

STATE LEADERSHIP DRIVING THE SHIFT TO CLEAN ENERGY: 2016 UPDATE

State Progress and Success Stories

GEORGETOWN CLIMATE CENTER
A Leading Resource for State and Federal Policy

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State Leadership Driving the Shift to Clean Energy:

2016 Update

Introduction

In December 2013, the Georgetown Climate Center released a report that captured stories of U.S. state and power company actions that were helping to drive a shift to cleaner electricity generation while also generating economic benefits for residents and customers. The stories had previously been shared at a gathering of states and utility companies from across the country hosted by the Center in June 2013.

This updated 2016 report highlights the continued progress many states are making towards a cleaner and more efficient electricity system.

In the last three years, the U.S. power sector has seen a dramatic increase in electricity generation from renewable energy sources and less-polluting fossil fuel sources, as well as an increase in energy savings due to energy efficiency investments. These actions have dramatically reduced emissions of carbon dioxide and other harmful pollutants, diversified our fuel mix, enhanced resilience, and provided opportunities for energy cost savings.

These changes are being driven by a variety of factors, including the decreasing cost of solar and wind generation and the low cost of natural gas. But one consistent, critical factor has been the role of state policies across the country.

The 19 states highlighted in this report represent regions all over the United States with very different energy resources. States are taking action for different reasons—some states prioritize diversifying energy resources and cutting energy waste, while others focus on reducing carbon pollution to address climate change. All are taking actions that help further clean energy and increased energy efficiency.

The examples presented here highlight a broad variety of policies. Different states are strengthening renewable portfolio standards, adding incentives to promote distributed renewable energy, investing in energy efficiency, updating carbon pollution reduction programs, and in some cases, preparing for compliance with the federal standards under the Clean Power Plan.

The Center thanks all of the states for their participation and help in sharing their stories. We hope these examples of innovation will provide useful insights into how states can continue to lead the way to a cleaner and more efficient electricity system. We also thank the William and Flora Hewlett Foundation, the John D. and Catherine T. MacArthur Foundation, the Rockefeller Brothers Fund, and the Joyce Foundation for supporting this work, as well as our other funders who make all our work possible.

- *Hampden Macbeth, Gabe Pacyniak, Kathryn A. Zyla, Vicki Arroyo*

State Progress and Success Stories

California

California is continuing and deepening its efforts to support green economic growth and reduce emissions. The state is in the process of developing new initiatives to chart a course for 2030 and beyond.

These efforts began with a greenhouse gas (GHG) reduction target of 40 percent below 1990 levels, which was set by Executive Order,¹ based on California's landmark Global Warming Solutions Act, Assembly Bill (AB) 32, and ratified this year by the state legislature in Senate Bill (SB) 32.² The California Air Resources Board (CARB) is developing a Scoping Plan, working with agencies and stakeholders across the state, to chart a course towards this new target.³ CARB has proposed to extend and enhance California's economy wide Cap-and-Trade Program to help meet this goal, pairing this effort with a wide array of regulatory initiatives, incentive programs, and other efforts to move the state forward.⁴

California energy agencies and utilities are also moving forward under a new state law, SB 350, to build an integrated resource planning process around GHG reduction principles which will ensure the state is powered by at least 50 percent renewable energy by 2030.⁵ Simultaneously, California will work to double building energy efficiency.⁶

California is also working to strengthen and extend efforts to cut emissions from cars, trucks, and other forms of transport. Its Mobile Source Strategy⁷ and Sustainable Freight Action Plan⁸ are among the efforts intended to build on existing successes while moving forward with cleaner fuels, vehicle electrification, and far more efficient movement of goods and people.

¹ Governor Edmund Brown, Ex. Order B-30-15 (2015).

² Cal. Senate Bill 32, chap. 249 (2016).

³ See CAL. AIR RES. BD., *AB 32 Scoping Plan*, <https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm> (last reviewed Sept. 7, 2016).

⁴ CAL. AIR RES. BD., PROPOSED AMENDMENTS TO THE CALIFORNIA CAP ON GREENHOUSE GAS EMISSIONS AND MARKET-BASED COMPLIANCE MECHANISM REGULATION (Aug. 2, 2016), <https://www.arb.ca.gov/regact/2016/capandtrade16/appa.pdf>.

⁵ CAL. ENERGY COMM., *Clean Energy & Pollution Reduction Act SB 350 Overview*, <http://www.energy.ca.gov/sb350/> (last visited Oct. 25, 2016).

⁶ *Id.*

⁷ CAL. AIR RES. BD., *2016 Mobile Source Strategy*, <https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm> (last reviewed May 16, 2016).

⁸ CAL. SUSTAINABLE FREIGHT ACTION PLAN, *California Sustainable Freight Action Plan*, http://www.casustainablefreight.org/app_pages/view/154 (last visited Oct. 25, 2016).

Short-lived climate pollutants, including black carbon, methane, and hydrofluorocarbons threaten public health and exacerbate climate change.⁹ Following a new state law, SB 1383, California is moving forward with a statewide strategy to cut methane and hydrofluorocarbons by 40 percent and anthropogenic black carbon by 50 percent from 2013 levels by 2030.¹⁰ These efforts include a strong, collaborative, effort to reduce emissions from the agricultural and waste disposal sectors.¹¹ Major emission reductions from the oil and gas sector are also a central part of this strategy.¹²

California is also actively supporting and implementing crucial federal climate programs. California proposed the first complete state compliance plan for the Clean Power Plan.¹³ CARB held a board hearing on the proposal in fall 2016 and the Board will vote on finalizing it in spring 2017.¹⁴ CARB staff have conducted many meetings with stakeholders, including representatives of environmental justice communities, in developing the compliance plan, and anticipates further discussions before finalization.¹⁵ CARB has also met with many other states on regional options, including potential interstate trading, and looks forward to working with other states throughout the country to fully implement the Plan.

The many climate programs underway in California also help to support the state's complementary efforts to reduce criteria pollutants, like ozone smog, and to reduce exposure to toxics. By shifting towards cleaner sources of energy and reducing emissions from industry and mobile sources, California's programs are intended to help create a healthier state even as they reduce the risk from climate change.¹⁶ In all of this work, California is working to advance equity and environmental justice as a crucial part of its response to climate change, and is actively seeking ways to further integrate and improve these efforts.¹⁷ In addition to planning billions of dollars in investments in California's disadvantaged communities,¹⁸ CARB and other state agencies are working to build public engagement and considerations of community environmental impacts into their decision making from the beginning.¹⁹

⁹ CAL. AIR RES. BD., *Reducing Short-Lived Climate Pollutants in California*, <https://www.arb.ca.gov/cc/shortlived/shortlived.htm> (Aug. 9, 2016).

¹⁰ See CAL. AIR RES. BD., PROPOSED SHORT-LIVED CLIMATE POLLUTANT REDUCTION STRATEGY, 4-5 (APR. 2016), <https://www.arb.ca.gov/cc/shortlived/meetings/04112016/proposedstrategy.pdf> [hereinafter SHORT-LIVED CLIMATE POLLUTANT REDUCTION STRATEGY].

¹¹ See generally *id.*

¹² See generally *id.*

¹³ CAL. AIR RES. BD., CALIFORNIA'S PROPOSED COMPLIANCE PLAN FOR THE FEDERAL CLEAN POWER PLAN (Aug. 5, 2016), <https://www.arb.ca.gov/cc/powerplants/meetings/09222016/proposedplan.pdf>.

¹⁴ Per. Cal. Air Res. Bd.

¹⁵ *Id.*

¹⁶ See e.g. SHORT-LIVED CLIMATE POLLUTANT REDUCTION STRATEGY, *supra* note 10.

¹⁷ CAL. AIR RES. BD., *Environmental Justice Advisory Committee*, <https://www.arb.ca.gov/cc/ejac/ejac.htm> (last reviewed Oct. 21, 2016).

¹⁸ CAL. AIR RES. BD., CAP-AND-TRADE AUCTION PROCEEDS FUNDING GUIDELINES FOR AGENCIES THAT ADMINISTER CALIFORNIA CLIMATE INVESTMENTS (2015), <https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/arb-funding-guidelines-for-ca-climate-investments.pdf>.

¹⁹ Per. Cal. Air Res. Bd.

Colorado

Colorado is a national leader in reducing GHGs and shifting to clean energy. The state was the first to adopt a Renewable Energy Standard by popular vote, and the legislature has since increased the renewable requirement three times.²⁰ The Clean Air Clean Jobs Act of 2010 spurred the conversion of several coal-fired power plants to natural gas and other low emitting sources, reducing emissions of GHGs and conventional pollutants.²¹ Colorado ranks ninth in the nation for cumulative solar electric capacity²² and tenth for installed wind capacity.²³ In 2014, Colorado became the first state to regulate methane emissions from oil and gas production.²⁴ Governor John Hickenlooper is committed to having the cleanest air in the nation and Colorado continues to work toward this goal.

These initiatives are important because climate and air quality are central to Coloradans' health, lifestyle, and the state economy. The state's agriculture industry employs more than 170,000 Coloradans and contributes more than \$40 billion per year to the economy.²⁵ Winter sports in Colorado have an economic impact of \$4.8 billion per year²⁶ while hunting, fishing, and wildlife viewing contribute another \$5 billion.²⁷ Yet Colorado has warmed 2 °F in the last 30 years, with temperatures projected to rise an additional 2.5 to 5 °F by 2050.²⁸ Colorado is taking proactive steps to mitigate impacts to these and other industries and protect public health.

Colorado's efforts to promote clean energy and reduce emissions are bearing fruit. In 2012 alone, the state's programs prevented 5.5 million tons of carbon dioxide (CO₂) emissions.²⁹ Advances in oil and natural gas production have put Colorado's ozone nonattainment area on track to reduce emissions of volatile organic compounds approximately 33 percent between 2011 and 2017, with simultaneous methane reductions.³⁰ Colorado's largest electric utility reduced its CO₂ emissions by 25 percent from 2005 to 2015, with a 35 percent reduction projected by 2020.³¹

²⁰ COLO. REV. STAT. § 40-2-124 (2016).

²¹ COLO. REV. STAT. § 40-3.2-202 (2016).

²² Fact Sheet, Solar Energy Indus. Assoc., Top 10 Solar States (2015), http://www.seia.org/sites/default/files/resources/Top%2010%20Solar%20States_2015_PRINT_7-27-16.pdf.

²³ Fact Sheet, Am. Wind Energy Assoc., Colorado Wind Energy (2016), <http://awea.files.cms-plus.com/FileDownloads/pdfs/Colorado.pdf>.

²⁴ COLO. REV. STAT. § 1001-9.

²⁵ COLO. GOVERNOR'S OFFICE, COLORADO CLIMATE PLAN: STATE LEVEL POLICIES AND STRATEGIES TO MITIGATE AND ADAPT, 49 (2015), <https://www.codot.gov/programs/environmental/Sustainability/colorado-climate-plan-2015> [hereinafter COLO. CLIMATE PLAN].

²⁶ Press Release, Colo.: Ski Country USA, Economic Study Reveals Ski Industry's \$4.8 Billion Annual Impact to Colorado (2015).

²⁷ COLOR. DEP'T. NAT. RES., Q1 FY2016 PERFORMANCE EVALUATION (2015), https://www.colorado.gov/pacific/sites/default/files/16Colorado%20Department%20of%20Natural%20Resources%20FY%202016%20Performance%20Evaluation_1.pdf.

²⁸ JEFF LUKAS ET AL., CLIMATE CHANGE IN COLORADO: A SYNTHESIS TO SUPPORT WATER RESOURCES MANAGEMENT AND ADAPTATION 2-3 (2nd ed, 2014), http://www.colorado.edu/climate/co2014report/Climate_Change_CO_Report_2014_FINAL.pdf.

²⁹ COLO. CLIMATE PLAN, *supra* note 25, at 3.

³⁰ COLO. DEP'T. PUB. HEALTH & ENV'T, MODERATE AREA OZONE STATE IMPLEMENTATION PLAN FOR THE DENVER METRO AND NORTH FRONT RANGE NONATTAINMENT AREA, ES-3 (2016).

³¹ XCEL ENERGY, THE RIGHT MIX: 2015 CORPORATE RESPONSIBILITY REPORT, 102 (2016), <https://www.xcelenergy.com/staticfiles/xeresponsive/Company/Corporate%20Responsibility%20Report/2015-Corporate-Responsibility-Report.pdf>.

Colorado is reaping economic benefits as well. From 2009 to 2014, employment in Colorado clean technology industries grew by 29.1 percent—more than 14 percent greater than the national average.³² In 2015, there were 2,070 clean tech companies operating in Colorado, and the industry supported 25,260 direct jobs and an additional 62,500 indirect jobs.³³ These clean tech jobs provided \$3.6 billion in wages.³⁴

Colorado is pursuing additional GHG reductions. Colorado continues to plan for implementation of EPA’s Clean Power Plan, which would reduce CO₂ emissions from existing electric generating units by 31 percent under a mass-based compliance plan or 38 percent under a rate-based plan.³⁵ Colorado continues to work closely with stakeholders regarding strategies to meet federal carbon targets.³⁶ The state has met with stakeholders in environmental justice communities, and provided live translation services so non-English speakers could participate and provide verbal comments in their native language.³⁷ Colorado Executive Order D 2015-013 establishes goals for state agencies to reduce their GHG emissions and their consumption of energy, water, and petroleum.³⁸ The Colorado Climate Plan was revised in 2015 to promote policy recommendations and actions to mitigate and adapt to the effects of climate change.³⁹ Colorado is up to the challenge of reducing emissions and developing its clean energy resources.

³² COLO. CLEANTECH INDUS. ASSOC., *Clean Tech Workforce: March 4, 2015* (Mar. 4, 2015), <http://coloradocleantech.com/cleantech-workforce-march-4-2015/>.

³³ Per Colo. Dep’t Pub. Health & Env’t.

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ Governor. John W. Hickenlooper, Ex. Order D 2015-013 (2015), https://www.colorado.gov/pacific/sites/default/files/Greening%20Govt.%20E.O.%20-%20signed_1.pdf.

³⁹ COLO. CLIMATE PLAN, *supra* note 25.

Connecticut

Connecticut has long been a leader in shifting to clean energy and addressing climate change. The state's commitment began as early as 1990 when it passed its landmark Public Act 90-219, An Act Concerning Global Warming,⁴⁰ which required the state to implement a wide range of measures to reduce energy consumption and associated GHG emissions. The state strengthened its leadership efforts when it passed Public Act 08-98, An Act Concerning Connecticut Global Warming Solutions. This requires the state to achieve a 10 percent reduction from 1990 emissions by 2020 and an 80 percent reduction from 2001 emissions by 2050.⁴¹

More recently, in April 2015, Governor Dannel Malloy issued Executive Order 46, creating the Governor's Council on Climate Change (GC3).⁴² Composed of 15 members from state agencies, quasi-state agencies, companies, and nonprofits, the Council is charged with establishing interim GHG reduction targets and recommending new policies, regulations, or legislative actions that will ensure that the state achieves its established emission reduction targets.⁴³

Since setting the 2020 and 2050 targets, economy-wide emissions have experienced an overall downward trend, putting the state on a trajectory to meet its short- and long-term carbon reduction targets.⁴⁴ Connecticut has successfully demonstrated that it can achieve emissions reduction as the economy grows and its population increases. The carbon intensity of Connecticut's economy has declined dramatically, from nearly 1 pound of CO₂ equivalency (CO₂e) per dollar of state gross domestic product in 1990 to 0.4 pounds per dollar of state gross domestic product in 2013.⁴⁵ This demonstrates significant decoupling of economic activity and carbon pollution. Connecticut's 2013 per capita emissions per year were 26,000 pounds per person, which is well below the national average of 37,500 pounds per person.⁴⁶ Connecticut's per capita emissions have declined 18 percent since 2000 and an average of 0.5 percent per year since 1990.⁴⁷

Connecticut is implementing a suite of complimentary strategies to ensure that the state is on a course to achieve its emission reduction goals. The range of GHG reduction actions include direct regulations, monetary and non-monetary incentives, market-based mechanisms, and recognition for voluntary actions. A primary strategy to reduce economy-wide emissions includes shifting to clean energy sources within the electric sector.

Connecticut's renewable portfolio standard (RPS) requires all retail electricity suppliers to obtain at least 20 percent of their supply from class I renewable sources by 2020.⁴⁸ To meet this standard, Connecticut has launched new initiatives that harness market forces to boost the supply of low-cost, in-state renewables. Small-scale renewable distributed generation projects can compete for long-term power purchase agreements (PPA) that

⁴⁰ Public Act No. 90-219 (1990).

⁴¹ Public Act No. 08-98 (2008).

⁴² Governor Dannel P. Malloy, Ex. Order 46 (2015), http://www.ct.gov/deep/lib/deep/climatechange/gc3/executive_order_46.pdf.

⁴³ *Id.*

⁴⁴ CONN. DEP'T OF ENERGY & ENV'T PROT., 2013 CONNECTICUT GREENHOUSE GAS EMISSION REDUCTION SUMMARY 2 (2015), http://www.ct.gov/deep/lib/deep/climatechange/2012_ghg_inventory_2015/ct_2013_ghg_inventory.pdf [hereinafter CONN. EMISSION REDUCTION SUMMARY].

⁴⁵ *Id.* at 4.

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ CONN. GEN. STAT. § 16-245a(15) (2016).

Connecticut's electric distribution companies are required to offer through reverse auctions.⁴⁹ These projects support local economic development and also reduce local electricity consumption. At the regional level, Connecticut's electric companies have signed long-term PPAs that will bring more grid-scale solar and wind to the regional wholesale power market.⁵⁰

The Malloy Administration has also embraced the use of open, competitive procurements of renewables and large-scale hydropower through long-term contracts as the best way to secure investment in new clean generation at the least cost to the state's ratepayers. Currently, the Connecticut Department of Energy and Environmental Protection (CT DEEP) is considering more than 100 bids submitted in two historic requests for proposals for clean energy projects of different size classes that could be selected for long-term contracts pursuant to Public Acts 13-303 and 15-107.⁵¹ Under those statutes, CT DEEP has the authority to contract for up to 4,250 GWh, or approximately 15 percent of the state's electricity demand, from clean energy resources.⁵²

The Connecticut Green Bank, established in 2011, has pioneered multiple programs to expand the deployment of rooftop solar photovoltaics (PV) in Connecticut, while driving down installed costs and ratepayer incentives.⁵³ A program goal of installing 30 megawatts (MW) of rooftop solar PV under the Residential Solar Incentive Program was met in 2015, 8 years early.⁵⁴ Public Act 15-194 requires the Connecticut Green Bank to offer incentives to support the deployment of 300 MW of residential solar by 2022.⁵⁵ The Green Bank is partnering with the state's electric utilities in the Solar Homes Renewable Energy Credit (SHREC) program to enable purchase of long-term contracts for Renewable Energy Credits produced from a homeowner's solar systems, making solar more accessible and affordable to ratepayers throughout the state.⁵⁶

Public Act 15-113 requires CT DEEP to establish a two-year pilot program for shared clean energy facilities (SCEF) which include solar, fuel cells, geothermal, hydroelectric and other renewables.⁵⁷ Multiple customers will be able to contract a percentage or set amount of the electricity produced from these facilities.⁵⁸

Connecticut participates in the Regional Greenhouse Gas Initiative (RGGI), in partnership with the other New England states, Delaware, Maryland and New York. RGGI is the nation's first market-based, regulatory cap-and-trade program to reduce GHG emissions from large fossil fueled power plants in the region.⁵⁹ Collectively, the RGGI states have cut carbon pollution from the power sector 45 percent even as their economies grew 8 percent.⁶⁰ In Connecticut, carbon emissions from the electric power sector have declined significantly – 39 percent from 1990 to 2013.⁶¹

⁴⁹ Press Release, Office of the Governor of Connecticut, *Leading the Way: Reducing Connecticut's Greenhouse Gas Emissions Impact* (Aug. 2015), http://portal.ct.gov/uploadedFiles/Departments_and_Agencies/Office_of_the_Governor/Press_Room/Press_Releases/2015/08-2015/2015.08.03%20CT%20Greenhouse%20Gas%20fact%20sheet.pdf [hereinafter Conn. Press Release].

⁵⁰ *Id.*

⁵¹ Per. Ct. Dep't of Energy & Env'tl. Prot.

⁵² Public Act 13-303 (2013); Public Act 15-107 (2015).

⁵³ CONN. EMISSION REDUCTION SUMMARY, *supra* note 44, at 6.

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ Conn. Press Release, *supra* note 49.

⁶⁰ REG'L GREENHOUSE GAS INITIATIVE, *THE INVESTMENT OF RGGI PROCEEDS THROUGH 2014 REPORT*, 4 (2016), https://www.rggi.org/docs/ProceedsReport/RGGI_Proceeds_Report_2014.pdf [hereinafter RGGI INVESTMENT PROCEEDS].

⁶¹ CONN. EMISSION REDUCTION SUMMARY, *supra* note 44, at 2-3.

Connecticut applauds the release of the EPA’s Clean Power Plan (CPP) for setting the U.S. on a path to reduce harmful carbon pollution from power plants nationwide.⁶² The success of RGGI makes Connecticut and its partnering states well-placed to meet the CPP targets, which are among the most ambitious in the nation.⁶³ Currently underway, the RGGI 2016 program review provides the states an opportunity to evaluate changes that might be needed to meet CPP requirements. The continued success of RGGI has proven that a capped, mass-based, multi-state approach achieves concrete, cost-effective emission reductions.

⁶² Per. Ct. Dep’t of Energy & Env’tl. Prot.

⁶³ *Id.*

Delaware

Delaware is committed to reducing GHG emissions because the state is already impacted by the changing climate. Delaware is on the front lines of dealing with the impacts of climate change. As a low-lying coastal state with the lowest average land elevation in the United States and a significant population living along 381 miles of coastline; sea level rise, storm surges, and coastal flooding pose significant risks to the state.⁶⁴ In addition to flooding, heat creates issues for Delawareans working outdoors, those with health and respiratory ailments, and to Delaware's air quality.⁶⁵ It is critical for Delaware to achieve the goals set forth for renewable energy and GHG reductions to ensure that Delaware's population, economy, and environment are resilient to the impacts of climate change.

The state of Delaware is dedicated to building a clean energy economy through innovative policies and programs that promote renewable energy, energy efficiency, and alternative fuels for transportation. Executive Order 18 was signed by Governor Jack Markell in 2010.⁶⁶ Executive Order 18 directed state agencies to reduce energy consumption, decrease miles traveled, increase recycling rates, and adopt and implement environmentally-friendly procurement policies.⁶⁷ Governor Markell signed Executive Order 41 in 2013.⁶⁸ Executive Order 41 directed state agencies to prepare for the impacts of climate change and to determine strategies and measures that could be undertaken to reduce GHG emissions.⁶⁹ In addition to these Executive Orders, Governor Markell has pursued aggressive policies to promote renewable energy technologies and research.⁷⁰ Deployment of alternative fueled vehicles and infrastructure have also been a cornerstone of the administration.

Delaware is demonstrating success in achieving both reductions in GHGs and creating opportunities for clean energy jobs. Delaware is currently a leader in deploying renewable energy. Delaware is on track to meet its aggressive RPS mandate of 25 percent (3.5 percent solar PV) by 2025.⁷¹ This is in part because of the state's Green Energy Fund.⁷² The Green Energy Fund has provided funding incentives for 3,600 small scale renewable energy installations, mostly solar PV.⁷³ The solar PV industry in Delaware employs 300 workers, and generates \$21 million in salaries and \$37.6 million in economic impact.⁷⁴ In addition, Executive Order 41 for the first time directed the state to develop a GHG reduction goal. The reduction goal approved through the Executive Order 41 process was 30 percent by 2030 from a 2008 baseline.⁷⁵ Many of the GHG reduction strategies include deployment of additional renewable energy and increased energy efficiency throughout the state.

⁶⁴ DELAWARE DIVISION OF ENERGY AND CLIMATE, AVOIDING AND MINIMIZING RISK OF FLOOD DAMAGE TO STATE ASSETS: A GUIDE FOR DELAWARE STATE AGENCIES, 2 (March 2016).

⁶⁵ DEL. DEP'T OF NAT. RES. & ENVTL. CONTROL, *DNREC Takes Action to Thwart 'Upwind States' From Transporting Air Pollution into Delaware, Which Brings With It a Wide Range of Public Health Problems* (July 7, 2016), <http://www.dnrec.delaware.gov/News/Pages/DNREC-takes-action-to-thwart-upwind-states-from-transporting-air-pollution-into-Delaware,-which-brings-with-it-a-wide-range.aspx>.

⁶⁶ Governor Jack Markell, Ex. Order 18 (2010).

⁶⁷ *Id.*

⁶⁸ Governor Jack Markell, Ex. Order 41 (2013).

⁶⁹ *Id.*

⁷⁰ See e.g., Fact Sheet, Del. Governor, Delaware Clean Energy Jobs Act, <http://governor.delaware.gov/docs/clean-energy-jobs-act-summary.pdf>.

⁷¹ Per Del. Dep't of Nat. Res. & Env'tl. Control.

⁷² DEL. DEP'T OF NAT. RES. & ENVTL. CONTROL, *History of Delaware Green Energy Programs*, <http://www.dnrec.delaware.gov/energy/Pages/History-of-Delaware-green-energy-programs.aspx> (last visited Oct. 28, 2016).

⁷³ Per Del. Dep't of Nat. Res. & Env'tl. Control.

⁷⁴ Memorandum, Del. Dep't of Nat. Res. & Env'tl. Control, Revised Renewable Energy Portfolio Standards Cost Cap Analysis (Mar. 10, 2016).

⁷⁵ Governor Jack Markell, Ex. Order 41.

Delaware is working with partners throughout the state to develop a multi-pronged strategy to promote energy efficiency through utilities, grant programs, and the Delaware Sustainable Energy Utility.⁷⁶ Delaware's Public Service Commission (DPSC) has approved measures to direct Delmarva Power and Light (DPL), the state's main investor-owned utility, to include emissions and externalities calculations in their integrated resource planning.⁷⁷ In addition, the DPSC has directed DPL to create load control programs for its customers to reduce peak load.⁷⁸ In the most recent Delmarva Integrated Resource Plan (IRP), it was calculated that renewable energy in Delaware has reduced carbon dioxide emissions by 165,300 tons, nitrogen oxide emissions by 134 tons, and sulfur dioxide emissions by 312 tons.⁷⁹ In addition, the IRP calculates that renewable energy avoided \$16 million in mortality costs from reduced nitrogen oxide and sulfur dioxide emissions and \$4.6 million in climate benefits from reduced carbon dioxide emissions.⁸⁰ Additionally, DPSC has directed that \$14 million be invested in energy efficiency programs, \$3 million of capital be invested in renewable energy, and that 120 MW of wind power be purchased as part of the settlement of Exelon's acquisition of DPL.⁸¹

Improving air quality and reducing emissions are a key component to Delaware's approach for addressing climate change. The Delaware Clean Transportation Incentive Program has provided incentives for consumers to purchase or lease over 250 vehicles powered by propane and electricity.⁸² This program has also funded alternative fueling stations throughout the state including 5 DC fast chargers, a commercial compressed natural gas facility, and 3 propane fueling stations.⁸³

Delaware was an original signatory and is an active member in RGGI. RGGI has assisted in reducing carbon dioxide emissions from large electricity generators throughout the region through an allowance cap-and-trade program.⁸⁴ Delaware is actively working with other participating states and RGGI staff on the 2016 program review to ensure that the RGGI program is robust and meets the standards set forth in the federal Clean Power Plan.⁸⁵ Delaware will be using RGGI as the compliance mechanism to achieve the elements outlined in the Clean Power Plan.⁸⁶ The state has conducted two listening sessions and workshops on the Clean Power Plan and is prepared to schedule more if the need arises.⁸⁷

⁷⁶ ENERGIZE DEL., *Energize Delaware and the Sustainable Energy Utility*, <http://www.energizedelaware.org/Sustainable-Energy/> (last visited Oct. 28, 2016).

⁷⁷ Del. Pub. Serv. Comm., In the Matter of Integrated Resource Planning for the Provision of Standard Offer Service By Delmarva Power & Light Company Under 26 Del. C. , §26 (c)& D), Order No. 8779 (2015).

⁷⁸ See e.g., Del. Pub. Serv. Comm., In the Matter of the Application of Delmarva Power & Light Company for Approval of Its Proposal to Establish A New Residential Air Conditioning Cycling, Order No. 8253 (2012).

⁷⁹ DELMARVA POWER & LIGHT CO, 2014 INTEGRATED RESOURCE PLAN (2014).

⁸⁰ *Id.*

⁸¹ Del. Pub. Serv. Comm., In the Matter of the Application of Delmarva Power & Light Company, Exelon Corporation, et al., Order 8952 (2014).

⁸² Per Del. Dep't of Nat. Res. & Env'tl.

⁸³ DEL. DEP'T OF NAT. RES. & ENVTL. CONTROL, OVERVIEW OF THE DELAWARE CLEAN TRANSPORTATION INCENTIVE Program, http://www.dnrec.delaware.gov/energy/Documents/Transportation%20Program/FINAL_Overview%20of%20the%20Delaware%20Clean%20Transportation%20Rebate%20Programs.pdf.

⁸⁴ REG'L GREENHOUSE GAS INITIATIVE, *Delaware* https://www.rggi.org/rggi_benefits/program_investments/delaware (last visited Oct. 28, 2016).

⁸⁵ DEL. NAT. RES. & ENVTL. CONTROL, *Delaware's Clean Power Plan*, <http://www.dnrec.delaware.gov/Air/Pages/CleanPowerPlan.aspx> (last revised Sept. 19, 2016) [hereinafter *Delaware's Clean Power Plan*].

⁸⁶ Per Del. Dep't of Nat. Res. & Env'tl.

⁸⁷ *Delaware's Clean Power Plan*, *supra* note 85.

Louisiana

Louisiana is an energy-producing state. According to the U.S. Energy Information Administration, in 2014, Louisiana ranked fifth in natural gas production, ninth in crude oil production, eighth in total energy production, and, due to the state's large petroleum refining and petrochemical base, first in total energy consumed per capita.⁸⁸ Consequently, Louisiana has relatively high energy-related CO₂ emissions in terms of mass.

Yet, notwithstanding these facts, Louisiana's energy-related CO₂ emissions declined by 15.4 percent between 2000 and 2013,⁸⁹ and the state ranks thirty-first in terms of carbon intensity (mass of CO₂ per Btu).⁹⁰ In 2014, natural gas, nuclear, and renewable sources accounted for nearly 75 percent of the state's electricity generation mix, whereas coal accounted for less than 19 percent.⁹¹ Further, coal use is anticipated to trend downward.⁹²

The Louisiana Department of Environmental Quality (LDEQ) is the primary agency tasked with environmental protection and regulation within the state of Louisiana.⁹³ However, establishment of renewable energy standards and energy efficiency programs is under the purview of the Louisiana Public Service Commission (LPSC).⁹⁴ In the near term, LDEQ's primary effort to further reduce CO₂ emissions will be through compliance with the federal Clean Power Plan.⁹⁵ The department has committed to developing a state plan in collaboration with the LPSC and had begun public outreach efforts prior to the stay of the rule.⁹⁶

Although Louisiana does not have a RPS, Louisiana has proactively incentivized programs that promote the wise use of the state's natural energy resources to enhance both conservation efforts and economic development. Additionally, The Louisiana legislature has declared that increasing the consumption of renewable energy resources promotes the wise use of Louisiana's natural energy resources to meet a growing energy demand, increases Louisiana's use of indigenous energy fuels, and fosters investment in emerging renewable technologies to stimulate economic development and job creation in the state.⁹⁷ The legislature has also stated that Louisiana should actively encourage the manufacture of new technologies through promotion of emerging energy technologies.⁹⁸

Louisiana has instituted a number of programs and tax credit offerings that encourage the development and use of renewable energy and implementation of demand-side energy efficiency measures. These include a tax credit for new residential solar energy systems installed before December 31, 2017,⁹⁹ and exempting these systems from ad valorem taxation—assessors may not consider the value of such equipment in assessing the value of a property.¹⁰⁰

⁸⁸ U.S. ENERGY INFO. ADMIN, *Louisiana*, <https://www.eia.gov/state/?sid=LA> (last updated January 21, 2016).

⁸⁹ U.S. ENERGY INFO. ADMIN, *Energy-Related Carbon Dioxide Emissions at the State Level, 2000-2013*, <http://www.eia.gov/environment/emissions/state/analysis/> (last updated Oct. 26, 2016) [select Table 1].

⁹⁰ That is, 30 states have a *higher* carbon intensity than Louisiana. Per. La. Dep't of Env'tl. Quality.

⁹¹ U.S. ENERGY INFO. ADMIN, *Louisiana*, <https://www.eia.gov/state/?sid=LA#tabs-4> (last updated January 21, 2016).

⁹² For example, in 2015, one of the state's eight coal-fired boilers switched to natural gas. Per. La. Dep't of Env'tl. Quality.

⁹³ See LA. DEP'T OF ENVTL. QUALITY, *Rules and Regulations*,

<http://www.deq.louisiana.gov/portal/DIVISIONS/LegalAffairs/RulesandRegulations.aspx> (last visited Nov. 7, 2016).

⁹⁴ See LA. PUB. SERV. COMM., *Welcome to the Louisiana Public Service Commission Website*, <http://www.lpsc.org/> (last visited Nov. 7, 2016).

⁹⁵ La. Senate Bill 650 (2014). Act 726 of the 2014 Regular Session authorized LDEQ to establish CO₂ standards for existing electric generating units. *Id.*

⁹⁶ LDEQ's course of action will necessarily be dependent on the outcome of pending litigation.

⁹⁷ LA. STAT ANN. § 51:3061 (2016).

⁹⁸ *Id.*

⁹⁹ LA. STAT ANN. § 47:6030 (2016).

¹⁰⁰ *Id.* § 47:1706.

Additionally, the LPSC requires publicly-owned utilities to offer net metering to customers with systems that generate electricity using renewable resources until such time as the utility's net metering purchases exceed 0.5 percent of its peak load.¹⁰¹ Through the Home Energy Loan Program (HELP) administered by the Department of Natural Resources (DNR), a homeowner can obtain a five year loan to improve the energy efficiency of an existing home.¹⁰² Items such as air conditioning and heating systems, solar hot water systems, appliances, windows, and insulation are eligible for financing under this program.¹⁰³ Louisiana also currently offers a corporate or income tax credit for qualified capital infrastructure projects that are directly related to green industries, including the renewable electric power industry.¹⁰⁴ The portion of the base investment expended on payroll for Louisiana residents employed in connection with the construction of the project may also be eligible for an additional tax credit.¹⁰⁵

¹⁰¹ Per. La. Dep't of Env'tl. Quality.

¹⁰² LA. DEP'T OF NAT. RES., *HELP*, dnr.louisiana.gov/index.cfm?md=pagebuilder&temp=home&pid=40&pnid=103&nid=105 (last visited Nov. 7, 2016).

¹⁰³ *Id.*

¹⁰⁴ LA. STAT ANN. § 47: 6037.

¹⁰⁵ *Id.*

Maryland

Maryland has achieved significant energy sector GHG emission reductions since 2006—a decline of 12.3 million metric tons, or 38.1 percent as of 2014—due in significant part to its participation in RGGI, a requirement to reduce energy use, its RPS, and regional fuel switching.¹⁰⁶

In October 2015, an updated plan released by Governor Lawrence J. Hogan outlined measures the state can take to meet its economy-wide goal to reduce GHG pollution 25 percent from 2006 levels by 2020.¹⁰⁷ On April 4, 2016, Governor Hogan signed the Greenhouse Gas Emissions Reduction Act (GGRA) of 2016 into law, which requires Maryland to develop a plan to reduce statewide GHG emissions by 40 percent from 2006 levels by 2030.¹⁰⁸ Continuing to reduce carbon pollution from the electricity sector through participation in RGGI, energy efficiency programs, and renewable energy programs are key components of the new plan. An independent study found the overall collection of climate and energy proposals would generate between \$2.5 billion and \$3.5 billion for Maryland’s economy and support between 26,000 and 33,000 new jobs.¹⁰⁹

Through the 2012 RGGI program review, including a reduction in the regional emissions cap to 91 million short tons, Maryland expects to potentially further reduce the state’s 2020 CO₂ emissions from the electricity sector by an additional 3.6 million metric tons of CO₂e.¹¹⁰

Through the EmPOWER Maryland Energy Efficiency Act of 2008, targets were established by the Maryland legislature to reduce statewide electricity usage, as well as demand, 15 percent on a per capita basis by 2015.¹¹¹ The state’s electric utilities were required to provide cost-effective energy efficiency programs with a goal of achieving a reduction equal to “10% by the end of 2015 of per capita electricity consumed in the electric company’s service territory during 2007”.¹¹² At the end of calendar year 2015, the five electric utilities participating in the EmPOWER Maryland initiative reported saving 5,394,086 MWh, which equates to more than \$4 billion in lifetime energy bill savings and represents 99 percent of the goal established for the participating utilities.¹¹³ Overall, there has been an 11.4 percent reduction in per capita electricity consumption statewide since 2007.¹¹⁴ Moving forward, the Maryland Public Service Commission has established post-2015 electric energy efficiency goals aimed at achieving “an annual incremental gross energy savings equivalent to 2.0 percent of the individual utility’s weather-normalized gross retail sales baseline, with a ramp-up rate of 0.20 percent per year.”¹¹⁵

¹⁰⁶ Per Md. Dep’t of Env’t.

¹⁰⁷ See generally MD. DEP’T OF ENV’T, THE 2015 GREENHOUSE GAS EMISSIONS REDUCTION ACT PLAN UPDATE (2015), http://news.maryland.gov/mde/wp-content/uploads/sites/6/2015/10/GGRA_Report_FINAL_10-29-15.pdf [hereinafter Md. 2015 GGRA PLAN UPDATE]. Maryland’s Greenhouse Gas Emissions Reduction Act of 2009 requires Maryland to achieve a 25 percent reduction in state-wide GHG from 2006 levels by 2020. MD. ENVIR. CODE ANN. § 2-1204 (2016).

¹⁰⁸ MD. ENVIR. CODE ANN. § 2-1204.1. Maryland’s Greenhouse Gas Emissions Reduction Act of 2016 requires Maryland to achieve a 40 percent reduction in state-wide GHG from 2006 levels by 2030.

¹⁰⁹ Md. 2015 GGRA Plan Update, *supra* note 107, at 6.

¹¹⁰ *Id.* at 92.

¹¹¹ MD. PUB. UTILS. CODE ANN. § 7-211(g)(1)-(2) (2016).

¹¹² *Id.* § 7-211(g)(2).

¹¹³ MD. PUB. SERV. COMM., THE EMPOWER MARYLAND ENERGY EFFICIENCY ACT STANDARD REPORT OF 2016 WITH DATA FOR COMPLIANCE YEAR 2015, 3 (2016), <http://www.psc.state.md.us/wp-content/uploads/2016-EmPOWER-Maryland-Energy-Efficiency-Act-Standard-Report.pdf>.

¹¹⁴ PUBLIC SERVICE COMMISSION OF MARYLAND, THE EMPOWER MARYLAND ENERGY EFFICIENCY ACT STANDARD REPORT OF 2016 WITH DATA FOR COMPLIANCE YEAR 2015, 34 (2016), <http://www.psc.state.md.us/wp-content/uploads/2016-EmPOWER-Maryland-Energy-Efficiency-Act-Standard-Report.pdf>.

¹¹⁵ MD. PUB. SERV. COMM., 2015 ANNUAL REPORT, 18 (2016), <http://www.psc.state.md.us/wp-content/uploads/2015-MD-PSC-Annual-Report-1.pdf>.

Maryland's RPS requires 20 percent of electricity consumed in the state to be generated by renewable energy sources in 2022.¹¹⁶ In addition, Maryland's RPS includes a solar "carve out" requiring 2 percent of all electricity consumed in Maryland to come from solar generation by 2020.¹¹⁷ The Maryland RPS requirements ramp up over time, with a goal of 15.2 percent in calendar year 2016, of which 0.7 percent needs to come from solar generation.¹¹⁸

Coal is the single largest source of electricity generation in Maryland's portfolio, providing 41 percent of net electricity generation in June 2016.¹¹⁹ In 2015, nuclear power provided 40 percent of the state's electricity, and renewables contributed 7.5 percent of total net electricity generation.¹²⁰ Maryland's electric power sector CO₂ emissions have declined by 45 percent during 2005-2013, decreasing from 32.2 million metric tons in 2005 to 17.4 million metric tons in 2013.¹²¹

¹¹⁶ MD. PUB. UTILS. CODE ANN. § 7-703(b)(17) (2016).

¹¹⁷ *Id.* § 7-703(b)(17)(i).

¹¹⁸ *Id.* § 7-703(b)(11).

¹¹⁹ U.S. ENERGY INFO. ADMIN., *Maryland*, <http://www.eia.gov/State/?sid=MD#tabs-4> (last updated July 21, 2016).

¹²⁰ U.S. ENERGY INFO. ADMIN., *Maryland State Energy Profile*, <https://www.eia.gov/state/print.cfm?sid=MD> (last July 21, 2016).

¹²¹ U.S. ENERGY INFO. ADMIN., *State Carbon Dioxide Emissions*, <http://www.eia.gov/environment/emissions/state/> (last updated Oct. 26, 2015) [Maryland specific data available at <http://www.eia.gov/environment/emissions/state/excel/maryland.xlsx>] [hereinafter *State Carbon Dioxide Emissions*].

Calculated using data published on October 26, 2015 for calendar year 2013.

Massachusetts

The Commonwealth of Massachusetts continues to pursue a variety of strategies and approaches to reduce greenhouse gas emissions and promote energy efficiency and renewable energy.

Massachusetts' energy policies and programs, including those funded in part by RGGI proceeds, have made Massachusetts the most energy efficient state in the country for the last six years, according to the American Council on an Energy Efficient Economy.¹²²

In August 2016, Governor Charlie Baker signed comprehensive energy diversification legislation that directs various Massachusetts agencies, among other efforts, to solicit contracts for increased renewable and clean energy, to reduce gas leaks from pipelines, and to improve energy production and use through energy storage pilots and PACE (a lending program to help offset the financial costs of energy efficiency).¹²³

Massachusetts is also dramatically boosting renewable energy generation. Due to financial incentives such as renewable energy credits, net metering, and long-term contracts, solar energy capacity has grown from 1.64 MW in 2007 to 1281 MW in 2016,¹²⁴ and wind energy has grown from 1.64 MW to 115 MW in these same years.¹²⁵ And Massachusetts is vigorously pursuing other clean energy solutions, such as combined heat and power and energy from the anaerobic digestion of food waste.¹²⁶

Building on the administration's efforts to prevent and prepare for climate change, Governor Baker signed Executive Order 569 "Establishing an Integrated Climate Change Strategy for the Commonwealth"¹²⁷ in September, 2016. This Order directs all state agencies to help reduce GHG emissions from their operations and prepare for the impacts of climate change. In order to comply with a ruling of the Massachusetts Supreme Judicial Court, the Order directs the Massachusetts Department of Environmental Protection (MassDEP) to finalize regulations by August, 2017 to ensure the state meets its 2020 GHG emission reductions goals.¹²⁸ The Order also directs the Secretary to establish interim greenhouse gas emission reduction limits for 2030 and 2040 at least 10 years in advance. On the energy side, the Order directs the Secretary of Energy and the Environment to develop a comprehensive energy plan based upon the state's energy demands and to develop strategies to meet these demands through conservation, energy efficiency and other manners that contribute to the Commonwealth's GHG reduction goals. Finally, the Order calls for the development of a statewide climate change adaptation plan, climate change vulnerability assessments for each agency, technical assistance to municipalities, and climate change coordinators to be designated across state government.

¹²² AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, *The State Energy Efficiency Scorecard*, <http://aceee.org/state-policy/scorecard> (last visited Oct. 31, 2016).

¹²³ 2016 Mass. House Bill 4568. The legislation authorizes the purchase of 9.45 million MW hours annually of clean energy.

¹²⁴ MASS. DEPARTMENT OF ENERGY RESOURCES, INSTALLED SOLAR CAPACITY IN MASSACHUSETTS (2016), <http://www.mass.gov/eea/docs/doer/renewables/installed-solar.pdf>.

¹²⁵ MASS. DEPARTMENT OF ENERGY RESOURCES, INSTALLED WIND CAPACITY IN MASSACHUSETTS (2016), <http://www.mass.gov/eea/docs/doer/renewables/installed-wind.pdf>.

¹²⁶ MASS. EX. OFFICE OF ENERGY & ENVTL. AFFAIRS, *Massachusetts Leads The Way in Greenhouse Gas Emissions Reduction Efforts; Successful RGGI Program Advocated as Model for Other States*, <http://www.mass.gov/eea/agencies/massdep/news/enews/greenhouse-gas-emissions-and-rggi-success.html> (last visited Oct. 28, 2016).

¹²⁷ Gov. Charles D. Baker, Ex. Order 569 (2016), <http://www.mass.gov/eea/docs/executive-order-climate-change-strategy.pdf>.

¹²⁸ *Id.*

The Baker-Polito Administration continues to work to implement the requirements of the Global Warming Solutions Act (GWSA) of 2008 which has established limits of GHG emissions reductions of 25% below 1990 levels by 2020 and 80% below 1990 levels by 2080.¹²⁹ The Clean Energy and Climate Plan, required by the GWSA, outlines strategies to reduce GHG emissions from all sectors of the economy by 25 percent below 1990 levels by 2020 and 80 percent by 2050.¹³⁰ The plan update completed in December of 2015 demonstrated significant progress towards the 2020 goal and outlined plans for meeting the 2020 target.¹³¹

Massachusetts continues to work as an active participant in RGGI, the nation's first market-based regulatory program to cap and reduce greenhouse gas emissions from large fossil-fueled power plants. Massachusetts is actively working with other participating states on the 2016 program review to ensure that RGGI is robust and will enable compliance with the Federal Clean Power Plan as appropriate.¹³²

Massachusetts has directed more than 90 percent of its RGGI proceeds into clean energy programs and initiatives.¹³³ As of September 2016, Massachusetts received more than \$427 million in RGGI auction proceeds,¹³⁴ which the state has used to implement energy programs that improve building efficiency, comfort, durability, health, and affordability for individuals, businesses, and state and local governments. Two top initiatives are Massachusetts' statewide Three-Year Energy Efficiency Investment Plans, implemented through the Commonwealth's investor-owned utilities under the Mass Save® brand, and the Green Communities Designation and Grant Program, which provides funds to communities that meet ambitious energy criteria.¹³⁵ These programs reduce harmful pollution, build the Commonwealth's clean energy economy, and increase the predictability of energy costs for homes and businesses.¹³⁶

Through 2014, investor-owned utilities and energy efficiency providers have delivered energy efficiency programs to Massachusetts residences and businesses, generating more than \$691 million in lifetime energy bill savings.¹³⁷ These programs gain additional funding through the state's Energy Efficiency Reconciliation Factor (EERF), system benefit charges, and regional forward capacity market auction proceeds.¹³⁸

¹²⁹ MASS. EX. OFFICE OF ENERGY & ENVTL. AFFAIRS, *Massachusetts' Progress Towards Reducing Greenhouse Gas (GHG) Emissions by 2020*, <http://www.mass.gov/eea/air-water-climate-change/climate-change/massachusetts-global-warming-solutions-act/> (last visited Oct. 28, 2016).

¹³⁰ *Id.*

¹³¹ EX. OFFICE DEP'T OF ENERGY & ENVTL. AFFIARS, MASSACHUSETTS CLEAN ENERGY AND CLIMATE PLAN FOR 2020 (2015), <http://www.mass.gov/eea/docs/eea/energy/2020-clean-energy-plan.pdf>. For more information, see the Global Warming Solutions Act Dashboard: <http://www.mass.gov/eea/air-water-climate-change/climate-change/massachusetts-global-warming-solutions-act/>.

¹³² Per Mass. Dep't of Env'tl. Prot.

¹³³ REGIONAL GREENHOUSE GAS INITIATIVE, *Massachusetts*, https://www.rggi.org/rggi_benefits/program_investments/massachusetts) [hereinafter *Massachusetts*].

¹³⁴ REG'L GREENHOUSE GAS INITIATIVE, *Auction Results*, http://rggi.org/market/co2_auctions/results (last visited Oct. 31, 2016) [select "Cumulative Allowance & Proceeds (by State)].

¹³⁵ *Massachusetts*, *supra* note 133.

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *Id.*

Mass Save programs provide energy assessments, air sealing and weatherization, and rebates for insulation and efficient lighting, appliances, HVAC, and water heating equipment.¹³⁹ The programs provide incentives for implementing combined heat and power systems, and enable industrial facilities to improve process efficiency.¹⁴⁰ RGGI proceeds also support incentives to develop markets for energy-efficient technologies.¹⁴¹ This can include building code consultations, community-based initiatives, public education and outreach, and other programs helping to develop and commercialize energy-efficient products and practices.¹⁴²

The Green Communities Division of the Department of Energy Resources strives to help all Massachusetts cities and towns find clean energy solutions that reduce long-term energy costs and strengthen local economies.¹⁴³ The Division provides technical assistance and financial support for municipal initiatives to improve energy efficiency and increase the use of renewable energy in public buildings, facilities, and schools.¹⁴⁴ The Green Communities Designation and Grant Program has helped 155 cities and towns earn Green Community designation.¹⁴⁵ As energy leaders in Massachusetts, Green Communities are eligible for state grants. Nearly \$29 million from those Green Community grants is already at work in 136 communities, with more than \$3 million in additional grants for energy projects in the newest 19 designated communities.¹⁴⁶ Executive Order 569, described above, also directs the state to provide technical assistance to cities and towns to complete climate change vulnerability assessments and build resilience to the impacts of climate change.

¹³⁹ *Id.*

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

Michigan

Michigan sees adaptability as a foundation for Michigan's energy future, with protection of the environment as a pillar of energy decision-making, alongside reliability and affordability. Michigan's energy generation is part of a healthier future, and the Governor has set goals to reduce mercury emissions, pollution that creates acid rain, and particles in the air for the health of Michigan.¹⁴⁷ Achieving these goals is particularly important because meeting these goals would improve public health and make Michigan more adaptable in a world of increasing regulation. Michigan has done a great deal of modelling and has shown that it no longer sees a trade-off between affordability and environmental protection in many cases. When looking at its energy mix in 2025, if Michigan always selected its cheapest option, it would get between 30 and 40 percent of its energy needs from its cleanest sources—waste reduction and renewable energy.¹⁴⁸ That compares to only 15 percent in 2015 from those sources.¹⁴⁹

Michigan has taken several steps to pursue the cheapest option energy future and has seen significant economic benefits as a result. Michigan signed on to (and is on the steering committee for) the Governors' Accord for a New Energy Future, which is an effort to diversify energy generation, transition to clean energy sources, modernize energy infrastructure and encourage clean transportation options.¹⁵⁰ Michigan is also pursuing legislative changes to remove barriers to the elimination of energy waste.¹⁵¹ Additionally, Michigan achieved energy savings of 6 percent (2009-2015) driven in large part by state energy optimization programs.¹⁵² Michigan's renewable energy supply now stands at 9 percent as of 2015, which has been achieved at no cost over traditional generation for the majority of the state.¹⁵³ Energy efficiency programs are providing a high return on investment to the state—for every dollar invested in energy efficiency, energy efficiency provides \$4 in benefits to homeowners and businesses in Michigan, meaning the state has saved billions of dollars since 2012.¹⁵⁴

¹⁴⁷ Gov. Snyder, Press Release, Governor Snyder Sets Goals for "No Regrets" Energy Future by 2025 (Dec. 19, 2013), http://www.michigan.gov/snyder/0,4668,7-277-61409_61417-318423--,00.html.

¹⁴⁸ Gov. Rick Snyder, Special Message, Ensuring Affordable, Reliable, and Environmentally Protective Energy for Michigan's Future, 16 (2015), https://www.michigan.gov/documents/150313_Energy_Message_FINAL_484033_7.pdf.

¹⁴⁹ *Id.* at 12.

¹⁵⁰ Governors' Accord for a New Energy Future, Feb. 16, 2016, <https://static1.squarespace.com/static/56704ad6bfe873c2cc9eff73/t/56c3b30c62cd942b3f8c1dc5/1455665943323/Accord> [Governors' New Energy Accord].

¹⁵¹ Jonathan Oosting, *Energy Director: A "Shame" if Legislators Don't Act*, THE DETROIT NEWS (Sept. 27, 2016), <http://www.detroitnews.com/story/news/politics/2016/09/27/energy-legislators/91162174/>. A removal of the 2 percent spending cap is present in both House and Senate energy bill packages.

¹⁵² Mich. Governor's Office, Fact Sheet, Michigan Energy Future: Ensuring Affordable, Reliable, Adaptable, and Environmentally Protective Energy (2015), http://www.michigan.gov/documents/snyder/2015energymessage1pager_484037_7.pdf.

¹⁵³ MICH. PUB. SERV. COMM., REPORT ON THE IMPLEMENTATION OF THE P.A. 295 RENEWABLE ENERGY STANDARD AND THE COST-EFFECTIVENESS OF THE ENERGY STANDARDS, 3 (2016), http://www.michigan.gov/mpsc/0,4639,7-159-16400_17280-376729--,00.html.

¹⁵⁴ MICH. PUB. SERV. COMM., 2015 REPORT ON ENERGY OPTIMIZATION PROGRAMS AND COST-EFFECTIVENESS OF PA 295 STANDARDS, 5 (2015), http://www.michigan.gov/documents/mpsc/2015_Energy_Optimization_Report_501851_7.pdf.

Minnesota

Minnesota achieved a 28 percent reduction of in-state CO₂ emissions from the power sector between 2005-2013.¹⁵⁵ The state has relied on a number of policies to increase clean energy development and decrease power sector emissions, including GHG reduction goals and renewable energy and energy efficiency standards, and is currently planning additional strategies to further reduce emissions.

Minnesota has a renewable energy standard (RES) requiring utilities in the state to provide 25 percent of their power from renewable energy (defined in statute as wind, solar, hydropower, and biomass) by 2025.¹⁵⁶ The largest utility in the state, Xcel Energy, is required to produce 30 percent of their power from renewables by 2020.¹⁵⁷ All subject utilities complied with the 2012 RES benchmark requirements and are positioned to comply with their 2025 obligations.¹⁵⁸ In 2015, Minnesota generated 21 percent of its electricity from renewable energy sources, while it saw coal-powered generation drop to 45 percent from 62 percent in 2005.¹⁵⁹

A 2013 law established an additional solar energy standard requiring investor-owned utilities to obtain 1.5 percent of their power from solar energy by 2020.¹⁶⁰ The law also establishes an energy goal for the state that 10 percent of retail electric sales in Minnesota be generated by solar energy.¹⁶¹ Though solar energy provided less than 1 percent of the state's electricity in 2015, the state is expecting to see a significant increase in solar energy, with over 500 MW of large solar projects expected to be completed in 2016.¹⁶²

Minnesota also set energy-saving goals for electric and natural gas utilities to achieve annual energy savings of at least 1.5 percent of annual retail sales.¹⁶³ Minnesota's Conservation Improvement Program (CIP) requires electric utilities to spend a minimum of 1.5 percent of annual gross operating revenues on CIP programs like rebates for efficient appliances or energy audits.¹⁶⁴ CIP programs also include green building standards and programs targeting low-income ratepayers.¹⁶⁵ The CIP resulted in an avoided 2.2 million tons of CO₂ emissions annually from 2012-2013.¹⁶⁶

Minnesota's 2007 Next Generation Energy Act established economy-wide goals to reduce GHG emissions from 2005 levels: 15 percent by 2015, 30 percent by 2025, and 80 percent by 2050.¹⁶⁷ While power sector emissions in the state are well on their way to a 30 percent reduction by 2025, the state economy as a whole is not currently

¹⁵⁵ *State Carbon Dioxide Emissions*, *supra* note 121 [Minnesota specific data available at <http://www.eia.gov/environment/emissions/state/excel/minnesota.xlsx>].

¹⁵⁶ MINN. STAT. § 216B.1691, Subd. 2a(a) (2016).

¹⁵⁷ *Id.* § 216B.1691, Subd. 2a(b).

¹⁵⁸ MINN. DEP'T COMMERCE, MINNESOTA RENEWABLE ENERGY STANDARD: UTILITY COMPLIANCE, 7-9 (Jan. 15, 2015), <https://www.leg.state.mn.us/docs/2015/mandated/150096.pdf>.

¹⁵⁹ Minn. Dep't Commerce, Fact Sheet: 21% of Minnesota's Electricity Came from Renewables in 2015 (2016), <http://mn.gov/commerce-stat/pdfs/mn-renewable-energy-update-2015-page-numbers.pdf> [hereinafter Minnesota Fact Sheet].

¹⁶⁰ MINN. STAT. § 216B.1691, Subd. 2f.

¹⁶¹ *Id.*

¹⁶² Minnesota Fact Sheet, *supra* note 159.

¹⁶³ MINN. STAT. § 216B.2401.

¹⁶⁴ MINN. DEP'T COMMERCE, *Conservation Improvement Program*, <https://mn.gov/commerce/industries/energy/utilities/cip/> (last visited Oct. 17, 2016).

¹⁶⁵ *Id.*

¹⁶⁶ MINN. DEP'T COMMERCE, MINNESOTA CONSERVATION IMPROVEMENT PROGRAM ENERGY AND CARBON DIOXIDE SAVINGS REPORT FOR 2012-2013, 5 (2016), <https://www.leg.state.mn.us/docs/2016/mandated/160413.pdf>.

¹⁶⁷ MINN. STAT. § 216H.02, subd. 1.

projected to meet these goals. Therefore, current state planning efforts focus on getting the state on track for needed emissions reductions, expanding on successful programs like the RES and CIP. The state completed a Climate Solutions and Economic Opportunities project in 2016, producing a report documenting key findings on state progress and opportunities in state climate policy.¹⁶⁸ The report highlights some immediate-impact policies, focused on the energy sector, to help get Minnesota on track towards its Next Generation GHG reduction goals. These policies include an increased RES of up to 50 percent, continued retirements and repowering of the state's coal-fired power plants, increasing the energy efficiency resource standard to 2 or 2.5 percent, and broad implementation of and support for Minnesota's Sustainable Building 2030 standards for more energy efficient buildings.¹⁶⁹

Minnesota continues work on the Clean Power Plan (CPP). Minnesota is focusing on better understanding compliance plan design options of the CPP and hearing from Minnesotans what matters most to them.¹⁷⁰ The Minnesota Pollution Control Agency (MPCA) has held 27 stakeholder meetings and webinars to focus on technical issues related to the development of Minnesota's implementation plan.¹⁷¹ The MPCA also held eight listening sessions around the state and has developed a user-friendly website to provide information and opportunities for all Minnesotans to give input on the plan.¹⁷² The MPCA is now beginning its work to understand how the state can both avoid any possible disproportionate negative impacts on vulnerable communities and bring the benefits of the Clean Power Plan to communities that have historically not had access to clean energy opportunities.¹⁷³ This effort will involve outreach to communities and the development of an analysis of potential impacts and opportunities.

¹⁶⁸ See generally MINN. ENVTL. QUALITY BD., CLIMATE SOLUTIONS AND ECONOMIC OPPORTUNITIES: A FOUNDATION FOR MINNESOTA'S STATE CLIMATE ACTION PLANNING (2016), https://www.eqb.state.mn.us/sites/default/files/documents/CSEO_EQB.pdf.

¹⁶⁹ See generally *id.*

¹⁷⁰ Per. Minn. Pollution Control Agency.

¹⁷¹ *Id.*

¹⁷² *Id.*

¹⁷³ *Id.*

Nevada

Governor Brian Sandoval recently issued the First Edition of Nevada’s Strategic Planning Framework, which the Administration prepared to identify the values and issues of greatest importance to the state, as well as goals and objectives undertaken to realize those values.¹⁷⁴ One of the goals related to clean energy and GHG emissions reductions is to become the nation’s leading producer and consumer of clean and renewable energy, with three objectives.¹⁷⁵ First, by 2020, complete an “electric highway” system serving the entire state.¹⁷⁶ Second, significantly reduce the percentage of imported fossil fuels over the next 10 years.¹⁷⁷ Third, reduce carbon emissions to a level at or below accepted federal standards.¹⁷⁸

Governor Sandoval issued Executive Order 2016-04 in February 2016, reconvening the New Energy Industry Task Force to provide recommendations on the best energy policies for Nevada’s future.¹⁷⁹ The Task Force is charged with specifically addressing policies that: encourage the development of clean energy sources and integrate renewable energy technologies into Nevada’s energy sector; create a modern, resilient, and cost-effective energy grid; and support distributed generation and storage, with a specific focus on rooftop solar and net metering.¹⁸⁰ The Task Force and Technical Advisory sub-committees held 23 public meetings since March 2016 to receive public and stakeholder input on Nevada’s clean energy policies.¹⁸¹ The Task Force produced 27 legislative and policy recommendations to achieve these goals.¹⁸² Among the recommendations were policy proposals related to rooftop solar and net metering, community solar, integrated resource planning, clean energy financing, distributed generation pilot and demonstration programs, energy efficiency incentives, and participation in regional energy markets and trading mechanisms.

In 2016, Nevada signed onto the Governors’ Accord for a New Energy Future along with 16 other states in a bipartisan effort to diversify energy generation, transition to clean energy sources, modernize energy infrastructure, and encourage clean transportation options.¹⁸³ The Accord states have prioritized a number of action items to achieve these goals and continue to coordinate efforts.¹⁸⁴ Work priorities include: in-depth energy data and analysis; identifying energy goals and policy priorities for each state; developing an action plan specific to each member state; providing technical assistance to carry out actions identified in the plan. Nevada is a participant on the Executive Committee formed by the Accord states to seek support to effectively communicate and implement the identified energy policy goals.

¹⁷⁴ See generally NEV., NEVADA’S STRATEGIC PLANNING FRAMEWORK 2016-2020 (2016),

<http://gov.nv.gov/uploadedFiles/govnv.gov/Content/StrategicPlan/GovernorsPlanningFrameworkFinal.pdf>.

¹⁷⁵ *Id.* at 10.

¹⁷⁶ *Id.*

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ Governor Brian Sandoval, Ex. Order 2016-04 (2016), http://gov.nv.gov/News-and-Media/Executive-Orders/2016/EO_-2016-04-New-Energy-Task-Force/.

¹⁸⁰ *Id.*

¹⁸¹ NEV. GOVERNOR’S OFFICE OF ENERGY, *New Energy Industry Task Force*, http://energy.nv.gov/Programs/New_Energy_Industry_Task_Force/ (last visited Oct. 18, 2016).

¹⁸² NEV. GOVERNOR’S OFFICE OF ENERGY, NEW ENERGY INDUSTRY TASKFORCE FINAL RECOMMENDATIONS (2016), [http://energy.nv.gov/uploadedFiles/energynv.gov/content/Programs/NEITF%20Final%20Recommendations\(1\).pdf](http://energy.nv.gov/uploadedFiles/energynv.gov/content/Programs/NEITF%20Final%20Recommendations(1).pdf).

¹⁸³ Governors’ New Energy Accord, *supra* note 150.

¹⁸⁴ GOVERNORSNEWENERGYFUTURE.ORG, *Update: Governors Begin Work Together Under the Bipartisan Accord* (May 19, 2016), <http://www.governorsnewenergyfuture.org/news/>.

Nevada has promoted clean transportation through the Nevada Electric Highway project, which was launched by the state in partnership with NV Energy in 2015.¹⁸⁵ Development of charging station infrastructure provides electric vehicle owners the ability to drive between the state's largest urban centers of Reno and Las Vegas and reliably charge their vehicles.¹⁸⁶ The Governor's Office of Energy is partnering with the Nevada Department of Transportation and rural electric utilities in an effort to expand the scope of the project and install electrical vehicle (EV) charging stations throughout Nevada's entire highway infrastructure, thus reducing Nevada's petroleum imports and associated GHGs.¹⁸⁷ The first operational EV charging station of the NV Electric Highway was announced in March 2016, with more to follow.¹⁸⁸

Nevada was one of the first states to adopt a RPS in 1997, and it has contributed to the states' strong renewable energy market.¹⁸⁹ The percentage of renewable energy required by the RPS is 25 percent by 2025.¹⁹⁰ Nevada's largest investor-owned utility, NV Energy, is already exceeding the requirement in 2015 with Sierra Pacific (northern company) ending at 31.3 percent, and NV Power (southern company) ending at 21.2 percent.¹⁹¹ Nevada's renewable generation has doubled in the past 8 years.¹⁹² Nevada is proud to be ranked number one in the nation for solar capacity per capita,¹⁹³ and number one in installed geothermal energy per capita.¹⁹⁴

Nevada's clean energy policies have already achieved significant reductions in carbon pollution in the power sector, largely due to legislation implemented in 2013. The Emissions Reduction Capacity Replacement Plan, implemented by Senate Bill 123 in the 2013 Legislative session, moved the state away from coal and into renewable energy resources and natural gas.¹⁹⁵ SB 123 required the largest investor-owned utility in the state, NV Energy, to retire or eliminate 800 MW of coal-fired electric generating plants by December 31, 2019.¹⁹⁶ It also required that NV Energy purchase, construct, or acquire 900 MW of power from cleaner facilities, 350 MW of which must come from new renewable resources.¹⁹⁷

¹⁸⁵ Fact Sheet, NV Energy, Nevada Electric Highway to Link Northern and Southern Nevada with Electric Vehicle Charging Stations Along U.S. Route 95 (Mar. 2016), [http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/Nevada%20Electric%20Highway%20Fact%20Sheet\(2\).pdf](http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/Nevada%20Electric%20Highway%20Fact%20Sheet(2).pdf) [hereinafter Nevada Electric Highway Fact Sheet].

¹⁸⁶ *Id.*

¹⁸⁷ See generally NEV. DEP'T TRANSP., NEVADA ELECTRIC HIGHWAY (Feb. 8, 2016), [https://www.nevadadot.com/uploadedFiles/NDOT/About NDOT/Board of Directors/Item%208%20Presentation%20Feb%202016.pdf](https://www.nevadadot.com/uploadedFiles/NDOT/About%20NDOT/Board%20of%20Directors/Item%208%20Presentation%20Feb%202016.pdf).

¹⁸⁸ Nevada Electric Highway Fact Sheet, *supra* note 185.

¹⁸⁹ NEV. REV. STAT. § 704.7821 (2016).

¹⁹⁰ *Id.*

¹⁹¹ NV ENERGY, *NV Energy Exceeds Renewable Requirement for 2015* (Apr. 5, 2016), <https://www.nvenergy.com/company/mediaroom/newsdetail.cfm?n=136939>.

¹⁹² Fact Sheet, Bloomberg New Energy Fin., State Energy Fact Sheet (2015), http://www.bcse.org/images/2015EFGGrant/BNEF_BCSE_Nevada%20state%20energy%20factsheet%20v22%20FINAL.pdf.

¹⁹³ Sean Whaley, *Nevada Led US In Solar Electricity Per Capita, Study Says*, July 21, 2016, <https://solarenergyfairness.com/review-journal-nevada-led-us-in-solar-electricity-per-capita-study-says/>.

¹⁹⁴ NEV. GOVERNOR'S OFFICE, *Nevada Selected To Host Ground-Breaking National Geothermal Test Site* (Apr. 27, 2015), <http://gov.nv.gov/News-and-Media/Press/2015/Nevada-Selected-to-Host-Ground-Breaking-National-Geothermal-Test-Site/>.

¹⁹⁵ NEV. REV. STAT. § 704.701 *et seq.* (2016).

¹⁹⁶ *Id.* § 704.7316(2)(a).

¹⁹⁷ *Id.* § 704.7316(2)(b)-(d).

In 2014, 2015 and 2016, NV Energy conducted annual Requests for Proposals for 100 MW of renewable energy, which resulted in three separate Power Purchase Agreements (PPA) of 100 MW each for solar projects with some of the lowest PPA prices seen in the country.¹⁹⁸ The last coal-fired power plant in the state will be retired by 2025.¹⁹⁹

The state offers economic incentives to attract developers to the state through a Renewable Energy Tax Abatement program. This program was created in 2009 and awards partial tax abatements for property and sales and use taxes to eligible projects located in Nevada.²⁰⁰ To date, the program has attracted over \$6.5 billion in economic benefits or in-state investments, including capital investment, jobs, and taxes paid.²⁰¹ The program has created over 4,000 jobs paying an average of \$41 an hour, which is well above the average statewide hourly wage.²⁰² There are currently 29 large-scale renewable energy projects that have been constructed throughout Nevada thanks to this state clean energy program.²⁰³

Nevada's largest utility, NV Energy, offers a Green Energy Choice tariff that enables residential customers to choose the option of having 50 percent or 100 percent renewable energy by electing to pay an additional amount on monthly bills.²⁰⁴ In addition, NV Energy also offers the GreenEnergy Rider initiative, which enables large customers to be served by renewable energy. The program allows large customers to enter into a special contract which provides for dedication of a new or existing renewable resource with power owned or procured by the utility dedicated to the specific customer.²⁰⁵ Just this year, the state approved 129 MW of solar capacity from two new power plants owned by First Solar and Boulder Solar, which were built specifically to serve Apple and Switch (and went above and beyond the requirements of the RPS and SB 123).²⁰⁶

The state of Nevada offers economic incentives for new non-residential and multifamily residential green buildings, and existing buildings which are renovated to meet certain green building standards, and was ranked 6th in the nation in 2015 for Leadership in Energy & Environmental Design (LEED) green building standards.²⁰⁷ Data from the United States Green Building Council's 2015 Green Building Economic Impact Study show LEED construction is expected to support 96,000 jobs in Nevada and impact state GDP by \$8.55 billion from 2015-2018.²⁰⁸ LEED-certified spaces use less energy and water resources, save money for families, businesses and taxpayers, reduce carbon emissions and create a healthier environment for residents, workers and the community.²⁰⁹

¹⁹⁸ NEV. PUB. UTILS. COMM., IN THE MATTER OF THE APPLICATION OF NEVADA POWER COMPANY SEEKING APPROVAL OF THE FIRST AMENDMENT TO ITS EMISSION REDUCTION AND CAPACITY REPLACEMENT PLAN, DOCKET NO. 15-07 (July 2, 2016).

¹⁹⁹ NEV. PUB. UTILS. COMM., APPLICATION OF SIERRA PACIFIC POWER COMPANY FOR AUTHORITY TO RESTATE \$1.277.5 MILLION OF EXISTING LONG TERM DEBT AUTHORITY, DOCKET NO. 16-07001 (July 1, 2016).

²⁰⁰ NEV. REV. STAT. §§ 701A.200; 701A.360 (2016).

²⁰¹ Fact Sheet, Nevada Governor's Office of Energy, Renewable Energy Tax Abatement Program (Apr. 2016), <http://energy.nv.gov/uploadedFiles/energyngov/content/Programs/RETA%20Fact%20Sheet.pdf>.

²⁰² *Id.*

²⁰³ *Id.*

²⁰⁴ NV ENERGY, *Northern NV Green Energy Choice*,

<https://www.nvenergy.com/renewablesenvironment/reneables/greenenergy/> (last visited November 9, 2016).

²⁰⁵ See Press Release, NV Energy, NV Energy Rolls Out New Green Energy Opportunity for Large Customers (May 3, 2016), <https://www.nvenergy.com/company/mediaroom/newsdetail.cfm?n=136941>.

²⁰⁶ See NEWS RENEWABLES, *Nevada PUC Clears PPAs for 129 MW of Solar Power* (Jan. 28, 2016), <http://renewables.seenews.com/news/nevada-puc-clears-ppas-for-129-mw-of-solar-power-510751>.

²⁰⁷ U.S. GREEN BLDG. COUNCIL, *USGBC Releases the 2015 Top 10 States for LEED Green Building Per Capita in the U.S.* (Jan. 26, 2016), <http://www.usgbc.org/articles/usgbc-releases-2015-top-10-states-leed-green-building-capita-us>.

²⁰⁸ U.S. GREEN BLDG. COUNCIL, GREEN BUILDING ECONOMIC IMPACT STUDY, 35, 38 (2015), https://kapost-files-prod.s3.amazonaws.com/published/56438d353dab34e8a1000061/green-building-economic-impact-study.pdf?kui=ntZxSELuijOYNSwkwEO_Kw.

²⁰⁹ U.S. GREEN BLDG. COUNCIL, *This is Lead*, <http://leed.usgbc.org/leed.html> (last visited Oct. 18, 2016).

New Hampshire

New Hampshire's Climate Action Plan, adopted in 2009, established a goal of reducing GHG emissions 80 percent below 1990 levels by 2050, based on the reductions that climate scientists believe to be necessary to stabilize GHG in the atmosphere at or below 450 parts per million of carbon dioxide.²¹⁰ More recently, in August 2015, New Hampshire signed onto the New England Governors and Eastern Canadian Premiers Resolution 39-1, adopting an interim goal of reducing GHG emissions by 35 to 45 percent below 1990 levels by 2030.²¹¹

Achieving these goals is particularly important because impacts to New Hampshire from climate change are already manifesting themselves, including an increase in average maximum temperatures, which have warmed by 1.9°F (annual) and 2.8°F (winter), and an increase in average minimum temperatures, which have warmed by 3.2°F (annual) and 6.0°F (winter).²¹² New Hampshire has experienced a 7 to 20 percent increase in annual precipitation, with more of that falling as rain instead of snow.²¹³ The frequency and magnitude of extreme precipitation events has increased and there are fewer days with snow cover. These impacts are projected to become even more severe between 2020 and 2099 with warmer winters (20–45 fewer days below 32°F) and hotter summers (14–42 more days above 90°F); an average annual increase in precipitation of 16 to 19 percent; a two- to three-fold increase in extreme precipitation events;²¹⁴ more frequent and severe flooding; less snow and more rain; and less snow cover (25–48 fewer snow covered days).²¹⁵

Since 2004, New Hampshire's GHG emissions have fallen 32 percent economy-wide, while the economy's compound annual growth rate was 0.8 percent for the period between 2004 and 2014.²¹⁶ New Hampshire's participation in RGGI has resulted in a 57 percent reduction in GHG emissions from the power sector since 2005,²¹⁷ reflecting a 69 percent reduction in coal-fired generated carbon emissions²¹⁸ as well as a shift to natural gas and renewables. In addition, New Hampshire's RPS has helped to increase generation from renewable energy sources by 25 percent from 2012 to 2014.²¹⁹ Renewable energy now supplies 17 percent of the state electricity total.²²⁰

The New Hampshire utility "Core" energy efficiency programs, started in 2002, have also produced significant savings. As part of the Restructuring Act, the electric utilities in the state of New Hampshire established a set of energy efficiency programs designed for statewide implementation in the service territories of the utilities regulated by the Public Utilities Commission (PUC).²²¹ A variety of programs exist, serving both residential and

²¹⁰ N.H. DEP'T OF ENVTL. SERVS. THE NEW HAMPSHIRE CLIMATE ACTION PLAN: A PLAN FOR NEW HAMPSHIRE'S ENERGY, ENVIRONMENTAL AND ECONOMIC DEVELOPMENT FUTURE, 1 (2009),

http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/nh_climate_action_plan.htm.

²¹¹ Resolution Concerning Climate Change, 39th Annual Conference of New England Governors and Eastern Canadian Premiers, Aug. 31, 2015, NEG/ECP <http://www.cap-cpma.ca/data/Signed%2039-1En.pdf>.

²¹² Fact Sheet, Climate Solutions New England, New Hampshire's Climate Past and Future Changes (2016).

²¹³ *Id.*

²¹⁴ *Id.*

²¹⁵ *Id.*

²¹⁶ U.S. DEP'T. OF COMMERCE, *BearFacts* ,

<http://bea.gov/regional/bearfacts/action.cfm?geoType=3&fips=33000&areatype=33000> (last updated Sept. 28, 2016) [select "GDP by State" tab].

²¹⁷ *State Carbon Dioxide Emissions*, *supra* note 121 (last updated Oct. 26, 2015) [New Hampshire specific data available at <http://www.eia.gov/environment/emissions/state/excel/newhampshire.xlsx>].

²¹⁸ *Id.*

²¹⁹ Per N.H. Dep't of Env'tl. Serv.

²²⁰ U.S. ENERGY INFO. ADMIN., *New Hampshire: State Profile and Energy Estimates*, <http://www.eia.gov/state/?sid=NH> (last visited Oct. 17, 2017).

²²¹ N.H. REV. STAT. ANN. § 374-F:3 X (2016).

commercial and industrial customers. They include programs for new construction, retrofitting existing structures, and rebate programs for selected lighting and appliances.²²² The Core programs are funded by the System Benefits Charge and proceeds from RGGI and the Forward Capacity Market. To date, approximately \$268 million has been invested in energy efficiency through the Core programs, with expected lifetime energy savings of over 12.0 billion kilowatt hours.²²³ In 2016, the U.S. Environmental Protection Agency (EPA) recognized the New Hampshire utilities with its highest ENERGY STAR award, the 2015 Partner of the Year-Sustained Excellence Award, demonstrating a strong commitment to energy efficiency through superior energy efficiency achievements and continued leadership in protecting the environment.²²⁴ RGGI-funded investments from 2009 to 2016 in the Core programs will save 438,330 MWh of electricity and 1,023,193 million British thermal units (Btu) over the expected life of the energy efficiency improvements, saving electric utility customers \$92 million in energy costs that can be reinvested in the NH economy.²²⁵

Through Executive Order 2016-03, New Hampshire expanded its “lead-by-example” initiative, setting updated goals of reducing fossil fuel use at state-owned facilities 30 percent by 2020, 40 percent by 2025, and 50 percent by 2030, compared to a 2005 baseline; reducing GHG emissions from the state passenger vehicle fleet by 30 percent on a metric-ton basis by 2030, as compared to a 2010 baseline; enhancing construction and renovation standards; and increasing management and tracking of energy consumption.²²⁶

In May 2016, New Hampshire doubled the cap on net metering projects to 100 MW,²²⁷ with 80 percent of the increase allocated to smaller projects of less than 100 kilowatts, mostly homes and some small businesses, and 20 percent allocated to larger projects.

In 2016, the New Hampshire PUC established an Energy Efficiency Resource Standard (EERS)²²⁸ with an implementation date of January 1, 2018. The PUC also opened a docket (IR 15-296) on electric grid modernization on July 30, 2015.²²⁹ A workgroup will produce a report to the commissioners summarizing its recommendations in February 2017.

In 2016, New Hampshire also continued its participation in RGGI and RGGI’s 2016 Program Review.²³⁰ New Hampshire intends to submit its RGGI Program as a Clean Power Plan compliance plan to EPA after the U.S. Supreme Court stay is lifted. Stakeholder meetings have been and will continue to be held at both the regional²³¹ and state levels.²³²

²²² NHSAVES, <http://www.nhsaves.com/> (last visited Oct. 24, 2016).

²²³ N.H. PUB. UTILS. COMM., RESULTS AND EFFECTIVENESS OF THE SYSTEM BENEFITS CHARGE 1 (2016), <http://puc.nh.gov/Electric/REPORT%20on%20SBC%20TO%20THE%20LEGISLATIVE%20OVERSIGHT%20COMMITTEE%202016%20Report%2010-01-16.pdf>.

²²⁴ EVERSOURCE, *EPA Recognizes New Hampshire’s Electric Utilities with 2016 Energy Star Partner of the Year – Sustained Excellence Award* (Apr. 12, 2016), <https://www.eversource.com/content/nh/about/news-room/new-hampshire/newspost?Group=new-hampshire&Post=2016-energy-star-award>.

²²⁵ RGGI INVESTMENT PROCEEDS, *supra* note 60, at 31.

²²⁶ Governor Margaret Hassan, Ex. Order 2016-03 (2016), <http://governor.nh.gov/media/news/2016/pr-2016-05-06-executive-order.htm>.

²²⁷ 2016 N.H. Laws 2124.

²²⁸ Energy Efficiency Resource Standard, N.H. Pub. Utils. Comm., Order 25,932 (Aug. 2, 2016), <http://puc.nh.gov/Regulatory/Orders/2016orders/25932e.pdf>.

²²⁹ Investigation into Grid Modernization, N.H. Pub. Utils. Comm., IR 15-296 (July 30, 2015), <http://puc.nh.gov/Regulatory/Orders%20of%20Notice/0730onIR15-296revised%20Grid%20Modernization.PDF>.

²³⁰ REG’L GREENHOUSE GAS INITIATIVE, *2016 Program Review*, <http://rggi.org/design/2016-program-review> (last visited Oct. 24, 2016) [hereinafter *2016 Program Review*].

²³¹ REG’L GREENHOUSE GAS INITIATIVE, *RGGI Public Stakeholder Meetings*, <http://www.rrgi.org/design/2016-program-review/rggi-meetings> (last visited Oct. 24, 2016).

²³² REG’L GREENHOUSE GAS INITIATIVE, *State-Specific Stakeholder Meetings*, <http://rggi.org/design/2016-program-review/state-specific-meetings> (last visited Oct. 24, 2016).

New York

New York State is already experiencing the impacts of climate change—including an increase in severe weather events like Superstorm Sandy and Hurricanes Irene and Lee. Addressing the drivers of climate change through shifting to clean energy and reducing GHG is critical to maintaining New York’s strong economy and to protecting the state’s natural resources and the health and security of all New Yorkers.

Governor Andrew M. Cuomo has committed to making New York State a leader in the transition to clean energy. New York State’s vision as set forth in the 2015 State Energy Plan includes three targets for 2030: 40 percent reduction in GHG emissions from 1990 levels, 50 percent of energy generation from renewable energy sources, and a 600 trillion Btu (23 percent) increase in statewide energy efficiency.²³³

Under Governor Cuomo, the electricity sector has made significant progress at reducing carbon dioxide emissions efficiently and equitably. Since the inception of RGGI, carbon dioxide emissions have been significantly reduced while the state has collected \$977 million for investments into the clean energy economy,²³⁴ resulting in more than one billion dollars in net overall economic benefits, bill savings, and avoided fuel costs.²³⁵ Going forward, New York is working with partner RGGI states to update this successful program through its scheduled program review. The cap reduction will continue to drive down emissions from the electricity sector and maximize benefits from the Governor’s new programs, like the Reforming the Energy Vision (REV) and Clean Energy Standard (CES).

REV and CES are two of Governor Cuomo’s key initiatives that are accelerating the transition to clean energy. Launched in 2014, the REV regulatory proceeding will change the way electricity is used in New York by cultivating a retail market for “distributed” energy resources; including distributed generation, energy efficiency, and demand management.²³⁶ The new CES builds upon the REV and New York’s previously successful RPS program and lays out the plan for reaching 50 percent renewables by 2030 in the bulk electricity system, while maintain existing zero-emission nuclear power.²³⁷

New York State is well-positioned to comply with the EPA’s Clean Power Plan (CPP) through its market-based policies, and its stakeholders are demonstrating their support for the CPP through public comments, in the RGGI Program Review,²³⁸ and as part of the state’s CPP outreach to environmental justice communities.²³⁹ New York continues to support the CPP and considers RGGI, which served as a model for the CPP, as evidence of the benefits of regional, market-based GHG reduction policies for achieving cost-effective and equitable reductions while maintaining system reliability. New York anticipates that RGGI would be the mechanism by which the state complies with the CPP.²⁴⁰

²³³ N.Y. STATE ENERGY PLANNING BD., THE ENERGY TO LEAD: 2015 NEW YORK STATE ENERGY PLAN 112 (2015).

²³⁴ \$977,470,936.20 through the last auction in September 2016. REG’L GREENHOUSE GAS INITIATIVE, *Auction Results*, http://rggi.org/market/co2_auctions/results#state_proceeds (last visited Oct. 17, 2016) [click on “+” symbol for “Cumulative Allowances & Proceeds (by State)”].

²³⁵ Fact Sheet, Reg’l Greenhouse Gas Initiative, About the Regional Greenhouse Gas Initiative (Aug. 2016), https://www.rrgi.org/docs/Documents/RGGI_Fact_Sheet.pdf (“Independent reports by the Analysis Group found that the investment of RGGI proceeds from the first control period is generating \$1.6 billion in net economic benefit, and the investment of RGGI proceeds from the second control period is generating \$1.3 billion in net economic benefit.”).

²³⁶ Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision, N.Y. Pub. Serv. Comm., Case 14-M-0101.

²³⁷ Order Adopting a Clean Energy Standard, N.Y. Pub. Serv. Comm., Case 15-E-0302 (Aug. 1, 2016).

²³⁸ *E.g.*, Comment of Indep. Power Producers of New York, Inc. to Regional Greenhouse Gas Initiative (Dec. 4, 2015), https://www.rrgi.org/docs/ProgramReview/2016/11-17-15/Comments/IPPNY_Comments.pdf.

²³⁹ Per N.Y. Dep’t. Envtl. Conservation.

²⁴⁰ *Id.*

RGGI has produced considerable economic and health benefits for New York as emissions from power plants under RGGI have been reduced 46 percent and coal-fired generation has been reduced by 90 percent since 2005.²⁴¹ At the same time, New York's economy has grown: GDP has increased by approximately 12 percent since 2005²⁴² and the number of jobs in New York has increased by approximately 9 percent since 2006.²⁴³ Even more significantly, health impacts from power plants in New York were reduced by 87 to 88 percent in the first years of RGGI.²⁴⁴ Investments in the RGGI portfolio of programs through March 31, 2016 are expected to save more than 10 million tons of CO₂, 52.5 million Btu in fuel savings, and 4.2 million MWh of electricity savings over the lifetime of the measures installed with RGGI funding.²⁴⁵ Over the same timeframe, net renewable generation is expected to rise to approximately 5.6 million MWh and bill savings are anticipated to be more than \$2.9 billion.²⁴⁶

Additional RGGI-funded programs help to establish a foundation for long-term GHG emissions reductions, which contribute to the realization of additional statewide benefits like bill savings.²⁴⁷ Projects funded through RGGI programs focus on renewable energy and energy efficiency and have included rapid bus transport demonstrations, deployment of EV charging stations, biogas initiatives, development of multi-modal transportation hubs, support for energy efficient buildings, and community renewable energy projects to reduce carbon emissions from the power sector.²⁴⁸

²⁴¹ *State Carbon Dioxide Emissions*, *supra* note 121 (last updated Oct. 26, 2015) [New York specific data *available at* <http://www.eia.gov/environment/emissions/state/excel/newyork.xlsx>]; *Compare* N.Y. INDEP. SYM. OPERATOR INC., 2005 LOAD & CAPACITY DATA (2005) *with* N.Y. INDEP. SYM. OPERATOR INC., 2015 LOAD & CAPACITY DATA (2016).

²⁴² U.S. DEP'T OF COMMERCE, *Regional Data*, <http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1#reqid=70&step=1&isuri=1> (last visited Oct. 17, 2016) [select "Real GDP in chained dollars;" select "All Industries;" click "Next Step;" select "New York;" click "Next Step;" select "All Years;" and click "Next Step"].

²⁴³ Per. N.Y. Dep't of Env't and Conservation.

²⁴⁴ JONATHAN BANKS AND DAVID MARSHALL, REGULATION WORKS: HOW SCIENCE, ADVOCACY, AND GOOD REGULATIONS COMBINED TO REDUCE POWER PLANT POLLUTION AND PUBLIC HEALTH IMPACTS; WITH A FOCUS ON STATES IN THE REGIONAL GREENHOUSE INITIATIVE, 13 (2015), <http://www.catf.us/resources/publications/view/216>. The 2005-2012 rates of mortality, heart attacks, bronchitis, asthma and hospital visits linked to SO₂, NO_x, and PM_{2.5}.

²⁴⁵ N.Y. STATE ENERGY RESEARCH & DEVELOPMENT, NEW YORK'S REGIONAL GREENHOUSE GAS INITIATIVE-FUNDED PROGRAMS STATUS REPORT 4 (2016), <https://www.nyserda.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/RGGI-Reports> [hereinafter N.Y.'S RGGI FUNDED PROGRAM STATUS].

²⁴⁶ *Id.* at 4.

²⁴⁷ *Id.* at 2.

²⁴⁸ *See generally id.*

Oregon

Shifting to clean energy and contributing to global reductions of GHG emissions are important to Oregonians and Oregon is making progress. Oregon has committed to the goals of the Under 2 MOU, the central element of which is an agreement to reduce GHG emissions 80 percent to 95 percent by 2050. Oregon has also joined the Pacific Coast Climate Leadership Action Plan²⁴⁹ outlining areas of cooperation to reduce GHG emissions and promote a clean energy economy. Both these commitments make Oregon a part of coalitions of jurisdictions seeking to contribute to global GHG reductions by coordinating policy.

Oregon has taken significant action to transition its economy to cleaner energy by improving energy efficiency, transitioning to renewable sources of electricity, accelerating the transition to zero emission vehicles, and expanding a market for cleaner transportation fuels. Oregon is one of the leading states in improving energy efficiency, consistently ranking in the top ten states in annual assessments by the American Council for an Energy-Efficient Economy.²⁵⁰ Much of this success comes from utility ratepayers' funding of the Oregon Energy Trust,²⁵¹ which reinvests the money into a wide variety of energy efficiency programs in Oregon.

Oregon adopted a RPS in 2007. In 2016, Oregon enacted legislation prohibiting coal generated power from serving the state after 2035 and expanding the RPS to require Oregon's largest utilities to serve Oregonians with at least 50 percent renewable resources by 2040.²⁵² Oregon has also enacted requirements for utilities to credit participation in community solar projects, including a requirement that low-income customers have access to 10 percent of the capacity of community solar projects.²⁵³

Oregon is one of several states that have adopted California's requirement that auto manufacturers deliver increasing numbers of zero-emission vehicles.²⁵⁴ Oregon is now also requiring large utilities to develop plans for improving access to zero emission vehicle (ZEV) infrastructure.²⁵⁵ Oregon's Clean Fuels Program will expand the availability of alternative transportation fuels and technologies by requiring the carbon intensity of Oregon's transportation fuels to decline by 10 percent over the next 10 years.²⁵⁶

²⁴⁹ UNDER 2, *Under 2 Coalition*, <http://under2mou.org/founding-signatories/> (last visited Oct. 18, 2016); PACIFIC COAST COLLABORATIVE, *Member Jurisdictions*, <http://www.pacificcoastcollaborative.org/partners/Pages/default.aspx> (last visited Oct. 18, 2016).

²⁵⁰ See, e.g., Fact Sheet, Am. Council for Energy-Efficient Economy, Oregon (2016), <http://aceee.org/sites/default/files/pdf/state-sheet/2016/oregon.pdf>.

²⁵¹ See ENERGY TRUST OF OR., *Who We Are*, <https://energytrust.org/About/who-we-are/> (last visited Oct. 18, 2016).

²⁵² Or. Senate Bill 1547 §§ 1, 5 (2016).

²⁵³ *Id.* § 22.

²⁵⁴ OR. ADMIN. R. 340-257-0010 *et seq.* (2016).

²⁵⁵ Or. Senate Bill 1547 § 20 (2016).

²⁵⁶ OR. ADMIN. R. 340-253-0100 *et seq.* (2016).

Oregon's clean energy and efficiency programs are also providing economic and health benefits. For example, since 2002, the Energy Trust of Oregon has invested over \$1 billion in energy efficiency and renewable energy generation.²⁵⁷ These investments have saved customers more than \$1.3 billion on utility bills and will further reduce costs on Oregon utilities and their customers by saving at least \$5.6 billion in investments the utilities do not have to make for fuel, storage, transportation, and generation.²⁵⁸ Oregon has at least 68,700 jobs in fields related to renewable electricity and conservation.²⁵⁹

Oregon's clean energy policies are good for the health of Oregonians. Reducing GHG also lowers emissions of harmful pollutants like fine particulates from diesel exhaust and sulfur and nitrous oxides from fossil-fuel generated electricity. The estimated health impacts from fine particulates in Oregon alone is up to \$3.5 billion annually.²⁶⁰

Oregon is supportive of the EPA's Clean Power Plan and has worked closely with its stakeholders to develop a plan for implementing the federal rule.²⁶¹ Oregon agencies have been meeting with a wide variety of stakeholders for well over a year to discuss implementation of the Clean Power Plan.²⁶² Oregon expects to continue close coordination with states in the West to identify opportunities for a regionally cohesive strategy for reducing GHG emissions from the power sector.²⁶³

²⁵⁷ ENERGY TRUST OF OR., 2015 ANNUAL REPORT, 1 (2015),
http://assets.energytrust.org/api/assets/reports/PublicAnnualReport_2015_Final.pdf.

²⁵⁸ *Id.*

²⁵⁹ News Release, U.S. Dep't of Labor, Employment in Green Goods and Services – 2011 (2013),
<http://www.bls.gov/news.release/pdf/ggqcew.pdf>.

²⁶⁰ OR. DEP'T ENVTL. QUALITY, THE CONCERNS ABOUT DIESEL ENGINE EXHAUST 7 (2015),
<http://www.deq.state.or.us/aq/diesel/docs/DieselEffectsReport.pdf>.

²⁶¹ Per Or. Dep't of Env'tl. Quality.

²⁶² *Id.*

²⁶³ *Id.*

Pennsylvania

The Pennsylvania Climate Change Act (Act 70 of 2008) requires the Pennsylvania Department of Environmental Protection (PADEP) to submit to the Governor a Climate Change Action Plan that is revised every three years.²⁶⁴ The Act requires that the Action Plan evaluates cost-effective strategies for reducing or offsetting GHG emissions from various sectors in the Commonwealth.²⁶⁵ PADEP recently released the 2015 Climate Change Action Plan Update to the Governor and the State Energy Program plan to the Department of Energy.²⁶⁶ The Alternative Energy Portfolio Standard of 2004 mandates that a percentage of electricity generated in Pennsylvania come from alternative energy sources, maximizing at 18 percent by 2021.²⁶⁷

Overall, Pennsylvania's carbon emissions have fallen 15.9 percent between 2000 and 2013, based on the most recent data available from the Environmental Protection Agency's (EPA) State Inventory Tool,²⁶⁸ while the economy has grown annually by 1.1 percent over that same time period.²⁶⁹ Pennsylvania's programs have already achieved significant reductions in carbon pollution in the power sector, including 26.4 percent since 2005 and 16.7 percent since 2012 through 2015.²⁷⁰ This reflects in part reductions from coal-fired generation, 33.5 percent between 2005 and 2014, and shifts to cleaner sources, including natural gas and renewables.²⁷¹ Wind energy has increased by 87 percent and solar energy has increased by 174 percent in the Commonwealth between 2010 and 2014.²⁷²

Energy efficiency is also playing a major role in Pennsylvania's drive to reduce GHG emissions. Act 129 of 2008 mandates that Pennsylvania's largest electric distribution companies (EDCs) participate in energy efficiency and conservation programs.²⁷³ The programs are evaluated each year by a statewide evaluator (SWE) for program savings in MWh per year (yr) and demand reduction in MW.²⁷⁴ The most recent SWE report indicated a verified savings of over 2 million MWh/yr and a demand reduction of over 400 MW.²⁷⁵ Carbon dioxide emission reductions are estimated to be over 1.7 million tons.²⁷⁶

²⁶⁴ 71 PA. STAT. § 1361.7(a) (2016).

²⁶⁵ *Id.* § 1361.7(a)(1).

²⁶⁶ PA. DEP'T ENVTL. PROT., 2015 CLIMATE CHANGE ACTION PLAN UPDATE (2016),

<http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-114163/FINAL%202015%20Climate%20Change%20Action%20Plan%20Update.pdf> [hereinafter PA. CLIMATE CHANGE ACTION PLAN]; Per. Pa. Dep't Env'tl. Prot.

²⁶⁷ 73 PA. STAT. § 1658.3 (2016).

²⁶⁸ PA. CLIMATE CHANGE ACTION PLAN, *supra* note 266, at 15.

²⁶⁹ U.S. DEP'T OF COMMERCE, *Regional Data*,

<http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=2#reqid=70&step=1&isuri=1> (last visited Oct. 29, 2016) [select "Per capital real GDP;" select "NAICS (1997 forward" radio button; select "Pennsylvania" in "Area" menu; select "All Years" in Time Period"].

²⁷⁰ Per. Pa. Dep't Env'tl. Prot.

²⁷¹ Per. Pa. Dep't Env'tl. Prot.

²⁷² Per. Pa. Dep't Env'tl. Prot.

²⁷³ 66 PA. STAT. § 2806.1(a) (2016).

²⁷⁴ PA. PUB. UTILS. COMM., IMPLEMENTATION ORDER, M-2008-2069887 (2009),

https://www.puc.state.pa.us/electric/pdf/Act129/EEC_Implementation_Order.pdf.

²⁷⁵ PA. PUB. UTILS. COMM., ACT 129 SWE ANNUAL REPORT: PROGRAM YEAR 6, 9 (2016),

http://www.puc.pa.gov/Electric/pdf/Act129/SWE_PY6-Final_Annual_Report.pdf.

²⁷⁶ *Id.*

According to a July 2016 report from Environmental Entrepreneurs (E2) and Keystone Energy Efficiency Alliance, Pennsylvania has over 66,000 people employed in the clean energy sector, with 53,000 in energy efficiency industries and almost 9,000 in the renewable energy industry.²⁷⁷

For the first time this year, PADEP has tied the planned programming for the State Energy Program to recommendations from the Climate Change Action Plan.²⁷⁸ The 2016-17 plan proposes six major projects, four of which are directly tied to work plans and recommendations from the Climate Change Action Plan.²⁷⁹ These include microgrid technology that is enabled for combined heat-and-power and distributed renewable energy; energy assessments for small manufacturers; small business energy assessments and retrofits (in low income areas); and building operator training.²⁸⁰

Pennsylvania will also coordinate and conduct a scenario-based stakeholder engagement process to create a cogent statewide Pennsylvania's Solar Future plan, planning out five years and ten years in the future to facilitate achievement of solar representing 10 percent of Pennsylvania's electricity sales by 2030.²⁸¹ Among the stakeholders are solar energy market actors, consumer and environmental advocates, legislators, utility representatives, the regional transmission organization, academic experts, and regulators.²⁸² The project will result in a strong plan for solar development and growth in a state that has a traditional reliance on the fossil fuel industry.²⁸³ Pennsylvania is one of the top three electricity-generating states in the nation and though solar photovoltaic installations in Pennsylvania are increasing, solar still produces less than 1 percent of the state's net electricity generation.²⁸⁴ The goal is to make Pennsylvania a leader in renewable energy in the mid-Atlantic region.²⁸⁵

²⁷⁷ ENVTL. ENTREPRENEURS & KEYSTONE ENERGY EFFICIENCY ALLIANCE, CLEAN JOBS PENNSYLVANIA 4, 9 (2016), http://www.e2.org/wp-content/uploads/2016/07/FINAL_CleanJobsPA.pdf.

²⁷⁸ Per. Pa. Dep't Env'tl. Prot.

²⁷⁹ *Id.*

²⁸⁰ *Id.*

²⁸¹ *Id.*; PA. DEP'T OF ENVTL. PROT., OCTOBER 2016 REPORT TO THE CITIZENS ADVISORY COUNCIL, 14 (2016), http://files.dep.state.pa.us/PublicParticipation/Citizens%20Advisory%20Council/CACPortalFiles/Meetings/2016_10/October%20CAC%20Report.pdf.

²⁸² U.S. DEP'T OF ENERGY, *Project Profile: Pennsylvania Department of Environmental Protection (SEEDS2-SED)*, <http://energy.gov/eere/sunshot/project-profile-pennsylvania-department-environmental-protection-seeds2-ses> (last visited Oct. 30, 2016).

²⁸³ *See id.*

²⁸⁴ PA. CLIMATE CHANGE ACTION PLAN, *supra* note 266, at 4, 25.

²⁸⁵ Per. Pa. Dep't Env'tl. Prot.

Rhode Island

Rhode Island adopted its first data-driven State Energy Plan in 2015, setting ambitious goals to diversify its energy system and reduce GHG emissions while achieving economic benefits.²⁸⁶ Coupled with the state's Resilient Rhode Island Act of 2014,²⁸⁷ which establishes GHG emission reduction targets and a suite of complementary clean energy public policies,²⁸⁸ the Ocean State has set a pathway toward achieving a more sustainable clean energy future. The state's comprehensive efforts are already helping to boost a rapidly-growing clean energy economy, where the clean energy sector employment increased by 40 percent in 2015 and now supports approximately 14,000 workers across the state.²⁸⁹

Through its statutory least-cost procurement mandate, Rhode Island's clean energy portfolio is built upon a commitment to invest in all energy efficiency measures that are cost-effective and cost less than acquisition of additional supply.²⁹⁰ In the most recent program year (2015), Rhode Island achieved unprecedented energy savings of 2.91 percent of electricity consumption and 1.18 percent of natural gas consumption, producing \$386.4 million in economic benefits to Rhode Island and supporting 696 full-time equivalent jobs.²⁹¹ Since 2008, Rhode Island has invested \$489 million in energy efficiency and consumers have realized \$2.67 billion in economic benefits²⁹² and since 2006, its energy efficiency programs have avoided seven million metric tons of CO₂.²⁹³

Rhode Island has bolstered its nationally-recognized energy efficiency programs²⁹⁴ through innovative initiatives that target hard-to-reach market sectors, expand access through new financing tools, and lead by example. The state's Public Energy Partnership initiative²⁹⁵ successfully developed energy data baseline inventories for all public facilities in the state and implemented 123 energy efficiency projects that achieved total energy savings of 28.6 percent.²⁹⁶ The recently-established Rhode Island Infrastructure Bank (RIIB) provides financing assistance to local governmental units for deep energy-saving projects as well as PACE financing for commercial properties (with a residential program in development).²⁹⁷

Governor Gina M. Raimondo has also set robust clean energy mandates for state government consistent with broader policy goals that include clean energy industry and job growth; reducing public sector energy costs; diversifying the state's energy mix; and reducing public sector GHG emissions. The Governor's 2015 "Lead by Example" Executive Order directs state agencies to achieve energy reductions of 10 percent below 2014 levels by 2019; procure 100 percent of their electricity from renewable sources by 2025; and ensure that a minimum of 25

²⁸⁶ R.I. DEP'T OF ADMIN., ENERGY 2035: RHODE ISLAND STATE ENERGY PLAN (2015), <http://www.planning.ri.gov/documents/LU/energy/energy15.pdf>.

²⁸⁷ 1956 R.I. GEN. LAWS § 42-6.2-2 (2016).

²⁸⁸ R.I. OFFICE OF ENERGY RES., *Rhode Island Energy Laws*, <http://www.energy.ri.gov/laws/> (last visited Oct. 28, 2016).

²⁸⁹ COMMERCE RI & R.I. OFFICE OF ENERGY RES., RHODE ISLAND CLEAN ENERGY, 2 (2016), <http://www.energy.ri.gov/documents/News/Rhode%20Island%20Industry%20Report%202016.pdf>.

²⁹⁰ 1956 R.I. GEN. LAWS § 39-1-27.7(a)(2) (2016).

²⁹¹ R.I., STATE OF RHODE ISLAND ENERGY EFFICIENCY AND RESOURCE MANAGEMENT COUNCIL ANNUAL REPORT, 8, 10, 23 (2016), http://www.riermc.ri.gov/documents/annual/6_2016%20EERM%20Annual%20Report.pdf.

²⁹² *See generally id.*

²⁹³ Per R.I. Office of Energy Res.

²⁹⁴ *See* Fact Sheet, Am. Council for an Energy-Efficient Econ., Rhode Island (2016), <http://aceee.org/sites/default/files/pdf/state-sheet/2016/rhode-island.pdf>.

²⁹⁵ Supported by U.S. Department of Energy funds.

²⁹⁶ R.I. OFFICE OF ENERGY RES., 2016 ANNUAL REPORT 10 (2016), <http://www.energy.ri.gov/documents/Annual%20Reports/2016%20OER%20Annual%20Report.pdf>.

²⁹⁷ R.I. INFRASTRUCTURE BANK, *Welcome to the RI Infrastructure Bank*, <http://www.riinfrastructurebank.com/> (last visited Oct. 29, 2016).

percent of new light-duty state fleet purchases and leases be zero-emission vehicles by 2025, among other goals.²⁹⁸ Overseeing the development of the state’s first “stretch” building code and converting all state-owned highway streetlights to cost-effective LEDs are just some of the clean energy initiatives now underway to advance this important work.²⁹⁹

Rhode Island has also developed a comprehensive set of renewable energy programs and policies. The state is home to the nation’s first offshore wind project off the coast of Block Island, which is scheduled to begin commercial operation before the end of 2016.³⁰⁰ Rhode Island’s recently expanded RES creates a robust goal of supplying 38.5 percent of all electricity retail sales from renewable energy resources by 2035.³⁰¹ The successful launch of the state’s Renewable Energy Growth Program is expected to add 160 MW of new, local distributed generation projects between 2015 and 2019.³⁰² Finally, Rhode Island’s Solarize program, now in its third year, has already reached one-third of the state’s 39 municipalities, with 479 residents and businesses signing contracts for solar projects, representing a total of 3.4 MW of capacity.³⁰³

Because Rhode Island’s energy system is closely integrated with that of New England as a whole, the state also works in close collaboration with regional partners to advance clean energy programs and policies. For example, the state participates in RGGI, reinvesting auction proceeds in cost-effective energy efficiency and renewable energy projects.³⁰⁴ Rhode Island is also one of eight states that has signed a memorandum of understanding to increase adoption of—and coordinate actions in support of—zero emission vehicles.³⁰⁵

Rhode Island anticipates using RGGI as the means to comply with the Clean Power Plan.³⁰⁶ Rhode Island and the other RGGI participants are engaged in a program review in 2016.³⁰⁷ The program review is a comprehensive evaluation that includes program successes, program impacts and evaluation of specific program elements that could result in revisions to the program.³⁰⁸ The current review has been ongoing throughout 2016 with considerable public comment opportunity and stakeholder processes for engagement.

²⁹⁸ Governor Gina M. Raimondo, Ex. Order 15-17 (2015), <http://www.energy.ri.gov/documents/leadbyexample/ExecOrder15-17.pdf>.

²⁹⁹ R.I. OFFICE OF ENERGY RES., *State Lead by Example Initiative*, <http://www.energy.ri.gov/leadbyexample/> (last updated Aug. 29, 2016); R.I. OFFICE OF ENERGY RES., *Street Lights*, <http://www.energy.ri.gov/efficiency/streetlights/> (last visited Oct. 29, 2016).

³⁰⁰ DEEPWATER WIND, *Block Island Wind Farm*, <http://dwwind.com/project/block-island-wind-farm/> (last visited Oct. 29, 2016).

³⁰¹ 2016 R.I. House Bill 7413 § 1(4).

³⁰² DSIRE, *Renewable Energy Growth Program*, <http://programs.dsireusa.org/system/program/detail/5523> (last updated Aug. 1, 2016).

³⁰³ Per. R.I. Office of Energy Resources.

³⁰⁴ REG’L GREENHOUSE GAS INITIATIVE, *Welcome*, <http://rggi.org/> (last visited Oct. 29, 2016).

³⁰⁵ ZEVSTATES, *Multi-State Zev Task Force*, <https://www.zevstates.us/> (last visited Oct. 29, 2016).

³⁰⁶ Per R.I. Off. of Energy Res.

³⁰⁷ *2016 Program Review*, *supra* note 230.

³⁰⁸ *Id.*

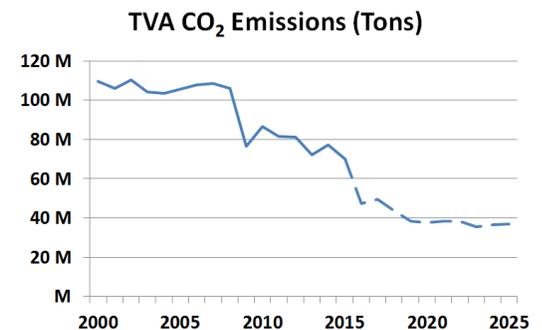
Tennessee

Tennessee strives to improve and maintain the quality of its air resources such that they are protective of human health and the welfare of its citizens while maximizing employment, enhancing economic development, and ensuring access to reliable and affordable electricity within the state.

The Tennessee Valley Authority (TVA) is the primary electric power provider in Tennessee, serving nearly 99.7 percent of the state.³⁰⁹ Because TVA is the principal electricity provider and Tennessee does not have a public utility commission charged with regulating TVA's electricity rates and services, the choices that TVA makes during its IRP process largely dictate generation options and emissions throughout the state.³¹⁰

Across its system in recent years, TVA has diversified its generation portfolio and significantly reduced carbon emissions. TVA's current generation mix is comprised of 37 percent nuclear, 24 percent coal, 20 percent natural gas, and 19 percent hydroelectric, renewables, and energy efficiency.³¹¹ The shift from higher-emitting generation sources to increasing amounts of lower-emitting generation sources has reduced carbon emissions over 34 percent below 2005 levels, and TVA is on track for reducing carbon emissions to an estimated 40 percent below 2005 levels by 2020.³¹² During the same period, Tennessee has seen significant economic and population growth, with Tennessee total annual gross domestic product and Tennessee population increasing by 30 percent and 10 percent, respectively, since 2005.³¹³

Tennessee has pursued a clean energy future and GHG emissions reductions via innovative state-led initiatives and will continue leveraging similar actions in the future.



The Tennessee Water and Wastewater Energy Efficiency Partnership, which provides free technical assistance to wastewater treatment plants through onsite energy assessments and provision of no-to-low cost energy efficiency recommendations, has saved participating utilities an average of 19 percent in yearly energy costs, motivating staff to find additional energy projects and helping to postpone rate increases.³¹⁴ To date, the Partnership has achieved annual energy savings of more than 15 million kilowatt hours, annual cost savings of more than \$1.5 million, and over 13,000 tons of avoided CO₂ emissions.³¹⁵

³⁰⁹ TENN. VALLEY AUTH., *TVA in Tennessee*, <https://www.tva.com/About-TVA/TVA-in-Tennessee> (last visited Oct. 28, 2016). The remaining portion of the state is served by four utilities: Appalachian Power Company, Entergy Arkansas, Kentucky Utilities Company, and Kingsport Power Company. Most jurisdictions (over 70 percent) in Tennessee have electric cooperatives or municipal electric power providers that deliver TVA's power to end-use customers. Typically, these local power companies set their own rates, passing along the power rate that is charged to it by TVA to its customers as well as any additional program costs that they may incur. Per Tenn. Dep't. of Env't & Conservation.

³¹⁰ See TENN. VALLEY AUTH., *INTEGRATED RESOURCE PLAN: 2015 FINAL REPORT* (2015),

<https://www.tva.gov/Environment/Environmental-Stewardship/Integrated-Resource-Plan>.

³¹¹ TENN. VALLEY AUTH., *TVA Invests in a Greener Future*, <https://www.tva.gov/Newsroom/TVA-Invests-in-a-Greener-Future> (last visited on Oct. 28, 2016) [hereinafter *TVA Invests in a Greener Future*].

³¹² *Id.* The CO₂ rate of energy delivered to TVA customers is approximately 1,000 lb/MWh and is projected to improve to less than 600 lb/MWh before 2020. Per Tenn. Dep't. Env't & Conservation.

³¹³ *TVA Invests in a Greener Future*, *supra* note 311.

³¹⁴ TENN. EDUC. INITIATIVE, *TDEC Works with Water and Wastewater Treatment Plants on Energy Efficiency*, <http://tnenergy.org/tdec-works-with-water-and-wastewater-treatment-plants-on-energy-efficiency/> (last visited on Oct. 28, 2016).

³¹⁵ YATASHA MOORE, *TENNESSEE WATER AND WASTEWATER ENERGY EFFICIENCY PARTNERSHIP*, 13 (2016), https://tn.gov/assets/entities/environment/attachments/sw-esos2016_rm-10-11_2016-04-21-1400_moore.pdf.

The Clean Tennessee Energy Grant (CTEG) funding provides financial assistance to state entities, municipal and county government entities, and utility districts in Tennessee to purchase, install, and construct projects that result in energy conservation or air quality improvement and/or that are considered clean energy alternatives.³¹⁶ Since 2011, TDEC has provided \$13.9 million in funding to 102 grantees in support of CTEG projects with nearly \$4.1 million in cost savings, 31.2 million kilowatt hours in energy savings and over 63,000 avoided tons of CO₂e annually.³¹⁷ The program has also leveraged significant matching funds that have generated local community investment in clean energy technologies.³¹⁸

Tennessee recently launched EmPower TN, an initiative to reduce energy consumption and costs across state-owned and managed facilities. In 2015-2016, the state's budget included \$37.5 million for energy efficiency projects in state facilities and \$6.2 million for acquisition and implementation of a statewide utility data management system to manage the state's utility bills and identify future energy efficiency opportunities.³¹⁹

Tennessee is investigating a power purchase agreement (PPA) for behind-the-meter solar photovoltaic and battery storage systems at 6 state institutions of higher education across the state.³²⁰ The potential 25-year PPA will include nearly 12 MW of nameplate solar power and 2.1 MW of battery storage capacity and is expected to provide over 430 million kilowatt hours of clean renewable energy and over 700,000 kilowatts of demand reduction, resulting in an estimated savings of nearly \$3.5 million for the State of Tennessee.³²¹ These systems will also provide increased resiliency and energy security in facilities that operate daily.

Tennessee is also a participant in several DOE Better Buildings Accelerators – Clean Energy for Low-Income Communities, Outdoor Lighting, and Wastewater Infrastructure – which are designed to demonstrate innovative policies and approaches that will accelerate investment in energy efficiency.³²²

Utilities and communities in Tennessee are also taking significant action to drive GHG emissions reductions and the state's utilization of clean energy strategies. TVA offers a number of renewable energy and energy efficiency programs for residential, industrial and business customers. Collectively these programs have resulted in over 375 gigawatt (GW) hours of savings during fiscal year 2016, with over 70 percent of these savings derived from programs for industry and business.³²³ TVA's EnergyRight Solutions for the Home (ERSH) portfolio of energy efficiency programs achieved energy savings of nearly 85 GWh in fiscal year 2016.³²⁴ The ERSH flagship program, eScore, was responsible for nearly 27 GWh. Over 18,428 valley residents participated in the eScore Program in TVA's fiscal year 2016, installing 25,608 energy efficiency upgrades.³²⁵

³¹⁶ TENN. DEP'T OF ENV'T & CONSERVATION, *Clean Tennessee Energy Grants*, <https://tn.gov/environment/article/grants-clean-tennessee-energy-grants> (last visited on Oct. 28, 2016).

³¹⁷ Per Tenn. Dep't. of Env't & Conservation.

³¹⁸ TENN. DEP'T OF ENV'T & CONSERVATION, CLEAN TENNESSEE ENERGY GRANT EXTERNAL PROJECTS REPORT FISCAL YEAR 2016 (2016); TENN. DEP'T OF ENV'T & CONSERVATION, CLEAN TENNESSEE ENERGY GRANT INTERNAL PROJECTS REPORT FISCAL YEAR 2016 (2016).

³¹⁹ TENN. DEP'T OF ENV'T & CONSERVATION, *EmPower TN*, <https://www.tn.gov/serem/section/empower-tn> (last visited on Oct. 28, 2016).

³²⁰ Per Tenn. Dep't. of Env't & Conservation.

³²¹ *Id.*

³²² U.S. DEP'T OF ENERGY, *Better Buildings Accelerators*, <https://betterbuildingsinitiative.energy.gov/accelerators> (last visited Oct. 31, 2016).

³²³ Per Tenn. Dep't. of Env't & Conservation.

³²⁴ TENN. VALLEY AUTH., TVA ENERGY RIGHT SOLUTIONS 2015 HIGHLIGHT REPORT, 35 (2015), https://www.energyright.com/file_source/TVA/Site%20Content/Energy/EnergyRight%20Solutions/ERS_Highlights_2015.pdf.

³²⁵ Savings are reflective of those across the entire Tennessee Valley. Per Tenn. Dep't. Env't & Conservation.

TVA's Extreme Energy Makeovers (EEM) are being implemented in 3 Tennessee communities—Knoxville, Cleveland, and Oak Ridge—providing whole-home, direct-install energy efficiency retrofits for income eligible residents.³²⁶ The first 12 months of the program in Knoxville has resulted in: \$6 million investment in energy efficiency in Knoxville; more than 600 homes weatherized; 3.7 million KWh saved; and 2,600 metric tons of CO₂e avoided.³²⁷ EEM programs in Cleveland and Oak Ridge will be implemented over the next 2 years.³²⁸

Empower Chattanooga teaches residents of Chattanooga's low-income communities simple low- and no-cost ways to reduce their utility bill through free one-hour energy workshops covering basic energy management and do-it-yourself weatherization and upgrade projects.³²⁹ In the past 18 months over 800 Chattanooga residents have participated in workshops, resulting in an average of \$400 cost savings annually per participant.³³⁰

The City of Lebanon and PHG Energy have partnered to deploy a new waste-to-energy gasification plant capable of sustainably managing waste and producing energy, which began operation in early October 2016. Commercial wood waste that was previously taken to area landfills, hundreds of tons of scrap tires, and local municipal sewer sludge are blended to provide feedstock for the gasification process. Synthetic gas produced fuels a generator to provide on-site power to the City's wastewater treatment plant's operations. On an annual basis, the project is estimated to avoid 2,500 tons of CO₂ emissions, divert 8,000 tons of material from landfills, and manage 400 tons of scrap tires.³³¹

The private sector in Tennessee also makes significant contributions to the state's clean energy future and GHG emissions reductions. Tennessee is home to more than 250 ENERGY STAR Partners including major business entities.³³² Schneider Electric and Nissan North America are also both DOE Superior Energy Performance Platinum certified sites, having achieved 23.1 percent and 17.7 percent facility energy performance improvement over a 3-year period, respectively.³³³ A June 2015 report developed by the Tennessee Advanced Energy Business Council shows that advanced energy³³⁴ is a rapidly expanding growth sector throughout the state.³³⁵ This is evidenced by the nearly 325,000 jobs in the state's advanced energy sector.³³⁶ Additionally, Tennessee's advanced energy sector contributes \$33.4 billion to the state's gross domestic product.³³⁷ Workers in the advanced energy sector pay more than \$820 million in sales tax to state and local governments.³³⁸

³²⁶ Per Tenn. Dep't. of Env't & Conservation.

³²⁷ CITY OF KNOXVILLE, *Knoxville Extreme Energy Makeover*, <http://www.keemteam.com/> (last visited Oct. 31, 2016).

³²⁸ Per Tenn. Dep't. of Env't & Conservation.

³²⁹ See generally TENN. VALLEY AUTH., *Smart Communities*, <http://www.greenspaceschattanooga.org/about-1/> (last visited Oct. 28, 2016).

³³⁰ Per Tenn. Dep't. of Env't & Conservation.

³³¹ PHP ENERGY, *Case Study: New Tennessee Waste-to-Energy Plant*, <http://www.phgenergy.com/case-study/lebanon-tenn> (last visited Oct. 31, 2016).

³³² Per Tenn. Dep't. of Env't & Conservation.

³³³ U.S. DEP'T OF ENERGY, *Certified Facilities*, <http://energy.gov/eere/amo/certified-facilities> (last visited Oct. 31, 2016).

³³⁴ The report defines advanced energy as any technology that makes energy cleaner, safer, more secure and more efficient. Examples include electric and plug-in hybrid cars, lightweight composites for the automotive industry, natural gas fueled trucks, pollution control equipment, bio energy, high-performance buildings, more efficient industrial processes, power reliability, smart grids, combined heat and power and the latest wind, solar, and nuclear technologies.

³³⁵ TENN. ADVANCED ENERGY BUS. COUNCIL & THE HOWARD BARKER JR. CENTER FOR PUB. POL. AT THE UNIV. OF TENN., *TENNESSEE ADVANCED ENERGY ECONOMIC IMPACT REPORT (2015)*, <http://www.tnadvancedenergy.com/site/wp-content/uploads/2015/06/TAEBC-Economic-Impact-Report.pdf>.

³³⁶ TENN. ADVANCED ENERGY BUS. COUNCIL *TENNESSEE ADVANCED ENERGY ECONOMIC IMPACT REPORT*, 7 (June 2015), <http://www.tnadvancedenergy.com/site/wp-content/uploads/2015/06/TAEBC-Economic-Impact-Report.pdf>.

³³⁷ *Id.*

³³⁸ *Id.*

Vermont

It has been more than a decade since the Vermont Legislature codified statewide goals to reduce emissions of GHGs.³³⁹ These goals were intended to reduce Vermont's own GHG emissions substantially, and make an appropriate contribution to achieving the regional goals established through the Conference of New England Governors and Eastern Canadian Premiers.³⁴⁰ Vermont has been experiencing the impacts of climate change, and is already documenting greater than average warming (especially in winter), fewer days with snow cover, more extreme precipitation events, and other changes.³⁴¹

Vermont's GHG emissions inventory estimates for 2012 indicate that emissions have declined steadily, by approximately 14 percent, since the emissions peak that occurred in 2004.³⁴² Although considerable progress has been made, these emissions reductions have fallen short of the statutory reduction goals set for 2012 to reach 25 percent below 1990 levels.³⁴³ Recently, there have been renewed efforts aimed at bending the emissions curve downward to reach the established mid- and long-term reduction goals. Vermont has taken important actions to move towards cleaner, low GHG-emitting energy through a multi-sector approach.

Vermont's ongoing participation in the multi-state RGGI for the electricity generation sector, and associated investments of auction proceeds in expanded energy efficiency programs for the residential and commercial sectors, have resulted in significant energy savings and GHG emissions reductions.³⁴⁴ The state Energy Efficiency Utility has used RGGI funds in combination with other funds to improve building performance and gain heating system efficiencies for approximately 5,000 households and 300 businesses in the state, thereby creating jobs and saving money in addition to reducing emissions.³⁴⁵

Additionally, proposed in-state electric transmission facilities, electric generation facilities (including renewable energy projects) and certain gas pipelines, must successfully complete a Section 248 Proceeding with the Vermont Public Service Board before site preparation or construction can begin.³⁴⁶ This proceeding requires, among other things, a determination that the project results in no undue adverse effects in terms of GHG impacts.³⁴⁷

Transportation sector emissions have been stemmed through ongoing adoption of the California Low Emissions Vehicle (LEV) standards. The Vermont Low Emission Vehicle (LEV)³⁴⁸ Program requires that new vehicles sold in the state meet the same emissions requirements as new vehicles sold in California. The program, including its zero emission vehicle (ZEV) requirements, is a key strategy in climate change mitigation, and is crucial to Vermont's efforts to remain in attainment of the National Ambient Air Quality Standards. The most recent amendments adopted the next generation of ZEV requirements, covering model years 2018-2025.³⁴⁹

³³⁹ VT. STAT. ANN. 10 § 578(a) (2016).

³⁴⁰ See VT. DEP'T ENVTL. CONSERVATION, VERMONT GREENHOUSE GAS EMISSION INVENTORY UPDATE 1990-2012, 6, 29 (2015), http://climatechange.vermont.gov/sites/climate/files/documents/Data/Vermont_GHG_Emissions_Inventory_Update_1990-2012_June-2015.pdf [hereinafter VT INVENTORY UPDATE].

³⁴¹ VERMONT.GOV, *Our Changing Climate*, <http://climatechange.vermont.gov/vermonts-changing-climate> (last visited Oct. 19, 2016).

³⁴² VERMONT.GOV, *Emissions and Goals*, <http://climatechange.vermont.gov/climate-pollution-goals> (last visited Oct. 19, 2016).

³⁴³ VT INVENTORY UPDATE, *supra* note 340, at 11.

³⁴⁴ REG'L GREENHOUSE GAS INITIATIVE, *Vermont*, https://www.rggi.org/rggi_benefits/program_investments/vermont (last visited Oct. 19, 2016).

³⁴⁵ *Id.*

³⁴⁶ VT. STAT. ANN. 30 § 248(a)(3) (2016).

³⁴⁷ *Id.* 30 § 248(b)(5).

³⁴⁸ 12-031-001 VT. CODE R. § 5-1106 *et seq.* (2016).

³⁴⁹ *Id.* § 5-1106(a)(6).

Additionally, in 2013, Governor Peter Shumlin signed a ZEV Memorandum of Understanding (MOU) with the governors of California, Connecticut, Maryland, Massachusetts, New York, Oregon, and Rhode Island to coordinate actions to ensure the successful implementation of the state ZEV programs.³⁵⁰ Vermont subsequently developed a Vermont Zero Emission Vehicle Action Plan³⁵¹ to identify strategies and actions that can facilitate achievement of the commitments outlined in the ZEV MOU.

Recently passed legislation, Act 56, initiated a Renewable Energy Standard (RES) for Vermont electric utilities, which is poised to increase the share of Vermont's electricity consumption that comes from renewable energy sources – 55 percent in 2017, rising over time to 75 percent in 2032.³⁵² In addition, the RES requires that utilities act with partners to reduce their customers' fossil fuel use by an increasing amount each year.³⁵³ Modeling conducted by the Vermont Department of Public Service estimates that this program has the potential to reduce GHG emissions by approximately 15 million metric tons by 2032, and provide roughly one quarter of the emissions reductions required to meet Vermont's 2050 GHG reduction goal.³⁵⁴

Vermont's 2016 Comprehensive Energy Plan (CEP) builds upon the goal set in the 2011 CEP to meet 90 percent of the state's energy needs through renewable sources by 2050.³⁵⁵ In doing so, it establishes additional energy and GHG reduction goals to advance Vermont towards a clean energy future. These include: reducing total energy consumption per capita by 15 percent by 2025, and by more than one third by 2050; meeting 25 percent of the remaining energy need from renewable sources by 2025, 40 percent by 2035, and 90 percent by 2050; reducing GHG emissions from Vermont's energy use 40 percent below 1990 levels by 2030, and 80 percent to 95 percent below 1990 levels by 2050.³⁵⁶ Additionally, the plan has three end-use sector goals for 2025: 10 percent renewable transportation, 30 percent renewable buildings, and 67 percent renewable electric power.

Vermont's ongoing comprehensive planning effort recognizes that meeting all of the statewide energy and GHG reduction goals will increase energy affordability, sustainability, and economic security for Vermonters. At the same time, it places great importance on making energy and land use choices that protect the health of Vermonters and the environment.

³⁵⁰ State Zero-Emission Vehicle Programs Memorandum of Understanding, Oct. 24, 2013.

³⁵¹ VT. AGENCY NAT. RES., VERMONT ZERO EMISSION VEHICLE ACTION PLAN (2014), http://anr.vermont.gov/sites/anr/files/specialtopics/climate/documents/ZEV/FinalVTZEVActionPlan_080114.pdf.

³⁵² VT. STAT. ANN. 30 § 8005(a)(1)(B) (2016).

³⁵³ *Id.* § 8005(a)(3)(A).

³⁵⁴ Fact Sheet, Vt. Pub. Serv. Dept., H.40 Renewable Energy Standard and Energy Transformation (RESET) Program, <http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/House%20Commerce/Bills/H.40/Witness%20Testimony%20and%20Comments/H.40~Rebecca%20Ellis~Notes%20Regarding%20H.40~2-24-2015.pdf>.

³⁵⁵ VT. DEP'T PUB. SERV., COMPREHENSIVE ENERGY PLAN 2016, 1 (2016), https://outside.vermont.gov/sov/webservices/Shared%20Documents/2016CEP_Final.pdf.

³⁵⁶ *Id.* at 1, 3.

Virginia

Climate change is a significant threat to Virginia's economy and quality of life. The Hampton Roads region is on the front lines and is already seeing higher tides along with more frequent flooding.³⁵⁷ However, the consequences of climate change will be felt across the entire Commonwealth through impacts on Virginia's built environment, natural systems, and the health of its citizens. Recognizing this, Governor Terry McAuliffe has made cutting carbon emissions a top priority through his leadership in the clean energy sector.

The Governor has supported strong carbon reduction efforts and is committed to finding ways to continue to reduce Virginia's carbon emissions. The Commonwealth's electric sector has made significant strides towards a reduced environmental impact; between 2005 and 2014, carbon emissions from Virginia's electric generators fell by 21 percent.³⁵⁸ In order to continue this downward trajectory, the Governor is moving forward with exploring additional ways to reduce the Commonwealth's carbon footprint.

In July 2016, Governor McAuliffe issued Executive Order 57, which directed the Secretary of Natural Resources to convene a work group and recommend concrete steps to reduce carbon emissions from Virginia's power plants.³⁵⁹ The work group will provide the Governor with recommendations for action under existing state authority by May 31, 2017.³⁶⁰ Regardless of the outcome of the Clean Power Plan litigation, the Governor has indicated he will work to identify a path forward that reduces Virginia's carbon emissions and grows the share of clean energy that powers the Commonwealth's economy.³⁶¹

These carbon reduction efforts will complement the significant work the Governor has already implemented to promote clean energy policies. In December 2015, Governor McAuliffe announced that Virginia's state government will rely on renewable power for at least 8 percent of its energy needs within 3 years.³⁶² That same year, the governor signed into law a bill that declares 500 MW of utility-scale solar to be in the public interest.³⁶³ These actions have provided a market for renewable energy in Virginia, attracting \$500 million of investment in the clean energy industry since the beginning of the governor's term.³⁶⁴ This has also resulted in a ten-fold increase in the amount of solar generation in Virginia since 2014.³⁶⁵

³⁵⁷ HAMPTON RDS. TRANSP. PLANNING ORGANIZATION, SEA LEVEL RISE AND STORM SURGE IMPACTS TO ROADWAYS IN HAMPTON ROADS, 5 (2016), <http://www.hrtpo.org/uploads/docs/Sea%20Level%20Rise-Storm%20Surge%20Impacts%20to%20Roadways%20in%20HR%20Final%20Report.pdf>.

³⁵⁸ Governor Terence R. McAuliffe, Ex. Order 57 (2016), <https://governor.virginia.gov/media/6396/eo-57-development-of-carbon-reduction-strategies-for-electric-power-generation-facilities.pdf>.

³⁵⁹ *Id.*

³⁶⁰ *Id.*

³⁶¹ *See Governor McAuliffe Vows to Ignore Supreme Court, Implement Clean Power Plan*, THE NEW RIVER DISPATCH (Feb. 11, 2016), <http://www.newriverdispatch.com/governor-mcauliffe-vows-to-ignore-supreme-court-implement-clean-power-plan/>.

³⁶² Press Release, Governor Terrance R McAuliffe, Governor Announces Actions to Stimulate Growth of Renewable Energy in the Commonwealth (Dec. 21, 2015), <https://governor.virginia.gov/newsroom/newsarticle?articleId=13729>.

³⁶³ VA. CODE ANN. § 56-585.1 (2016).

³⁶⁴ VA. DEP'T OF MINES, MINERALS AND ENERGY, ENERGY IN THE NEW VIRGINIA ECONOMY: UPDATE TO THE 2014 VIRGINIA ENERGY PLAN (2016), <http://commerce.virginia.gov/media/7935/energy-in-the-new-virginia-economy-update-to-the-2014-energy-plan.pdf> [hereinafter VA. ENERGY PLAN UPDATE].

³⁶⁵ *Id.*

In addition to renewable energy, Governor McAuliffe recognizes the importance of energy efficiency as a means of cutting carbon emissions. The Governor signed Executive Order 31 identifying energy efficiency in state government as a priority and establishing a goal of reducing state electricity consumption by 15 percent over 2010 levels by the end of the 2017.³⁶⁶ Through the use of energy performance contracting, Virginia has achieved 38 percent of this goal, resulting in a reduction of 43 million kilowatt hours of electricity and avoiding 31,219 metric tons of carbon dioxide emissions.³⁶⁷

Building off these public sector programs, Governor McAuliffe also signed an executive order establishing Virginia's first statewide Green Community Program to provide low-cost financing for energy efficiency, renewable energy, and alternative fuel projects.³⁶⁸ In the thirteen months since the program was established, Virginia has allocated approximately \$28.9 million and as of September 2016, the program had at least \$65.9 million in the project pipeline.³⁶⁹

Governor McAuliffe's efforts are already creating new opportunities for Virginia to generate economic growth while simultaneously cutting carbon emissions. He is committed to building a new Virginia economy, powered by energy that is clean, affordable, and reliable.

³⁶⁶ Press Release, Governor Terrance R McAuliffe, Governor McAuliffe Signs Executive Order on Reducing Energy Consumption in Virginia Government (Oct. 16, 2014),

<https://governor.virginia.gov/newsroom/newsarticle?articleId=6872>.

³⁶⁷ VA. ENERGY PLAN UPDATE, *supra* note 364.

³⁶⁸ Governor Terence R. McAuliffe, Ex. Order 36 (2014), <https://governor.virginia.gov/media/4371/eo-36-continuing-qualified-energy-conservation-bondsada.pdf>.

³⁶⁹ VA. ENERGY PLAN UPDATE, *supra* note 364.

Washington

Washington State is acutely aware of the impacts of climate change on the state's economy and communities. In 2014 and 2015, Washington saw the two largest fire seasons in the state's history.³⁷⁰ In 2016, abnormally warm ocean conditions resulted in the closure of the state's coho salmon fishery.³⁷¹ Public health effects related to air pollution from fossil fuel transportation emissions are a significant concern.³⁷² The state is taking action to address these dangers and to lead in the development of clean energy technologies.

In 2006, Washington's citizens enacted a renewable electricity standard that requires the use of new renewable energy technologies.³⁷³ By 2020, the state will have added 15 percent more renewables on top of the 70 percent it gets from its significant hydropower system.³⁷⁴ Washington will soon be approaching 90 percent carbon-free electricity, including about 5 percent from its one nuclear plant.³⁷⁵

In 2008, Washington enacted economy-wide statutory limits on GHG emissions within the state, including specified limits for 1990, 2035 and 2050.³⁷⁶ Under a 2011 agreement reached by the state and the owners of the TransAlta coal-fired power plant, Washington will fully retire its only remaining in-state coal plant, by 2025,³⁷⁷ and recently-enacted legislation will allow Washington utilities to shift away from importing electricity from out-of-state coal-fired power-plants.³⁷⁸

In 2013, Washington established the Clean Energy Fund to support the development, demonstration, and early deployment of clean energy technologies that save energy and reduce energy costs, reduce harmful air emissions or otherwise increase energy independence of the state.³⁷⁹ Since 2013, the state has appropriated nearly \$80 million to the Fund, which has leveraged an additional \$200 million in private and federal funds, for research and development, utility-scale demonstration of grid modernization, loans for early deployment of energy efficiency and renewable energy technologies, and credit enhancements for clean energy manufacturers.³⁸⁰ Additionally, by executive direction, at least 20 percent of new Washington state agencies' vehicle purchases will be all-electric, beginning in 2017.³⁸¹

³⁷⁰ Per Wash Dep't of Ecology.

³⁷¹ See Press release, Wash. Dep't of Fish & Wildlife, Fishery Managers Consider Closing Ocean Salmon Seasons Due to Project Poor Coho Returns (Mar. 14, 2016), <http://wdfw.wa.gov/news/mar1416a/>; Wash. Dep't of Fish & Wildlife, 2016 Puget Sound-area Fishing Seasons Update, http://wdfw.wa.gov/fishing/pugetsound_salmon_update/ (last updated June 24, 2016).

³⁷² See generally LINN GOULD AND BJ CUMMINGS, DUWAMISH VALLEY CUMULATIVE HEALTH IMPACTS ANALYSIS: SEATTLE, WASHINGTON (Just Health Action and Duwamish River Cleanup Coalition/Technical Advisory Group, 2013), http://duwamishcleanup.org/wp-content/uploads/2013/03/CHIA_low_res.pdf.

³⁷³ WASH. REV. CODE § 19.285.040 (2016).

³⁷⁴ *Id.* § 19.285.040(1)(e)(2)(a)(iii).

³⁷⁵ U.S. ENERGY INFO. ADMIN., *Washington*, <http://www.eia.gov/state/?sid=WA#tabs-4> (last visited Oct. 28, 2016).

³⁷⁶ WASH. REV. CODE § 70.235.020(1)(a) (2016).

³⁷⁷ Agreement Reached to Stop Burning Coal at Centralia Power Plant, *Seattle Times*, March 2011, <http://www.seattletimes.com/seattle-news/agreement-reached-to-stop-burning-coal-at-centralia-power-plant/>.

³⁷⁸ Engrossed Substitute Senate Bill 6248, Washington State Legislature, 2016, <http://lawfilesextr.leg.wa.gov/biennium/2015-16/Pdf/Bills/Session%20Laws/Senate/6248-S.SL.pdf>.

³⁷⁹ WASH. DEP'T OF COMMERCE, *Washington State Clean Energy Fund*, <http://www.commerce.wa.gov/growing-the-economy/energy/clean-energy-fund/> (last visited Nov. 4, 2016).

³⁸⁰ Fact Sheet, Wash. Dep't of Commerce, Clean Energy Fund Update (Aug. 2016).

³⁸¹ OFFICE OF WASH. GOVERNOR, WASHINGTON STATE ELECTRIC FLEETS INITIATIVE (2015), http://www.governor.wa.gov/sites/default/files/documents/ElectricFleetsInitiative12_07_2015.pdf.

Washington's past and ongoing investments in clean energy have paid off in jobs, savings, and reduced pollution. Between 2010 and 2014, clean economy jobs in the state grew by 9.7 percent³⁸² and the clean economy in Washington State had seen a 23 percent increase since 2010.³⁸³

In 2015, Washington joined the Under 2 MOU, subnational governments' commitment to reduce emissions by 80 percent below 1990 levels by 2050.³⁸⁴ While the state's actions have flattened the growth of its GHG emissions, it is not yet on course to meet the limits enacted in the 2008 state law, or the limits called for in the Under 2 MOU.³⁸⁵ In response, the state recently adopted a "Clean Air Rule" to limit GHG emissions.³⁸⁶

Adopted by the Washington State Department of Ecology in September 2016, the Clean Air Rule uses existing regulatory authority under the state Clean Air Act to cap and reduce GHG emissions from Washington's major sources, including transportation emissions which are the state's largest source.³⁸⁷ Beginning in 2017, it requires the largest GHG sources, including natural gas distributors, petroleum fuel producers and importers, large manufacturers, electricity generating plants, waste facilities and others, to reduce emissions approximately 1.7 percent per year through 2035.³⁸⁸ Regulated entities can comply by making facility efficiency or process improvements, initiate projects in Washington that reduce emissions, obtain emission reductions from others, or purchase allowances from approved out-of-state multi-sector carbon markets.³⁸⁹ The rule makes provisions to recognize energy-intensive businesses competing in highly competitive international markets.³⁹⁰

The Clean Air Rule currently applies to the electricity generating sector.³⁹¹ The rule specifies that when the federal Clean Power Plan (CPP) goes into effect, the state implementation plan will be designed to achieve emission reductions that are larger than the minimum required by the CPP.³⁹² In this case, the state's Clean Air Rule would transition regulation of electricity generation GHG emissions to the CPP.³⁹³ Washington Governor Jay Inslee has voiced strong support for the CPP, and his staff and the state Department of Ecology engaged with the U.S. Environmental Protection Agency (EPA) in its development.³⁹⁴ The Department of Ecology continues to meet with stakeholders, including two meetings with representatives of environmental justice organizations; collect input; and, in 2017, prepare an initial proposed state plan for compliance with the federal standard.³⁹⁵

³⁸² DELPHI GRP., WEST COAST CLEAN ECONOMY: 2010-2014 JOBS UPDATE, 8 (November 2015), <http://delphi.ca/wp-content/uploads/2015/12/PCC-Clean-Economy-Report-FINAL.pdf>.

³⁸³ *Id.*

³⁸⁴ UNDER 2, *Under 2 Coalition*, <http://under2mou.org/coalition/> (last visited Oct. 18, 2016) [select "S-Z" tab].

³⁸⁵ WASH. DEP'T OF ECOLOGY, GREENHOUSE GAS INVENTORY REPORT, <http://www.ecy.wa.gov/climatechange/docs/2012GHGtable.pdf> (2015).

³⁸⁶ WASH ADMIN. CODE § 173-442-010 (2016).

³⁸⁷ *Id.* § 173-442-020(1)(k).

³⁸⁸ *Id.* § 173-442-060(1)(b).

³⁸⁹ *Id.* § 173-442-110.

³⁹⁰ *Id.* § 173-442-030.

³⁹¹ *See id.* § 173-442-040(4).

³⁹² *Id.* § 173-442-040(4)(b).

³⁹³ *Id.* § 173-442-040(4).

³⁹⁴ WASH. GOVERNOR JAY INSLEE, *Gov. Inslee Statement on Release of EPA's final Clean Power Plan* (Aug. 3, 2015), <http://www.governor.wa.gov/news-media/gov-inslee-statement-release-epa%E2%80%99s-final-clean-power-plan>.

³⁹⁵ WASH. DEP'T OF ECOLOGY, *Federal Clean Power Plan Rule*, http://www.ecy.wa.gov/programs/air/permit_register/clean_power/clean_power.htm (last visited Oct. 28, 2015).

Conclusion

The case studies shared in this report illustrate the wide range of approaches states have taken to expand clean energy and reduce pollution from the power sector since our last report in 2013. State leadership has helped reduce emissions while growing economic opportunities, producing a diverse energy mix, and enhancing resilience. We hope these examples will serve as an inspiration to others seeking to promote clean and affordable energy solutions.

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