California's IOUs, and DER providers released a report in June 2017, which examines ways to improve coordination between transmission and distribution systems in preparation for higher penetrations of DERs. The report provides a variety of recommendations for addressing issues likely to arise in the near-term and mid-term. The working group will continue to meet throughout 2017 to further advance their transmission and distribution coordination framework.	<a href="#">More Than Smart Report</a>
	Wholesale Market Rules	California ISO's (CAISO) Energy Storage and Distributed Energy Phase 2 initiative is exploring market participation options for energy storage and other DERs. One option being considered is the development of a bi-directional Proxy Demand Response (PDR) product, which would allow energy storage systems to consume excess load at certain times. CAISO released its Draft Final Proposal for Phase 2 in June 2017. CAISO chose not to address PDR in the Draft Final Proposal, suggesting a decision may be deferred until Phase 3 of the proceeding.	<a href="#">Phase 2 Initiative</a> <a href="#">Draft Final Proposal</a>
CO	Integrated Resource Planning	In April 2017, the Colorado Public Utilities Commission issued a decision approving Public Service Company of Colorado's (Xcel Energy) 2016 resource plan, which plans for resource provision through 2023. The decision requires Xcel to incorporate a carbon price in its resource plan.	<a href="#">Docket No. 16A-0396E</a>
CT	Distribution System Planning	In June 2017, Connecticut Light and Power submitted its application before the Public Utilities Regulatory Authority for approval of its proposal to build (1) a DER customer portal and (2) a DER hosting capacity portal. This will provide a web-based graphical map of the company's distribution system, helping to identify locations on the grid that are already saturated with DERs and areas where DERs would benefit the grid. The company intends to participate in the Electric Power Research Institute's DRIVE (Distribution Resource Integration and Value Estimation) program which is a part of a nationwide effort to enable planners to evaluate the technical impacts of DERs on the grid.	<a href="#">Docket No. 17-06-02</a>
	Distribution System Planning	In June 2017, United Illuminating Company submitted its DER integration plan. The plan includes the following projects: (1) DER hosting capacity analysis and mapping, (2) DER and load forecasting, and (3) localized targeting of DERs. This proposal is	<a href="#">Docket No. 17-06-03</a>

		submitted pursuant to Connecticut General Statutes § 16-244w, which requires the utilities to build grid-side system enhancements to integrate DERs.	
HI	Microgrid Rules	H.B. 1248, as originally written, would have exempted any microgrid demonstration project (authorized by the legislature or the Public Utilities Commission) from regulation as a public utility. As amended, the provisions only apply to a microgrid demonstration project at the Natural Energy Laboratory of Hawaii. The bill, in its amended form, passed the House in March 2017.	<a href="#">H.B. 1248 (P1)</a>
LA	Integrated Resource Planning	In January 2017, the New Orleans City Council opened a docket to consider proposed changes to the Council's integrated resource planning process and requirements. Proposed changes were filed by late February 2017, and the Advisors filed a report in late April. The proceeding was not initiated explicitly or exclusively to consider changes related to DERs, but several comments propose making changes to ensure fair treatment and consideration of DERs and demand-side management.	City Council Docket No. UD-17-01 ( <i>docket not publicly accessible</i> )
MA	Grid Modernization Planning	H.B. 1725 would require distribution utilities to submit grid modernization plans every five years. These plans must include an evaluation of locational benefits and costs of local energy resources on the system. The plan must also identify optimal locations for local energy resources over the next ten years, additional spending necessary to integrate cost-effective local energy resources, and any barriers to deployment of local energy resources. Furthermore, the plans must propose or identify location-based incentives and other ways to deploy cost-effective local energy resources, as well as cost-effective ways to coordinate existing programs, incentives, and tariffs to maximize locational benefits and minimize incremental costs of these resources. Finally, the utilities would also be required to develop publicly accessible hosting capacity maps that are continually updated. The Department of Public Utilities would be required to initiate a proceeding by January 31, 2018 to establish a procedure for creating and filing these plans. The proceeding would also establish metrics and performance incentives to evaluate the distribution utilities' progress toward developing a system where local energy resources can be utilized to meet demand. The bill also creates a Grid Modernization Consumer Board to review utilities' grid modernization plans and budgets.	<a href="#">H.B. 1725 (I)</a> <a href="#">S.B. 1875 (I)</a>
	Non-Wires Alternatives	H.B. 1725 would require utilities to receive a "Determination of Wires" prior to constructing (or receiving a construction permit for) a transmission	<a href="#">H.B. 1725 (I)</a> <a href="#">S.B. 1875 (I)</a>

		<p>line, distribution line, or ancillary structure integral to the operation of a transmission or distribution line. As part of the application for this determination, the utility must describe alternatives to the facility and also include an investigation from an independent 3rd party of the ability for local energy resource alternatives to address or defer part or all of the wires investment. The investigation must include the total costs and benefits to ratepayers of both the wires project and the local alternatives. A Grid Modernization Consumer Board would be created by the bill, and this entity would be responsible for approving a Determination of Wires. The Board would be required to first consider whether any local energy resource alternatives, alone or in combination, could meet or defer the wires investment.</p>	
ME	Microgrid Rules	<p>H.B. 190 would establish rules to allow municipalities working together with electric utilities to create microgrids. The bill is currently a concept draft, and will address the following topics: (1) renewable generators within the microgrid, (2) methods for adding storage and enabling the utility to manage charging and use of stored energy, (3) rates for generation and stored power usage, (4) credits for municipal utilization, and (5) compensation for scheduling or shedding of electrical load to reduce peak demand.</p>	<a href="#">H.B. 190 (I)</a>
	Non-Wires Alternatives	<p>S.B. 516 directs the Public Utilities Commission (PUC) to appoint a Smart Grid Coordinator with demonstrated experience in developing, operating, and managing non-transmission alternatives. The Coordinator would work to develop, implement, and manage non-transmission alternatives approved by the PUC. Specifically, when a transmission project is proposed, the Coordinator would develop a non-transmission alternative; the costs of developing this alternative would be borne by the transmission project applicant. If the PUC determines it is in the public interest to proceed with the non-transmission alternative and it is a utility proposing the project, the bill states that the costs of this alternative would be just and reasonable for ratemaking purposes.</p>	<a href="#">S.B. 516 (I)</a>
	Non-Wires Alternatives	<p>In April 2016, the Public Utilities Commission (PUC) opened an investigation into the designation of a Non-Transmission Alternative (NTA) Coordinator. The Smart Grid Policy Act authorized the PUC to designate a smart grid coordinator, and previous proceedings examined this possibility. The purpose of this proceeding is to develop a framework for selecting an NTA Coordinator, determine the scope of the NTA Coordinator's functions and duties, and determine whether a third party entity or transmission</p>	<a href="#">Docket No. 2016-00049</a>

		and distribution utilities should perform the NTA Coordinator functions. The end goal is to have the framework for an RFP or rate incentive, depending on whether a third party or utilities should hold the NTA Coordinator role. The PUC filed a strawman proposal when it opened the docket, leaving many aspects open for discussion. A revised process chart and preliminary issues list was filed in November 2016. Settlement conferences were held in Q2 2017, and a hearing is scheduled for September 7 <sup>th</sup> .	
MI	Integrated Resource Planning	Legislation passed in December 2016 requires the Public Service Commission (PSC) to set modeling parameters and assumptions for utilities to use in submitting integrated resource plans (which are required under the legislation). The PSC held stakeholder meetings in May and June 2017, and will initiate a formal proceeding by August 18, 2017.	<a href="#">S.B. 437 (2016)</a> <a href="#">S.B. 438 (2016)</a> <a href="#">Integrated Resource Plan Updates</a>
MISO	Wholesale Market Rules	In April 2017, DTE Electric submitted an Issue Submission Form to MISO requesting that tariffs for energy storage be updated. Current rules treat storage as a synchronous generator and do not recognize that storage acts as both a generator and a load, which results in sub-optimal use of the storage resource. This request references an ongoing review of this issue by FERC prompted by an Indianapolis Power & Light request in 2016.	<a href="#">Energy Storage Resource Optimization</a>
MN	Integrated Resource Planning	A pair of bills introduced in February 2017 would require the economy, job growth, and job retention to be analyzed in the integrated resource planning process. Neither bill advanced before the end of the 2017 legislative session.	<a href="#">H.B. 1309 (I)</a> <a href="#">S.B. 1177 (I)</a>
NH	Non-Wires Alternatives	As part of the New Hampshire Public Utilities Commission's (PUC) June 2017 net metering successor tariff decision, the PUC ordered the implementation of four pilot programs, including a non-wires alternatives pilot. The pilot would be focused on the installation of DG in lieu of distribution system upgrades. Each utility is to have at least one pilot program location, and Eversource is to have at least three.	<a href="#">Docket No. DE 16-576</a> <a href="#">Order No. 26,029</a>
NM	Integrated Resource Planning	In February 2017, the New Mexico Public Regulation Commission initiated a rulemaking to amend the state's integrated resource planning (IRP) rules. The Commission is considering requiring utilities to consider energy storage resources on a comparable and consistent basis in IRPs alongside supply-side and demand-side resources. Stakeholders filed comments in April 2017, and a hearing was held in late May. The Staff noted in its comments that it supports amending the IRP scope to explicitly include	<a href="#">Docket No. 17-00022-UT</a>

		energy storage. The Staff also noted that it would be helpful for utilities submit cost-benefits analyses for storage options they have considered to better understand why no storage projects are not being developed. PNM's comments indicated that it supports the amendment as well, but recommends separating "energy storage resources" from "demand response resources". El Paso Electric and Southwestern Public Service d/b/a Xcel Energy indicated that they do not oppose the amendment. The Energy Storage Association expressed its support, but recommends more detail on methodology to ensure storage options are appropriately considered.	
NV	Grid Modernization Planning	S.B. 145 requires utilities to submit grid modernization plans to the Public Utilities Commission as part of their integrated resource plans. The bill authorizes the Commission to approve these plans if the benefits exceed costs. The bill passed the Senate in April 2017, but was amended to remove the provisions related to grid modernization before being signed into law.	<a href="#">S.B. 145 (E)</a>
	Integrated Resource Planning	S.B. 65 requires utilities to provide the Public Utilities Commission with an overview of their integrated resource plans (IRP) four months before officially filing them. The bill also requires the Commission to give preference in IRPs to sources of supply that provide the greatest economic and environmental benefits to the state. The bill was signed by the Governor in June 2017.	<a href="#">S.B. 65 (E)</a>
NY	Distribution System Planning, Non-Wires Alternatives	In March 2017, the Public Service Commission (PSC) published its order on the Distributed System Implementation Plans. In the order, the PSC provided guidance on hosting capacity, interconnection portals, non-wires alternatives, data privacy, and energy storage as being implemented as a part of the Reforming the Energy Vision process. The PSC directed the utilities to provide suitability criteria for non-wires alternatives to be included in utility planning procedures. In May 2017, the utilities filed additional details, describing the suitability criteria for non-wires alternatives as a part of utility capacity planning and budgeting. Each utility has filed its specific criteria, including information on how it will be applied and the solicitation process.	<a href="#">Docket No. 14-M-0101</a> <a href="#">Docket No.16-M-0411</a>
	Grid Modernization Planning	The "New York Grid Modernization Act" (A.B. 7480) would require utilities to develop smart grid deployment plans if, following a study, it is determined that smart grid deployment is in the public interest. The program is to include many components, including transmission and distribution system	<a href="#">A.B. 7480 (I)</a>

		improvements, low-income assistance and education, access to real-time pricing data, AMI opt-out, opportunities for the use of smart appliance and plug-in or hybrid vehicles.	
	Grid Modernization Planning	A.B. 4223 requires utilities to develop and adopt smart grid system deployment plans by July 2018 and issue RFPs by October 2018. The smart grid would allow for a two-way communications system with real time monitoring, diagnostics, and control. Utilities would be allowed recovery of their costs.	<a href="#">A.B. 4223 (I)</a>
	Non-Wires Alternatives	In May 2017, the Public Service Commission (PSC) approved Con Edison's tariff amendment, permitting the export of electricity discharged by battery storage systems to the distribution system during demand response events. This is part of Con Edison's Brooklyn Queens Demand Management Non-Wires Alternative project. This order provides regulatory certainty that battery storage systems participating in non-wires alternative projects will be allowed to export electricity.	<a href="#">Docket No. 17-E-0104</a>
PJM	Wholesale Market Rules	In April 2017, the Energy Storage Association filed a complaint against PJM before FERC, alleging that PJM unilaterally changed its frequency regulation market, discriminating against existing energy storage resources. The PJM frequency regulation market is categorized into RegA (for traditional resources with limited ramp rates) and RegD (for resources with short ramp rates, including batteries). Previously, the RegD resources were energy neutral. However, in January 2017 PJM changed its rules that maintained energy neutrality and eliminated the provision for RegD resource use for short durations.	<a href="#">Docket No. EL17-64</a>
RI	Distribution System Planning	In March 2017, the Governor of Rhode Island directed the Public Utilities Commission, Office of Energy Resources, and Division of Public Utilities and Carriers to design a new regulatory framework for Rhode Island's electric system. Distribution system planning is being considered as part of this effort. A meeting on distribution system planning was held in May 2017, and the Office of Energy Resources opened an inquiry into distribution system planning in June. Comments were accepted through June 19 <sup>th</sup> .	<a href="#">Power Sector Transformation Initiative</a>  <a href="#">Notice of Inquiry Into Distribution System Planning</a>
	Non-Wires Alternatives	In December 2016, Rhode Island's Energy Efficiency and Resource Management Council (EERMC) filed changes to the state's System Reliability Procurement (SRP) Standards, along with the 2018-2020 energy efficiency savings targets. Proposed changes to the SRP standards include a new framework for comparing the costs and benefits of wires and non-wires alternatives, as well as new flexibility for non-	<a href="#">Docket No. 4684</a>

		wires alternatives screening criteria. A technical session was held in May 2017, and new standards were approved in July. The new standards require National Grid to consider non-wires alternatives in all distribution planning and capital investment decision-making.	
VA	State Planning & Support	S.B. 1258, enacted in early April 2017, converted the Virginia Solar Energy Development Authority to the Virginia Solar Energy Development and Energy Storage Authority. The Authority's purpose is to facilitate, coordinate, and support the development of the state's solar and energy storage industries.	<a href="#">S.B. 1258 (E)</a>
WA	Distribution System Planning, Integrated Resource Planning	<p>In May 2015, the Washington Utilities and Transportation Commission staff initiated a proceeding (UE-151069) to investigate the role of energy storage in utility planning and procurement. The Commission later initiated a rulemaking proceeding in September 2016 (U-161024) to consider changes to the integrated resource planning (IRP) process. The two proceedings overlap in certain areas. The Commission specifically seeks to evaluate how recent advances in the energy industry, such as the growth of DG and development of energy storage technologies, should be treated in the IRP.</p> <p>In March 2017, the Commission released a draft energy storage policy statement for comment in both dockets, and parties submitted comments until early April. The Commission's policy statement cites energy storage as a key enabling technology for utilities to comply with state energy policies, and that utilities should be diligently working to identify and pursue cost-effective energy storage opportunities. Other key items include: (1) Utilities seeking a prudence determination for new resource acquisitions must demonstrate that their analysis of resource options included a storage alternative, and that they have reasonably considered all of the costs and benefits; (2) A timeline for transitioning to sub-hourly IRP modeling will be discussed in the rulemaking proceeding (U-161024). In the meantime, a "net cost" method will be used within traditional hourly modeling, whereby utilities will use an external model to calculate sub-hourly benefits of energy storage and subtract these from costs in the IRP model; (3) Utilities are to rely on energy storage cost data from reliable, independent third parties; and (4) The Commission is willing to consider rate design proposals that reflect the cost of serving customers during high-demand periods, in order to provide tariffs with price signals to encourage behind-the-meter storage projects. A workshop was held on PURPA</p>	<a href="#">Docket No. UE-151069</a>  <a href="#">Docket No. U-161024</a>  <a href="#">Draft Policy Statement</a>

and the obligations of a utility to a qualifying facility in May 2017 as part of the rulemaking proceeding.

Legislative Status Key: I = Introduced, P1 = Passed One Chamber, P2 = Passed Both Chambers, E = Enacted, D = Dead. Bill statuses are up to date as of early May 2017.

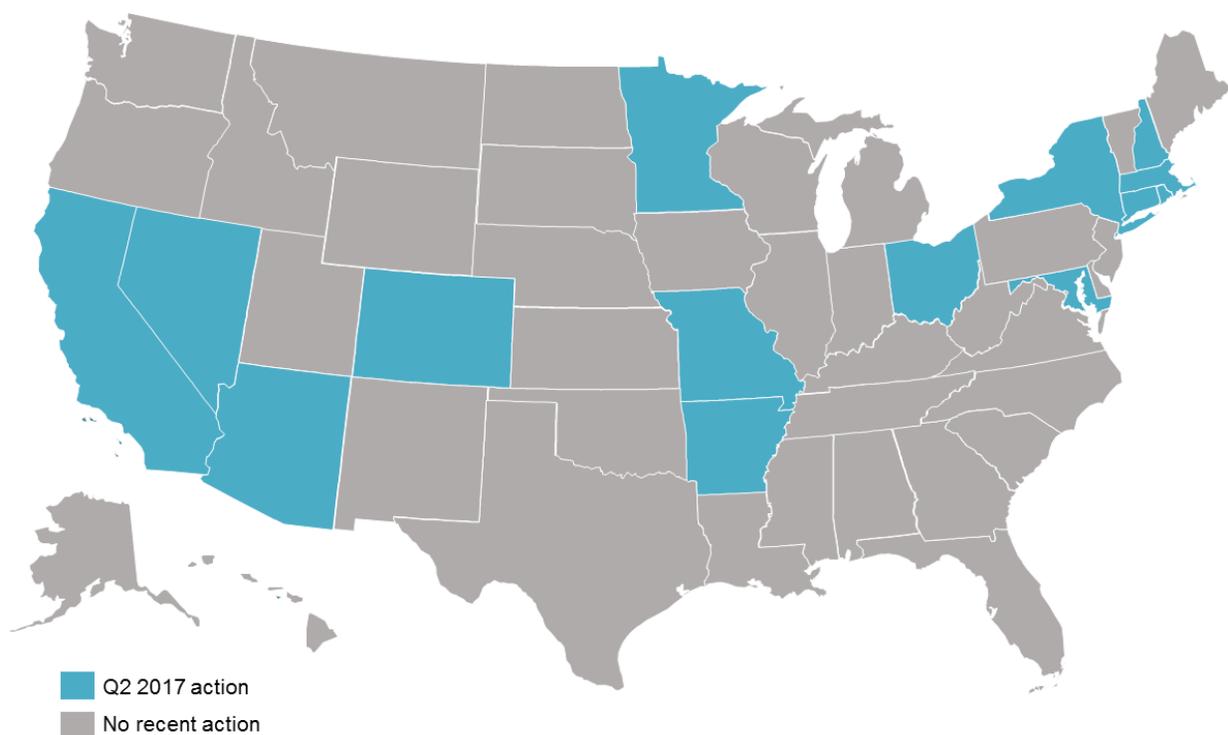
# UTILITY BUSINESS MODELS AND RATE REFORMS

## Key Takeaways:

- In Q2 2017, 14 states took 22 actions to reform rate design, regulatory structures, or utility business models.
- Ten states took action on time-varying rates, while four states are considering utility business model reforms.
- Only two investor-owned utilities – Arizona Public Service and Oklahoma Gas & Electric (AR) – have proposed mandatory demand charges for all residential customers since 2015.

U.S. utilities have traditionally operated under cost of service regulation, whereby a utility's rates are based on its revenue requirement – its costs, including both capital and operating costs, plus a reasonable return. Utility rate design, particularly for residential customers has typically consisted of a fixed customer charge, plus a flat per-kWh rate for energy consumed during the billing period. Many commercial and industrial rates also include a demand charge, based on the customer's maximum kW demand during the billing period; however these charges have been rarely mandatory for residential customers.

**Figure 7. Action on Utility Business Model and Rate Reform (Q2 2017)**

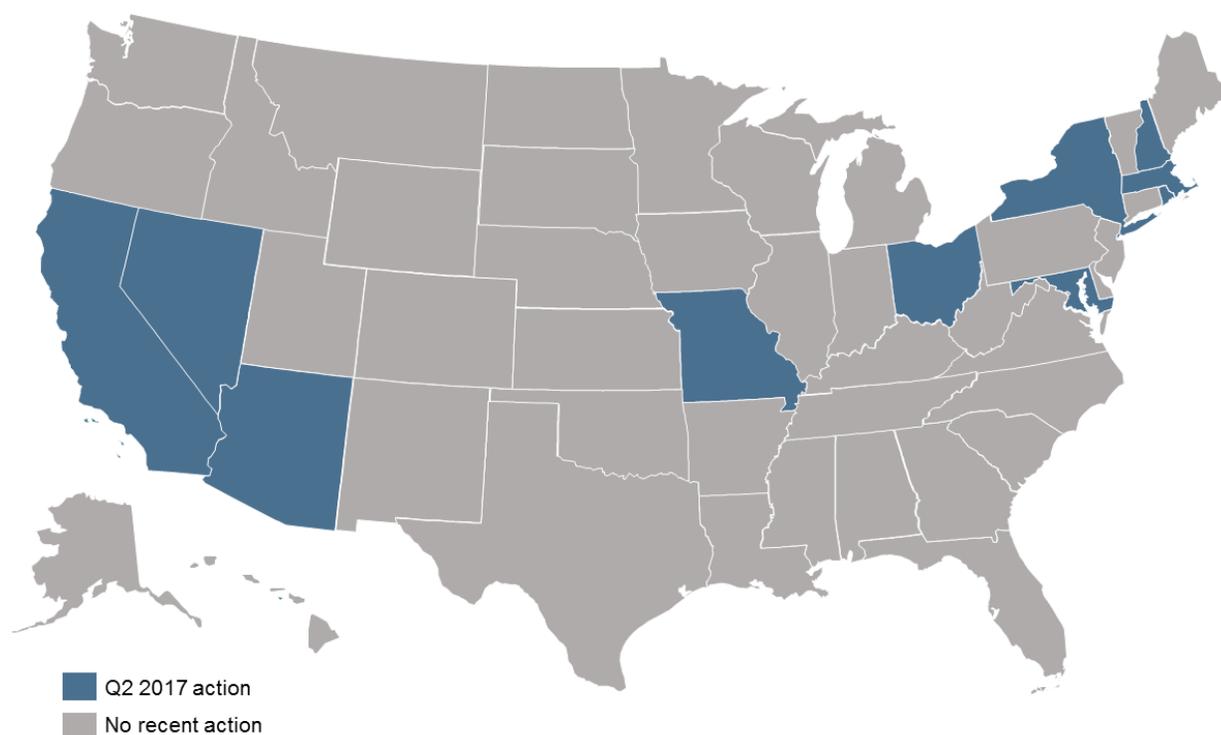


As technological advancements are made, traditional utility business models, regulatory frameworks, and rate designs are being reformed in many parts of the country. In Q2 2017, 14

states considered these types of changes. In both the first and second quarters of 2017, the most common type of action related to time-varying rates, particularly as a default option for residential customers.

Two state utilities commissions directed utilities to take action on time-varying rates in Q2 2017. In a decision on Kansas City Power and Light's proposed general rate increase, the Missouri Public Service Commission directed the utility to propose time-varying rates in its next rate case. In New Hampshire, as part a June decision on a net metering successor tariff, the Commission ordered four pilot programs to be conducted, including one for time-varying rates (Eversource and Unitil) and one for real-time pricing (Liberty Utilities with City of Lebanon).

**Figure 8. Action on Residential Time-Varying Rates (Q2 2017)**



A handful of states are also considering changes to traditional utility business models and regulation. In Massachusetts, Eversource has proposed a performance-based ratemaking mechanism, while utilities in New York are proposed earning adjustment mechanisms as part of the state's Reforming the Energy Vision process.

Arizona Public Service and Oklahoma Gas and Electric (AR) are the only two investor-owned utilities to propose mandatory demand charges for all residential customers in recent years. A settlement was approved in Oklahoma Gas & Electric's case during Q2 2017, adopting a voluntary demand tariff for residential customers with a bill protection mechanism, but excluding the mandatory residential demand charge originally proposed.

**Table 4. Updates on Utility Business Model and Rate Reform (Q2 2017)**

State	Sub-Topic	Description	Source
AR	Demand Charges	As part of its general rate case filed in August 2016, Oklahoma Gas & Electric proposed a mandatory demand charge for all residential customers. In May 2017, the Public Service Commission approved a settlement agreement, which includes only a voluntary demand tariff for residential customers. For the first year, demand tariff participants will receive "best bill" protection, receiving a credit at the end of the year if the customer would have been better off on the standard residential tariff.	<a href="#">Docket No. 16-052-U</a>  <a href="#">Order No. 8</a>
AZ	Demand Charges, Time-Varying Rates	In Arizona Public Service's (APS) June 2016 general rate case, the utility proposed mandatory time-varying rates and demand charges for all residential customers. In March 2017, a settlement agreement among 30 parties was filed, which includes several rate options for residential customers and residential DG customers, but does not make time-varying rates and demand charges mandatory. However, in May 2018, time-varying rates will become default for all APS customers. In May 2017, the Arizona Corporation Commission staff filed a brief concluding that the settlement should be adopted. The agreement is pending Commission approval.	<a href="#">Docket No. E-01345A-16-0036</a>  <a href="#">Settlement Agreement</a>
CA	Time-Varying Rates	California is in the process of shifting to default TOU rates for residential customers of investor-owned utilities. The California Public Utilities Commission (CPUC) issued a decision in 2015, establishing rules for the transition from tiered rates to default TOU rates, including a process for flattening the tiers in the interim. The decision also set a cap on the amount that Tier 1 rates could increase at any one time. The utilities filed a Petition for Modification of the decision in December 2016, arguing that they may need to exceed that cap in the future. The CPUC issued a proposed decision in May 2017, allowing the utilities to exceed the cap in certain circumstances.	<a href="#">Docket No. R-12-06-013</a>  <a href="#">Proposed Decision</a>
	Time-Varying Rates	This proceeding, separate from the proceeding examining the transition to default TOU rates, is examining the appropriate time periods for future TOU rates. In a January 2017 decision, the California Public Utilities Commission (CPUC) identified relevant principles and related data requirements at a broad level to assess TOU time periods. Among the provisions included in the decision were rules through which customers with existing PV systems, or nearly completed PV systems, could be grandfathered under the original TOU rates. The ALJ issued a ruling in June 2017, which addressed a Petition for	<a href="#">Docket No. R-15-12-012</a>  <a href="#">Ruling</a>

		Modification to allow extra time for certain schools to be grandfathered under the original TOU rates.	
CO	Decoupling	In July 2016, Public Service Company of Colorado d/b/a Xcel Energy filed a request to implement a revenue decoupling plan for residential and small commercial customers. Evidentiary hearings were held in February 2017, and position statements were filed by March 10 <sup>th</sup> . In early May 2017, the Public Utilities Commission (PUC) issued a recommended decision, which would approve the decoupling pilot program for residential customers, but not for commercial customers. In June 2017, the PUC issued a decision approving the decoupling pilot program for both residential and small commercial customers (there will be separate programs for the different classes, but both will have decoupling programs.)	<a href="#">Docket No. 16A-0546E</a> <a href="#">Decision No. C17-0557</a>
CT	Rate Reform	In February 2016, the Public Utilities Regulatory Authority (PURA) opened a docket to conduct a full Cost of Service Study (COSS) and rate design review to establish a standardized methodology for electric distribution companies to use. The review will be conducted in two phases – Phase I addressing the COSS and Phase II addressing rate design. In early April 2017, PURA determined that questions regarding the cost of serving DG customers should be explored in a new, separate docket. This docket is temporarily suspended until completion of the new docket pertaining to DG rate issues.	<a href="#">Docket No. 16-02-30</a>
MA	Fixed Charges	H.B. 1725 would prohibit the Department of Public Utilities from approving residential fixed charges that are higher than the sum of connection costs, billing, and provision of customer service.	<a href="#">H.B. 1725 (I)</a> <a href="#">S.B. 1875 (I)</a>
	Utility Business Model Reform	In Eversource's pending general rate case, filed in January 2017, the utility requested approval of a performance-based ratemaking mechanism, whereby rates would adjusted annually in accordance with a revenue-cap formula. This mechanism would replace the utility's current capital cost recovery mechanism, and Eversource suggests that it will help the utility pursue its clean energy goals and greater cost efficiency.	<a href="#">Docket No. 17-05</a>
	Time-Varying Rates	H.B. 1725 would require each distribution company to offer customers a time-of-use rate option. The company would also be required to provide a summary of available rate options with expected bill impacts for the customer once per year. Customers opting in to time-of-use rates for the first time would be offered bill protection for at least one year, where the customer would not be required to pay more than	<a href="#">H.B. 1725 (I)</a> <a href="#">S.B. 1875 (I)</a>

		they would have paid under their previous rate schedule.	
MD	Time-Varying Rates	As part of Maryland's grid modernization proceeding (Public Conference No. 44), utilities will develop pilot programs for time-varying rates. These are set to be developed between February and June 2017, with the pilot programs taking place between July 2017 and June 2018. The Commission also established a working group to develop a proposal that enables the utilities that have deployed AMI to institute a data sharing system.	<a href="#">Public Conference No. 44</a>
MN	Rate Reform	A pair of bills introduced in February 2017 would require the Public Utilities Commission to consider economic growth and job retention when establishing rates. Neither bill advanced before the end of the 2017 legislative session.	<a href="#">H.B. 1309 (I)</a> <a href="#">S.B. 1177 (I)</a>
MO	Time-Varying Rates	In July 2016, Kansas City Power & Light (KCP&L) proposed an increase in its residential monthly fixed charge. In May 2017, the Commission approved a smaller increase in the fixed charge than requested. The Commission also ordered KCP&L to propose time-varying rates in its next rate case.	<a href="#">Docket No. ER-2016-0285</a> <a href="#">Order</a>
NH	Time-Varying Rates	H.B. 401 directs the Public Utilities Commission to develop a process to implement time-varying rates as part of the active grid modernization proceeding. The bill was retained in committee in February 2017 for action in the second year of the legislative session.	<a href="#">H.B. 401 (I)</a>
	Time-Varying Rates	In the New Hampshire Public Utilities Commission's June 2017 net metering successor tariff order, the Commission ordered the implementation of four pilot programs, including one on TOU rates (Eversource and Unitil) and one on real-time pricing (Liberty Utilities / City of Lebanon). The TOU pilots will be open to both residential and small commercial customers. The order requires that the data from these pilot programs be made available to a broad range of stakeholders. Upon the utilities proposing pilot program designs, a stakeholder working group will review and discuss the proposals.	<a href="#">Docket No. DE 16-576</a> <a href="#">Order No. 26,029</a>
NV	Time-Varying Rates	Existing law prohibits utilities from adopting time-of-use rates. S.B. 145 would remove that prohibition and allows utilities to adopt time-of-use rates if the Commission deems them just and reasonable. However, S.B. 145 was amended to remove these provisions before being signed into law.	<a href="#">S.B. 145 (E)</a>
	Utility Business Model Reform	Nevadans voted on a Constitutional Amendment in November 2016 to deregulate the electric utility industry. Seventy-two percent of voters voted in favor	<a href="#">The Energy Choice Initiative -</a>

		of deregulation. However, Nevada law requires Constitutional Amendments to be approved in two even-numbered years. This amendment will need to be approved by voters again in 2018 before taking effect.	<a href="#">Constitutional Amendment</a>
NY	Rate Reform	As a part of the Reforming the Energy Vision Track Two order, the Public Service Commission (PSC) required the utilities to provide in detail the cost allocation methodologies being used to calculate standby rates. The PSC also directed the utilities to file revisions to their standby service rates to implement offset tariff and reliability credit provisions for standby customers who are able to demonstrate that they are able to reduce their load below contract demand over consecutive summer periods. The utilities filed their tariff amendments in August 2016, which became effective on January 1, 2017 after including revisions ordered by the PSC. In July 2017, the PSC issued an order moving this proceeding into the Value of Distributed Energy Resources (VDER) proceeding's Rate Design Working Group (Matter No. 17-01277).	<a href="#">Case No. 16-M-0430</a>
	Time-Varying Rates	S.B. 3093 would create a Real Time Smart Meter program to provide residential customers with greater ability to control and manage electricity usage. Customer electing to participate in the program would be charged based on electricity usage and time of usage and a flat fee incorporating a generation bid cost and service size cost. Utilities, subject to Public Service Commission agreement, may delay participation in the program for at least ten years. During this time, other providers would have the opportunity to provide meters. The bill also provides authority to the Commission to establish real time smart meter pilot programs.	<a href="#">S.B. 3093 (I)</a>
	Utility Business Model Reform	In May 2016, as part of Track Two of New York's Reforming the Energy Vision proceeding, the Public Service Commission (PSC) directed the utilities to propose a DG interconnection survey process and Earning Adjustment Mechanism (EAM) metrics. The EAM will provide utilities with diverse, balanced financial incentives to implement REV outcomes. In September 2017, the utilities proposed EAM metrics, as well as specific targets and incentives to be developed. In March 2017, the PSC ordered the utilities to file a revised proposal with modifications provided by the PSC. In May 2017, the utilities published a revised EAM proposal.	<a href="#">Case No.16-01575/16-M-0429</a>
OH	Time-Varying Rates	In February 2017, the Public Utilities Commission of Ohio (PUCO) approved a stipulation for AEP to implement Phase 2 of its gridSMART Project. The	<a href="#">Docket No. 13-1939-EL-RDR</a>

		<p>gridSMART Project includes a deployment of smart meters to 894,000 additional customers, a transition to time-differentiated pricing, and other smart grid investments and studies. The Office of the Ohio Consumers' Council (OCC) initially opposed the settlement and filed an application for rehearing in March 2017. The OCC said it would back the settlement on the condition that residential customers will pay just 45% of the gridSMART Phase 2 costs, instead of the 62.4% included in the settlement. PUCO addressed this issue, siding with the OCC, and the OCC withdrew its application for rehearing in April 2017.</p>	
RI	Time-Varying Rates	<p>Companion bills H.B. 5642 and S.B. 553 would allow utilities to implement time-of-use rates for all residential customers. Currently, Rhode Island law does not allow time-of-use rates to be applied to residential customers, with the exception of pilot programs.</p>	<p><a href="#">H.B. 5642 (P1)</a></p> <p><a href="#">S.B. 553 (I)</a></p>
	Utility Business Model Reform	<p>In March 2017, the Governor of Rhode Island directed the Public Utilities Commission, Office of Energy Resources, and Division of Public Utilities and Carriers to design a new regulatory framework for Rhode Island's electric system. This broad proceeding includes evaluation of utility business models. A technical meeting on utility business models was held on April 24th.</p>	<p><a href="#">Power Sector Transformation Initiative</a></p> <p><a href="#">Utility Business Models</a></p>

Legislative Status Key: I = Introduced, P1 = Passed One Chamber, P2 = Passed Both Chambers, E = Enacted, D = Dead. Bill statuses are up to date as of early May 2017.



establish a formal energy storage target, while multiple other states are considering the adoption of a target. Nevada's Governor signed a bill in June, directing the Public Utilities Commission to determine if it is in the public interest to adopt an energy storage procurement target. Legislation to adopt or increase storage targets is pending in Massachusetts and New York.

### Box 3. A Note About Policies

Grid Modernization Policies is intended to be a broad category, capturing state-level policy actions related to grid modernization and the deployment of distributed energy resources (excluding solar-specific actions) that do not neatly fit into other categories in this report. The actions in this category are largely centered on market development policies, such as energy storage mandates, as well as regulatory procedures.

Some states are also working to clarify the treatment of energy storage within existing state policies. Interconnection proceedings are underway in Arizona, Colorado, and North Carolina, where standards for energy storage systems are being examined. California is considering a bill regarding the permitting process for energy storage systems, and New York is evaluating energy storage compensation rules as part of its larger value of distributed energy resources proceeding.

In Idaho, treatment of energy storage under the state's implementation of the federal Public Utility Regulatory Policies Act (PURPA) came under review this year. Several states are considering or have recently considered changes to PURPA implementation not specific to energy storage; these states include Idaho, Michigan, Montana, North Carolina, Oregon, South Carolina, Utah, and Washington. PURPA is most relevant in areas that are not part of wholesale energy markets, namely the southeast and west.

**Table 5. Updates on Grid Modernization Policies (Q2 2017)**

State	Policy Type	Description	Source
AZ	Interconnection	Arizona is in the process of developing statewide interconnection rules (Arizona does not currently have statewide interconnection standards). Multiple comments received during Q2 2017 recommended that the rules explicitly address energy storage, as well as advanced inverters.	<a href="#">Docket No. RE-00000A-07-0609</a>
	Renewable Portfolio Standard	In August 2016, Arizona Corporation Commission Chairman Little opened a docket to review, modernize, and expand Arizona's renewable portfolio standard (RPS). At the end of November, the Residential Utility Consumer Office filed a proposal to add a Clean Peak Standard to Arizona's RPS. The Clean Peak Standard would require a certain percentage of energy used to meet peak load hours to be derived from clean sources. A planned April 2017 workshop was rescheduled and held in June.	<a href="#">Docket No. E-00000Q-16-0289</a> <a href="#">RUCO Comments</a>
CA	Demand Response	The California Public Utilities Commission (CPUC) is working to integrate demand response into the CAISO market, and is investigating whether a competitive procurement mechanism for supply-side resources outside of traditional utility programs is viable. An initial pilot auction was conducted in 2015 with delivery in 2016, and a second auction took place in 2016 with delivery expected in 2017. The CPUC later approved a third pilot auction in 2017. OhmConnect filed a request for the evaluation of the pilot programs to be expedited so the demand response auction mechanism could be made permanent by summer 2018. In April 2017, the CPUC issued a decision denying OhmConnect's request and the request of the joint demand response parties. However, the decision left the door open for an additional auction in 2018 with delivery in 2019.	<a href="#">Docket No. R-13-09-011</a> <a href="#">Decision No. 17-04-045</a>
	Energy Storage Target	Guided by Assembly Bill 2514 of 2010, the California Public Utilities Commission (CPUC) adopted an energy storage mandate in 2013, which requires the IOUs to collectively procure 1,325 MW of energy storage by 2020. The CPUC has an ongoing proceeding, split into two tracks, examining this mandate and other issues surrounding the deployment of energy storage. Track 1 dealt with more near-term issues and was resolved through a CPUC decision in January 2016. The CPUC issued a decision in April 2017 related to various Track 2 issues, including revisions to the energy storage procurement targets, station power, and community storage.	<a href="#">Docket No. R. 15-03-011</a> <a href="#">Decision No. 17-04-039</a>

		Notably, the CPUC decision declined to increase the 1,325 MW storage requirement, but did set forth the process for implementing Assembly Bill 2868 of 2016, which requires the utilities to propose programs and investment for up to 500 MW of additional distributed energy storage resources.	
	Permitting	A.B. 546 in California would require local governments with at least 200,000 residents to make all documents and forms associated advanced energy storage permitting public accessible online by September 30, 2018. Local governments with fewer than 200,000 residents would have to meet this requirement by January 31, 2019. This bill further states that permitting and inspection fees should be based only on the cost to issue the permit and complete the inspection, and not on the value of the installation. The bill also directs the Governor's Office of Planning and Research to create a California Energy Storage Permitting Guidebook by January 2020. The Assembly passed the bill in May 2017.	<a href="#">A.B. 546 (P1)</a>
	Renewable Portfolio Standard	A.B. 1405, introduced in February 2017 would require an unspecified percentage of peak-load electricity to come from clean peak resources, such as energy storage. The bill would require the California Public Utilities Commission to determine the actual percentage of kilowatt-hours delivered by each load-serving entity during peak hours. The Assembly passed the bill in June 2017.	<a href="#">A.B. 1405 (P1)</a>
	Renewable Portfolio Standard	S.B. 338, introduced in February 2017 and amended in March, would require the California Public Utilities Commission to consider establishing policies and procedures to ensure each load-serving entity meets its net-load peak energy needs while reducing the need for new electricity generation and new transmission. Options to consider could include clean energy technologies, demand response, and efficiency. The bill passed the Senate in May 2017.	<a href="#">S.B. 338 (P1)</a>
CO	Demand Response	H.B. 1227, introduced in March 2017, would extend demand-side management goals for IOUs to 2028. It would require the Public Utilities Commission to set goals of at least 5% peak demand reduction and 5% energy savings relative to 2018 numbers. The bill was signed by the Governor in May 2017.	<a href="#">H.B. 1227 (E)</a>
	Interconnection	In March 2017, several solar groups filed a petition to modify current DG interconnection	<a href="#">Docket No. 17M-0131E</a>

		rules. The groups have requested that energy storage be added to the interconnection rules, and to investigate metering needs for solar-plus-storage systems. In May 2017, the Commission issued a decision granting the request in part; the interconnection rules will be examined as part of an upcoming rulemaking regarding Electric Resource Planning and Renewable Energy Standard rules.	<a href="#">Docket No. 16A-0396E</a>
ID	PURPA	In February 2017, Idaho Power filed a petition with the Public Utilities Commission for a declaratory order determining the appropriate contract terms, conditions, and avoided cost rates for PURPA contracts requested by battery storage facilities. Idaho Power suggested that facilities up to 100 kW should be entitled to published avoided cost rates and a 20-year term, while facilities larger than 100 kW may receive negotiated avoided cost rates and a two-year term. In July 2017, the Public Utilities Commission published an order, declaring that the particular project at issue, having storage facilities greater than 100 kW and solar as the primary energy source, is eligible for a two-year negotiated contract.	<a href="#">Docket No. IPC-E-17-01</a> <a href="#">Final Order</a>
IL	Data Access	A docket was opened in August 2014 to consider the adoption of guidelines for utility customer data. In July 2017, the Illinois Commerce Commission finalized the Open Data Access Framework, which will govern access to utility customer energy usage data. ComEd and Ameren (two major IOUs in Illinois) have begun to address the framework requirements by creating "data roadmaps" for customer data access.	<a href="#">Docket No. 14-0507</a>
	Demand Response	Legislation introduced in Illinois would extend the requirement for utilities to reduce peak demand by 0.1% over the prior year through cost-effective demand response measures. This requirement would be effective through December 31, 2026. The bills did not advance, and the legislative session has ended.	<a href="#">H.B. 2825 (I)</a> <a href="#">H.B. 3687 (I)</a> <a href="#">S.B. 1601 (I)</a>
MA	Data Access	A pair of bills introduced in 2017 would increase the availability of energy data in the state. The bills would require the state's investor-owned utilities to provide access, upon request by a municipal official, to aggregate annual energy consumption data by sector for up to five prior years, as well as anonymized annual energy consumption data by household, daily 15-minute peak demand data for commercial and municipal buildings for up to one prior year, and aggregate	<a href="#">H.B. 3386 (I)</a> <a href="#">S.B. 1858 (I)</a>

		daily 15-minute peak demand data for the residential sector.	
	Energy Storage Target	In August 2016, Massachusetts enacted legislation directing the Department of Energy Resources (DOER) to determine if it is prudent to adopt an energy storage requirement. In December 2016, DOER determined that establishing a target is prudent and requested stakeholder input by January 27th. In late June 2017, DOER adopted a 200 MWh energy storage target for electric distribution utilities to meet by January 2020.	<a href="#">DOER Letter to the Legislature</a>  <a href="#">Energy Storage Initiative</a>
	Energy Storage Target	Companion bills introduced in Massachusetts would direct the Department of Energy Resources (DOER) to establish a statewide deployment target of 1,766 MW of cost-effective energy storage to be developed by January 1, 2025. The proposed legislation would also direct DOER to set a subsequent deployment target on or before December 31, 2020 to be achieved by January 1, 2030. The targets are to include both minimum and maximum limits on the amount of storage that may be owned by load-serving entities and are to be reevaluated every three years. The legislation also permits DOER to consider policies to encourage storage deployment.	<a href="#">H.B. 1746 (I)</a>  <a href="#">S.B. 1874 (I)</a>
MD	AMI Rules	H.B. 1406 would allow customers to opt out of AMI installation at no additional cost. The bill also directs the Department of Health and Mental Hygiene and the Public Service Commission to jointly report on the public health impact of smart meters in the state. The bill was reported unfavorably from committee, and the legislative session ended in April.	<a href="#">H.B. 1406 (D)</a>
	Data Access	In September 2016, the Maryland Public Service Commission (PSC), as part of the Exelon-PHI merger condition, initiated a grid modernization proceeding to make sure that the electric distribution system in Maryland is customer-centric, affordable, reliable, and environmentally sustainable. A working group to examine competitive protections and customer choice has been established as part of this process, and in late June 2017, the group filed a request to seek comments and hold a hearing to support the development of regulations pertaining to customer interval data access.	<a href="#">Public Conference No. 44</a>
ME	AMI Rules	S.B. 75, introduced in January 2017, would allow customers to opt out of AMI installation without being charged a fee, monthly charge, or higher	<a href="#">S.B. 75 (D)</a>

		rate. The bill also allows utilities to decrease the number of times traditional meters are read and utilize a billing method based on average electricity consumption, subject to Public Utilities Commission approval. The bill died in June 2017.	
MI	AMI Rules	H.B. 4220, introduced in February 2017, would allow utility customers to opt out of having an advanced meter installed; utilities would only be able to install advanced meters if the customer did not opt out and choose to retain a traditional meter. This bill would apply to both IOUs and municipal utilities.	<a href="#">H.B. 4220 (I)</a>
MN	Data Access	The Minnesota Public Utilities Commission convened a working group to examine issues around privacy and customer data access in 2013. The Commission accepted comments regarding a potential customer energy use data release consent form in the first part of 2017, and issued an order in June 2017, approving a standard customer energy use data consent form. Utilities must honor customer data access requests from third parties as long as the third parties utilize the approved consent form.	<a href="#">Docket No. 12-1344</a>
NC	Interconnection	Following the adoption of revised interconnection standards in 2015, the North Carolina Utilities Commission directed the Public Staff to convene stakeholders in two years to discuss the functioning of the new standards. Advanced Energy, the entity assigned by the public staff to facilitate the stakeholder process created four working groups during Q2 2017. One of the working groups will be examining new technologies, including energy storage.	<a href="#">Docket No. E-1 Sub 101</a>
NJ	Building Requirements	A.B. 4861, introduced in May 2017, would require all new state buildings that are greater than 15,000 square feet to install distributed energy resources (DERs). Any existing buildings of similar size would also be required to consider installing DERs during any retrofitting. The definition of DERs includes energy storage.	<a href="#">A.B. 4861 (I)</a>
NV	Energy Storage Target	S.B. 204 would require the Public Utilities Commission to determine whether it is in the public interest to adopt annual requirements for the procurement of energy storage by utilities. The bill was signed by the Governor in May 2017.	<a href="#">S.B. 204 (E)</a>
	Renewable Portfolio Standard	A.B. 206 would have allowed energy storage systems to qualify for up to 10% of the state's renewable portfolio standard. The bill was vetoed by the Governor in June 2017.	<a href="#">A.B. 206 (D)</a>

NY	AMI Rules	A.B. 3066 and A.B. 6464 would require AMI devices to meet certain performance and safety standards, and would allow customers the ability to opt-out of AMI installation at no penalty, fee, or service charge.	<a href="#">A.B. 3066 (I)</a> <a href="#">A.B. 6464 (I)</a>
	AMI Rules	S.B. 3093 would create a Real Time Smart Meter program, in which customers would have the option of continuing with their current metering system, as well as purchasing or renting a real time smart meter from a third party certified by the Public Service Commission.	<a href="#">S.B. 3093 (I)</a>
	AMI Rules	The “New York Grid Modernization Act” (A.B. 7480) directs utilities to invest in smart grid deployment if, after a study on the matter is conducted, it is determined that doing so is in the public interest. The bill notes that as part of this deployment, utilities must allow any customer to decline AMI installation at no fee.	<a href="#">A.B. 7480 (I)</a>
	DER Compensation	<p>As part of New York’s Reforming the Energy Vision (REV) proceeding, the Public Service Commission (PSC) is developing a methodology for DER valuation that provides a more precise and complete accounting of the values and costs of DERs, including energy storage, than traditional net metering. While the PSC recognized that the development of an appropriate value and compensation for DERs will be an ongoing process progressing in tandem with technical and market capabilities, it directed the public staff to develop recommendations on the value of DERs that could potentially lead to an alternative to net metering.</p> <p>In March 2017, as part of the net metering transition order (Docket No. 15-E-0751), the PSC provided direction on how DERs should transition from net metering to a Value of Distributed Energy Resources (VDER) tariff that reflects the cost and benefits of DERs on the grid. The transition is to occur in phases. In Phase One, mass market projects will be interconnected under existing net metering rules with a 20-year contract term. Any on-site energy storage systems paired with renewable energy generation facilities will retain traditional net metering, and all projects interconnected before the order will be grandfathered. Projects that don’t qualify for the Phase One net metering will be compensated based on Phase One Value Stack tariff.</p> <p>The Value Stack tariff will be based on monetary crediting for net hourly electricity exported to the</p>	<a href="#">Docket No. 15-02703/15-E-0751</a>

		<p>grid. Excess credit will be eligible for carry over to subsequent billing and annual periods. Projects eligible for the Value Stack will have a contract term of 25 years from their in-service date. The Value Stack for net hourly electricity exported to the grid will be calculated based on the value of – (1) an energy value based on day-ahead hourly zonal locational-based marginal price (LBMP), (2) capacity value, (3) environmental value, and (4) demand reduction value and locational system relief value.</p> <p>In July 2017, the PSC issued a notice forming working groups for Phase 2 of the VDER proceeding. The PSC has established three working groups: (1) value stack, (2) rate design, and (3) low and moderate income.</p>	
	Energy Storage Target	S.B. 2699 would require the Public Service Commission to initiate a proceeding to determine energy storage targets that can be achieved by 2021. The procurements targets would be established by December 2018.	<a href="#">S.B. 2699 (I)</a>
	Energy Storage Target	Legislation introduced in 2017 would require the Public Service Commission to commence a proceeding to establish energy storage programs. The bills require the Commission by 2018 to set an energy storage target to be achieved by 2030.	<a href="#">A.B. 6571 (I)</a> <a href="#">S.B. 5190 (I)</a>
	Self-Directed Program	Legislation introduced in January 2017 requires the New York Public Service Commission to create a self-directed program for promoting renewable energy, microgrids, fuel cells, and energy storage technologies.	<a href="#">S.B. 1225 (P1)</a> <a href="#">A.B. 1705 (I)</a>
OK	AMI Rules	S.B. 601 would allow residential and commercial customers of public utilities regulated by the Corporation Commission to opt out of AMI installation. The bill would allow the utility to charge a one-time \$5.00 fee to customers opting out. The bill did not advance before the legislative session ended in May.	<a href="#">S.B. 601 (I)</a>
OR	Energy Storage Target	H.B. 2193 of 2015 directed utilities serving 25,000 or more residential customers to procure one or more energy storage systems with the capacity to store at least 5 MWh of electricity. The bill also directed the Public Utility Commission (PUC) to adopt guidelines for utilities to use in submitting an energy storage proposal. The PUC initiated a proceeding in September 2015, and issued an order adopting guidelines in December 2016. The guidelines cover various topic areas, including how utilities can design and select projects to	<a href="#">H.B. 2193 (2015)</a> <a href="#">Docket No. UM 1751</a>

		propose, how utilities should submit their formal proposals, storage evaluation requirements, and competitive bidding requirements. The PUC order also directed the Public Staff to convene workshops to develop a framework for the utilities to use in conducting storage potential evaluations. The Public Staff submitted their recommendations in March 2017, which the PUC later approved. No significant action occurred during Q2 2017, but the utilities filed their draft storage potential evaluations in July 2017.	
PA	Energy Storage and Microgrid Rules	H.B. 1412 would allow electric distribution companies to propose energy storage and microgrid pilot programs with the goals of facilitating the use of diverse electric supply options and enhancing electric distribution, resiliency, and operational flexibility. Within five years of approval of the first pilot program, the Commission is to initiate a rulemaking evaluate the circumstances where utility deployment of energy storage and microgrids is in the public interest and to develop regulations to further the deployment of energy storage and microgrids in the state. The bill specifically states that the rulemaking shall not require utilities to own, develop, or deploy energy storage or microgrids.	<a href="#">H.B. 1412 (I)</a>
TX	AMI Rules	S.B. 1145 and H.B. 2572 are companion bills which would apply to Entergy Texas, a fully integrated utility which is not part of ERCOT. These bills would apply ERCOT-applicable advanced metering rules to Entergy Texas. The relevant rules deal with cost recovery for AMI and data privacy. S.B. 1145 was signed into law in May 2017.	<a href="#">S.B. 1145 (E)</a> <a href="#">H.B. 2572 (I)</a>
	AMI Rules	The Texas Public Utility Commission has an ongoing docket pertaining to Smart Meter Texas, a web portal allowing customers and authorized competitive service providers to access information from smart meters. The docket also addresses issues of smart meter governance and funding. In July 2017, PUC staff recommended opening a contested case proceeding regarding smart meter issues and closing the current docket. An open meeting is scheduled for July 28, 2017.	<a href="#">Docket No. 46206</a>
VT	AMI Rules	In February 2017, the Vermont Department of Public Service filed a letter requesting that the Public Service Board hold a status conference on cybersecurity issues relating to smart metering. These issues were investigated several years ago and left open. A conference was held in April	<a href="#">Docket No. 7307</a>

	2017, and the Department was directed to file proposed cybersecurity principles by April 28th. Recommendations by stakeholders on these principles were scheduled to be due by June 2nd.	
Energy Storage Target	H.B. 501 directs the Department of Public Service to develop policy recommendations and targets for energy storage capacity in the state, particularly for systems storing electricity from intermittent sources. The full text of the bill is not yet available. The bill was not voted on during the 2017 legislative session.	<a href="#">H.B. 501 (I)</a>

Legislative Status Key: I = Introduced, P1 = Passed One Chamber, P2 = Passed Both Chambers, E = Enacted, D = Dead. Bill statuses are up to date as of early May 2017.

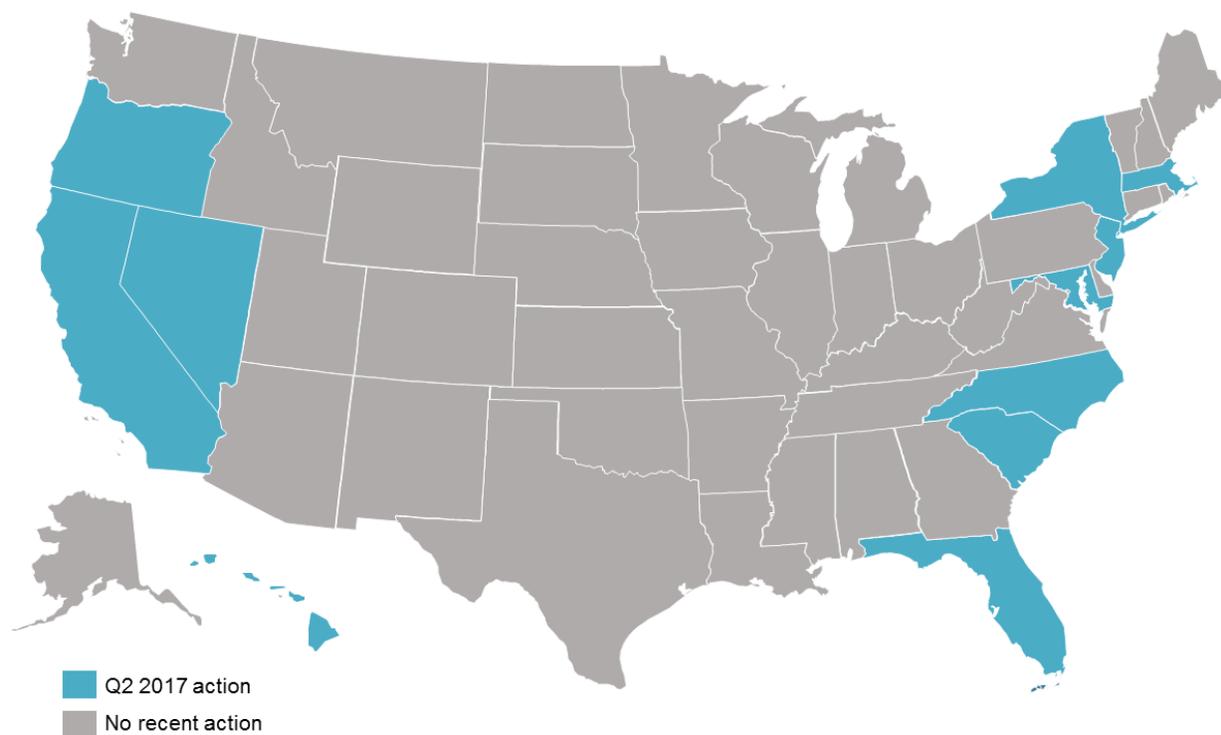
## FINANCIAL INCENTIVES

### Key Takeaways:

- In Q2 2017, there were 24 actions ongoing or under consideration in 11 states related to incentives for advanced grid technologies.
- Of these, 22 proposals were for energy storage incentives, while 2 were for microgrid incentives.
- Maryland became the first state to enact a state tax credit for energy storage in Q2 2017, and Nevada approved the development of an energy storage rebate program.

In Q2 2017, there were 24 actions ongoing or under consideration in 11 states related to incentives for grid modernization. These actions include tax credits, property and sales tax exemptions, grant programs, rebate programs, loan programs, and property assessed clean energy (PACE) financing programs.

**Figure 10.** Action on Financial Incentives (Q2 2017)



The majority of action on financial incentives in Q2 2017 was legislative, with 21 bills adopting or expanding incentives for energy storage or microgrids being considered during the quarter. While most bills are still pending or may be carried over to next year's legislative session, three bills – in Florida, Maryland, and Nevada – were enacted in Q2 2017.

In Florida, the state's Governor signed legislation in June adopting a property tax exemption for solar-plus-storage systems for commercial and industrial customers. In May, Maryland

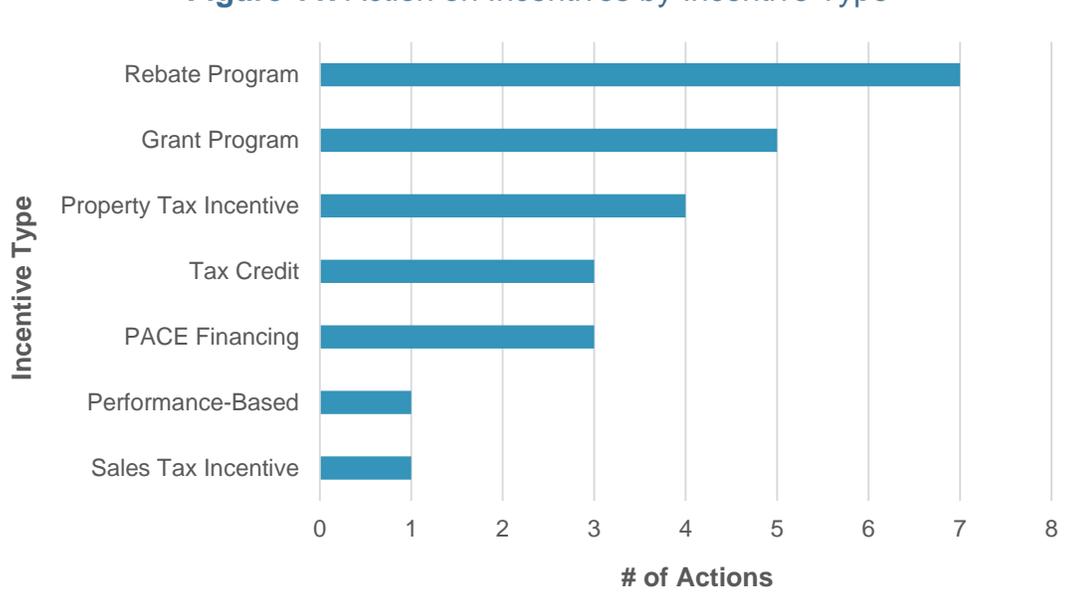
approved the first state tax credit for energy storage systems in the country. In Nevada, a bill enacted in May creates a rebate program for energy storage, to be administered by NV Energy. The Public Utilities Commission will develop the incentive structure and program rules.

#### Box 4. Tax Incentives, Grants, Rebates, and Financing Programs

The term **tax incentives** covers a broad spectrum of incentives, including income **tax credits and deductions**; **property tax exemptions**, exclusions, abatements, and credits; and **sales tax exemptions** and refunds. **Performance-based incentives** are based on the energy production of a system. **Grant programs** are one-time monetary payments, typically awarded through a competitive process, while **rebate programs** provide cash incentives for equipment installations meeting program specifications. Finally, **loan programs** provide financing for the purchase of advanced grid technologies and **Property Assessed Clean Energy (PACE) financing** programs allow property owners to borrow money to pay for certain clean energy improvements and repay the amount via a special assessment on the property. Find incentives for renewable energy and energy efficiency with the [Database of State Incentives for Renewables and Efficiency](#).

California and New York also saw significant action on state energy storage incentives during Q2 2017. As a result of an April decision, California effectively doubled the budget for its Self-Generation Incentive Program (SGIP), with 85% of the budget increase dedicated to energy storage. The New York State Energy Research and Development Authority recently allocated up to \$15.5 million for grants to energy storage demonstration projects that provide grid benefits.

Figure 11. Action on Incentives by Incentive Type



**Table 6. Updates on Financial Incentives (Q2 2017)**

State	Incentive Type	Description	Source
CA	Rebate Program	The Self-Generation Incentive Program (SGIP) provides rebates for energy storage systems. The California Public Utilities Commission, as required by 2016 legislation, approved a decision in April 2017 effectively doubling the budget for the program. The decision also sets aside 85% of the additional funding for energy storage, splitting it 90/10 between projects larger than 10 kW and residential projects equal to or less than 10 kW. Three parties filed a motion following the decision, expressing concern that storage projects coupled with solar would claim all the incentives and that no funding would be left for stand-alone storage projects. The Assigned Commissioner issued a ruling in June 2017, denying the parties' motion, but proposing additional requirements that would ensure storage projects would provide a grid benefit. The SGIP reopened at Step 1 for energy storage projects on May 1, 2017, and was fully subscribed after one week. Step 2 for energy storage applicants opened on June 5, 2017.	<a href="#">Docket No. R-12-11-005</a>  <a href="#">Assigned Commissioner's Ruling</a>
	Rebate Program	A.B. 1030, introduced in February 2017, would require the Public Utilities Commission and governing boards of local publicly owned utilities to create an energy storage rebate program that sets aside a portion of funding for low-income customers and disadvantaged communities. The bill was defeated in April 2017.	<a href="#">A.B. 1030 (D)</a>
	Rebate Program	S.B. 700 would require the California Public Utilities Commission to create an Energy Storage Initiative, through which utilities would be required to offer rebates to customers who install certain energy storage equipment. As currently amended, the bill does not specify a required funding level; utilities would have individual proceedings to determine an appropriate funding amount for the rebates. The bill passed the Senate in May 2017, but was pulled from the Assembly agenda in July and is now dead.	<a href="#">S.B. 700 (D)</a>
FL	Property Tax Incentive	S.B. 90 implements a ballot initiative passed in August 2016, adopting a property tax exemption for solar plus storage systems for commercial and industrial customers. The Governor signed the bill into law in June 2017.	<a href="#">S.B. 90 (E)</a>
HI	Rebate Program	H.B. 1593 would create the Energy Savings Jump Start Program within the Hawaii Green Infrastructure Authority. Among other things, the Energy Savings Jump Start Program would include a rebate program for residential, commercial, and utility-scale energy storage systems. The bill was passed by the House	<a href="#">H.B. 1593 (P1)</a>

		in March 2017. The House rejected amendments made by the Senate in April, and the bill was sent to conference committee. There has been no action on the bill since.	
	Tax Credit	S.B. 665 would create a state tax credit for energy storage systems starting in 2018. The tax credit would be equal to 25% of costs, up to \$5,000 for residential and \$500,000 for commercial projects. The bill passed the Senate in March 2017.	<a href="#">S.B. 665 (P1)</a>
MA	Performance-Based Incentive	As part of legislation enacted in April 2016, the Department of Energy Resources (DOER) was directed to develop a new solar incentive program to succeed the Solar Renewable Energy Credit II (SREC II) Program. DOER released its final program design at a stakeholder meeting on January 31, 2017. The new program takes the form of a performance-based incentive and includes an adder for solar + storage systems. The base adder is \$0.045/kWh and will decrease by 4% with each block of installed solar capacity (amount of capacity per block will vary by utility territory.) This adder will vary based on the ratio of storage capacity to solar capacity, as well as the duration of the storage system. In June 2017, DOER filed an emergency regulation to implement the program, including a formula for calculating the storage adder. Three public hearings were held in July.	<a href="#">Development of the Next Solar Incentive</a> <a href="#">Final Program Design</a> <a href="#">225 CMR 20.00</a>
	Property Tax Incentive	H.B. 2600 would allow municipalities to exempt energy storage systems from property taxation.	<a href="#">H.B. 2600 (I)</a>
	Rebate Program	H.B. 2600 directs the Department of Energy Resources to establish a rebate for Massachusetts-based companies installing and manufacturing energy storage systems.	<a href="#">H.B. 2600 (I)</a>
	Sales Tax Incentive	H.B. 2600 would adopt a sales tax exemption for energy storage systems through 12/31/2025.	<a href="#">H.B. 2600 (I)</a>
MD	Grant Program	H.B. 1395 would add grants for energy storage systems to the state's existing Solar Energy Grant Program. Eligible storage equipment would include batteries and other electrochemical storage, capacitors, compressed air, pumped hydropower, hydrogen storage, thermal energy storage, regenerative fuel cells, flywheels, and superconducting magnets. Grants would be available for 30% of the installed cost, up to \$3,000. The bill received an unfavorable report from committee, and Maryland's session ended in April.	<a href="#">H.B. 1395 (D)</a>
	Tax Credit	S.B. 758 creates a state tax credit for energy storage systems. Energy storage systems are defined as	<a href="#">S.B. 758 (E)</a>

		systems used to store electrical energy, or mechanical, chemical, or thermal energy that was once electrical energy, for use as electrical energy at a later time or in a process that offsets electricity use at peak times. The credit is equal to 30% of installed costs up to \$5,000 for a residential property and \$150,000 for a commercial property. The aggregate amount of tax credits provided in a taxable year will be \$750,000, and the credit will expire on 12/31/2022. The bill was signed into law in May 2017.	
NC	PACE Financing	S.B. 493 would make significant changes to North Carolina's commercial PACE financing enabling legislation, including explicitly allowing energy storage systems to be financed through the program. Current PACE language allows distributed generation renewable energy and energy efficiency improvements to qualify.	<a href="#">S.B. 493 (I)</a>
NJ	Rebate Program	The New Jersey Clean Energy Program (NJCEP) provides grants for energy storage projects that are integrated with behind-the-meter Class 1 renewable energy projects at non-residential customer sites. The program offers an incentive of \$300 per kW of capacity, up to \$300,000 or 30% of project costs. The program has a budget of \$3 million for program year 2017 and will accept applications until funding is exhausted. As of April 2017, there were \$1.4 million in uncommitted program funds. In April 2017, NJCEP completed its strategic plan, developing the design and implementation plans for its FY 2018 programs. For FY 2018, the NJCEP plans to increase the incentive to a maximum of \$500,000 and provide an additional 20% in incentives to projects larger than 1 MW. The New Jersey Board of Public Utilities approved the NJCEP recommendations for an increase in incentives.	<a href="#">Renewable Electric Storage program</a>
NV	Rebate Program	S.B. 145, as amended, creates a new incentive for energy storage systems, which is to be administered by NV Energy. The rules for the program, including the incentive structure, will be determined by the Public Utilities Commission. The bill was signed by the Governor in May 2017.	<a href="#">S.B. 145 (E)</a>
NY	Grant Program	S.B. 4490 requires the New York State Energy Research and Development Authority to create a grant program to provide incentives up to \$150,000 per applicant to promote microgrids in the state.	<a href="#">S.B. 4490 (I)</a>
	Grant Program	The "New York Microgrid Act" would establish a microgrid grant program within the New York State Energy Research and Development Authority (NYSERDA) to provide funding for microgrid projects	<a href="#">A.B. 8212 (I)</a>

		that reduce utility rates and demand, and encourage the use of renewable energy resources.	
	Grant Program	In April 2017, the New York State Energy Research and Development Authority (NYSERDA) announced that it is allocating \$15.5 million to support energy storage demonstration projects that leverage the flexibility of energy storage to stack values by providing multiple benefits to the electric grid. Interested applicants must submit a concept proposal to NYSERDA for review. There is no maximum limit to funding, but the grant has cost-share requirements. Applications are being accepted until December 31, 2019.	<a href="#">PON 3541 Demonstrating Distributed Energy Storage for 'stacking' customer and grid values.</a>
	Grant Program	In June 2017, the new York State Energy Research and Development Authority announced that it is allocating \$6.3 million for energy storage demonstration projects focused on advancing, developing, and field testing energy storage technologies that address costs, performance, and integration in New York. There are two funding rounds for this solicitation; applications for the first were due by July 20, 2017, and applications for the second will be due December 29, 2017.	<a href="#">PON 3585 Energy Storage Product Development</a>
	Property Tax Incentive	S.B. 6762 would expand the state's property tax exemption for renewable energy systems to include micro-hydro, fuel cells, combined heat and power, and electric energy storage equipment and systems.	<a href="#">S.B. 6762 (P1)</a>
	Tax Credit	A.B. 6235 would create a state tax credit for residential energy storage systems equal to 25% of costs, up to \$7,000.	<a href="#">A.B. 6235 (I)</a>
OR	PACE Financing	H.B. 2132 would add energy storage and smart electric vehicle charging stations to the list of improvements eligible for PACE financing. The bill was signed into law in June 2017.	<a href="#">H.B. 2132 (E)</a>
SC	PACE Financing	S.B. 261 would establish a commercial PACE financing program in the state. Battery and thermal storage systems would be eligible under this program. South Carolina ended its session in May, and the bill remains in the House Committee on Labor, Commerce, and Industry.	<a href="#">S.B. 261 (P1)</a>
	Property Tax Incentive	S.B. 44 would adopt an 80% property tax exemption for distributed energy resources, including energy storage systems. South Carolina ended its session in May, and the bill remains in the House Committee on Ways and Means.	<a href="#">S.B. 44 (P1)</a> <a href="#">H.B. 3079 (I)</a>

**Legislative Status Key:** I = Introduced, P1 = Passed One Chamber, P2 = Passed Both Chambers, E = Enacted, D = Dead. Bill statuses are up to date as of early May 2017.

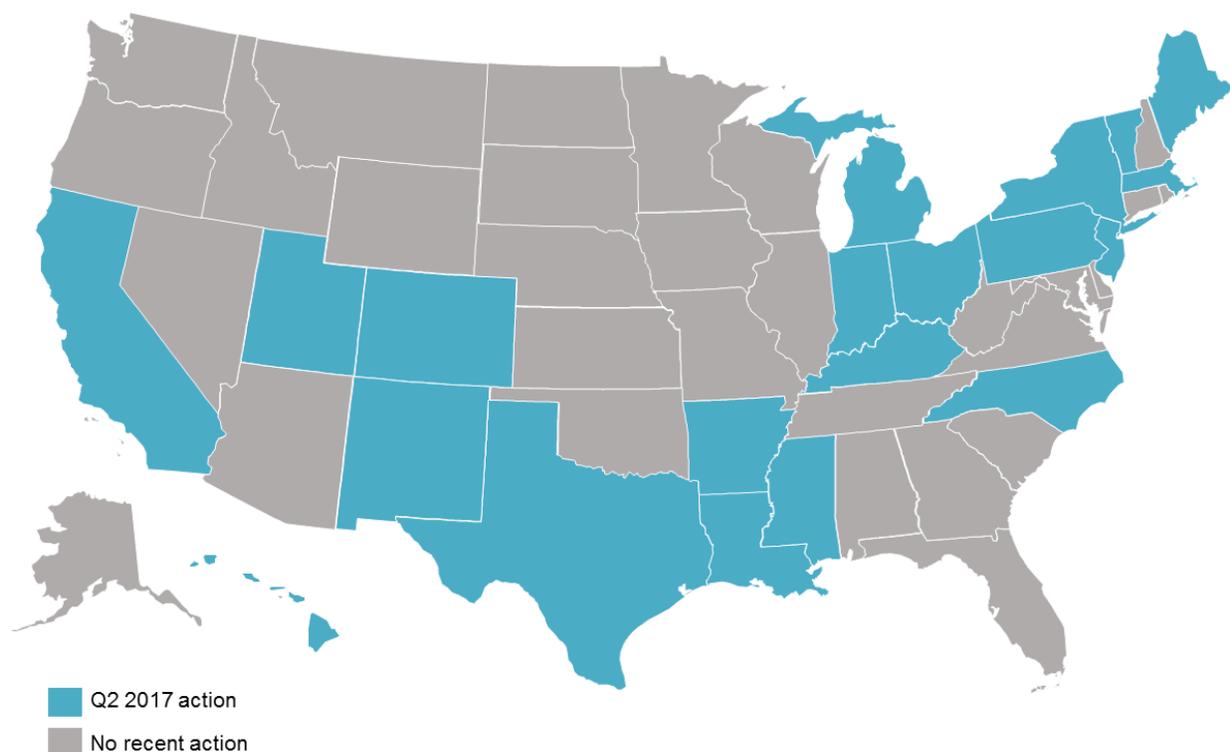
# DEPLOYMENT OF ADVANCED GRID TECHNOLOGIES

## Key Takeaways:

- In Q2 2017, there were 40 pending or decided proposals from state legislators or utilities across 20 states to deploy advanced grid technologies, such as advanced metering infrastructure (AMI), smart grid components, microgrids, and energy storage projects.
- Proposals to deploy advanced metering infrastructure (AMI) were the most common type of request, with 19 proceedings across 14 states related to AMI.
- Utility requests were typically filed as standalone requests, as part of general rate cases, or as part of grid modernization plans.

While most states are still investigating or proposing policy and regulatory changes to better enable the use of advanced grid technologies, many utilities are already deploying these technologies. Advanced metering infrastructure (AMI) is the technology that has seen the greatest deployment thus far; AMI deployment is often seen as a first step in grid modernization.

**Figure 12.** Action on Advanced Grid Technology Deployment (Q2 2017)



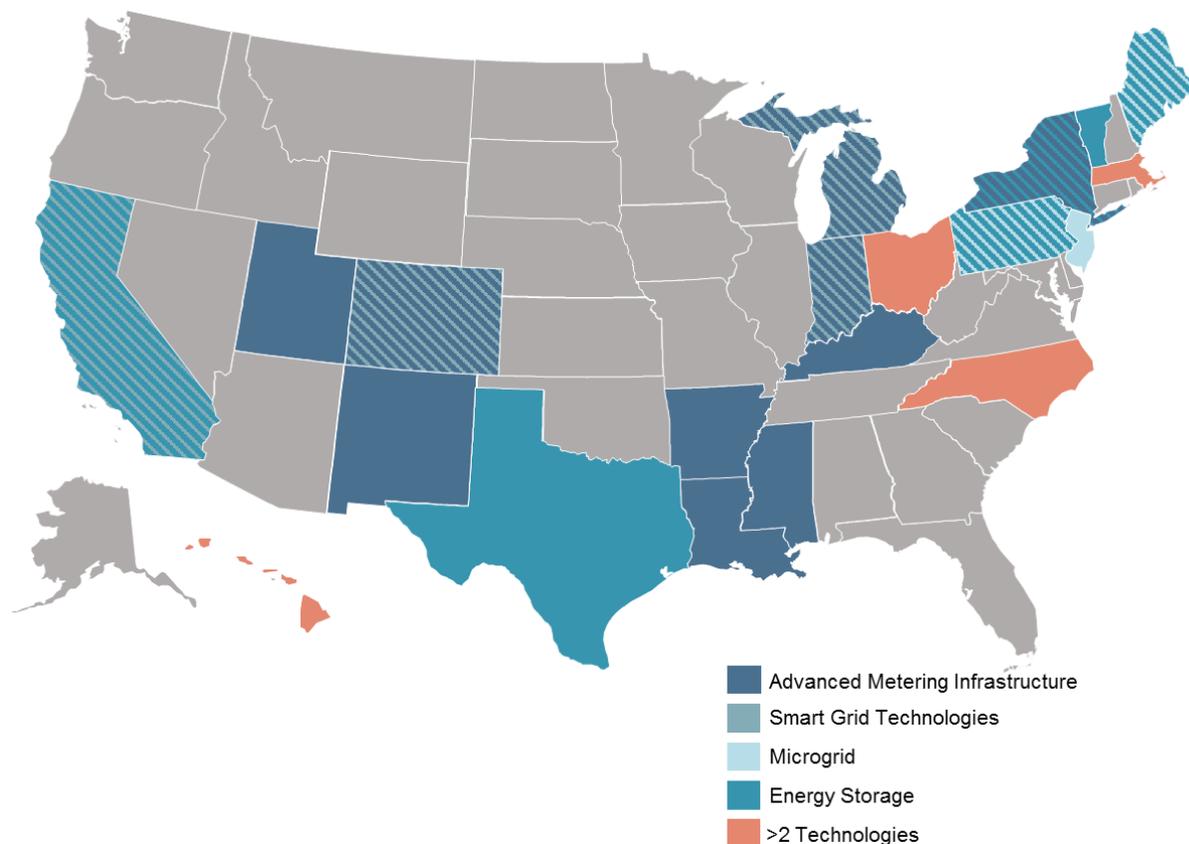
## Advanced Metering Infrastructure

In Q2 2017, a total of 14 states had open proceedings related to AMI deployment. In the southeast, Entergy filed requests to deploy AMI across its Louisiana, Arkansas, and Mississippi

service territories. Entergy estimates that AMI deployment will provide a net benefit in each of its service areas, and its Mississippi proposal was approved during Q2 2107.

In Kentucky, Louisville Gas and Electric and Kentucky Utilities withdrew their proposals for full deployment of AMI in their service territories and will conduct stakeholder discussions on issues surrounding AMI deployment. Other AMI proceedings are ongoing in Colorado, Indiana, New Mexico, New York, and North Carolina.

**Figure 13. Proposed Deployments by Technology Type (Q2 2017)**



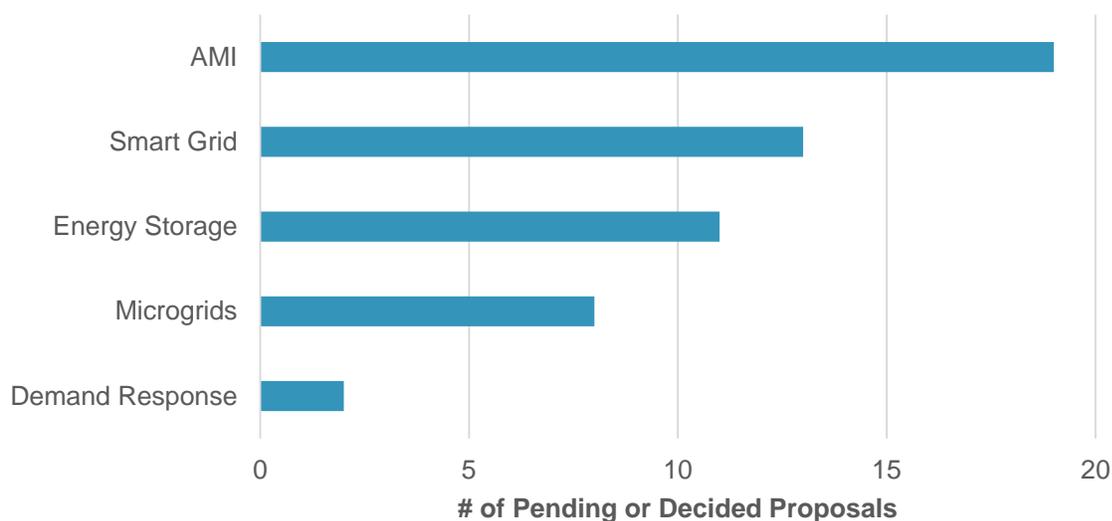
### Smart Grid / Distribution System Modernization

In Q2 2017, seven states had active proceedings regarding the deployment of comprehensive suite of grid modernization technologies. These are most often standalone proceedings with an objective of grid modernization.

In Massachusetts, as part of its 10-year grid modernization plan, each utility has filed for approval of a grid modernization investment package. The utilities in New York continued with development of more than 15 diverse Reforming the Energy Vision demonstration projects, which range from energy storage to virtual power plants and other cutting-edge systems.

Notably, in Hawaii the Public Utilities Commission rejected the utilities' initial grid modernization proposal, citing that the plan may not be cost-effective. In Q2 2017, as directed the Commission, the utilities in Hawaii published their grid modernization strategy, which is being vetted through the stakeholder process.

**Figure 14. Proposed Deployments by Technology Type (Q2 2017)**



### Energy Storage

In Q2 2017, nine states had active proceedings or legislation related to energy storage deployment. Notably, California Senate Bill 801 would require the Los Angeles Department of Water and Power to deploy at least 100 MW of energy storage by end of 2017.

Duke Energy has proposed energy storage projects in both its North Carolina and Ohio service territories. The Texas Public Utilities Commission is considering a proposal whether distribution utilities can own and rate base energy storage projects in the grid. In Vermont, Green Mountain Power recently filed a request to install a 1 MW battery system at an existing 5 MW solar facility. Green Mountain Power intends to stack values, using the system primarily for grid regulation and peak shaving.

### Microgrids

Five states had active proceeding related to microgrid deployment in Q2 2017. Microgrid deployment has been primarily motivated by a desire to increase the resiliency of the electric grid. The New Jersey Board of Public Utilities approved a plan initiating the construction of microgrids at 13 different strategic sites to power essential services should the larger grid fail during an emergency. Four separate bills were considered during Q2 2017 to promote microgrids. These bills were largely focused on establishing microgrid pilot projects and allowing certain types of facilities to install microgrids on their premises.

**Table 7. Updates on Advanced Grid Technology Deployment (Q2 2017)**

State	Utility	Technology	Description	Source
AR	Entergy Arkansas	AMI	In September 2016, Entergy Arkansas submitted a proposal to replace existing meters with advanced meters. Entergy expects the deployment to provide a nominal net benefit of \$431 million to customers. If approved, Entergy would begin deployment of the communications network in 2018 and meters in 2019. Entergy proposed recovering the AMI deployment costs through its Formula Rate Plan Rider. A hearing is scheduled to begin on August 31, 2017.	<a href="#">Docket No. 16-060-U</a>
CA	Los Angeles Department of Water & Power (LADWP)	Energy Storage	S.B. 801, introduced in February 2017, would require LADWP to deploy at least 100 MW of cost-effective energy storage by December 31, 2017. Cost-effective energy storage is defined as any transmission-connected, distribution-connected, or behind-the-meter storage facility providing a four-hour duration resource adequacy service. This directive is intended to mitigate the impact of a gas leak at the Aliso Canyon natural gas storage facility. The bill passed the Senate in June 2017.	<a href="#">S.B. 801 (P1)</a>
	Southern California Edison	Smart Grid	In its latest rate case, Southern California Edison proposed an investment of \$1,875 million in capital expenditures from 2016 - 2020 for its Grid Modernization plan, which includes automation, planning, communications, and information technology improvements. The case is ongoing.	<a href="#">Docket No. A-16-09-001</a> <a href="#">Southern California Edison Proposal</a>
CO	Public Service Co. of Colorado d/b/a Xcel Energy	AMI, Smart Grid	In August 2016, Xcel Energy submitted an Advanced Grid Intelligence and Security proposal. This plan includes AMI deployment, as well as a Volt-VAR optimization program and components of an advanced communications network. An unopposed settlement agreement was filed in May 2017, and a hearing was also held in May. The settlement agreement was approved in July 2017.	<a href="#">Docket No. 16A-0588E</a>
HI	Maui Electric Company (MECO)	Demand Response	In September 2016, Maui Electric filed an application for an expansion of its Fast Demand Response program from its current 0.2 MW total load to 5 MW. In March 2017, the Consumer Advocate	<a href="#">Docket No. 2016-0232</a>

			recommended approving an expansion of just 1 MW for 2017. Maui Electric replied in March, asserting that the load total of 5 MW is necessary to meet an anticipated reserve capacity shortfall.	
	N/A	Microgrid	H.B. 848 would require the University of Hawaii to develop a plan for a microgrid project on its campus and to submit the plan to the legislature prior to convening the regular session of 2019. The bill passed the House in March 2017. The Senate made amendments to the bill, passed it, and sent it back to the House in April 2017. The House rejected the Senate amendments, and the bill was sent to conference committee later in April. There has been no action on the bill since.	<a href="#">H.B. 848 (P1)</a>
	Hawaiian Electric Company (HECO), Hawaii Electric Light Company (HELCO), Maui Electric Company (MECO)	AMI, Smart Grid	In March 2016, Hawaii's IOUs submitted a proposal for a \$340 million Smart Grid Foundation Project. In January 2017, the Public Utilities Commission denied the utilities' request, noting that the project may not be cost-effective, it fails to address how customer-sited assets will be integrated, and it does not address the risk of obsolescence due to technological advancement. The Commission also directed each of the utilities to submit a comprehensive Grid Modernization Strategy by June 30, 2017, which will be vetted through a stakeholder process. The utilities filed their draft Grid Modernization Strategy on June 30, 2017. Beginning in early July 2017, the utilities plan to conduct additional one-on-one meetings with various stakeholders to brief them on the report. Additionally, the utilities plan to hold public meetings in August to discuss the report.	<a href="#">Docket No. 2016-0087</a>  <a href="#">Draft Grid Modernization Strategy</a>
IN	Southern Indiana Gas & Electric d/b/a Vectren	AMI, Smart Grid	In February 2017, Southern Indiana Gas & Electric filed a \$500 million, seven-year transmission and distribution modernization plan. The plan includes deployment of AMI. An evidentiary hearing was held in June 2017, and in early July, the utility submitted a proposed order with the agreement of the Indiana Office of the Utility Consumer Counselor, which would approve the plan.	<a href="#">Docket No. 44910</a>
KY	Kentucky Utilities	AMI	In November 2016, Kentucky Utilities (KU) filed for a general rate increase as well as	<a href="#">Docket No. 2016-00370</a>

			deployment of AMI throughout its service territory. In June 2017, the Commission issued an order reflecting KU's withdrawal of the AMI request. KU will conduct a stakeholder process to discuss AMI concerns.	
	Louisville Gas & Electric	AMI	In November 2016, Louisville Gas & Electric (LG&E) filed for a general rate increase. The proposal also includes full deployment of AMI in the utility's service territory. In June 2017, the Commission issued an order reflecting LG&E's withdrawal of the AMI deployment request. LG&E will instead conduct a stakeholder process on AMI concerns.	<a href="#">Docket No. 2016-00371</a>
LA	Entergy Louisiana	AMI	In November 2016, Entergy Louisiana submitted a proposal to deploy an advanced metering system, including advanced electric and gas meters and a communications network supporting two-way data communications. Entergy's plan would deploy AMI in phases, resulting in full implementation by 2022. Communications network deployment would begin in 2018, with meter deployment beginning in 2019. Entergy estimates the nominal net benefit to customers to be \$607 million (\$190 million NPV). Entergy is also proposing an Advanced Metering System (AMS) Customer Charge be implemented to recover costs beginning in April 2019. The per-customer AMS charge is estimated to be \$2.22 in Year 1, \$2.74 in Year 2, \$3.08 in Year 3, and \$2.88 as the final charge. A hearing is scheduled to begin on September 26, 2017.	<a href="#">Docket No. U-34320</a>
	Entergy New Orleans	AMI	In October 2016, Entergy New Orleans filed a proposal to deploy AMI throughout its service territory, as well as an advanced communications network, a distribution management system, meter data management system, outage management system, and supporting infrastructure.	City Council Docket No. UD-16-04 ( <i>docket not publicly accessible</i> )
MA	Eversource	AMI, Energy Storage, Smart Grid	In accordance with the Department of Public Utilities' June 2014 order on grid modernization plans, Eversource filed its grid modernization plan in August 2015. Eversource has proposed investments in advanced sensing technology, next generation remote faulted circuit indication,	<a href="#">Docket No. 15-122</a>

		<p>a distribution management system, network load flow, predictive outage detection, automated feeder reconfiguration, voltage optimization, integrated planning tracking for DERs, energy storage, adaptive protection/two-way power flow, resiliency improvements, opt-in time-varying rates and related infrastructure, cybersecurity, communications, and a customer education and outreach plan. Evidentiary hearings were held in May 2017, and intervenor briefs were due in mid-July. Eversource will submit its brief in late July, and reply briefs will be submitted by Eversource and intervenors in August.</p>	
Eversource	Energy Storage, Smart Grid	<p>As part of its general rate case filed in January 2017, Eversource has proposed a Grid Modernization Base Commitment, which includes several investments to modernize the grid. These investments include creation of a distribution system network operator (\$44 million), distribution system automation (\$84 million), foundational technology for demand-side management (\$111 million), energy storage research and demonstration projects (\$100 million), customer tools for DER integration (\$15 million), and electric vehicle infrastructure and vehicle conversions (\$45 million). Three public hearings were held in July.</p>	<a href="#">Docket No. 17-05</a>
Fitchburg Gas and Electric Light Company d/b/a Until	Smart Grid	<p>In accordance with the Department of Public Utilities' June 2014 order on grid modernization plans, Until filed its grid modernization plan in August 2015. Until's proposed plan includes five programs: (1) DER enablement, (2) grid reliability, (3) distribution automation, (4) customer empowerment, and (5) workforce and asset management encompassing 16 capital investment projects. Evidentiary hearings were held in May 2017, and intervenor briefs were due in mid-July. Until will submit its brief in late July, and reply briefs will be submitted by Until and intervenors in August.</p>	<a href="#">Docket No. 15-121</a>
Massachusetts Electric Company and Nantucket Electric	AMI, Smart Grid	<p>In accordance with the Department of Public Utilities' June 2014 order on grid modernization plans, National Grid filed its grid modernization plan in August 2015. National Grid proposed four different</p>	<a href="#">Docket No. 15-120</a>

	Company d/b/a National Grid		scenarios (Balanced Plan Scenario, AMI-Focused Scenario, Grid-Focused Scenario, and Opt-In Scenario) which provide a different portfolio of investments. The plans include investments in the following: AMI, customer load management devices, voltage optimization and conservation voltage reduction technologies, advanced distribution automation, feeder monitors, an advanced communications network, an advanced distribution management system and distribution supervisory control and data acquisition system, information and operational technologies, cybersecurity infrastructure and protocol development, training and asset management, and marketing outreach and education surrounding these technologies and new proposed offerings. Evidentiary hearings were held in May 2017, and intervenor briefs were due in mid-July. National Grid will submit its brief in late July, and reply briefs will be submitted by National Grid and intervenors in August.	
ME	Emera Maine	Energy Storage, Microgrid	In February 2017, Emera Maine filed a petition for approval of a microgrid project at its Hampden Operations Center. The project is intended to provide electric supply, storm back-up, and reduction of energy operating cost at the Center. The proposed microgrid would consist of a 600 kW solar PV system, a 500 kW/950 kWh Tesla Powerpack battery, an existing diesel generator, and an electric vehicle charger. At issue is whether Emera is legally permitted to own the microgrid generation. Under Maine's Electric Utility Restructuring Act, investor-owned transmission and distribution (T&D) utilities were prohibited from owning generation. However, the Public Utilities Commission (PUC) may approve an exception if the ownership interest is necessary for the utility to perform its obligations as a T&D utility. In June 2017, the PUC issued an order, finding that it cannot conclude whether Emera's ownership of the project is permitted or not, and directed the Hearing Examiner to establish a litigation schedule to more fully develop the record. A settlement and case conference was held on July 21st.	<a href="#">Docket No. 2017-00027</a>

	N/A	Microgrid	S.B. 378 directs the Public Utilities Commission to establish a limited microgrid program for industrial customers in northern Maine. The Commission is to establish the capacity limit for generators in a microgrid, the kilovolt limit for transmission or distribution systems in a microgrid, the maximum distance between a generator and an industrial customer in a microgrid, and the maximum number of industrial customers that may be in a microgrid. Anyone constructing and operating a microgrid, pursuant to this legislation, would not be regulated as a public utility. The bill died in early May 2017.	<a href="#">S.B. 378 (D)</a>
MI	Consumers Energy	Smart Grid	As part of the Public Service Commission's February 2017 order in Consumers Energy's general rate case, the Commission directed Consumers Energy Company to submit a draft five-year (2018-2022) distribution investment and maintenance plan by August 1, 2017.	<a href="#">Docket No. 17990</a>
	DTE Electric	AMI, Smart Grid	As part of the Public Service Commission's January 2017 order in DTE Electric's general rate case, the Commission directed DTE to submit a draft five-year (2018-2022) distribution investment and maintenance plan by July 1, 2017. A final plan is due by December 31, 2017. DTE's draft plan includes an advanced distribution management system, non-wire alternatives demonstration projects, AMI system upgrades, and substation and distribution automation. Costs and projected benefits will be included in the final plan.	<a href="#">Docket No. 18014</a> <a href="#">Draft Distribution Investment Plan</a>
MS	Entergy Mississippi	AMI	In November 2016, Entergy Mississippi submitted a proposal to deploy advanced metering infrastructure throughout its service territory. Entergy estimates the nominal net benefit of this deployment to customers to be \$183 million (\$53 million net present value). If approved, Entergy would begin communications network deployment by late 2018 and meter deployment in early 2019. The total implementation cost would be \$136 million. Entergy proposed an opt-out option be made available, but limited to residential customers. A joint stipulation agreement between Entergy and the Mississippi	<a href="#">Docket No. 2016-UA-261</a>

			Public Utilities Staff was filed in early May 2017, which would allow for the full AMI deployment proposed by Entergy. The Public Service Commission adopted the stipulation agreement in May.	
NC	Duke Energy Carolinas	AMI	Duke Energy Carolinas has deployed smart meters to about 25% of its customers in North Carolina and South Carolina and plans to deploy more. Some customers eligible to receive smart meters have asked to keep their traditional meters. Duke Energy Carolinas has proposed charging these opt-out customers an initial \$150 set-up fee and a monthly fee of \$11.75 to cover expenses related to sending out meter readers. An April 2017 decision from the Utilities Commission requires Duke Energy to work with the Public Staff to design three alternatives for dealing with opt-out customers.	<a href="#">Docket No. E-7 Sub 1115</a>
	Dominion NC Power, Duke Energy Carolinas, Duke Energy Progress	AMI, Microgrid, Smart Grid	As part of the 2016 Biennial IRP and REPS Compliance proceeding, the IOUs were required to submit their 5-year Smart Grid Technology Plans. The plans vary and include a wide mix of smart grid technologies, including AMI deployment and, in Dominion's case, a microgrid project. The Utilities Commission approved the utilities' plans in March 2017, but also requested that the utilities, the Public Staff, and all interested parties continue discussing potential rule changes for customer data access. In May 2017, the utilities filed updated Smart Grid Technology Plans, which showed an increase in their planned AMI deployment.	<a href="#">Docket No. E-100 Sub 147</a>
	Duke Energy Progress	Energy Storage	In January 2016, Duke Energy Progress filed an application for its Western Carolinas Modernization Project. The project involves the construction of new natural gas units and a 5 MW utility-scale energy storage pilot. In March 2017, Duke Energy Progress filed its annual progress report on the project in which it proposed deployment of up to 10 batteries with a total capacity over 5 MW to be deployed starting in 2018.	<a href="#">Docket No. E-2 Sub 1089</a>
	Duke Energy Progress	Microgrid	In November 2016, Duke Energy Progress applied for a certificate of public convenience and necessity for a microgrid	<a href="#">Docket No. E-2 Sub 1127</a>

			<p>project. The small project would serve a communications tower operated by the National Park Service in the Great Smoky Mountains. The project would consist of a 10 kW PV system and an approximately 95 kWh zinc-air battery. The proposed project received two statements of public support and no objections, and in March 2017 Duke Energy Progress and the Public Staff submitted their proposed order. The Utilities Commission granted the certificate in April 2017, allowing the project to move forward.</p>	
NJ	Atlantic City Electric	Microgrid	In May 2017, the New Jersey Board of Public Utilities approved a settlement authorizing Atlantic City Electric to invest \$79 million in a five-year capital investment plan to improve distribution grid resiliency under the PowerAhead program.	<a href="#">BPU News Release</a>
	N/A	Microgrid	S.B. 881 and A.B. 2756 would require the Board of Public Utilities to establish a microgrid pilot project for municipalities to equip critical facilities.	<a href="#">S.B. 881 (I)</a> <a href="#">A.B. 2756 (I)</a>
NM	Public Service Company of New Mexico (PNM)	AMI	In February 2016, Public Service Company of New Mexico (PNM) submitted a proposal to deploy advanced metering infrastructure throughout its service territory. The cost of the project would be \$87.2 million, and PNM expects installation to be completed by June 2019. PNM estimates the net benefit of the project to customers to be \$20.9 million over 20 years (net present value). PNM also proposes an opt-out option with a surcharge. Hearings were held in February and March 2017. It was determined that PNM's selected vendor to install the proposed AMI does not have the appropriate license to do so. Therefore, PNM will issue a new RFP and update its cost-benefit analysis based upon its new selected quote. This supplemental testimony is due by September 2017. A hearing is scheduled for October 25-26, 2017.	<a href="#">Docket No. 15-00312-UT</a>
NY	New York State Electric & Gas, Rochester Gas & Electric	AMI	In December 2016, New York State Electric & Gas and Rochester Gas & Electric filed a petition seeking authorization for full deployment of AMI and to establish surcharge for recovery of the costs. In March 2017, the Public	<a href="#">Docket No. 17-E-0058</a>

			Service Commission held a procedural conference where procedural issues were discussed, including party status, litigation schedule, and other topics.	
	Orange and Rockland Utilities	AMI	In February 2017, Orange and Rockland Utilities filed a petition for full deployment of AMI, an AMI rate pilot program, and implementation of Non-Wires Alternative (NWA) projects and cost recovery of these programs. The Public Service Commission previously authorized the first phase of the AMI rollout program; this is the second phase of the program completing full deployment of AMI in the utility's service area.	<a href="#">Docket No. 17-M-0178</a>
	National Grid	Energy Storage	In April 2017, Li Energy Storage System LLC, a joint venture between National Grid and Next Era, filed an application to install 5 MW/40MWh of storage on Long Island.	<a href="#">Docket No. 17-M-0422</a>
OH	Duke Energy Ohio	Energy Storage	Duke Energy Ohio filed its Electric Security Plan in June 2017. Part of its plan includes a proposal for a 10 MW pilot distribution battery storage system to be located in its southwest Ohio service territory.	<a href="#">Docket No. 17-1263-EL-SSO</a>
	Ohio Edison d/b/a First Energy	Smart Grid	In October 2016, PUCO ordered First Energy to file a Distribution Modernization Rider (DMR), which would collect \$600 million over three years to fund modernization of the distribution grid. First Energy filed its tariff in November 2016, and in December the Public Staff recommended its approval. The Ohio Consumers' Counsel (OCC) and the Ohio Manufacturers' Association Energy Group (OMAEG) then filed a joint motion to reject the DMR tariff. PUCO denied the consumer groups' motion and approved the DMR tariff in December 2016. The OCC filed an additional application for rehearing in January 2017, which PUCO denied in February 2017. No significant action occurred during Q2 2017.	<a href="#">Docket No. 14-1297-EL-SSO</a>
	Ohio Power Company d/b/a AEP	AMI, Smart Grid	In February 2017, the Public Utilities Commission of Ohio (PUCO) approved a stipulation for AEP to implement Phase 2 of its gridSMART Project. The gridSMART Project includes a deployment of smart meters to 894,000 additional customers, a transition to time-differentiated pricing, and other smart grid investments and studies.	<a href="#">Docket No. 13-1939-EL-RDR</a>

			The Office of the Ohio Consumers' Council (OCC) initially opposed the settlement and issued an application for rehearing in March 2017. The OCC noted that it would back the settlement on the condition that residential customers pay just 45% of the gridSMART Phase 2 costs, instead of the 62.4% included in the settlement. PUCO addressed the issue, siding with the OCC, and the OCC withdrew its application for rehearing in April 2017.	
PA	N/A	Energy Storage, Microgrid	H.B. 1412 would establish a pilot program for microgrids and energy storage projects with the goal of facilitating the use of a diverse electric supply and enhancing electric distribution, resiliency, and operational flexibility.	<a href="#">H.B. 1412 (I)</a>
TX	El Paso Electric	Demand Response	In March 2017, El Paso Electric submitted a plan for a three-year residential and small commercial demand response pilot program. Smart thermostats would be used to control customers' air conditioning load during summer. No comments were filed on the plan, and in April, El Paso Electric indicated that it would begin implementation immediately.	<a href="#">Docket No. 46967</a>
	American Electric Power Texas North Company	Energy Storage	In September 2016, AEP Texas North Company filed a proposal to install two utility-scale lithium-ion batteries in its distribution system with the aim of increasing system reliability and avoiding the need to perform alternate infrastructure upgrades. Distribution utilities in Texas are normally prohibited from owning energy storage systems used to sell electricity at wholesale, but the utility in this case has requested relief from these rules and requested that the batteries be considered distribution assets. A hearing was held in June 2017, and in July, the Commission staff submitted a brief recommending against approval of the proposal.	<a href="#">Docket No. 46368</a>
UT	Rocky Mountain Power	AMI	In September 2016, Rocky Mountain Power submitted a proposal, pursuant to the 2016 Sustainable Transportation and Energy Program (STEP) Act, to implement an advanced substation metering project and a solar plus storage project. An order on Phase I issues, including the solar plus storage project, was issued in December 2016, approving the project on the	<a href="#">Docket No. 16-035-36</a>

			condition that Utah customers are credited for the program's generation. The advanced substation metering project is being addressed in Phase II of the proceeding. The Public Service Commission published an order on Phase II of the proceeding in May 2017, approving the advanced substation metering project.	
VT	Green Mountain Power	Energy Storage	In April 2017, Green Mountain Power (GMP) filed a request for a Certificate of Public Good for its proposed Panton Battery Storage Project. The project would be a 1 MW/4MWh Tesla Powerpack 2.0 battery system and located on the site of its existing 4.9 MW Solar Panton Project. GMP plans to stack values that the battery project can provide, with the primary values being peak shaving and regulation. GMP estimates the total net present value of the project to be \$3.8 million. The Public Utility Commission (formerly called the Public Service Board) accepted comments through June 9th and held a status conference on July 14th.	<a href="#">Docket No. 17-2813-PET</a>
	Green Mountain Power	Energy Storage	In May 2017, Green Mountain Power (GMP) announced a new program, in which GMP will install Tesla Powerpack batteries on utility property and up to 2,000 Powerwall batteries to homeowners within the utility's service territory. Customers may receive a Powerwall battery for \$15 per month or a one-time \$1,500 fee.	<a href="#">Press Release</a>

Legislative Status Key: I = Introduced, P1 = Passed One Chamber, P2 = Passed Both Chambers, E = Enacted, D = Dead. Bill statuses are up to date as of early May 2017.

# Q3 2017 OUTLOOK

At the end of Q2 2017, nearly 70 bills remained pending and nearly 80 regulatory proceedings were ongoing. Several bills related to grid modernization and energy storage remain active in **California**, **Massachusetts**, **New Jersey**, and **New York** in particular.

The Governor of **North Carolina** signed H.B. 589 into law in late July, which initiates an energy storage study. The focus in Q3 2017 will be on fundraising the \$75,000 in non-state matching funds necessary before the obligation to complete the study takes effect.

A bill awaiting a decision by the Governor of **Oregon** would initiate a broad investigation into grid modernization and utility regulation. As part of **Ohio**'s grid modernization proceeding, a three-day workshop centered on technologies was held in July, and a similar session on ratemaking and regulation is planned for the first quarter of 2018. Investigations will continue in several states, including **Illinois**, **Maryland**, **Rhode Island**, and **Vermont** through Q3 2017.

The **Connecticut** Department of Energy and Environmental Protection published a draft of its updated state energy strategy in July, which places an emphasis on grid modernization, while **Rhode Island** approved changes to its System Reliability Procurement standards, requiring National Grid to consider non-wires alternatives in distribution planning and capital investment decisions.

In July, legislation was proposed in **New Jersey** to adopt a statewide energy storage target. Bills to adopt or increase energy storage targets are also pending in **Massachusetts** and **New York**. The **Nevada** Public Utilities Commission opened dockets in early Q3 2017 to implement energy storage legislation passed during Q2, including a study to determine whether an energy storage target should be established.

In early Q3 2017, FirstEnergy in **Pennsylvania** filed for approval of a \$600 million transmission upgrade and grid modernization package, and regulators approved Xcel Energy's **Colorado** grid modernization proposal. Large grid modernization deployment proposals are also pending in **California**, **Hawaii**, **Indiana**, and **Massachusetts**.

An administrative law judge in Arizona recommended approval of a pending settlement agreement in **Arizona** Public Service's general rate case in July, and a final decision is expected in Q3 2017. In **Maryland**, pilot programs for time-varying rates are planned to begin in Q3 2017 and continue through Q2 2018.

## ENDNOTES

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<sup>1</sup> Energy Storage Association, *Facts and Figures*, 2017, <http://energystorage.org/energy-storage/facts-figures>

<sup>2</sup> Adam Cooper, *Electric Company Smart Meter Deployments: Foundation for a Smart Grid*, The Edison Foundation Institute for Electric Innovation, October 2016, <http://www.edisonfoundation.net/iei/publications/Documents/Final%20Electric%20Company%20Smart%20Meter%20Deployments-%20Foundation%20for%20A%20Smart%20Energy%20Grid.pdf>