

CleanEnergy
States Alliance

Advancing Toward 100 Percent

State Policies,
Programs, and Plans for
Zero-Carbon Electricity

By **BENTHAM PAULOS**, PaulosAnalysis

UPDATED APRIL 2021





About the 100% Clean Energy Collaborative

The [100% Clean Energy Collaborative](#) assists states that have 100 percent clean energy goals by providing knowledge-sharing activities and analysis so that together they can address program challenges and opportunities. The Collaborative also provides information and technical assistance to states that may seek to establish similar goals.

The primary participants in the 100% Clean Energy Collaborative are state agency officials. Through the Collaborative, participants share program insights, engage with analysts who are studying solutions to technical challenges, and participate in Collaborative events.

The Collaborative also shares information with utilities, municipalities, clean energy advocates, industry representatives, and the general public. Anyone can sign up to receive a [free bimonthly newsletter](#) and announcements of the Collaborative's free webinars.

The Collaborative was created by the Clean Energy States Alliance (CESA) and is managed by CESA in partnership with the United States Climate Alliance.



About the Clean Energy States Alliance

The [Clean Energy States Alliance](#) (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy. CESA members— mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country. CESA facilitates information sharing, provides technical assistance, coordinates multi-state collaborative projects, and communicates the views and achievements of its members

About the Author

Bentham Paulos is the principal of [PaulosAnalysis](#), providing consulting on energy policy, advocacy, communications, and research. He is an analyst, strategist, writer, and advocate for clean energy. PaulosAnalysis clients have included government agencies, nonprofits, foundations, consulting firms, trade associations, and media. Paulos is a CESA board member, a commissioner on the Berkeley Energy Commission, and an Affiliate in the Electricity Markets & Policy Group at Lawrence Berkeley National Lab.

Acknowledgements

The author thanks the many state officials who provided information for this report and reviewed a draft. Warren Leon and Maria Blais Costello of CESA reviewed drafts and copyedited the report. Updates for the revised edition were supplied by CESA Research Associate Charles Hua. David Gerratt of DG Communications designed the final product.

© December 2020 Clean Energy States Alliance
Updated April 2021

Contents

4	Summary
5	Introduction
7	State Clean Energy Goals
9	State Progress, Plans, and Studies
9	California
12	Colorado
13	Connecticut
13	District of Columbia
14	Hawaii
15	Maine
16	Massachusetts
17	Nevada
18	New Jersey
19	New York
20	Rhode Island
21	Virginia
22	Washington
23	Conclusion
23	Further Reading



Summary

Seventeen states plus the District of Columbia and Puerto Rico have adopted policies to move to either all-renewable or zero-emission electricity supplies. The policies are typically extensions of existing renewable energy laws and regulations. In some cases, they are part of a broader effort to decarbonize the entire state economy.

This transition generally means a shift from coal and gas generation to wind and solar power in the power sector, with all of the challenges that such a shift can entail:

- **Technical issues**, such as dealing with the variability of wind and solar electricity generation, developing transmission lines to connect to new generators, and incorporating energy storage.
- **Economic issues**, such as expanding clean energy at a reasonable cost to consumers, shaping wholesale energy markets to accommodate variable generators, and adjusting retail rate designs.
- **Social issues**, such as ensuring that changes in the energy economy can deliver improvements in equity and environmental justice, create jobs and economic development, and reduce the impact on communities that will be affected by plant closures.

Although most states have a long way to go to meet their all-renewable or zero-emission goals, they are all assiduously planning for transitions that they hope will minimize potential negative impacts and maximize the benefits.

This paper, prepared for the Clean Energy States Alliance (CESA) in support of its 100% Clean Energy Collaborative, summarizes planning activities in some of the states that are aggressively pursuing decarbonization goals, describing their research, engagement, and regulatory activities. It is intended to be especially useful for policymakers, industry, and stakeholders in the current 100 percent clean energy states, as well as in those other states that may be considering similar goals.

Since planning is necessarily an iterative process, the CESA 100% Clean Energy Collaborative plans to track progress in coming years and provide updates on state activities, successes, and challenges. For more about the Collaborative see the CESA website.¹

¹ Learn more about the CESA 100% Clean Energy Collaborative at <https://www.cesa.org/projects/100-clean-energy-collaborative>.



Introduction

The declining cost and improving performance of renewable energy, along with the growing reality of climate change, has spurred a growing number of states to increase their policy ambitions on clean energy.

Currently, 17 states, plus the District of Columbia and Puerto Rico, have adopted policies to move to either all-renewable or zero-emission electricity supplies (see Figure 1, p.6). In most cases, the 100 percent targets are an extension of existing power sector policies, like state Renewable Portfolio Standard (RPS) laws. Among the 30 states that have adopted RPS policies, compliance has been strong, with many states going well beyond their targets as renewables become the least-cost option for new generation.² This has helped increase policy ambitions.

In some cases, the power sector targets are embedded in larger economy-wide decarbonization goals. Thanks to the low cost of wind and solar power, policymakers are seeing that cleaning up electricity generation can be the first step toward cleaning up other sectors, by converting transportation, industry, and space and water heating in buildings to electricity generated from renewables.

Reflecting the unique policy structures and power markets of each state, the commitments to 100 percent clean energy have taken a variety of forms. Some states have set mandates with clear and enforceable timelines. Others have included “escape hatches,” allowing reassessment as they approach higher levels, such as by requiring power suppliers to go over 80 percent renewable only “if economically and technically feasible.” And some states have used general commitments to kick off a process to develop specific policies and programs.

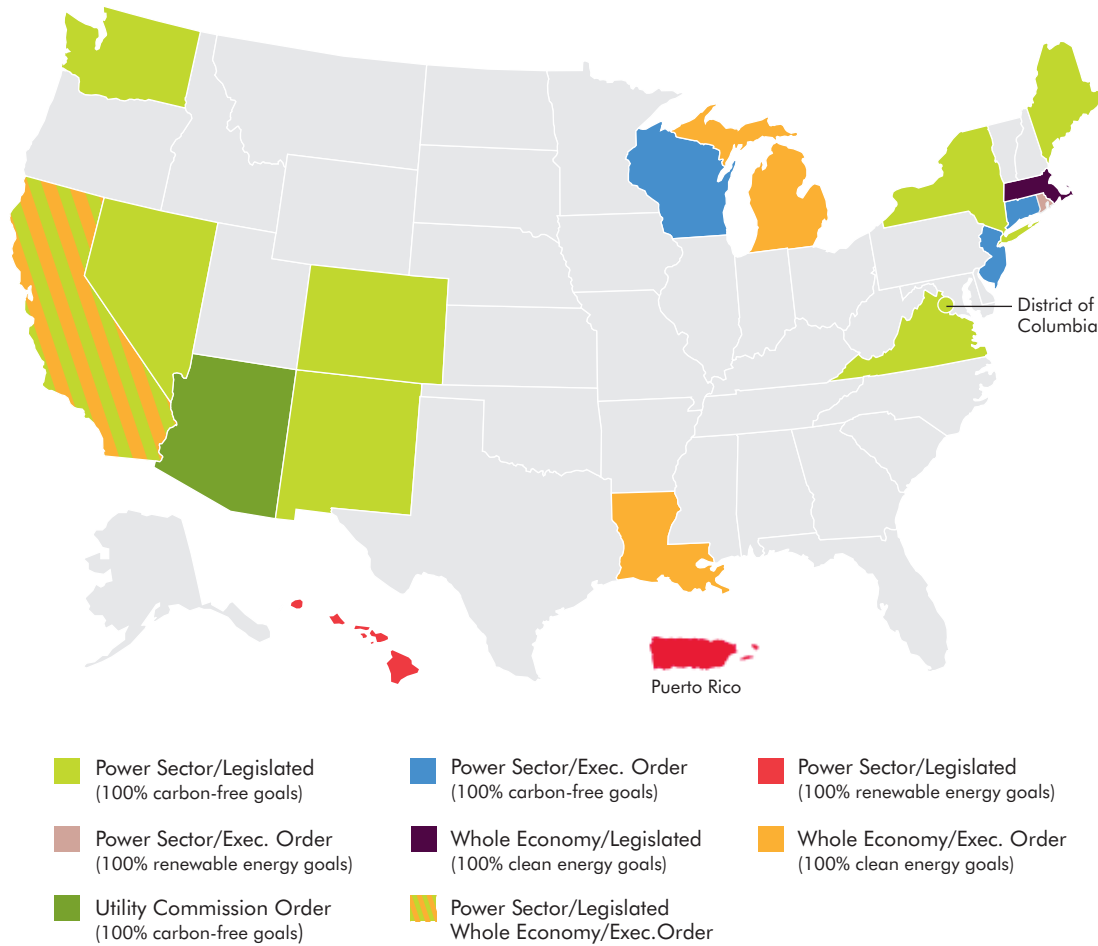
Indeed, there are many issues that require careful analysis and planning. Although wind and solar power markets are rapidly growing and make up a significant portion of generation in some regions, there is an active technical debate about how these intermittent energy resources can provide the majority of energy in a reliable regional power system. Integration strategies, such as energy storage, flexible demand, and larger grid connections, have become top-tier issues for energy planners and researchers.

Likewise, the transition from the current system to a zero-carbon or all-renewable system raises important social and fiscal questions. Communities that host coal mining, gas drilling, or fossil power plants are often dependent on those activities for jobs and tax revenues. Studies have shown that the transition to wind and solar will create more jobs than are

² Galen L Barbose, Berkeley Lab, *U.S. Renewables Portfolio Standards: 2019 Annual Status Update*, July 2019, <https://emp.lbl.gov/publications/us-renewables-portfolio-standards-2>.

Figure 1

States with 100 Percent Clean Energy or Renewable Energy Policies



This map identifies the states that have 100 percent clean energy or renewable energy goals. It also shows whether the goal was established by legislation, executive order, or the public utility commission, and if the goal applies to the power sector or to the whole economy. California's goals cover both the power sector and the whole economy.

For a more interactive, user-friendly way to see and sort the details about each state, go to the CESA website at www.cesa.org/projects/100-clean-energy-collaborative/map-and-timeline-of-100-clean-energy-states. Users can filter results and click on links to authorizing documents for each state.

displaced, but those jobs may not be in the same locations or require the same skills. Tax revenues may be quite different, affecting the ability to pay for public services. Policymakers are interested in managing the transition to reduce harms to workers and local communities.

This paper provides a landscape overview of actions by states and regions with 100 percent clean energy goals, looking especially at efforts to study, plan, and implement their energy transitions.



State Clean Energy Goals

Table 1 summarizes the goals of the 17 states, plus the District of Columbia and Puerto Rico, with policies to move to either all-renewable or zero-emission electricity supplies. The table includes links to relevant documents.

Table 1
States with 100 Percent Clean Energy Goals

State	The Goal	Comments
Arizona	100% carbon-free electricity by 2050	Adopted by order of the Arizona Commerce Commission in November 2020, extending and expanding the existing state RPS. Docket number RU-00000A-18-0284 .
California	100% carbon-free electricity by 2045	2018 legislation (SB 100) extended and expanded the existing state RPS. State agencies are required to submit implementation plans by January 1, 2021. Also in 2018, Gov. Jerry Brown's Executive Order B-55-18 set a goal of statewide carbon neutrality by no later than 2045, with net negative GHG emissions thereafter.
Colorado	100% carbon-free electricity by 2050 for Xcel Energy	A 2019 law (SB 19-236) codified a pledge previously made by Xcel, whose service territory covers approximately 60% of the state's load. It is mandatory "so long as it is technically and economically feasible."
Connecticut	100% carbon-free electricity by 2040	Governor Ned Lamont's 2019 Executive Order (Number 3) set a 2040 goal for carbon-free electricity and asked the Department of Energy and Environmental Protection to develop a decarbonization plan for the power sector, in line with previous legislation to cut economy-wide carbon emissions by 80% below 2001 levels by 2050.
District of Columbia	100% renewable electricity by 2032 through the RPS	The <i>Clean Energy DC Omnibus Amendment Act of 2018</i> (DC Act 22-583) amended the existing RPS to mandate 100% renewable electricity by the year 2032.
Hawaii	100% renewable energy by 2045 through the RPS	2015 legislation (HB623) made Hawaii the first state to set a 100% RPS for the electricity sector.
Louisiana	Net zero greenhouse gas emissions by 2050	Governor John Bel Edwards' 2020 Executive Order (JBE 2020-18) established a Climate Initiatives Task Force to develop a roadmap and make recommendations.

State	The Goal	Comments
Maine	100% clean energy by 2050	2019 legislation (LD 1494) increased Maine’s RPS to 80% by 2030, and set a goal of 100% by 2050. Also LD1679 sets an economy-wide goal of 80% cuts to greenhouse gases by 2050.
Massachusetts	Net-zero greenhouse gas emissions by 2050	In 2020, the Secretary of Energy and Environmental Affairs set a 2050 net-zero GHG emissions goal under the authority of 2008 legislation. The same goal was then included in a March 2021 climate action law (Bill S.9). A decarbonization roadmap was released at the end of 2020.
Michigan	Economy-wide carbon neutrality by 2050	Governor Gretchen Whitmer’s order in 2020 (Executive Directive 2020–10) set a goal “to achieve economy-wide carbon neutrality no later than 2050.” It directed the Department of Environment, Great Lakes, and Energy to develop a plan by the end of 2021.
Nevada	100% carbon-free electricity by 2050	2019 legislation (SB 358) raised the RPS to 50% by 2030, and set a goal of a net-zero emission power sector by 2050.
New Jersey	100% carbon-free electricity by 2050	Governor Phil Murphy’s Executive Order 28 in 2018 set a carbon free goal for the power sector and directed the BPU to develop an Energy Master Plan, which was released in 2020.
New Mexico	100% carbon-free electricity by 2045	2019 legislation (SB 489) requires a zero-carbon power supply by 2050, with at least 80% from renewables.
New York	100% zero-emission electricity by 2040	2019 legislation (S6599) requires zero-emissions electricity by 2040 and sets a goal of cutting all state GHGs 85% by 2050. A Climate Action Council will develop a plan.
Puerto Rico	100% renewable energy for electricity by 2050	2019 legislation (SB1121), the Public Energy Policy Law of Puerto Rico, set a timeline for reaching 100% renewable electricity by the year 2050.
Rhode Island	100% renewable energy electricity by 2030	Governor Gina Raimondo’s 2020 Executive Order (20-01) requires the Office of Energy Resources to “conduct economic and energy market analysis and develop viable policy and programmatic pathways” to meet 100% of statewide electricity deliveries with renewables by 2030.
Virginia	100% carbon-free electricity by 2045 for Dominion Energy and 2050 for Appalachian Power Company	The 2020 <i>Virginia Clean Economy Act</i> (House Bill 1526 and Senate Bill 851) requires zero-carbon utilities by 2050 at the latest.
Washington	100% zero-emissions electricity by 2045	2019’s <i>Clean Energy Transformation Act</i> (SB5116) applies to all utilities. The state Commerce Department started a rulemaking process in August 2019. Utilities must file implementation plans by January 2022.
Wisconsin	100% carbon-free electricity by 2050	Governor Tony Evers’ Executive Order (EO38) in 2019 directed a new Office of Sustainability and Clean Energy to “achieve a goal” of all carbon-free power by 2050.

For additional information about some of these states’ goals, as well as a list of cities and counties with 100 percent commitments, as of Fall 2019, see UCLA Luskin Center for Innovation, [Progress toward 100% Clean Energy in Cities & States across the U.S.](#), November 2019.



State Progress, Plans, and Studies

All of the states and regions that have made commitments to a 100 percent clean or renewable power supply are developing plans of some kind, as are some states that have not yet set 100 percent targets.

In this section, we provide a summary of the most substantive or fully developed plans to give a sense of how state officials, stakeholders, and consultants are approaching the issue.

There is also a large and growing body of literature studying high-renewable or low-carbon futures, which may or may not be specific to individual states and their policies. Those studies are not included here, but an annotated bibliography is available at the CESA website.³

CALIFORNIA

California's power supply has seen rapid growth from solar in the last five years, surpassing hydroelectric power as the largest source of renewable energy. Overall, the state gets about one-third of its power from RPS-eligible renewables, an additional 20 percent from large hydropower, and 8 percent from one nuclear plant, with the rest from natural gas and imports from a variety of sources.

A 2018 law, SB 100, increased the state RPS to require 60 percent from eligible renewables by 2030 and to be entirely zero-carbon by 2045. The RPS was first adopted in 2002 and steadily strengthened; before SB 100, it required 50 percent renewables by 2030 and beyond.

Several studies were done in advance of the state adopting a 100 percent policy. The California Energy Commission (CEC) funded a notable economy-wide deep-decarbonization study by consulting firm Energy + Environmental Economics (E3).⁴ The study looked at 10 scenarios to cut greenhouse gases (GHGs) 40 percent by 2030 and 80 percent by 2050, relative to 1990 levels, with a focus on energy efficiency, renewable electricity, and transportation electrification. It found a High Electrification scenario to be lower-cost and lower-risk, underscoring the

³ See <https://www.cesa.org/projects/100-clean-energy-collaborative/publications>.

⁴ Amber Mahone, et al., Energy and Environmental Economics (E3), *Deep Decarbonization in a High Renewables Future: Updated Results from the California PATHWAYS Model*, 2018, for the California Energy Commission. Publication Number: CEC-500-2018-012, https://www.ethree.com/wp-content/uploads/2018/06/Deep_Decarbonization_in_a_High_Renewables_Future_CEC-500-2018-012-1.pdf.

The California Integrated Energy Policy Report (IEPR)⁵

The IEPR is a biennial energy planning document (with off-year updates) produced by the California Energy Commission since 2002 to inform state policy. The most recent IEPR covers “decarbonizing buildings, integrating renewables, energy efficiency, energy equity, integrating renewable energy, updates on Southern California electricity reliability, climate adaptation activities for the energy sector, natural gas assessment, transportation energy demand forecast, and the California Energy Demand Forecast.” Energy forecasts are used in integrated resource plans (IRPs), state transmission planning, and transportation planning.

One notable role of the IEPR is to summarize and track progress for all of the individual IRPs filed by load-serving entities in California. The report summarizes IRPs from six investor-owned utilities, 20 community choice aggregators, 17 competitive power retailers (called ESPs), and four electric cooperatives, plus the state’s 16 largest publicly owned utilities. It compares the summarized IRPs with state goals on renewable energy, energy efficiency, and greenhouse gas emissions. Since the time scale of the IRPs and the IEPR is ten years, it shows strong progress, but not achievement of the longer-term zero-emission requirements in 2045.

Another role of the IEPR is to put forward strategic proposals for consideration by other agencies. For example, California’s large energy efficiency programs have typically focused only on saving energy and cutting customer bills. The most recent IEPR proposes a shift to ensure “low-income residents perceive the full range of benefits of the low-carbon energy economy” and to work on “market transformation” efforts that lower the cost of low-carbon technologies, such as for building electrification.

importance of consumer choice in adopting electric vehicles, energy efficiency, and electrification in buildings. The authors advised that a market transformation strategy would be needed to reduce the purchase price of electric vehicles and heat pumps. They also warned against waiting to take action, since continued purchase of fossil-fueled equipment results in a costly need to replace it later.

SB 100 requires a planning and progress report from the three state agencies—the CEC, California Public Utilities Commission (CPUC), and California Air Resources Board (CARB)—to be filed every four years. The first SB100 report, delivered March 2021, models several pathways for California to achieve its carbon-free energy goals.⁶ The report finds that California will need to triple its electricity grid capacity and maintain an unprecedented rate of renewable energy generation buildout by developing up to 175 GW of new capacity by 2045, or 6 GW of new solar, wind, and storage resources per year. Although these pathways suggest an

5 California Energy Commission, Final 2019 *Integrated Energy Policy Report* including Errata, adopted February 20, 2020, <https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report>.

6 California Energy Commission, Public Utility Commission, Air Resources Board, SB 100 *Joint Agency Report: Charting a Path to a 100% Clean Energy Future*, March 15, 2021, <https://www.energy.ca.gov/news/2021-03/california-releases-report-charting-path-100-percent-clean-electricity>.

annual increase in electricity system costs, they will also yield significant air pollution, public health, emissions reduction, and job creation benefits.

Utilities and other load-serving entities are required to submit Integrated Resource Plans (IRPs) to the California Public Utility Commission every two years, with 10-year procurement plans.⁷ SB 100 also requires all state agencies to incorporate 100 percent targets into their relevant planning documents, including the CEC's Integrated Energy Policy Report (IEPR), the broadest energy planning document (see sidebar).

A series of eight SB 100 workshops have been held to date to address issues related to environmental and land-use impacts, equity, affordability, reliability, and climate resilience.

One key issue California is working to address is the impact of solar PV on daily grid operations. Solar now accounts for 20 percent of annual in-state generation and meets 18 percent of total demand. Renewables (not counting large hydropower) have already supplied as much as 80 percent of demand in some hours.

Since solar is concentrated in daylight hours, it has dramatically reshaped the daily "net demand" curve (i.e., electricity demand minus wind and solar generation), resulting in very low net demand midday, a large evening ramp, and an early evening peak. Since solar is the least-cost source of new generation, the key questions for SB 100 planning are how best to integrate solar and how to meet demand with zero-carbon sources in non-daylight hours.

These issues contributed to a set of rotating power outages in August 2020, as a record heat wave across the West drove up power demand beyond forecast levels. In a postmortem analysis, state agencies said that "In transitioning to a reliable, clean and affordable resource mix, resource planning targets have not kept pace to lead to sufficient resources that can be relied upon to meet demand in the early evening hours." The report recommends updating resource and reliability planning targets as well as improving the use of demand response and flexibility measures.⁸

COLORADO

The Colorado legislature's 2019 session was a monumental one for clean energy and climate policy, with 14 bills passed and signed into law.

Senate Bill 19-236 incorporates a cost of carbon into utility planning and requires Xcel Energy, the state's largest electric utility, to cut power sector carbon emissions by 80 percent below 2005 levels by 2030 and move to 100 percent clean energy by 2050.⁹ It codified a pledge previously made by Xcel, which covers approximately 60 percent of the state's load. The 100 percent goal is mandatory "so long as it is technically and economically feasible" and "in the public interest."

7 California Public Utilities Commission, *Integrated Resource Plan and Long Term Procurement Plan* (IRP-LTPP), <https://www.cpuc.ca.gov/irp>.

8 California Independent System Operator, California Public Utilities Commission, California Energy Commission, *Preliminary Root Cause Analysis: Mid-August 2020 Heat Storm*, October 6, 2020, <http://www.caiso.com/Documents/Preliminary-Root-Cause-Analysis-Rtating-Outages-August-2020.pdf>.

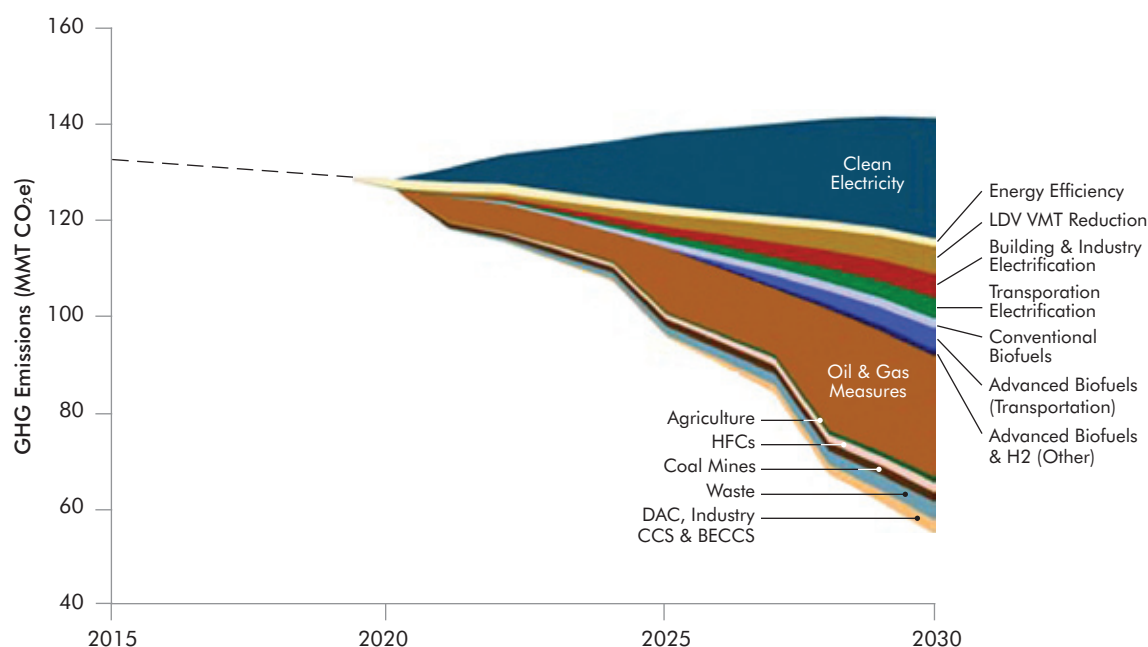
9 Senator Garcia et al., Colorado Senate Bill 19-236, *Sunset Public Utilities Commission*, signed May 30, 2019, <http://leg.colorado.gov/bills/sb19-236>

A broader bill, HB 19-1261, sets a goal of reducing GHGs economy-wide by 25 percent below 2005 levels by 2025, 50 percent by 2030, and 90 percent by 2050.¹⁰ It directs the state air quality control commission to promulgate rules.

These bills and other policies are reflected in a plan from Governor Jared Polis, the *Roadmap To 100 percent Renewable Energy by 2040 and Bold Climate Action*.¹¹ The 11-page document reports on progress in developing policies and programs across various end-use sectors and gives a detailed list of future actions to take in pursuit of decarbonization goals.

In January 2021, the state released a more specific *Colorado Greenhouse Gas Pollution Reduction Roadmap* that outlined a comprehensive set of strategies and near-term actions for Colorado to accelerate progress on reducing emissions, advancing environmental justice, mitigating air pollution, and creating economic prosperity.¹² To develop the report, the state energy office led an extensive public engagement process, reaching out to the public, local governments, and stakeholder groups, with supporting analysis from the consulting firm E3 and a Technical Advisory Group consisting of experts from industry and the academic and scientific communities.

Figure 2
Potential Reductions in Greenhouse Gases in Colorado



Source: Colorado Greenhouse Gas Pollution Reduction Roadmap (Public Review Draft), September 30, 2020.

10 Representative KC Becker et al., Colorado House Bill 19-1261, *Climate Action Plan To Reduce Pollution*, signed May 30, 2019, <http://leg.colorado.gov/bills/hb19-1261>

11 Governor Jared Polis, *Roadmap to 100% Renewable Energy by 2040 and Bold Climate Action*, May 2019, https://drive.google.com/file/d/1K_anGQpEf-edqhjz5b6D3LJlsfV3ml3/view?usp=sharing

12 Governor Jared Polis, *Colorado Greenhouse Gas Pollution Reduction Roadmap*, January 14, 2021, https://drive.google.com/file/d/1jzLvFcrDryhhs9ZkT_UXkQM_0LiYzfzq/view

The Roadmap notes that while Colorado has made significant progress towards meeting its 2025 and 2030 greenhouse gas emissions reduction goals, new policies, regulations, and actions will be necessary to further decarbonize the state's economy. Its analysis found that three of the largest opportunities for emissions reductions consist of transitioning away from coal for power generation, minimizing methane leakage from oil and gas production within the state, and accelerating electrification of its buildings and transportation sectors (see Figure 2, p. 12). The Roadmap also calls for a greater focus on analyzing and mitigating the disproportionate impacts of air pollution and greenhouse gas emissions on lower-income communities and communities of color.

CONNECTICUT

Connecticut is developing a decarbonization plan under a 2019 Executive Order from Governor Ned Lamont, in line with previous legislation to cut economy-wide carbon emissions by 80 percent below 2001 levels by 2050.¹³ The key planning venue is the IRP for utilities.

The decarbonization analysis is looking at a central, cost-minimizing "Balanced Blend Scenario" along with four alternative pathways that either extend the life of the Millstone nuclear power plant, emphasize distributed solar, upgrade the transmission system to remove constraints, or impose a carbon tax on in-state generators. The study uses two load projections, a base case of current projections and an electrification case that assumes greater deployment of air source heat pumps and electric vehicles. This study will be released in late 2020.

DISTRICT OF COLUMBIA

DC has three connected planning documents related to clean energy and climate change. The *Clean Energy DC* plan, released in 2018, "serves as both a long-term GHG reduction plan and a short-term energy plan."¹⁴

At the time, the District had three interrelated goals for 2032: to cut GHGs by 50 percent below 2006 levels, to cut energy use by half of 2012 levels, and to get half of its energy from renewable sources. In modeling for the *Clean Energy DC* plan, the Department of Energy and Environment (DOEE) found that achieving all three targets in unison "will prove exceptionally difficult, if not impossible." As a result, DOEE prioritized achieving the GHG reduction target, while energy use would drop 20 percent below 2012 levels and renewables would make up 30 percent of power supply.

In 2019, the *Clean Energy DC Omnibus Amendment Act* (DC Act 22-583) amended the District's existing RPS to mandate 100 percent renewable electricity by the year 2032 and set the District on a path for carbon neutrality by 2050.¹⁵

13 Gov. Ned Lamont, Executive Order Number 3, September 3, 2019, <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-3.pdf?la=en&hash=F836ED64F1BB49A5424AB4C7493A3AE3>.

14 Department of Energy & Environment (DOEE), *Clean Energy DC*, August 2018, <https://doee.dc.gov/cleanenergydc>.

15 DC Act 22-583, January 18, 2019, https://lms.dccouncil.us/downloads/LIMS/40667/Signed_Act/B22-0904-SignedAct.pdf.

The second planning document is a broader *Sustainable DC* plan, first released in 2013. An updated version 2.0, released in 2019, contains 167 actions and 36 goals across 13 separate topics, including energy and climate. Each of the 13 topic areas has specific goals, quantitative targets, and actions with short, medium, and long-term timeframes.¹⁶

The third document is *Climate Ready DC*, covering climate adaptation.¹⁷ That plan outlines actions the District will take to adapt to and prepare for higher temperatures, more dangerous heat waves, rising sea levels, and more severe and frequent storms.

HAWAII

Legislation in 2015 (HB623) made Hawaii the first state to set a 100 percent RPS for the electricity sector.¹⁸ Hawaii has the highest electricity costs in the US, and is very dependent on oil for power generation, putting it at the mercy of fluctuations in price and supply trends on the global oil market, which carry through to retail electricity costs. Electricity prices hit an average retail price of 36 cents per kWh in 2012, compared to the US average of 11 cents.

As an island power system, Hawaii is forced to grapple now with issues that all regions will have to face eventually, such as integration of variable renewables, business models, and energy transition. Because most of the state is served by a single investor-owned utility, the Hawaii Electric Company (HECO), the utility's power supply improvement plan (PSIP) is the primary document for planning for the state's power system.¹⁹

It took HECO three attempts to develop a 100 percent renewable energy plan that regulators would accept. The current PSIP was accepted in 2017 and aims to hit the 100 percent renewable target by 2040, five years sooner than required. Procurement activity is centered on solar and battery storage, with small amounts of wind, biomass, and geothermal, and ongoing growth of customer-owned solar and storage.²⁰

Indeed, Hawaii has a higher share of customer-owned solar than in any other state. In 2019, 12 percent of electricity sales in Hawaii came from small solar systems, double the percentage of the next largest state, California.²¹

As a result of the very high penetration levels of rooftop solar, Hawaiian energy planners and researchers have focused more than other regions on the impacts and opportunities of distributed energy. The Hawaii Electricity Reliability Administrator (HERA) was created to oversee technical issues, and numerous studies have been done by the National Renewable Energy

16 Office of Planning (OP) and the Department of Energy & Environment (DOEE), *Sustainable DC 2.0*, April 23, 2019, <https://www.sustainabledc.org/in-dc/sdc2>.

17 Department of Energy & Environment (DOEE), *Climate Ready DC*, November 15, 2016, http://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/CRDC-Report-FINAL-Web.pdf.

18 State of Hawaii, *HB 623: Relating to Renewable Standards*, June 10, 2015, https://www.capitol.hawaii.gov/Archives/measure_indiv_Archives.aspx?billtype=HB&billnumber=623&year=2015.

19 HECO, 2016 Power Supply Improvement Plan, <https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/power-supply-improvement-plan>.

20 HECO, Renewable Project Status Board, accessed October 2020, <https://www.hawaiianelectric.com/clean-energy-hawaii/our-clean-energy-portfolio/renewable-project-status-board>.

21 Berkeley Lab, *Utility Scale Solar 2020 Data Update*, <https://emp.lbl.gov/capacity-and-generation-state>.

Lab, Sandia National Lab, GE Energy Consulting, and the Hawai'i Natural Energy Institute at the University of Hawai'i-Manoa.²²

But procurement and technical issues are only part of the planning process. Some policy-makers have long been unhappy that HECO displayed a “capital investment bias” that impeded the development of customer-side generation, such as rooftop solar. The legislature passed the *Ratepayer Protection Act of 2018* (SB 2939) to address the issue, requesting a study of alternative business models for electric utilities, and alternative models for regulatory approaches “to align the HECO Companies’ business model with customers’ interests and the State’s public policy goals.”²³

The study, completed in June 2019, evaluated “the ability of each model to achieve state energy goals; maximize customer cost savings; enable a competitive distribution system in which independent agents can trade and combine evolving services to meet customer needs; and eliminate or reduce conflicts of interest in energy resource planning, delivery, and regulation.”²⁴

In short, the study found that “alternative regulatory models have a greater likelihood of helping to achieve the core policy objectives” than different utility business models. It found that “shortcomings of the current [IOU] ownership models identified in the evaluation can be offset by changes to the regulatory model.” The primary recommendation was to move to a performance-based regulation (PBR) model.

MAINE

In June 2019, Governor Janet Mills signed several major climate and clean energy bills, including LD 1494 that increases Maine’s RPS to 80 percent by 2030, up from 40 percent today, and sets a goal of 100 percent by 2050.²⁵ An executive order from the Governor sets a statewide goal to achieve carbon neutrality by 2045. Other legislation directs the reduction of greenhouse gas emissions to 80 percent below 1990 levels by 2050, as well as establishes the Maine Climate Council to develop a four-year plan to accomplish these goals.

The Climate Council has seven subcommittees and working groups, including an energy working group, that delivered a Climate Action Plan to the governor and legislature in December.²⁶ The report, *Maine Won’t Wait*, presents eight strategies to cut greenhouse gas emissions, protect against the impacts of climate change, advance economic opportunity and equity, and engage the public. It lays out near-term and long-term needs for funding, establishes a set of metrics to track progress, and identifies lead agencies to ensure accountability.

22 See for example research from the Hawai'i Natural Energy Institute, <https://www.hnei.hawaii.edu/research/grid-integration-renewable-power-generation>.

23 Ratepayer Protection Act (SB 2939), April 24, 2018, https://www.capitol.hawaii.gov/session2018/bills/SB2939_.htm.

24 London Economics International, *Evaluation of Utility Ownership and Regulatory Models for Hawaii*, prepared for the Hawaii Department of Business, Economic Development, and Tourism, June 2019, <https://energy.hawaii.gov/utility-model>.

25 Office of Governor Janet T. Mills, Press Release: “Governor Mills Signs Major Renewable Energy and Climate Change Bills Into Law,” June 26, 2019, <https://www.maine.gov/governor/mills/news/governor-mills-signs-major-renewable-energy-and-climate-change-bills-law-2019-06-26>.

26 Maine Climate Council, *Maine Won’t Wait: A Four-Year Plan for Climate Action*, December 2020, https://www.maine.gov/future/sites/maine.gov/future/files/inline-files/MaineWontWait_December2020.pdf.

To support the main report, the Council commissioned several research documents including an assessment of the impacts of climate change on Maine, a “cost-of-doing-nothing” report, detailed energy sector modeling, cost/benefit analysis of the potential recommendations, and an equity assessment.²⁷

In addition, the Governor’s Energy Office and Governor’s Office of Policy Innovation and the Future released a report in November 2020, *Strengthening Maine’s Clean Energy Economy*, which offers a detailed analysis of the momentum within Maine’s clean energy sector, in part as a result of strong climate and clean energy policies. The report details the potential of the clean energy sector to be a source of economic growth and workforce opportunities and outlines strategies for recognizing that potential and expanding Maine’s clean energy economy.²⁸

The Governor’s Energy Office is also slated to produce a Renewable Energy Market Assessment Report by January 2021, which was put out for bid in July 2020. This study will assess the renewable energy market and will include analysis and review of the opportunities, potential, and challenges facing the state in reaching Maine’s 80 percent RPS by 2030.²⁹

MASSACHUSETTS

The 2008 *Global Warming Solutions Act* (GWSA) requires the Secretary of the Executive Office of Energy and Environmental Affairs (EEA) to adopt a statewide GHG emissions limit for 2050 that is at least 80 percent below the state’s 1990 emissions level. Under the authority of the GWSA, the Secretary issued a decision in April 2020 establishing net zero emissions as the new legal limit for 2050, achieving at least an 85 percent gross emissions reduction.³⁰

In March 2021, the legislature passed and Governor Charlie Baker signed comprehensive climate action legislation that includes the same goal of net-zero emissions by 2050. The law also includes an interim goal for 2030 of a 50 percent reduction in emissions from 1990 levels.

The GWSA requires EEA to issue a progress report and implementation plan, called the Clean Energy and Climate Plan (CECP), every five years.³¹ The CECP looks forward 10 years and is used to guide program and policy development. Over the past several years, Massachusetts has released several documents, including the *GWSA 10-Year Progress Report*, *State Hazard Mitigation and Climate Adaptation Plan*, and *Climate Change Adaptation Report*.

In December 2020, EEA, in collaboration with The Cadmus Group, released a Massachusetts 2050 Decarbonization Roadmap report, which outlined pathways for the state to achieve its new 2050 emissions limit.³² The Roadmap report analyzed the various tradeoffs and short- and

27 Maine Climate Council, Reports, <https://climatecouncil.maine.gov/reports>.

28 State of Maine Office of Governor Janet Mills, Press Release: “Mills Administration Releases Report on Strengthening Maine’s Clean Energy Economy,” November 9, 2020, <https://www.maine.gov/governor/mills/news/mills-administration-releases-report-strengthening-maines-clean-energy-economy-2020-11-09>.

29 Maine Governor’s Energy Office, Renewable Energy Market Assessment, <https://www.maine.gov/energy/studies-reports-working-groups/current-studies-working-groups/renewable-energy-market-assessment>.

30 Massachusetts Executive Office of Energy and Environmental Affairs, Press Release: “Baker-Polito Administration Issues Letter Establishing Net Zero Emissions Target,” April 22, 2020, <https://www.mass.gov/news/baker-polito-administration-issues-letter-establishing-net-zero-emissions-target>.

31 Executive Office of Energy and Environmental Affairs, 2015 *update of the Clean Energy and Climate Plan for 2020*, December 31, 2015, <https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2020/download>

32 Executive Office of Energy and Environmental Affairs, “Massachusetts 2050 Decarbonization Roadmap,” December 2020, <https://www.mass.gov/info-details/ma-decarbonization-roadmap>.

long-term implications for Massachusetts to achieve its deep decarbonization goals, while informing interim emissions targets for its 2030 CECP.

The Roadmap analysis used an integrated cross-sector approach to model eight deep decarbonization pathways for Massachusetts to achieve net zero emissions statewide by 2050. These pathways differed primarily along technology dimensions, with some pathways considering limited offshore wind, efficiency, or thermal resources, and other pathways placing greater emphasis on distributed energy resources or natural gas. The report also developed four sector-specific analyses (aimed at buildings, transportation, non-energy emissions, and carbon sequestration) and a separate economic and health impact analysis.

By identifying key themes that emerge from the pathways, EEA hopes to identify “no-regret” actions to pursue, while ensuring flexibility given shifting economic and policy trends around various energy technologies.³³

NEVADA

Legislation in 2019 (SB 358) raised the state’s existing RPS, first adopted in 1997, to 50 percent by 2030, and set a goal of a net-zero emission power sector by 2050.³⁴ Up to 10 percent of the goal can be met with energy efficiency improvements.

Also, Gov. Sisolak convened the Nevada Climate Initiative in August 2020, which released a Climate Strategy in December for cutting emissions economy-wide.³⁵ The Strategy provides an integrated framework for assessing climate mitigation policies, lays the groundwork for future climate resilience and adaptation planning, outlines economic recovery opportunities connected to climate action, and offers options for climate governance and long-term community engagement. The strategy was developed in support of Nevada’s greenhouse gas emission reduction goal of 4 percent below 2005 levels by 2030, set in 2019 by SB254, and Executive Order 2019–22.³⁶

Planning for the higher RPS is done through normal utility planning structures. Power providers are required to file IRPs every three years, with interim updates, along with annual RPS compliance reports. NV Energy, the consortium of two utilities that account for 81 percent of state power sales, said in their most recent IRP that they will add 1,190 megawatts of new solar capacity plus 590 megawatts of energy storage.

However, in 2020 amendments to the plan, the company argues that “just-in-time or short-term planning” is no longer adequate: “Long term visions and planning need to be pursued to ensure the Companies can meet their legal obligations to serve, meet customer’s needs,

33 *Global Warming Solutions Act (GWSA) Implementation Advisory Committee (IAC)*, meeting minutes, June 11, 2020, https://www.mass.gov/doc/draft-meeting-minutes-0/download?_ga=2.179986788.1767947979.1603235747-1725447752.1599256910.

34 Nevada voters are also voting on a ballot measure in 2020 to achieve the same goal. Similar legislation was vetoed in 2017, so advocates put the measure on the ballot in 2018. Under state law constitutional amendments must be approved in two successive elections.

35 Nevada Climate Initiative, *State Climate Strategy*, December 2020, <https://climateaction.nv.gov/our-strategy>

36 Nevada Legislature, SB254, signed June 3, 2019, <https://www.leg.state.nv.us/App/NELIS/REL/80th2019/Bill/6431/Overview>. Gov. Steve Sisolak, EXECUTIVE ORDER 2019-22, November 22, 2019, https://gov.nv.gov/News/Executive_Orders/2019/Executive_Order_2019-22_Directing_Executive_Branch_to_Advance_Nevada_s_Climate_Goals

and efficiently and economically meet the increased RPS and the state's net-zero carbon policy."

To explore long-term planning, NV Energy commissioned an analysis from E3, which found that even though solar and geothermal resources are plentiful in Nevada, the portfolio would benefit from more out-of-state wind power and more regional power transactions.³⁷

In response to other legislation (2017 SB 146), NV Energy developed its first Distributed Resources Plan (DRP) in 2019. The utility is required to offer an online portal for developers with maps and information on distribution-level grid, such as hosting capacity and locational net benefits. This is intended to help developers and vendors make siting decisions for Distributed Energy Resources (DERs).³⁸

NEW JERSEY

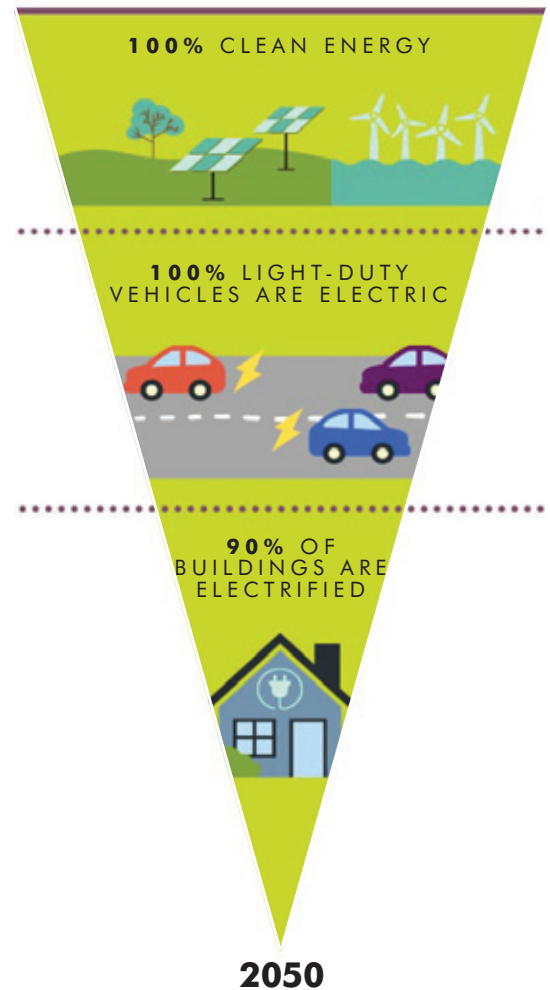
New Jersey's *Global Warming Response Act of 2007* (GWRA) set goals to reduce state greenhouse gas emissions to 1990 levels by 2020 and 80 percent below 2006 levels by 2050.³⁹ The 2020 target was far surpassed, as 2018 emissions dropped to 97 million metric tons (MMt) of CO₂, well below the 123 MMt released in 1990. The 2050 target is only 24 MMt of CO₂.

In 2018, Governor Phil Murphy signed the *Clean Energy Act of 2018*, which raised the state RPS to 50 percent by 2030, set goals for offshore wind and energy storage, increased energy efficiency standards, and set new policies for distributed and community solar power. The same day he issued Executive Order 28, setting a goal of 100 percent clean energy by 2050.⁴⁰

The Order also provided direction on energy planning to pursue the 100 percent goal, including integrating it into the 2019 edition of the Energy Master Plan, which was released in January 2020 (see Figure 3).

Later in 2020, the New Jersey Department of Environmental Protection (DEP) issued a progress report on the *Global Warming Response Act's* "80x50" goals, as required by statute.⁴¹ The

Figure 3
NJ Strategies to Achieve 80x50



Source: NJ Department of Environmental Protection

37 NV Energy, Northern and Southern Service Territory IRP 4th Amendment, Docket# 20-07023, Volume 8, "Zero Carbon Findings and Analysis," filed July 20, 2020, <https://www.nvenergy.com/about-nvenergy/rates-regulatory/recent-regulatory-filings>.

38 NV Energy, Distributed Resources Portal, <https://drp.nvenergy.com/drp-external/#>.

39 *Global Warming Response Act* (GWRA), July 6, 2007, http://www.njleg.state.nj.us/20062007/PL07/112_.PDF.

40 Gov. Murphy, Executive Order 28, <https://www.nj.gov/infobank/eo/056murphy/pdf/EO-28.pdf>.

41 NJ Department of Environmental Protection, 2020 New Jersey *Global Warming Response Act* 80x50 Report, October 15, 2020, <https://www.nj.gov/dep/climatechange/docs/nj-gwra-80x50-report-2020.pdf>.

New Jersey Energy Master Plan—Pathway to 2050⁴²

The New Jersey Board of Public Utilities (BPU), which serves as both the utility regulator and the state energy office, has written the Energy Master Plan (EMP) since the 1970s. Under an executive order from the governor, the most recent plan “marks the first report in our state’s history to holistically consider the complete energy system in New Jersey, including electricity generation, transportation, and buildings, along with their associated greenhouse gas emissions.”

The Energy Master Plan is informed by a research product called the Integrated Energy Plan, which models future scenarios for energy demand across the state economy.⁴³ Because that plan provides deep analysis, the Master Plan puts a greater focus on planning and policy recommendations, laying out strategies in seven key areas. These cover technical issues like grid modernization; financial issues, such as a proposal to develop a New Jersey green bank; and social issues, such as greater planning and engagement with low-income and “environmental justice communities.” The 2019 Energy Master Plan was discussed in a CESA webinar in July 2019.⁴⁴

report is “intended to provide comparisons of policy alternatives to understand where the greatest gains could be realized,” to give implementation guidance along with regulatory and legislative recommendations.

Like other states, the New Jersey plans put an emphasis on continuing to clean up the power system, then using electricity to decarbonize transportation and buildings. New Jersey has long been a leader on distributed solar. Current planning aims to diversify the sources of renewable energy, with a greater focus on offshore wind and larger community solar installations.

NEW YORK

New York has largely retired coal from in-state generation, but the state still got 36 percent of its power from natural gas generators in 2018. Large hydro facilities, such as at Niagara Falls, and four nuclear plants provide 55 percent of generation, with other renewables providing approximately 3 percent.⁴⁵

42 New Jersey Board of Public Utilities, *Energy Master Plan: Pathway to 2050*, January 2020, https://nj.gov/emp/docs/pdf/2020_NJBPU_EMP.pdf.

43 Rocky Mountain Institute (RMI), *New Jersey Integrated Energy Plan Public Webinar*, under contract to the NJ BPU, November 1, 2019, [https://www.bpu.state.nj.us/bpu/pdf/publicnotice/NJ percent20IEP percent20Public percent20Webinar percent20Nov1 percent20Final.pdf](https://www.bpu.state.nj.us/bpu/pdf/publicnotice/NJ%20IEP%20Public%20Webinar%20Nov1%20Final.pdf).

44 Clean Energy States Alliance, Webinar recording: “New Jersey’s Plan for Achieving 100 Percent Carbon-Neutral Electricity,” July 29, 2019, <https://www.cesa.org/event/new-jerseys-plan-for-achieving-100-carbon-neutral-electricity>.

45 NYSDA, *Clean Energy Standard Annual Progress Report: 2018 Compliance Year*, December 2019, <https://www.nyserda.ny.gov/-/media/Files/Programs/Clean-Energy-Standard/2019/Case-15-E00302-CES-2018-Annual-Progress-Report.pdf>.

The *Climate Leadership and Community Protection Act* (CLCPA, S6599), enacted in 2019, requires power providers to get at least 70 percent of their load from renewables in 2030 (up from the previous target of 50 percent), and to move to zero-emission electricity by 2040.⁴⁶

The most recent New York State Energy Plan is from 2015, but it was followed by a 2017 biennial progress report, and amended in 2020 by the state planning board.⁴⁷ Those documents put a strong emphasis on increasing solar and offshore wind capacity, while cutting power demand through energy efficiency.

In October 2020, the New York Public Service Commission issued an order that expanded the Clean Energy Standard (CES) that aligns “the existing and relevant regulatory and procurement structures” with the CLCPA.⁴⁸ The order sets procurement trajectories for categories of renewable energy systems to meet the 70 percent target and beyond.

A Climate Action Council, with input from various advisory panels, is required to finalize a Scoping Plan for implementation of the CLCPA within three years.⁴⁹ The Scoping Plan will evaluate technology and policy pathways across all sectors of the economy, including the energy sector, to identify actions to meet GHG reduction goals. The law requires that at least 35 percent (with a goal of 40 percent) of the benefits from clean energy and energy efficiency investments be realized by disadvantaged communities, with a Climate Justice Working Group established to develop criteria to identify disadvantaged communities. The final Scoping Plan, with updates, will inform future policies and programming, including future state energy plans.

RHODE ISLAND

In January 2020, Governor Gina M. Raimondo issued Executive Order 20-01, which established a goal for Rhode Island to meet its electricity demand with 100 percent renewable energy by 2030. With its commitment to transition entirely to renewable energy within a decade, Rhode Island currently has the earliest timeline to reach a goal of 100 percent renewable energy of any state.⁵⁰

The Executive Order directed Rhode Island’s Office of Energy Resources (OER) to analyze economic and technical pathways to achieve this goal. To develop its report, OER secured research support from the Brattle Group and conducted an extensive stakeholder engagement process consisting of virtual feedback sessions and technical workshops.

In December 2020, Rhode Island released its report, which outlined economic and policy analysis for the state to achieve its 100 percent renewable energy goal.⁵¹ The report captures

46 *Climate Leadership and Community Protection Act* (S6599), <https://www.nysenate.gov/legislation/bills/2019/s6599>.

47 New York State Energy Plan, <https://energyplan.ny.gov>.

48 State of New York Public Service Commission, *Order Adopting Modifications to the Clean Energy Standard*, CASE 15-E-0302, October 15, 2020, <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={EAAF1A1E-2A05-49A7-A4D1-C5755E5BE536}>.

49 New York Climate Action Council, <https://climate.ny.gov>.

50 Gov. Gina M. Raimondo, *Executive Order 20-01, Advancing a 100% Renewable Energy Future for Rhode Island by 2030*, January 17, 2020, <https://governor.ri.gov/documents/orders/Executive-Order-20-01.pdf>.

51 Rhode Island Office of Energy Resources, *The Road to 100% Renewable Electricity by 2030 in Rhode Island*, prepared by the Brattle Group, December 2020, <http://www.energy.ri.gov/100percent>.

a range of pathways, comparing various renewable energy technologies along several dimensions (including feasibility, scalability, cost, market value, and job impacts) and analyzing technical and economic barriers, policy mechanisms, and equity considerations.

The report's analysis suggests that Rhode Island is likely to rely heavily on offshore and on-shore wind to reach its goal. In 2024, Rhode Island expects to add 400 MW of offshore wind capacity through the Revolution Wind project, which is projected to meet roughly 40 percent of the state's electricity demand in 2030. The report also considers strategies around renewable energy credits (RECs) and collaboration on energy procurement initiatives with other New England states to fulfill remaining gaps. The report underscores the need for equity and investment to support frontline and marginalized communities.⁵²

VIRGINIA

In September 2019, Governor Ralph Northam issued Executive Order 43 (EO-43) defining requirements for renewable energy investment in Virginia and setting a goal for 100 percent of electricity utilized in Virginia to be derived from carbon-free sources by 2050. The clean energy goals defined in EO-43 were given legislative authorization in the *Virginia Clean Economy Act (VCEA)* which was passed by the General Assembly in March 2020 and signed into law by Governor Northam in April 2020.

The VCEA established a mandatory RPS Program for the state's two largest utilities, Dominion Energy Virginia and Appalachian Power Company (ApCo). The annual RPS requirements of the VCEA increase over time to 100 percent by 2045 for Dominion and by 2050 for ApCo. The VCEA also declared construction of 16 gigawatts (GW) of solar and onshore wind, 5.2 GW of offshore wind, and 2.7 GW of energy storage capacity to be in the public interest; set annual energy efficiency savings requirements of 1.25 percent for Dominion and 0.5 percent for ApCo; required inclusion of the social cost of carbon in the regulatory review of any new electric generating facilities; and established a Percentage of Income Payment Plan to shield low-income customers from excessive energy burdens.

In response to EO-43 and the VCEA, Dominion and ApCo issued RFPs in 2020 for 1.2 GW of utility-scale onshore wind and solar projects and an additional 80 MW of distributed solar capacity. Site assessment is also well underway at a wind energy development zone 27 miles off the coast of Virginia Beach. Construction of a 2.6 GW wind farm at the site is scheduled to start by 2024. The Commonwealth intends to develop an additional 2.6 GW of offshore wind capacity by 2034 and has entered into a partnership with Maryland and North Carolina to accelerate and coordinate offshore wind development in the Mid-Atlantic and Southeast region.

Legislation passed during the 2020 session of the General Assembly also authorized the Virginia Air Pollution Control Board to implement an emission allowance and trading program that will provide the state with an additional mechanism for ensuring a low-cost transition to a 100 percent carbon-neutral electricity supply. Based on this authorization, Virginia will join the Regional Greenhouse Gas Initiative in 2021.

52 A bill, S0629, was introduced in March 2021 to codify the executive order in law. See <https://www.billtrack50.com/BillDetail/1348316>.

The VCEA requires the Secretary of Natural Resources and the Secretary of Commerce and Trade to provide a report to the General Assembly by January 1, 2022 with recommendations on how to achieve 100 percent carbon-free electric energy generation by 2045, at least cost for ratepayers. To support the transition to clean energy in the state, the Energy Transition Institute at the University of Virginia's Weldon Cooper Center has completed an initial analysis of alternative pathways for achieving a 100 percent carbon-neutral energy supply for Virginia.

WASHINGTON

The *Clean Energy Transformation Act of 2019* (SB5116) set a goal of carbon-free power in Washington by 2045.⁵³ The Utilities and Transportation Commission (UTC) and the Commerce Department ran parallel rulemaking processes covering investor- owned utilities and consumer-owned utilities, respectively, in 2020.

In January 2021, after two dozen workshops to collect input from stakeholders, utilities, and other state agencies, the two agencies announced administrative rules for implementation of the law.⁵⁴ The rules put a substantial focus on equity considerations, requiring utilities to pursue greater engagement with minority-owned businesses, measure the benefits and burdens of policies on vulnerable populations, account for the social costs of greenhouse gas emissions for certain programs, and develop processes for further public engagement through advisory groups. Implementation plans are due from utilities by January 2022.

The legislation was preceded by a Deep Decarbonization Pathways Analysis in 2016. The state contracted with Evolved Energy and the Deep Decarbonization Project to conduct energy modeling "to design and evaluate scenarios that reduce GHG emissions in Washington by 80 percent below 1990 levels by 2050."⁵⁵

A notable aspect of the legislation and rules is the priority on energy equity, which is defined as the "equitable distribution of energy benefits and reduction of burdens to vulnerable populations and highly impacted communities."⁵⁶ Discussions around the rulemaking process served to refine and operationalize terms from the statute. The statute says that equitable distribution, for example, "means a fair and just, but not necessarily equal, allocation intended to mitigate disparities in benefits and burdens . . . including existing legacy and cumulative impacts." To determine impacted communities, the state Department of Health is applying a cumulative impacts assessment (CIA) to geographic areas; vulnerable populations are defined through demographics, including adverse socioeconomic factors and health sensitivities.

53 *Clean Energy Transformation Act of 2019*, May 7, 2019, [https://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/Session Laws/Senate/5116-S2.SL.pdf](https://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/Session%20Laws/Senate/5116-S2.SL.pdf).

54 Washington State Department of Commerce and Washington Utilities and Transportation Commission, "State agencies adopt rules to implement Washington's 100% clean electricity law," January 5, 2021, <https://wastatecommerce.medium.com/state-agencies-adopt-rules-to-implement-washingtons-100-clean-electricity-law-a9e5c0027ff4>.

55 Ben Haley, Gabe Kwok and Ryan Jones (Evolved Energy Research) and Jim Williams (Deep Decarbonization Pathways Project), *Deep Decarbonization Pathways Analysis for Washington State*, Prepared for the State of Washington Office of the Governor and Office of Financial Management, December 16, 2016, https://www.governor.wa.gov/sites/default/files/Deep_Decarbonization_Pathways_Analysis_for_Washington_State.pdf.

56 Washington Administrative Code, Title 480, WAC 480-100-605, accessed March 23, 2021, <https://apps.leg.wa.gov/wac/default.aspx?cite=480-100-605>.



Conclusion

While the details, opportunities, and barriers for each state are unique, they have some common themes.

Initially, clean energy policies were adopted with modest goals, such as renewable portfolio standard (RPS) laws with 10-30 percent targets. Such power sector policies date back to the early 1980s, but they became most common in the 2000s.

The RPS is the obvious policy vehicle for ramping up clean energy ambitions in the power sector. The common dynamic for action has been that the RPS programs have proven successful, technology costs have fallen (especially wind, solar, and storage), economic opportunities have emerged and created benefits, and the need for climate action has become more clear.

In some cases, a state agency or stakeholders perform in-depth analysis to show that higher levels are viable, such as capacity expansion and dispatch models. The analysis is then used to make the case for expanding clean energy goals. In other cases, higher goals are set by policymakers based on a preliminary analysis, and further studies are done to show how to reach them, to inform further action.

In either case, once a goal is adopted a detailed process is established to plan future actions and implementation. In many cases, existing utility or energy planning vehicles, such as integrated resource plans (IRPs), are used to pursue higher goals. Often though, IRPs are supplemented with formal outreach to key stakeholders, such as through working groups and advisory committees. This is especially true with aspects that fall outside typical utility planning, such as jobs programs, community impacts, and equity considerations.

In all cases, pursuit of long-term low-carbon goals is and will be an iterative process, playing out in utility procurement dockets and other recurring proceedings over the coming years.

FURTHER READING

UCLA Luskin Center for Innovation, *Progress toward 100% Clean Energy in Cities & States across the U.S.*, November 2019, <https://innovation.luskin.ucla.edu/wp-content/uploads/2019/11/100-Clean-Energy-Progress-Report-UCLA-2.pdf>

John Podesta, et al., "State Fact Sheet: A 100 Percent Clean Future," *Center for American Progress*, October 16, 2019, <https://www.americanprogress.org/issues/green/reports/2019/10/16/475863/state-fact-sheet-100-percent-clean-future>

Julia Pyper, "Tracking Progress on 100% Clean Energy Targets," *Greentech Media*, November 12, 2019, <https://www.greentechmedia.com/articles/read/tracking-progress-on-100-clean-energy-targets>

Andrew Place, "State and Utility Decarbonization Commitments," *Clean Air Task Force*, updated October 1, 2020, <https://www.catf.us/2020/10/state-and-regional-decarbonization-commitments>

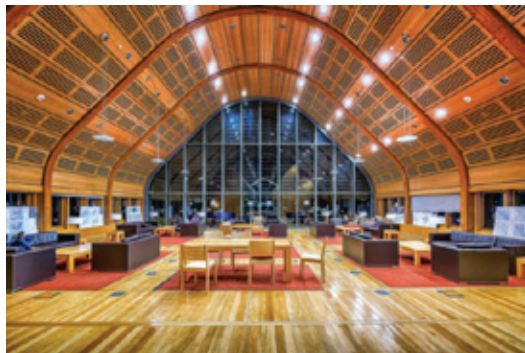
The Clean Energy States Alliance (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy. CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.



Ørsted US Offshore Wind/Block Island Wind Farm



50 State Street, Suite 1, Montpelier, VT 05602
802.223.2554 | cesa@cleanegroup.org | www.cesa.org



Clockwise from upper left: Shutterstock/Soonthorn Wongsaita; Tom Piorkowski; Resonant Energy; Portland General Electric; RE-volv; Bigstockphoto.com/Davidm199