50 States of GRID MODERNIZATION

Q1 2022 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 2022 GRID MODERNIZATION ACTION

In the first quarter of 2022, 49 states plus DC took a total of 578 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 578 actions catalogued, the most common were related to deployment (128), policies (104), and financial incentives (103).

Table 1. Q1 2022 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Deployment	128	22%	34
Policies	104	18%	34 + DC
Financial Incentives	103	18%	34
Business Model and Rate Reform	96	17%	38 + DC
Planning and Market Access	74	13%	25 + DC
Studies and Investigations	73	13%	31 + DC
Total	**578**	**100%**	**49 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 2022

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

Virginia Regulators Approve Dominion Energy's Grid Transformation Plan

In January 2022, the Virginia State Corporation Commission approved Dominion Energy's Phase II Grid Transformation Plan. The $666.5 million plan includes investments in AMI, a customer information platform, a DER management system, intelligent grid devices, fault isolation and service restoration, voltage optimization, and cybersecurity. Dominion has also provided a timeline for system-wide implementation of time-varying rates and an opt-in system-wide peak time rebate program.

Grid Modernization Roadmap Released in New Mexico

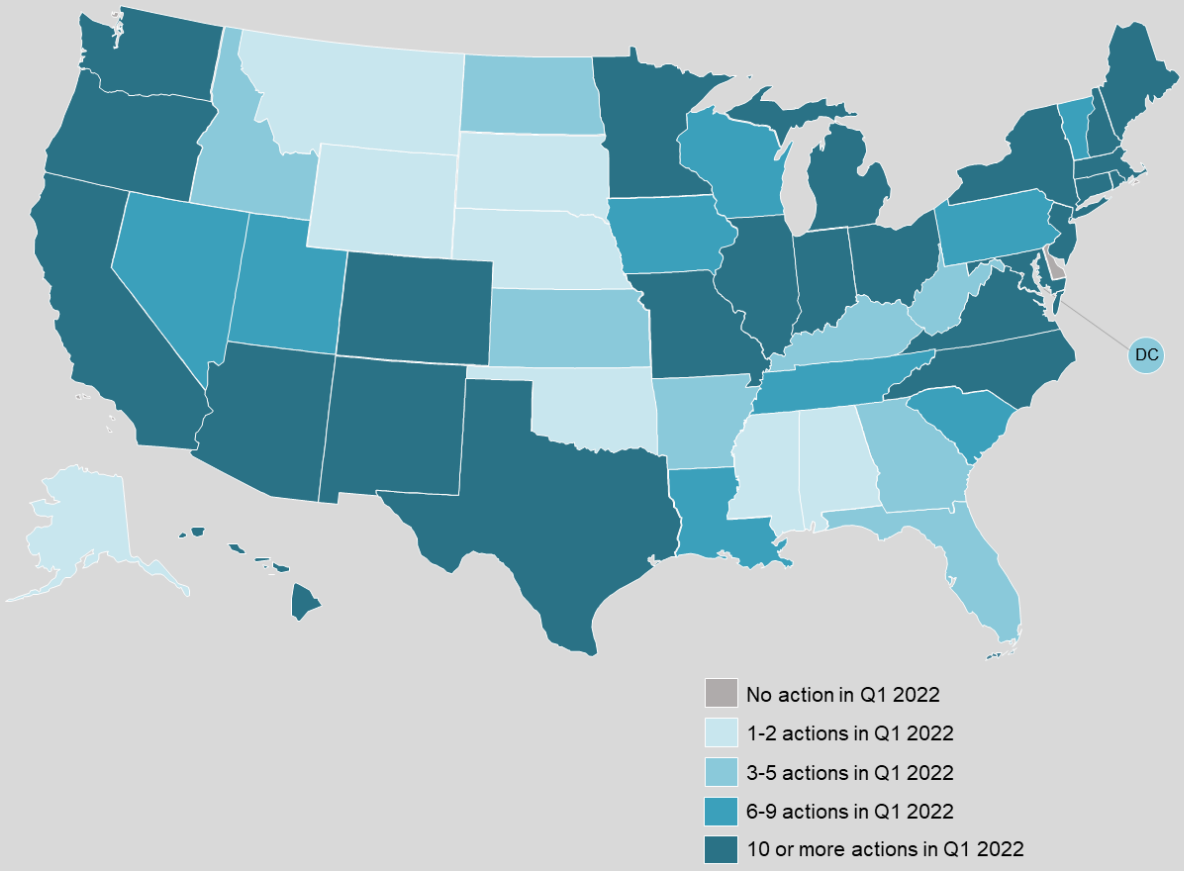
The New Mexico Energy, Minerals, and Natural Resources Department released its grid modernization roadmap in January 2022, following a working group process. The roadmap

includes a number of consensus recommendations, including investing in AMI, updating interconnection rules and advanced inverter standards, creating a transmission planning group, and strategically deploying energy storage.

Hawaii PUC Approves Bring Your Own Device Tariff Framework

The Hawaii Public Utilities Commission issued an order in January 2022, establishing an advanced DER tariff offering, which will be a Bring Your Own Device tariff. The tariff will include three enrollment options – Level 1 will involve participants making certain dispatch commitments, Level 2 will involve the utility controlling dispatch for a predetermined number of events, and Level 3 will involve compensation for system grid services. The details of these tariff options will be addressed further in Phase 2 of the proceeding.

Figure 1. Q1 2022 State and Utility Action on Grid Modernization



Maine and New Hampshire Regulators Address Statewide Energy Data Platforms

The Maine Public Utilities Commission completed its report on the feasibility of a statewide energy data platform during Q1 2022, finding that there is no existing solution that can provide the desired functionality and that the cost and complexity for such a platform would be

significant. Meanwhile, New Hampshire regulators approved a design and framework for a statewide energy data platform authorized by 2019 legislation.

New Jersey Regulators Approve AMI Deployment for Jersey Central Power & Light

The New Jersey Board of Public Utilities issued an order in February 2022, approving Jersey Central Power & Light's proposed deployment of AMI throughout its service territory. The utility will install 1.15 million advanced meters, totaling $390 million in capital investment. The decision also specifies that customer AMI usage data belongs to the customer, who may share it with third parties.

MOST ACTIVE STATES AND SUBTOPICS OF Q1 2022

The most common types of actions across the country related to energy storage deployment (80), utility business model reforms (51), smart grid deployment (43), advanced metering infrastructure deployment (35), and time-varying rates (30).

The states taking the greatest number of actions related to grid modernization in Q1 2022 can be seen in Figure 4. New York, Massachusetts, California, Illinois, and Minnesota saw the most action during the quarter, followed by Michigan, Hawaii, Washington, Connecticut, and Missouri. Overall, 49 states, plus DC, took actions related to grid modernization in Q1 2022.

TOP GRID MODERNIZATION TRENDS OF Q1 2022

States Examining Decommissioning and Recycling of Energy Storage Systems

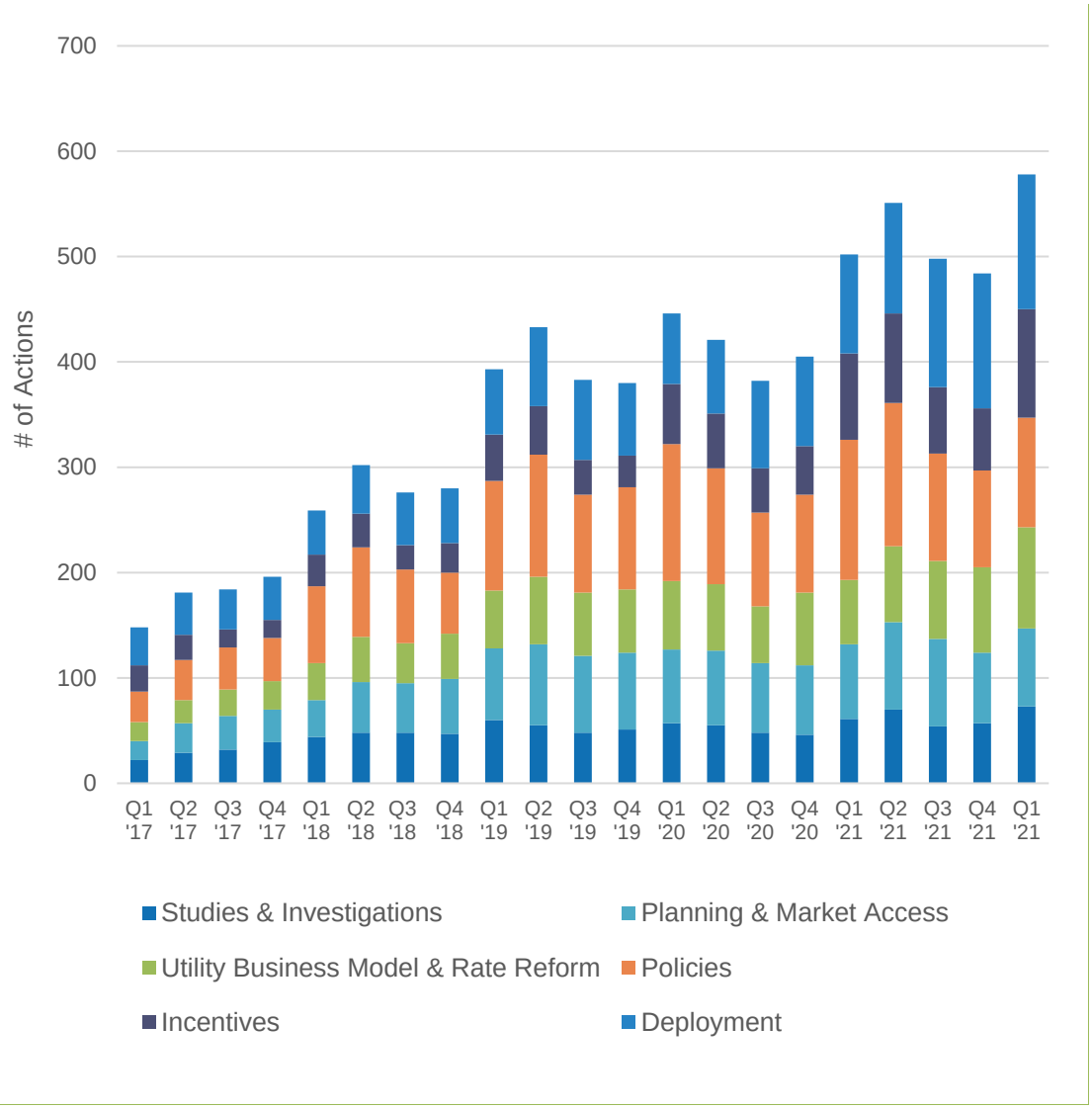
State legislatures considered numerous bills during Q1 2022 calling for the examination of decommissioning and recycling processes for energy storage systems. South Carolina lawmakers enacted a bill directing the Department of Health and Environmental Control to develop regulations to manage the decommissioning of solar and energy storage systems in excess of 13 acres. In Virginia, state legislators enacted bills requiring that the State Corporation Commission create a task force to analyze the life cycle of energy facilities including solar, wind, and/or battery storage. The study is to address recycling and salvage opportunities, waste strategies, and decommissioning. Legislation introduced in Tennessee would require a study that addresses end-of-life management for energy storage systems, while a Louisiana bill would establish decommissioning requirements for solar facilities, including those with energy storage.

Utilities Pursuing Resiliency-As-A-Service Programs

A growing number of utilities are requesting approval for "resiliency-as-a-service" programs involving customer-sited, utility-owned battery storage. In California, Liberty Utilities filed an application for a customer resiliency program, including a behind-the-meter battery energy

storage offering targeting medical baseline, critical infrastructure, and large commercial segments. Liberty Utilities will own and maintain the storage systems, with participants making monthly payments. Xcel Energy filed an application with Colorado regulators to implement a resiliency service program tariff, providing utility-owned battery storage or other resiliency assets to commercial customers. DTE Electric proposed a customer-sited, utility-owned residential and commercial battery storage program in Michigan, and Georgia Power is currently developing a resilience asset service tariff to provide utility-owned distributed energy resources to commercial and industrial customers.

Figure 2. Total Number of Grid Modernization Actions by Quarter



State Legislators Exploring Financing and Incentives for Resiliency Improvements

Across the country, state legislators have been considering new incentives and financing opportunities for resiliency improvements, including battery storage and microgrids. Legislation introduced in Louisiana would establish a disaster resiliency and grid stability battery incentive

program, while a bill that did not advance in Florida would have created an energy security and disaster resilience pilot focused on solar-plus-storage for critical disaster resilience facilities. A Colorado bill would create a grant program to support microgrids for community resilience, and a bill introduced in California would provide grants to help local governments develop community energy resilience plans. Several states considered bills that would allow resiliency improvements to qualify for property assessed clean energy financing, with bills in Alaska and Pennsylvania advancing through one chamber and bills in Virginia and Wisconsin being signed into law.

Figure 3. Most Common Types of Actions Taken in Q1 2022

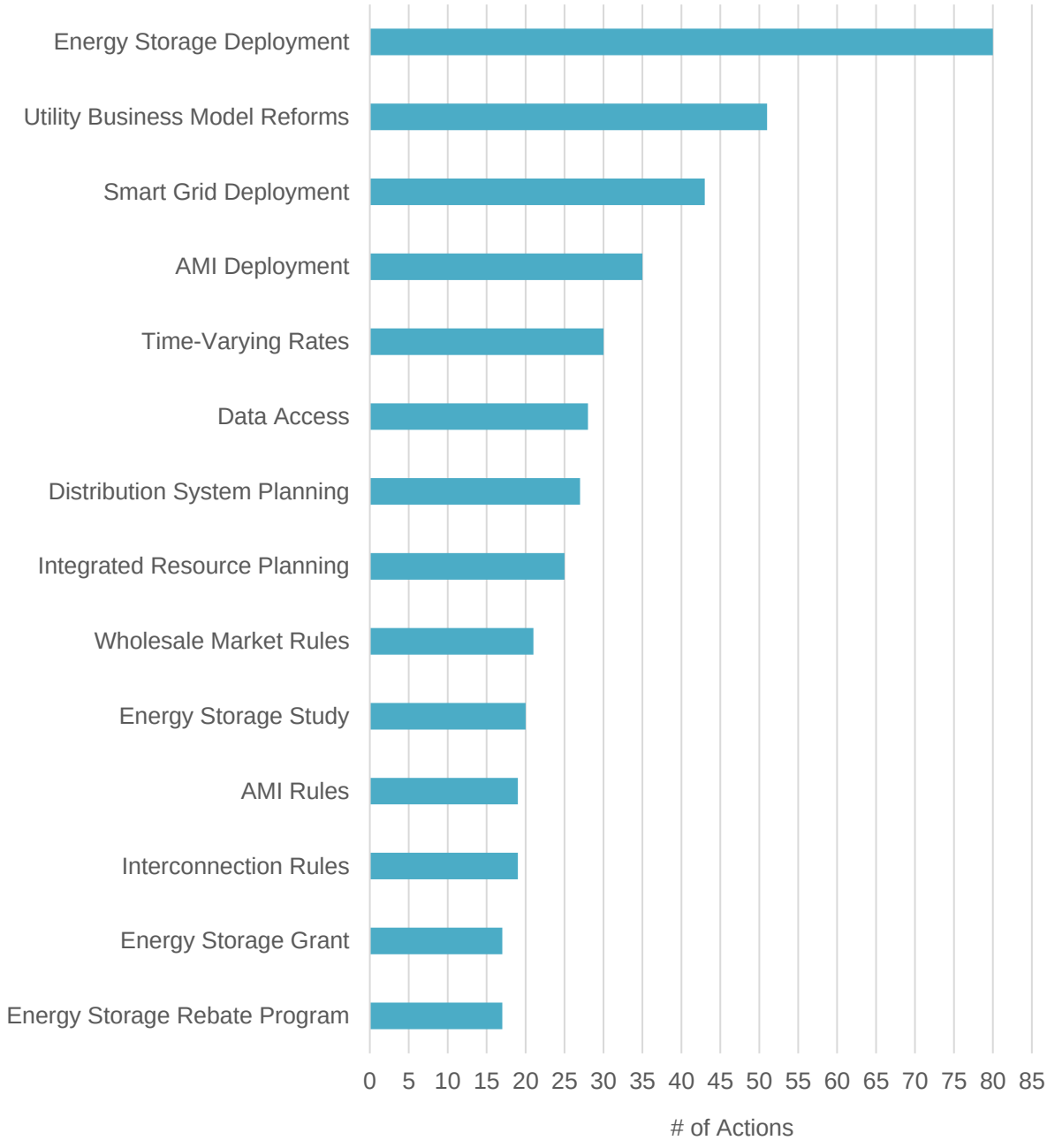


Figure 4. Most Active States of Q1 2022

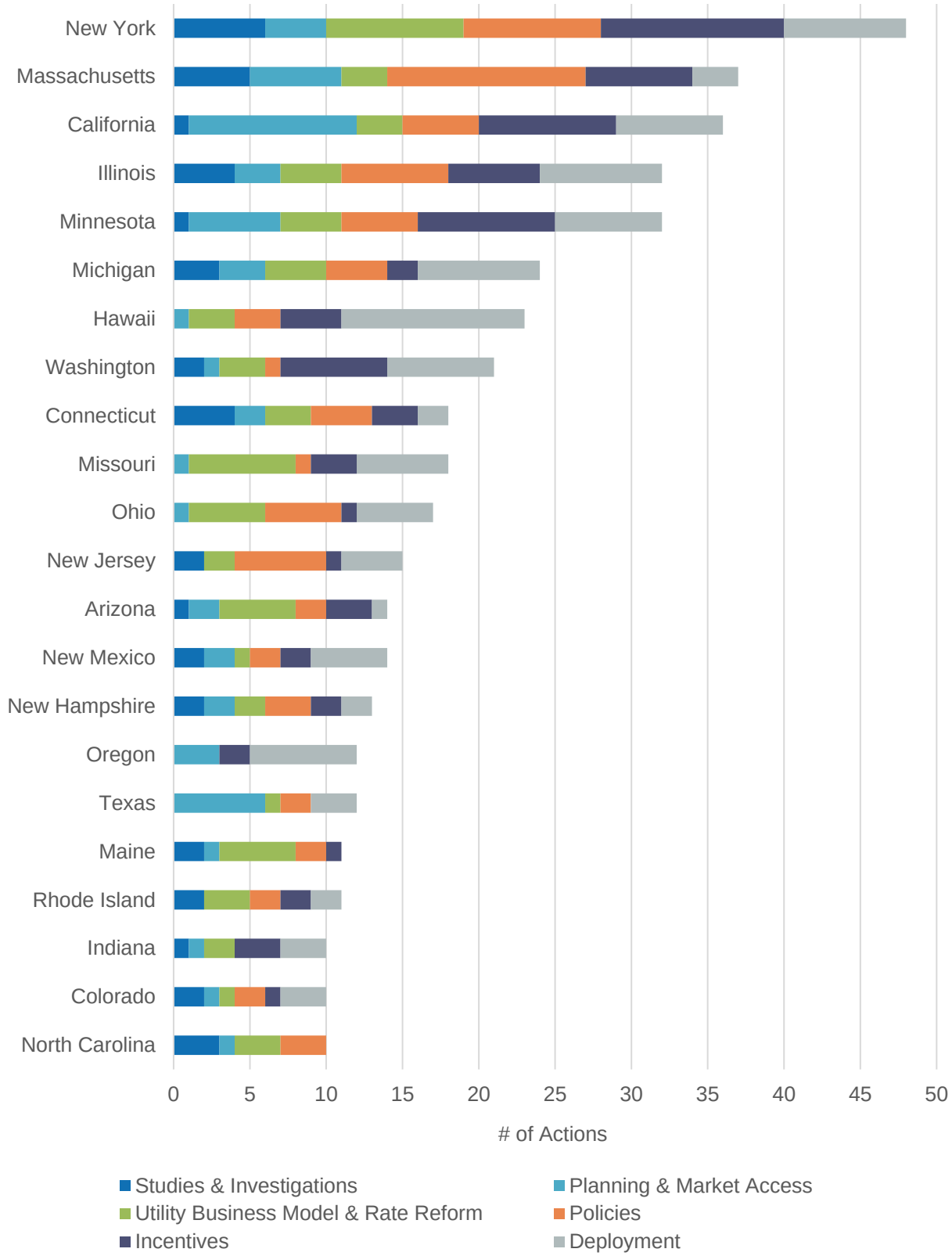
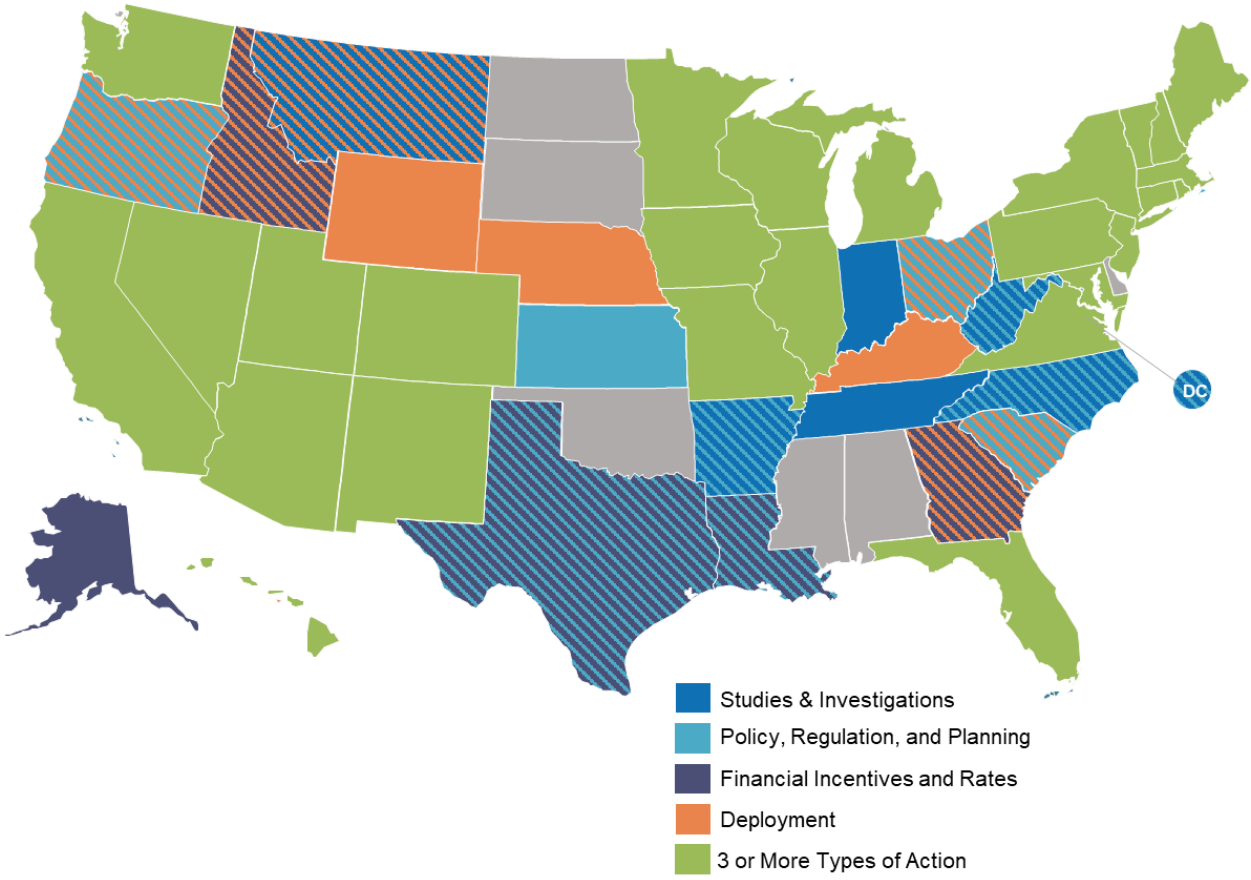


Figure 5. Q1 2022 Energy Storage Action, by Action Type



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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- Identify new market opportunities, as well as changing and risky markets
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- Give your own team a head start in tracking legislative and regulatory proceedings

Investor-Owned and Public Power Utilities

- 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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