States' Climate Action for Achieving Carbon Neutrality: What's out there and yet to be done?

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About the California-China Climate Institute

The California-China Climate Institute was launched in September 2019 and is a University of California-wide initiative housed jointly at UC Berkeley's School of Law (through its Center for Law, Energy, and the Environment) and the Rausser College of Natural Resources. It is Chaired by Jerry Brown, former Governor of the State of California, and Vice-Chaired by the former Chair of the California Air Resources Board Mary Nichols. The Institute also works closely with other University of California campuses, departments, and leaders. Through joint research, training, and dialogue in and between California and China, this Institute aims to inform policymakers, foster cooperation and partnership and drive climate solutions at all levels.

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Table of Contents

1. Introduction

While climate policy has often been viewed as being driven at the national or international scale, it is increasingly clear that subnational governments play an essential role in advancing climate policy and implementation. In the United States (U.S.), with its changing national leadership, federalist system, and diverse constituencies, some states have emerged as climate leaders. As of October 2021, twenty-eight states had set near- or long-term[1] greenhouse gas emissions reductions targets. A greenhouse gas emissions reductions target is a goal to reduce emissions by a specific amount by a specific date. This white paper analyzes those state targets, and the sectoral policy portfolio to achieve them.

Meeting the Paris Agreement goals and the United States' Nationally-Determined Contributions will ultimately only be possible through a combination of national and subnational actions. A study by Hultman et al. (2020) found that U.S. states, cities, and businesses' existing commitments can reduce 25% of emissions below 2005 levels by 2030 and reach 37% with increased ambition.[2] Other analysis has found that a state-driven approach is not necessarily significantly more costly than a more unified federal approach.[3] Further, a decentralized approach provides some clear advantages, including: (1) experimentation and flexibility to develop, scale-up, and adapt policy approaches, (2) increased understanding of the local context and ability to tailor approaches to fit, and (3) decision-making power to guide action.[4] Finally, state action has and can continue to help inspire and inform national actions and approaches.[5]

Within the U.S. federal system, states have legal authority, administrative capacity, and a degree of autonomy from the federal government. Climate policy falls into traditional states' roles, including electricity regulation, land use planning, and air pollution policy. Constitutional rules, along with lapses in federal leadership, has meant that much of the U.S.'s energy and climate policy has been led by states since the 1990s. This has produced an uneven terrain of state climate action as some states such as California have developed and accelerated climate solutions while others have made limited progress.

States have a large toolkit, including policies, measures, instruments, and approaches available to them to address the largest sources of U.S. emissions - energy, industry, buildings, and agriculture. While most transportation sources fall under federal authority due to interstate commerce rules, states like California and others following its path have been able to address light- and medium-duty vehicle emissions. This paper considers the four basic categories of subnational climate policy instruments: (a) regulations, (b) market-based instruments, (c) financial incentives, and (d) voluntary initiatives. Regulatory policies set a standard or a mandatory requirement. This includes clean energy mandates, low carbon fuel standards, oil and gas processing and extraction requirements, appliance standards, and land use targets. Regulations have been a dominant policy tool to address emissions across all sectors. This stemmed from the use of regulations to address air quality and the strong linkages between addressing air quality and climate change. In many sectors, the federal government has established a floor for regulation with no ceiling, allowing states to go beyond that mandate if they wish, and providing ample space for subnational policy innovations to develop and spread. In states that control a large market share of an industry, state-level regulations can have an outsized impact, if, due to cost-efficiencies, companies act upon the regulations in regions beyond that state's jurisdiction. Market-based instruments are economic-based tools that send a price signal to polluting industries. In state policies, the most significant market-based tool is cap and trade. Financial incentives include tax credits or subsidies for manufacturers and consumers to encourage clean production and purchase. Finally, voluntary initiatives are used to provide information such as certifications or energy labeling. Table 1 presents selected policy instruments across policy areas.

1 In this paper, near-term targets refer to greenhouse gas emissions reductions targets set for the year 2025-2030, and long-term targets refer to those set for post-2030.
2 Hultman, N. et al., 2020
3 Peng, W. et al., 2021
4 Hsu, A. et al., 2017
5 Oates, W., 2001

Table 1: Selected Cross-sectoral and Sectoral Approaches and Climate Policy Instruments

	Regulations	Market-based	Financial	Voluntary
Economy-wide (Cross-sectoral)	Binding targets	Cap and Trade	Tax credits, subsidies, loans	Non-binding targets, Climate Action Plans
Energy	Clean energy mandates, Renewable Portfolio Standards	Cap and Trade		Research and development spending
Transportation	Low carbon fuel standards, Low Emission Vehicle standards, Zero Emissions Vehicle Mandate	Cap and Trade		High-Occupancy Vehicle (HOV) lanes; Zero Emission Vehicle sales targets
Industry	Equipment standards, oil and gas regulations, methane regulations, procurement policies	Cap and Trade		
Buildings	Energy codes, appliance standards	Cap and Trade		Energy star labeling, LEED
Land Use	Land use and zoning regulations, targets, sustainable forestry and agriculture policies		Incentives for best management practices	Healthy soil programs, technical assistance

Based on data collected through October 2021, this white paper provides a snapshot of U.S. states' climate actions across various sectors. The research is focused on the twenty-eight states with near- or long-term greenhouse gas or carbon emission reduction targets, and prevalent sectoral policies in energy, transportation, industry, and land use. These sectors were chosen since they are the primary sources of emissions in the U.S. The analysis demonstrates the dominant climate policy strategies used in U.S. states in order to increase the visibility of state-level initiatives and illuminate areas of progress and highlight gaps.

This analysis builds on the California-China Climate Institute's work to identify pathways to achieve carbon neutrality in the United States and China. It is a companion to the interactive States' Climate Action Map, and subnational climate policy tracking activities. It builds upon prior analyses on pathways to net-zero for the U.S. and China. This paper highlights where U.S. states are making significant progress and opportunities for sharing lessons-learned and enhancing collaboration with subnational entities in China and beyond.

2. Economy-wide Strategies

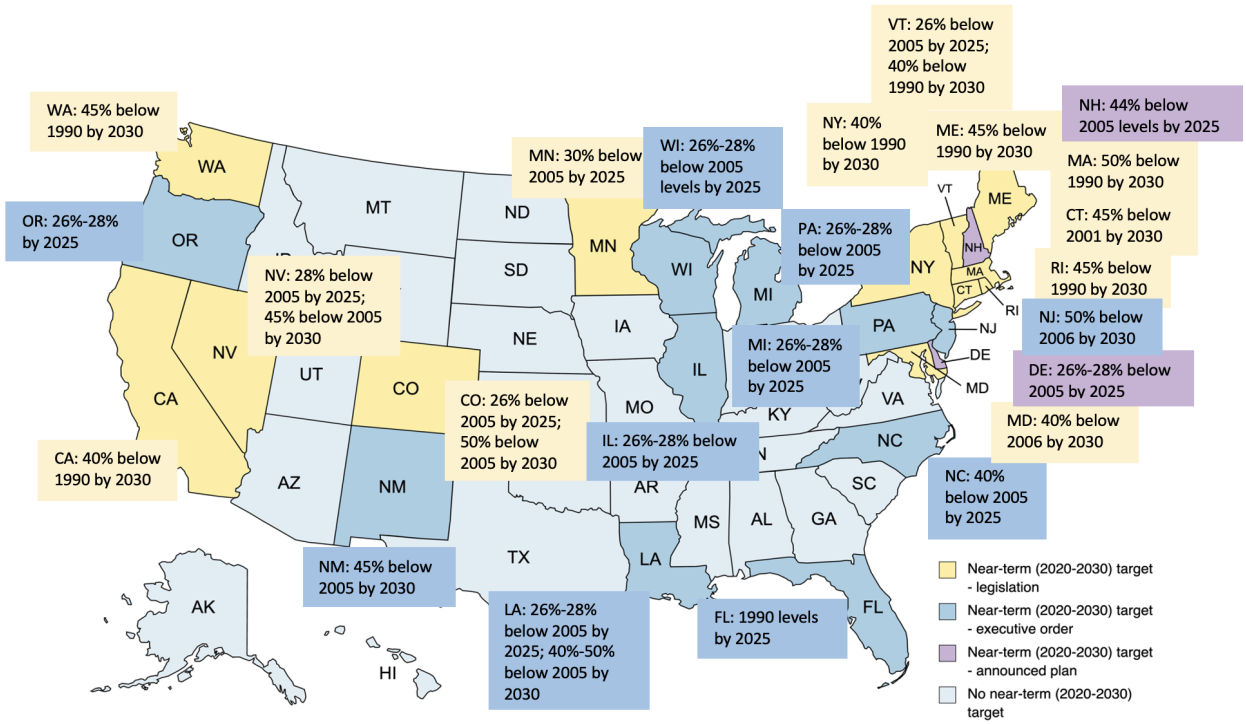
2.1. State Greenhouse Gas Emissions Reductions Targets

As of October 2021, twenty-eight U.S. states have pledged specific near-term (to 2030) or long-term (post-2030) greenhouse gas emissions reductions targets. These climate targets provide quantitative goals to guide climate policy-making and an accountability mechanism. They have been set through legislation, executive orders, or announcements to reduce their greenhouse gas (GHG) or carbon emissions with varied levels of enforcement. Some states have gone further by enacting economy-wide net-zero commitments via legislation or executive orders.[6]

For both near- and long-term targets, state legislation is more common than executive orders or announced plans. Executive orders have limits because future governors can decide not to follow through with commitments by previous governors, and executive orders are rarely enforceable in court. Figure 1 and Figure 2 highlight state near- and long-term emissions reductions targets, respectively.

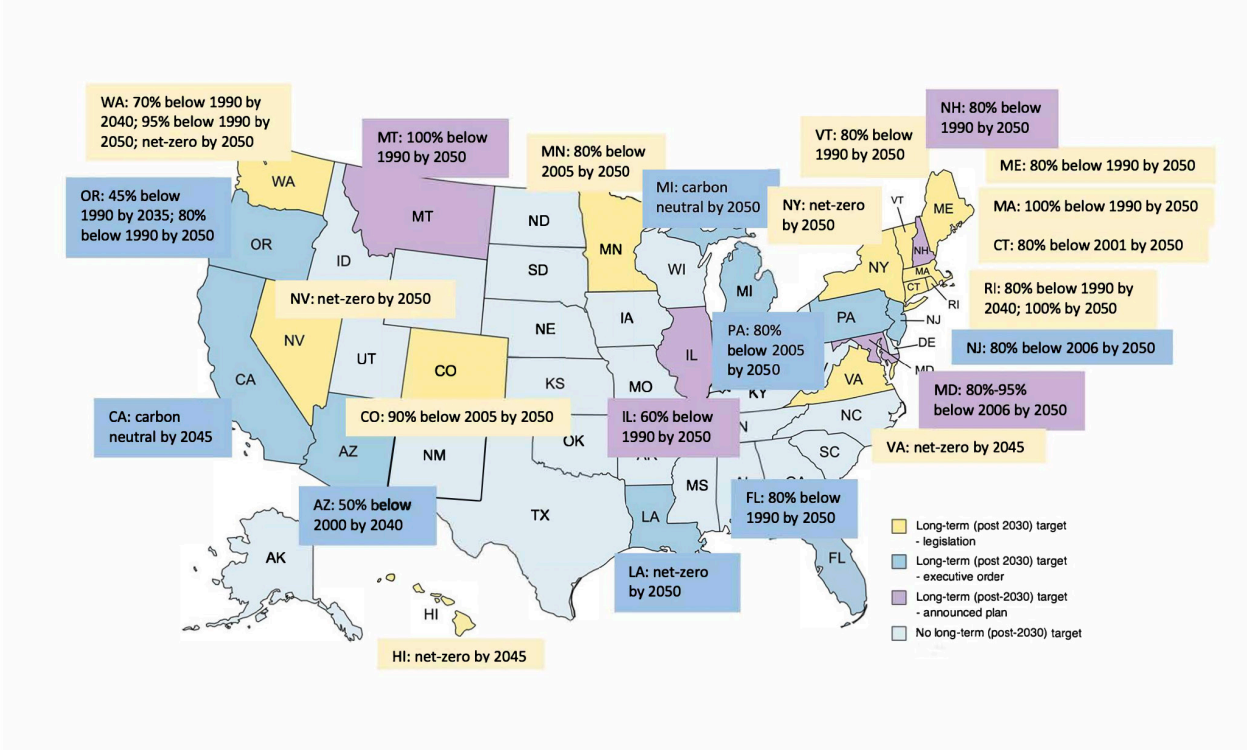
In some states GHG emissions have decoupled from economic growth, meaning that real gross domestic product (GDP) continues to increase, while energy-related carbon dioxide emissions decrease. Analysis by Saha and Jaeger, demonstrates that between 2005 and 2017, forty-one states decoupled emissions and economic growth, including states with (e.g., Maine, New York, and Nevada) and without (e.g., Alabama, Georgia, Indiana, Ohio, and Alaska) near-term or long-term targets.[7]

Figure 1: States with near-term greenhouse gas targets (2020 - 2030)



6 Wiltshire-Gordon, 2020
7 Saha and Jaeger, 2020

Figure 2: States with long-term greenhouse gas targets (post 2030)



2.2. Collaborative Initiatives

Over the last few years, states have developed several collaborative organizations to meet state, national, and international goals. In 2017, California, New York, and Washington States co-founded the United States Climate Alliance (USCA) to work towards the Paris Agreement goals in the absence of U.S. federal action; more than 20 additional states have since joined.[8] In addition, the America's Pledge initiative, a public-private collaboration, aggregated and quantified the actions of states, cities, businesses, and other non-national actors to drive down their GHG emissions consistent with Paris goals.[9] Further, the Under2 Coalition, a global collaboration that includes over 260 subnational jurisdictions, has agreed to reduce GHG emissions to a level to limit warming to below two degrees Celsius.[10] These platforms demonstrate the value and significance of subnational collaboration.

2.3. Cap-and-Trade

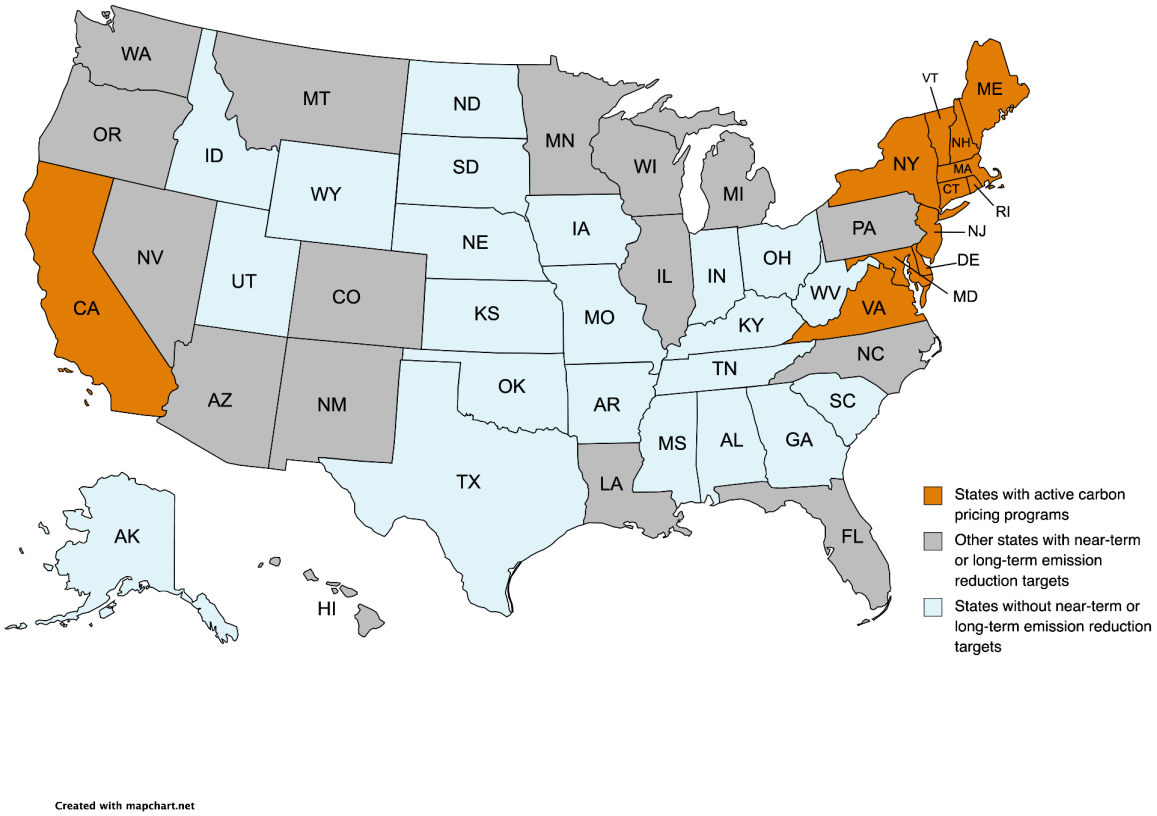
Cap and trade is a market-based mechanism to reduce emissions whereby there is a ceiling on the total amount of emissions (cap) and firms can trade the right to emit specified amounts. As shown in Figure 3, twelve states have active cap and trade programs to reduce emissions: California,[11] and the Regional Greenhouse Gas Initiative (RGGI)[12] that includes the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Virginia, Vermont, and Washington, DC.[13] RGGI is the first mandatory cap-and-trade program in the U.S., which limits carbon dioxide emissions from the power sector. Massachusetts

8 United States Climate Alliance, 2020
9 America's Pledge, 2020
10 Under2 Coalition, 2021
11 California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms
12 See Regional Greenhouse Gas Initiative at https://www.rggi.org/
13 Virginia officially joined RGGI on January 1, 2021. Washington also passed a cap and trade bill in 2021. Pennsylvania has begun the process to join RGGI.

also has regulations to establish an additional cap-and-trade program for its power sector,[14] extending to 2050, along with declining RGGI emissions caps for 2021-2030. In 2020, the Governor of Pennsylvania signed an executive order to begin the rule-making process to allow Pennsylvania to join RGGI. In 2021, Washington passed legislation to establish their cap and trade program and it will begin in 2023.[15]

California's cap-and-trade program, which took effect in 2012, is the first economy-wide cap-and-trade program in North America. The program caps GHG emissions from transportation fuels, electricity, industrial, agricultural, waste, residential, and commercial sources. California's cap-and-trade program sets an overall cap on emissions, which declines over time, and introduces tradable credits under the cap. Covered entities purchase allowances through an auction, and each year the cap available in the system declines, realizing overall emissions reductions. The program currently covers about more than 450 emitters[16] which are responsible for approximately 75 - 85% of California's GHG emissions. The system, in turn, generates revenue which is then used to fund other climate policy objectives within the state. California invests auction proceeds totalling over $16.9 billion, into programs that reduce GHG emissions, a portion of which are required to be invested in disadvantaged communities.[17] State assessments have found that the approach is four times less costly than some of its alternatives.[18]

Figure 3: States with active Cap-and-Trade programs[19]

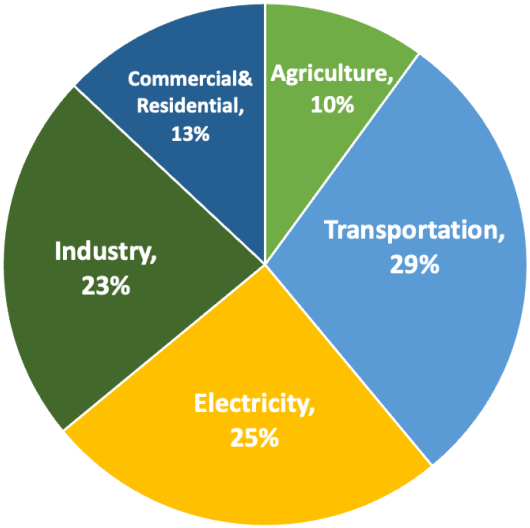


14 Massachusetts 310 CMR 7.74
15 See Washington Senate Bill 5126
16 See ARB Emissions Trading Program
17 See California Climate Investments at https://www.caclimateinvestments.ca.gov/
18 See 2017 California Scoping Plan
19 Only includes states with near-term or long-term emission reduction targets. Washington State started its cap and trade program in 2021 with implementation planned for 2023.

3. Sectoral Approaches

The primary sources of greenhouse emissions in the United States include the energy, transportation, industry, buildings and land use sectors. The chart below presents the emissions breakdown across sectors as of 2019. This section evaluates policies in these sectors.

Figure 4: Sources of U.S. Greenhouse Gas Emissions in 2019



Source: U.S EPA 2019

3.1. Energy Supply

The electricity sector is responsible for 25% of the U.S. GHG emissions according to the latest inventory by the U.S. Environmental Protection Agency.[20] Therefore, low- and zero-carbon electricity production is essential in the energy transition across sectors. Some U.S. states have committed to a 100% renewable energy future. Since 2018, seventeen states have passed legislation or executive orders with 100% clean or renewable energy goals,[21] with six states having mandatory codified goals. This section describes the types of clean energy targets and the primary policy mechanism that states are using to achieve this target: renewable portfolio standards.

3.1a 100% Clean and Renewable Energy Mandates

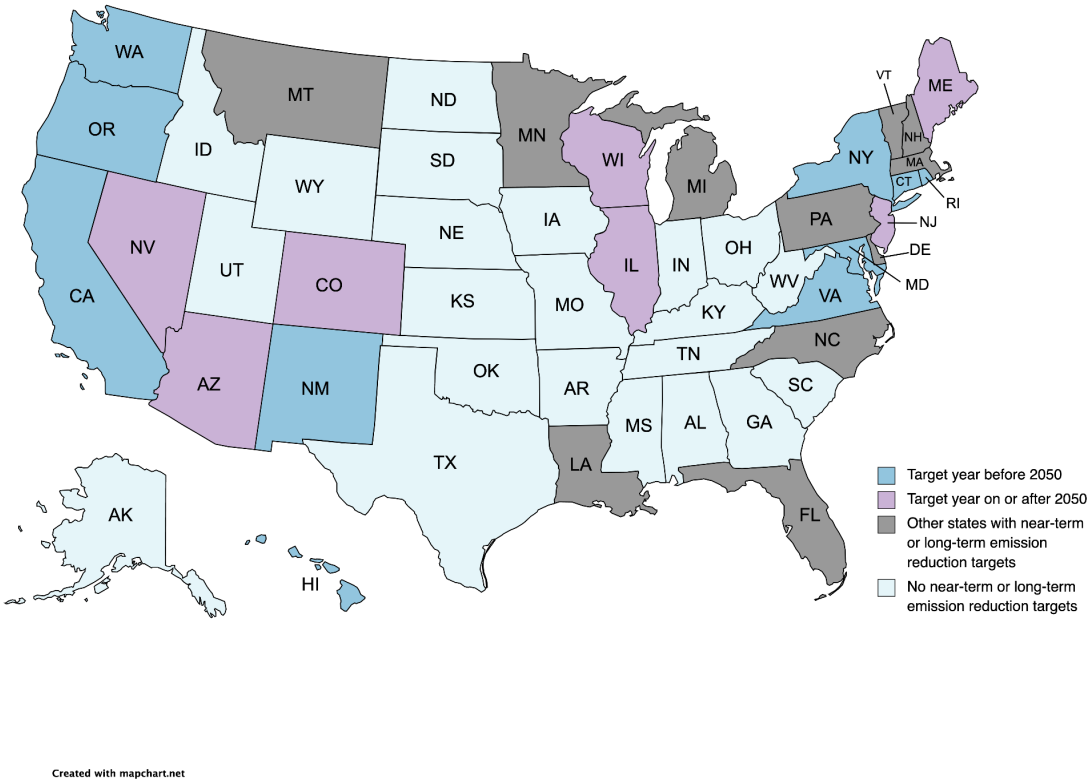
Three basic elements are important to consider when evaluating state targets for renewable energy: 1) what resources are eligible; 2) whether the target is binding; and 3) the timeline for achieving the target. While some state targets are focused exclusively on renewable energy, most subnational action has used the broader term of "clean energy." Renewable energy resources are those that are not depleted when used. Clean energy resources include renewable energy resources, but can also include technologies such as fossil fuels with carbon capture and sequestration (CCS) or nuclear energy.

Trends show that states with clean or renewable energy targets are more common in coastal states. As of

20 U.S. Environmental Protection Agency, 2020
21 State Policies, U.S. Climate Alliance, 2020

October 2021, of states with near or long-term targets, seventeen states have passed 100% clean or renewable electricity targets through legislation or executive orders. As shown in Figure 5, ten states have target years before 2050. The most ambitious one is Rhode Island's[22] executive order, which sets the target of achieving 100% state-wide renewable energy by 2030. It is also worth mentioning that North Carolina has clean energy laws outlining goals for clean energy, showing some legislative commitment but falling short of a full requirement. Wisconsin,[23] Connecticut,[24] Maine, Rhode Island, and New Jersey[25] have executive orders.Table 2 describes the type of resources (clean or renewable), type of target (legislation or executive order), and timeline for state goals.

Figure 5: States with long-term 100% clean and renewable energy mandates[26]



22 Rhode Island Executive Order 20-01
23 Wisconsin Executive Order 38
24 Connecticut Executive Order 19-03
25 New Jersey Executive Order 2019-28
26 Only includes states with near- and long-term emissions reductions targets. CA, HI, ME, NM, NY, and WA have mandatory codified goals to achieve clean energy.

Table 2: State 100% clean and renewable energy mandates[27]

State	Type	Clean/Renewable	Target Year
AZ	Legislation	Clean	2070
CA	Legislation	Clean	2045
CO	Legislation	Clean	2050
CT	Executive Order	Clean	2040
HI	Legislation	Renewable	2045
IL	Legislation	Clean	2050
MD	Legislation	Clean	2040
ME	Executive Order	Renewable	2050
NJ	Executive Order	Clean	2050
NM	Legislation	Clean	2045
NV	Legislation	Clean	2050
NY	Legislation	Clean	2040
OR	Legislation	Clean	2040
RI	Executive Order	Renewable	2030
VA	Legislation	Clean	2045
WA	Legislation	Clean	2045
WI	Executive Order	Clean	2050

3.1b Renewable Portfolio Standards (RPS)

The Renewable Portfolio Standard (RPS), sometimes called a renewable energy standard (RES) or by other similar terms, is the most prominent state-level renewable energy policy to accelerate renewable energy deployment. RPS mandates specify a percentage of electricity supply that must be generated from renewable sources.[28]

RPS policies have changed over time, with a number of states planning to rely upon these policies to meet ambitious climate and energy goals. Iowa adopted the first RPS in 1983, and was followed by several states in the late 1990s.[29] Despite widespread adoption of RPS by states, each state's policy is unique. They differ in target years, eligible technologies, the existence of carve-outs or multipliers, and other features. Comparing RPS approaches in different states can be complicated due to these differences. Nonetheless, highlighting policy gaps can inform policymakers working towards renewable energy goals.

Of states with near- or long-term climate targets, more than twenty states currently have some form of a binding RPS[30] with a target year after 2022, and a dozen target an energy portfolio greater than 80% renewable energy. Almost half of RPS policies have increased their ambition in the past couple of years, though several states have decreased RPS requirements or temporarily frozen their policies. An inventory of binding state RPS targets can be found in Table 3.

In 2015, Hawaii was the first state to increase RPS requirements to 100% electricity generated from renewable resources. California followed in 2018, and more than ten states have since followed suit. Figure 6 depicts the binding targets of state renewable portfolio standards with target years after 2022.

27 Only includes states with near- and long-term emissions reductions targets.
28 U.S. State Electricity Portfolio Standards, C2ES, 2020
29 Carley and Miller, 2012
30 U.S. State Electricity Portfolio Standards, C2ES, 2020

Figure 6: Renewable Portfolio Standards post-2022 binding targets[31]

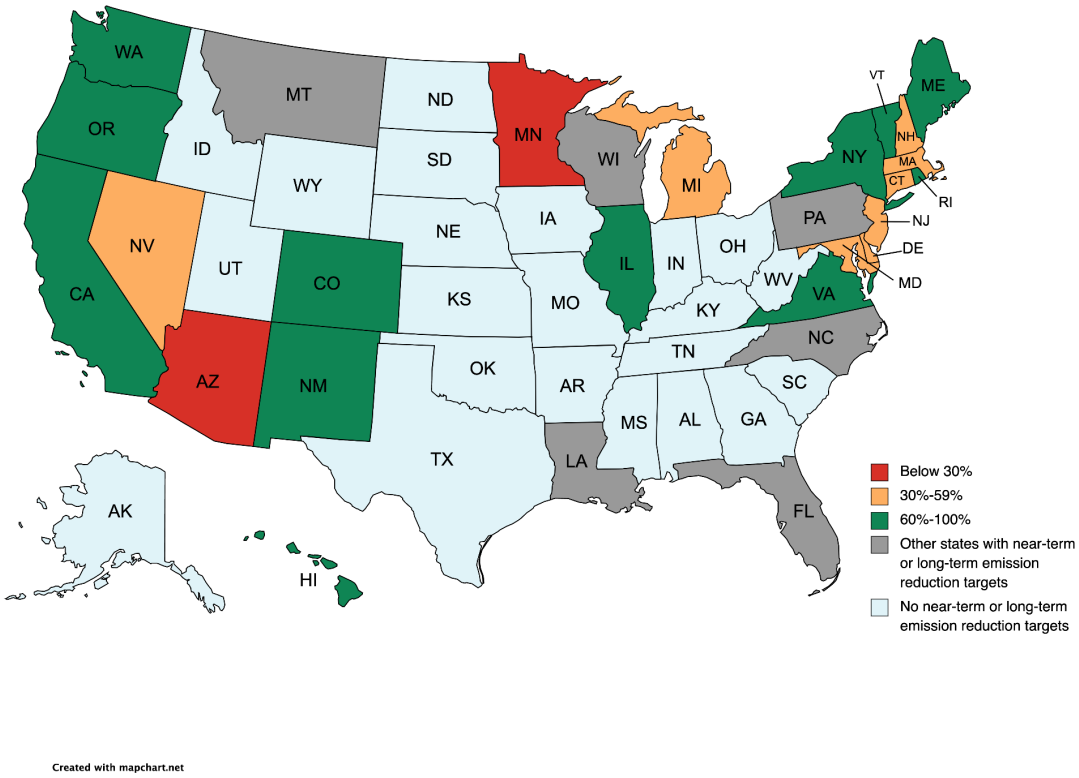


Table 3: Renewable Portfolio Standards Major Binding Targets[32]

State	Percent	Target Year	State	Percent	Target Year
AZ	15	2025	**MN**	25	2025
CA	100	2045	**NH**	50	2030
CO[33]	100	2050	**NJ**	50	2030
CT	48	2030	**NM**	100	2045
DE	40	2035	**NY**	100	2040
HI	100	2045	**NV**	50	2030
IL	100	2045	**OR**	100	2040
MA	35	2030	**RI**	100	2030
MD	50	2030	**VA**	100	2045
ME	100	2050	**VT**	75	2032
MI	35	2025	**WA**	100	2045

31 Only includes states with near- and long-term emissions reductions targets. Several additional states have target years prior to 2022.
32 Only includes states with near- and long-term emissions reductions targets.
33 Colorado's 100% requirement only applies to utilities with 500,000 customers or more. See Colorado's Senate Bill 263.

3.2. Transportation

Transport is the sector with the highest GHG emissions in the United States. It accounted for 29% of total emissions in 2019.[34] The U.S. Energy Information Administration projects that energy-related carbon dioxide (CO_2) emissions from the transport sector will continue to be the highest among all sectors in the upcoming decades.[35] In August 2021, President Biden announced a target of achieving 50% electric vehicles sales share nationwide by 2030. Increasing electric vehicle sales' share from 4% in 2021 to 50% in 2030 requires financial incentives for manufacturers and consumers, sales requirements, charging infrastructure deployment, and emission standards. States are at the forefront of developing innovative policies to address these challenges and reduce GHG emissions from the transport sector. Our study looks at state-level regulatory and fiscal transportation decarbonization approaches, including the Zero Emissions Vehicle Mandate, Low Emission Vehicle rules, non-binding target setting, and fiscal incentives.

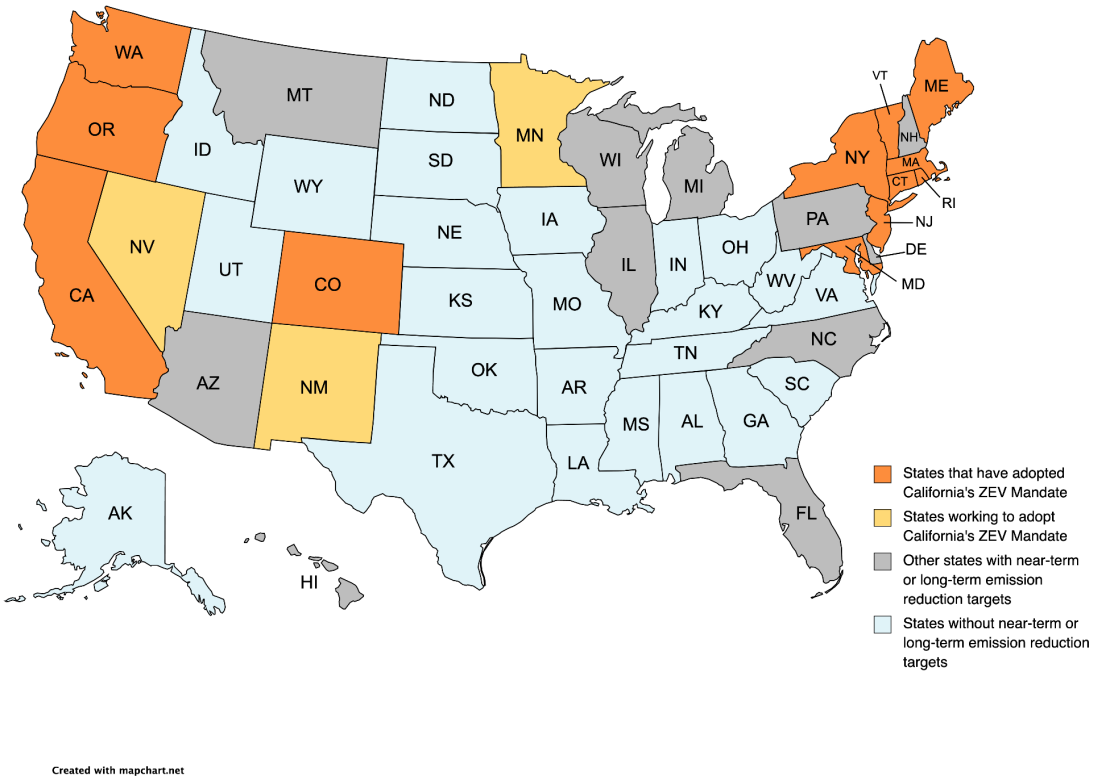
3.2a Sales Requirement: Zero Emissions Vehicle Mandate

Since California created the innovative Zero Emissions Vehicle (ZEV) Mandate in 1990, several states have adopted this regulatory approach, as shown in Figure 7. New Mexico, Minnesota, and Nevada have also announced plans to follow California's ZEV Mandate in the next few years. It is worth noting that the ZEV Mandate was adopted and adapted by China in 2018 as well, which signified China's important policy shift from direct subsidy incentives to a market-based regulatory approach to spur the growth of electric vehicles.

The ZEV Mandate requires auto manufacturers to produce a number of full battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles each year, based on the total number of cars they sell in the state. If manufacturers exceed the regulations' targets, they receive credits. Non-compliance results in deficits. Manufacturers are allowed to bank, sell, or buy ZEV credits in the credit market. Tesla, for example, sold nearly 230,000[36] credits in all 10 ZEV states from 2016 to 2019, and earned $710.56[37] million ZEV credit revenues from 2015 to 2018. The ZEV Mandate successfully achieved multiple policy benefits in participating states: revenues that surpass the federal tax credit for manufacturers, reduced fleet average CO_2 emissions, and most importantly, growth of the ZEV market. In 2018, the share of ZEVs in new light-duty vehicle sales reached 4% in ZEV states while staying at 1% in non-ZEV states. [38]

34 Inventory of U.S. Greenhouse Gas Emissions and Sinks, EPA, 2021
35 Annual Energy Outlook 2021, U.S. Environmental Information Administration, 2021
36 Data collected from checking the ZEV Program websites and contacting program staff in ten ZEV states: California, New Jersey, Vermont, Massachusetts, New York, Oregon, Rhode Island, Maine, Maryland, and Connecticut. Washington and Colorado hadn't started credit trading when this data was collected.
37 Data collected from Tesla's annual financial reports.
38 Evadoption, 2019

Figure 7: California ZEV mandate adoption



3.2b Criteria Pollutants and Greenhouse Gas Emission Standards

California is the only state with the authority to establish its own vehicle emission standards. This authority is granted in the Clean Air Act because of California's leading actions to reduce vehicle emissions in the state's efforts to address air pollution. Other states have the option to follow California's emission standards or federal standards. California used its Clean Air Act waiver to establish the first vehicle greenhouse gas standards, which was followed by 13 other states and set the stage for the federal Corporate Average Fuel Economy (CAFE) standards.

California's current vehicle emissions standards are called the Low Emission Vehicle (LEV) standards, which set declining emissions levels for cars and light trucks, encouraging gas-electric hybrids and cleaner internal combustion engines. The LEV standards only included criteria pollutants initially and started to cover GHG emissions in 2004. In 2012, the LEV regulation entered its third phase and covers new passenger vehicles until model year 2025. All of the current ZEV states have also adopted California's LEV requirements. Delaware and Pennsylvania have not mandated ZEVs yet, but have adopted the LEV emission standards. Different from the ZEV Mandate that only aims at promoting electric and hybrid vehicles, the LEV standards also help reduce the emissions from internal combustion engine (ICE) vehicles. Since ICE vehicles will still account for a large share of the vehicle fleet in the upcoming decades, the LEV regulations are crucial to ensure that manufacturers don't ignore the environmental performance of conventional vehicles as they put more ZEVs on the road.

3.2c Regional Voluntary Approaches: Target Setting

In addition to adopting more stringent regulations, several states have committed to non legally-binding Zero Emission Vehicles (ZEV) sales targets through government memoranda of understandings (MOUs), executive orders, and legislation. California issued an executive order in September 2020 to gradually phase out the sales

of internal combustion engine vehicles. In September 2021, New York also legislated a goal for all new passenger vehicles and light-duty trucks to be zero-emission by 2035. In July 2020, fifteen states and the District of Columbia signed the Multi-State Medium- and Heavy-Duty Zero-Emission Vehicle MOU,[39] including California, Connecticut, Colorado, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington. This MOU targets medium- and heavy-duty vehicles. The signatories pledged to achieve 30% zero-emission medium- and heavy-duty vehicle sales by 2030 and ban the sales of internal combustion engine buses and trucks by 2050. Setting near- and long-term ZEV sales targets is the first step for states to design their transportation decarbonization roadmaps. It provides clear signals for automakers, consumers, and government agencies, and lays the foundation for other supportive regulatory and fiscal policies.

3.2d Fiscal Incentives for Consumers, Commercial Fleets, and Manufacturers

Fiscal incentives are a common tool states use to spur the growth of electric vehicles (EVs). One example is purchase subsidies. Since electric vehicles are usually more expensive than their conventional counterparts, rebates, tax credits, and waived annual fees are needed to reduce the consumer ownership costs of clean vehicles. Oregon, for example, offers rebates from $1,500 to $2,500 toward the purchase or lease of new or used EVs. Eligible low-to moderate-income participants can receive an additional $2,500 on top of the standard rebate rates. States like California and Washington also provide incentives for developing private and public charging stations. There are also subsidies for manufacturers to encourage ZEV production, and for commercial fleet owners to purchase or lease zero emission buses, trucks, car rental fleets, or public agency vehicles. One important source of the state-level incentives is the Volkswagen (VW) Settlement fund. All U.S. states have access to the $2.7 billion clean transportation fund and can decide its specific use. In California, the $423 million from VW Environmental Mitigation Trust is used to electrify school buses and port drayage trucks, expand the hydrogen fueling network, reduce emissions from ferry, tugboats, and towboats, and support other clean transportation projects.

3.3. Industry

Industrial greenhouse gas emissions accounted for 23% of total U.S. greenhouse gas emissions in 2019.[40] Energy efficiency, fuel switching, and increased use of renewable energy offer pathways to reduce industrial GHG emissions. There has been comparatively little policy focus on industrial emissions at the state level. California uses the cap-and-trade program to address most of its industrial sources. Using price signals, this approach has rewarded early adopters and industries that follow best practices. This approach, compared to regulations, has been traditionally more welcomed by the private sector.

Action on addressing short-lived climate pollutants such as hydrofluorocarbons (HFCs) and methane, both highly potent GHGs, has been an exception. All U.S. Climate Alliance states have committed to reducing short-lived climate pollutants by 40-50% below current levels by 2030.[41] The majority of HFC emissions come from fugitive emissions of refrigerants used in refrigeration and air-conditioning (AC) systems. The largest uses of HFCs are in commercial and industrial refrigeration and air-conditioning, which comprise 48 percent of HFC emissions. California became the first state to adopt regulations to phase down the use of HFC refrigerants in commercial and industrial uses (as federal Environmental Protection Agency rules were vacated), and includes an incentive program to support its implementation. As of 2021, several additional states have taken action to curb specific HFC uses including Colorado, Maine, Maryland, Massachusetts, New Jersey, New York, Rhode Island, Vermont, Virginia, Delaware, and Washington.

Oil, coal, and gas production is the largest source of methane emissions in the United States. Colorado's 2014 methane pollution rules required additional emissions control devices and implementation of leak detection and

39 See Multi-State Medium- and Heavy-Duty Zero Emissions Vehicle MOU at https://www.energy.ca.gov/sites/default/files/2020-08/Multistate-Truck-ZEV-Governors-MOU-20200714_ADA.pdf

40 U.S. Environmental Protection Agency, 2019

41 U.S. Climate Alliance, 2021

repair programs to address volatile organic compounds (VOCs) and methane emissions.[42] It became the basis for the Obama administration's federal methane standards, and Colorado strengthened these regulations in 2019.[43] California introduced greenhouse gas standards for crude oil and natural gas facilities in 2017 that required specific mitigation options in support of its target to achieve at least 45% of its overall methane reduction by reducing fugitive emissions from the oil and gas sector. New Mexico also finalized proposed state rules to require oil and gas producers to capture 98% of methane they produce by 2026.[44]

3.4. Buildings

Commercial and residential buildings accounted for 13% of GHG emissions in the United States in 2019. [45] The main sources of emissions are from electricity, heating, and cooling. The primary means to decarbonize the building sector is therefore to improve energy efficiency and electrify fossil fuel end uses. State governments have the power to develop building codes, influence fuel choices in new and existing buildings, set appliance standards and use financial incentives including taxes and subsidies.

3.4a Building Energy Efficiency Codes and Policies

Of the states with near-term or long-term emission reduction targets, at least 14 have legislation for building energy codes and at least 21 have adopted some form of the International Energy Conservation Code (IECC). The IECC establishes minimum regulations for energy-efficient buildings for state laws as there is no national building energy code.[46] Notable state actions include legislation for Washington state's Clean Buildings Act (HB 1257),[47] the first statewide mandatory adoption of an energy performance standard for existing buildings; Montana's tax law, which provides an income tax credit for certain investments in energy efficiency;[48] North Carolina's executive order to improve state building energy efficiency by 40%;[49] and New York's legislation for a specific target of increasing energy efficiency 23% above 2012 levels by 2030.[50] California's energy efficiency goal is to be "net zero energy" residential buildings (meaning that the annual consumed energy is less than or equal to the on-site renewable generated energy.) This will be extended to commercial buildings by 2030.[51]

3.4b Green Building Incentives, Funding, and Investments

Green building policies are widespread across U.S. states and span financial, lead-by-example, and other methods. State government green incentives often depend on fiscal outlook, current levels of economic development, and the scope of the green building programs proposed. Many states have taken actions similar to Washington State's legislation for high-performance green standards for state-funded buildings. States can use taxes, grants, loans, insurance, technical assistance programs, and other policies to encourage green buildings.

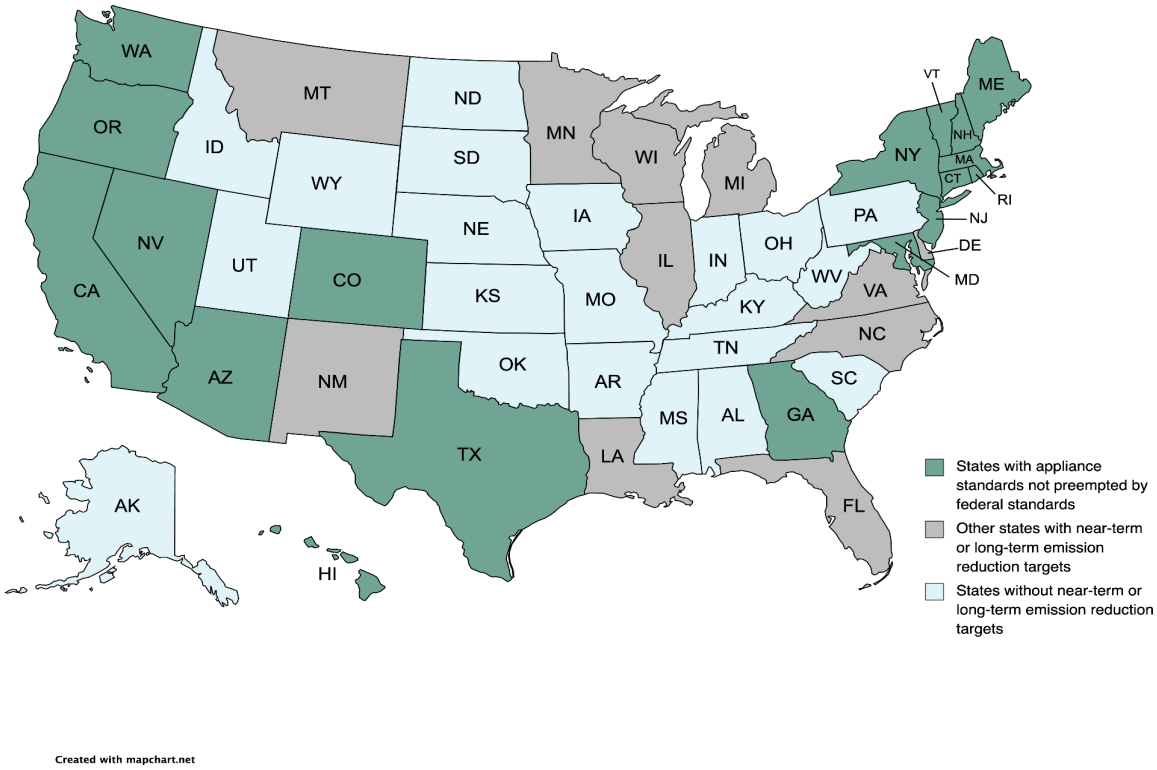
3.4c Appliance Standards

States have generally led the nation in the development of new and more stringent appliance standards in past years, as detailed in Figure 8. California and New York adopted the country's first appliance standards in 1976. These standards require products to meet specific minimum efficiency requirements to reduce energy use while improving the environment. Appliance standards also prohibit the production and sales of products less efficient than the minimum requirements. In most cases, new state standards cover products for which there are no

42 Colorado Oil & Gas Association, 2021
43 Environmental Defense Fund, 2021
44 New Mexico Oil Conservation Division, 2021
45 Environmental Protection Agency, 2021
46 Energy-Efficient Codes Coalition, 2020
47 Washington House Bill 1257, 2019
48 Montana Home Energy Efficiency and and Alternative Energy Tax Incentives, 2019
49 North Carolina, Executive Order 80, 2018
50 New York State Energy Plan, 2015
51 California Public Utilities Commission, 2021

existing federal standards. State leadership in this area is especially important because, as of 2020, the federal government had failed to review seventeen overdue energy efficiency standards, failed to finalize six standards after proposing an efficiency standard improvement, and failed to update three standards to make them more stringent, leaving twenty-six efficiency standards unaddressed.[52]

Figure 8: States with appliance standards not preempted by federal standards[53]



3.5. Land Use

In the United States, land and coastal waters management has the potential to deliver carbon sequestration and storage, limit future emissions and protection from current and future climate risks. The Environmental Protection Agency (2020) reports that carbon sequestered in natural and working lands reduced total GHG emissions in the United States by 12 percent in 2019. Overall, natural and working lands have been an area underrepresented in state climate policy. It has become an increasingly important component as its benefits to air and water quality, public health, economies and equity are taken into consideration.

The twenty-six U.S. Climate Alliance states and territories have shared priorities in climate policy for natural and working lands. Other states are taking action, too. Oregon has a proposed natural and working land goal to sequester at least an additional 5 million metric tons of carbon dioxide equivalent (MMTCO2e) per year in natural and working lands and waters by 2030, and at least 9.5 MMTCO2e per year by 2050 relative to a 2010 to 2019 activity based, business-as-usual net carbon sequestration baseline.[54] California recently released a draft of its Natural and Working Lands Climate Smart Strategy which includes priorities across different

52 Natural Resources Defense Council, 2020
53 Of states with near-term or long-term emission reduction targets
54 Oregon Natural and Working Lands Proposal 2021

ecosystems from croplands to seagrass beds to developed land.[55] This strategy builds on existing legislation that declared natural and working lands as important for meeting greenhouse gas and adaptation goals.[56] Hawaii's SB 944, requires the state's Climate Change Mitigation and Adaptation Commission to prioritize nature-based solutions in climate change mitigation and adaptation.[57] These formal strategies have been accompanied by the development of task forces, research initiatives and voluntary forest carbon programs.

Conservation and restoration have been a common priority across states. California established a goal to conserve 30% of its land to support its climate policies,[58] and this goal has now been adopted by New Mexico[59] and the Biden administration. Connecticut has a goal to protect 21% of the state's land as open space by 2023.[60] Other notable state land use initiatives include Virginia's executive order for ConserveVirginia, a state land conservation strategy that identifies high-value lands and conservation sites across the state;[61] and North Carolina's executive order for the Division of Mitigation Services to restore and protect wetlands and waterways for future generations while offsetting unavoidable environmental damage from economic development.

In the forestry sector, actions have focused on tree planting, forest management to sequester emissions and maintain existing forest levels, and actions to reduce the severity of wildfires. Wisconsin, for example, has legislation with a state goal of ensuring a future supply of wood fuel and reduction of atmospheric carbon dioxide by increasing the forested areas of the state; and the Managed Forest Law, which offers incentives to private landowners in Wisconsin for engaging in sustainable forestry practices that improve water quality, wildlife management, harvesting, and recreation.[62] Massachusetts, among other states, has also developed urban forestry programs to address environmental justice, reduce energy use, reduce flooding from stormwater runoff and urban heat islands.[63]

There has been limited effort to incorporate agriculture in state climate strategies although there are clear synergies with regenerative agriculture practices that have been promoted for reasons beyond maintaining carbon in soil. Hawaii, for example, has established the Carbon Farming Task Force within the Office of Planning to identify agricultural and aquacultural practices to improve soil health and promote carbon sequestration.[64] California has made significant investments through its Climate Smart Agriculture programs in healthy soils and agricultural land conservation. Agriculture and livestock also contribute significant methane emissions which require additional policy focus.

55 See California Natural and Working Lands Climate Smart Strategy
56 California 2016 Senate Bill (SB) 1386, California 2015 Assembly Bill (AB) 1482, California 2013 Assembly Bill (AB) 691
57 Hawaii 2019 Senate Bill 944
58 California Executive Order N-82-20
59 New Mexico Executive Order 2021-052
60 Connecticut Comprehensive Open Space Acquisition Strategy 2016-2020 Green Plan
61 Virginia 2018 Executive Order 22
62 Wisconsin's Climate Leadership, U.S. Climate Alliance, 2020
63 Massachusetts Greening the Gateway Cities Program
64 Hawaii 2018 House Bill 2182

4. Conclusion

States have been setting near- and long-term climate change targets, building the policy portfolio to meet these targets, and partnering with one another on policy development and implementation. This analysis points to the dominant approaches that states are taking within each sector. Our analysis suggests a few key characteristics of the U.S. states climate action:

- Geographically, the U.S. states climate leadership has been unevenly dominated by states in the Western and Eastern coast through economy-wide targets and regional coalition building. There has been a general lack of ambition and participation from inland states.

- Regulatory approaches have been the primary tool for climate policy making at the state level, while market-based mechanisms and other policies play a complementary role. As federalism sets the floor of climate policies, certain states, such as California, were able to aggressively develop their climate policy through state legislation and the executive branch.

- States' climate policy and action have been heavily-focused on the energy and transportation sectors, primarily in response to their contribution to GHG emissions; while industry and land use sectors have been long under-represented in states' climate policy. The majority of near-term and long-term climate targets are focused on mitigation; these actions are also rarely considered as complementary or in an integrated approach.

There are four areas in which states' climate policies needs to continue to develop:

- Equity and social benefits. Equity needs to be at the heart of climate policy to be effective. This requires more climate policies to consider the equity aspects of policy priorities, instrument choice, and implementation.

- Evaluation and progress tracking. There needs to be a better understanding of the current baseline and how states are planning to reach their near- and long-term goals, and the gaps and synergies in this process. There is an opportunity for shared learning across states as each one determines its path to carbon neutrality.

- Building climate resilience. To date, the majority of state actions focus on reducing GHG emissions. However, many states are already experiencing climate-induced disasters and need to be taking proactive steps to build resilience in the face of a changing climate.

- Federal and state coordination. There are clear roles for the federal and state government in climate policy. Through more coordinated action, and with emboldened federal leadership, the federal government can catalyze additional state actions through national climate policies and regulations, finance, incentives, capacity- building and research funding.

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