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STATES OF POWER DECARBONIZATION

Q1 2024 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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FULL REPORT AND OTHER 50 STATES REPORTS

The full Q1 2023 50 States of Power Decarbonization report may be downloaded [here](#). In addition to *The 50 States of Power Decarbonization*, the NC Clean Energy Technology Center publishes additional quarterly reports called *The 50 States of Solar*, *The 50 States of Grid Modernization*, and *The 50 States of Electric Vehicles*. These reports may be purchased [here](#). Executive summaries and older editions of these reports are available for download [here](#).

ABOUT THE REPORT

WHAT IS POWER DECARBONIZATION?

Decarbonization is an expansive term generally referring to the reduction of carbon dioxide emissions. Decarbonization can be discussed in the context of any emitting sector – electric power, buildings, industrial processes, transportation, agriculture, or the economy as a whole. This report focuses specifically on decarbonization of the electric power sector, which may include economy-wide decarbonization actions that necessarily encompass the electric power sector.

PURPOSE

The purpose of this report is to provide timely, accurate, and unbiased updates to a broad audience of state lawmakers and regulators, state agencies, utilities, the clean energy industry, and other energy stakeholders, about how states are choosing to study, adopt, implement, amend, or discontinue policies associated with power decarbonization and how utilities are planning for and implementing future generation resource additions and retirements. This report catalogues proposed and approved executive, legislative, and regulatory changes affecting electric power decarbonization during the most recent quarter, as well as actions related to investor-owned utility resource plans and generation capacity changes.

The 50 States of Power Decarbonization report series provides regular quarterly updates and annual summaries of electric power decarbonization policy updates and utility resource planning, keeping stakeholders informed and up to date.

APPROACH

The authors identified relevant policy changes and resource planning updates 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 U.S. electric power sector decarbonization, including:

- What targets are states setting for clean/renewable electricity generation or the reduction of greenhouse gas emissions from the power sector?
- How are states reforming statutes and regulations governing utility generation resource planning, procurement, and retirement?

- What electric generation capacity additions and retirements are utilities planning over the near-term and long-term?
- What specific electric generation capacity additions are utilities seeking to implement in the near-term through direct development or procurement processes? What resources are utilities requesting approval to retire in the near-term?

Actions Included

This report focuses on cataloguing and describing important proposed and adopted policy changes related to electric power sector decarbonization.

In general, this report considers an “action” to be a relevant (1) legislative bill that has been introduced, (2) an open or recently decided regulatory docket or rulemaking proceeding, (3) an executive order or significant state agency initiative, (4) a recently published integrated resource plan, or (5) a competitive procurement under development or underway for electric generation capacity. Primarily, statewide actions and those related to investor-owned utilities are included in this report. Specifically, actions tracked in this issue include:

Studies and Investigations

State- or utility-led efforts to study issues related to electric power decarbonization, including decarbonization pathways, cost impacts, and other specific topics.

Clean Energy Targets

New state clean energy standards, renewable portfolio standards, or technology-specific capacity targets, or changes to existing targets. Changes to implementation rules, such as eligible technologies and facility sizes, covered entities, and alternative compliance payment rates are also included.

Emission Targets and Carbon Policies

New state greenhouse gas emission reduction targets or modifications to existing targets. Changes to implementation rules for emission reduction targets are also included, as well as state or regional carbon pricing policies, such as carbon taxes or cap-and-trade programs.

Planning and Procurement Rules

Changes to rules governing the utility integrated resource planning process, as well as rules governing utility procurement of electric generation resources or retirement of existing utility-owned generation facilities.

Utility Integrated Resource Plans

Integrated resource plans recently filed by investor-owned utilities and actively under review by regulators, as well as utility efforts to develop an integrated resource plan in advance of filing the plan with regulators.

Generation Capacity Changes

Utility-initiated requests to build, acquire, convert, or retire generation facilities, as well as utility green tariffs for large customers and state- or utility-led competitive procurements for electric generation resources (excluding utility requests for approval of individual power purchase agreements and competitive procurements for unbundled renewable energy certificates).

Actions Excluded

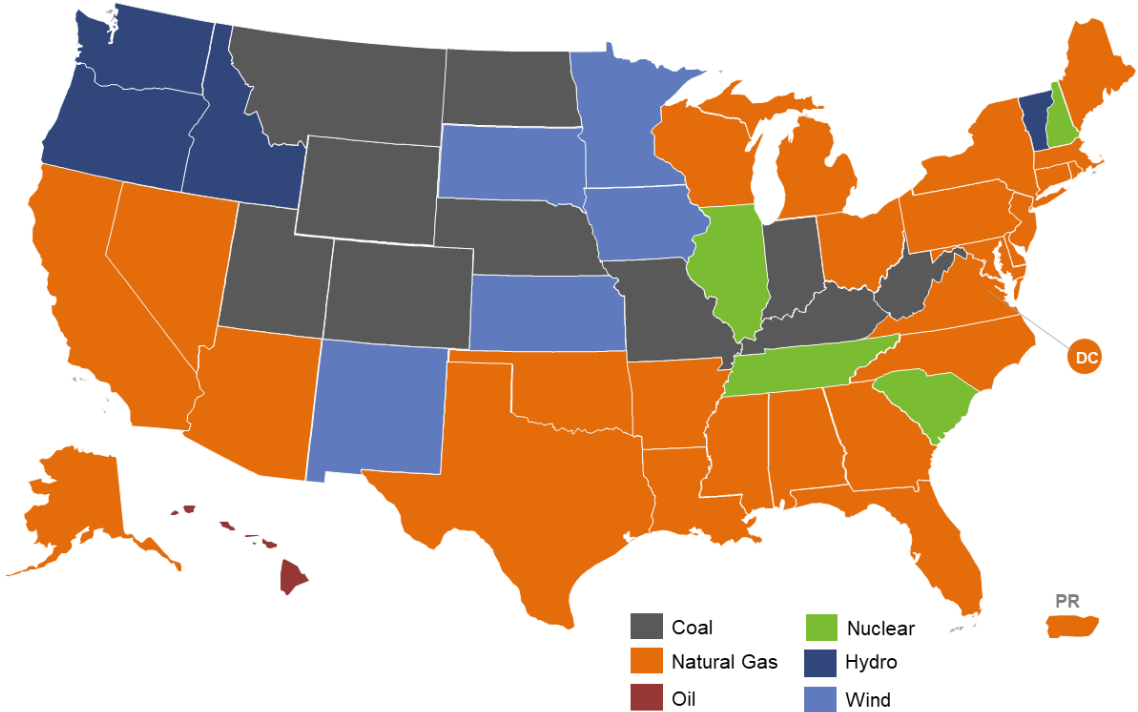
This report excludes actions that are specifically related to decarbonization of buildings, industrial processes, transportation, and agriculture. The report authors recognize that there are numerous important policy and regulatory issues related to clean energy project development that are highly relevant to overall electric power sector decarbonization. In order to maintain a well-defined scope of content, the report excludes actions specifically related to transmission and distribution planning, interconnection rules, and permitting and siting rules. Distribution system planning efforts are covered in the 50 States of Grid Modernization quarterly report, as well as a multitude of policies pertaining specifically to energy storage. Actions specific to distributed generation and community solar are covered in the 50 States of Solar quarterly report, and actions related to transportation electrification are covered in the 50 States of Electric Vehicles quarterly report. As noted above, utility requests for approval of individual power purchase agreements and competitive procurements for unbundled renewable energy certificates are excluded from this report.

DECARBONIZING THE U.S. ELECTRIC POWER SECTOR

The electric power sector in the U.S. is the second largest source of greenhouse gas emissions, behind the transportation sector, with a majority of its energy resources coming from fossil fuels. The industrial end-use sector is right behind it, followed by commercial and residential buildings. Together, these sectors account for approximately 90% of U.S. greenhouse gas emissions.* While the electric power sector itself accounts for 25% of emissions, efforts underway to electrify transportation, buildings, and industrial processes amplify the impact of decarbonizing the power sector.

Current federal government goals have the U.S. attaining a carbon pollution-free power sector by 2035 and a net-zero economy by 2050. As of now, 22 states have set clean or renewable energy standards or goals to reach net-zero emissions by 2050 at the latest. In addition, a plethora of electric utilities have announced net-zero or carbon neutrality goals for Scope 1, Scope 2 – and for some – Scope 3 emissions.†

Figure 1. Largest Contributing Resource to State Electric Generation Mix (2023)

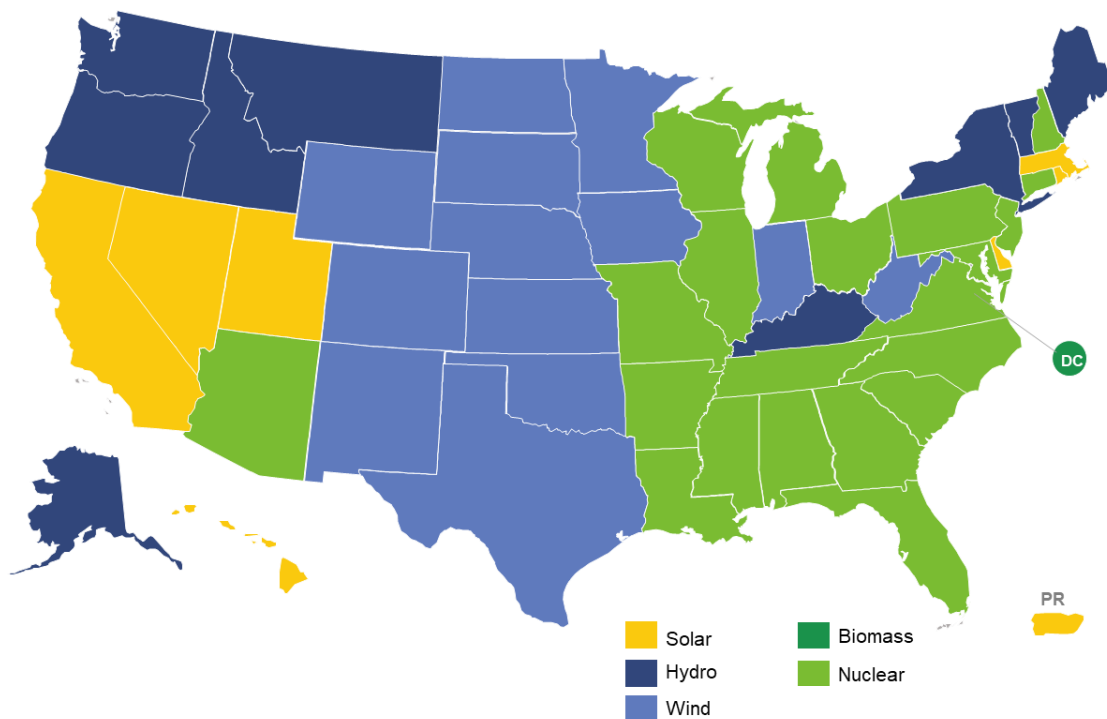


Data Source: U.S. Energy Information Administration – Electric Power Monthly, Net Generation by State by Type of Producer by Energy Source (Jan. – Dec. 2023).

* Environmental Protection Agency (EPA), *Sources of Greenhouse Gas Emissions*. EPA, May 2024, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.
 † Smart Electric Power Alliance (SEPA), *Utility Carbon-Reduction Tracker™*. SEPA, May 2024, <https://sepapower.org/utility-transformation-challenge/utility-carbon-reduction-tracker/#:~:text=100%25%20carbon%2Dfree%20electricity%20by%20the%20end%20of%202030.&text=Carbon%20neutral%20scope%201%20and%202%20emissions%20by%202030.&text=Net%2Dzero%20scope%201%20and%202%20emissions%20by%202040.&text=Net%2Dzero%20CO2%20emissions%20by%202045>.

However, most U.S. states and the country as a whole still have a long way to go to achieve these goals. Natural gas (43.1%) and coal (16.2%) remain two of the nation’s dominant electric generation resources, and either natural gas, coal, or oil makes up the largest share of electricity generation in 37 states (See Figure 1).[‡] Despite the current dominance of fossil fuels, clean energy is becoming a mainstay in the nation’s energy mix, particularly as costs decline and states acquire cleaner resources to meet climate and other environmental objectives.

Figure 2. Largest Contributing Clean Resource to State Electric Generation Mix (2023)



Data Source: U.S. Energy Information Administration – Electric Power Monthly, Net Generation by State by Type of Producer by Energy Source (Jan. – Dec. 2023).

Nationwide, clean energy resources are currently led by nuclear (18.6%), followed by wind (10.2%), hydropower (5.7%), and solar (3.9%).[§] Across the country, these resource mixes vary greatly, with different resources leading each state’s clean electricity generation; currently, most states’ clean energy portfolios are led by either nuclear or wind energy (see Figure 2). The overall contribution of clean energy sources to states’ electricity generation also varies widely, ranging from 5% to 99% in 2023 (see Figure 3).

Power decarbonization involves a wide range of potential pathways and technological solutions, allowing decision-makers to pursue a variety of combinations that, in theory, lead to the same

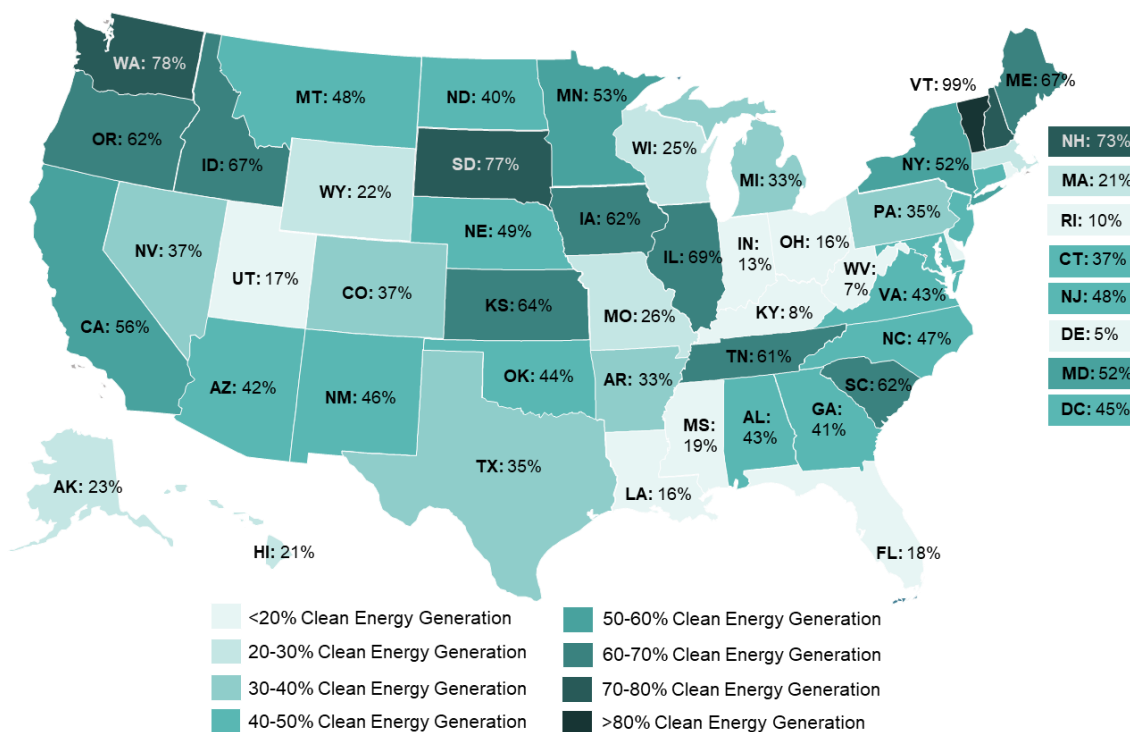
[‡] U.S. Energy Information Administration (EIA), *What is U.S. electricity generation by energy source?* U.S. EIA, February 2024, <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>. and U.S. EIA, *Electric Power Monthly, Net Generation by State by Type of Producer by Energy Source* (Jan. – Dec. 2023). <https://www.eia.gov/electricity/data/state/>.

[§] U.S. EIA, *What is U.S. electricity generation by energy source?* U.S. EIA, February 2024, <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>.

end goal. However, the cost of each pathway can vary dramatically, and challenges like global supply chains, transmission access, interconnection queues, and local permitting can impact the actual feasibility and timeline of each pathway. The timescale for implementation is a critical consideration for meeting climate goals, while cost is also highly important to minimize adverse economic impacts on individuals and businesses, particularly low-income households.

Another major factor influencing U.S. power decarbonization is the federal Inflation Reduction Act, signed into law in 2022. The Act includes significant incentives, including an array of tax credits and grants, for clean energy development and greenhouse gas emission reduction projects, upending the assumptions used in most existing technology deployment projections, cost-benefit analyses, and utility resource plans.

Figure 3. Percentage of Clean Electricity Generated by State (2023)



Data Source: U.S. Energy Information Administration – Electric Power Monthly, Net Generation by State by Type of Producer by Energy Source (Jan. – Dec. 2023). Map represents percent of total MWh generated in each state from clean energy sources (biomass, geothermal, hydroelectric, nuclear, solar, and wind).

Although there is much work to be done from where we currently stand to achieve state and utility power decarbonization goals, the future is looking bright. Power decarbonization is being actively considered by policymakers and regulators in nearly every state in the nation, and clean energy resources are dominating most states’ planned electric generation capacity additions in both the near-term and long-term. Meanwhile, states are working to create regulatory structures that will support the achievement of power decarbonization goals in the most fair and efficient ways.

EXECUTIVE SUMMARY

Q1 2024 POWER DECARBONIZATION ACTION

In the first quarter of 2024, 48 states plus DC and Puerto Rico took a total of 507 actions related to electric power decarbonization and resource planning. Table 1 provides a summary of state and utility actions on these topics. Of the 507 actions tracked, the most common were related to clean energy targets (118), planning and procurement rules (117), and electric generation capacity changes (77).

Table 1. Q1 2024 Summary of Grid Modernization Actions

Type of Action	# of Actions	% by Type	# of States
Clean Energy Targets	118	23%	28 + DC
Planning and Procurement Rules	117	23%	36 + PR
Electric Generation Capacity Changes	77	15%	33 + PR
Studies and Investigations	69	14%	29 + PR
Utility Integrated Resource Plans	64	13%	27 + PR
Emissions Targets & Carbon Policies	62	12%	28
Total	507	100%	48 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 POWER DECARBONIZATION ACTIONS OF Q1 2024

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

Arizona Regulators Vote to Repeal Renewable Energy Standards

While most states with existing renewable energy standards are electing to increase these targets, the Arizona Corporation Commission voted in February 2024 to begin the process of repealing the state's renewable energy standard and electric energy efficiency standard. Numerous individuals have submitted comments in opposition of the move. The current standard requires utilities to achieve 15% renewable energy by 2025.

Kentucky and Utah Lawmakers Restrict Fossil Fuel Plant Retirement

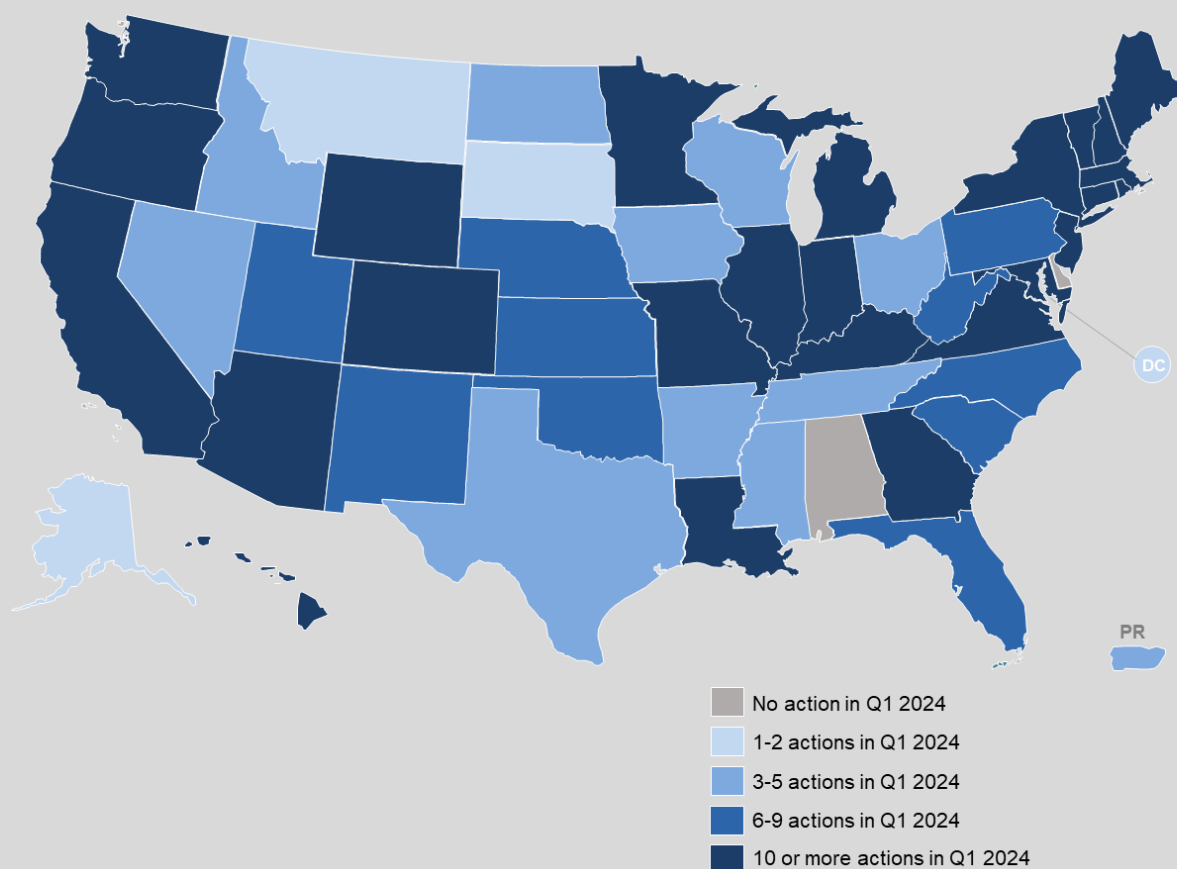
Lawmakers in Kentucky and Utah recently passed legislation adding new requirements for the retirement of fossil fuel-fired generating units. In Kentucky, a coal or gas plant cannot be retired without findings from an executive committee on the effect of the retirement on the availability

of reliable and dispatchable power in the state, land use impacts, and economic development, among other factors. In Utah, the Public Service Commission must also consider new factors before authorizing the early retirement of a generating facility.

Washington Legislators Support Linking Carbon Market with California and Quebec

In Washington, state legislators enacted a bill that facilitates the linkage of Washington’s carbon market with the California-Quebec market. The bill makes a number of technical changes related to allowances, auctions, and participants. The legislation includes a nullifying provision if an initiative set to be on the November 2024 ballot that would repeal the state’s carbon pricing program is approved.

Figure 4. Q1 2024 Action on Power Decarbonization and Resource Planning



Colorado Energy Office Releases New Greenhouse Gas Pollution Reduction Roadmap

The Colorado Energy Office released its Greenhouse Gas Pollution Reduction Roadmap 2.0 in February 2024, which is an update to its original 2021 plan. The new roadmap outlines 49 near-term actions across various sectors to reduce greenhouse gas emissions to 76.8 million

TOP POWER DECARBONIZATION TRENDS OF Q1 2024

Utility Integrated Resource Plans Forecasting Significant Load Growth

A number of utilities are releasing projections for significant load growth in their territories, along with plans for how they plan to meet this increased demand. In the Carolinas, Duke Energy filed a revised Carbon Plan Integrated Resource Plan, which increases its forecasted winter peak by 2.1 GW and annual energy needs by 24 terawatt-hours from its plan filed just last August. Duke Energy proposed a new resource portfolio, which adds offshore wind and increases new solar, storage, and natural gas. Georgia Power filed a revised integrated resource plan in October 2023 due to increased and accelerated demand for electricity. Xcel Energy's integrated resource plan recently filed in Minnesota projects significantly increased load growth over its 2019 plan, due largely to data centers and electric vehicle adoption. Arizona Public Service's recent integrated resource plan provides another example of a utility forecasting significant load growth, citing data centers, large industrial customers, and electric vehicle adoption as driving factors.

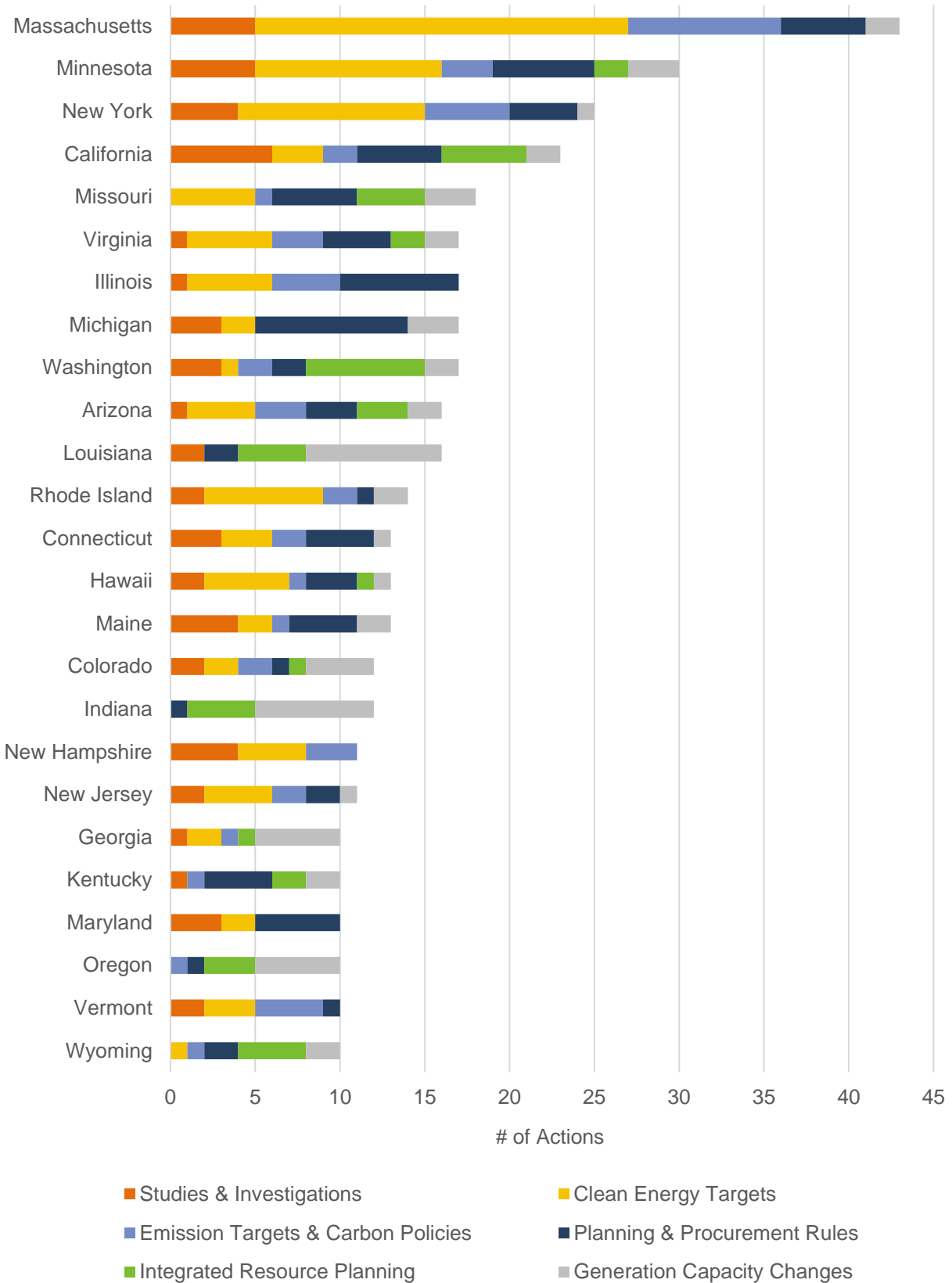
State Lawmakers Adding New Hurdles for Coal Plant Retirement

Legislators in several states considered bills during the quarter that would add new hurdles for the retirement of coal-fired generating units. In Kentucky, lawmakers overrode the Governor's veto to enact legislation that prevents the retirement of coal- or gas-fired generation without approval from the Public Service Commission and findings from an executive committee on the effect of the retirement on the availability of reliable and dispatchable power, as well as considerations around economic and fiscal effects, land use impacts, and future economic development. In Utah, legislators enacted a bill that prevents the early retirement of electric generation if it is being undertaken as a result of federal financial incentives for benefits, it if exacerbates existing shortages of electricity, or if it harms the utility's ratepayers by causing the utility to impose net incremental costs. Legislation under consideration in Arizona, Kansas, Nebraska, and Oklahoma would also restrict coal retirement or limit replacement options.

Carbon Pricing Programs Facing Uncertain Futures

While most states do not currently have a carbon pricing program, a number of those that do are seeing new opposition to these programs and actions to repeal them. In Washington, a ballot measure that will be voted on in November 2024 would prohibit state agencies from implementing any type of carbon tax credit trading and repealing provisions that provided for a cap-and-invest program. In Virginia, the Air Pollution Control Board voted to withdraw from the Regional Greenhouse Gas Initiative (RGGI) last year, but the move has faced legal challenges. In Pennsylvania, the Commonwealth Court issued a decision on a challenge to the state's entry into RGGI, finding that it constitutes an undue tax. Despite these actions, there is also legislation enacted or under consideration in each of these states that would support continued participation in carbon pricing programs.

Figure 6. Most Active States of Q1 2024



FULL REPORT PRICING DETAILS

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