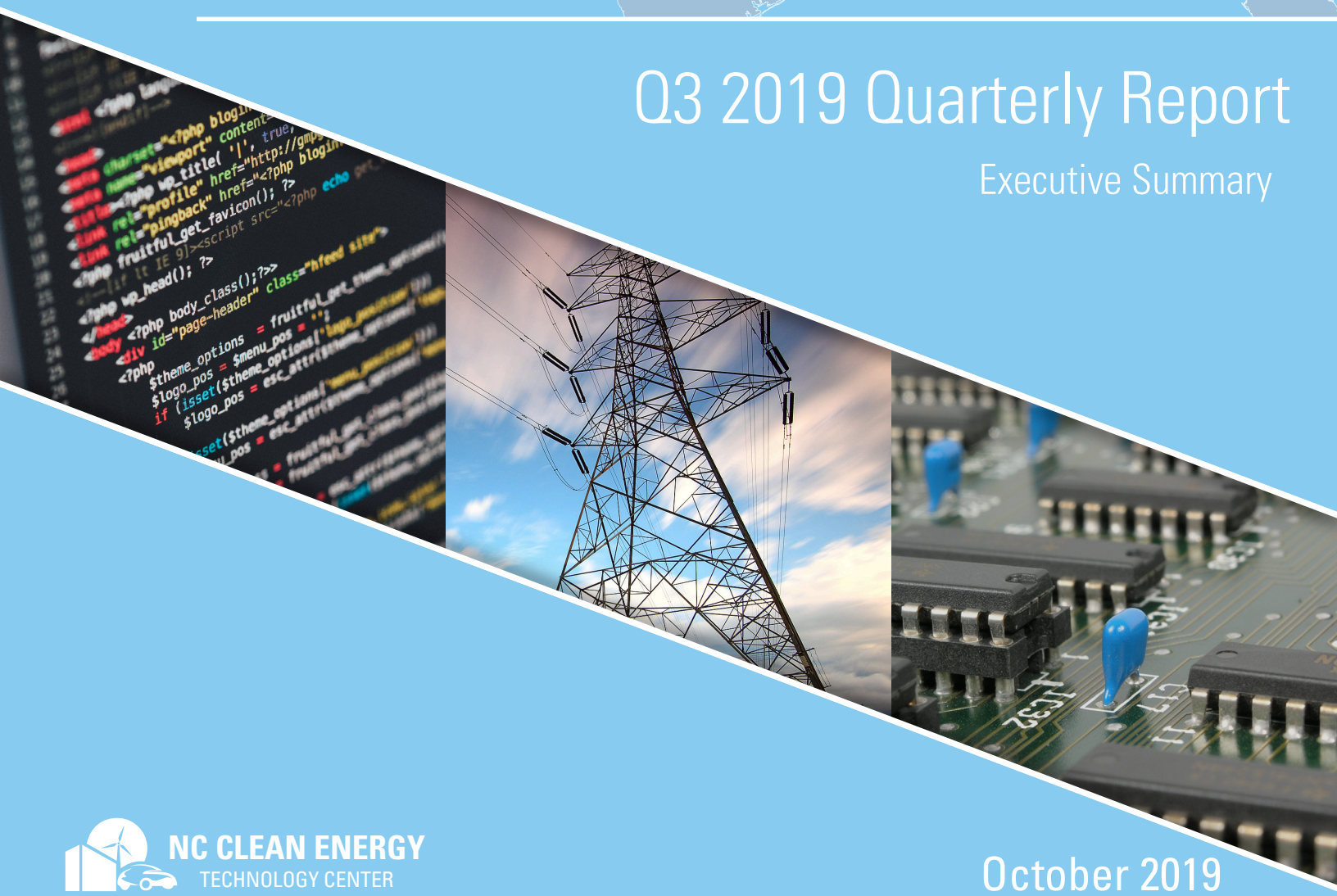
50 States of GRID MODERNIZATION

Q3 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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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

Q3 2019 GRID MODERNIZATION ACTION

In the third quarter of 2019, 45 states plus DC took a total of 383 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 383 actions catalogued, the most common were related to policies (93), deployment (76), and planning and market access (73).

Table 1. Q3 2019 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Policies	93	24%	32
Deployment	76	20%	30
Planning and Market Access	73	19%	23 + DC
Business Model and Rate Reform	60	16%	28 + DC
Studies and Investigations	48	13%	29 + DC
Financial Incentives	33	9%	14
Total	**383**	**100%**	**45 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 2019

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

Maryland Regulators Issue Decision on Alternative Ratemaking

In August 2019, the Maryland Public Service Commission issued an order on alternative forms of rate regulation. The Commission did not approve the formula rates proposed by the utilities, but directed the Public Utility Law Division to establish a working group to develop an implementation report on multi-year rate plans. After the working group submits its report, it is to consider performance-based regulation issues.

Utilities File Revised Grid Modernization Plans in North Carolina and Virginia

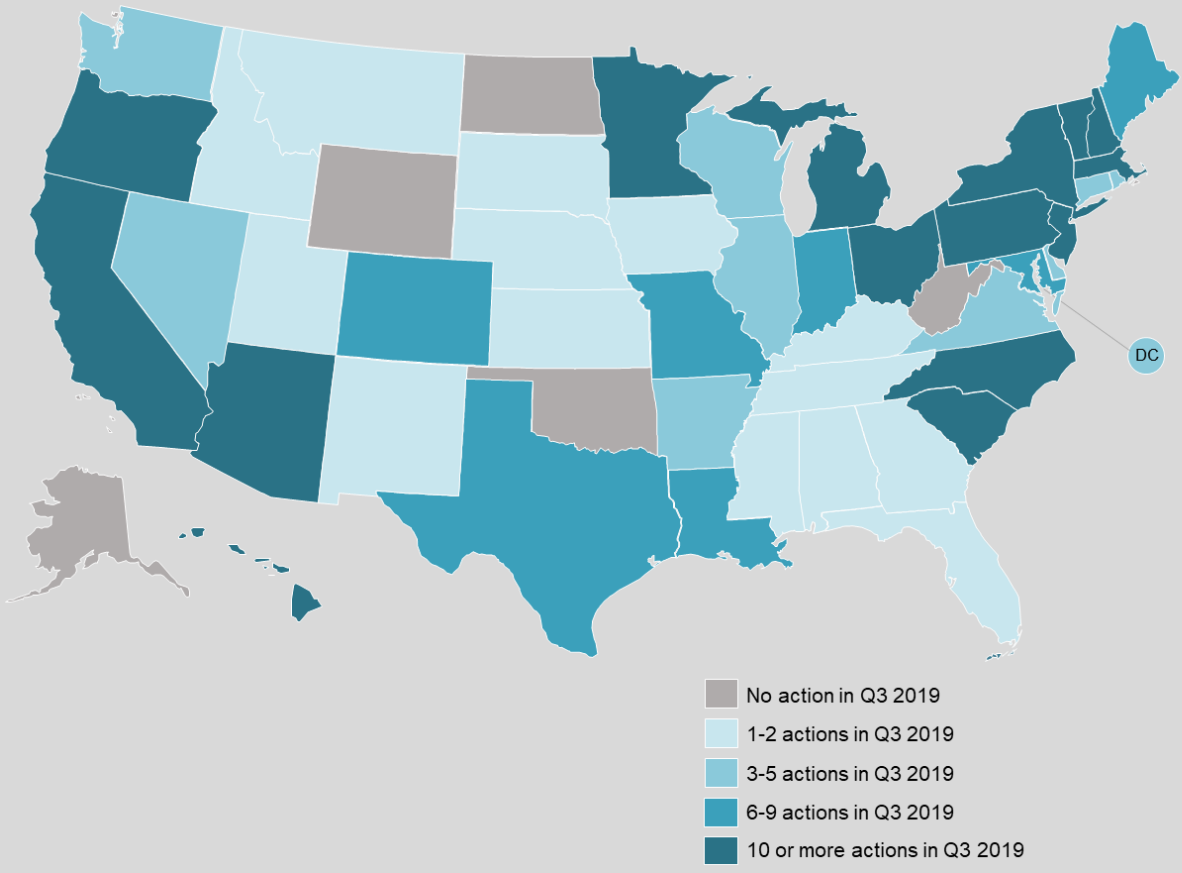
During Q3 2019, two utilities – Duke Energy Carolinas in North Carolina and Dominion Energy in Virginia – filed revised grid modernization plans for approval after regulators rejected their

initial plans. Both utilities' plans have a reduced budget and include a range of investments, such as advanced metering infrastructure, distribution automation, and grid hardening.

Massachusetts Regulators Reject National Grid Proposed Performance Incentives

The Massachusetts Department of Public Utilities (DPU) issued a decision on National Grid's general rate case application in September 2019, rejecting the utility's four proposed performance incentive mechanisms based on peak reduction, electric vehicle adoption, electric vehicle supply equipment cost containment, and customer ease. However, the DPU approved the utility's proposed scorecard metrics

Figure 1. Q3 2019 State and Utility Action on Grid Modernization



California Public Utilities Commission Opens Microgrid Rulemaking

In September 2019, the California Public Utilities Commission opened a new rulemaking proceeding to reduce barriers to microgrid development, pursuant to legislation enacted in 2018. The Commission is to develop standards, protocols, guidelines, methods, rates, and tariffs to support microgrid deployment while avoiding cost shifting between ratepayers. The rules are to be established by December 1, 2020.

North Carolina Department of Environmental Quality Releases Clean Energy Plan

The North Carolina Department of Environmental Quality released its final Clean Energy Plan in late September 2019. The final plan includes several policy recommendations focused on six strategy areas: carbon reduction, utility incentives and comprehensive planning, grid modernization and resilience, clean energy deployment and economic development, equitable access and just transition, and energy efficiency and electrification strategies.

MOST ACTIVE STATES AND SUBTOPICS OF Q3 2019

The most common types of actions across the country related to energy storage deployment (46), data access policies (30), distribution system planning (28), integrated resource planning (27), and smart grid deployment (27). Grid modernization activity decreased in Q3 2019, as a result of most state legislatures adjourning in the first half of the year. Grid modernization activity in Q3 2019 increased by 39% over Q3 2018 (276 actions) and by 108% over Q3 2017 (184 actions).

The states taking the greatest number of actions related to grid modernization in Q3 2019 can be seen in Figure 4. New York, Massachusetts, and California saw the most action during the quarter, followed by Minnesota, New Jersey, Hawaii, Michigan, and North Carolina. Overall, 45 states, plus DC, took actions related to grid modernization in Q3 2019.

TOP GRID MODERNIZATION TRENDS OF Q3 2019

Utilities Filing Innovative Rate Design Proposals

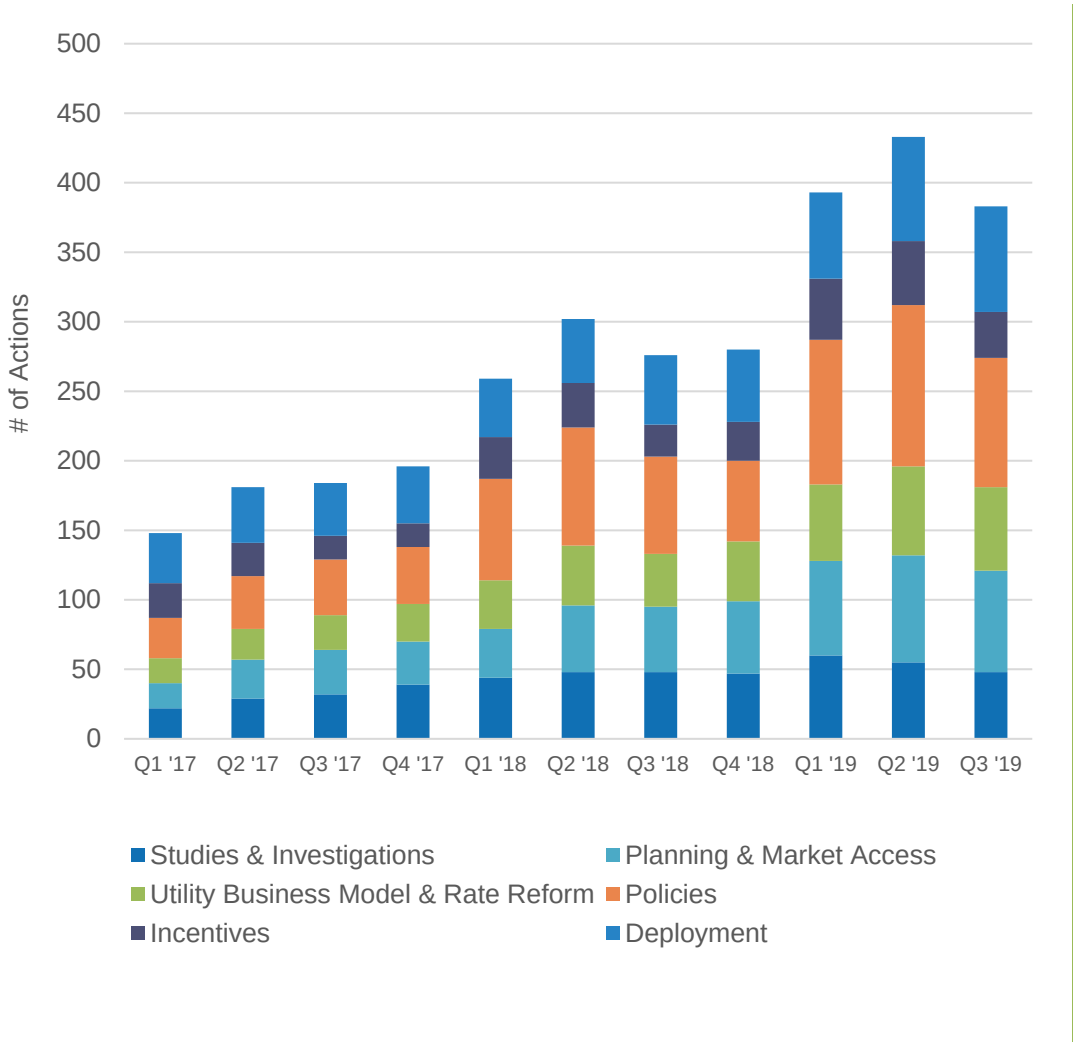
Several utilities have recently innovative rate designs, primarily as pilots, with state regulators. These rates typically include time-varying rates, but are increasingly including components such as critical peak pricing, peak time rebates, and demand charges. The HECO Companies in Hawaii filed their Advanced Rate Design Strategy in September 2019, pursuant to a Commission directive, which includes time-varying rates, critical peak incentives, multi-part time-varying rates, and electric vehicle rates. In Michigan, DTE Electric filed an application for a new advanced customer pricing pilot in July 2019. The pilot includes two time-varying rates, two demand rates, and two rates combining time-varying and demand elements. Duke Energy Indiana filed a proposal for new rates, including critical peak pricing, and in Illinois, regulators approved Commonwealth Edison's three-part time-of-use pilot including super peak, peak, and off-peak periods. Additionally, North Carolina regulators approved Duke Energy's dynamic pricing pilots in July 2019.

Energy Storage Additions Increasingly Included in Utility Integrated Resource Plans

Utilities are increasingly including new energy storage capacity in their integrated resource plans (IRPs). Thirty-one states currently require utilities to file IRPs. The Georgia Public

Service Commission approved Georgia Power's IRP stipulation in July 2019. The stipulation reached with the Commission Staff includes 80 MW of energy storage – 30 MW more than originally included in the utility's plan. Other recently filed IRPs including energy storage capacity additions include Green Mountain Power in Vermont (50 to 100 MW) Appalachian Power in Virginia (10 MW) Indiana Michigan Power in Michigan (50 MW of energy storage by 2028), Idaho Power (60 MW installed beginning in 2034). Proposed amendments to NV Energy's latest IRP also include 515 MW of battery storage.

Figure 2. Total Number of Grid Modernization Actions by Quarter



States and Utilities Planning Online Energy Data Portals

A number of states and utilities are planning the development of online energy data portals for customers to access granular data about their energy use. In July 2019, New Hampshire lawmakers enacted a bill to establish a statewide online energy data platform that will be administered by the Public Utilities Commission. As part of the HECO Companies' Data Access and Privacy Policy filed with Hawaii regulators in September 2019, the utilities will make an energy portal available to customers with advanced metering infrastructure. Indiana Michigan

Power also proposed the creation of an online customer engagement platform that will allow users to track their energy usage. In North Carolina, regulators approved Duke Energy's proposed Smart Meter Usage App pilot, which will allow residential customers to monitor their real-time usage data. Dominion Virginia Energy also requested approval in September 2019 for a Customer Information Platform as part of its revised grid transformation plan.

Figure 3. Most Common Types of Actions Taken in Q3 2019

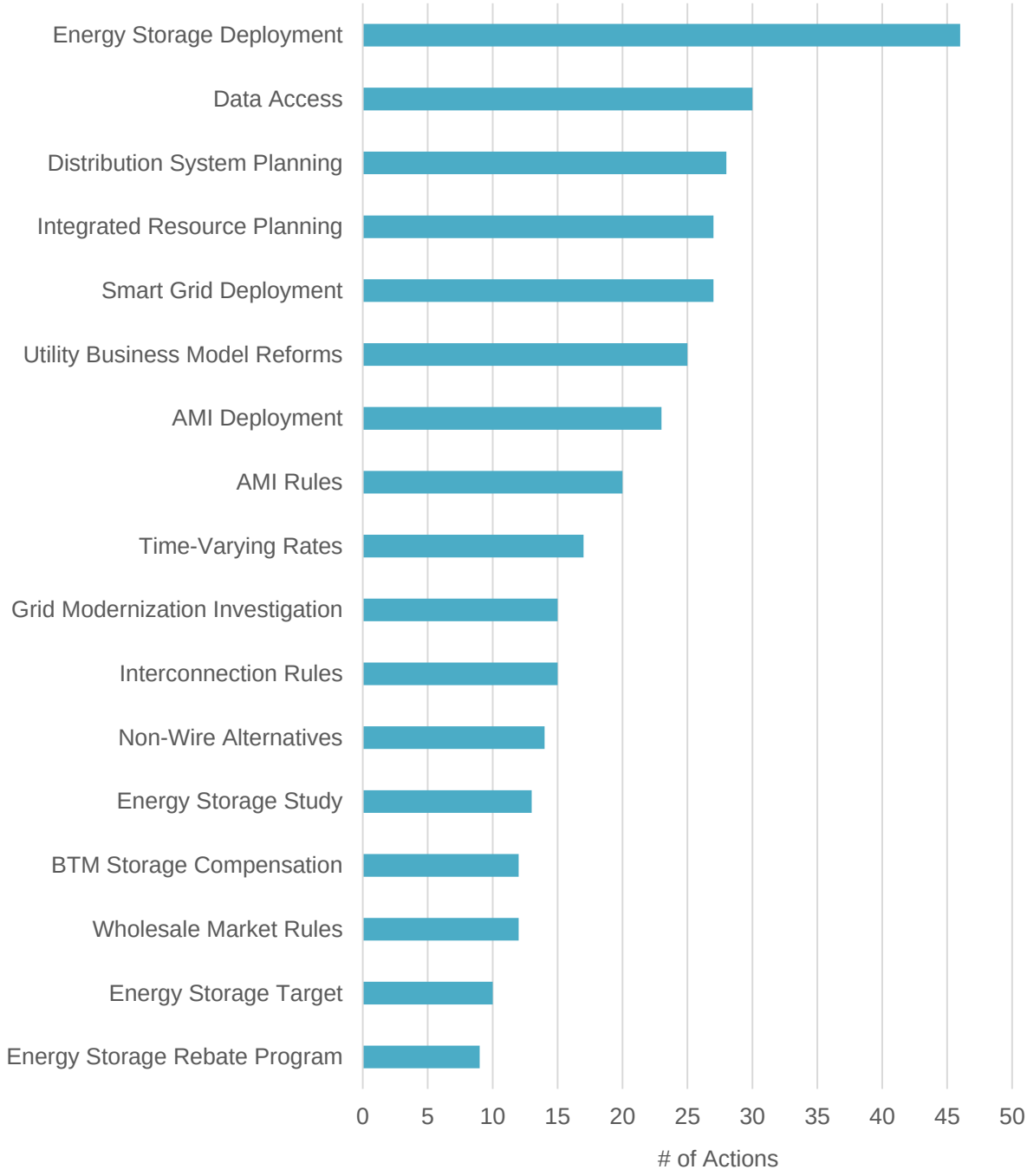


Figure 4. Most Active States of Q3 2019

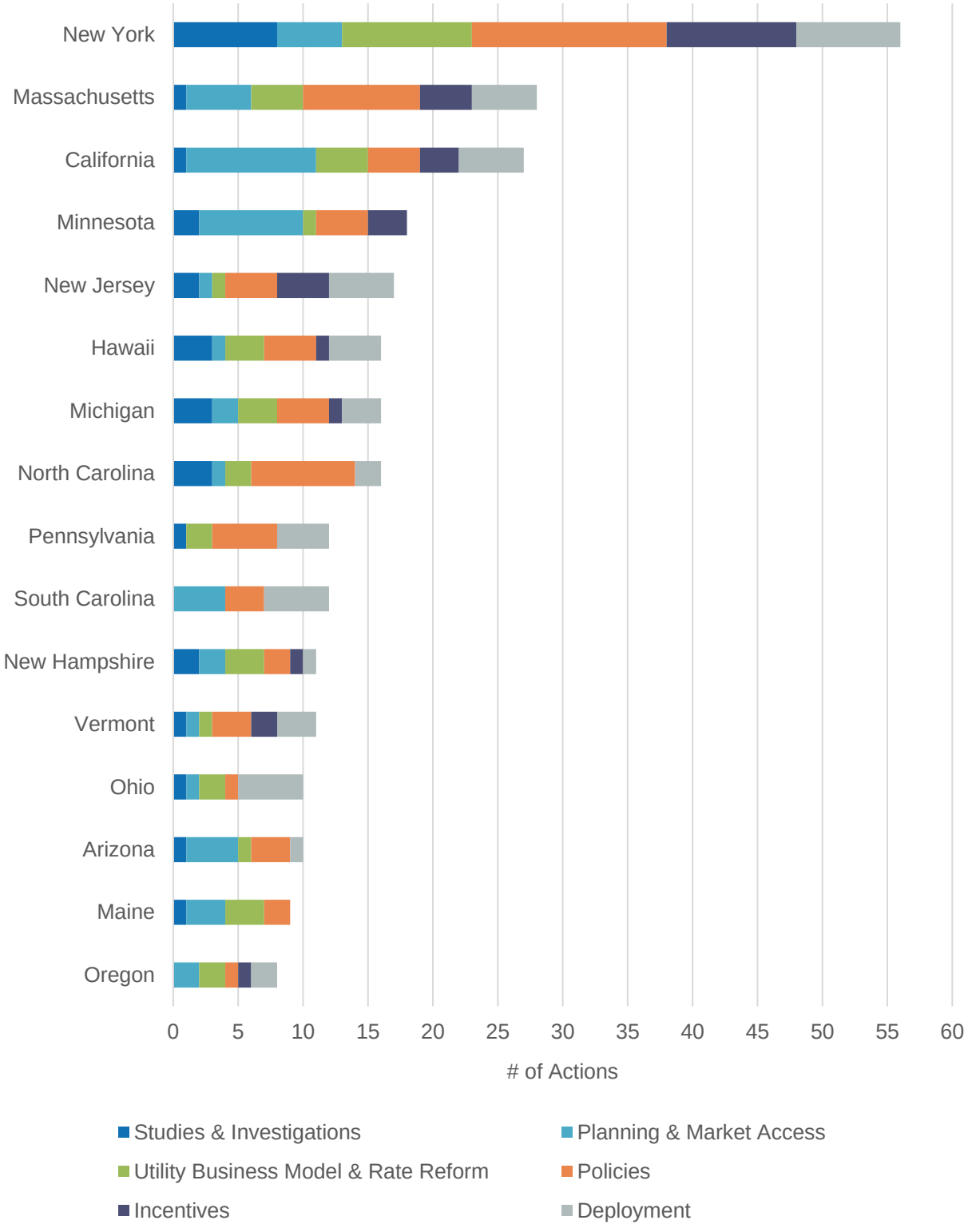
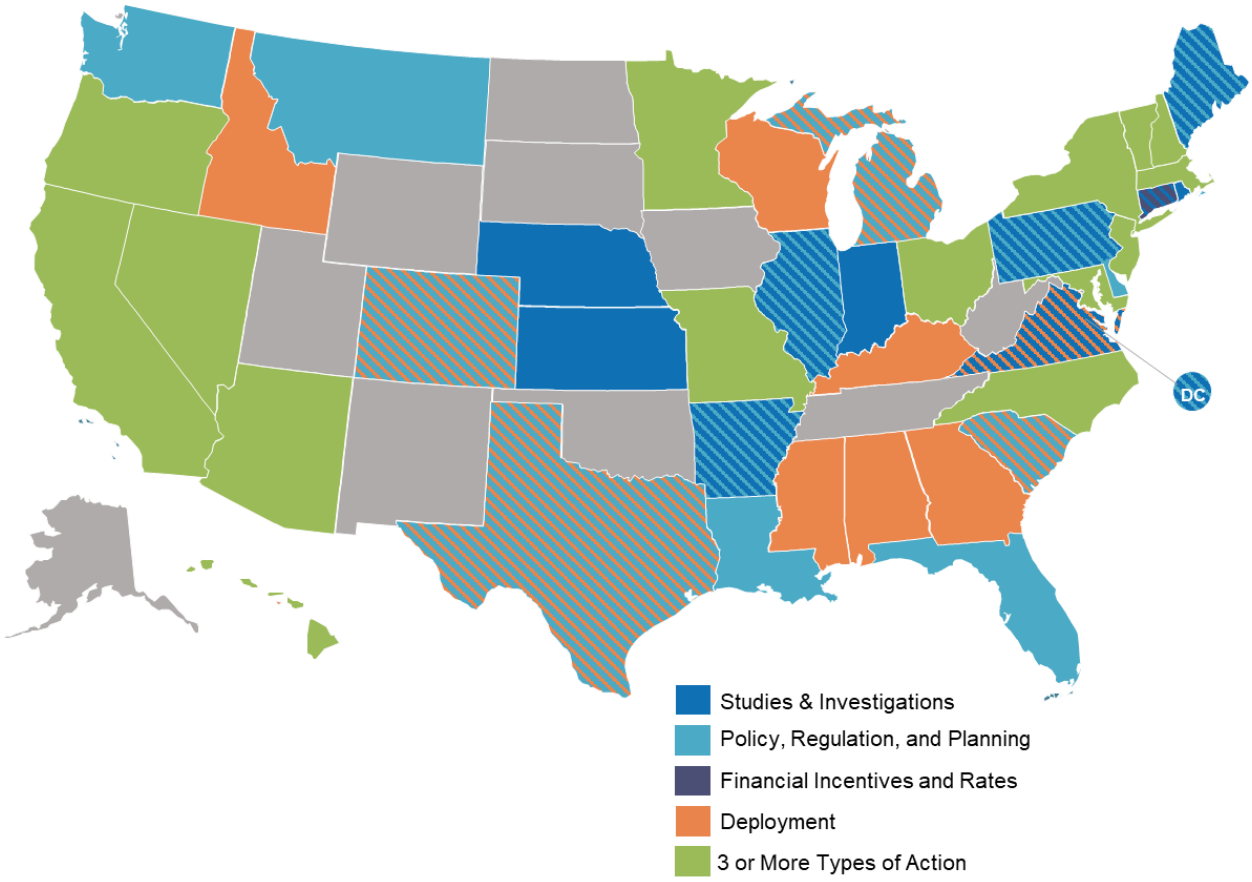


Figure 5. Q3 2019 Energy Storage Action, by Action Type



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.

Advanced Energy Technology Businesses

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- Give your own team a head start in tracking legislative and regulatory proceedings

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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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