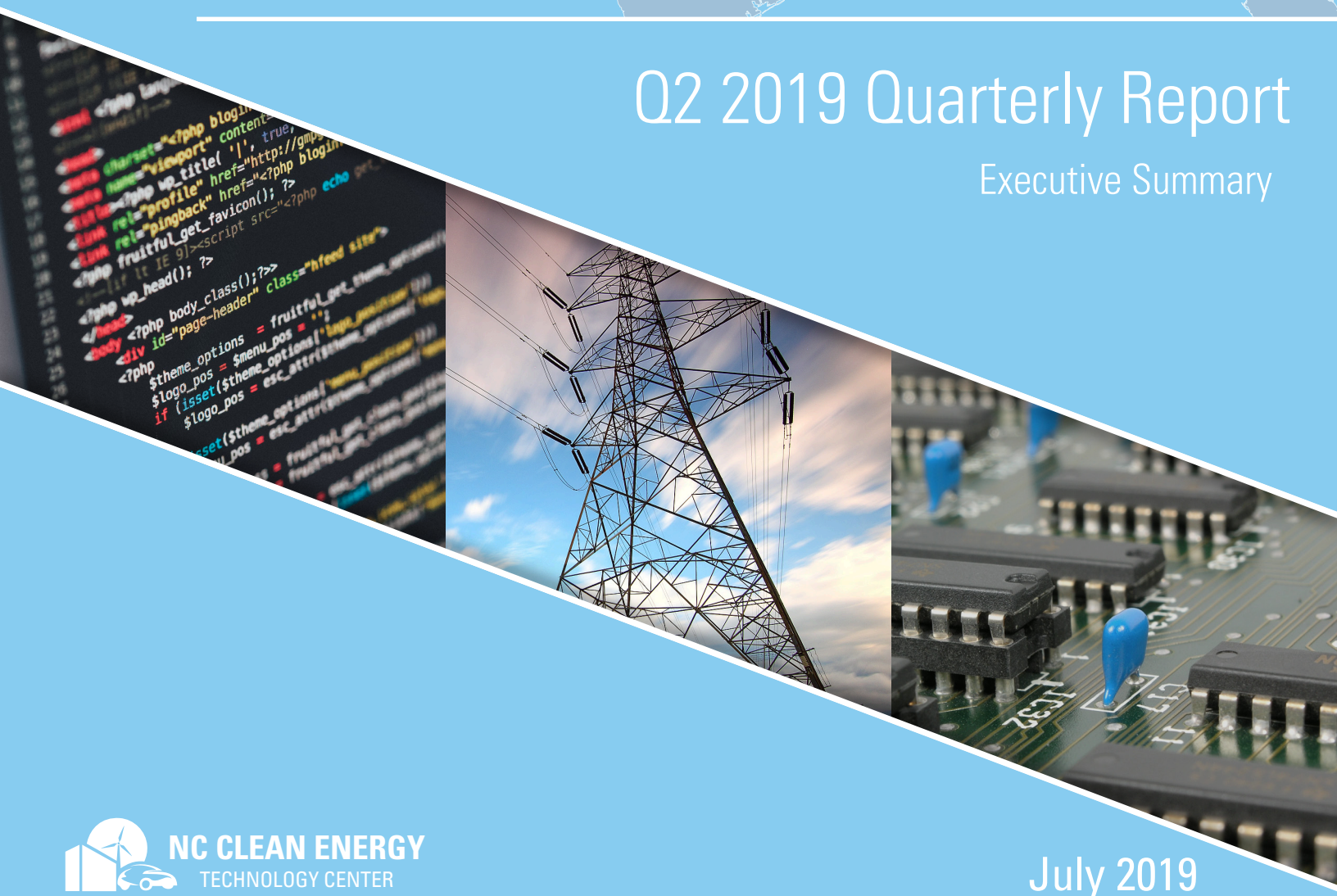
50 States of GRID MODERNIZATION

Q2 2019 Quarterly Report

Executive Summary



NC CLEAN ENERGY
TECHNOLOGY CENTER

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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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PREFERRED CITATION

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Full editions of and annual subscriptions to the 50 States of Grid Modernization may be purchased here.

The 50 States of Grid Modernization is a quarterly publication. Previous executive summaries and older full editions of *The 50 States of Grid Modernization* are available here.

In addition to *The 50 States of Grid Modernization*, the NC Clean Energy Technology Center publishes additional quarterly reports called *The 50 States of Solar* and *The 50 States of Electric Vehicles*. These reports may be purchased at here. Executive summaries and older editions of these reports are available for download here.

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.

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 modern 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 specific 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 (a separate report series available from the NC Clean Energy Technology Center covers electric vehicle actions). Time-varying 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. 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; these changes are covered in the 50 States of Solar quarterly report.

EXECUTIVE SUMMARY

Q2 2019 GRID MODERNIZATION ACTION

In the second quarter of 2019, 44 states plus DC and Puerto Rico took a total of 433 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 433 actions catalogued, the most common were related to policies (116), planning and market access (77), and deployment (75).

Table 1. Q2 2019 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Policies	116	27%	33
Planning and Market Access	77	18%	25 + DC
Deployment	75	17%	31 + PR
Business Model and Rate Reform	64	15%	28 + DC
Studies and Investigations	55	13%	30 + DC
Financial Incentives	46	11%	19
Total	**433**	**100%**	**44 States + DC, PR**

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 Q2 2019

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

Minnesota Lawmakers Enact Expansive Energy Storage Bill

The Minnesota Legislature, during its special session in May 2019, enacted a bill that addresses energy storage in a variety of ways. The bill directs the Commissioner of Commerce to contract with an independent consultant to conduct an energy storage cost-benefit analysis, requires utilities to assess energy storage in their integrated resource plans, and authorizes utilities to undertake energy storage pilot projects.

Ohio Supreme Court Strikes Down First Energy Grid Modernization Rider

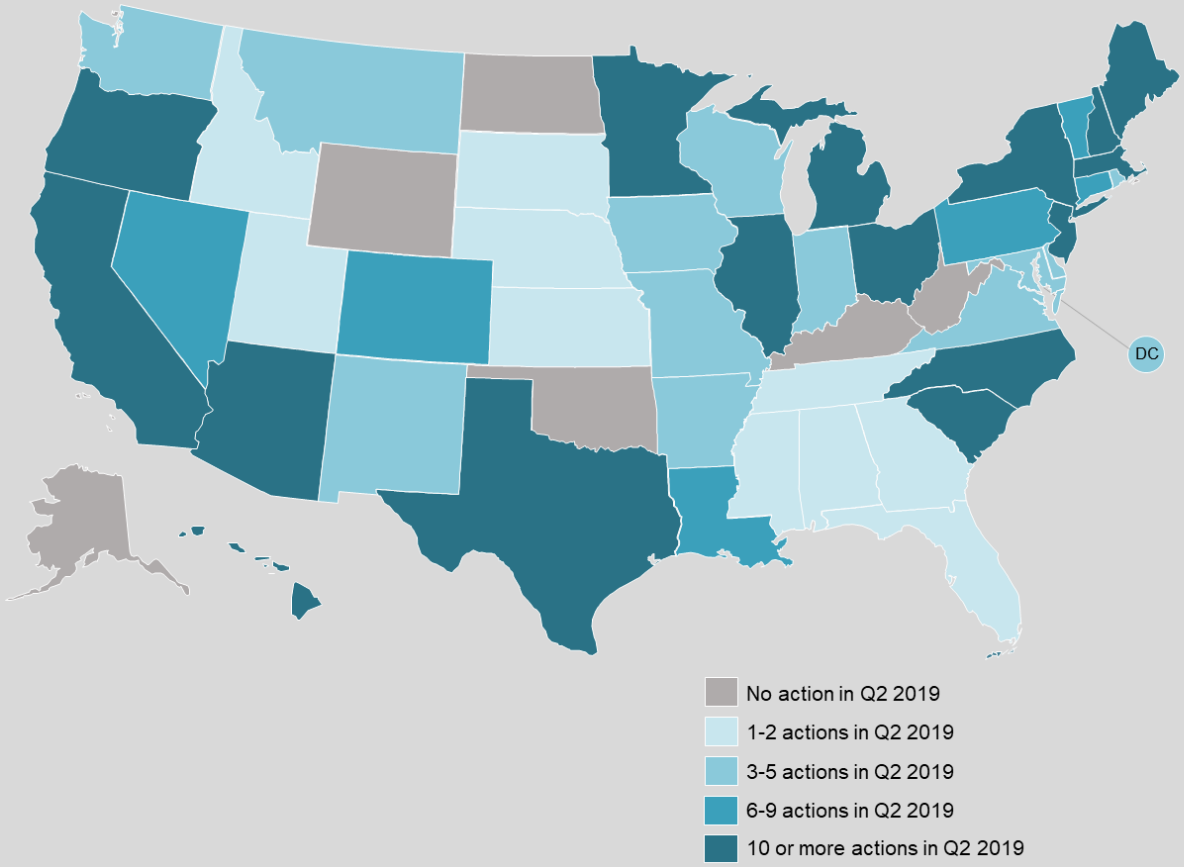
In June 2019, the Ohio Supreme Court struck down First Energy's Distribution Modernization Rider, finding that there were not sufficient protections to ensure that funds collected through the rider would be used for grid modernization investments. First Energy had implemented the

rider in January 2017, but money already recovered under the rider will not be refunded to ratepayers.

Final Working Group Recommendations Filed in DC Grid Modernization Proceeding

The six working groups formed as part of DC's Modernizing the Distribution Energy Delivery System (MEDSIS) proceeding filed their final recommendations with the Public Service Commission in late May 2019. The working groups provided numerous recommendations related to data access, non-wires alternatives, rate design, customer impact, microgrids, and pilot projects.

Figure 1. Q2 2019 State and Utility Action on Grid Modernization



Nevada Legislators Pass Utility Business Model Reform Bill

In May 2019, Nevada legislators enacted S.B. 300, which directs the Public Utilities Commission to adopt procedures for utilities to apply for approval of alternative ratemaking plans. Alternative ratemaking plans must include at least one alternative ratemaking

mechanism, including performance-based rates, formula rates, multi-year rate plans, subscription pricing, earnings sharing mechanisms, and decoupling mechanisms.

Puerto Rico Electric Power Authority Proposes MiniGrids, Energy Storage in Final Integrated Resource Plan

The Puerto Rico Electric Power Authority (PREPA) released its final integrated resource plan in June 2019, which includes 1.38 GW of solar and 920 MW of energy storage deployment by 2022. The plan would also divide Puerto Rico into eight MiniGrids, each of which could be islanded. Smaller microgrids would be developed at more isolated locations within the MiniGrids, and demand response programs would also be implemented.

MOST ACTIVE STATES AND SUBTOPICS OF Q2 2019

The most common types of actions across the country related to energy storage deployment (48), data access policies (33), distribution system planning (31), utility business model reforms (30), and integrated resource planning (29). Grid modernization activity increased over the first quarter of 2019, making Q2 2019 the busiest quarter yet, with a total of 433 actions. Grid modernization activity in Q2 2019 increased by 43% over Q2 2018 (302 actions) and by 139% over Q2 2017 (181 actions).

The states taking the greatest number of actions related to grid modernization in Q2 2019 can be seen in Figure 4. New York, California, and Massachusetts saw the most action during the quarter, followed by Minnesota, New Jersey, North Carolina, and New Hampshire. Overall, 44 states, plus DC and Puerto Rico, took actions related to grid modernization in Q2 2019.

TOP GRID MODERNIZATION TRENDS OF Q2 2019

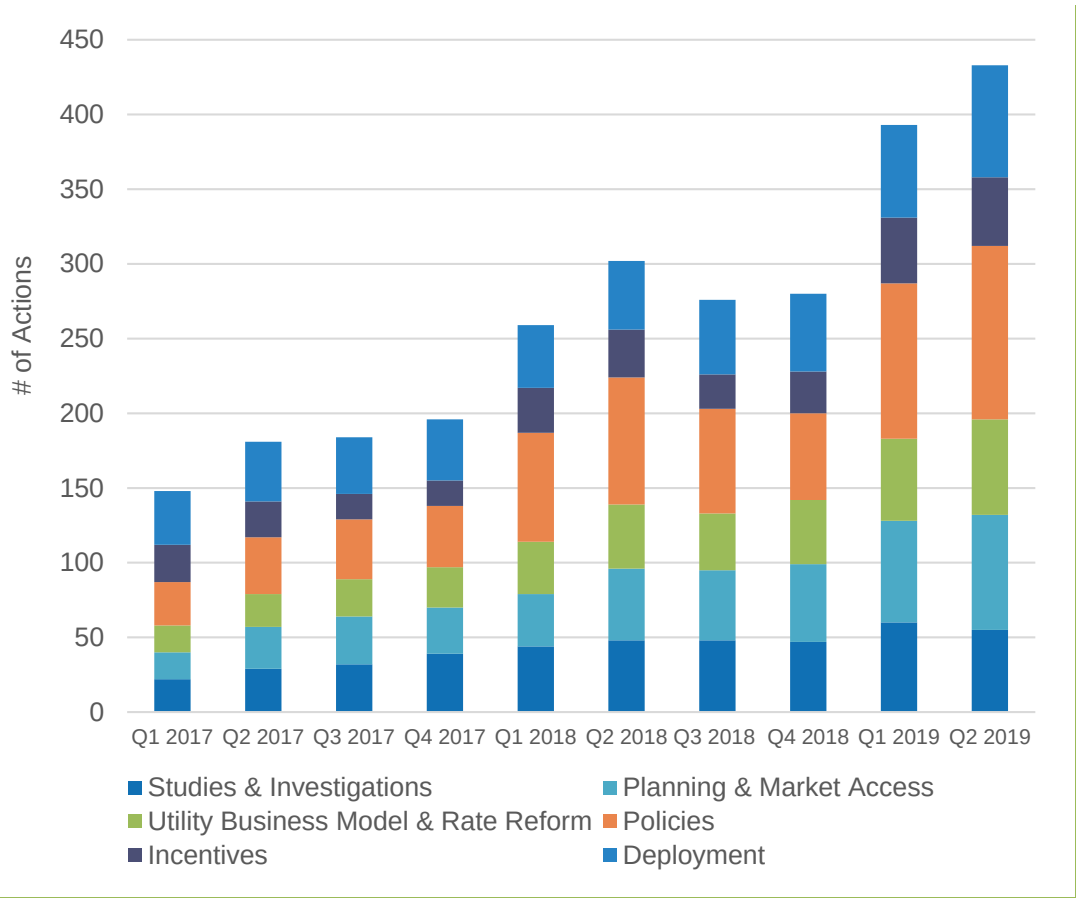
States Developing Criteria for Evaluating Non-Wires Alternatives

A number of states took actions toward developing criteria and procedures for evaluating non-wires alternatives (NWA) during Q2 2019. Maine lawmakers enacted a bill authorizing the Office of the Public Advocate to contract with a person or entity to serve as the state's NWA coordinator. Previously, the Public Utilities Commission had issued a decision designating the state's investor-owned utilities as the NWA coordinator. The legislation also directs utilities to contract with Efficiency Maine for behind-the-meter alternatives and allows both utilities and third parties to deliver grid-side alternatives. Legislators in Colorado and Washington also enacted bills related to NWA. In Colorado, the Public Utilities Commission will be required to develop a methodology for evaluating distributed energy resources as NWA, and Washington utilities will be required to conduct an analysis of NWA for major transmission and distribution investments as part of the distributed energy resource planning process.

Policymakers Considering Next Generation Renewable Portfolio Standards

Policymakers and regulators in several states are considering revisions to renewable portfolio standards that incorporate elements of grid modernization. Draft rule modifications under consideration in Arizona would increase the state's renewable energy standard while also setting a new clean peak goal and a distributed renewable storage requirement. The New Orleans City Council is considering the adoption of a renewable portfolio standard, with a pair of stakeholders proposing a "resilient renewable portfolio standard," which would give preference to renewable resilience projects, such as microgrids and rooftop solar-plus-storage. As part of Washington's new 100% clean energy standard adopted in May 2019, utilities will be able to use "energy transformation projects," such as energy storage, to comply with a portion of the requirement. Other states, such as Massachusetts and Pennsylvania, are implementing or considering clean or renewable peak standards.

Figure 2. Total Number of Grid Modernization Actions by Quarter



States Analyzing the Costs and Benefits of Battery Storage

A growing number of states are undertaking studies to analyze the costs and benefits of energy storage. Legislatures in two states – Maine and Minnesota – initiated energy storage analyses in Q2 2019, while the Iowa Energy Office recommended that the Iowa Economic Development

Authority evaluate the benefits of energy storage. State legislatures in Illinois and Pennsylvania are also considering bills that would require energy storage cost-benefit analyses to be conducted. New Jersey's energy storage analysis was completed in May 2019, finding that lithium-ion battery storage is most cost-effective for providing ancillary services in the bulk power market. An energy storage study is currently underway in Virginia, and studies have previously been conducted in Maryland, North Carolina, Nevada, Vermont, and Massachusetts.

Figure 3. Most Common Types of Actions Taken in Q2 2019

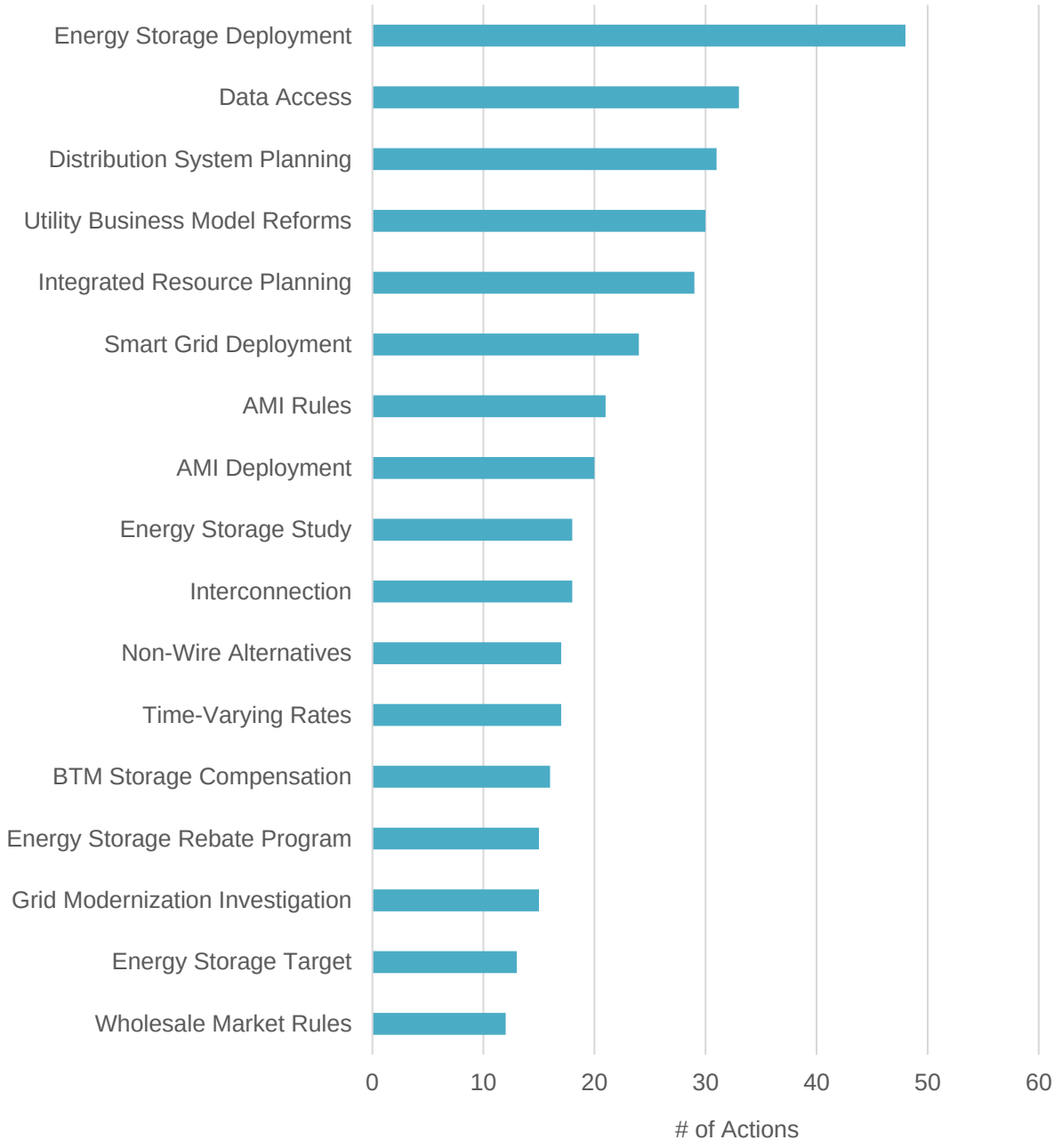


Figure 4. Most Active States of Q2 2019

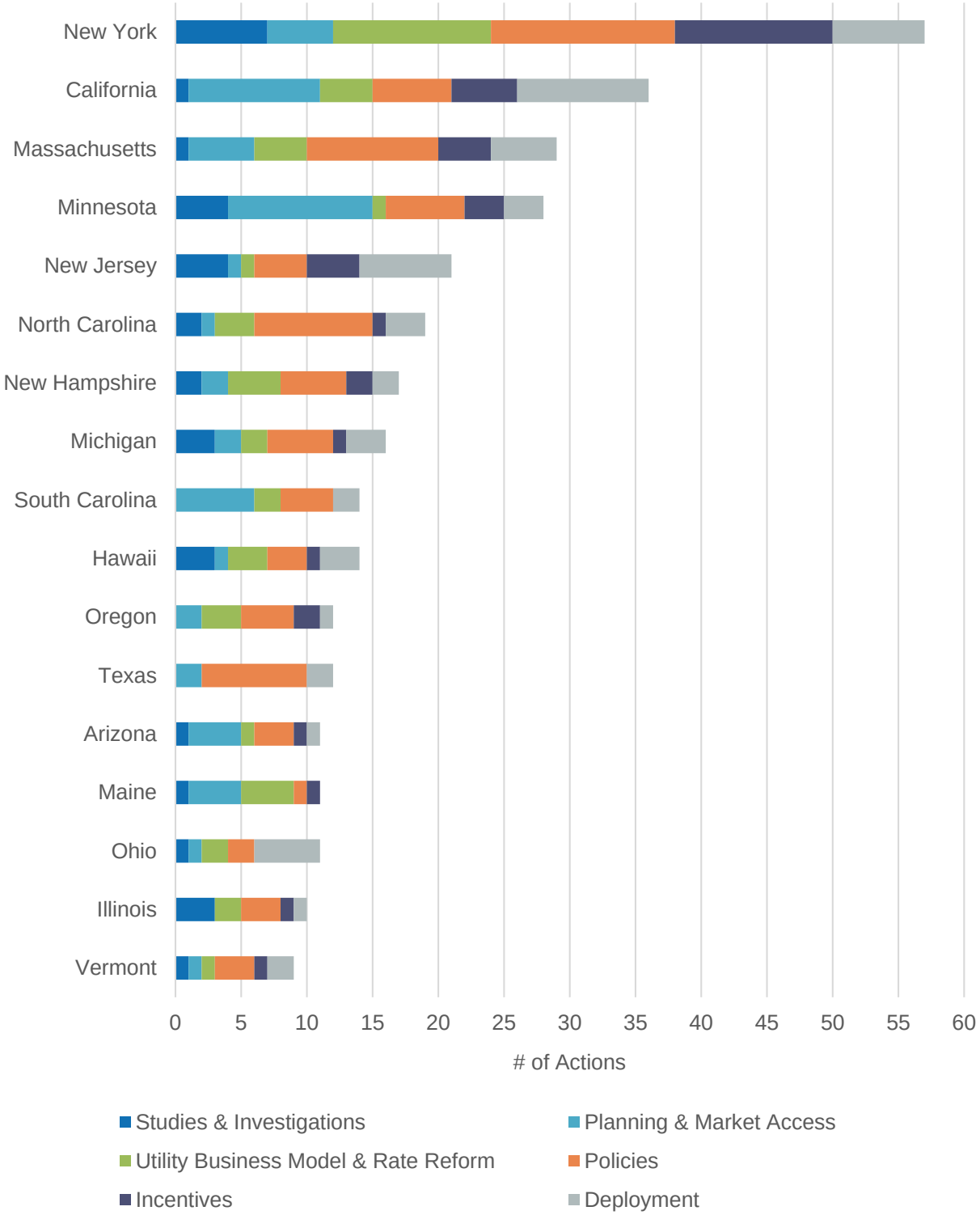
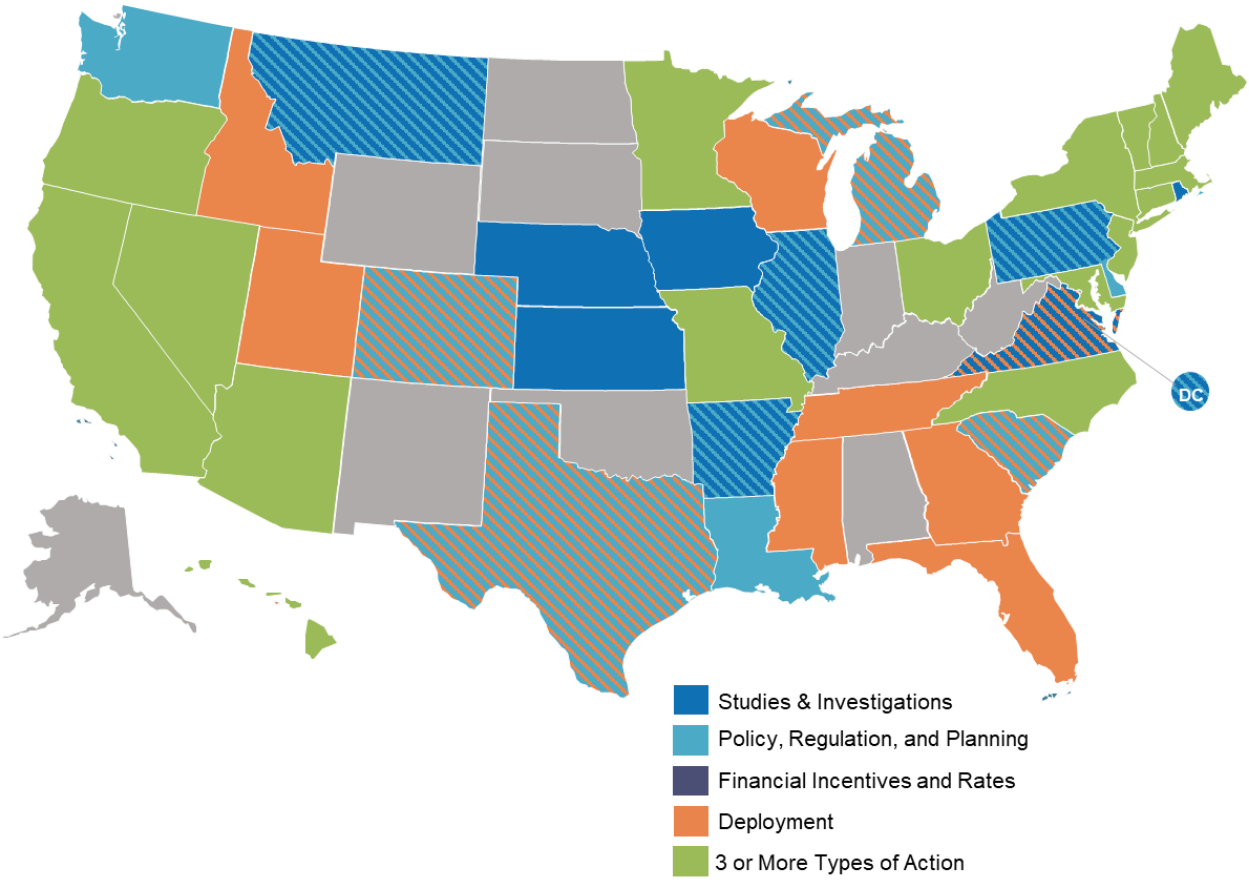


Figure 5. Q2 2019 Energy Storage Action, by Action Type



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
- Excel spreadsheet file of all actions taken during the quarter and separate Powerpoint file of all summary maps available upon request
- 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. At a cost of $500 per issue (or $1,500 annually), the 50 States of Grid Modernization offers a significant time and financial savings. With direct links to original sources for all actions, customers may stay on top of policy developments between quarterly reports.

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- Learn about the approaches being taken by other utilities facing similar opportunities and challenges

- Stay on top of relevant state policy developments
- Utilize an objective source of information in legislative and regulatory proceedings

Investors and Financial Analysts

- Identify new investment opportunities and emerging areas of growth, as well as risky investments
- Identify active utility investment proceedings

Advocacy Organizations

- Learn about the diverse grid modernization actions occurring across the country
- Learn about the outcomes of other states' policy decisions
- Utilize an objective source of information in legislative and regulatory proceedings

Researchers and Consultants

- Access valuable data requiring a vast amount of time to collect first-hand
- Identify research needs to inform grid modernization proceedings
- Cite an objective source in your own research and analysis

PRICING

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Subscription Type	Annual Subscription	Single Report
50 States of Grid Modernization Report	$1,500	$500
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