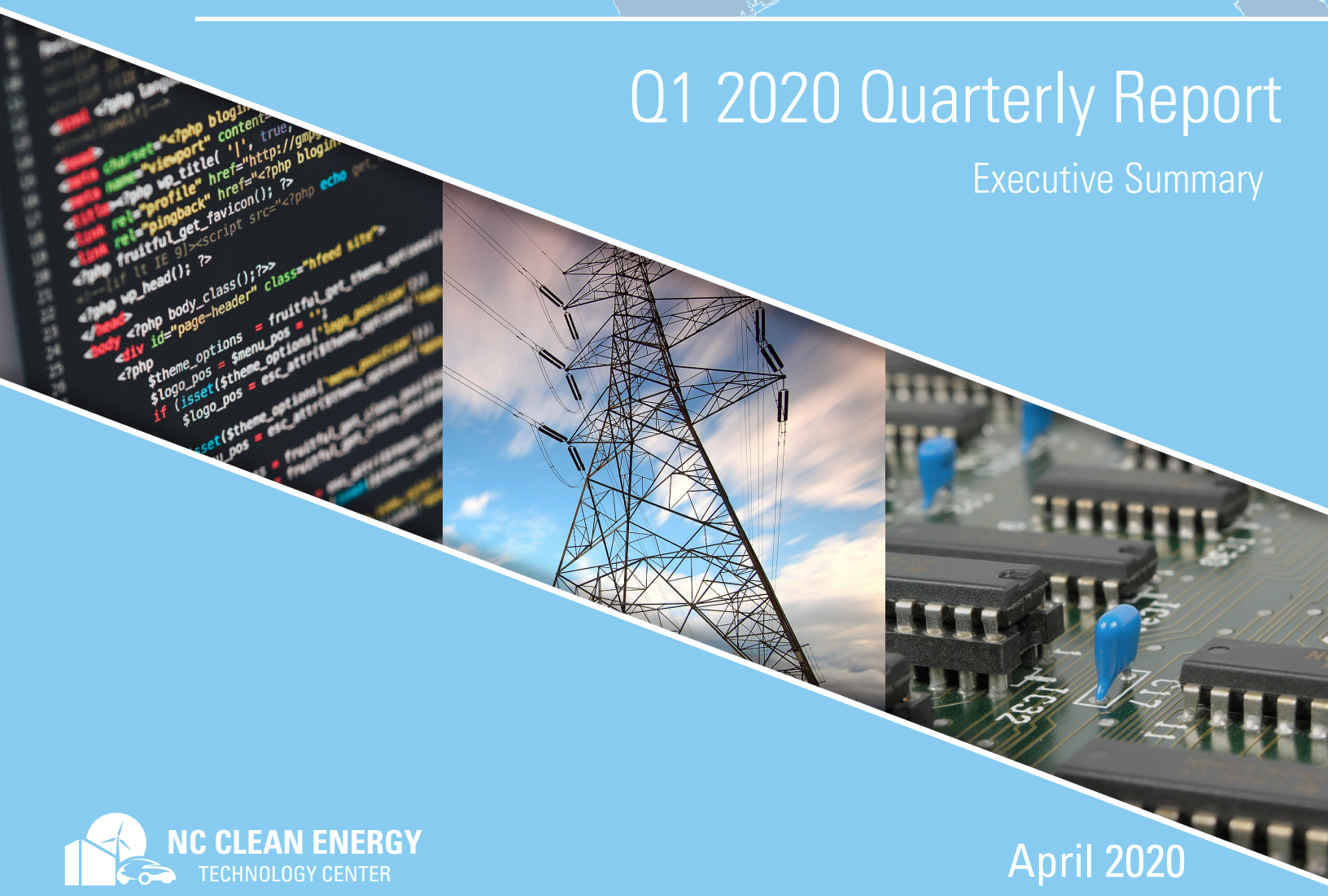
50 States of GRID MODERNIZATION

Q1 2020 Quarterly Report

Executive Summary



NC CLEAN ENERGY
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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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PREVIOUS EDITIONS AND OTHER 50 STATES REPORTS

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

Q1 2020 GRID MODERNIZATION ACTION

In the first quarter of 2020, 47 states plus DC took a total of 446 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 446 actions catalogued, the most common were related to policies (130), planning and market access (70), and deployment (67).

Table 1. Q1 2020 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Policies	130	29%	37 + DC
Planning and Market Access	70	16%	22 + DC
Deployment	67	15%	26
Business Model and Rate Reform	65	15%	27 + DC
Studies and Investigations	57	13%	30 + DC
Financial Incentives	57	13%	20
Total	**446**	**100%**	**47 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 Q1 2020

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

Energy Storage Targets Adopted in Nevada and Virginia

Nevada and Virginia became the sixth and seventh states, respectively to adopt energy storage targets during Q1 2020. The Public Utilities Commission of Nevada approved a target of 1,000 MW of energy storage by 2030, with interim targets beginning in 2020.The Virginia General Assembly adopted a target of 3,100 MW of energy storage by December 31, 2035, with 2,700 MW of this required for Dominion Energy and 400 MW required for Appalachian Power.

DC Public Service Commission Issues Major Grid Modernization Order

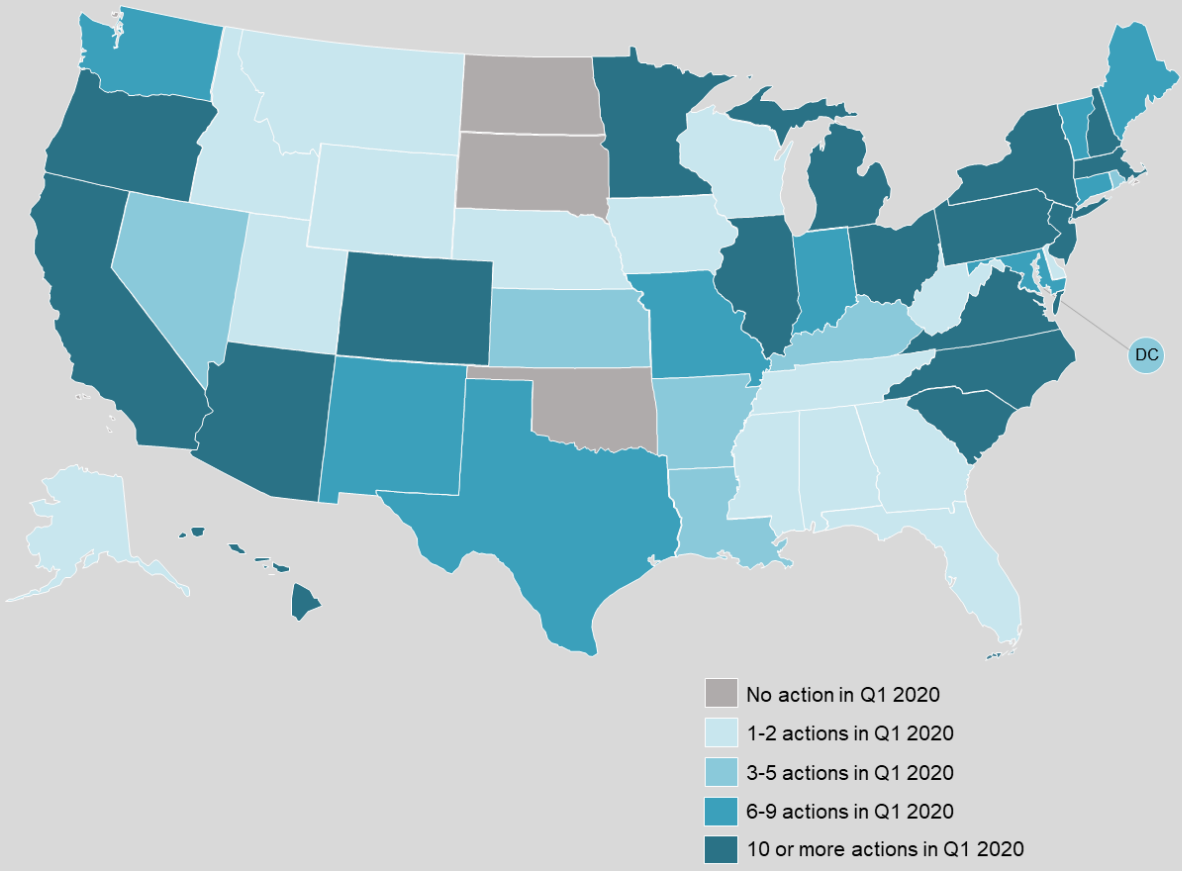
The DC Public Service Commission issued a decision in the district's grid modernization proceeding in January 2020, which takes several steps to forward the state's grid

modernization efforts. The order approves a distribution system planning and non-wires alternative stakeholder process, the development of a data sharing web portal, the creation of a rate design working group, the establishment of a microgrid proceeding, and more.

Virginia Regulators Issue Decision on Dominion Energy's Grid Transformation Plan

The Virginia Corporation Commission issued an order on Dominion Energy's Phase IB Grid Transformation Plan in March 2020. The decision approves the utility's proposed investments in cybersecurity, stakeholder engagement and customer education, a customer information platform, smart electric vehicle charging, and a hosting capacity analysis, but rejected investments in advanced metering infrastructure, self-healing grid, and certain components of grid hardening.

Figure 1. Q1 2020 State and Utility Action on Grid Modernization



New Mexico Lawmakers Enact Grid Modernization Roadmap Bill

In February 2020, the New Mexico Legislature enacted H.B. 233, which directs the Energy, Minerals, and Natural Resources Department to develop a grid modernization roadmap for the state. The legislation also establishes a grid modernization grant program for public entities

and authorizes public utilities to file applications for grid modernization projects, including investments, incentives, rate design, and education.

Delaware Public Service Commission Adopts Distribution System Planning Rules

The Delaware Public Service Commission adopted distribution system planning rules in February 2020, following a collaborative effort that began in 2018. The rules require electric distribution companies to file 10-year Long Range Distribution Plans including potential distribution system performance issues and solutions, as well as 3-year Infrastructure, Safety, and Reliability Plans including proposed capital spending.

MOST ACTIVE STATES AND SUBTOPICS OF Q1 2020

The most common types of actions across the country related to energy storage deployment (41), data access policies (32), utility business model reforms (31), distribution system planning (30), and rules related to advanced metering infrastructure opt-out (29). In Q1 2020, grid modernization activity increased by 13% over Q1 2019 and 72% over Q1 2018.

The states taking the greatest number of actions related to grid modernization in Q1 2020 can be seen in Figure 4. New York, California, Massachusetts, and Minnesota saw the most action during the quarter, followed by Virginia, New Hampshire, Colorado, Michigan, and New Jersey. Overall, 47 states, plus DC, took actions related to grid modernization in Q1 2020.

TOP GRID MODERNIZATION TRENDS OF Q1 2020

State Regulators Developing Energy Storage Interconnection Rules

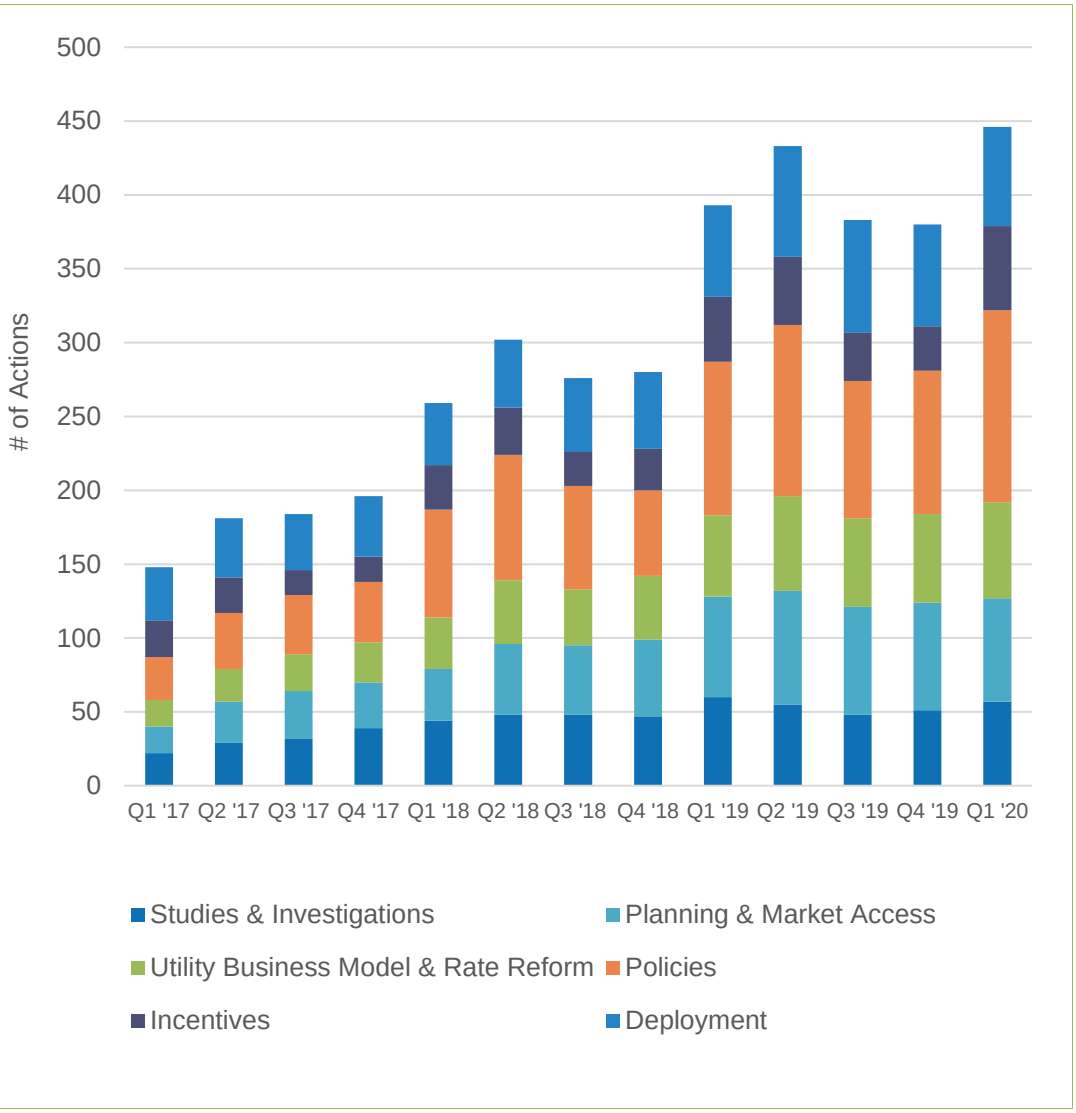
A number of states are considering revisions to interconnection rules to include specific standards applicable to energy storage systems. Maryland regulators approved revised interconnection rules in March 2020, which include evaluation of energy storage projects based on net system capacity and proposed use. In Wisconsin, parties filed an energy storage interconnection supplement, and Colorado regulators are considering interconnection rule updates that include standards specific to storage. In November 2019, the Arizona Corporation Commission adopted distributed generation interconnection rules including energy storage provisions. Other states addressing energy storage interconnection rules include Connecticut, Massachusetts, Ohio, and Vermont.

States Considering Mechanisms to Encourage Microgrid Development

Although microgrids are widely viewed as a valuable element of grid modernization, barriers to the development of microgrids currently exist in many states. A number of states are considering different ways to address these barriers and to encourage greater microgrid

development. Lawmakers in states such as Minnesota and New Hampshire are considering studies that would evaluate the potential of microgrids and how to advance microgrid development. Regulators in California and Hawaii are in the process of developing tariffs governing microgrid interconnection and compensation. Meanwhile, legislation under consideration in Maine and Michigan would establish exceptions to certain utility franchise and regulation rules to enable the development of microgrids by non-utilities. Other states, including California and New Jersey, are considering grant programs for microgrids.

Figure 2. Total Number of Grid Modernization Actions by Quarter



Proposed Grid Modernization Legislation Focusing on Energy Storage

State lawmakers considered more than 215 bills related to grid modernization topics during Q1 2020, with the majority of these bills including provisions related to energy storage. Common topics addressed by proposed legislation include energy storage incentive programs (grants, rebates, property tax incentives, sales tax incentives, etc.), studies, and deployment targets.

As of late April 2020, state legislators had enacted 13 grid modernization bills. Legislation enacted in Washington authorizes energy storage as a qualified improvement for commercial Property Assessed Clean Energy (PACE) financing. Lawmakers enacted several bills in Virginia, which include the creation of an energy storage target and a task force to study bulk energy storage resources. Bills related to energy storage remain under consideration in a number of states, including Massachusetts, New Hampshire, and New Jersey. Other major topics of 2020 proposed legislation include microgrids and advanced metering infrastructure opt-out and data access rules.

Figure 3. Most Common Types of Actions Taken in Q1 2020

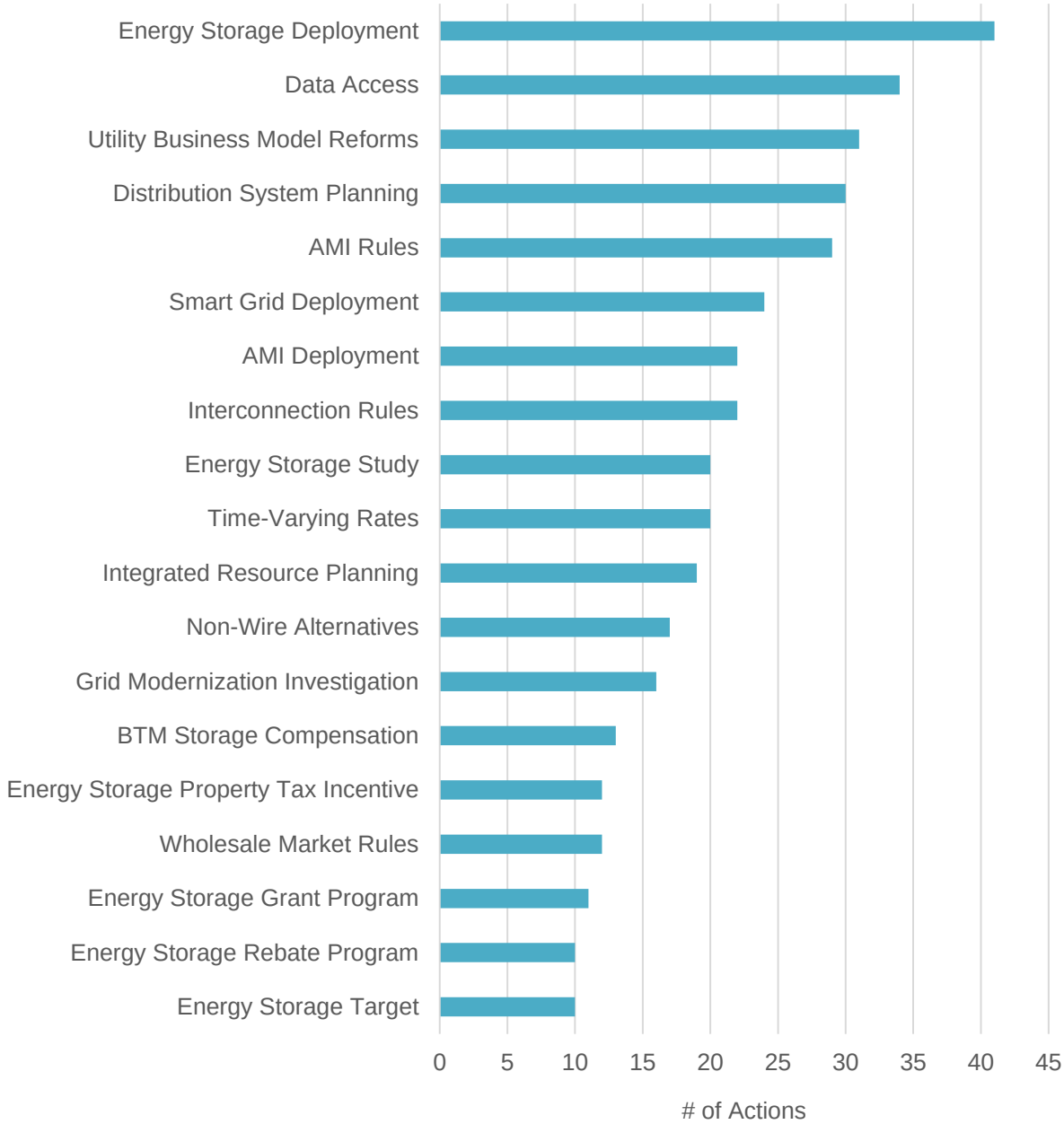


Figure 4. Most Active States of Q1 2020

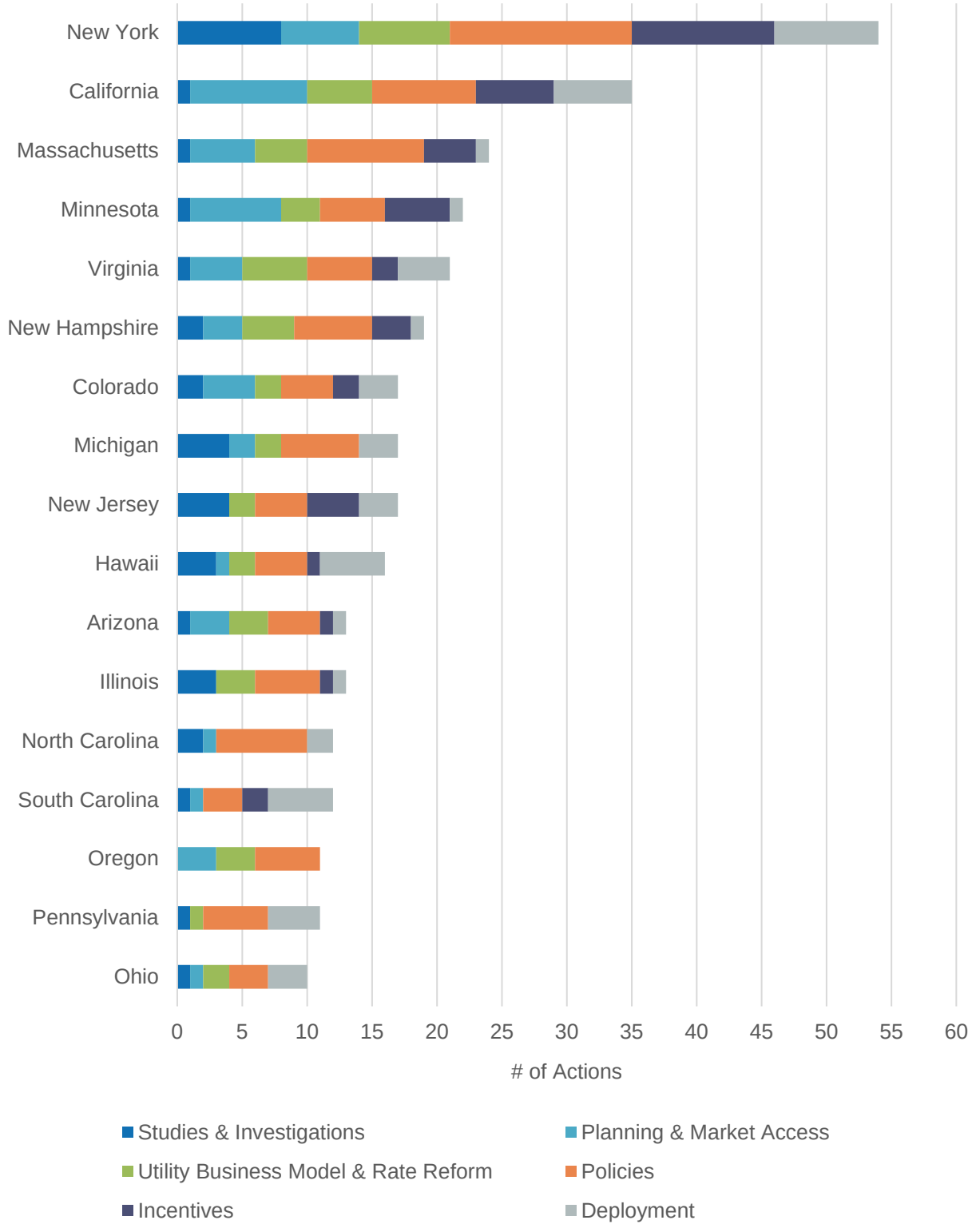
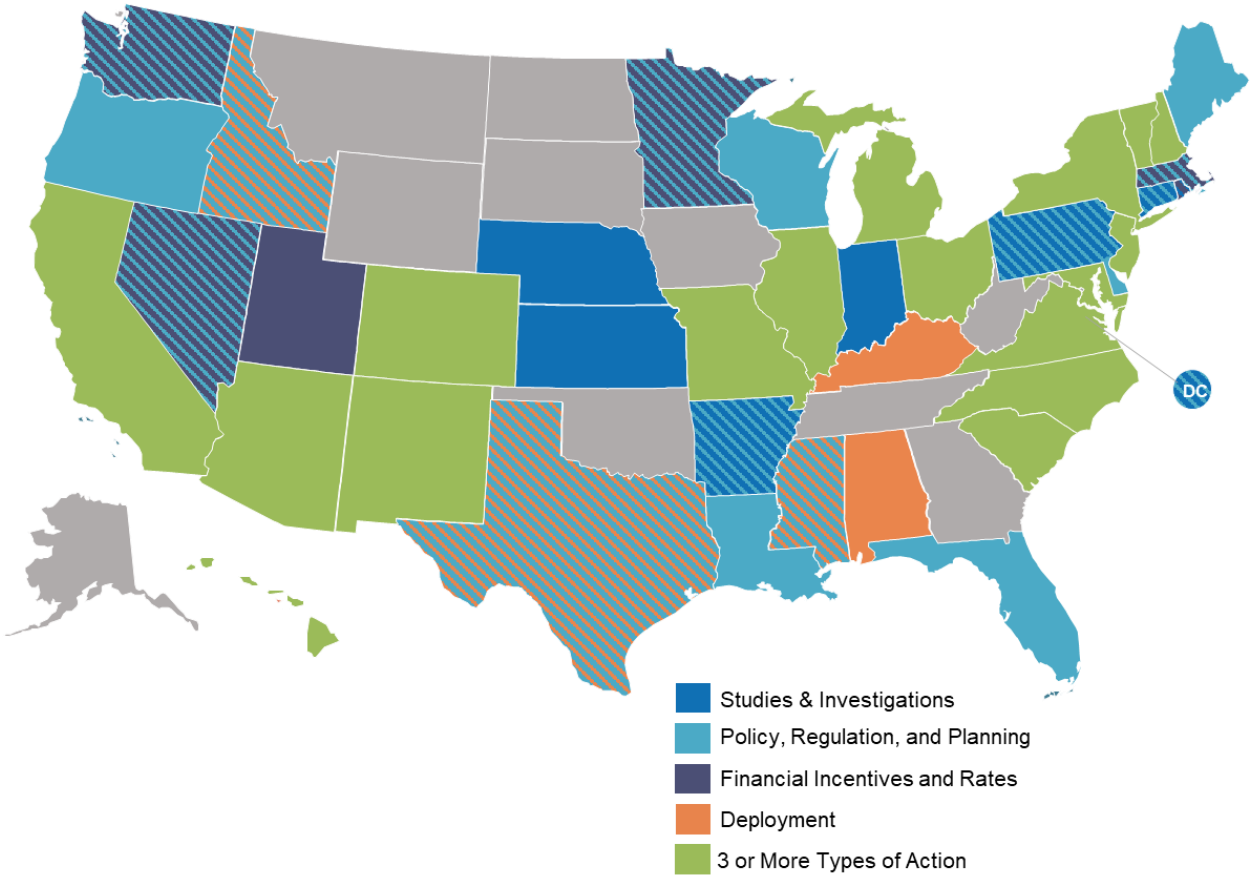


Figure 5. Q1 2020 Energy Storage Action, by Action Type



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