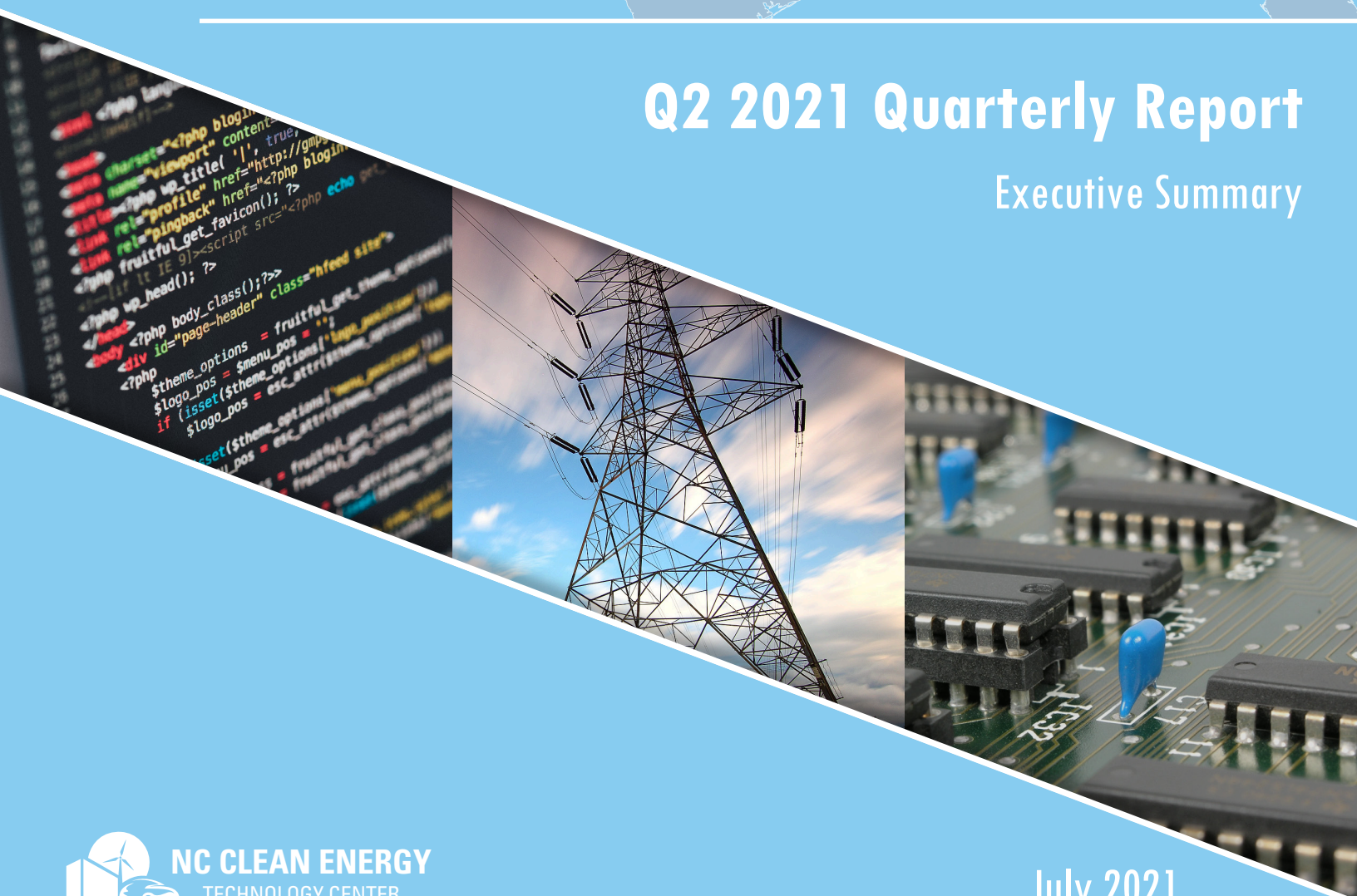


50 States of GRID MODERNIZATION

Q2 2021 Quarterly Report

Executive Summary



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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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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

Q2 2021 GRID MODERNIZATION ACTION

In the second quarter of 2021, 47 states plus DC took a total of 551 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 551 actions catalogued, the most common were related to policies (136), deployment (105), and financial incentives (85).

Table 1. Q2 2021 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Policies	136	25%	32 + DC
Deployment	105	19%	36
Financial Incentives	85	15%	32
Planning and Market Access	83	15%	25 + DC
Business Model and Rate Reform	72	13%	35 + DC
Studies and Investigations	70	13%	27 + DC
Total	551	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 Q2 2021

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

Connecticut and Maine Lawmakers Adopt Energy Storage Targets

State legislators in both Connecticut and Maine enacted bills adopting energy storage targets during Q2 2021. Connecticut’s legislation establishes a deployment target of 1,000 MW of storage by December 31, 2030, while Maine’s legislation sets a target of 400 MW by December 31, 2030. Both bills authorize the development of programs, such as rates and incentives, to help achieve these goals.

Nevada Legislators Direct Transmission Providers to Join an RTO by 2030

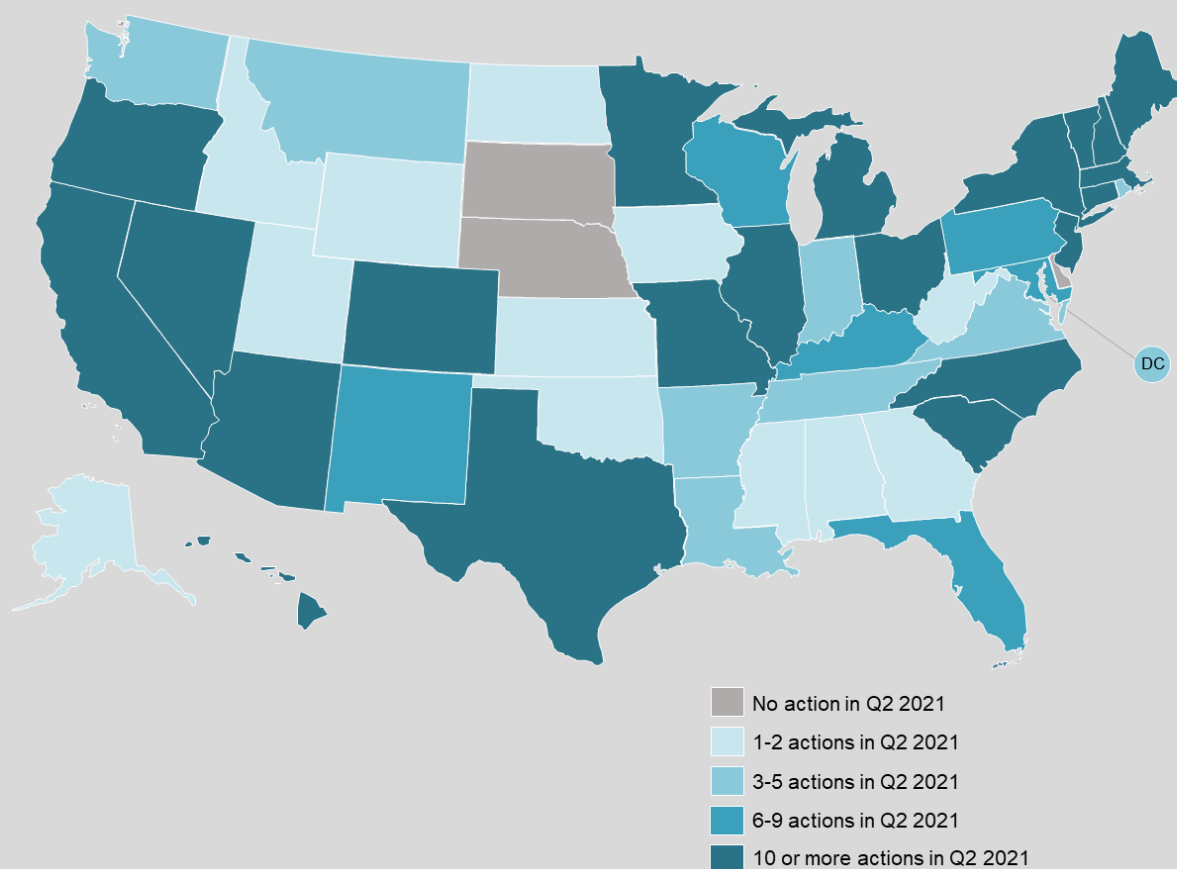
The Nevada Legislature enacted a bill directing transmission providers in the state to join a Regional Transmission Organization (RTO) by January 1, 2030. The bill also establishes the Regional Transmission Coordination Task Force to advise on the costs and benefits of joining

an RTO, as well as policies that will accommodate entrance into an RTO and site transmission facilities that are necessary to achieve the state's clean energy and economic development goals.

California Regulators Prepare to Modernize the Grid for a High-DER Future

In June 2021, the California Public Utilities Commission opened a proceeding to modernize the electric grid to prepare for a high number of distributed energy resources (DERs). The proceeding will be focused on integrating DERs while ensuring affordable rates. Three tracks are currently being addressed: distribution system operator roles and utility or aggregator business models, evolving the distribution resource planning frameworks into a more holistic process, and grid modernization investments for the near and medium terms.

Figure 1. Q2 2021 State and Utility Action on Grid Modernization



Hawaii Public Utilities Commission Approves Microgrid Services Tariff

Hawaii regulators approved a microgrid services tariff in May 2021, which will enable customers to participate in or develop microgrids. The tariff defines two types of microgrids: customer microgrids, where only customer infrastructure is used to supply electricity needs

during emergencies, and hybrid microgrids, where both customer and utility infrastructure may be used to supply electricity during an emergency.

Dominion Energy Files Phase II Distribution Grid Transformation Plan

In Virginia, Dominion Energy filed its Phase II Distribution Grid Transformation Plan in June 2021. The plan includes deployment of AMI, intelligent grid devices, distribution automation, a DER management system, voltage optimization, a customer information platform, and more. The total proposed investment is \$669.4 million capital costs and \$109.5 million in operations and maintenance costs.

MOST ACTIVE STATES AND SUBTOPICS OF Q2 2021

The most common types of actions across the country related to energy storage deployment (66), utility business model reforms (40), smart grid deployment (39), distribution system planning (33), and energy storage interconnection rules (31). Q2 2021 was the busiest quarter yet for grid modernization, with activity increasing in every category.

The states taking the greatest number of actions related to grid modernization in Q2 2021 can be seen in Figure 4. Texas, New York, California, Illinois, Minnesota, and New Jersey saw the most action during the quarter, followed by Massachusetts, Maine, Hawaii, and North Carolina. Overall, 47 states, plus DC, took actions related to grid modernization in Q2 2021.

TOP GRID MODERNIZATION TRENDS OF Q2 2021

States and Utilities Examining Electricity Market Reform

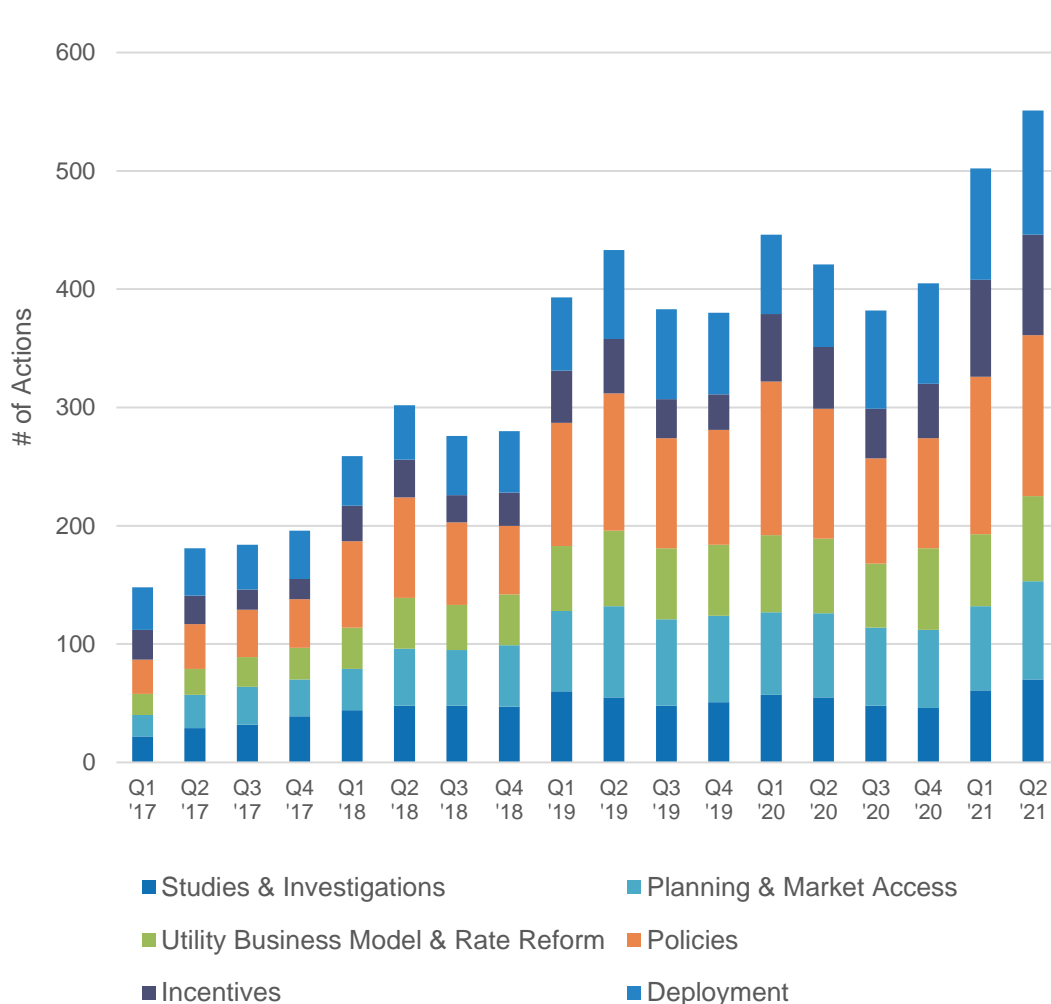
While the Federal Energy Regulatory Commission considers reforms to wholesale market rules, a growing number of states are examining their current membership in a wholesale market or exploring options to join or create a wholesale market. One notable proposal is the Southeast Energy Exchange Market, put forward by a number of southeastern utilities. Meanwhile, a study committee in South Carolina is reviewing electricity market reform measures, and a bill introduced in North Carolina would direct the Utilities Commission to study wholesale market reforms. In Colorado, a recently enacted bill requires electric cooperatives to participate in organized wholesale markets, while legislation enacted in Nevada requires transmission providers in the state to join a regional transmission organization (RTO). Mississippi regulators are also evaluating Entergy's membership in MISO, and the Missouri Public Service Commission is reviewing the costs and benefits of RTO membership.

Lawmakers Expanding Financing Options for Customer-Sited Technologies

State lawmakers in several states took steps to expand financing options for customer-sited energy technologies, and particularly energy storage, during the quarter. Property Assessed

Clean Energy (PACE) financing is one approach that was common among state lawmakers, with Maine, Nevada, and Tennessee enacting legislation making energy storage eligible for PACE financing programs. New Jersey legislation passed by the Assembly and Senate would also make energy storage systems and microgrids eligible improvements under the state’s PACE financing rules. Maine legislators also established the Maine Clean Energy and Sustainability Accelerator that will provide financing for projects reducing greenhouse gas emissions, including energy storage, microgrid, and smart grid projects.

Figure 2. Total Number of Grid Modernization Actions by Quarter



States Considering Ownership of Energy Storage and Microgrids

Some states are considering issues related to the ownership of energy storage systems and microgrids. In response to a proposal from Central Maine Power to own a battery storage system, regulators directed the utility and intervenors to consider alternative ownership models. Also in Maine, state lawmakers enacted a bill authorizing entities to construct, maintain, and operate microgrids without being classified as a public utility. In Texas, state

legislators considered several bills that would allow transmission and distribution utilities to own and operate battery storage facilities under certain circumstances. Texas lawmakers enacted one bill that allows transmission and distribution utilities to lease and operate storage systems for the purpose of restoring power to customers in a widespread outage. In Colorado, legislators enacted a bill creating the Colorado Electric Transmission Authority, which would be permitted to install and operate storage projects.

Figure 3. Most Common Types of Actions Taken in Q2 2021

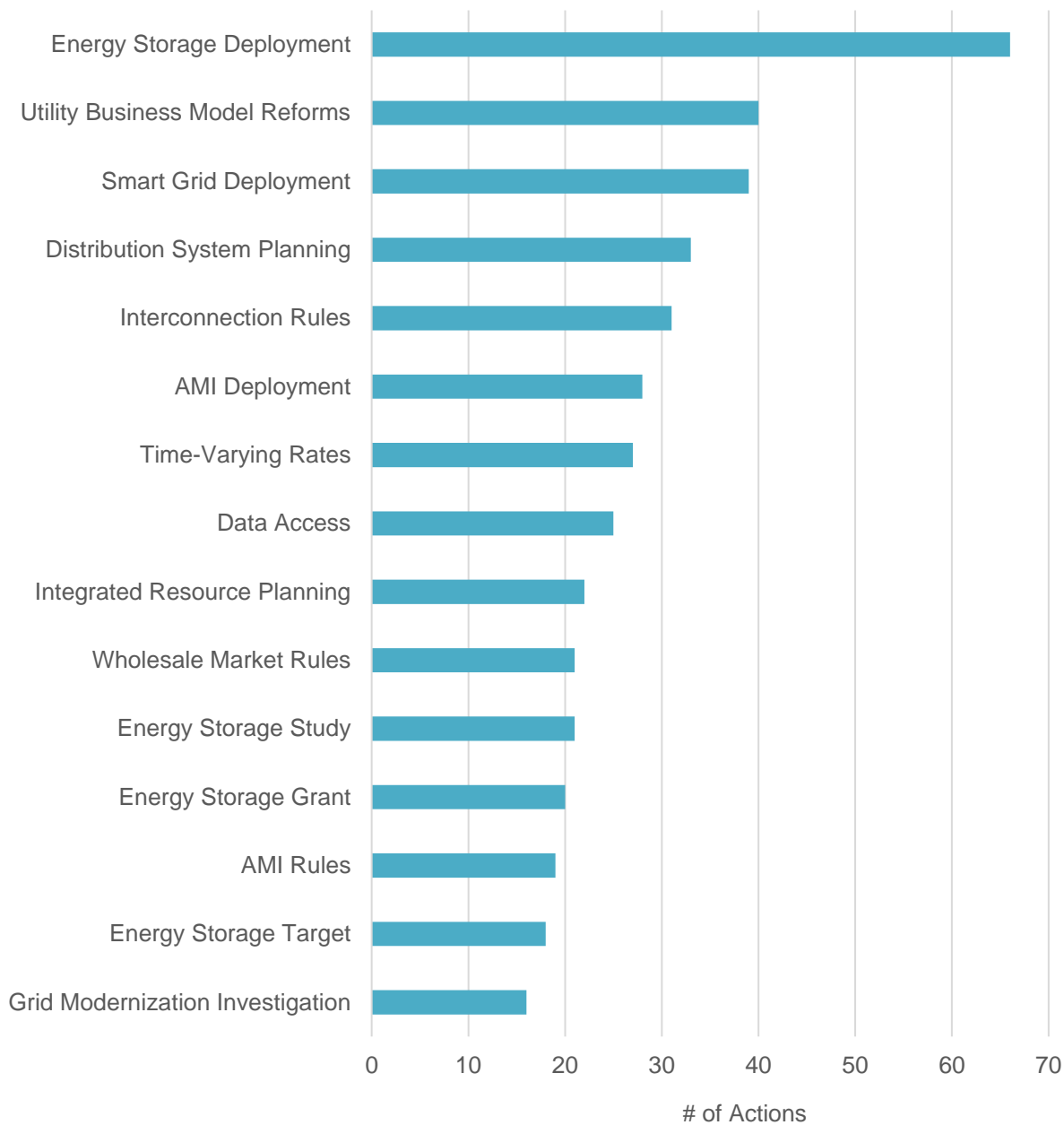


Figure 4. Most Active States of Q2 2021

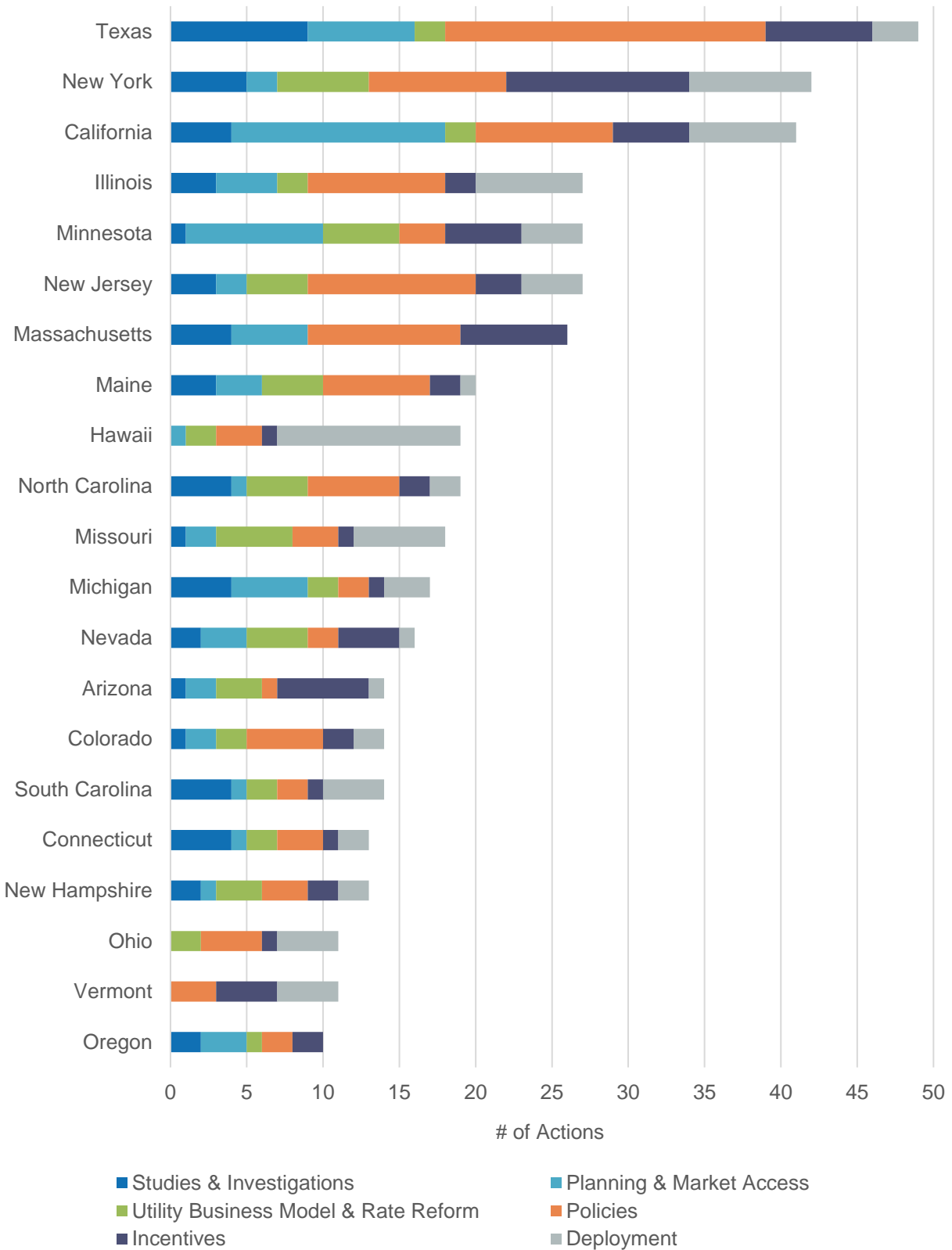
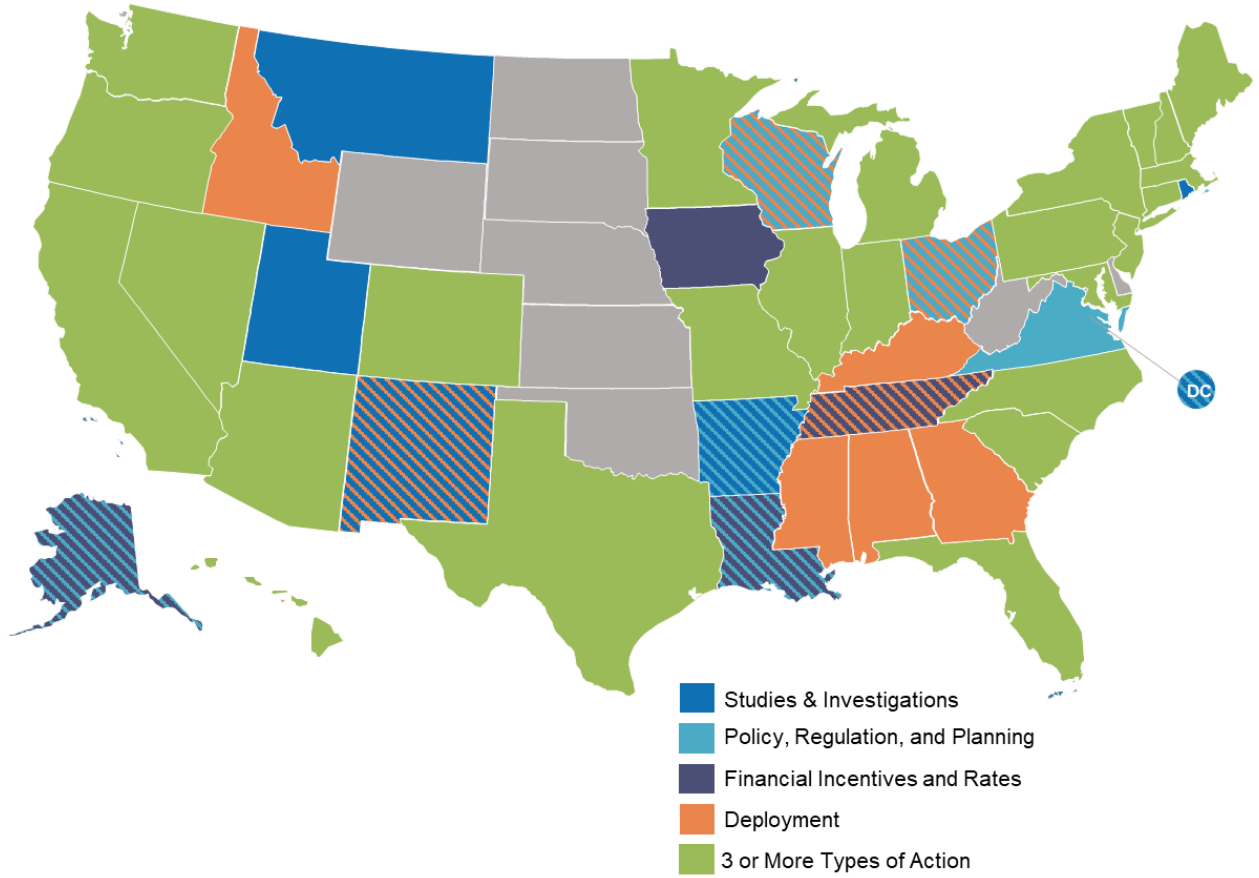


Figure 5. Q2 2021 Energy Storage Action, by Action Type



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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- 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
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PRICING

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