

REDUCING CARBON EMISSIONS IN THE POWER SECTOR

State and Company Successes

Case Studies from a Dialogue between States and Power Companies
Convened by the Georgetown Climate Center

GEORGETOWN CLIMATE CENTER
A Leading Resource for State and Federal Policy

December 2013

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Reducing Carbon Emissions from the Power Sector: State and Company Successes

June 27, 2013

Georgetown University Law Center

AGENDA

8:00: Breakfast

8:30: Welcome

- **William M. Treanor**, Dean of Georgetown Law
- **Vicki Arroyo**, Executive Director, Georgetown Climate Center

9:00: Success Stories Panel I & Discussion

Moderator: Vicki Arroyo, Executive Director, Georgetown Climate Center

- **Maryland: Abigail Hopper**, Energy Advisor to Gov. O'Malley; Director, Maryland Energy Administration
- **National Grid: Robert Teetz**, Vice President, Environmental Services
- **NextEra: Ray Butts**, Director, Strategic & Regulatory Planning
- **New York: Jared Snyder**, Assistant Commissioner for Air Resources, Climate Change and Energy, Department of Environmental Conservation

Discussion among all participants, featuring **Jonathan Pershing**, Deputy Assistant Secretary for Climate Change Policy and Technology, U.S. Department of Energy

10:45: Coffee Break

11:00: Success Stories Panel II & Discussion

Moderator: Gabe Pacyniak, Institute Associate, Georgetown Climate Center

- **Xcel: Frank Prager**, Vice President, Environmental Policy and Services
- **Minnesota: Ellen Anderson**, Senior Energy & Environment Advisor to Gov. Dayton
- **Colorado: Martha Rudolph**, Director of Environmental Programs, Colorado Department of Public Health and Environment

Discussion among all participants, featuring **Michael Goo**, Associate Administrator for the Office of Policy, U.S. Environmental Protection Agency

12:30: Lunch

1:15: Discussion with Dan Utech

- **Dan Utech**, Deputy Director for Energy and Climate Change, White House Domestic Policy Council

2:00: Success Stories Panel III & Discussion

Moderator: Kate Zyla, Deputy Director, Georgetown Climate Center

- **CPS Energy: Kim Stoker**, Director of Environmental Planning, Compliance & Sustainability
- **Austin Energy: Matthew Russell**, Environmental Services Manager
- **Kentucky: John Davies**, Deputy Commissioner for Department of Energy Development and Independence
- **California: Brian Turner**, Assistant Executive Officer, Air Resources Board

Discussion among all participants, featuring **Joseph Goffman**, Senior Counsel to the Assistant Administrator for Air and Radiation, U.S. Environmental Protection Agency

3:15: Coffee Break

3:30: Lessons Learned Discussion with Gary Guzy

Participants will reflect on key themes and lessons learned from the day's dialogue in a discussion with

- **Gary Guzy**, Deputy Director and General Counsel, White House Council on Environmental Quality.

4:15: Concluding Remarks

- **Vicki Arroyo**, Executive Director, Georgetown Climate Center

4:30: Meeting Adjourns & Reception

PARTICIPANTS

States

- **California: Brian Turner**, Assistant Executive Officer, Air Resources Board
- **Colorado: Martha Rudolph**, Director of Environmental Programs, Colorado Department of Public Health and Environment
- **Illinois: Doug Scott**, Chair, Illinois Commerce Commission
- **Kentucky: John Davies**, Deputy Commissioner, Department for Energy Development and Independence
- **Maryland: Abigail Hopper**, Energy Advisor to Gov. O'Malley; Director, Maryland Energy Administration
- **Minnesota: Ellen Anderson**, Senior Energy & Environment Advisor to Gov. Dayton
- **New York: Jared Snyder**, Assistant Commissioner for Air Resources, Climate Change and Energy, Department of Environmental Conservation

Power Companies

- **Austin Energy: Matthew Russell**, Environmental Services Manager
- **Calpine: Yvonne McIntyre**, Vice President, Federal Government Affairs
- **CPS Energy: Kim Stoker**, Director of Environmental Planning, Compliance & Sustainability
- **Dominion: Ann Loomis**, Senior Advisor for Federal & Environmental Policy
- **Entergy: Jeff Williams**, Director, Climate Consulting
- **Exelon: Amy Trojecki**, Director of Environmental and Fuels Policy
- **National Grid: Robert Teetz**, Vice President, Environmental Services
- **NextEra Energy: Ray Butts**, Director, Strategic & Regulatory Planning
- **PG&E: Melissa Lavinson**, Vice President, Federal Affairs
- **Portland General Electric: Dave Robertson**, Vice President of Public Policy
- **PSEG: Kristen Ludecke**, Vice President, Federal Affairs
- **Seattle City Light: Lynn Best**, Director, Environmental Affairs
- **Sempra Energy: Scott Crider**, Vice President, Federal Government Affairs
- **Xcel Energy: Frank Prager**, Vice President, Environmental and Public Policy

Federal Representatives

White House

- **Dan Utech**, Deputy Director for Energy and Climate Change, White House Domestic Policy Council

White House Council on Environmental Quality

- **Gary Guzy**, Deputy Director and General Counsel, White House Council on Environmental Quality
- **Drew McConville**, Senior Advisor to the Chair, White House Council on Environmental Quality

Environmental Protection Agency

- **Michael Goo**, Associate Administrator for the Office of Policy, EPA
- **Joseph Goffman**, Senior Counsel to the Assistant Administrator for Air and Radiation, EPA
- **Alex Barron**, Senior Advisor, Office of Policy, EPA
- **Lisa Conner**, Manager, Policy and Strategies Group, EPA
- **Julie Rosenberg**, Branch Chief, State and Local Climate & Energy Programs, EPA

Department of Energy

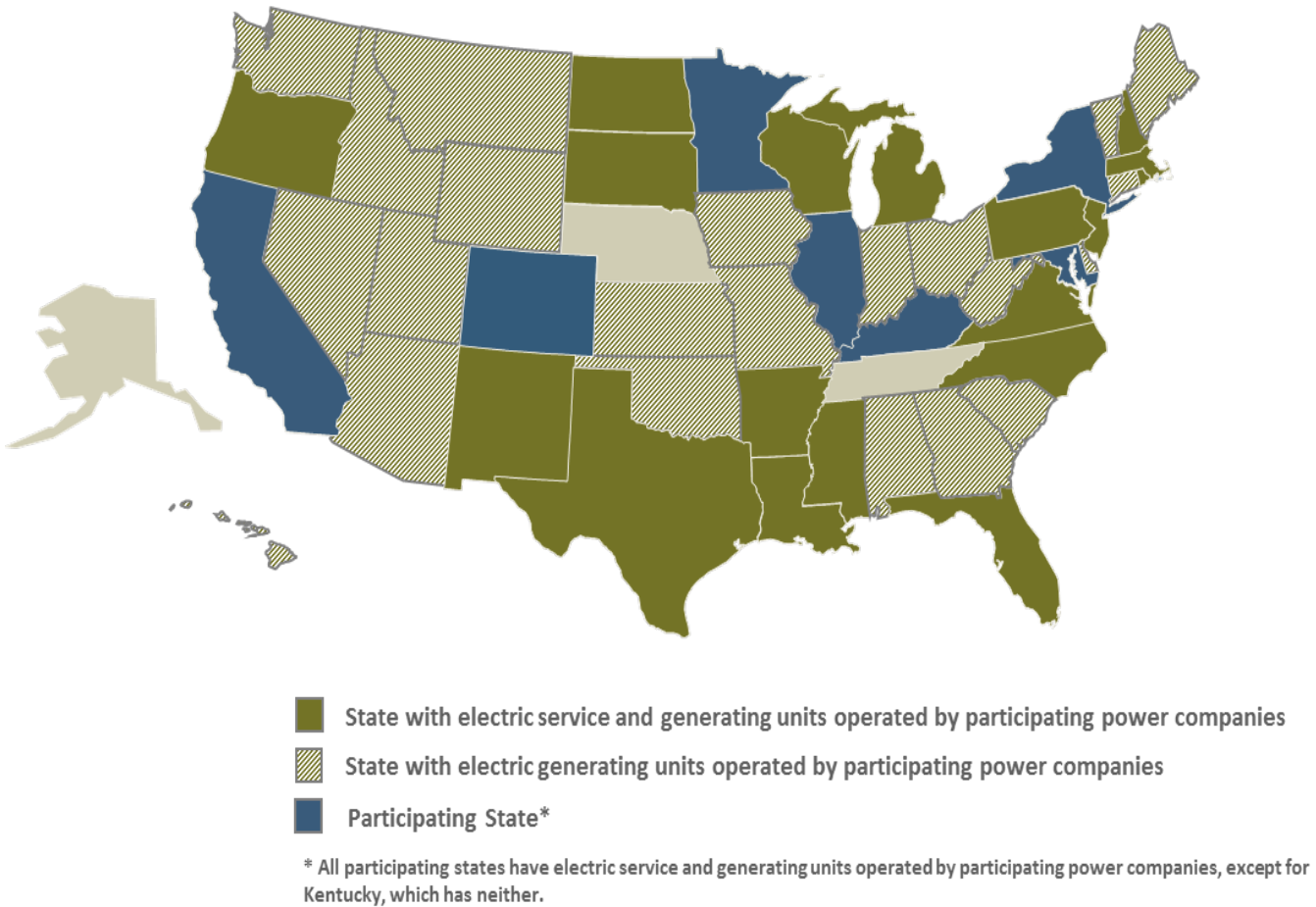
- **Jonathan Pershing**, Deputy Assistant Secretary for Climate Change Policy and Technology, DOE
- **Holmes Hummel**, Senior Policy Advisor, Office of Policy & International Affairs, DOE
- **John Larsen**, Senior Policy Analyst, Office of Domestic Climate Change Policy and Technology, DOE
- **Erin Boyd**, AAAS Science and Technology Policy Fellow, DOE

Georgetown Climate Center

- **Vicki Arroyo**, Executive Director
- **Kathryn Zyla**, Deputy Director
- **Gabe Pacyniak**, Institute Associate and Project Manager for this report

Geographic Representation of Participants

This conversation drew on a regionally-diverse mix of participants sharing successes occurring throughout the country.



Reducing Carbon Emissions from the Power Sector: State and Company Successes

Introduction

On June 27, 2013, the Georgetown Climate Center brought together a regionally diverse group of U.S. state and power company leaders to share their experiences reducing carbon pollution in the power sector, and invited federal officials to participate in the conversation and to learn from these experiences.

This conversation provided valuable insights about the significant reductions in carbon pollution that are already taking place across the country through a variety of mechanisms. These insights are particularly timely as President Barack Obama announced just days before the gathering that he was directing the U.S. Environmental Protection Agency (EPA) to develop greenhouse gas emission standards for existing power plants, and EPA is now in the process of developing a proposal to do so. In his June 25 speech at Georgetown University, President Obama instructed the EPA to build on the successes that states and firms were already achieving in developing these standards.

The June 27 discussion showcased the variety of ways that states and firms are achieving carbon pollution reductions while also developing new and diverse energy sources and providing economic benefits to states and customers. This report captures stories shared during the June meeting in the hopes that these experiences will be useful to a broader audience.

The Center thanks all of the states and power companies for their participation in the conversation and subsequent help in producing these case studies, as well as the federal officials who attended for their participation and interest. We hope these examples of innovation will provide useful insights for those crafting the emerging federal program.

State Success Stories

California

California has implemented a suite of programs to meet its goals of reducing greenhouse gas (GHG) emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050.¹ These policies include energy efficiency and renewable energy programs, and a multi-sector cap-and trade program.

California's energy efficiency standards are the bedrock upon which its climate policies are built.² Energy efficiency is the first resource procured under California's loading order.³ Because California has decoupled utility profits from sales and offered utilities the opportunity to profit from efficiency, its utilities have strong incentives to pursue these savings.⁴ Savings are projected at nearly 70 million megawatt hours (MWh) in 2013 alone.⁵ California's efficiency efforts are an economic driver; the state produces twice as much economic output per kilowatt-hour than the national average.⁶ The California Energy Commission estimates that efficiency standards have generated \$74 billion in savings for Californians.⁷ According to independent analysts, California's average monthly residential energy bills are 25 percent below the national average.⁸ Analysts have concluded that hundreds of thousands of jobs can be created by the program.⁹

California strives to fill any remaining energy needs with renewable energy. California's Renewable Portfolio Standard (RPS) requires that 33 percent of electricity come from renewable sources by 2020.¹⁰ Companies have responded with large-scale renewable projects and citizens have installed small-scale renewable energy. California has 15,000 megawatts (MW) of installed renewable capacity, more than doubling its installed capacity since 2002.¹¹ In 2012, California served about 22 percent of retail energy

¹ See Cal. Air Res. Bd., Climate Change Scoping Plan 31-32, 41-46 (2008),

http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

² See generally Cal. Energy Commission, Tracking Progress: Energy Efficiency (2013),

http://www.energy.ca.gov/renewables/tracking_progress/documents/energy_efficiency.pdf.

³ Cal. Energy Commission, Implementing California's Loading Order for Electricity Resources (2004),

<http://www.energy.ca.gov/2005publications/CEC-400-2005-043/CEC-400-2005-043.PDF>.

⁴ See *State Energy Efficiency Database: California*, American Council for an Energy-Efficient Economy,

<http://aceee.org/sector/state-policy/california>.

⁵ *Id.*

⁶ *Id.*

⁷ See *Id.*

⁸ Devra Wang, Natural Resources Defense Council, California's Energy Efficiency Success Story (2013),

<http://www.nrdc.org/energy/files/ca-success-story-FS.pdf>.

⁹ David Roland-Holst, Energy Efficiency, Innovation, and Job Creation in California 35 (2008),

http://are.berkeley.edu/~dwrh/CERES_Web/Docs/UCB%20Energy%20Innovation%20and%20Job%20Creation%2010-20-08.pdf.

¹⁰ See *California's Renewables Portfolio Standard (RPS)*, Cal. Public Utility Commission,

<http://www.cpuc.ca.gov/PUC/energy/Renewables/index.htm>.

¹¹ Cal. Energy Commission, Tracking Progress: Renewable Energy (2013),

http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf.

sales with renewable energy.¹² Proponents of the RPS believe the measure could generate \$60 billion and create up to 235,000 jobs.¹³ The RPS avoided 3.5 million metric tons of CO₂e in 2011 alone.¹⁴

California is also a leader in deploying small renewable energy systems. In 2007, the state launched the California Solar Initiative, a first-of-its kind effort to deploy 3,000 MW of rooftop solar photovoltaic (PV) systems and create a self-sustaining market for the technology. It is on track to meet its goal two years early, creating thousands of local jobs and spurring technological innovation.¹⁵

Importantly, California's cap-and-trade program includes power plants. By placing a price on the carbon content of electricity, the program encourages use of cleaner electricity.¹⁶

The state is also promoting energy storage efforts which will help further integrate renewable power into the grid,¹⁷ investing in development of other low-emission technologies,¹⁸ implementing a GHG permitting program for new major sources of carbon pollution, and maintaining a GHG emission reporting system.¹⁹

These efforts support one of the lowest-emitting electricity systems in the country. California's in-state fossil generation is almost entirely natural gas-fired,²⁰ and the state is rapidly phasing out imported power from higher-emitting coal-fired power plants. These coal imports represent only about 10 percent of California's energy portfolio, and are expected to decline by nearly two-thirds by 2020.²¹

As a result of these efforts, California's utility sector's GHG emissions have continued to decline. Based upon the Air Resources Board's initial analysis, emissions from in-state and imported power fell by 16 million metric tons, or 16 percent, from 2005 to the 2010-12 averaging period (from 108 million metric tons CO₂e to 91 million tons CO₂e).²² By 2025, California expects to cut utility sector emissions to

¹² *Id.*

¹³ Office of Senate Floor Analyses, Bill Analysis for 2011 Senate Bill 2X1 at 10 (2011), http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_cfa_20110223_155225_sen_floor.html.

¹⁴ Cal. Environmental Protection Agency, State Agency Greenhouse Gas Reduction Report Card 10, 16 (2013), http://www.climatechange.ca.gov/climate_action_team/reports/2013_CalEPA_Report_Card.pdf.From 2008-2011.

¹⁵ *Cal. Solar Initiative 2013 Annual Program Assessment*, Cal. Public Utilities Commission, http://www.cpuc.ca.gov/PUC/energy/Solar/2013_Annual_Program_Assessment.htm

¹⁶ *See generally* Cal. Air Resources Board, Proposed Regulation to Implement the California Cap and Trade Program, Initial Statement of Reasons (2010), <http://www.arb.ca.gov/regact/2010/capandtrade10/capisor.pdf>.

¹⁷ *Electric Energy Storage*, Cal. Public Utility Commission, (2013), <http://www.cpuc.ca.gov/PUC/energy/electric/storage.htm>.

¹⁸ *Electric Program Investment Charge*, Cal. Energy Commission, <http://www.energy.ca.gov/research/epic/>.

¹⁹ *Mandatory Greenhouse Gas Reporting*, Cal. Air Resources Board, (2013), <http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep.htm>.

²⁰ California Energy Commission, Tracking Progress: Installed Capacity (2013), http://www.energy.ca.gov/renewables/tracking_progress/documents/installed_capacity.pdf.

²¹ Cal. Energy Commission, Tracking Progress: Current and Expected Energy from Coal in California (2013), http://www.energy.ca.gov/renewables/tracking_progress/documents/current_expected_energy_from_coal.pdf.

²² Cal. Air Resources Board analysis, based in part on CARB, *2008 to 2012 Emissions for Mandatory Greenhouse Gas Emissions Reporting Summary*, <http://www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/2008-2012-ghg-emissions-summary.pdf> (last visited Nov. 13, 2013). Analysis is preliminary, but representative. Emissions in 2012

below 80 million metric tons CO₂e, a roughly 25 percent reduction from 2005 levels.²³ Carbon emissions from all generation are expected to decline over the 2005-2025 period, with emissions from in-state generation projected to drop by 9 million metric tons and from imported power by 20 million metric tons. California's carbon emissions rates have also fallen, from approximately 1,245 lbs CO₂e/MWh for fossil generation (considering both in-state and imported power) and 875 lbs CO₂e/MWh for all power in 2005 to an average of approximately 1,090 lbs CO₂e/MWh and 775 lbs CO₂e/MWh in the three years before 2012. Those rates are expected to decline to an estimated rate in the range of 830 lbs CO₂e/MWh for fossil sources and of about 581 lbs CO₂e/MWh for all generation by 2025.

Colorado

Colorado is on track to achieve a 29 percent reduction in carbon dioxide emissions by 2018²⁴ and has experienced significant growth in renewable power in recent years.²⁵ Policies to promote energy efficiency, support renewable energy, and reduce carbon pollution play an important role in Colorado's energy outlook, including Colorado's Clean Air – Clean Jobs Act. Colorado's efforts to reduce carbon pollution will also result in reductions in other air pollutants and promote cleaner energy sources to meet electricity needs while promoting economic development.

To support greater energy efficiency—and reduce energy costs—Colorado statute requires a 5 percent reduction from 2006 electricity sales by 2018 and 5 percent reduction from 2006 peak demand by 2018.²⁶ In 2012, the electricity demand-side management plans of the Public Service Company of Colorado and Black Hills Energy resulted in net economic benefits of \$103.7 million.²⁷ Energy efficiency goals set for Xcel Energy and Black Hills Energy under the law reduced CO₂ emissions by 1 million tons from 2009 to 2011.²⁸

In 2010, Colorado increased its Renewable Energy Standard (RES) from 20 percent to 30 percent by 2020 for investor-owned utilities.²⁹ Under legislation passed in 2013, larger rural electric co-ops must meet a 20 percent renewable target by 2020, while smaller co-ops and most municipal utilities have a

were relatively higher than in recent years because of relatively low hydroelectric generation and the unexpected shutdown of the San Onofre Nuclear Generating Station, but the state remains on course to meet emissions targets.

²³ Cal. Air Resources Board analysis.

²⁴ Per Colo. presentation or comments from June 27 dialogue.

²⁵ U.S. Energy Information Administration, 1990-2011 Net Generation by State by Type of Producer by Energy Source (EIA-906, EIA-920, and EIA-923), http://www.eia.gov/electricity/data/state/annual_generation_state.xls [hereinafter EIA State Generation].

²⁶ Colo. Rev. Stat. § 40-3.2-104 (2013).

²⁷ Colo. Public Utility Commission, 2013 Report to the Colorado General Assembly on Demand Side Management 6 (2013), <http://cdn.colorado.gov/cs/Satellite/DORA-PUC/CBON/DORA/1251638492924>.

²⁸ Southwest Energy Efficiency Project, House Bill 07-1037: A Success Story for Homes and Businesses in Colorado Serviced by Xcel Energy and Black Hills Energy (2011), <http://www.swenergy.org/news/news/documents/file/CO%20House%20Bill%201037%20fact%20sheet.pdf>.

²⁹ Colo. House Bill 10-1001 (2010); see Colo. Governor's Energy Office, Colorado's 30% Renewable Energy Standard: Policy Design and New Markets 3 (2010), <http://cnee.colostate.edu/graphics/uploads/HB10-1001-Colorados-30-percent-Renewable-Energy-Standard.pdf>.

10 percent target.³⁰ Caps on retail cost increases address concerns about price spikes for consumers.³¹ The RES is projected to create more than 33,000 jobs during construction and \$4.3 billion in lifetime economic output.³² These benefits are in addition to some 30 million tons of avoided CO₂.³³

The Clean Air – Clean Jobs Act enacted in 2010 will significantly reduce air pollution, including GHG emissions, while improving public health, supporting in-state energy production, and spurring job creation. The law, which was supported by a diverse group of stakeholders, including utilities, environmental groups, the natural gas industry, and state officials, requires utilities to develop plans to reduce air pollution emissions from dirtier plants.³⁴ Xcel Energy, Colorado’s largest utility, anticipates reducing its emissions of CO₂ in Colorado by 28 percent, NO_x by 86 percent, SO₂ by 83 percent, and mercury by 82 percent by 2020 under the law (Xcel Energy was also a participant in this dialogue).³⁵ Xcel’s plan is predicted to have a positive economic impact of \$590 million on the state from 2010 to 2026, and to create about 1,500 jobs during peak construction.³⁶

Colorado’s electricity generation mix is made up of 10 percent renewables, 62 percent coal, and 27 percent natural gas.³⁷ From 2005-2011, power generation from wind jumped 570 percent providing 4.4 million MWh—a significant increase that in part reflects the effectiveness of the state’s RES.³⁸ During this time, Colorado’s CO₂ emissions declined by 1.9 million tons and its CO₂ emissions rate dropped 7.9 percent while power generation increased 3.7 percent.³⁹

³⁰ Colo. Senate Bill 13-252 (2013).

³¹ See Press Release, Gov. Hickenlooper Signs Executive Order, Issues Signing Statement Related to SB13-252 (June 5, 2013), <http://www.colorado.gov/cs/Satellite?c=Page&cid=1251643166067&p=1251643166067&pagename=GovHickenlooper%2FCBONLayout>.

³² Colo. Governor’s Energy Office, Colorado’s 30% Renewable Energy Standard: Policy Design and New Markets 10 (2010), <http://cnee.colostate.edu/graphics/uploads/HB10-1001-Colorados-30-percent-Renewable-Energy-Standard.pdf>.

³³ *Id.*

³⁴ See Press Release, Gov. Ritter, Bipartisan Lawmakers & Coalition Introduce Colorado Clean Air-Clean Jobs Legislation (Mar. 16, 2010), <http://www.colorado.gov/cs/Satellite%3Fc%3DPage%26childpagename%3DGovRitter%252FGOVRLayout%26cid%3D1251573201310%26pagename%3DGOVRWrapper>.

³⁵ *Colorado Clean Air – Clean Jobs Act*, Xcel Energy, http://www.xcelenergy.com/Environment/Doing_Our_Part/Clean_Air_Projects/Colorado_Clean_Air_-_Clean_Jobs_Plan.

³⁶ *Id.*

³⁷ *Generation*, Colo. Energy Office, <http://www.colorado.gov/cs/Satellite/GovEnergyOffice/CBON/1251599939003>.

³⁸ EIA State Generation, *supra* note 25.

³⁹ *Id.*

Illinois

Illinois encourages efforts to reduce carbon pollution and increase clean energy through its energy efficiency and renewable energy standards. In addition, the state plays a leading role in advancing carbon capture and storage (CCS) technologies through the FutureGen project in conjunction with the U.S. Department of Energy.⁴⁰

Energy efficiency policies require electric utilities to save two percent of electricity annually by 2015 and have reduced rate-payer spending on electricity.⁴¹ For example, in the first year (2008-2009) of the Illinois Public Utilities Act, Ameren Illinois Utilities (AIU) customers saved almost 90,000 MWh, far exceeding AIU's goal for that year.⁴² In Plan Year 3 (June 2010-May 2011), another major utility, Commonwealth Edison Company (ComEd), achieved about 662,000 MWh net energy savings through its energy-efficiency and demand-response programs.⁴³

Under its RPS, Illinois requires that 25 percent of its electricity come from renewables by 2025.⁴⁴ The state has experienced significant growth in wind power development as a result—electricity generation from wind increased by more than six million MWh from 2005-2011.⁴⁵ Growth in wind energy from 2003 to 2010 alone created almost 10,000 new local jobs during construction and a lifetime economic benefit of \$3.2 billion, according to one analysis.⁴⁶ In 2011, Illinois avoided about five million tons of CO₂ emissions from renewable resource integration, along with four million tons of NO_x.⁴⁷

In addition to its CCS work on FutureGen, Illinois aims to significantly reduce carbon pollution from any new coal plants through emission standards. From 2009-2015, any new coal-fueled power plant must capture and store 50 percent of the carbon emissions that the facility would otherwise emit.⁴⁸ This target increases to 70 percent from 2016-2017 and to 90 percent after 2017.⁴⁹ These policies are especially notable as coal provides 45 percent of the state's electricity.⁵⁰

⁴⁰ See FutureGen Alliance, <http://www.futuregenalliance.org/>.

⁴¹ 220 Ill. Comp. Stat. 5/8-103(b) (2013).

⁴² See Ameren Ill. Utilities, ActOnEnergy Energy Efficiency and Demand-Response Program Results 9 (2010), available at http://library.cee1.org/sites/default/files/library/8579/CEE_Eval_AIUEnergyEfficiencyPortfolioReport2008_2009_1Jan2010.pdf.

⁴³ Navigant Consulting, Inc., Evaluation Report: Summary Report Final 1 (2012), available at http://ilsagfiles.org/SAG_files/Evaluation_Documents/ComEd/ComEd%20EPY3%20Evaluation%20Reports/ComEd_Summary_PY3_Evaluation_Report_Final.pdf.

⁴⁴ Ill. Pub. Act 095-0481 (2007).

⁴⁵ EIA State Generation, *supra* note 25.

⁴⁶ Ctr. for Renewable Energy, Illinois State University, Economic Impact: Wind Energy Development in Illinois 6, 25 (2010), http://web.extension.illinois.edu/lgien/pdf/events/2012_04-19_economic.pdf.

⁴⁷ Ill. Power Agency, Annual Report: The Costs and Benefits of Renewable Resource Procurement in Illinois Under the Illinois Power Agency and Illinois Public Utilities Acts 35 (2013), <http://www2.illinois.gov/ipa/Documents/201304-IPA-Renewables-Report.pdf>.

⁴⁸ Ill. Clean Coal Portfolio Standard, Public Act 095-1027 (2009).

⁴⁹ *Id.*

⁵⁰ 2011 data. EIA State Generation, *supra* note 25.

Kentucky

Although Kentucky is a leading coal producer, the Bluegrass State’s energy mix is diversifying because of changes in the energy landscape and because of tangible steps to increase renewable power and increase energy efficiency. These steps have helped put Kentucky on a path to achieve its goal to reduce GHG emissions by 20 percent below 1990 levels by 2030.⁵¹ Through its plan to diversify the state’s energy sector, Kentucky aims to provide 30,000-40,000 new jobs.⁵²

Kentucky’s energy efficiency programs aim to achieve an 18 percent reduction in energy use by 2025 in all sectors.⁵³ Tangible progress in Kentucky’s efficiency efforts is shown through its increase in Energy Star schools, which grew from 12 schools in 2008 to more than 200 today.⁵⁴ Kentucky Home Performance was recognized as the 2012 Energy Star Partner of the Year for its work to retrofit more than 1,000 homes and increase the number of certified building contractors to 200.⁵⁵ The Kentucky Save Energy Now program works with industrial and commercial participants to reduce energy intensity by at least 2.5 percent annually for 10 years.⁵⁶ Overall, Kentucky has saved about \$16 million by improving energy efficiency.⁵⁷

Kentucky aims to meet 25 percent of its energy needs by 2025 through energy efficiency, renewable energy, and biofuels.⁵⁸ The state is exploring opportunities to expand the use of renewable energy, including solar photovoltaic electricity, wind power, and biomass energy.⁵⁹

Maryland

Maryland has achieved significant energy sector GHG emission reductions since 2006—a decline of 9.7 million metric tons, or 30 percent—due in significant part to its participation in the Regional Greenhouse Gas Initiative (RGGI), a requirement to reduce energy use, its RPS, and regional fuel switching.⁶⁰

In July 2013, a plan released by Governor Martin O’Malley outlined more aggressive measures the state can take to meet its economy-wide goal to reduce GHG pollution 25 percent from 2006 levels by 2020.⁶¹

⁵¹ Ky. Climate Action Plan Council, Final Report of the KPAC (2011), <http://energy.ky.gov/carbon/Documents/KY%20Final%20Report%20Part%20I%20revised%2003-05-12.pdf>. ..

⁵² Gov. Steven L. Beshear, Intelligent Energy Choices for Kentucky’s Future xii (2008), <http://migration.kentucky.gov/NR/rdonlyres/2880287D-511E-4421-ACC3-D4B9A7F97132/0/EnergyStrategy.pdf>.

⁵³ *Id.* at 13.

⁵⁴ Per Ky. Department of Energy Development and Independence June 27 comments.

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ Gov. Steven L. Beshear, Intelligent Energy Choices for Kentucky’s Future 13 (2008), <http://migration.kentucky.gov/NR/rdonlyres/2880287D-511E-4421-ACC3-D4B9A7F97132/0/EnergyStrategy.pdf>.

⁵⁹ *Id.* at 31.

⁶⁰ Per Md. Department of the Environment.

⁶¹ Md. Department of the Environment, Maryland’s Greenhouse Gas Reduction Plan (2013) http://www.climatechangemaryland.org/site/assets/files/1184/mde_ggrp_execsummary_2013.pdf [hereinafter Md. 2013 GHG Reduction Plan]. Maryland’s Greenhouse Gas Reduction Act requires Maryland to achieve a 25

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 plan. An independent study found the overall collection of climate and energy proposals would generate \$1.6 billion for Maryland's economy and support 37,000 jobs.⁶²

Through recently announced programmatic changes to RGGI, including a reduction in the regional emissions cap of more than 50 percent from 2005 levels by 2020, Maryland expects to further reduce the state's 2020 CO₂ emissions from the electricity sector by an additional 3.6 million metric tons.⁶³

The state's EmPOWER Maryland initiative mandates a 15 percent reduction in peak demand and per-capita electricity consumption and demand by 2015 from 2007 levels. Ten percent of the overall reduction must come from measures implemented by the state's utilities and five percent from other energy efficiency programs.⁶⁴ To date, Maryland has achieved a 10.8 percent reduction in peak electricity demand, equivalent to avoiding one coal power plant.⁶⁵ The state is on track to exceed its peak demand target with a current projected 17.7 percent reduction in peak demand by 2015. The EmPOWER Maryland program has funded measures that will reduce ratepayer electricity use by more than 2 million MWh per year and save \$250 million annually.⁶⁶ These savings will continue for years, with currently existing measures saving ratepayers \$3.7 billion over their useful life.⁶⁷ Total annual GHG emission reductions attributable to aggressive implementation of EmPOWER Maryland could reach 10.52 million metric tons of CO₂e in 2020.⁶⁸

Maryland's RPS requires 20 percent of electricity consumed in the state to be generated by renewable energy sources in 2022. A proposal to increase the RPS to 25 percent by 2020 is under consideration.⁶⁹ Maryland's RPS includes a solar "carve out" requiring 2 percent of all electricity delivered in Maryland to come from in-state solar generation (photovoltaic or thermal) by 2020.⁷⁰ The Maryland Offshore Wind Energy Act of 2013 establishes revenue certainty for 20 years for a 200 MW offshore wind project, and is a key component of the state's renewable energy expansion.⁷¹

Coal is the single largest source of electricity in Maryland's generation portfolio. However, during the period from 2005 to 2012, the percentage of electricity generated from coal dropped from 56 to

percent reduction in state-wide greenhouse gases from 2006 levels by 2020 and establishes a long-term goal to reduce emissions 90 percent by 2050. Md. Code Ann., Envir. §§ 2-1201 to 1211.

⁶² Md. 2013 GHG Reduction Plan, *supra* note 61, at 192-93.

⁶³ Press Release, Md. Energy Administration, RGGI States Propose Lowering Regional CO₂ Emissions Cap 40%, <http://www.mde.state.md.us/programs/PressRoom/Pages/0207RGGIAnnouncement.aspx>.

⁶⁴ Per Md. Energy Administration June 27 Presentation/Comments.

⁶⁵ *Id.* Similarly, since 2007, the state's per capita energy consumption has declined by nearly 10 percent.

⁶⁶ *EmPOWER Maryland Planning*, Md. Energy Administration, <http://energy.maryland.gov/empower3/>.

⁶⁷ *Id.*

⁶⁸ Md. 2013 GHG Reduction Plan, *supra* note 61, at 84.

⁶⁹ *Id.* at 84-85; Md. Code Ann., Pub. Util. Cos. § 7-701 et seq.

⁷⁰ Md. Code Ann., Pub. Util. Cos. § 7-701.

⁷¹ Per Md. Energy Administration June 27 presentation or comments; *see also* Md. Offshore Wind Energy Act of 2013, House Bill 226 (2013).

43 percent. Maryland's CO₂ emission rate per MWh hour declined by 12 percent during 2005-2011.⁷² The state's Calvert Cliffs nuclear plant provides 35 percent of the state's electricity, and renewables, including hydroelectric plants, wind farms, and solar cells now contribute nearly seven percent.⁷³

Minnesota

From 2005-2011, Minnesota experienced a 17.5 percent reduction in carbon pollution.⁷⁴ Policies to reduce carbon emissions, increase renewable energy use, and improve energy efficiency have helped drive these reductions. To build on this progress, the state has established goals to reduce GHG emissions by 15 percent from 2005 levels by 2015, by 30 percent by 2025, and by 80 percent by 2050.⁷⁵

Minnesota has a target of reducing energy use by 1.5 percent per year through energy efficiency measures.⁷⁶ Minnesota's Conservation Improvement Program (CIP) requires utilities to spend a minimum of 1.5 percent of annual operating revenues on incentives like rebates on high-efficiency appliances.⁷⁷ CO₂ emissions reductions from the CIP have been increasing in recent years, reaching more than 800,000 tons in 2010.⁷⁸

Minnesota's RES requires utilities to provide 25 percent of their power from renewables by 2025.⁷⁹ Xcel Energy, the state's largest utility, must provide 30 percent power generation from renewables by 2020, one quarter of which must be met with wind. All utilities have met their 2012 RES goals and most ratepayers are experiencing cost benefits.⁸⁰ New legislation creates an additional solar energy standard that will require investor-owned utilities to obtain 1.5 percent of their power from solar energy by 2020.⁸¹ Between 2000 and 2010, wind power generation in Minnesota increased 900 percent and natural gas generation increased 250 percent.⁸² Most of the growth in natural gas use occurred after its price dropped from historic highs in 2008.⁸³ Also between 2000 and 2010, the use of biomass for power

⁷² Emission rate calculated using all electricity generation. EIA State Generation, *supra* note 25; U.S. Energy Information Administration, U.S. Electric Power Industry Estimated Emissions by State, http://www.eia.gov/electricity/data/state/emission_annual.xls [hereinafter EIA State Electric Power Emissions].

⁷³ 2011 data. U.S. Energy Information Administration, Maryland State Profile, <http://www.eia.gov/state/?sid=MD#tabs-4>.

⁷⁴ Reduction in in-state electricity generation. EIA State Generation, *supra* note 25.

⁷⁵ Minn. Stat. § 216H.02.

⁷⁶ Minn. Stat. § 216B.2401. Amended 2013 to "at least" 1.5%.

⁷⁷ *How CIP Works*, Minn. Department of Commerce, <http://mn.gov/commerce/energy/topics/conservation/How-CIP-Works.jsp>; Minn. Stat. 216B.241.

⁷⁸ Minn. Department of Commerce, Minnesota Conservation Improvement Program Energy and Carbon Dioxide Savings Report for 2009-2010 at 3 (2012), <http://mn.gov/commerce/energy/images/CIPCO2Rpt2012.pdf>.

⁷⁹ *Renewable Energy*, Minn., <http://mn.gov/portal/natural-resources/renewable-energy/>; Minn. Stat. § 216B.1691.

⁸⁰ Minn. Department of Commerce, Progress on Compliance by Electric Utilities with the Minnesota Renewable Energy Objective and the Renewable Energy Standard 3, 9 (2013), <http://mn.gov/commerce/energy/images/2013RESLegReport.pdf>.

⁸¹ *Governor OKs Solar Energy Bill*, Greenwire, May 24, 2013; Minn. Stat. § 216B.1691 (Subd. 2f.).

⁸² Per Minn. Department of Commerce.

⁸³ *Id.*

generation increased 60 percent, while the use of coal decreased about 17 percent and use of petroleum decreased 94 percent.⁸⁴

Under the 2007 Next Generation Energy Act, Minnesota prohibits new coal-fired power plants that produce a net increase in carbon emissions.⁸⁵ Utilities cannot import electricity from large fossil fuel-fired power plants in another state that were not operating by January 1, 2007.⁸⁶ Minnesota also has a longstanding moratorium on new nuclear power plants, although two existing plants operate.⁸⁷

The state's policies have resulted in significant new clean generation sources, including more efficient natural gas plants and renewables. While in decline, coal still fuels 50 percent of Minnesota's electricity.⁸⁸ Nuclear power and renewable sources make up 18 and 15 percent respectively and natural gas fuels 17 percent of the state's power.⁸⁹ From 2005-2011, Minnesota reduced its CO₂ emissions by 6.9 million tons and lowered its CO₂ emissions rate by 17.5 percent, while total power generation slightly increased.⁹⁰ Minnesota experienced economic growth as emissions have dropped and electricity rates remain competitive.⁹¹

New York

New York has achieved a 39 percent reduction in carbon pollution from the power sector in the past seven years due to policies that have capped carbon emissions, required more renewable energy generation, and invested in energy efficiency and because of fuel-switching from coal to natural gas.⁹² New York's policies have resulted in significant new clean generation sources, including new efficient natural gas plants and renewables. New York's participation in RGGI is a major factor in the state's efforts to curb carbon pollution while generating more than \$500 million for a broad spectrum of clean energy programs.⁹³

New York is one of nine states that form RGGI, the first emissions budget and allowance trading program in the United States to reduce GHG emissions from the power sector. An independent study by the Analysis Group found the first three years of RGGI produce \$1.6 billion in economic growth while lowering consumer energy bills.⁹⁴ New York uses proceeds from RGGI allowance auctions, which are projected at \$65 million annually, to invest in energy efficiency in communities in order to reduce the

⁸⁴ *Id.*

⁸⁵ Minn. Stat. § 216H.03.

⁸⁶ *Id.*

⁸⁷ Per Minnesota presentation, comments.

⁸⁸ 2011 data. U.S. Energy Information Administration, Minnesota State Profile, <http://www.eia.gov/state/?sid=MN>.

⁸⁹ *Id.*

⁹⁰ In-state electricity generation. EIA State Electric Power Emissions, *supra* note 72.

⁹¹ Ellen Anderson, Energy Adviser to Minnesota Gov. Mark Dayton.

⁹² 2005-2011. EIA State Electric Power Emissions, *supra* note 72.

⁹³ \$539.6 million in cumulative proceeds from auction of New York allowances. *Cumulative Allowances and Proceeds by State*, Regional Greenhouse Gas Initiative, http://www.rggi.org/market/co2_auctions/results#state_proceeds.

⁹⁴ Analysis Group, The Regional Greenhouse Gas Initiative: Economic Impacts of the First Three Years (2011) http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic_Impact_RGGI_Fact_Sheet.pdf.

use of fuel for heating and transportation.⁹⁵ RGGI revenues support green jobs, including the training of 1,000 workers to implement building retrofits.⁹⁶ The revenues also fund solar power installation efforts.⁹⁷ Overall, RGGI-funded programs have benefited more than 55,000 households and 600 businesses in New York.⁹⁸

New York implemented an energy efficiency goal requiring a 15 percent reduction in usage by 2015.⁹⁹ As a result of this Energy Efficiency Portfolio Standard, the 2009 New York State Energy Plan projected emissions reductions of more than 9 million tons of CO₂ in 2015, as well as 6,544 tons of NO_x and 9,040 tons of SO₂.¹⁰⁰ While more savings are achievable, by the end of 2011 the program had avoided \$3.2 billion in wasted energy costs and created about 10,000 jobs.¹⁰¹

New York's RPS calls for 30 percent of the state's electricity to come from renewable sources by 2015.¹⁰² This policy boosted the use of hydroelectric resources and jumpstarted wind power development in the Empire State. The New York State Energy Research and Development Authority (NYSERDA) estimates that the state's renewable portfolio standard, which requires 30 percent of electricity used by consumers to come from renewables by 2015, avoided 4.1 million tons of CO₂ from 2006 to 2012, along with 4,028 tons of NO_x and 8,853 tons of SO₂.¹⁰³ NYSEDA expects that projects initiated to meet the standard will inject \$1.1 billion into the state's economy over their operating lives.¹⁰⁴

These new policies and the low price of natural gas have delivered a cleaner power sector in New York and resulted in lower wholesale electricity prices.¹⁰⁵ New York currently gets 22 percent of its energy from renewable sources, 18 percent of which comes from hydroelectric power.¹⁰⁶ Prior to implementing an RPS, New York generated no wind power. It now has 1,400 MW of installed wind energy capacity,

⁹⁵ Per N.Y. State Department of Environmental Conservation June 27 presentation, comments.

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *Id.*; *Regional Greenhouse Gas Initiative*, N.Y. State Department of Environmental Conservation, <http://www.dec.ny.gov/energy/rggi.html#Rulemaking>.

⁹⁹ N.Y. State Public Service Commission, Order Establishing Energy Efficiency Portfolio Standard and Approving Programs, Case 07-M-0548 (June 18, 2008), *available at* <http://www3.dps.ny.gov/W/PSCWeb.nsf/0/06F2FEE55575BD8A852576E4006F9AF7?OpenDocument>.

¹⁰⁰ State Energy Planning Bd., Energy Efficiency Assessment, New York State Energy Plan 2009 at 29 (2009), <http://www.nysenergyplan.com/Prior-State-Energy-Plans/2009stateenergyplan.aspx>.

¹⁰¹ Pace Energy & Climate Center, Energy Efficiency in New York: Midcourse Status Report of '15 by 15' at 6 (2012), http://energy.pace.edu/sites/default/files/publications/Energy%20Efficiency%20in%20New%20York%2015x15_0.pdf.

¹⁰² Per N.Y. State Department of Environmental Conservation June 27 presentation, comments; N.Y. State Public Service Commission, Order Establishing New RPS Goal and Resolving Main Tier Issues, Case 03-E-0188 (Jan. 8, 2010), *available at*

<http://www3.dps.ny.gov/W/PSCWeb.nsf/0/1008ED2F934294AE85257687006F38BD?OpenDocument>.

¹⁰³ N.Y. State Energy & Development Authority, The New York State Renewable Portfolio Standard Performance Report 19 (2012), <http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/Renewable-Portfolio-Standard-Reports.aspx>.

¹⁰⁴ *Id.*

¹⁰⁵ Per N.Y. State Department of Environmental Conservation.

¹⁰⁶ 2012 data. EIA State Generation, *supra* note 25.

accounting for two percent of the state's power.¹⁰⁷ Natural gas power plants generate 44 percent of New York's electricity.¹⁰⁸ Nuclear power plants produce 30 percent of the generation mix.¹⁰⁹ From 2005-2011, New York reduced 24 million tons of CO₂ emissions from the power sector and its CO₂ emission rate declined 35 percent.¹¹⁰

Company Success Stories

Austin Energy

Austin Energy, located in Austin, Texas, is the nation's eighth-largest public power utility.¹¹¹ In 2012, Austin Energy provided 12.7 million MWh of electricity to over 420,000 customers, met a peak demand of 2,700 MW,¹¹² and generated electricity from a diverse mix of resources. This included 20 percent of generation from natural gas-fired units, 27 percent from coal-fired units, 22 percent from nuclear units, 15 percent from renewable resources, and 16 percent from market purchases.¹¹³

Austin Energy's generating capacity in MW has historically closely tracked its service area peak demand for electricity. As a result of its integrated strategy to address carbon emissions using Demand-Side Management (DSM) and renewable resources, Austin Energy's total CO₂-emitting generating capacity in 2012 was nearly the same as it was 20 years ago despite a rapid population increase and peak demand growth in its service area.

The Austin City Council passed the Austin Climate Protection Plan in 2007, establishing GHG emissions reduction goals for the city, including targets specific to Austin Energy.¹¹⁴ These goals, updated in 2012,¹¹⁵ include achieving an additional 800 MW of peak demand savings through energy efficiency and conservation by 2020, meeting 35 percent of all energy needs through renewable resources by 2020 including 200 MW of solar power, and reducing power plant CO₂ emissions by 20 percent relative to 2005 levels by 2020.¹¹⁶

¹⁰⁷ 2011 data, U.S. Energy Information Administration, Existing Nameplate and Net Summer Capacity by Energy Source, Producer Type and State (EIA-860), http://www.eia.gov/electricity/data/state/existcapacity_annual.xls.

¹⁰⁸ 2012 data. EIA State Generation, *supra* note 25.

¹⁰⁹ *Id.*

¹¹⁰ *Id.*; EIA State Electric Power Emissions, *supra* note 72.

¹¹¹ *Company Profile*, Austin Energy, <http://www.austinenergy.com/About%20Us/Company%20Profile/index.htm>.

¹¹² *System Peak Demand*, Austin Energy Data Library, <http://www.austinenergy.com/about%20us/Company%20Profile/dataLibrary/energyUse.htm>.

¹¹³ *Generation by Fuel Type*, Austin Energy Data Library, <http://www.austinenergy.com/about%20us/Company%20Profile/dataLibrary/quickFacts.htm>.

¹¹⁴ City of Austin, Climate Protection Resolution No. 20070215-0232, www.austintexas.gov/edims/document.cfm?id=100723.

¹¹⁵ See City of Austin, Climate Protection Resolution No. 20070215-0232, 2012 Update, <http://www.austintexas.gov/sites/default/files/files/Sustainability/2012%20Resolution%20Matrix.pdf>.

¹¹⁶ *Company Profile*, Austin Energy, <http://www.austinenergy.com/About%20Us/Company%20Profile/index.htm>.

Austin Energy has been a national leader in implementing DSM programs since 1982 and was recognized for the ninth year in a row in 2013 with the Energy Star Sustained Excellence Award by the U.S. EPA and Department of Energy.¹¹⁷ The utility avoided an estimated 700 MW of peak demand electricity through DSM programs prior to 2007.¹¹⁸ Since 2007, the utility has offset 365 MW of peak demand, representing 46 percent of the 800 MW goal to be achieved by 2020.

Austin Energy established the nation's first Green Building program in 1991 to encourage sustainable homes and buildings by using an Austin-specific rating system and paving the way for energy and building code changes that reduce building energy use. As a result, one-third of permits issued for single-family homes in Austin are now for Green Building-rated homes.¹¹⁹

Austin Energy's GreenChoice¹²⁰ program led the nation's 850 utility-sponsored, voluntary green energy programs in total sales every year from 2002 to 2011 and continues to be one of the most successful renewable energy sales programs in the country. At the end of 2012, Austin Energy had 850 MW of wind power, 112 MW of biomass generation, and 48 MW of utility and local solar resources under contract. The utility will add a net additional 375 MW of wind energy by 2015,¹²¹ putting the utility on track to meet its 35 percent renewable goal several years early.

In 2012, Austin Energy's GHG emissions were below 2005 levels, measuring 4.6 million metric tons of CO₂ equivalents.¹²² The utility's carbon emissions per MWh of electricity generated have dropped by 14 percent since 2005 to 950 lbs CO₂ equivalents per MWh.¹²³

Calpine Corporation

Calpine Corporation is an independent power producer (IPP) that supports the growth of cleaner power generation. Calpine manages more than 28,000 MW of electricity capacity in 20 U.S. states and Canada, with 93 power plants in operation or under construction.¹²⁴ It primarily provides power to utilities in California, Texas, and the mid-Atlantic. In 2012, the company's fleet generated more than 116 million MWh of electricity.¹²⁵

¹¹⁷ Press Release, Austin Energy, Austin Energy wins Energy Star Sustained Excellence Award (March 5, 2013), <http://www.austinenergy.com/About%20Us/Newsroom/Press%20Releases/2013/energyStarAward2013.htm>.

¹¹⁸ *Id.*

¹¹⁹ Press Release, Austin Energy, Austin Energy sets major milestone rating 10,000th green building home (April 27, 2012), <http://www.austinenergy.com/About%20Us/Newsroom/Press%20Releases/Press%20Release%20Archive/2012/greenBuildingMilestone.html>.

¹²⁰ *GreenChoice*, Austin Energy, <http://www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Choice/GC%20Admin-OLD/index.htm>.

¹²¹ Austin Energy, Quarterly Briefing 4 (2013), <https://www.austinenergy.com/About%20Us/Newsroom/Reports/QuarterlyReportAug2013.pdf>.

¹²² Austin Energy Annual Performance Report Year Ended September 2012 at 6 (2013), <http://www.austinenergy.com/About%20Us/Newsroom/Reports/2012AnnualPerformanceReport.pdf>

¹²³ Per Austin Energy background material (converted from lbs CO₂ per kWh).

¹²⁴ Calpine Corporation, <http://www.calpine.com/about/>.

¹²⁵ Calpine Corporation, <http://calpine.com/>.

Calpine is the largest operator of highly efficient combined heat and power (CHP) plants in the country, earning recognition by the EPA's Combined Heat and Power Partnership for efficient energy production and CO₂ reduction. The average plant age is about 13 years old, and the fleet emits fewer greenhouse gases per MWh generated than any other IPP in the U.S. According to a May 2013 report that analyzed 2011 data for the top 100 power producers in the U.S., Calpine, listed as the tenth largest power producer overall and the largest IPP, was ranked among the lowest in air emissions rates – 81st for sulfur dioxide, 82nd for nitrogen oxides and 89th for carbon dioxide – among all fossil fuel fleets.¹²⁶

Calpine also operates the largest single renewable geothermal power resource in the world at The Geysers, a complex of 15 geothermal plants north of San Francisco, CA.¹²⁷ The Geysers consists of 725 MW of geothermal turbine-based power plants, approximately 18 percent of California's renewable energy.

CPS Energy

CPS Energy in San Antonio, Texas, is the largest municipally-owned electric and gas utility in the U.S. with 728,000 electric customers and 328,000 natural gas customers.¹²⁸ The firm plans to achieve a 30 percent savings in CO₂ emissions by 2020, thanks in part to renewable energy projects, energy efficiency programs, and deactivating two older coal units.¹²⁹ CPS has also significantly increased its clean power generation sources, including natural gas plants and renewable energy, in order to reduce its carbon pollution.¹³⁰

CPS Energy's energy efficiency goal to save 771 MW of electricity by 2020 is the equivalent of building a power plant.¹³¹ The firm is on track to reach this goal ahead of schedule.¹³²

CPS Energy also plans to add 1,500 MW of power from renewable sources by 2020, accounting for about 20 percent of its generation capacity.¹³³ The company's commitment to renewable energy was reflected in last year's announcement of a partnership with OCI Solar Power on the construction of a 400 MW solar farm and signing of a 25-year purchase agreement for the power the facility generates.¹³⁴ Also in 2012, CPS announced that it would purchase 200 MW of power annually from the planned \$2.4 billion

¹²⁶ M.J. Bradley & Associates, *Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States (2013)*, <http://www.ceres.org/resources/reports/benchmarking-air-emissions/view> [hereinafter 2013 M.J. Bradley Benchmarking Report].

¹²⁷ *The Geysers*, Calpine Corporation, <http://www.geysers.com/geothermal.aspx>.

¹²⁸ CPS Energy, https://www.cpsenergy.com/About_CPS_Energy/Who_We_Are/.

¹²⁹ Per CPS Energy June 27 Comments, Presentation; *see also What We're Doing About Climate Change*, CPS Energy,

http://www.cpsenergy.com/About_CPS_Energy/Who_We_Are/Environmental_Stewardship/Climate_Change/index.asp.

¹³⁰ Per CPS Energy June 27 Comments, Presentation.

¹³¹ *Id.*

¹³² *Id.*

¹³³ *Id.*

¹³⁴ *Solar*, CPS Energy, http://cpsenergy.com/Services/Generate_Deliver_Energy/Solar_Power/.

Texas Clean Energy Project, which is expected to capture 90 percent of its CO₂ emissions through CCS technology.¹³⁵

With the growth of wind and solar projects, CPS Energy has developed a diverse electricity mix that also includes natural gas, coal, and nuclear power. CPS Energy has managed to achieve carbon pollution reductions even as energy production is increasing. As power generation increased 36 percent from 2000-2011, the firm managed to reduce its CO₂ emissions rate by seven percent.¹³⁶

Dominion

Dominion, an investor-owned energy company, is one of the nation's largest producers and transporters of energy, serving customers in 15 states in the energy-intensive Midwest, mid-Atlantic and Northeast regions of the country.¹³⁷ The firm has succeeded in significantly reducing its CO₂ emissions rate and continues to explore opportunities, such as with renewable power, energy efficiency, and technological advances, to invest in clean energy.

Dominion has greatly increased its use of natural gas to produce electricity in recent years, and natural gas made up 20 percent of its electricity production mix in 2011. Nuclear power made up 44 percent of Dominion's generation mix and coal represented 34 percent.¹³⁸ The firm's overall CO₂ emissions declined by 1 million tons from 2000 to 2011, and its CO₂ emissions rate declined 31 percent even as total power generation increased 43 percent due to population and economic growth in its service territory.¹³⁹

Renewable energy is an increasingly important aspect of Dominion's diverse power generating portfolio. Dominion Virginia Power is on track to meet renewable power goals of two states: Virginia's goal of 15 percent renewable power by 2025 and North Carolina's target to achieve 12.5 percent renewable power by 2021.¹⁴⁰ Dominion's renewable sources throughout its corporate footprint (regulated and unregulated) include wind, hydro, wood biomass, fuel cells, and a community solar program. Dominion has renewable projects either in operation or under development from Georgia to Connecticut, including substantial investments in its home state of Virginia, such as the conversion of three coal power stations to renewable biomass. When fully operational, the combined output from all renewable projects will exceed 1,600 MW—enough to power more than 400,000 typical households.¹⁴¹ To expand its renewable energy portfolio, Dominion recently gained approval for 30 MW of rooftop

¹³⁵ Michael Hess, U.S. Department of Energy, *CPS Energy to purchase low-carbon power from innovative clean coal plant in Texas*, Penn Energy (Jan. 20, 2012), <http://www.pennenergy.com/articles/pennenergy/2012/01/cps-energy-to-purchase.html>.

¹³⁶ Per CPS Energy.

¹³⁷ *About Dominion*, Dominion, <https://www.dom.com/about/index.jsp>.

¹³⁸ 2013 M.J. Bradley Benchmarking Report, *supra* note 126, at 45.

¹³⁹ Computed from data in M.J. Bradley and Associates, *Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States*, <http://www.mjbradley.com/content/benchmarking-air-emissions-2013-past-reports> (2000 data based on 2002 report, 2011 data based on 2013 report).

¹⁴⁰ *Renewable Goals, Fleet and Portfolio Standards*, Dominion, <https://www.dom.com/about/stations/renewable/goals-fleet-and-portfolio-standards.jsp>.

¹⁴¹ *Id.*

solar power.¹⁴² It is also developing the largest fuel-cell project in the country, the Dominion Bridgeport Fuel Cell in Connecticut, which will generate 15 MW. Also, Dominion has won the bid to lease federal land to develop offshore wind resources for electricity generation off of the coast of Virginia.¹⁴³

Dominion's new combination biomass and coal plant in Virginia, called the Virginia City Hybrid Energy Center, demonstrates the firm's use of cleaner energy technologies. The 600 MW station, which opened in 2012, is one of the cleanest coal-fired power plants in the country and is designed to co-fire with up to 20 percent renewable biomass. The station produces enough electricity to power about 150,000 homes¹⁴⁴ and will generate about \$258 million annually for the local economy.¹⁴⁵

Entergy

Entergy is a New Orleans-based investor-owned utility that provides electricity to 2.8 million customers in four southern states.¹⁴⁶ Entergy operates more than 40 power plants using natural gas, nuclear, coal, oil and hydroelectric power with approximately 30,000 MW of electric generating capacity.¹⁴⁷ In 2001, Entergy became the first U.S. electric utility to establish a voluntary GHG emissions stabilization goal for its power plants.¹⁴⁸ The firm met the goal to stabilize emissions at 2000 levels through 2005.¹⁴⁹ Entergy revised this goal to stabilize emissions at 20 percent below 2000 levels from 2006 through 2010, and this stabilization goal has been extended through 2020.¹⁵⁰

Since 2001, Entergy has spent \$14.7 million on 61 energy efficiency improvements that have resulted in nearly 5.3 million metric tons of CO₂ savings and \$30 million in annual fuel savings.¹⁵¹ For example, the company has added nearly 4,000 MW from efficient natural gas-fired combined cycle gas turbine (CCGT) generation resources. It estimates that this upgrade saves 850,000 metric tons of CO₂ per year and \$55 million in annual fuel savings.¹⁵²

Over the past decade, Entergy has also increased the capacity of its nuclear fleet by over 700 MW, the equivalent of a new reactor, through power upgrades, turbine replacements and cooling tower

¹⁴² *Solar Partnership Program*, Dominion, <https://www.dom.com/about/stations/renewable/solar/solar-partnership-program.jsp>.

¹⁴³ *Offshore Wind Power*, Dominion, <https://www.dom.com/about/stations/renewable/offshore-wind-power.jsp>.

¹⁴⁴ *Virginia City Hybrid Energy Center*, Dominion, <https://www.dom.com/about/stations/fossil/virginia-city-hybrid-energy-center.jsp>.

¹⁴⁵ *Id.*

¹⁴⁶ *About Entergy*, Entergy Corporation, http://entergy.com/about_entergy/.

¹⁴⁷ *Operations Information*, Entergy Corporation, http://www.entergy.com/operations_information/.

¹⁴⁸ Per Entergy Corporation June 27 presentation, comments, and background material.

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*; *Entergy and the Environment*, Entergy Corporation, http://www.entergy.com/our_community/environment/performance.aspx.

¹⁵¹ Per Entergy Corporation June 27 presentation, comments, and background material.

¹⁵² *Id.*

modifications. Entergy estimates that maintaining and expanding its nuclear energy production avoids 50 million metric tons of CO₂ emissions per year.¹⁵³

From 2000-2012, Entergy reduced annual CO₂ emissions by 15 million tons—a 29 percent emissions reduction that was accomplished even though electric generation over the same period grew by 26 percent. Its CO₂ emissions rate also declined 44 percent. Entergy’s cumulative CO₂ emissions from 2001-2012 are 62.9 million tons below the firm’s cumulative CO₂ emissions stabilization goals for the same period.¹⁵⁴

Exelon

Exelon, one of the largest competitive U.S. power generators, is an investor-owned corporation headquartered in Chicago with operations and business activities in 47 states and Canada.¹⁵⁵ Under its Exelon 2020 plan, the firm aims to reduce, offset, or displace 17.5 million metric tons of GHG emissions by 2020. This goal represents a combination of Exelon Corporation’s original 15.7 million metric ton reduction goal with the goals of Constellation Energy that merged with Exelon in March 2012.¹⁵⁶

From the program announcement in 2008 through 2012, Exelon has spent approximately \$810 million, creating 310 MW of additional nuclear capacity at existing plants.¹⁵⁷ The firm has also invested more than \$3 billion in wind and solar power projects since 2010. In 2012, Exelon reduced 8.7 million tons of direct and indirect CO₂e emissions from legacy Exelon assets.¹⁵⁸ Some of the same factors that lowered CO₂ emissions have also brought reductions in SO₂ and NO_x emissions.¹⁵⁹ Exelon has one of the nation’s cleanest and lowest-cost power generation portfolios, with more than 80 percent of its generation from nuclear power.¹⁶⁰ It is the largest nuclear power generator in the United States and has a total of 34,700 MW of owned capacity, including its nuclear, fossil, and renewable assets.¹⁶¹ Exelon’s utilities deliver electricity to more than 6.6 million customers in central Maryland, northern Illinois, and southeastern Pennsylvania and natural gas to 1.2 million customers in the PECO and BGE service territories.¹⁶²

¹⁵³ *Id.*

¹⁵⁴ *Id.*; see Entergy Corporation, GHG Inventory Management Plan and Reporting Document (2012), http://www.entergy.com/content/our_community/pdfs/GHG_Inventory_Mgmt_Plan_Reporting_Doc_030912.pdf.

¹⁵⁵ *About Us*, Exelon Corporation, <http://www.exeloncorp.com/aboutus.aspx>.

¹⁵⁶ Exelon Corporation, Exelon 2020 Program Update 1 (2013), http://www.exeloncorp.com/assets/environment/docs/Exelon_2020_Program_Update.pdf.

¹⁵⁷ Exelon Corporation, 2012 Exelon Corporation Sustainability Report 34-35 (2012), http://www.exeloncorp.com/assets/newsroom/downloads/docs/dwnld_Exelon_CSR.pdf.

¹⁵⁸ *Id.*

¹⁵⁹ *Id.* at 40.

¹⁶⁰ *Id.* at 5.

¹⁶¹ *Id.* at 3.

¹⁶² Exelon Corporation, 2012 Summary Annual Report 11 (2013), <http://www.exeloncorp.com/assets/newsroom/downloads/docs/Financial/SummaryAnnualReport.pdf>.

From 2000-2011, pre-merger Exelon reduced over 3 million tons of CO₂ emissions, and its CO₂ emissions rate declined over 40 percent while it increased power generation by almost 14 percent.¹⁶³

National Grid

National Grid is a global electricity and gas company based in the northeast United States and in London. It is one of the world's largest investor-owned utilities with 19 million customers, including nearly 7 million in the United States.¹⁶⁴ The company has achieved a 60 percent reduction in its GHG emissions based on 1990 levels, surpassing its 2020 goal of a 45 percent emissions reduction.¹⁶⁵ The firm's 2050 goal is to reduce emissions by 80 percent.¹⁶⁶ To advance its ambitious vision, the company factors a social cost of carbon of about \$50 per ton of CO₂ into all capital project decisions.¹⁶⁷

National Grid sees energy efficiency investments as playing a critical role in reducing carbon emissions. In 2013, the company completed \$70 million in efficiency improvements at a natural gas power plant by modernizing turbines at four 375 MW units.¹⁶⁸ This project avoids 100,000-150,000 tons of CO₂ per year, which is equivalent to taking 24,000 cars off the road each year.¹⁶⁹ The company also promotes energy efficiency for its customers and saves 1.8 million customers 770,000 MWh of electricity annually, avoiding 660,000 tons of CO₂ per year.¹⁷⁰ The firm's Low-Income Retrofit, Small Business, and EnergyWise programs have been recognized as exemplary programs by the American Council for an Energy Efficient Economy.¹⁷¹

National Grid is also pursuing its clean energy and GHG emission reduction goals in part through its commitment to wind energy. The company has signed a 15-year power purchase agreement with the Cape Wind offshore wind farm project in Massachusetts to buy half the expected output of about 750,000 MWh per year.¹⁷² This investment is expected to avoid 700,000 tons of CO₂ per year.¹⁷³

¹⁶³ Exelon Corporation; *see also* data provided in current and historic benchmarking reports. M.J. Bradley and Associates, Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States (2013), <http://www.mjbradley.com/content/benchmarking-air-emissions-2013-past-reports>.

¹⁶⁴ Per National Grid June 27 presentation / comments.

¹⁶⁵ National Grid, National Grid Annual Report and Accounts 2012 at 13, 15 (2013), http://www.nationalgrid.com/NR/rdonlyres/763A93AA-4982-45D1-94EF-8A8D90522D7A/61001/National_Grid_Interactive_FINAL.pdf.

¹⁶⁶ *Id.* at 42.

¹⁶⁷ Per National Grid June 27 presentation / comments.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.*

¹⁷¹ Press Release, National Grid Receives "Exemplary Program" Award from ACEEE for Energy Efficiency Programs (Apr. 11, 2013), http://www.nationalgridus.com/masselectric/a3-1_news2.asp?document=7633.

¹⁷² Press Release, National Grid and Cape Wind Sign Power Purchase Contract (May 7, 2010), http://www.nationalgridus.com/aboutus/a3-1_news2.asp?document=5163.

¹⁷³ *Id.*

In 2010, the company received regulatory approval for a power purchase agreement with Deepwater Wind, a 28.8 MW project off the coast of Rhode Island.¹⁷⁴

NextEra Energy, Inc.

NextEra Energy, Inc. is a leading clean energy company with 2012 operating revenues of approximately \$14.3 billion, more than 42,000 MW of generating capacity, and nearly 15,000 employees in 26 states and Canada as of year-end 2012.¹⁷⁵ Headquartered in Juno Beach, Florida, NextEra Energy's principal subsidiaries are Florida Power & Light Company (FPL) and NextEra Energy Resources, LLC. FPL serves approximately 4.6 million customer accounts in Florida and is one of the largest rate-regulated electric utilities in the United States. NextEra Energy Resources, LLC, together with its affiliated entities (NextEra Energy Resources), is the largest North American generator of wind and solar power.¹⁷⁶

Through its subsidiaries, NextEra Energy also generates clean, emissions-free electricity from eight commercial nuclear power units in Florida, New Hampshire, Iowa, and Wisconsin.¹⁷⁷ Since 1997, NextEra Energy's CO₂ emissions rate has dropped 35 percent.¹⁷⁸ As it has implemented cleaner energy practices, NextEra Energy has improved its value to shareholders by exceeding the S&P index for utilities.¹⁷⁹

NextEra Energy's subsidiary, FPL, is a national leader for demand-side management, according to the most recent U.S. Department of Energy data.¹⁸⁰ FPL's programs to encourage customers to use energy more efficiently have saved the company from having to build 14 medium-sized power plants since 1981, avoiding more than 25 million MWh of electricity and an associated 13 million tons of CO₂ since 2007.¹⁸¹

From 2000-2011, the company's CO₂ emissions rate declined by approximately 40 percent despite an almost 90 percent increase in total power generation.¹⁸² This emissions rate is 48 percent lower than the electric power sector average and is mainly driven by greater energy efficiency in the company's power plants and by its large renewable portfolio.¹⁸³ For instance, in 2012, the company's wind generation avoided over 20 million tons of CO₂, and its nuclear generation avoided about 26 million tons of CO₂.¹⁸⁴

¹⁷⁴ Press Release, Deepwater Wind, RI Energy Commission OK's Wind Farm Agreement (Aug. 11, 2010), <http://dwwind.com/deepwater-news/ri-energy-commission-ok-s-wind-farm-agreement>.

¹⁷⁵ NextEra Energy, Delivering For You 1 (2013), <http://www.nexteraenergy.com/pdf/profile.pdf>.

¹⁷⁶ *Id.*

¹⁷⁷ *Id.*

¹⁷⁸ Per NextEra Energy Inc. June 27 Presentation, Comments.

¹⁷⁹ NextEra Energy, Delivering For You 1 (2013), <http://www.nexteraenergy.com/pdf/profile.pdf>.

¹⁸⁰ *Energy Efficiency*, Florida Power & Light Company, http://www.fpl.com/landing/energy_efficiency.shtml.

¹⁸¹ *Id.*

¹⁸² Computed from data in M.J. Bradley and Associates, Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States, <http://www.mjbradley.com/content/benchmarking-air-emissions-2013-past-reports> (2000 data based on 2002 report, 2011 data based on 2013 report).

¹⁸³ Per NextEra Energy Inc. June 27 Presentation, Comments.

¹⁸⁴ *Id.*

Natural gas makes up 59 percent of NextEra’s power generation mix, with nuclear (22 percent) and wind (15 percent) representing significant amounts.¹⁸⁵

PG&E

PG&E is one of the country’s largest combination natural gas and electric utilities and serves more than 15 million customers in northern and central California.¹⁸⁶ Operating in a state with some of the nation’s most robust renewable energy and energy efficiency policies, PG&E is an industry leader in providing power from renewable sources and improving efficiency. Through efforts to address climate change and reduce CO₂ emissions, the GHG emissions rate for the power it provides to its customers is among the lowest of any investor-owned utility in the country – about half the national average.¹⁸⁷

For more than 35 years, PG&E has supported energy efficiency efforts that have saved enough power to avoid building approximately 25 power plants.¹⁸⁸ This has been made possible in part by California’s policies that decouple utility profits from aggregate electricity and gas consumption and provide incentives for the state’s utilities to aggressively pursue energy efficiency efforts.¹⁸⁹ As part of its efforts to continuously find new ways to provide consumers with energy saving choices, PG&E is using the data it collects from the more than nine million smart meters it has deployed to better understand customer usage patterns and provide more personalized consumer energy efficiency options.¹⁹⁰

PG&E is also the largest purchaser of renewable energy in the country and owns and operates the largest privately-held hydroelectric system. PG&E’s portfolio of renewable resources eligible for compliance with California’s RPS contains solar, wind, geothermal, biomass and small hydro power, and the company is on its way toward the state’s 33 percent renewable electricity goal by 2020.¹⁹¹ Over the past year, PG&E has emerged as a significant driver of solar energy growth, as 46 percent of U.S. utility solar installations built in 2012 provide electricity to the firm.¹⁹² From 2002 to 2011, PG&E entered into more than 110 contracts to procure nearly 9,000 MW of renewable energy.¹⁹³ PG&E also leads the nation by hooking up more than 60,000 solar-generating customers to the electric grid.¹⁹⁴

Overall, about half of the electricity PG&E delivers to its customers comes from a combination of renewable and GHG-free resources.¹⁹⁵ In 2011, its power mix included 22 percent nuclear generation,

¹⁸⁵ *Id.*

¹⁸⁶ *Company Profile*, PG&E, <http://www.pge.com/en/about/company/profile/index.page?>

¹⁸⁷ *Fighting Climate Change*, PG&E, <http://www.pge.com/myhome/environment/pge/climate/>.

¹⁸⁸ Per PG&E June 27 Comments.

¹⁸⁹ *How PG&E Makes Money*, PG&E, <http://www.pge.com/en/mybusiness/rates/rateinfo/howwemakemoney.page?>

¹⁹⁰ *Putting Energy Efficiency First*, PG&E, <http://www.pge.com/myhome/environment/pge/energyefficiency/>.

¹⁹¹ *Clean Energy Solutions*, PG&E, <http://www.pge.com/myhome/environment/pge/cleanenergy/>.

¹⁹² *California: The Clean and Green State*, PGE Currents, <http://www.pgecurrents.com/2013/06/06/california-the-clean-and-green-state/>.

¹⁹³ *Energizing California for 150 Years*, PG&E, <http://www.pge.com/about/company/profile/history/>.

¹⁹⁴ *Clean Energy Solutions*, PG&E, <http://www.pge.com/myhome/environment/pge/cleanenergy/>.

¹⁹⁵ 2013 M.J. Bradley Benchmarking Report, *supra* note 126.

19 percent renewables, 18 percent hydroelectric facilities, and 25 percent from natural gas. From 2000-2011, PG&E reduced CO₂ emissions by 83 percent and its CO₂ emissions rate declined 79 percent.¹⁹⁶

Portland General Electric

Portland General Electric (PGE) is a publicly-traded, investor-owned utility serving approximately 834,000 customers, including 103,000 commercial customers in Portland, Oregon, and surrounding areas.¹⁹⁷ PGE is Oregon's largest utility, with customers comprising about 45 percent of Oregon's population and 75 percent of Oregon's industrial and commercial activity.¹⁹⁸ In 2012, PGE filed an update to its 2009 Integrated Resource Plan (IRP) to meet load growth through 2020, which includes a variety of emission reduction initiatives.¹⁹⁹ The company plans to file a new IRP early in 2014.

The 2009 IRP contained 101 average megawatts (MWA) of additional renewable resources to help meet Oregon's RPS. In 2013 the company began the construction of a new wind farm in Washington State, near the Tucannon River, to fulfill renewable resource goals established in the IRP and bring the company into compliance with the 2015 RPS.²⁰⁰ The RPS ratchets up again in 2020 and ultimately requires that 25 percent of the utility's load be served by qualifying renewable resources in 2025. PGE also leads the nation in the number of customers who have chosen to participate in the utility's voluntary renewable power options.²⁰¹ Since 2009, PGE has been ranked number one in the nation by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) for the number of renewable energy customers participating.²⁰² And in 2012, PGE's voluntary programs sold more renewable energy than any other voluntary utility program in the U.S.²⁰³

¹⁹⁶ Computed from data in M.J. Bradley and Associates, Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States, <http://www.mjbradley.com/content/benchmarking-air-emissions-2013-past-reports> (2000 data based on 2002 report, 2011 data based on 2013 report).

¹⁹⁷ *Our Company*, Portland General Electric, http://www.portlandgeneral.com/our_company/pge_glance/quick_facts.aspx.

¹⁹⁸ Per Portland General Electric background information.

¹⁹⁹ *Integrated Resource Plan*, Portland General Electric, http://www.portlandgeneral.com/our_company/energy_strategy/resource_planning/irp.aspx.

²⁰⁰ *Renewable Customer News*, Portland General Electric, http://www.portlandgeneral.com/community_environment/initiatives/renewable_energy/renewable_news/default.aspx.

²⁰¹ Press Release, Portland General Electric, DOE Ranks PGE No. 1 in U.S. for Sales of Renewable Energy, http://www.portlandgeneral.com/our_company/news_issues/news/06_05_2013_doe_ranks_pge_no_1_in_us_for.aspx.

²⁰² *Top Ten Utility Green Power Programs*, U.S. Department of Energy, <http://apps3.eere.energy.gov/greenpower/resources/tables/topten.shtml>.

²⁰³ Press Release, Portland General Electric, DOE Ranks PGE No. 1 in U.S. for Sales of Renewable Energy, http://www.portlandgeneral.com/our_company/news_issues/news/06_05_2013_doe_ranks_pge_no_1_in_us_for.aspx.

Under its IRP, PGE plans to acquire all “achievable cost-effective energy efficiency”²⁰⁴ identified by the Energy Trust of Oregon, with energy efficiency measures expected to meet nearly half of PGE’s load growth through 2020.²⁰⁵ As of 2010, PGE had full smart meter deployment in its service territory, and in 2013 began operating a Smart Power Center in Salem, Oregon, as a pilot project involving several smart-grid technologies implemented for about 500 homes and businesses.²⁰⁶ The company has over 3,000 customer-generators enrolled in its net metering program and supported the 2009 adoption of a solar payment program (i.e., feed-in tariff) pilot in order to gain an understanding of alternative incentive models that encourage customer solar photovoltaic generation. PGE now has over 900 customers receiving payments in its Solar Payment Option program and nearly 40 MW of installed capacity in both programs.²⁰⁷

As a result of analysis in its 2009 IRP, PGE committed to a cessation of coal-based operations at its 585 MW Boardman Power Plant by December 31, 2020.²⁰⁸ Boardman is the only coal-fired power plant in Oregon, and PGE is currently researching the potential of combusting biomass at the plant.²⁰⁹ In addition, PGE recently announced plans to build a 440 MW natural gas-fueled power plant that is expected to open in 2016.²¹⁰ PGE is also constructing a 220 MW flexible capacity plant, also fueled with natural gas, that will be used once it goes online in 2015 to help meet peak demand and integrate the variable output from PGE’s renewable wind and solar generating resources.²¹¹

PGE operates 13 power plants and has a diverse generation mix that includes hydropower, coal and gas combustion, wind, and solar, helping it to meet Oregon’s renewable standard and the state’s GHG emission standard for new power plants.²¹²

²⁰⁴ For background on definition of “achievable, cost-effective” energy efficiency, see *Achievable Savings*, Northwest Power and Conservation Council, <http://www.nwcouncil.org/reports/2007/2007-13>; see also Energy Trust of Oregon, <http://energytrust.org/>.

²⁰⁵ *Climate Change and PGE*, Portland General Electric, http://www.portlandgeneral.com/our_company/news_issues/current_issues/climate_change_pge.aspx?community.

²⁰⁶ *Salem Smart Power Project*, Portland General Electric, http://www.portlandgeneral.com/our_company/news_issues/current_issues/climate_change_pge.aspx?community.

²⁰⁷ See *Solar Payment Option Q&A*, Portland General Electric, http://www.portlandgeneral.com/renewables_efficiency/generate_power/solar_payment/solar_payment_qa.aspx#3.

²⁰⁸ *PGE GHG Emission Profile*, Portland General Electric, http://www.portlandgeneral.com/community_environment/initiatives/climate_change/emissions_profile.aspx.

²⁰⁹ PGE June 27 Comments.

²¹⁰ Press Release, Portland General Electric, PGE announces new power plants, transmission capacity proposal, (June 3, 2013) http://www.portlandgeneral.com/our_company/news_issues/news/06_03_2013_pge_announces_new_power_plant.aspx.

²¹¹ *Id.*

²¹² *Company Overview*, Portland General Electric, <http://investors.portlandgeneral.com/overview.cfm>.

PSEG

Public Service Enterprise Group (PSEG) is an investor-owned corporation with annual revenues of approximately \$10 billion. Its three principal subsidiaries include PSEG Power, PSEG Energy Holdings, and Public Service Electric and Gas Company (PSE&G), which is New Jersey's oldest and largest public utility company.²¹³

Since 2007, PSEG has reduced its GHG emissions through energy efficiency, renewable energy, and other cleaner sources of power generation. These efforts helped PSEG achieve its goal of a 25 percent reduction in GHG emissions by 2025 in 2011, 14 years ahead of schedule.²¹⁴ From 2000-2008, PSEG achieved a 31 percent reduction in GHG emissions intensity, exceeding its voluntary goal of an 18 percent reduction.²¹⁵ PSEG Power reduced its GHG intensity by increasing nuclear power output and building clean, efficient natural gas plants.

PSEG is investing in resilient electricity infrastructure, and in the wake of Superstorm Sandy PSE&G proposed Energy Strong, a 10-year, \$3.9 billion program designed to make the company's electric and gas systems more resilient to severe weather or other natural disasters.²¹⁶ In 2013, for the second straight year, PSE&G received Edison Electric Institute's Emergency Response Award for restoring power to nearly 1.9 million customers affected by Sandy and for its outstanding storm management practices.²¹⁷ PSE&G is investing more than \$300 million in energy efficiency initiatives that reduce emissions while creating jobs and saving customers money.²¹⁸ These efforts have saved electricity equivalent to the amount used by all residential customers in New Jersey's third-largest city of Paterson.²¹⁹ PSE&G efforts include a \$129 million investment to help hospitals make ongoing energy efficiency improvements, and efficiency projects at nearly 200 government facilities and non-profits, including more than 50 schools.²²⁰

The company is also making strides in renewable energy, including plans to invest \$468 million to develop an additional 140 MW of solar capacity over the next five years. With this investment, PSEG will have made investments in over 200 MW of solar energy.²²¹ To advance wind power, PSEG is partnering on a 350 MW offshore wind farm project that will generate clean energy and jobs in New Jersey.²²²

²¹³ Our Family of Companies PSEG, PSEG, <http://www.pseg.com/family/pseandg/index.jsp>.

²¹⁴ From a 2005 baseline. PSEG, 2013 Sustainability Report 33 (2013), http://www.pseg.com/info/environment/sustainability/2013/sustainability_report/HTML/index.html#33/z

²¹⁵ *Sustainability: Climate Strategy*, PSEG, http://www.pseg.com/info/environment/sustainability/2009/green/climate_strategy.jsp.

²¹⁶ PSEG, Fact Sheet: Making New Jersey Energy Strong (2013), http://www.pseg.com/info/media/energy_strong/press_kit/PDF/factsheet.pdf.

²¹⁷ *Awards and Recognition*, PSEG, <http://www.pseg.com/family/about/awards.jsp>.

²¹⁸ *Energy Efficiency*, PSEG, <http://www.pseg.com/family/pseandg/energyefficiency/index.jsp>.

²¹⁹ *Id.*

²²⁰ *Id.*

²²¹ Per PSEG comments.

²²² *Environment*, PSEG, http://www.pseg.com/info/environment/ps_renewable.jsp.

In addition to PSEG's efforts in clean energy, efficiency, and improved nuclear performance, external economic conditions including low natural gas prices have helped PSEG achieve its GHG targets in recent years. From 2000-2011, PSEG reduced its CO₂ emissions rate 24 percent while its electricity generation increased 37 percent.²²³

Seattle City Light

Seattle City Light is a publicly-owned utility that generates 90 percent of its electricity from hydroelectric power to serve customers in the greater Seattle, Washington area.²²⁴ The utility is a leader in energy efficiency and has achieved substantial reductions in GHG emissions in accordance with a resolution passed by the Seattle City Council in 2000 to become carbon neutral.²²⁵ Since 2000, Seattle City Light has reduced GHG emissions by 88 percent, largely by divesting its ownership of a coal plant.²²⁶

Seattle City Light's investments in energy efficiency provide savings to customers and have helped reduce GHG emissions. To become carbon neutral, Seattle City Light also started a carbon offset program to offset those GHG emissions it could not eliminate.²²⁷ The offset program included work with local farmers to reduce emissions from methane, a potent GHG.²²⁸ The program has also helped reduce CO₂ from the transportation sector, which is Seattle's largest source of emissions.²²⁹ For instance, Seattle City Light reduced the carbon footprint of cruise ships by connecting them to electricity when they were in port.²³⁰ Seattle City Light has been carbon neutral since 2005.²³¹

Sempra Energy

Sempra Energy operates California utilities San Diego Gas & Electric Co. and Southern California Gas Co., which together serve 24.5 million customers.²³² The investor-owned corporation also provides utility service or operates clean energy infrastructure in nine other states in addition to Chile, Mexico, and Peru.²³³ The firm has achieved significant GHG emissions reductions since 2009, and its CO₂ emissions

²²³ Computed from data in M.J. Bradley and Associates, Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States, <http://www.mjbradley.com/content/benchmarking-air-emissions-2013-past-reports> (2000 data based on 2002 report, 2011 data based on 2013 report).

²²⁴ Per Seattle City Light June 27 comments.

²²⁵ *Id.*; Seattle City Earth Day Resolution No. 30144 (2000), www.seattle.gov/light/conserve/globalwarming/cv_2kres.pdf.

²²⁶ *Id.*

²²⁷ *Id.*

²²⁸ *Id.*

²²⁹ *Id.*

²³⁰ *Global Warming*, Seattle City Light, <http://www.seattle.gov/light/conserve/globalwarming/>.

²³¹ Press Release, Seattle City Light, Climate Registry Designates Seattle City Light a Sustainability Leader with Climate Registered™ Status (April 25, 2013), <http://powerlines.seattle.gov/2013/04/25/climate-registry-designates-seattle-city-light-a-sustainability-leader-with-climate-registered-status/>.

²³² Sempra Energy, 2012 Corporate Responsibility Report 11 (2013), http://www.sempra.com/pdf/responsibility/final_2012.pdf [hereinafter Sempra 2012 Corporate Responsibility Report].

²³³ *Id.*

intensity in 2012 was about 40 percent below the national average.²³⁴ Its business strategy is based on a low-carbon model focused on energy efficiency, renewable energy, natural gas, and technological innovation.²³⁵

Rules that decouple utility profits from electricity sales in California have played a significant role in Sempra Energy's efforts to increase energy efficiency.²³⁶ Its two California utilities are investing \$375 million in efficiency programs over the next two years and these measures help lower customers' bills.²³⁷ Sempra Energy's companies are meeting customer demand for greater choice in their energy use, such as by installing 2.5 million smart meters as part of its smart grid program.²³⁸ In San Diego and elsewhere, people are also turning to Sempra Energy to fuel their vehicles, as charging infrastructure expands for the city's 3,300 plug-in electric vehicles.²³⁹

The firm has invested more than \$2 billion in utility-scale wind and solar power and owns 842 MW of renewable capacity.²⁴⁰ Sempra Energy is constructing another 350 MW of utility-scale solar power by 2015.²⁴¹ San Diego Gas & Electric, which is on track to meet California's renewable electricity target of 33 percent by 2020, has invested \$2 billion in power transmission to facilitate development of solar, wind, and geothermal power in Imperial Valley, California.²⁴² This brings economic benefits to a region that has experienced 30 percent unemployment.

For three consecutive years, Sempra Energy has been named to the Carbon Disclosure Project's Standard & Poor's 500 Climate Disclosure Leadership Index, a tool used by investors to assess companies' disclosure of management practices related to GHG emissions.²⁴³ Sempra Energy's GHG emissions decreased by about 17 percent in 2011 and the firm aims to achieve a 10 percent decrease in its CO₂ emissions rate by 2016 from 2010.²⁴⁴

²³⁴ *Id.* at 34-36.

²³⁵ *Id.* at 21.

²³⁶ Per Sempra Energy.

²³⁷ Sempra 2012 Corporate Responsibility Report, *supra* note 232, at 27.

²³⁸ *Id.* at 65.

²³⁹ Per Sempra Energy.

²⁴⁰ Sempra 2012 Corporate Responsibility Report, *supra* note 232, at 9.

²⁴¹ Per Sempra Energy.

²⁴² Sempra 2012 Corporate Responsibility Report, *supra* note 232, at 31; Press Release, Sempra Energy, A Year Later, SDG&E's Sunrise Powerlink Delivering on What it was Designed to do (Jun. 17, 2013), <http://www.sdge.com/newsroom/press-releases/2013-06-17/year-later-sdge%E2%80%99s-sunrise-powerlink-delivering-what-it-was>.

²⁴³ CDP S&P 500 Climate Change Report (2013), <https://www.cdp.net/CDPResults/CDP-SP500-climate-report-2013.pdf>.

²⁴⁴ Sempra 2012 Corporate Responsibility Report, *supra* note 232, at 35-36.

Xcel Energy Inc.

Xcel Energy Inc. is an investor-owned corporation and the largest utility provider of wind power in the United States. The company serves 3.4 million electric customers and 1.9 million gas customers in eight states.²⁴⁵ Growth in its use of cleaner sources of electricity, including renewables, have helped put Xcel Energy on track to reduce its CO₂ emissions by 31 percent from 2005 levels by 2020.²⁴⁶ It reduced CO₂ emissions by 18 percent from 2005 to 2012.²⁴⁷

Xcel Energy has been the largest provider of wind energy in the United States for nine straight years.²⁴⁸ Since 1998, Xcel's Windsource program has allowed customers to designate part or all of their electricity to come from renewables.²⁴⁹ In 2011, roughly 58,000 residential customers were enrolled.²⁵⁰ Since 2009, Xcel has partnered with the National Center for Atmospheric Research (NCAR) to develop a wind energy forecasting system to help integrate wind energy into the grid,²⁵¹ and in October 2011, Xcel set a world record for generating electricity from wind power.²⁵² The firm's green pricing program ranks third nationally in both the number of customer participants and solar power additions.²⁵³ As it has provided customers more wind and solar power, Xcel's retail electric rates have never gone above the national average.²⁵⁴

State policies, such as clean energy laws in Colorado and Minnesota, have moved Xcel to develop cleaner sources of power generation leading to significant CO₂ emissions reductions.²⁵⁵ For instance, Colorado's RPS has driven Xcel to provide more wind power.²⁵⁶ In Minnesota, Xcel must produce 30 percent of its electricity from renewables by 2020, and one quarter of its electricity must be met with wind.²⁵⁷ Recently, Xcel Energy has announced significant additions of wind capacity driven primarily by favorable economics, representing a 42 percent increase in the company's wind power capacity in the

²⁴⁵ *Our Company*, Xcel Energy, http://www.xcelenergy.com/About_Us/Our_Company.

²⁴⁶ Per Xcel Energy Inc.

²⁴⁷ Xcel Energy, 2012 Corporate Responsibility Report 17, 19 (2013), <http://www.xcelenergy.com/staticfiles/xcel/Corporate/Environment/Xcel%20Energy%202012%20CRR%20Overview.pdf>.

²⁴⁸ *Id.* at 19.

²⁴⁹ *Id.* at 17.

²⁵⁰ *Windsources*, Xcel Energy Inc, <http://www.xcelenergy.com/staticfiles/xcel/Corporate/CRR2011/customer-value/customer-choice/windsources.html>.

²⁵¹ *NCAR wind forecasts save millions of dollars for Xcel Energy*, UCAR, <https://www2.ucar.edu/atmosnews/news/5771/ncar-wind-forecasts-save-millions-dollars-xcel-energy>.

²⁵² Mark Jaffe, *Xcel sets world record for wind power generation*, Denver Post (Nov. 15, 2011), http://www.denverpost.com/breakingnews/ci_19342896.

²⁵³ *NREL Highlights 2012 Utility Green Power Leaders*, NREL Website, <http://www.nrel.gov/news/press/2013/2211.html>.

²⁵⁴ Per Xcel Energy Inc.

²⁵⁵ *Id.*

²⁵⁶ *Id.*

²⁵⁷ Minn. Stat. § 216B.1691.

upper Midwest.²⁵⁸ Favorable economics have also moved Xcel Energy to propose tripling its utility-scale solar power in Colorado by adding 170 MW and increasing wind power in the state by 450 MW.²⁵⁹

Xcel has also achieved emissions reductions through fuel-switching and increasing the efficiency of its facilities. Its Metro Emissions Reduction Project, which included upgrading and repowering existing generation units, reduced CO₂ emissions from Twin Cities-area power plants by 1.8 million tons per year, or 21 percent, from 2007 to 2009. Xcel achieved these reductions largely by replacing coal-fired power plants with combined-cycle natural gas facilities.²⁶⁰ The project lowers emissions not only of CO₂, but also of SO₂, NO_x, mercury, and particulates.²⁶¹ Similarly, Xcel's plan under Colorado's Clean Air – Clean Jobs Act is expected to reduce CO₂ emissions from its Colorado fleet by 28 percent by 2020, largely by replacing coal-fired plants with natural-gas-fired plants and switching fuels (from coal to natural gas) at existing plants.²⁶² Power plants covered by the plan will also cut emissions of NO_x by 86 percent, SO₂ by 83 percent, and mercury by 82 percent.²⁶³ The plan is predicted to have a positive economic impact of \$590 million on the state from 2010 to 2026, and to create about 1,500 jobs during peak construction.²⁶⁴

In addition to its renewable facilities, the company's power plants include 27 natural gas facilities, 26 hydropower dams, 13 coal plants, and two nuclear facilities.²⁶⁵ Xcel's generation mix includes 46 percent coal, 24 percent natural gas, 12 percent nuclear, and 12 percent wind.²⁶⁶

²⁵⁸ Press Release, Xcel Energy, Xcel Energy's Wind Plan Wins Approval (Oct. 17, 2013), http://www.xcelenergy.com/About_Us/Energy_News/News_Releases/Xcel_Energy%E2%80%99s_wind_plan_wins_approval.

²⁵⁹ Press Release, Xcel Energy, Xcel Energy Proposes Adding Economic Solar, Wind to Meet Future Customer Energy Demands (Sept. 10, 2013), https://www.xcelenergy.com/About_Us/Energy_News/News_Releases/Xcel_Energy_proposes_adding_economic_solar_wind_to_meet_future_customer_energy_demands.

²⁶⁰ *Minnesota Metro Emissions Reduction Project*, Xcel Energy, http://www.xcelenergy.com/Environment/Doing_Our_Part/Clean_Air_Projects/MN_MERP.

²⁶¹ *Id.*

²⁶² *Colorado Clean Air – Clean Jobs Plan*, Xcel Energy, http://www.xcelenergy.com/Environment/Doing_Our_Part/Clean_Air_Projects/Colorado_Clean_Air_-_Clean_Jobs_Plan.

²⁶³ *Id.*

²⁶⁴ *Id.*

²⁶⁵ Xcel Energy Inc., *Power Generation*, http://www.xcelenergy.com/xen/About_Us/Our_Company/Power_Generation/Power_Generation_Main.

²⁶⁶ *Id.*

Conclusion

The case studies shared in this report from our June 2013 meeting illustrate a wide array of approaches taken by states and companies to reduce carbon pollution in the power sector. Driven by innovative policies and technologies, visionary leadership, and market dynamics, these success stories highlight the many ways to reduce emissions while providing reliable, affordable energy. We hope these examples will serve as an inspiration to others seeking to promote clean and affordable energy solutions at the state and federal level.

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