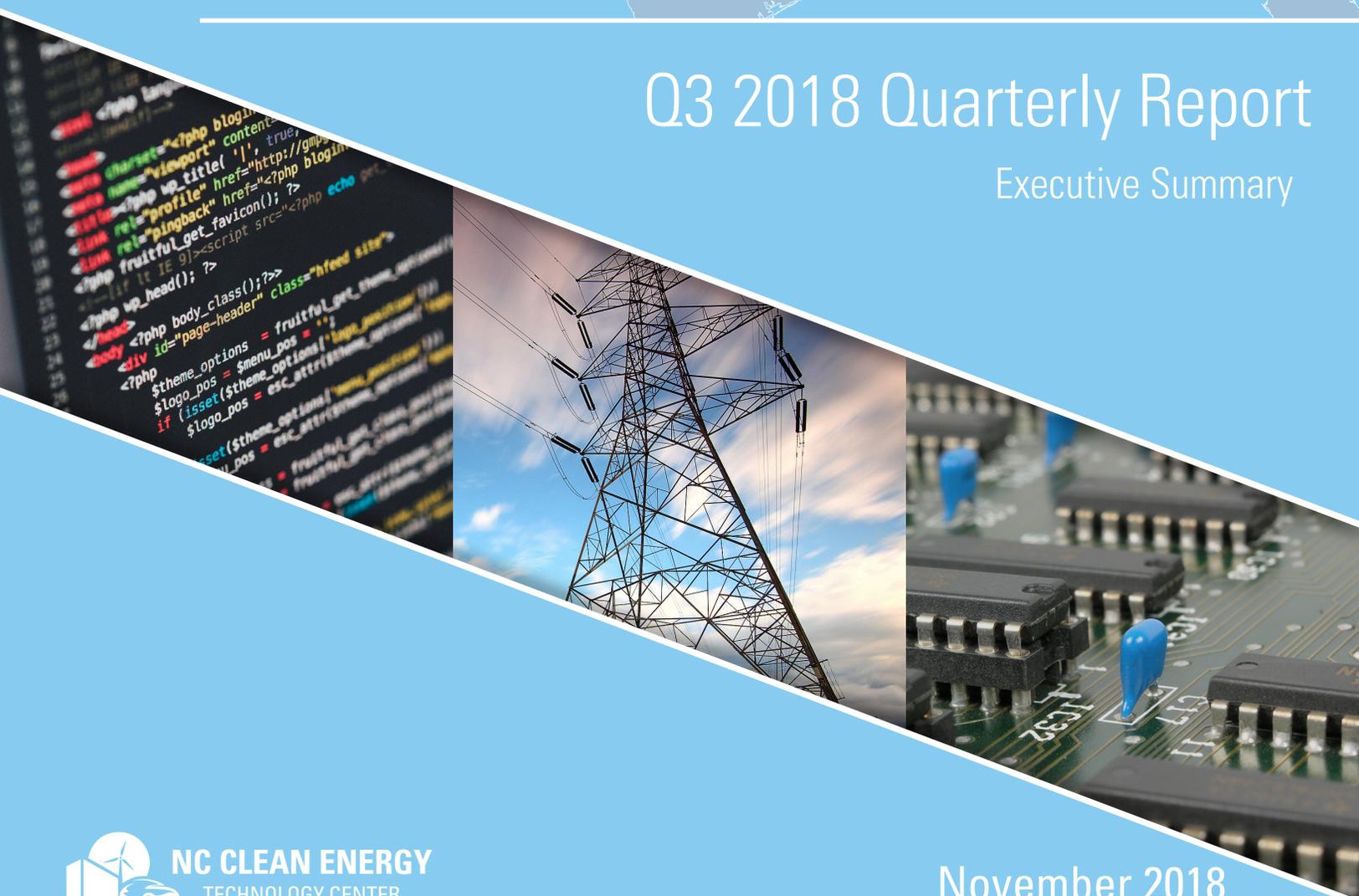


50 States of GRID MODERNIZATION

Q3 2018 Quarterly Report
Executive Summary



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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.

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- Q2 2018: [Executive Summary](#)
- Q1 2018: [Executive Summary](#)
- Q4 2017 and 2017 Annual Review: [Executive Summary](#)
- Q3 2017: [Full Report](#) | [Executive Summary](#)
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ABOUT THE REPORT

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 and annual summaries 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 industry stakeholders and regulators.

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 and deploying 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. 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, energy storage compensation rules, interconnection standards, and customer data access policies.

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 are included. The report also excludes changes to policies and rate design for distributed generation customers and changes related to electric vehicles; these changes are covered in the 50 States of Solar and 50 States of Electric Vehicles quarterly reports, respectively.

EXECUTIVE SUMMARY

Q3 2018 GRID MODERNIZATION ACTION

In the third quarter of 2018, 39 states plus DC took a total of 276 policy and deployment actions related to grid modernization, utility business model and rate reform, energy storage, microgrids, and demand response. Table 1 provides a summary of state and utility actions on these topics. Of the 276 actions catalogued, the most common were related to policies (70), deployment (50), and studies and investigations (48).

Table 1. Q3 2018 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Policies	70	25%	24 + DC
Deployment	50	18%	23
Studies and Investigations	48	17%	27 + DC
Planning and Market Access	47	17%	20 + DC
Business Model and Rate Reform	38	14%	18 + DC
Financial Incentives	23	8%	8
Total	276	100%	39 States + DC

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%.

TOP 5 GRID MODERNIZATION DEVELOPMENTS OF Q3 2018

Five of the quarter’s top policy developments are highlighted below.

Massachusetts Legislators Adopt Country’s First Clean Peak Standard

In August 2018, the Massachusetts General Court enacted H. 4857, adopting the country’s first clean peak standard. The initial standard will be set by the Department of Energy Resources and increase by 0.25% each year thereafter. The bill also increased the state’s energy storage target to 1,000 MWh by 2025 and adopted new requirements related to distribution system planning and non-wires alternatives.

Ohio and Oregon Publish Grid Modernization Reports

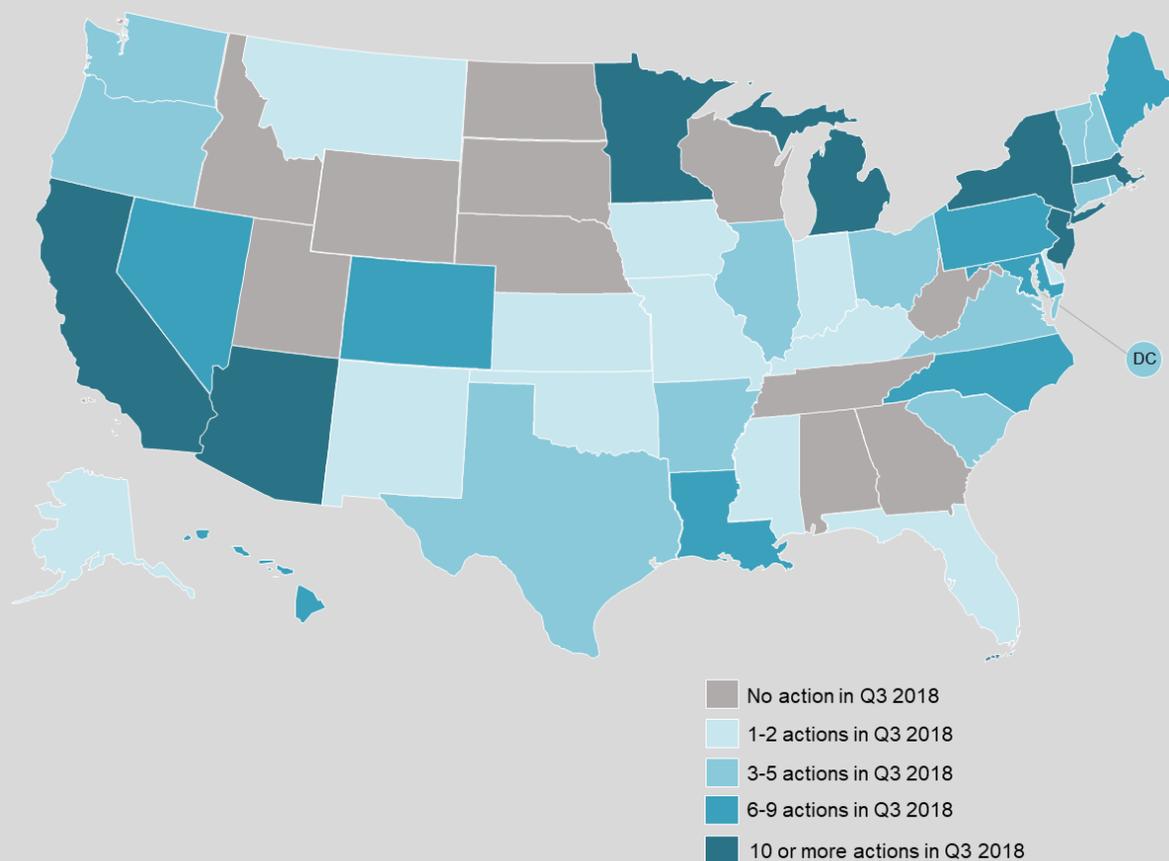
Regulators in Ohio and Oregon published final grid modernization reports in Q3 2018, following broad investigatory proceedings. The reports detail stakeholder discussions held during the investigations and include recommended next steps. Both reports include a wide array of

recommendations, including further work on performance-based regulation and distribution system planning.

PSE&G New Jersey Proposes \$4 Billion Clean Energy Future Plan

PSE&G New Jersey filed its proposed Clean Energy Future plan in September 2018, which includes \$4 billion in investments in energy storage, electric vehicles, advanced metering infrastructure, non-wires alternatives, volt-VAR optimization, energy efficiency, and smart homes. The program includes a combination of utility deployment and incentives for customers to invest in distributed energy resources.

Figure 1. Q3 2018 Legislative and Regulatory Action on Grid Modernization



Nevada Regulators Approve Distributed Resource Planning Framework

The Public Utilities Commission of Nevada approved a distributed resource planning framework for NV Energy in September 2018. The rules require NV Energy to evaluate the locational benefits and costs of distributed energy resources (DERs), propose standard tariffs for cost-effective DER deployment, coordinate existing programs to maximize locational

benefits, identify additional spending needed to integrate DERs into distribution planning, and identify barriers to DER deployment.

Rhode Island Public Utilities Commission Approves Settlement on National Grid's Power Sector Transformation Proposal

In August 2018, Rhode Island regulators approved a settlement agreement on National Grid's Power Sector Transformation investment proposal. The agreement includes certain grid investments and directs National Grid to work with stakeholders to develop a comprehensive grid modernization plan. The agreement also approves an initial performance incentive based on capacity savings and directs the utility to develop an updated advanced metering business case.

MOST ACTIVE STATES AND SUBTOPICS OF Q3 2018

The most common types of actions across the country related to energy storage deployment (25), advanced metering infrastructure rules (22), grid modernization investigations (19), smart grid deployment (18), and distribution system planning (17). The total number of grid modernization actions declined in Q3 2018, due to most state legislatures being out of session, with a total of 276 actions taken during the quarter. However, Q3 2018 was still the second most active quarter yet, with action increasing 50% over Q3 2017 (See Figure 2).

The states taking the greatest number of actions related to grid modernization in Q3 2018 can be seen in Figure 4. New York, California, and New Jersey saw the most action during the quarter, followed by Massachusetts, Arizona, Michigan, and Minnesota. Overall, 39 states and DC took actions related to grid modernization during the quarter.

TOP GRID MODERNIZATION TRENDS OF Q3 2018

States Considering a Wide Variety of Metrics for Utility Performance Incentives

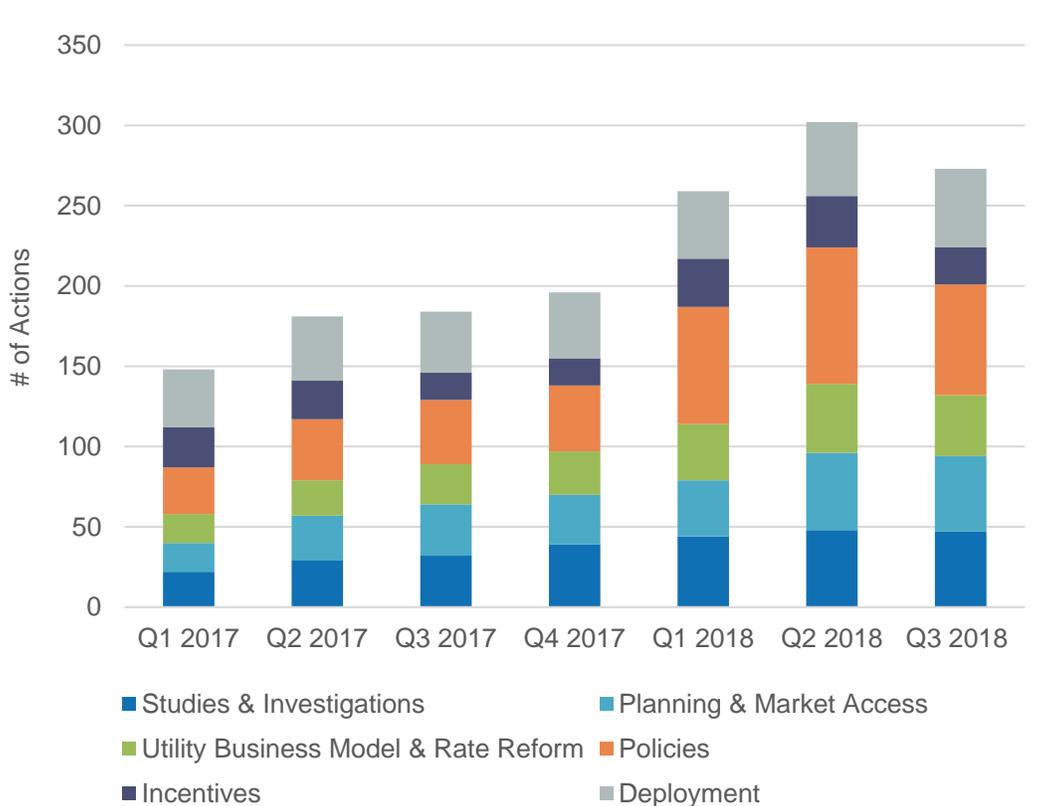
A growing number of states are examining performance-based regulation, with a wide variety of performance incentive metrics under consideration. In Q3 2018, regulators approved performance incentives for National Grid in two of its service territories, based on capacity savings (Rhode Island) and electric vehicle charging site development (Massachusetts). Rhode Island regulators are also considering performance incentives related to storage capacity, beneficial electrification, and interconnection. Public Service Company of Oklahoma proposed performance incentive mechanisms in Q3 2018 that are based on reliability indices, customer satisfaction, public safety, economic development activities, and grid modernization (executing the utility's grid modernization plan on time and within a certain cost cap). Performance incentives related to customer service, climate adaptation, and peak reduction are also under consideration for Eversource in Massachusetts, and California is implementing

a pilot incentive for non-wires alternatives. Several other states, including Hawaii, Minnesota, and New York, are implementing or considering performance-based regulation.

Utility Technology Deployment Proposals Pick Up in Q3 2018

While grid modernization activity slowed overall in Q3 2018, due to the majority of state legislatures being out of session, deployment activity increased during the quarter. Six utilities filed new proposals to deploy advanced metering infrastructure and various smart grid technologies for a total investment of approximately \$2.36 billion. Several of these proposals include investments in traditional grid technologies aimed at improving reliability, in addition to newer grid technologies. Four of these six utility proposals also include requests for new riders to recover grid modernization project costs. Other deployment proposals filed during the quarter related to energy storage, with PSE&G New Jersey requesting approval for a \$179 million investment in storage projects, to be recovered through a new Technology Innovation Charge. A total of 50 requests were under consideration during the quarter, amounting to over \$7 billion in investment.

Figure 2. Total Number of Grid Modernization Actions by Quarter



Utilities Eyeing Comprehensive DER Programs for Customers

Utilities are increasingly considering distributed energy resource (DER) programs that are not technology-specific, but rather focus on more comprehensive, whole-building solutions.

PSE&G New Jersey proposed a new Smart Homes Pilot Program and a Non-Wires Alternatives Pilot Program that offer incentives for customers to adopt a variety of DERs, including battery storage, demand response, energy efficiency, electric vehicles, smart appliances, and distributed generation. In Mississippi, Entergy proposed a new Smart Energy Services program, through which the utility would directly offer customers a variety of DERs. Utilities in Arizona are also piloting new rate designs for customers with multiple DERs. These rate structures include a combination of time-varying rates and demand charges. The vast majority of utility programs remain technology-specific, but these new proposals signal growing attention to broader solutions.

Figure 3. Most Common Types of Actions Taken in Q3 2018

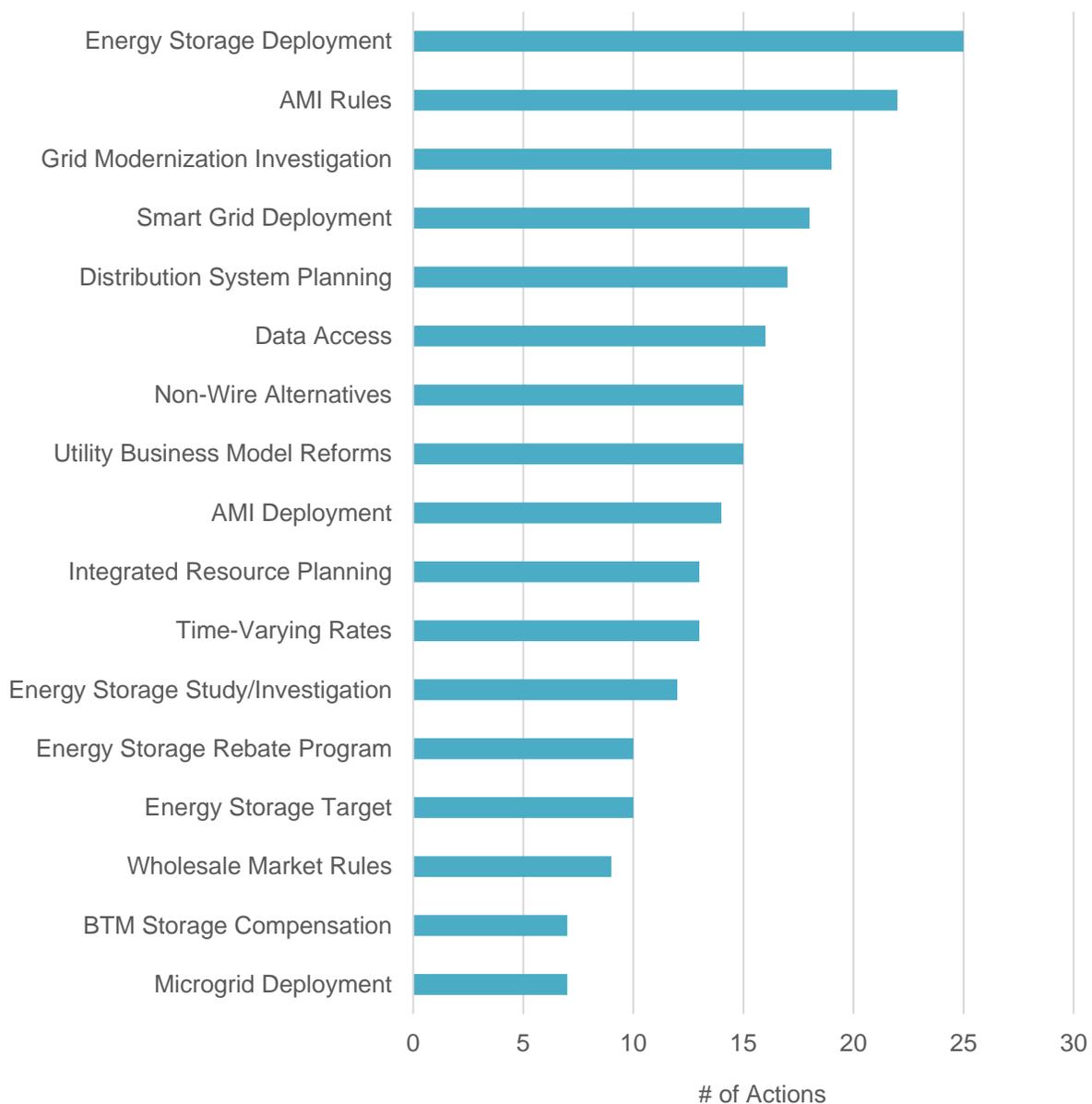
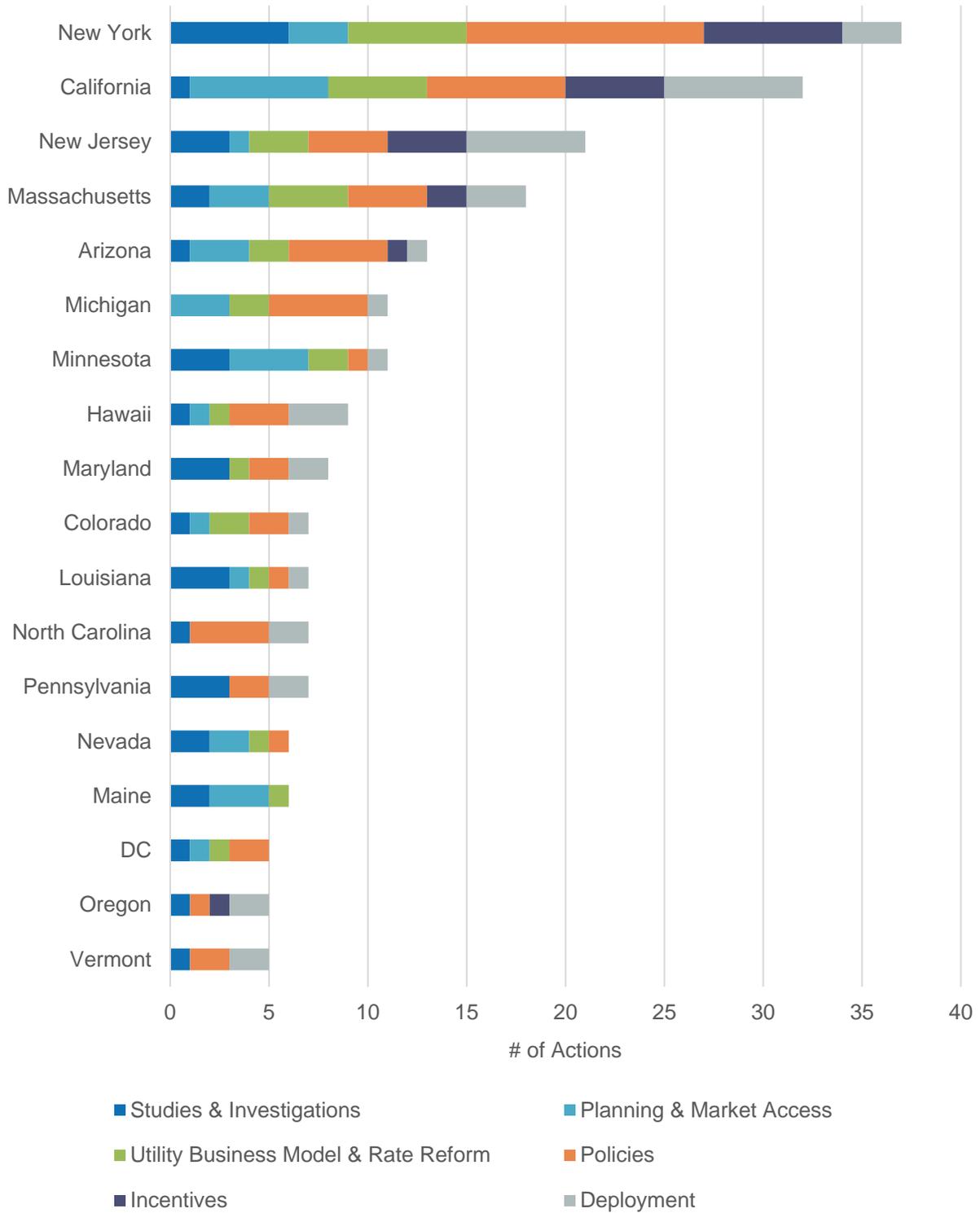


Figure 4. Most Active States of Q3 2018



FULL REPORT DETAILS & PRICING

FULL REPORT DETAILS

Content Included in the Full Quarterly Report:

- Detailed tables describing each pending and recently decided state and utility grid modernization action 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. Actions are broken out into the following categories:
 - Studies and Investigations
 - Planning and Market Access
 - Utility Business Model and Rate Reforms
 - Policies
 - Financial Incentives
 - State and Utility Deployment
- Links to original legislation, dockets, and commission orders for each legislative and regulatory action
- A separate Excel file including all actions, descriptions, and links to original sources
- Summary maps of action for each policy category above, including a separate Powerpoint file of all summary maps
- Qualitative analysis and descriptive summaries of grid modernization policy action and trends
- Outlook of action for the next quarter

WHO SHOULD PURCHASE THIS REPORT

The 50 States of Grid Modernization allows those involved in the electric industry to easily stay on top of legislative and regulatory changes. The report provides a comprehensive quarterly review of actions, saving weeks and thousands of dollars in staff time. At a cost of \$500 per issue (or \$1,600 annually), the 50 States of Grid Modernization offers an significant time and financial savings. With direct links to original sources for all actions, customers may stay on top of legislative and regulatory developments between quarterly reports.

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- Identify research needs to inform grid modernization proceedings
- Cite an objective source in your own research and analysis

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