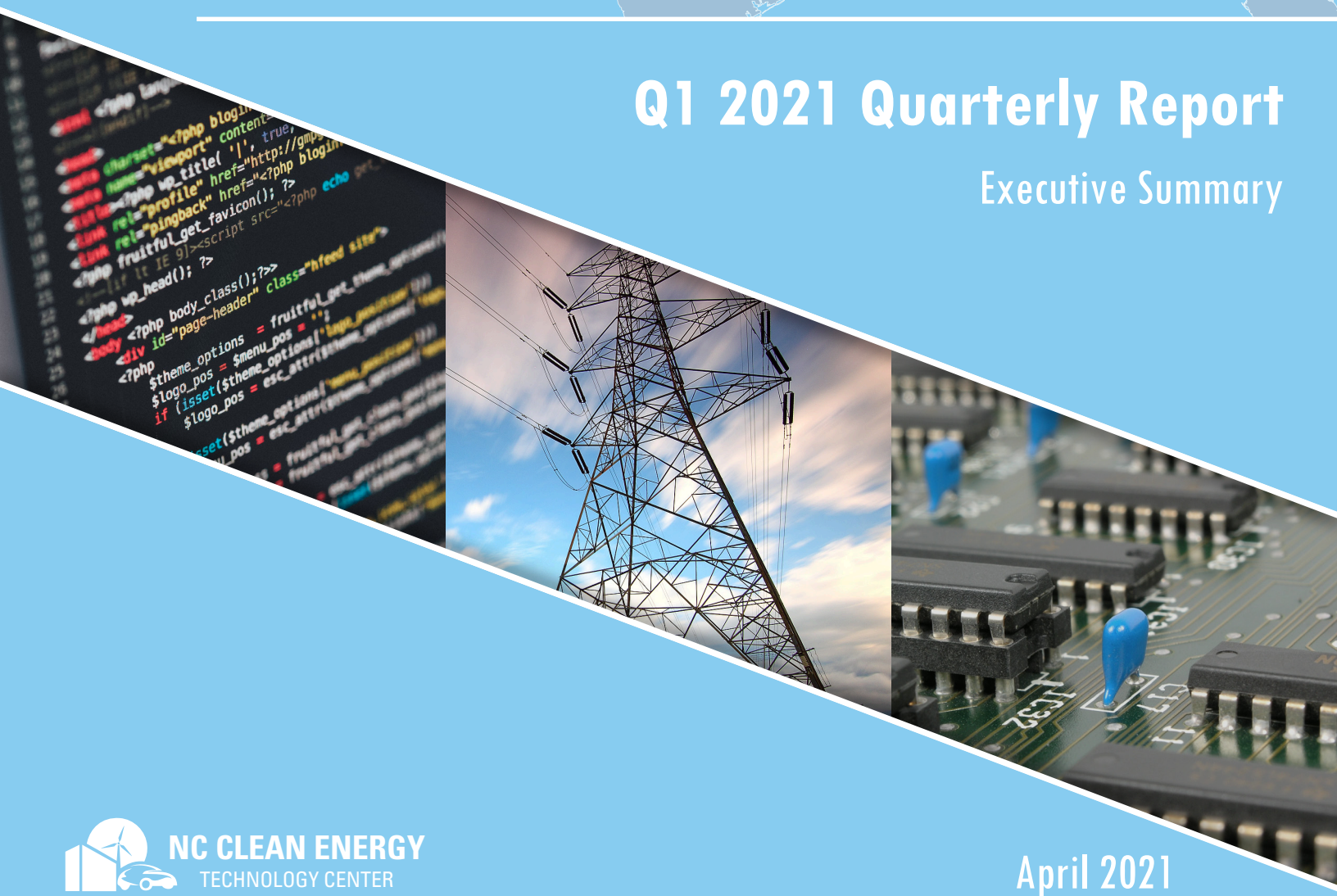
50 States of GRID MODERNIZATION

Q1 2021 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

Q1 2021 GRID MODERNIZATION ACTION

In the first quarter of 2021, 47 states plus DC took a total of 502 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 502 actions catalogued, the most common were related to policies (133), deployment (94), and financial incentives (82).

Table 1. Q1 2021 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Policies	133	26%	38 + DC
Deployment	94	19%	33
Financial Incentives	82	16%	32
Planning and Market Access	71	14%	25 + DC
Business Model and Rate Reform	61	12%	33 + DC
Studies and Investigations	61	12%	27 + DC
Total	**502**	**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 2021

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

North Carolina Regulators Approve Deferral Treatment for Duke Energy Grid Spending

The North Carolina Utilities Commission issued a decision in March 2021, authorizing Duke Energy Carolinas to defer approximately $800 million in grid improvement investments from June 2020 through 2022, including costs associated with self-optimizing grid, distribution automation, transmission system intelligence, and a distributed energy dispatch tool. The decision also approves a rate design study and a climate risk and resilience working group.

Maine Public Utilities Commission Launches Grid Modernization Proceeding

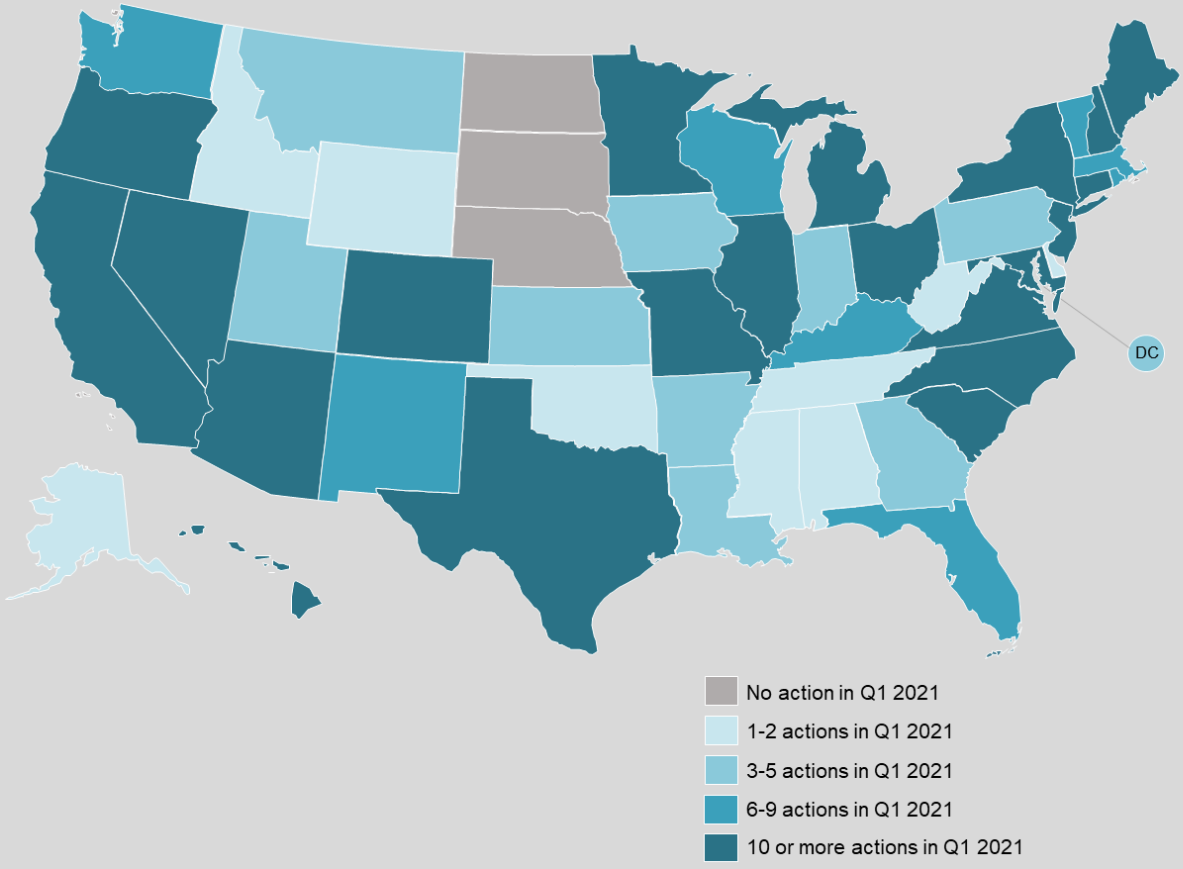
Maine regulators opened a new proceeding in February 2021 to conduct a comprehensive examination of the design and operation of the state's distribution system to accommodate the increasing integration and operation of distributed energy resources and the potential for

substantial load increases resulting from climate policies and initiatives designed to encourage building and transportation electrification.

National Grid Files Advanced Metering and Grid Modernization Proposals in Rhode Island

In January 2021, National Grid filed its updated advanced metering functionality business case, as well as its grid modernization plan. The advanced metering plan proposes AMI deployment with a budget of $224 million and includes a customer engagement plan and a data governance plan. The grid modernization plan envisions grid modernization investments out to 2030 and includes different budget scenarios based on high and low distributed energy resource scenarios.

Figure 1. Q1 2021 State and Utility Action on Grid Modernization



Virginia Lawmakers Enact Series of Energy Storage Bills

Virginia Lawmakers enacted a series of bills related to energy storage in March 2021. The enacted bills include property and sales tax incentives for energy storage systems, special permitting guidelines for storage facilities, and a requirement that storage projects constructed

to comply with the state's storage procurement target use equipment and components from a Virginia or U.S. based manufacturer, if available.

Connecticut Regulators Release Energy Storage Incentive Straw Proposal

The Connecticut Public Utilities Regulatory Authority released its straw proposal for an electric storage incentive program in January 2021. The nine-year program calls for a total deployment of 580 MW (290 MW residential and 290 commercial and industrial), which would be achieved with an upfront declining block incentive and performance-based incentives for dispatching the system during peak events. The upfront incentive would begin at $280 per kWh, with low to moderate income customers eligible for an additional incentive.

MOST ACTIVE STATES AND SUBTOPICS OF Q1 2021

The most common types of actions across the country related to energy storage deployment (62), utility business model reforms (31), energy storage interconnection rules (30), smart grid deployment (29), and data access policies (27). Q1 2021 was the busiest quarter yet for grid modernization, with activity increasing in nearly every category.

The states taking the greatest number of actions related to grid modernization in Q1 2021 can be seen in Figure 4. New York, Texas, California, Minnesota, and New Jersey saw the most action during the quarter, followed by Illinois, Hawaii, and North Carolina. Overall, 47 states, plus DC, took actions related to grid modernization in Q1 2021.

TOP GRID MODERNIZATION TRENDS OF Q1 2021

States Focusing on Improving Grid Resilience

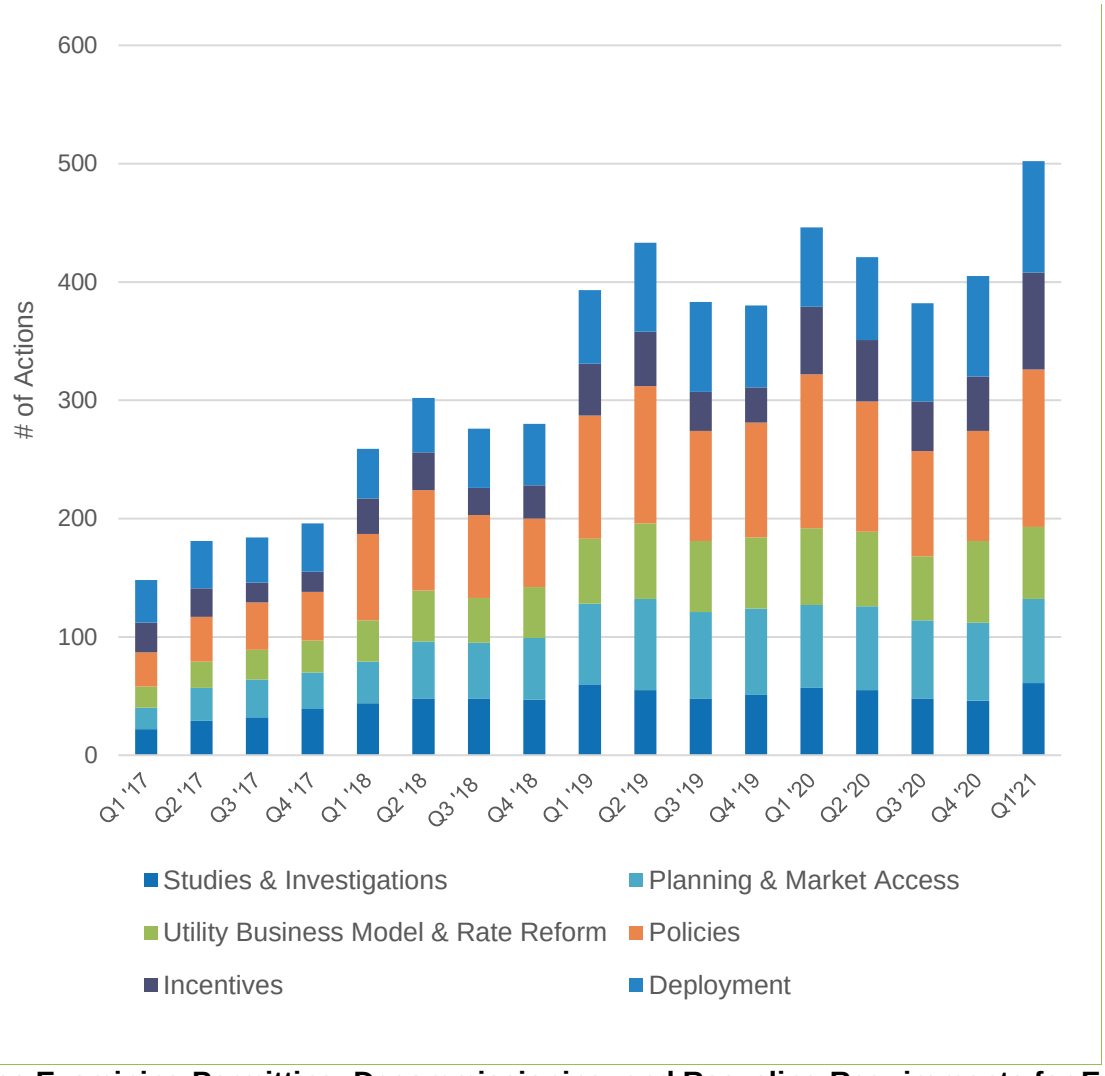
States across the country are showing increased focus on improving grid resilience, particularly in the wake of the extreme winter weather event occurring in February 2021. In Texas, the Public Utilities Commission opened proceedings to investigate the event, while state legislators introduced numerous bills focused on grid resilience. Among these are bills establishing a grid security commission, a critical infrastructure resiliency fund, and a solar and energy storage resilience grant and loan program. Other states, including Arkansas and South Carolina, have also launched proceedings regarding extreme weather event response. Legislation introduced in Florida would create a Resilient Schools Pilot and an Energy Security and Disaster Resilience Pilot, while Xcel Energy has requested approval for resiliency as a service pilot programs in multiple states.

State Lawmakers Considering Financial Incentives for Grid Modernization

State legislators have introduced significantly more bills related to financial incentives for energy storage, microgrids, demand response, and other grid modernization technologies so

far in 2021 than in previous years. Lawmakers in at least 29 states considered grid modernization incentive bills during Q1 2021, with the majority of these related to property tax incentives, grant programs, and Property Assessed Clean Energy (PACE) financing. The Virginia General Assembly enacted legislation establishing property and sales tax incentives for energy storage systems, while Colorado and Massachusetts lawmakers also passed bills establishing property tax incentives for energy storage. In many of these cases, property tax incentives currently exist for solar and other renewable energy technologies and are being extended to also apply to storage facilities.

Figure 2. Total Number of Grid Modernization Actions by Quarter



States Examining Permitting, Decommissioning, and Recycling Requirements for Energy Storage Facilities

As energy storage deployment continues to increase, more states are examining permitting, decommissioning, and recycling requirements for energy storage facilities. Virginia lawmakers enacted legislation allowing energy storage facilities under 150 MW to qualify for special

permitting, review, and inspection requirements. In North Carolina, the Environmental Management Commission is in the process of developing rules governing end-of-life management for battery storage, and in Nevada, regulators determined that standalone energy storage systems are not considered utility facilities and, therefore, do not require Utility Environmental Protection Act permits. In Maine, a concept draft of a bill proposes measures to address the recycling of clean energy equipment, including battery storage systems. Legislation introduced in Vermont directs the Public Utility Commission to establish rules related to certificates of public good for energy storage projects, including decommissioning and application requirements.

Figure 3. Most Common Types of Actions Taken in Q1 2021

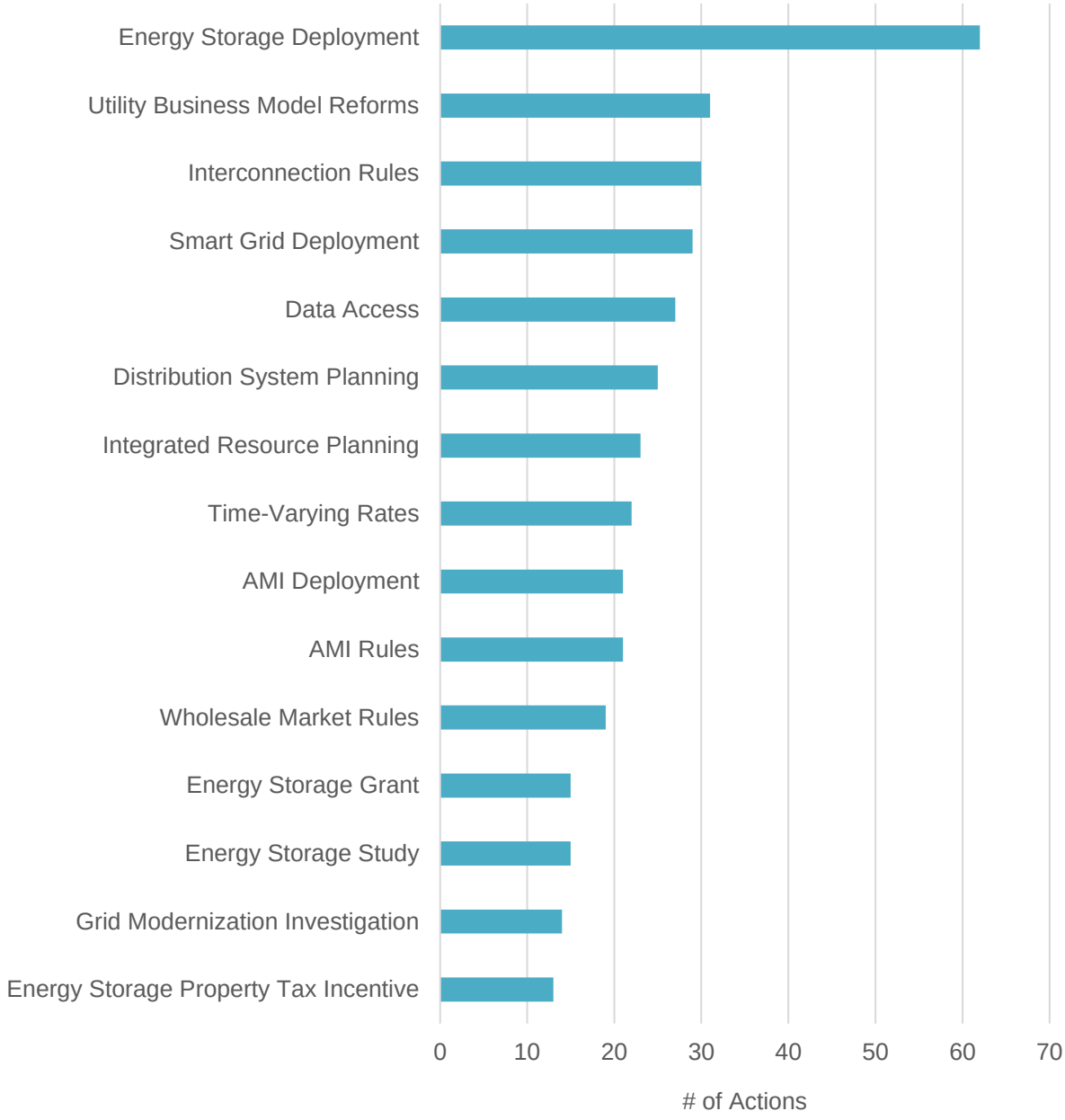


Figure 4. Most Active States of Q1 2021

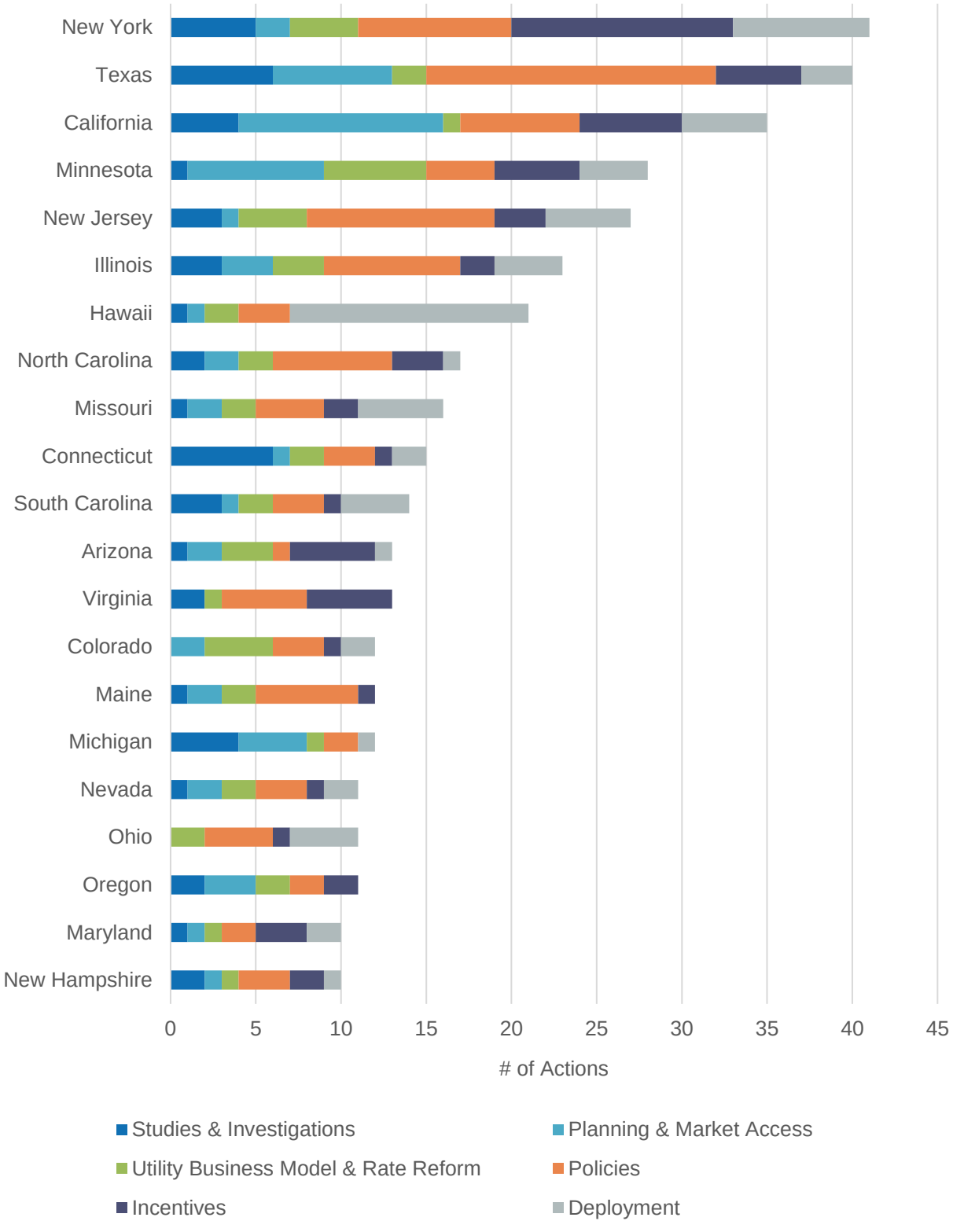
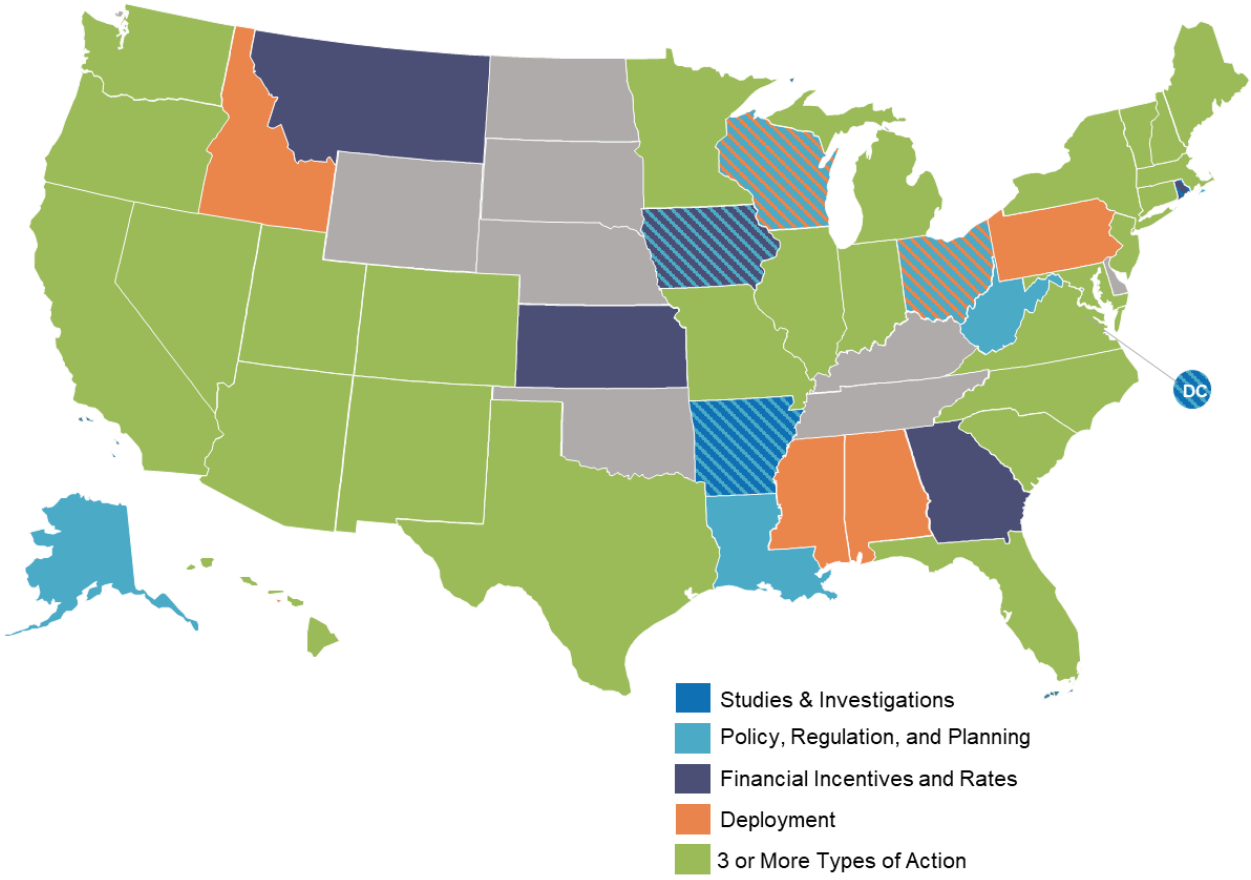


Figure 5. Q1 2021 Energy Storage Action, by Action Type



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
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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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