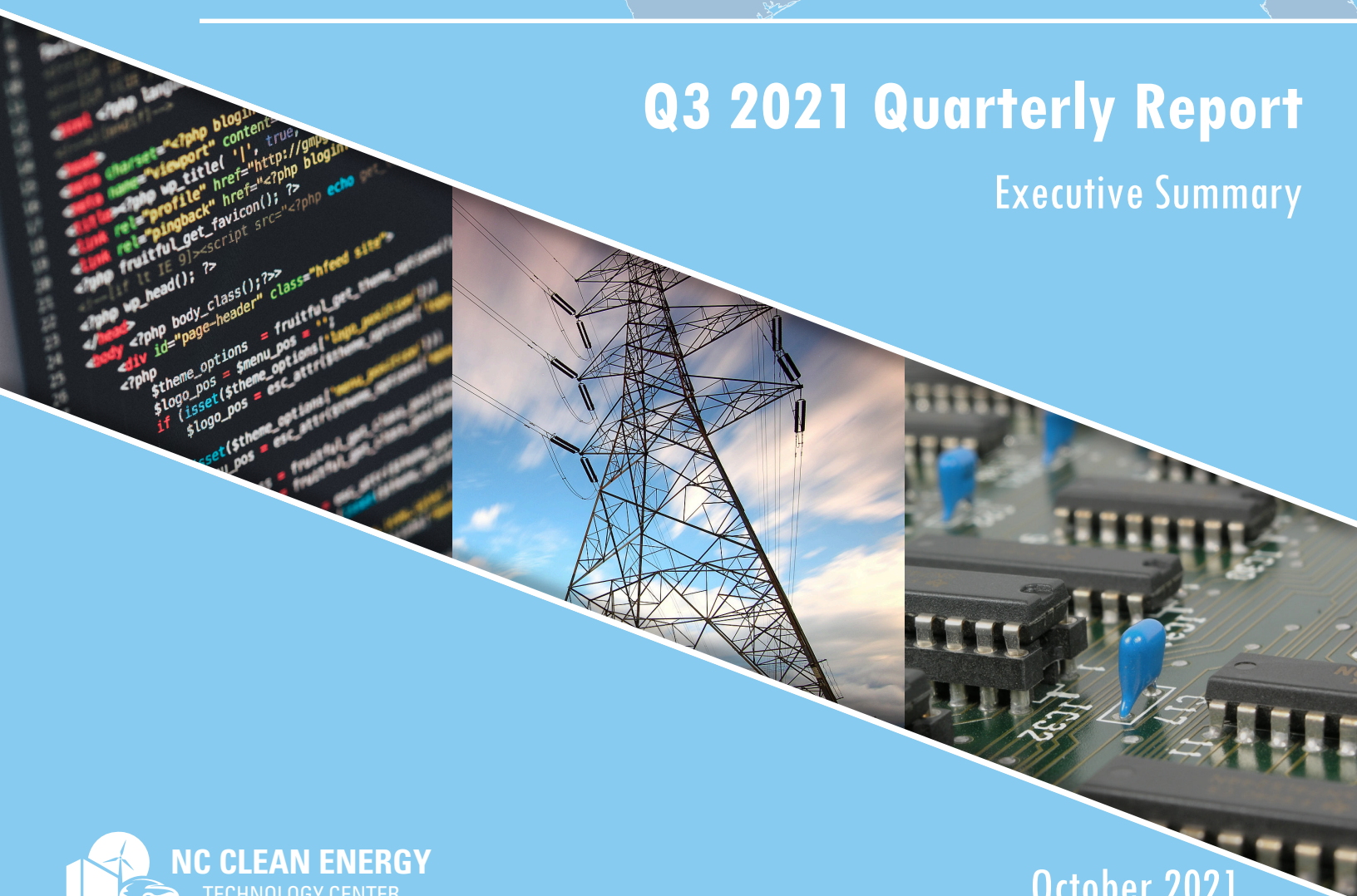


50 States of GRID MODERNIZATION

Q3 2021 Quarterly Report

Executive Summary



AUTHORS

Autumn Proudlove
Brian Lips
Meghann Papsdorf
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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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 2021 GRID MODERNIZATION ACTION

In the third quarter of 2021, 48 states plus DC took a total of 498 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 498 actions catalogued, the most common were related to deployment (122), policies (102), and planning and market access (83).

Table 1. Q3 2021 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Deployment	122	25%	39
Policies	102	21%	27 + DC
Planning and Market Access	83	17%	23 + DC
Business Model and Rate Reform	74	15%	36 + DC
Financial Incentives	63	13%	24
Studies and Investigations	54	11%	25 + DC
Total	498	100%	48 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 2021

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

Massachusetts Utilities File Grid Modernization Plans

Massachusetts’ three investor-owned utilities, Eversource, National Grid, and Unitil, filed their 2022-2025 Grid Modernization Plans in July 2021. The utilities’ plans include advanced metering infrastructure deployment, as well as a variety of distribution system investments, such as advanced distribution management systems and distributed energy resource management systems. Eversource’s plan totals approximately \$818.8 million in investment, while National Grid’s plan is \$796.93 million and Unitil’s is \$24.786 million.

Illinois Lawmakers Enact Expansive Clean Energy Legislation

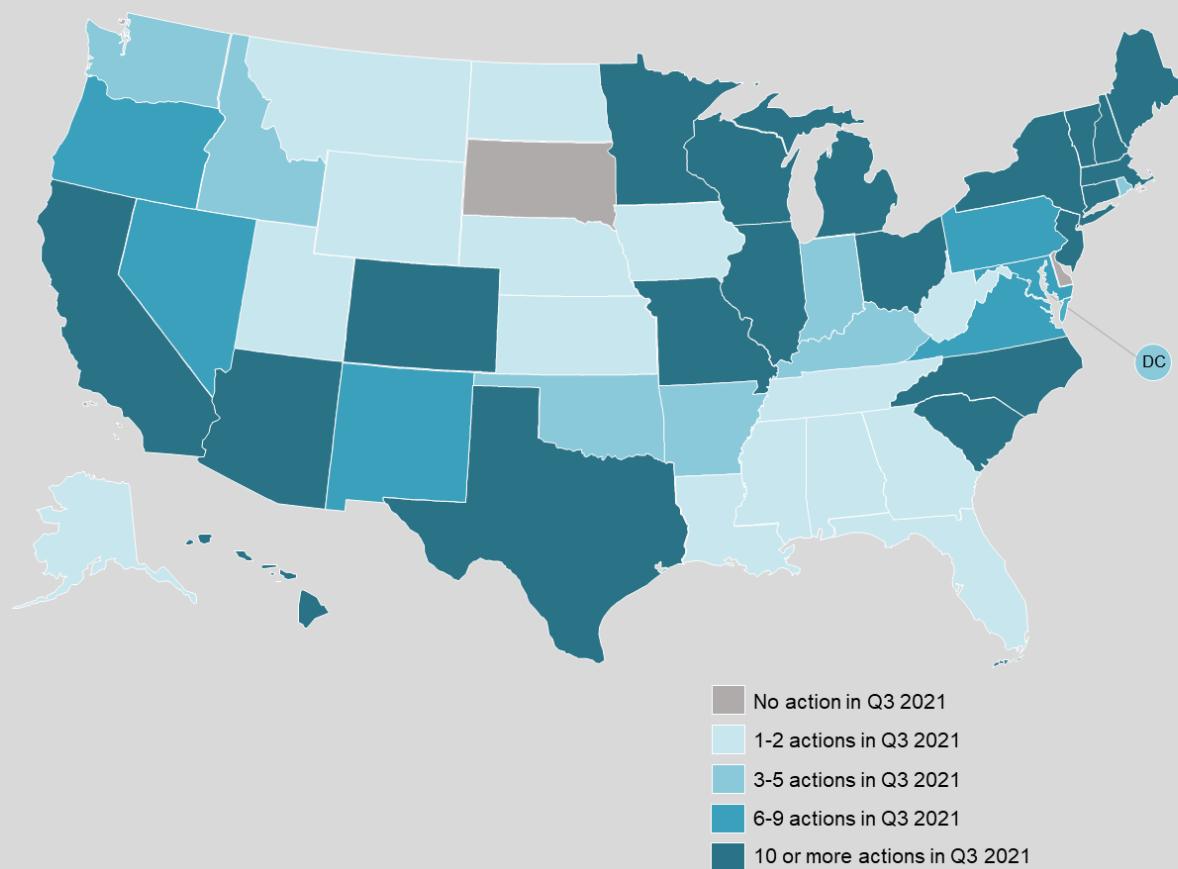
Illinois legislators enacted an expansive clean energy bill in September 2021, which requires utilities to prepare integrated grid plans beginning in 2023, as well as beneficial electrification

plans. The Commission is also to establish a comprehensive performance-based ratemaking framework for utilities serving more than 500,000 customers. The bill also calls for an energy storage investigation with recommendations for deployment targets.

Connecticut Regulators Approve Energy Storage Incentive Program

The Connecticut Public Utilities Regulatory Authority approved a new energy storage incentive program in July 2021. The program includes an upfront declining block incentive for residential customers and a single block for commercial and industrial customers, as well as performance-based incentives available to projects for ten years. The decision also adopts a statewide storage deployment target of 580 MW by 2030, which the incentives are designed to achieve.

Figure 1. Q3 2021 State and Utility Action on Grid Modernization



California Public Utilities Commission Approves Grid Modernization Investments for Southern California Edison

In August 2021, California regulators issued a decision in Southern California Edison’s general rate case, approving many of the utility’s proposed investments in engineering and planning software tools, a grid management system, automation projects, and communications

equipment. The Commission approved a total of \$424.67 million for these grid modernization investments, as well as expenses for energy storage projects.

Michigan Utilities File Distribution System Investment Plans

In Michigan, Indiana Michigan Power and DTE Electric filed final versions of their 2021-2025 distribution grid plans in September 2021. DTE's plan includes \$341 million in grid modernization investments, including distribution automation, advanced distribution management, and voltage optimization. Indiana Michigan Power's plan includes \$74 million for investment in advanced metering infrastructure, distribution automation, and conservation voltage reduction.

MOST ACTIVE STATES AND SUBTOPICS OF Q3 2021

The most common types of actions across the country related to energy storage deployment (74), smart grid deployment (45), utility business model reforms (44), advanced metering infrastructure deployment (38), and distribution system planning (36).

The states taking the greatest number of actions related to grid modernization in Q3 2021 can be seen in Figure 4. New York, Illinois, Massachusetts, California, Minnesota, and New Jersey saw the most action during the quarter, followed by Michigan, Missouri, North Carolina, and Hawaii. Overall, 48 states, plus DC, took actions related to grid modernization in Q3 2021.

TOP GRID MODERNIZATION TRENDS OF Q3 2021

Technology Deployment Leads the Way in Q3 2021

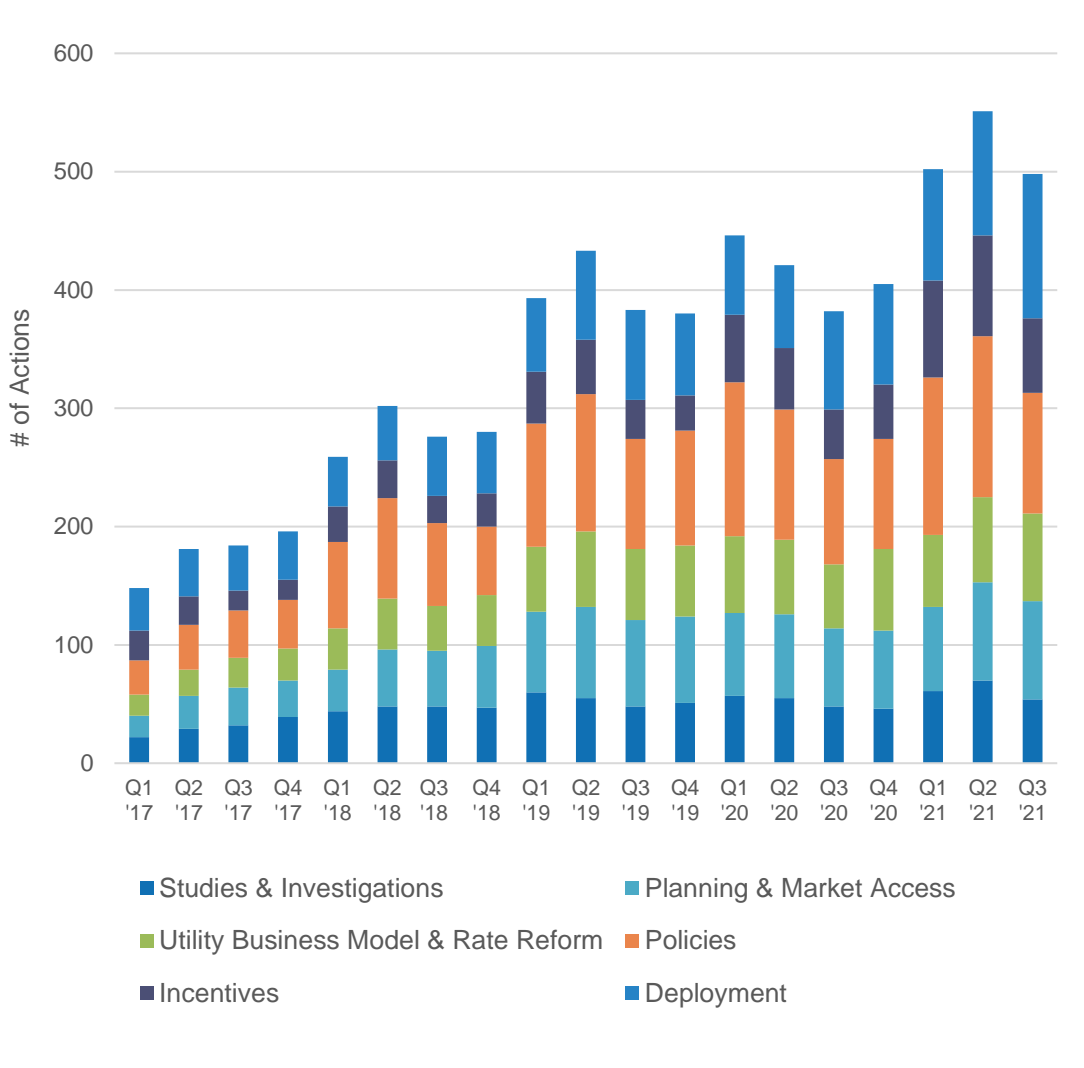
Technology deployment led grid modernization activity during Q3 2021, with energy storage deployment, smart grid deployment, and advanced metering infrastructure (AMI) deployment being three of the four top actions of the quarter. Utilities in at least eight states filed new requests to invest in grid modernization technologies. In Massachusetts, the state's three investor-owned utilities filed plans to deploy AMI and smart grid technologies, while SWEPCO and Xcel Energy in Texas submitted proposals to deploy AMI throughout their service territories. In Michigan, DTE Electric and Indiana Michigan Power filed their distribution grid plans, which include a variety of grid modernization investments. Indiana Michigan Power also requested approval for AMI deployment in Indiana. Numerous utilities, including Dominion Energy in Virginia, are also requesting approval for energy storage investments, and Xcel Energy has proposed new resiliency services tariffs in multiple states.

State Legislatures Authorizing Performance-Based Ratemaking

A growing trend across the U.S. has been state legislatures authorizing the use of performance-based ratemaking (PBR). Some of these states have even gone a step further to

require the development of a PBR framework for utilities. In October 2021, North Carolina lawmakers enacted legislation authorizing the use of PBR, including performance incentive mechanisms and multi-year rate plans. Illinois legislators also recently passed a major energy bill that requires the Illinois Commerce Commission to move to a comprehensive PBR process. Earlier this year, the Washington State Legislature enacted a bill directing the Utilities and Transportation Commission to develop a policy statement addressing alternatives to cost of service ratemaking, including performance incentive mechanisms. State legislators in Connecticut, Hawaii, and Nevada have also authorized or required the use of PBR.

Figure 2. Total Number of Grid Modernization Actions by Quarter



States Addressing Interconnection Standards for Energy Storage Systems

As increasing amounts of energy storage capacity is being added to the grid, states are examining interconnection standards for storage systems. Vermont regulators opened a new proceeding considering energy storage rules, including interconnection and permitting standards, during the quarter. New Hampshire lawmakers enacted a bill in August 2021

directing the Public Utilities Commission to adopt rules for interconnection of storage systems. The North Carolina Utilities Commission issued an order addressing the addition of energy storage systems to existing qualifying facilities. The order requires the installation of a second meter and an update to the certificate of public convenience and necessity, but only amendments to the existing PPA, rather than execution of a new PPA. Regulators in Illinois, Michigan, and Wisconsin are also among the states addressing interconnection standards for distributed resources, and recent Illinois legislation also calls for the creation of an interconnection working group, which will examine energy storage and other issues.

Figure 3. Most Common Types of Actions Taken in Q3 2021

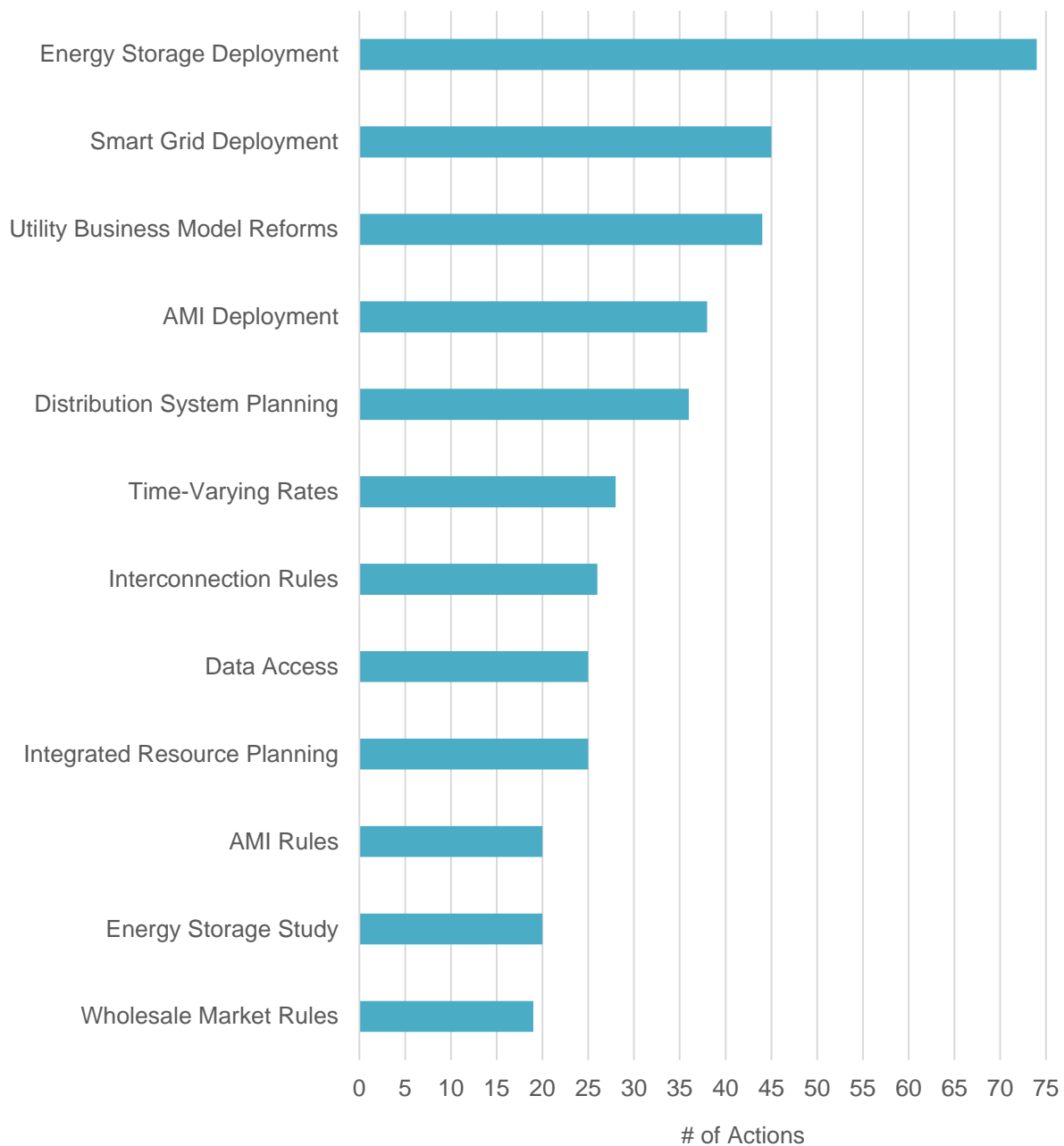


Figure 4. Most Active States of Q3 2021

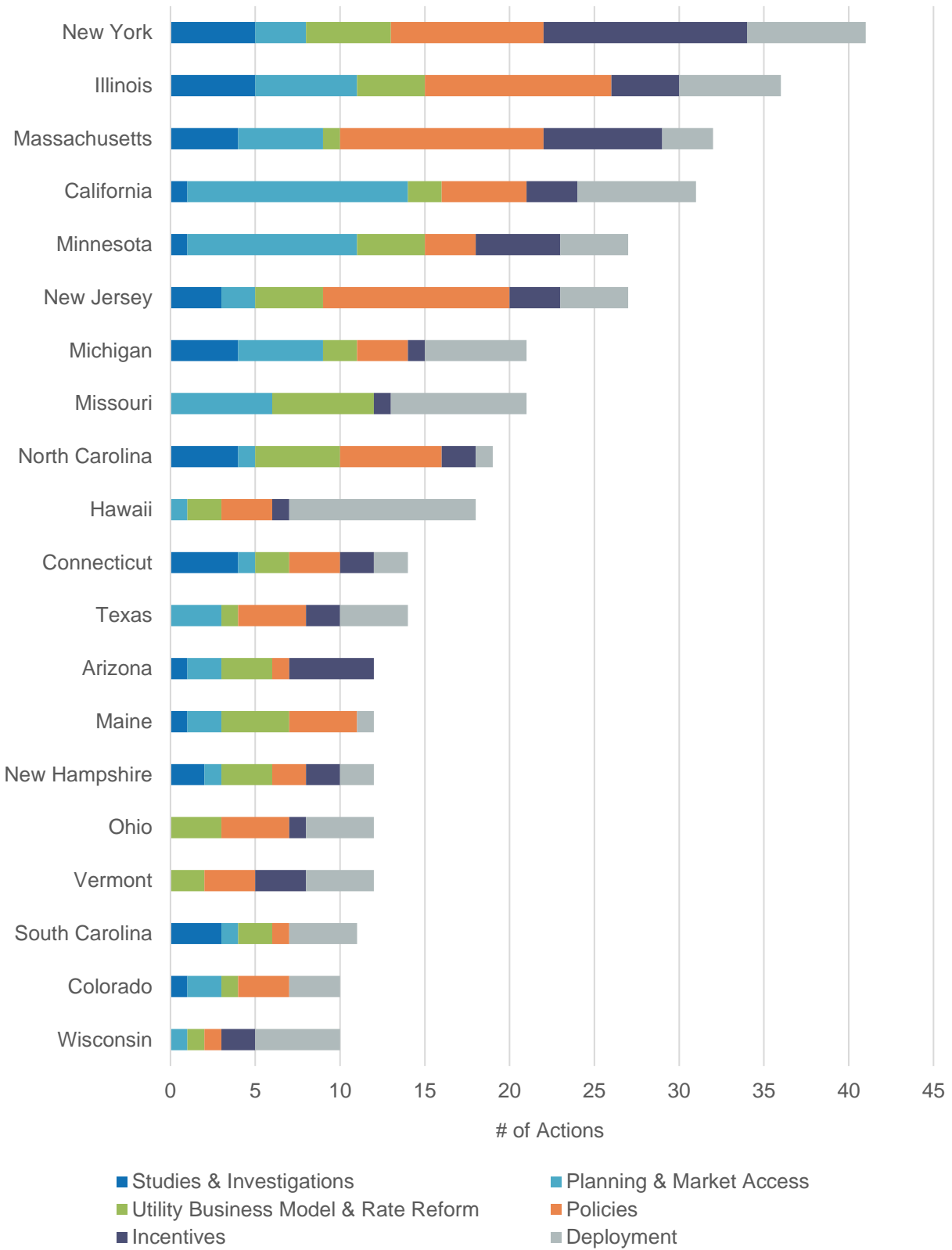
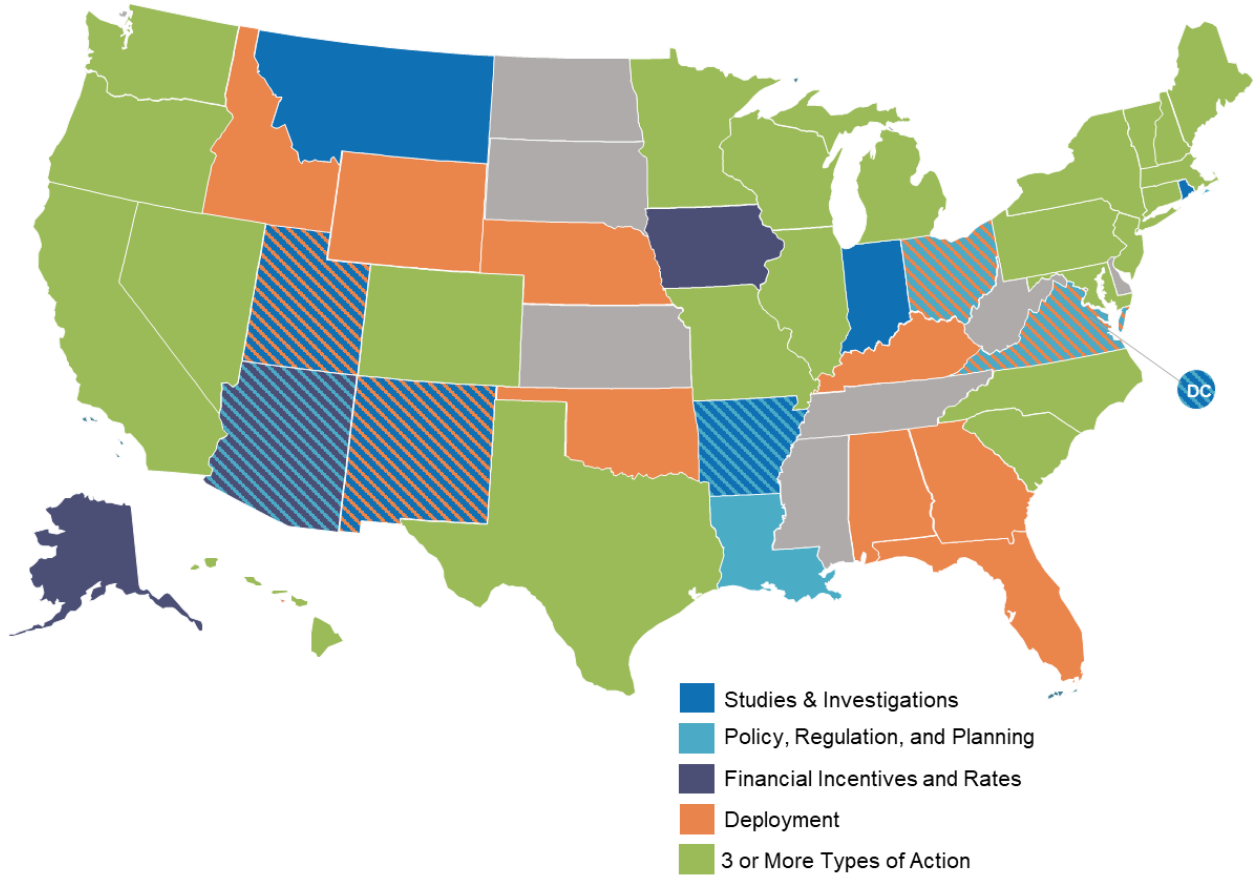


Figure 5. Q3 2021 Energy Storage Action, by Action Type



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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- Learn about the outcomes of other states' policy decisions
- Utilize an objective source of information in legislative and regulatory proceedings

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- 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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