50 STATES OF GRID MODERNIZATION

Q1 2024 Quarterly Report

Executive Summary

NC CLEAN ENERGY TECHNOLOGY CENTER | DSIRE insight

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AUTHORS

Emily Apadula
Rebekah de la Mora
Justin Lindemann
Brian Lips
Vincent Potter
Autumn Proudlove
David Sarkisian

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.

CONTACT

Autumn Proudlove (afproudl@ncsu.edu)

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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*, *The 50 States of Electric Vehicles,* and *The 50 States of Power Decarbonization*. 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 2024 GRID MODERNIZATION ACTION

In the first quarter of 2024, 49 states plus DC and Puerto Rico took a total of 567 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 567 actions catalogued, the most common were related to policies (133), financial incentives (108), and utility business model and rate reform (93).

Table 1. Q1 2024 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Policies	133	23%	34 + PR
Financial Incentives	108	19%	37 + PR
Business Model and Rate Reform	93	16%	37
Studies and Investigations	81	14%	30 + DC, PR
Deployment	80	14%	32
Planning and Market Access	72	13%	25 + DC, PR
Total	**567**	**100%**	**49 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 Q1 2024

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

Maryland Lawmakers Pass Legislation Advancing Virtual Power Plants

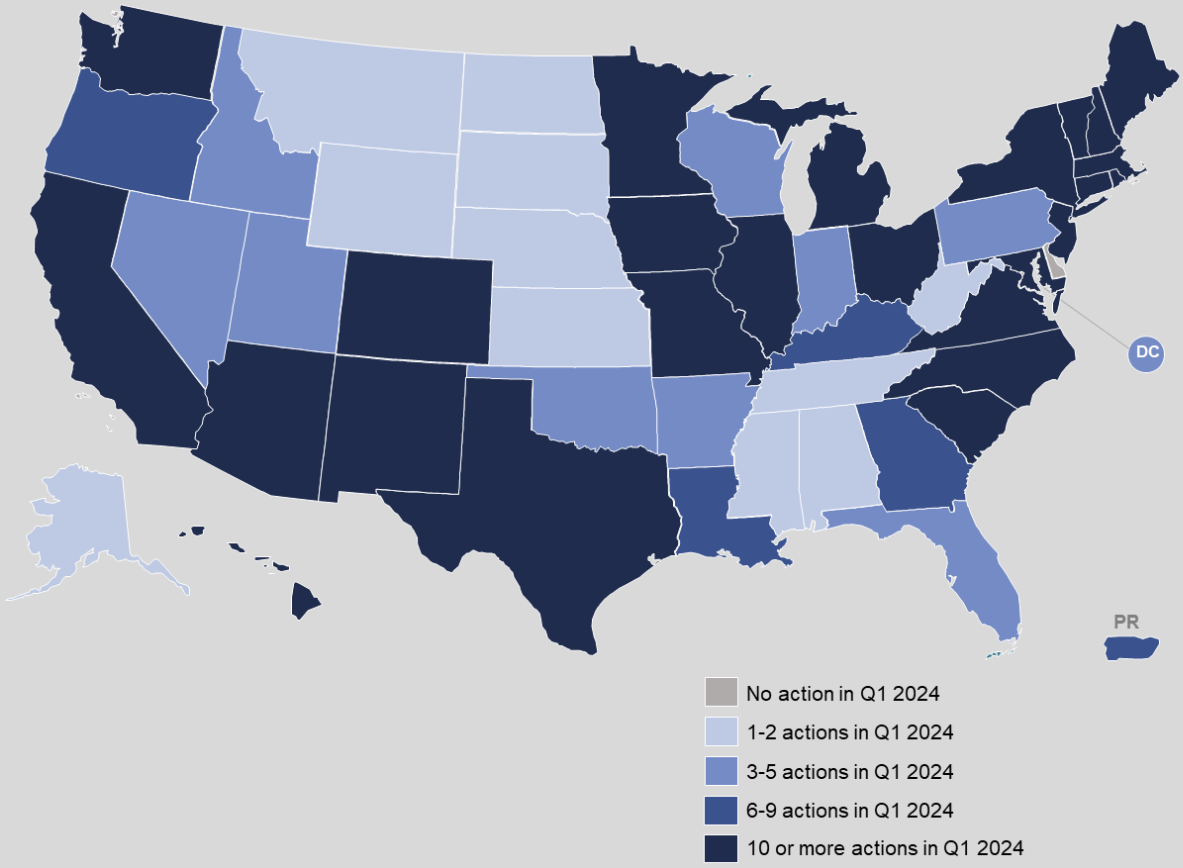
Lawmakers in Maryland passed the Distributed Renewable Integration and Vehicle Electrification (DRIVE) Act, which directs the Public Service Commission to develop a program for utilities to establish virtual power plant pilots to compensate owners and aggregators of distributed energy resources for distribution system support services. Each investor-owned utility is to submit a pilot program or temporary tariff proposal by July 1, 2025.

Massachusetts Utilities File Final Electric Sector Modernization Plans

In Massachusetts, Eversource, National Grid, and Unitil filed their final electric sector modernization plans in January 2024. The plans each include a variety of programs and investments, such as virtual power plant programs, advanced distribution management system

and distributed energy resource management system investments, resilience upgrades, heat pump integration, and non-wires alternative projects.

Figure 1. Q1 2024 State and Utility Action on Grid Modernization



Connecticut Regulators Move Forward on AMI and Performance Incentive Mechanisms

In early Q1 2024, the Connecticut Public Utilities Regulatory Authority (PURA) issued a decision setting guidelines for utilities' advanced metering infrastructure plans, including a directive to include advanced time-of-use rates and utilize Green Button Connect functionality. Later in the quarter, PURA filed a straw proposal on performance incentive mechanisms (PIMs), which includes four PIMs based on non-wires solutions, equitable reliability, distributed energy resource interconnection, and avoided service terminations.

Colorado Public Utilities Commission Approves Guidelines for Virtual Power Plants

The Colorado Public Utilities Commission recently approved guidelines and directives for virtual power plant implementation in Xcel Energy's service territory. The decision sets forth

objectives for a virtual power plant pilot program and supports the utility issuing an RFP for a distributed energy resource management system . The pilot is to run from October 2024 through October 2026.

Maine Releases Studies Energy Storage Studies

The Governor's Energy Office released its final long-duration energy storage study in February 2024, which identifies a number of policy considerations and actions for the state to support long-duration storage. The Public Utilities Commission also released a study in March 2024 examining utility control or ownership of energy storage, finding that utility ownership of storage should only be allowed under certain circumstances.

MOST ACTIVE STATES AND SUBTOPICS OF Q1 2024

The most common types of actions across the country related to energy storage deployment (52), utility business model reforms overall (49), performance-based regulation (26), interconnection rules (24), distribution system planning (23), and time-varying rates (23).

The states taking the greatest number of actions related to grid modernization in Q1 2024 can be seen in Figure 4. New York, Massachusetts, Michigan, California, Connecticut, and New Jersey saw the most action during the quarter, followed by Hawaii, Minnesota, Illinois, Missouri, Maine, New Hampshire, and Ohio. Overall, 49 states, plus DC and Puerto Rico, took actions related to grid modernization in Q1 2024.

TOP GRID MODERNIZATION TRENDS OF Q1 2024

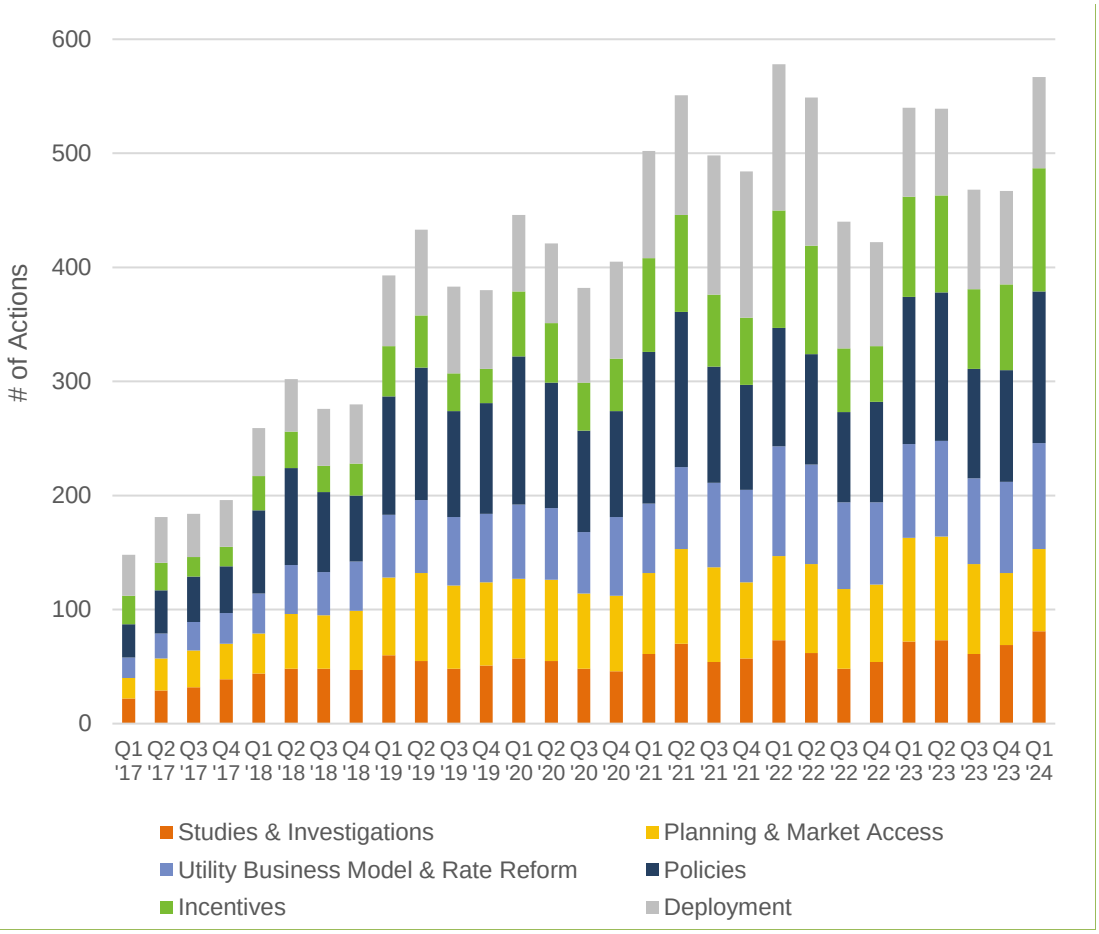
States Consider the Use of Grid-Enhancing Technologies

A notable trend during Q1 2024 was that of states considering the use of grid-enhancing technologies to expand transmission capacity. Virginia lawmakers enacted a bill requiring utility integrated resource plans to include a comprehensive assessment of the application of grid-enhancing technologies and advanced conductors. In Maine, legislators enacted a bill requiring the Public Utilities Commission to conduct a review of available grid-enhancing technologies that large investor-owned utilities may use to reduce investment needs in grid infrastructure. In Minnesota, lawmakers introduced bills requiring utilities to file plans regarding the implementation of grid-enhancing technologies to prevent grid congestion at the transmission level, and in New York, legislators introduced bills that would allow the Department of Public Service to approve requests from distribution companies to develop grid enhancement technologies. Other states considering legislation initiating studies on grid enhancing technologies include Connecticut and New Hampshire.

States Establishing Frameworks to Develop Virtual Power Plants

Although many virtual power plant programs to date have been established on a utility-by-utility basis, a growing number of state policymakers and regulators are taking steps to develop overarching frameworks for virtual power plants in their states. In Pennsylvania, regulators issued an advanced notice of proposed rulemaking seeking input on virtual power plants as a potential resource for the state. Meanwhile, Maryland lawmakers passed a bill directing the Public Service Commission to develop a program for utilities to establish virtual power plant pilots, with each investor-owned utility required to propose a pilot or temporary tariff by July 1, 2025. In Colorado, the Public Utilities Commission issued a decision outlining rules for virtual power plant pilots and acquisition. Regulators in California and Hawaii are also advancing expansive programs to promote virtual power plants.

Figure 2. Total Number of Grid Modernization Actions by Quarter



States Evaluating Microgrid Potential and Program Design

A growing number of states are evaluating the potential for microgrids to provide resilience or other benefits in their states. The Colorado Energy Office is currently developing a microgrid roadmap, which will examine how microgrids can improve grid resilience and reliability in the

state. In New Hampshire, lawmakers passed a bill requiring the state's Department of Energy to study the potential benefits, risks, and other factors of developing a microgrid framework, and the Rhode Island Public Utilities Commission recently issued an RFP for a consultant to conduct a study related to microgrid program design. Meanwhile, the Puerto Rico Energy Bureau is examining revisions to its existing microgrid revisions, and Arizona regulators issued a decision prohibiting Arizona Public Service from providing microgrid services. Lawmakers in California, Iowa, New Jersey, and New York also considered legislation related to microgrid studies during the quarter.

Figure 3. Most Common Types of Actions Taken in Q1 2024

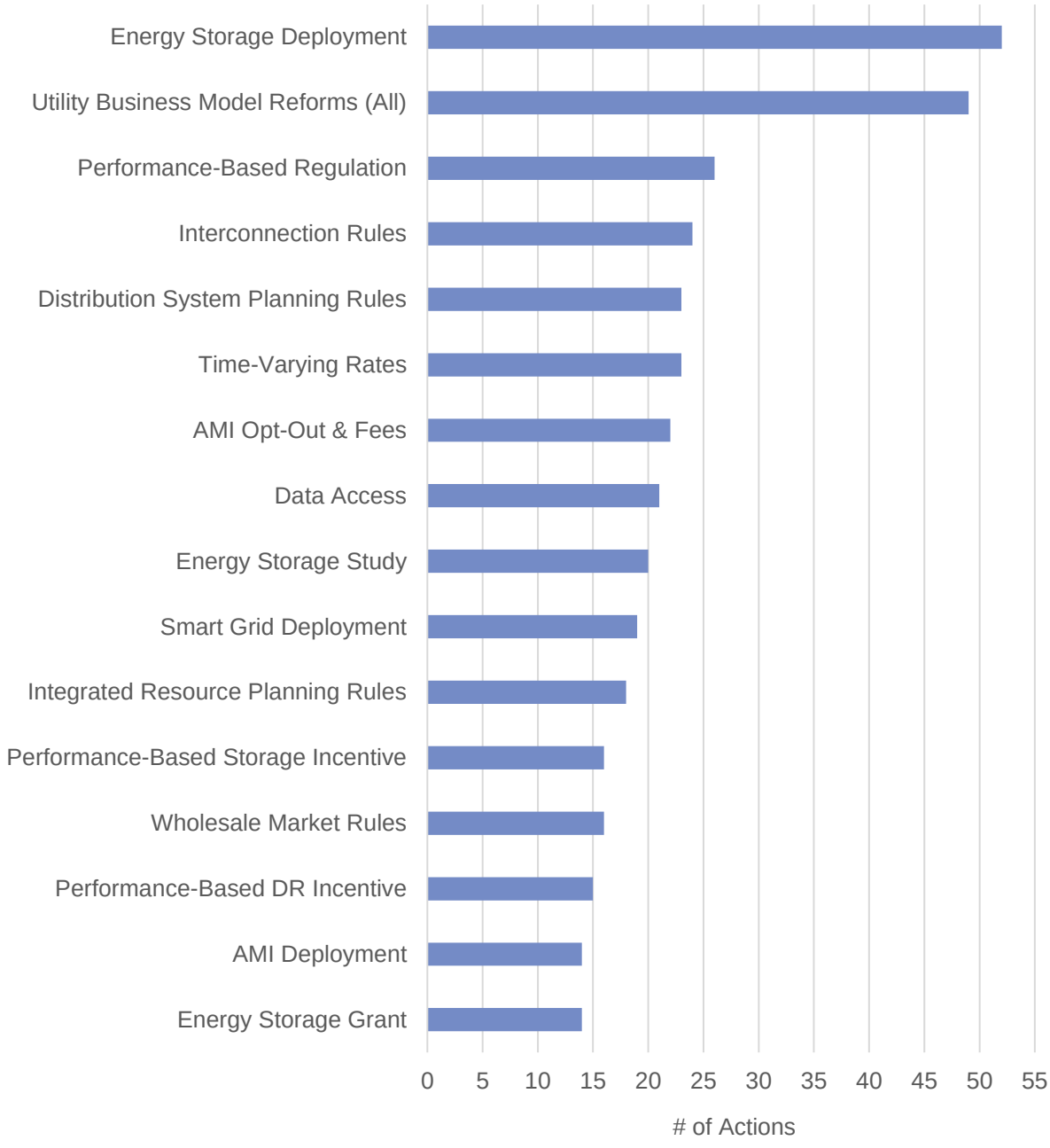


Figure 4. Most Active States of Q1 2024

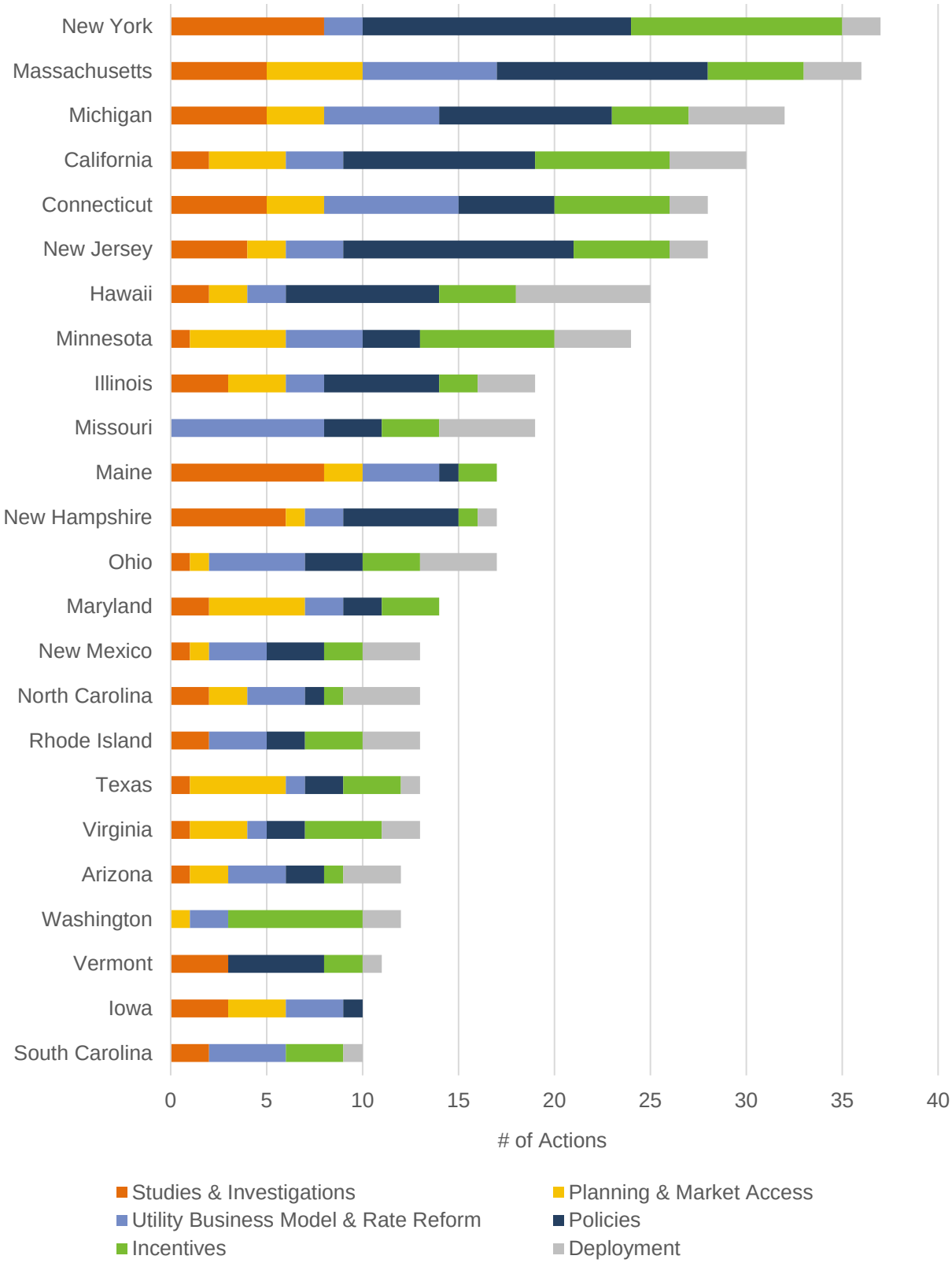
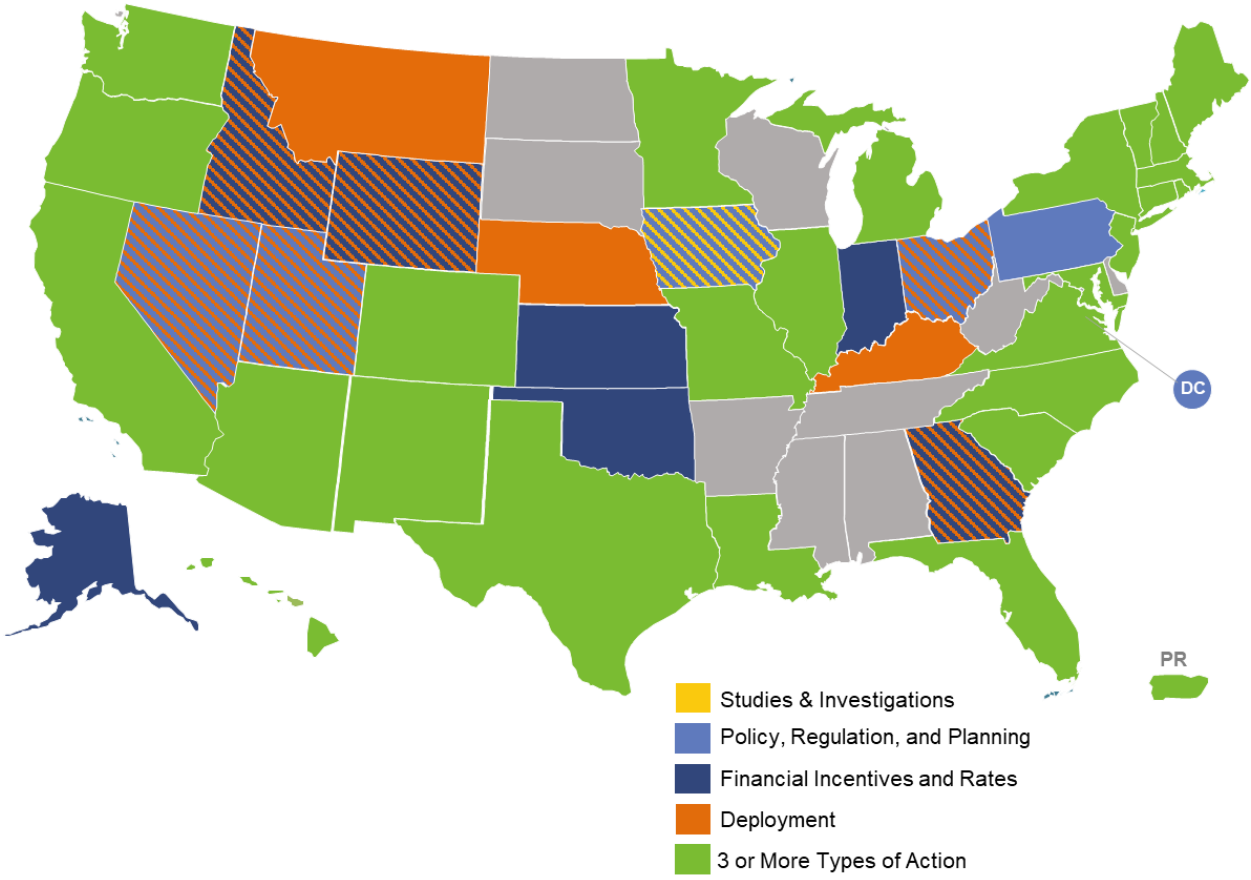


Figure 5. Q1 2024 Energy Storage Action, by Action Type



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

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- 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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