An Overview of Statewide Comprehensive Energy Plans

From 2002 to 2011

National Association of State Energy Officials
2107 Wilson Boulevard, Suite 850
Arlington, Virginia 22201
www.naseo.org

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THE FOLLOWING ORGANIZATION PREPARED THIS REPORT:
National Association of State Energy Officials (NASEO)
2107 Wilson Boulevard, Suite 850, Arlington, Virginia 22201-3091
Telephone: 703.299.8800; Fax: 703.299.6208
Website: www.naseo.org

The National Association of State Energy Officials

The National Association of State Energy Officials (NASEO) is the only national nonprofit organization whose membership includes governor-designated energy officials from each state and territory. Formed in 1986, NASEO facilitates peer information exchange among state energy officials, serves as a resource for and about State Energy Offices, and advocates the interests of the State Energy Offices to Congress and federal agencies. NASEO represents the states and derives basic funding from the states.

Members are senior officials from State and Territory Energy Offices, as well as affiliates from the private and public sectors. Member State Energy Offices work on a wide range of energy programs and policies, including:

- Energy efficiency in all market sectors—buildings, industry, agriculture;
- Renewable energy, such as solar, wind, geothermal, and biomass;
- Advanced transportation technologies, alternative fuels and infrastructure;
- Oil, natural gas, electricity production and distribution;
- Energy–environment integration to promote cost-effective energy solutions; and
- Energy system resiliency, supply disruption preparedness and response.

States manage and invest more than $8 billion of their own funds derived from state appropriations, system benefit charges, and other nonfederal sources each year. These resources are utilized to advance cost-effective energy efficiency actions that aid consumers and businesses in reducing energy costs while enhancing economic competitiveness.

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Executive Summary

State energy plans are a tool that policymakers can employ to shape their state's energy future. The plans and the planning process build consensus among stakeholders. The plans also provide a guide toward a shared goal of meeting future energy needs in a cost-effective and sustainable manner. By providing a vision for energy policy and technology development and deployment, state energy plans aid American businesses in achieving and maintaining a global competitive advantage and capture broader societal, environmental, and economic benefits that contribute to energy affordability. State energy plans provide an assessment of current and future energy supply and demand, examine existing energy policies, and identify emerging energy challenges and opportunities. In short, energy plans guide states toward energy resiliency and improved economic prosperity.

Energy is one of the fastest-growing sectors of the economy.[1] While some form of energy planning has been done in most states, a more comprehensive approach is becoming a necessity to deal with evolving global energy markets, consumer preferences, and changing environmental factors. Energy planning enables a state to address both energy challenges and to capture the economic benefits of energy production, and technological innovation. States are incorporating energy diversification and economic growth into their energy plans.

In December 2011, NASEO reviewed the 39 existing state energy plans (see Appendix B). The purpose of the evaluation was to baseline state energy plans and to explore the economic and energy trends surrounding state energy planning efforts, and the development and substance of state energy plans. This resource will show how states have conducted energy planning in the past, what has been included in the plans, and what may have been the impetus for the recommendations outlined in the plans. It will also provide a foundation for future state energy planning processes and, in turn, future economic and investment decisions, state/local/federal government coordination, and public/private partnerships. By analyzing state energy plans across the country, similarities among the plans may be of value in both the national energy discussion and federal policy. By early 2013, at least 20 states were updating existing state energy plans or developing new plans, and at least 45 states will have operational state energy plans.

A well-constructed plan is a tool that can be employed by the public and private sectors and offers important benefits for both. Consider the following ways a comprehensive state energy plan serves the public and private sectors:

- As a resource for policymakers – governors, legislators, agencies – the plan can aid in evaluating and justifying budget appropriation decisions and help prioritize policy directives and funding opportunities.
- As a guide to state utility regulators, it can clarify executive and legislative energy policy directives. Because most regulators are appointed and provided statutory direction, the plan can offer an additional basis for priority regulatory actions and utility planning.
- As a factor for the private sector in considering how policy will impact energy markets. The plan may indicate how public funds may be invested and subsequent policies and regulatory decisions will evolve.

1 The Pew Charitable Trust reports that the clean energy and green economy sector is the fastest-growing job sector, producing twice as many jobs as the sectoral average between 1998 and 2007. Clean Energy Economy: Repowering Jobs, Businesses and Investments across America, www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf, 2009.

- As an educational document for consumers and businesses, the plan can send a clear message that the state is cognizant of the importance of reliable, sustainable, and affordable energy.
- As a legacy framework for future policy and regulation, the state energy plan is a roadmap that provides recommendations and action items that establish shared priorities, opens market opportunities, and sets near- and long-term measurable goals.

The process of developing a plan and the subsequent plan's structure differ in detail from state to state. There is, however, a general format that most state energy plans follow. The planning process typically includes identifying a lead agency or the creation of a planning team that determines the time and money to be spent on the process, engages stakeholders to solicit input from the public and private sector, conducts a baseline assessment of the state's energy resources and needs, garners public input, develops statewide goals, writes the plan, and markets the final product. As states continue to learn from one another's experience, this process will be refined and employed in various iterations. While there is no single way to conduct a state energy planning process, NASEO's *State Energy Plan Guidelines* (a companion document to this evaluation) provides guidance and recommendations for states desiring to revise an existing plan or develop a statewide energy plan for the first time.[2]

The structure of state energy plans differs among states, but most follow a general construction pattern by first laying out an analysis of the state's current energy profile followed by a vision or purpose. These context-setting elements are followed by goals, which are supported by action items. Some plans include numeric goals while others suggest goals in less quantifiable ways. A number of plans also include financing mechanisms (existing or potential) through which the state can implement the plan's recommendations. Establishing metrics and evaluation criteria allows the state to assess the plan's progress. Finally, some states include projections of what could be achieved if a plan's recommendations were fully implemented.

Below are the key findings from NASEO's overview of the 39 comprehensive state energy plans:

1. Of the 39 energy plans reviewed for this report, 21 were led by the State Energy Office, 14 by an advisory board (with the State Energy Office included on the advisory board in 10 of those states), three by the governor, and one by the Public Utility Commission.

2. The most common overarching objectives included across state energy plans were to:
   - Increase use of in-state or domestic energy resources;
   - Promote economic growth;
   - Ensure reliable, low-cost energy supply;
   - Gain competitive advantage over rising energy costs; and
   - Position the state as a leader in the United States and world energy markets.

3. The most commonly cited goal in the state energy plans was energy efficiency.

4. Thirty-five state energy plans cited goals of increasing electricity generation from renewable energy resources. More than half of the states with energy plans (20) recognized the potential for increased electricity generation from solar energy.

5. All but 10 state energy plans include goals pertaining to the transportation sector, primarily to reduce reliance on foreign oil. These goals include the development of alternative fuels, vehicles, and infrastructure in addition to recommendations surrounding driver behavior and public transit.

2 National Association of State Energy Officials, Statewide Comprehensive Energy Plans, http://naseo.org/stateenergyplans/, accessed December 7, 2012.

6. More than half of the plans (22) include recommendations pertaining to natural gas production and consumption. Common production goals include increased state production of natural gas and expanded pipeline and storage infrastructure.

7. Tax incentives (include property, corporate, personal, sales, and income tax) were the most commonly recommended financing mechanism cited in state energy plans for achieving their energy goals.

8. State energy plans written prior to 2010 generally focus on electric transmission, distribution systems, and supply, and on reducing dependence on fossil fuels and foreign oil, likely reflecting the price spikes of that period. The plans written after 2010 place greater emphasis on economic development, energy efficiency, and affordable energy, likely in response to the slow economic recovery following the recession.

List of State Energy Plans Reviewed in this Report

State	Date	Plan Title
Alabama	-	-
Alaska	2010	Alaska Energy Pathway
Arizona	2013	-
Arkansas	2010	APSC Sustainable Energy Resources (SER) Action Guide
California	2010	Energy Action Plan 2008 Update
Colorado	2007	Colorado Climate Action Plan
Connecticut	2006 2007	Connecticut's Energy Vision 2007 Energy Plan for CT
Delaware	2009	Delaware Energy Plan 2009–2014
District of Columbia	2009 2010	Green DC Agenda Climate of Opportunity
Florida	2006 2008	Florida's Energy Plan Governor's Action Team on Energy and Climate Change Final Report
Georgia	2006	State Energy Strategy for Georgia
Hawaii	2000	Hawaii Energy Strategy
Idaho	2007	Idaho Energy Plan
Illinois	2009 2009	Illinois Energy Plan Governor Quinn's Comprehensive Energy Strategy
Indiana	2006	Indiana's Strategic Energy Plan
Iowa	2011	Energy Independence Plan
Kansas	-	-
Kentucky	2008	Intelligent Energy Choices for Kentucky's Future
Louisiana	-	-
Maine	2009	State of Maine Comprehensive Energy Plan
Maryland	2011	EmPowering Maryland
Massachusetts	2010	Massachusetts Clean Energy and Climate Plan for 2020
Michigan	2007	Michigan 21st Century Energy Plan
Minnesota	2001	Energy Planning Report
Mississippi	2010	Mississippi Energy Policy Institute's Roadmap for Mississippi's Energy Future
Missouri	-	-
Montana	2011	Schweitzer Energy Policy
Nebraska	2011	2011 Nebraska Energy Plan

Nevada	-	-
New Hampshire	2002	New Hampshire's 10 Year State Energy Plan
New Jersey	2011	2011 Energy Master Plan
New Mexico	-	Clean Energy Plan
New York	2009	2009 New York State Energy Plan
North Carolina	2010	North Carolina's Strategic Plan for Biofuels Leadership
North Dakota	2008	Empower North Dakota Comprehensive State Energy Policy 2008–2025
Ohio	-	-
Oklahoma	2011	Oklahoma First Energy Plan
Oregon	2011	State of Oregon Energy Plan 2011-–2013
Pennsylvania	2008	Energy Development Plan
Rhode Island	2002	Rhode Island Energy Plan
South Carolina	-	-
South Dakota	-	-
Tennessee	-	-
Texas	2008	State Energy Plan 2008
Utah	2011	Governor's 10-Year Strategic Energy Plan
Vermont	2011	Vermont Comprehensive Energy Plan
Virginia	2010	The Virginia Energy Plan
Washington	2010	2010 State Energy Strategy Update and Biennial Energy Report with Indicators
West Virginia	2007	West Virginia Energy Opportunities
Wisconsin	-	-
Wyoming	-	-

Approach

NASEO's research is based on the energy plans considered in effect by the state available as of December 2011. States undergoing state energy planning can use this report as a resource for examining the content of other state energy plans and their planning processes. This document accomplishes the following:

- It explores the economic and energy trends surrounding the states' energy planning effort;.
- It presents the development and substance of state energy plans, including the statutory authority, authoring agency, role of municipal government, outlook, format, goals, financing, updates, and metrics
- It considers how current trends may impact future state energy planning efforts.

NASEO reviewed the state energy plans of 38 states and the District of Columbia (DC) (hereafter referred to as 39 state energy plans). At the time of this evaluation, 20 states were in the process of developing either their first energy plan or updating or revising an existing plan. For those states currently updating or reviewing their energy plans, this report may serve as a retrospective or a benchmark of their energy planning from which they can track progress and changes in their state energy goals. Although many states have new plans or are in the process of reviewing an existing plan, this evaluation is aimed at baselining the status of U.S. energy plans as of December 2011.

The collection and evaluation of energy plans is an iterative process that will require regular updating as states review and revise existing plans and develop new ones. For example, following the 2008 elections, which resulted in 29 new governors and more than 1,000 new state legislators, at least a dozen states began updates or new plans.

For consistency and comparison purposes, this document only examines those plans that serve as the state's energy plan. The evaluation did not include energy assurance plans, business development plans, or other plans that were not clearly denoted as the state's energy plan. Although not included here, each of these other types of plans serve to inform a state's priorities in particular areas and may also influence a state's energy goals and priorities. When developing a state energy plan, it is important to consider other existing state plans that may lend support to energy goals, action items, and where possible include references to complimentary plans. For instance, each year, states prepare a U.S. State Energy Program (SEP) plan, as required to receive formula grants from the U.S. Department of Energy (DOE). The SEP describes the state's intended use of formula grant federal funds, along with state cost-shared funds, for energy projects and programs. A SEP plan can support state energy planning and implementation efforts by building upon actions recommended in the state's energy plan, allowing states to leverage federal funds to carry out their energy plan goals. SEP funds can also be used to fund the development or review of a comprehensive energy plan.

NASEO collected state energy plans and related policies and programs through a search of each State Energy Office's website, review of policies, publications, and obtained verification by the respective State Energy Office. NASEO created a state energy database to track the plans and to capture essential plan features and elements. NASEO's State Energy Plan Guidelines are also available on NASEO's website.[3]

Maintaining the currency of NASEO's State Energy Plan database is an iterative process, this database currently serves as the first time that all existing state energy plans have been summarized and compared. NASEO will develop addendums to this document as new state energy plans are drafted and adopted by the states.

Table 1 lists the state energy plans reviewed for this report.

Table 1. List of State Energy Plans Reviewed in this Report

State	Date	Plan Title
Alabama	-	-
Alaska	2010	Alaska Energy Pathway
Arizona	2013	-
Arkansas	2010	APSC Sustainable Energy Resources (SER) Action Guide
California	2010	Energy Action Plan 2008 Update
Colorado	2007	Colorado Climate Action Plan
Connecticut	2006 2007	Connecticut's Energy Vision 2007 Energy Plan for CT
Delaware	2009	Delaware Energy Plan 2009–2014
District of Columbia	2009 2010	Green DC Agenda Climate of Opportunity
Florida	2006 2008	Florida's Energy Plan Governor's Action Team on Energy and Climate Change Final Report

3 National Association of State Energy Officials, Statewide Comprehensive Energy Plans, http://naseo.org/stateenergyplans/, accessed December 7, 2012.

Georgia	2006	State Energy Strategy for Georgia
Hawaii	2000	Hawaii Energy Strategy
Idaho	2007	Idaho Energy Plan
Illinois	2009 2009	Illinois Energy Plan Governor Quinn's Comprehensive Energy Strategy
Indiana	2006	Indiana's Strategic Energy Plan
Iowa	2011	Energy Independence Plan
Kansas	-	-
Kentucky	2008	Intelligent Energy Choices for Kentucky's Future
Louisiana	-	-
Maine	2009	State of Maine Comprehensive Energy Plan
Maryland	2011	EmPowering Maryland
Massachusetts	2010	Massachusetts Clean Energy and Climate Plan for 2020
Michigan	2007	Michigan 21st Century Energy Plan
Minnesota	2001	Energy Planning Report
Mississippi	2010	Mississippi Energy Policy Institute's Roadmap for Mississippi's Energy Future
Missouri	-	-
Montana	2011	Schweitzer Energy Policy
Nebraska	2011	2011 Nebraska Energy Plan
Nevada	-	-
New Hampshire	2002	New Hampshire's 10 Year State Energy Plan
New Jersey	2011	2011 Energy Master Plan
New Mexico	-	Clean Energy Plan
New York	2009	2009 New York State Energy Plan
North Carolina	2010	North Carolina's Strategic Plan for Biofuels Leadership
Oklahoma	2011	Oklahoma First Energy Plan
Oregon	2011	State of Oregon Energy Plan 2011-–2013
Pennsylvania	2008	Energy Development Plan
Rhode Island	2002	Rhode Island Energy Plan
South Carolina	-	-
South Dakota	-	-
Tennessee	-	-
Texas	2008	State Energy Plan 2008
Utah	2011	Governor's 10-Year Strategic Energy Plan
Vermont	2011	Vermont Comprehensive Energy Plan
Virginia	2010	The Virginia Energy Plan
Washington	2010	2010 State Energy Strategy Update and Biennial Energy Report with Indicators
West Virginia	2007	West Virginia Energy Opportunities
Wisconsin	-	-
Wyoming	-	-

Comparison of Specific Plan Elements and Trends

A. State Requirements for Plan Development

Typically, a state's governor or legislature initiates the state energy planning process through a requirement for a planning or an ongoing plan cycle. State energy plans that are required or integrated with state executive and/or legislative policy give the plan more authority and influence, thereby ensuring that the plan is the state's broadly accepted energy framework. When a plan is required by legislation, there is often a greater opportunity at the frontend of the process for added guidance by the state legislature, the governor, and the State Energy Office. Beyond the initial enabling legislation, typically the influence of the plan must be built through a stakeholder engagement process, and by continuing to ensure that the governor, legislature, agency leaders, the private sector, and industry regard the plan as the guiding influence. A requirement through legislation or an executive order sets the stage for the planning process and often is where the process is defined, objectives established, and stakeholders identified.

Of the 39 state energy plans reviewed for this report, 23 states (plus the District of Columbia's) were created through a state mandate or an executive order. As an example, the 2000 Hawaii Energy Strategy was mandated under Chapter 226 of the Hawaii (HI) Revised Statutes, which requires that the energy planning office develop a state plan to serve as a guide for the future long-range development of the state, and directs the State Energy Office to build the plan around three primary goals:

(1) A strong, vibrant economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.
(2) A physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
(3) A sense of physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.[4]

If the development of a state energy plan is not statutorily required, then it may be initiated either by a governor who establishes an advisory board tasked with the development of a plan, or directly by the State Energy Office taking the lead to identify energy priorities and seek input from local governments, businesses, and stakeholders. In some cases, a governor-established advisory board may seek input from the State Energy Office or request that the energy office lead the energy planning efforts.

Table 2 highlights the state energy plans created through a legislated requirement or executive order.

Table 2. State Energy Plans Created as the Result of a Legislative Requirement or Executive Order

State	Energy Plan	Statute / Executive Order
California	California Energy Commission	Pub. Res. Code § 25000
Connecticut	2007 Energy Plan for Connecticut	Public Act 03-140, Public Act 11-80, Statute 16a-3a
Delaware	Delaware Energy Plan 2009--2014	Del. Code Ann. Tit. 29 §8053(c)(7)

4 The state's goals for the Hawaii state energy plan are listed in Section 226-4 of the Hawaii Revised Statutes (HRS). Hawaii State Planning Act, Chapter 226, http://hawaii2050.org/images/uploads/HRS226_StatePlanningAct.pdf, July 2006.

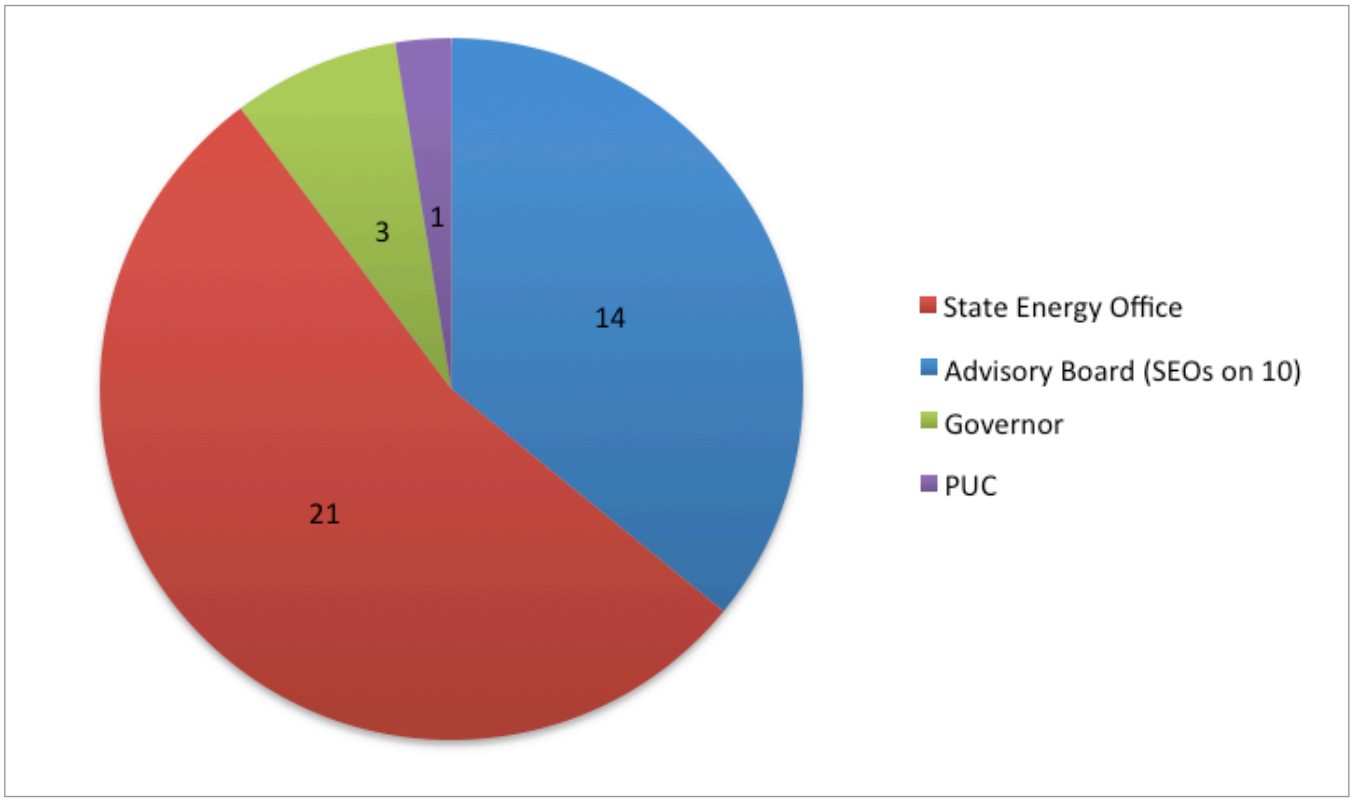
District of Columbia	Green DC Agenda	Clean and Affordable Energy Act of 2008
Florida	Florida Energy Plan	Executive Order 05-241
Georgia	Governor's Action Team on Energy and Climate Change Final Report	Executive Order 07-126, Executive Order 07-127, and Executive Order 07-128
Hawaii	Hawaii Energy Strategy	Section 226-18, Hawaii Revised Statutes
Idaho	Idaho Energy Plan	HCR 062 (2006 session) and HCR 013 (2007 session)
Maine	State of Maine Comprehensive Energy Plan	Me. Rev. Stat. Ann. Tit. 2 §9
Massachusetts	Massachusetts Clean Energy and Climate Plan for 2020	Chapter 298 of The Global Warming Solutions Act of 2008, and as codified at M.G.L. c. 21N
Michigan	Michigan 21st Century Energy Plan	Executive Directive No. 2006-02
Montana	Montana's Energy Policy (plus supp. goals)	Senate Bill No. 225 (Chapter 242, Laws of 1993) and Montana Code Annotated 90-4-1001
New Hampshire	New Hampshire's 10 Year State Energy Plan	HB 443 (2001 Session, not codified)
New Jersey	Energy Master Plan	52:27:F-14
New York	2009 New York State Energy Plan	March 2008 - Executive Order No. 2 directing the creation of a state energy plan; 2009 New York consolidated law ENG: Article 6 - Energy Planning
North Carolina	North Carolina's Strategic Plan for Biofuels Leadership	Session Law 2006-206 (Senate Bill 2051)
North Dakota	Empower North Dakota Comprehensive State Energy Policy 2008–2025	2007 Session Laws Chapter 204 §6
Oregon	State of Oregon Energy Plan	Or. Rev. Stat. Section 469.060
Pennsylvania	Energy Development Plan	Pennsylvania Energy Development Authority and Emergency Powers Act of 1982
Utah	Governor's 10 Year Strategic Energy Plan	Utah Code Ann. §63M-4-301
Vermont	Vermont Comprehensive Energy Plan	Vermont Energy Act of 2011
Virginia	The Virginia Energy Plan	Chapters 1 and 2 of Title 67 (§§ 67-100 through 67-203) of the Code of Virginia
Washington	Energy Strategy and Biennial Energy Reports	Chapter 271 (2010), Section 401
West Virginia	Energy Policy	WV State Code 5B-2F-1d

B. Authoring Agencies and Stakeholder Involvement

The State Energy Office, or a designated planning group, generally serves the lead role in terms of the actual drafting of a state energy plan. This role typically includes the development of a task force or "planning team" to lead and schedule planning meetings, engage stakeholders, participate in planning, solicit public feedback, and to draft the final plan. (The planning process and subsequent development of an energy plan can take several months to a year to complete, depending on the objectives and depth of the plan.[5]) Of the 39 energy plans reviewed for this report, 21 were led by the State Energy Office, 14 by an advisory board (with the State Energy Office included on the advisory board in 10 of those states), three by the governor, and one by the Public Utility Commission. It should be noted that the advisory board typically is established by the governor, either through a request or by specific appointments. Idaho is the only state that has developed an energy plan directly through the state legislature (captured under the advisory board category) with the planning team being a State Legislative Council interim committee on energy, environment, and technology.

States that establish a planning team will often include members who represent interests ranging from investors, utilities, industry to economic development, workforce, environmental protection, and transportation. These teams conduct analysis on energy resources, supplies, and market trends; prioritize resources and overall goals based on the state's needs; and review best practices from other states' energy plans for possible inclusion. Some teams are broken into working groups or subcommittees to focus more specifically on a particular energy resource or consumer sector and may have specific voting rights or authority.

Figure 1. Authoring / Lead Entity for State Energy Plans



5 U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Community Greening: How to Develop a Strategic Energy Plan, http://www.eereblogs.energy.gov/tap/file.axd?file=2010%2f11%2fStrategic+Energy+Plan.pdf, July 2009.

North Dakota (ND) is an example of a state that utilized multidisciplinary stakeholder groups to support the development of the state energy plan. The Empower North Dakota Comprehensive State Energy Policy 2008–2025 was prepared by the EmPower ND Commission, a 14-member commission appointed by then Governor John Hoeven with representatives from all sectors of the energy industry. The commission held its first meeting in Bismarck in September 2007, followed by seven subsequent public meetings throughout the state. Development of the energy plan consisted of three phases: information gathering and public input via the seven public meetings, analysis of the information, and development of the policy. The planning process and development of the final plan was conducted over the course of a year.

C. Role of Local and Municipal Governments

Though state energy plans primarily focus on state-level actions and policies as well as statewide impacts, the plans and their subsequent recommendations also have an impact on local and municipal governments. In general, the role of local and municipal governments and their participation was not specifically addressed in the 39 energy plans evaluated; however, many plans indicated that such entities were heavily engaged during the public comment and outreach phase of the planning process.

Several sections of the Vermont (VT) energy plan, for example, point to the role and inclusion of local and municipal governments in achieving the state's energy goals. The plan recommends that the state "continue to work with the Vermont Energy Climate Action Network and others to deepen the town energy committee impact in Vermont." The plan also states that, "Many towns are undertaking great projects with significant impact. Ensuring that such committees continue to thrive, and are used in even more towns throughout Vermont, will help bring energy efficiency and conservation to the grassroots." The plan applauds and encourages town energy inventories and energy challenges, which aid in achieving statewide energy awareness.

New York's energy plan also addresses the role of local and municipal governments. The energy plan indicates, "The most important local responsibility in realizing the State's energy policy objectives is enforcement of the Energy Code."[6] Though the state is responsible for providing training and technical resources, the enforcement and verification of energy code compliance is, by and large, a local task. Comprehensive planning at the local or municipal level is another local task outlined within New York's energy plan. The plan suggests that local jurisdictions make energy an explicit issue area within a comprehensive plan. This would raise its visibility as an element of a community's or region's long-range planning, serve as the basis for modifying local zoning and other land use regulations, and lay the foundation for increased understanding by local governments of the role they play in achieving the state's energy objectives.

D. Plan Outlook and Forecasting

State energy plans often include an outlook for a certain number of years or out to a certain date to provide a timeline (i.e., in 10 years, out to 2025) within which the state intends to meet the goals set forth within the plan. Alternatively, states may have a plan timeline that extends only to the date in which the plan will be reviewed and rewritten or replaced, as seen in California, where the energy plan is updated every two years. Although California's plan is updated frequently, the plan also includes a section highlighting long-term energy goals for the state. Similarly, even though Oregon's (OR) energy plan is updated biennially, it provides a list of objectives that should be included in a long-term energy plan.[7]

6 See Volume I, section 6.1 of New York's 2009 State Energy Plan for the discussion of roles and responsibilities of local governments and their communities as they relate to achieving the state's energy objectives. State of New York, 2009 State Energy Plan, http://www.nysenergyplan.com/final/New_York_State_Energy_Plan_VolumeI.pdf, December 2009.

7 See page 43 of the State of Oregon Energy Plan for a list of objectives that could be included in a long-term energy plan. State of Oregon Energy Plan, http://www.oregon.gov/ENERGY/docs/reports/legislature/2011/energy_plan_2011-13.pdf, February 2011.

Using a timeline outlook in the creation of an energy plan allows the planning team to devise realistic, time-relevant goals for the state to achieve within a certain foreseeable future. A defined timeline also assists the state in forecasting energy demand, use, and prices within a specific period. Such energy forecasts are also used in modeling various energy and policy scenarios to guide and support a planning team's recommendations to the state.

Several states have selected 2020 as the timeline for their comprehensive energy plans. Each of the states with timelines up to 2020—Colorado, Connecticut, Georgia, Massachusetts, Rhode Island, and Utah—developed their energy plans on or before 2010. Each of these plans includes several forecasting charts and discussion of the state's anticipated energy needs out to 2020. Comparatively, several states—Florida, Kentucky, New Hampshire, North Dakota, and Utah—with energy plans published after 2010 selected 2025 as the outlook for the energy plan. The Maine 2009 energy plan, which suggests using a 50-year planning horizon, is one of a few plans with a timeline beyond 2025.

Several state energy plans begin with a detailed assessment of the state's energy use and natural resources in addition to a critical look at the origins of the state's energy resources. Other state energy plans—Oregon and New York—also include a discussion of state energy programs and technical advances, as well as a breakdown of the state's current and anticipated budget for energy programs and projects. Such data provides the foundation for the goals and objectives detailed in the plan.

E. State Energy Plan Formats

State energy plans can be presented in a variety of formats: plans can be brief documents used for making decisions on state planning and policy development or they can be detailed guidebooks with multiple sections. Plans range in length from a few pages to multiple volumes, and may be presented as a stand-alone document, or, as in the case of the DC Green Agenda, a series of linked webpages.

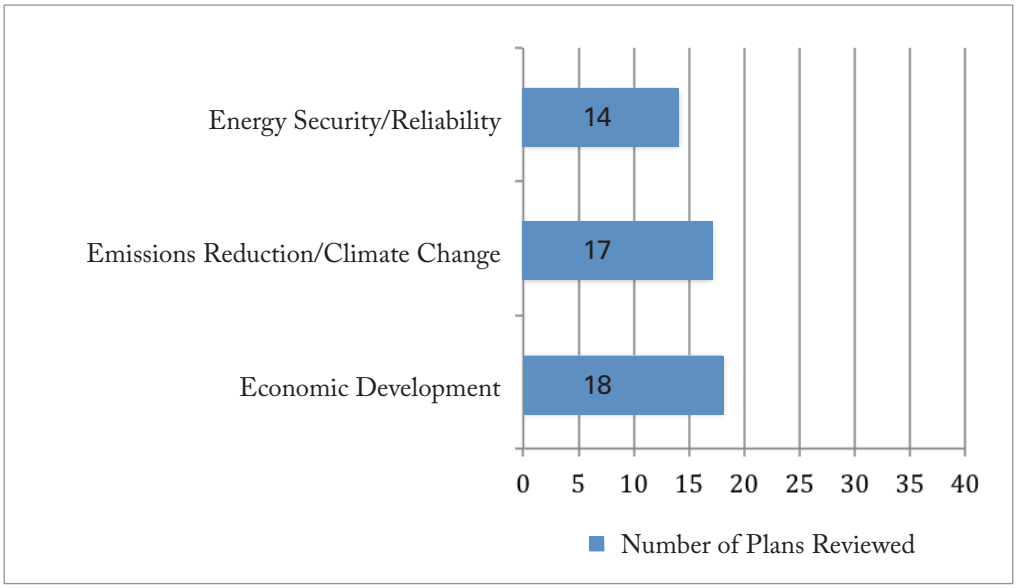
The 2011 Vermont Comprehensive Energy Plan (CEP) is a detailed guidance document of over 400 pages in length, which is presented in two volumes with appendices—making it the longest plan of the 39 reviewed in this report. The first volume of the plan, Volume 1: Vermont's Energy Future, summarizes the current energy picture and lays out the CEP's goals and vision for the future. The second volume, Volume 2: Facts, Analysis, and Recommendations, contains the details behind the recommended goals, initiatives, and key programs as they relate to electricity, thermal and process fuels, transportation, and land use.

At the other end of the spectrum, Montana's plan, The Schweitzer Energy Policy is a four-page whitepaper, and is the most concise of the 39 plans reviewed. Although brief, the Montana plan still addresses a wide range of energy policy topics, and the process includes principles codified in law.

F. Common State Energy Plan Motivations

State energy planning is motivated by three main factors: 1) economic development; 2) reducing greenhouse gas (GHG) emissions and mitigating climate change; and/or 3) enhancing energy security and reliability. Despite varied energy resources, demographics, geography, politics, infrastructure and economic base, each of the 39 states had common motivations for energy planning as illustrated in Figure 2.

Figure 2. Motivations for State Energy Planning



This section addresses the overall purpose and primary motivations observed in the 39 state energy plans that NASEO reviewed. Following is a more detailed description of the primary motivations revealed in 39 state energy plans.

State Energy Plans Overarching Objectives Pre- and Post-2010

Pre-2010:
- Reduce dependence on fossil fuels and foreign oil
- Enhance energy reliability through grid improvements and ensuring adequate supply
- Reduce GHG emissions

Post-2010:
- Enhance economic development
  - Create jobs
  - Improve workforce development
  - Spur innovation and technology
- Reduce energy use
- Enhance energy affordability

i. Motivated by Economic Development

Economic development is the primary motivation for state energy planning. At least seventeen states and the District of Columbia specifically listed economic development as a focal point for state decisions, investments, and policies related to energy planning. Many state energy plans emphasize the economic and employment benefits associated with increased energy production and advocate policy and research initiatives to encourage job growth, expand in-state energy production and increase state revenue.

The trend toward economic development as a primary motivator in state energy plans is reflective of efforts to stem the economic recession and consequent high unemployment from 2007 to 2009. National unemployment rates rose rapidly in all sectors between 2007 and 2010, reaching a national high of 10% in October 2009. Employment in the energy-intensive manufacturing sector has been on a downward trend since its all-time peak in 1979, with job losses accelerating during economic recessions in 2001 and again between 2007 and 2009. During the recession, employment in manufacturing declined sharply, and manufacturing job losses totaled more than 2 million employees, or 15% of its workforce, over an 18-month period. The increasing price of electricity for the commercial and industrial sectors from 2001 to 2011 increased the hardship. The average retail price of electricity in the commercial sector increased from around 7.5 cents per kilowatt-hour in 2001 to around 10.6 cents per kilowatt-hour by June 2011. Industrial electricity prices rose from around 5 cents per kilowatt-hour in 2001

to around 6.5 cents per kilowatt-hour in 2012. The nation's economic difficulties spurred states to seek economic opportunities in the energy sector and as part of their state energy plans.

Also in support of this trend, at least 16 states listed job creation and/or workforce development as a statewide focus that could be assisted by energy-related job growth and workforce training. Of these 16 states, eight focused on developing energy-related curricula at one or more levels of education (i.e., K-12, community colleges, universities). Most of these states emphasized the development of curricula in conjunction with an assessment of energy industry needs. All 16 states recommended either continued support for or development of new workforce training programs, many of which are administered by an institution of higher education and supported through state funding and promotional efforts. Some of these recommendations and actions focused explicitly on renewable energy and energy efficiency, while state energy plans recognized the potential for economic development through increased and more efficient use of fossil fuels, particularly natural gas.

ii. Motivated by Emissions Reductions/Climate Change

Seventeen states' energy plans were motivated by a focus on emissions reductions or climate change. These drivers reflect a growing trend at the state level to connect energy and climate activities. Colorado, Massachusetts, and Florida are the three states that actually have developed one plan that serves as both the climate plan and the energy plan. As an example, the 2010 Massachusetts Clean Energy and Climate Plan for 2020 sets a climate-related goal of reducing the state's greenhouse gas emissions by 25% below 1990 levels by 2020, and then outlines specific state energy goals and recommendations within the buildings, electricity, and transportation sectors for achieving this target. The takeaway is that state energy plans and climate action plans can serve to reinforce one another.

For some background on the climate side, by 2012, 32 states had some type of climate action plan to reduce the states' greenhouse gas emissions. Rhode Island was the first to adopt such a plan in 2002. Twenty-two state climate action plans were adopted between 2007 and 2009. These plans usually present economy-wide GHG emission reduction strategies. Some of these plans were developed prior to the state's energy plan, others during the same year, and some in years following the adoption of the state energy plan.

iii. Motivated by Energy Security/Reliability

For the 14 states motivated by energy security and reliability concerns, the hurricanes of 2005 and 2008 shed light on the nation's dependence on energy resources imported from other states and the need to increase in-state energy capacity to improve energy security. For example, Georgia's 2006 energy plan specifically refers to the "hurricanes of 2005 and 2008 which highlighted Georgia's dependence on out-of-state, fossil fuel energy resources and the need to ensure Georgia's energy supply" as the primary motivation for developing a proactive set of goals and actions aimed at improving the state's energy resource supplies for both electricity and transportation.

G. State Energy Plan Objectives by Topic

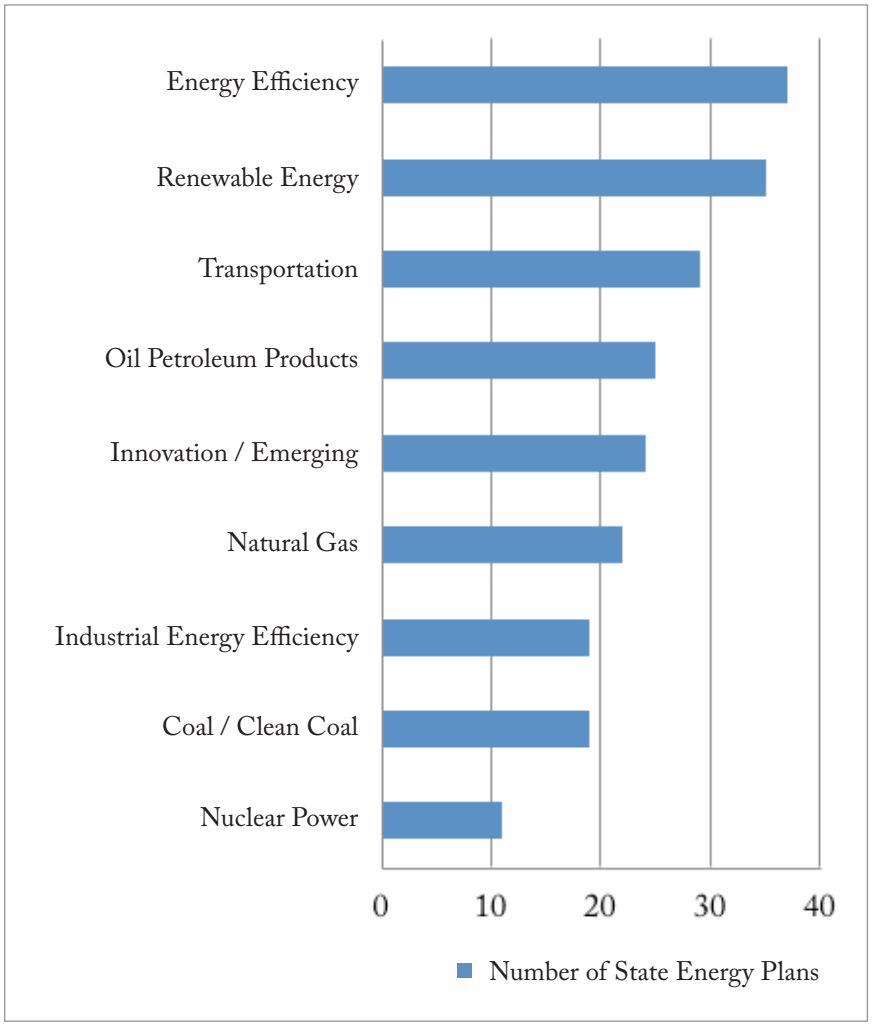
State energy plans are typically designed and written around the goals and objectives established early in the planning process by the authoring or planning team. As described earlier, plans provide a vision for a state's energy future—a vision achieved by a specific set of goals and actions. This section reviews the states' objectives broadly, then provides a more detailed description of the common goals and objectives identified in the state energy plans.

Generally, state energy plans focus on goals in the electricity and transportation sectors. There are a number of state energy plans that focus exclusively on "green" or clean energy, while other state plans take a more comprehensive approach by including both clean energy and conventional energy. Energy efficiency, renewable energy, transportation, emerging technologies, and natural gas were the five most common energy topics addressed in the 39 state energy plans.

Figure 3 summarizes the frequency of a number of energy topics addressed within the plans (goals and recommendations are written around these topics). Energy efficiency and renewable energy were the two most commonly included topics across all plans, followed closely by transportation. While it does not specifically call out each goal, this data is collectively important because it identifies the states' priority areas.

Some of the less common topics included in state energy plans were heating oils and fuels, carbon capture and sequestration, agriculture, and smart grid. It is interesting to note that despite only a few motivating factors for writing a comprehensive energy plan, the states take multiple pathways to achieve lower GHG emissions, increased energy reliability, security, and economic development.

Figure 3. Commonly Cited Energy Topics



Nearly every plan reviewed included the electricity and transportation sectors within the plan's objectives, goals, or recommended action items. The majority of plans examine the state's residential, commercial, industrial, and public sectors in terms of each sector's energy use, generation potential, and efficiency

potential. Vermont's 2011 energy plan, for example, focuses on residential consumers and indicates that a disproportionate percentage of Vermonters' income is spent on energy costs—particularly for home heating and transportation—compared to the national average.

Below is a more detailed discussion of the most common energy objectives by topic that are included in state energy plans with specific state examples. Each of the energy topics discussed below considers factors at the regional, national, and international scale that may have impacted a state's decision to include it in its energy plan. Each section includes a description of trends across the states as they relate to specific goals or recommendations. Finally, an overview of what has been achieved in the years since these energy plans were adopted is included.

i. Energy Efficiency

a. Energy Efficiency Motivations

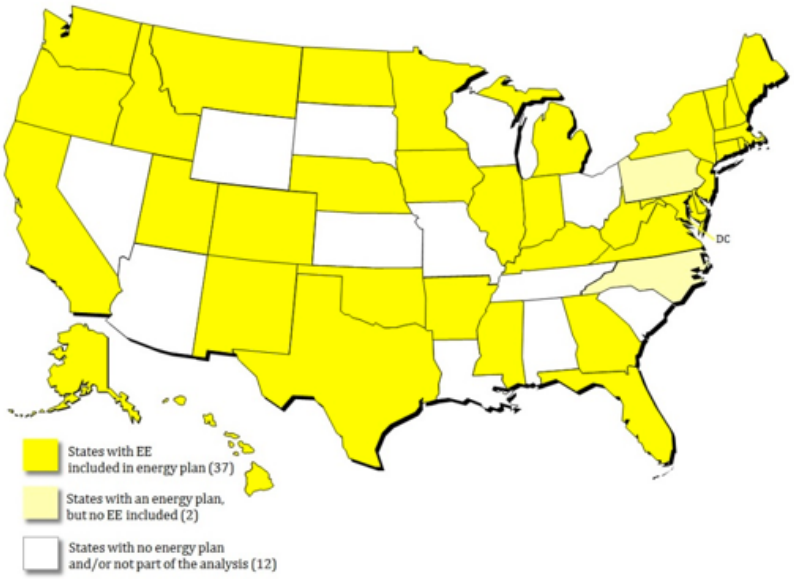
Over the past five years, energy efficiency has come into particular focus at both the national and state levels mainly for its ability to lower costs in a time of tightened budgets. Energy efficiency technology advancements, more stringent building energy codes, state-required utility efficiency programs, and state and federal policies and incentives are all reflective of the recognition of the value of energy efficiency. Cost-effective energy efficiency measures continue to gain traction as a first step in reducing overall energy use in buildings, industry, and vehicles.

Evidence of the priority placed on energy efficiency in recent years at the federal level can be found in the passage of several pieces of legislation with energy efficiency components, including the Energy Policy Act of 2005. The National Action Plan for Energy Efficiency, a guidance document facilitated by the U.S. Environmental Protection Agency (EPA) and the DOE, was published in July 2006.[8] This document provides a comprehensive framework for states and local governments interested in increasing energy efficiency and energy conservation measures within their jurisdiction.

8 EPA, http://www.epa.gov/cleanenergy/energy-programs/suca/resources.html

b. Energy Efficiency Objectives in State Energy Plans

Figure 4. States with Energy Efficiency (EE) Objectives



Increased energy efficiency is a widespread priority among the state energy plans and policies have reflected the increased focus on energy efficiency and conservation measures. At least 37 states included recommendations to promote energy efficiency within their state energy plan (Figure 4). Of those, at least seven states suggested that the state establish an Energy Efficiency Resource Standard (EERS), which are binding energy savings targets, or a statewide efficiency goal, which is non-binding.

Energy efficiency financing was listed in 18 state energy plans as a recommended mechanism for increasing overall efficiency throughout the state in multiple sectors. Numeric targets for energy efficiency—mostly in the form of achieving a certain percentage reduction in energy consumption by a specified date—were included in nine states energy plans. For example, Georgia's 2006 state energy plan, which is updated every three years, recommends that state facilities reduce energy consumption by 15% below FY'07 levels by 2020.[9]

Of those 37 states that listed energy efficiency as an objective, 16 of them recommended demand-side management as a way to reduce electricity loads and achieve greater energy efficiency. The majority of these (12) were states with vertically integrated utilities.

At least 14 states recommend that building codes be updated, improved, or better enforced within the state. All of these 14 have a current building code policy in place, and 13 of these also have an energy standard for public buildings. More than half of these states are located in the Northeast and Mid-Atlantic, where energy prices tend to be higher than in the rest of the continental United States, and where heating costs, particularly costs associated with fuel oil, are of greater consideration during the winter months.[10]

Other state plans that included energy efficiency as an objective, referenced strategies for determining current energy uses and demands. These strategies included the recommendation to establish a baseline or benchmark for energy use or an increased use of energy audits. Each of these strategies were intended

9 Georgia Environmental Finance Authority, State Energy Strategy, http://www.gefa.org/Index.aspx?page=342
10 EIA, US States Rankings, http://www.eia.gov/beta/state/rankings/?sid=US#/series/31, July 2012.

to help the state determine the best, most cost-effective energy efficiency investments. Six states—Alaska, Idaho, Michigan, New York, Oklahoma, and West Virginia—recommended that the state take action to establish a baseline or benchmark for energy use. Four states—Alaska, Maine, Rhode Island, and Washington—suggested that the state support an increased number of energy audits to identify appropriate energy efficiency measures and investments.

Three states—Connecticut, Michigan, and New Jersey—recommended that an energy efficiency fund, a utility-administered program funded by a small charge on customers' bills, be established to provide loans and rebates for energy efficiency measures in the residential, commercial, or industrial sectors. Each of these states has an energy efficiency fund in place.[11] The Clean Energy Solutions Energy Efficiency Revolving Loan Fund[12] was established approximately three years after the adoption of the 2008 New Jersey Energy Master Plan.

Additional priorities under energy efficiency included financing options (such as loans, system benefit charges, or bonds), standards for appliances (such as ENERGY STAR), and support of demand-side management programs to effectively manage and monitor energy use.

c. Energy Efficiency Progress

Ratepayer-funded energy efficiency and demand response programs in the United States saved a reported 112 terawatt-hours of energy in 2010—enough to power 9.7 million U.S. homes for one year.[13] Ratepayer or utility efficiency programs are the result of state policy direction from governors, legislatures, and regulatory authorities. Thus, the connection to planning and policy, as a means to enable regulatory action, is critical.

Today, 20 states have an EERS, and seven states have Energy Efficiency Resource Goals.[14] The majority of these EERSs were implemented between 2007 and 2009. Of the 27 states with an EERS or efficiency goal, 22 listed increased energy efficiency as a priority within their state energy plans.[15] Of those 27 states with an EERS or energy efficiency goal, nine states had a state energy plan in place before the EERS was passed.[16] A recent American Council for an Energy-Efficient Economy (ACEEE) report found that 13 of the 19 states with energy efficiency targets in place for more than two years have hit 100% of those targets.

Of the 27 states with an EERS or efficiency goal, 22 listed increased energy efficiency as a priority within their state energy plan.

The momentum of state energy efficiency policies and programs percolated up to the federal level in 2010 with the introduction of the Save American Energy Act (HR 889 and SB 548), which proposed a federal EERS.[17]

11 DSIRE, http://www.dsireusa.org
12 DSIRE, http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=NJ45F&re=0&ee=0
13 The Edison Foundation Institute for Electric Efficiency, Summary of Ratepayer-Funded Electric Efficiency Impacts, Expenditures, and Budgets, http://www.edisonfoundation.net/iee/newsevents/Pages/2012-01-03-IEE_CEEReport.aspx, 2012.
14 Database of Energy Efficiency for Renewable Energy (DSIRE), http://www.dsireusa.org/documents/summarymaps/EERS_map.pdf, 2012.
15 Of those states with an EERS in place, four states—Arizona, Missouri, Ohio, and Wisconsin—did not have an energy plan in place when the report was conducted. Pennsylvania is the only state that did not list energy efficiency as a primary goal within its energy plan, although the state does have an EERS in place.
16 Three states—Pennsylvania, Maine, and Delaware—created a plan in the same year that the EERS was passed
17 Alliance to Save Energy, Energy Efficiency Resource Standard, http://ase.org/resources/energy-efficiency-resource-standard-eers, February 2011

ii. Rewnewable Energy

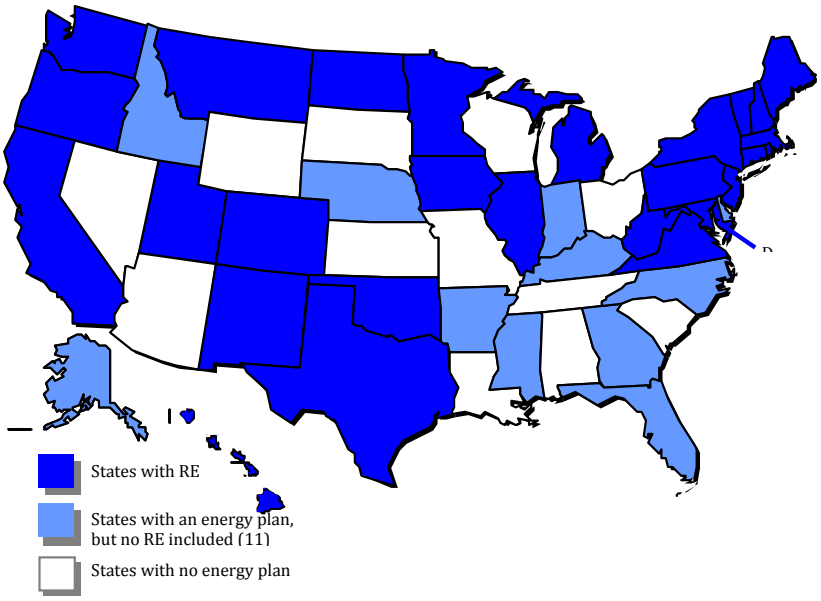
a. Renewable Energy Motivations

There has been considerable growth in renewable energy generation over the past 10 years. In 2002, renewable energy made up less than 1% of the United States' total net energy generation.[18] By 2009, renewable energy (including hydropower) made up nearly 12% of total installed capacity and more than 10% of total generation in America.[19] By early 2011, renewable energy accounted for 14.3% of domestically produced electricity in the United States.[20] While there have been federal drivers of growth, such as the Renewable Electricity Production Tax Credit first passed in 1992, state energy policy is recognized for much of the change experienced in the renewable energy sector.

States view renewable energy as a solution that meets energy security and resiliency challenges, climate concerns, and economic development potential. The State Energy Assurance Guidelines (EA Guidelines) —developed by NASEO and the National Association of Regulatory Utility Commissioners (NARUC) —were first released in 2005 and most recently updated in April 2010.[21] The EA Guidelines encourage states to include renewable energy resources in their emergency planning as a mechanism to diversify their energy sources and build resiliency through backup power to support critical facilities in the event of an outage.[22] State energy assurance plans developed over the last few years have increasingly reflected this recommendation, acknowledging the role of renewable energy in enhancing grid reliability and resiliency. State climate action plans have called for increased renewable energy generation capacity. New and sustainable jobs are attributed to renewable energy research and development (R&D), manufacturing, and installation projects. In-state credit multipliers and renewable energy tax incentives are illustrative of the ways in which states are harnessing renewable energy for economic development.

b. Renewable Energy Objectives in State Energy Plans

Figure 5. States with Renewable Energy Renewable (RE) Objectives



18 Energy Information Administration, Annual Energy Review 2002, http://www.eia.gov/totalenergy/data/annual/archive/038402.pdf
19 NREL, 2009 Renewable Energy Data Book, http://www1.eere.energy.gov/maps_data/pdfs/eere_databook.pdf
20 Energy Information Administration, Electric Power Monthly, June 2011.
21 NASEO, State Energy Assurance Guidelines Version 3.1, http://www.naseo.org/data/sites/1/documents/publications/State_Energy_Assurance_Guidelines_Version_3.1.pdf, December 2009.
22 Stet.

State comprehensive energy plans have reflected the growing trend in renewable energy generation—at least 35 states recommend increased utilization of renewable energy resources through their state. At least 15 of these states listed specific numeric targets. Several of these included a goal for achieving a certain percentage of the state's electricity from renewable sources by a specified date. Of those 35 states mentioned above, some included recommendations pertaining to specific renewable energy resources: 20 cited solar, 15 highlighted wind resources, and 13 included biomass and waste-to-energy as a priority within the state's goal for renewable energy.

The emphasis on increased renewable energy generation may be a response to high energy prices within those states. For example, nearly 75% of the states that included recommendations to increase solar energy capacity were ranked among those having the highest energy prices across the United States.[23] Job creation is another major driver of increased renewables integration.

At least 10 states created their RPS after the state energy plan was passed.

Today, at least 29 states, the District of Columbia, and two U.S. territories have a Renewable Portfolio Standard (RPS), and another eight states and two territories have nonbinding renewable energy goals. There are 16 states whose RPS includes a solar and/or distributed generation provision.[24] The majority of these states passed or strengthened their standards after 2000. Of those states with an RPS in place, 28 states listed renewable energy objectives within their energy plan. After the state energy plan was passed, at least 10 states created their RPS; of those, three created the RPS during the same year that the plan was created. Another 18 states updated or revised their RPS after the state energy plan was passed, and at least nine of those updated their RPS within the same year that the plan was created.

A select number of states included financing mechanisms to support the goal of increasing the amount of renewable energy in the state. At least four states—Maine, New Hampshire, Oregon, and Texas—listed public benefit funds or system benefit charges as an action item for achieving the state's clean energy goals. Utility pricing and on-bill financing was also listed as a recommended action item in the energy plans of at least five states—Maine, Massachusetts, Michigan, New Hampshire, and New York.

c. Renewable Energy Progress

The installed renewable energy capacity in the United States has more than tripled between 2000 and 2009.[25] Wind and solar photovoltaics were two of the fastest growing generation technologies in the United States during 2010. In 2010, cumulative wind capacity increased by 15% and cumulative solar photovoltaic capacity grew 71% from the previous year.[26] Overall, employment in the American wind industry has reached 85,000 and installed capacity has grown 40% in each of the past two years.[27] By the second quarter of 2012, the United States had more than 5,700 megawatts of installed solar electric capacity, enough to power more than 940,000 average American households. Eight states had 10 megawatts or more of utility-scale installations between 2011 and 2012.[28]

Of those state plans with renewable energy recommendations, all 35 have a RPS, interconnection standard, and a net-metering policy.[29] At least 16 states that specifically discussed solar energy within the state energy plan have a solar access policy (also called solar easements), which provides a right to install and operate a solar or wind energy system at a home or other facility and ensure a system's access to

23 SBE Council, Energy Cost Index 2012: Ranking the States, http://www.sbecouncil.org/uploads/EnergyCostIndex2012SBE%20Council.pdf, June 2012.
24 DSIRE, http://www.dsireusa.org
25 NREL, 2009 Renewable Energy Data Book
26 NREL, 2009 Renewable Energy Data Book, http://www1.eere.energy.gov/maps_data/pdfs/eere_databook.pdf, August 2010.
27 American Wind Energy Association (AWEA), AWEA in the News, http://www.awea.org/newsroom/inthenews/release_120710.cfm, December 7, 2010.
28 Solar Energy Industries Association, Solar Industry Data, http://www.seia.org/research-resources/solar-industry-data
29 DSIRE, http://www.dsireusa.org

sunlight.[30] Additionally, at least 10 of these states have solar/wind permitting standards in place, which facilitate the installation of wind and solar energy systems by clarifying the conditions and fees involved in project development.[31]

State energy plans were the catalyst for legislative and regulatory renewable energy initiatives in some states, while in others the state energy plan served to reinforce already-adopted renewable energy policies and regulations. The iterative nature of state energy planning serves as a tool in some cases to revise existing policies and programs, or develop new ones, to further promote renewable energy development.

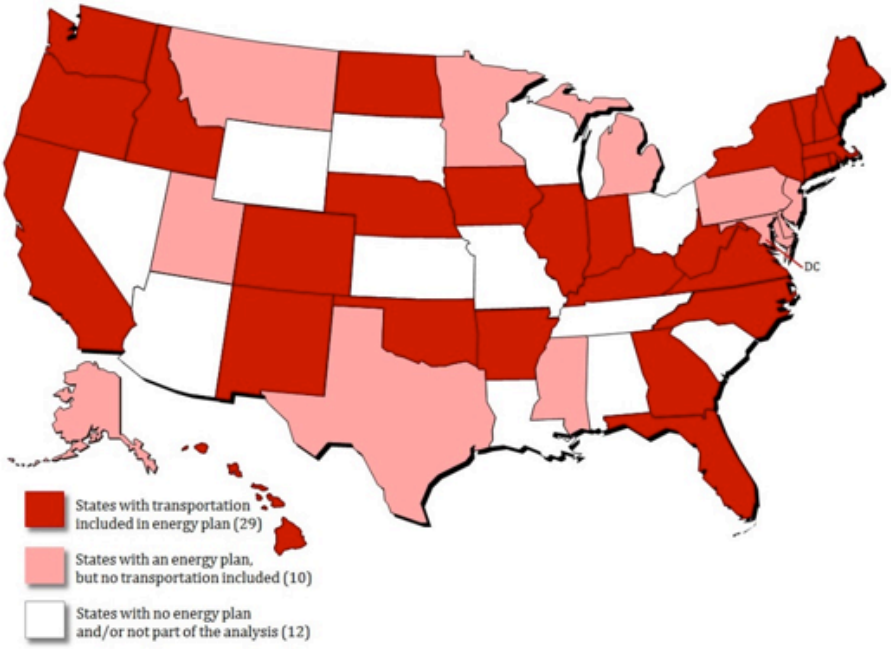
iii. Transportation

a. Transportation Motivations

The focus on the transportation sector among the plans is driven by a number of factors, including steadily rising gasoline prices since the mid-1980s[32] from imported sources, increasing corporate average fuel economy standards over time, and a more recent interest in reducing GHG emissions from mobile sources. In 2007, Massachusetts, along with 11 other states and a number of other parties, sued the EPA for failing to regulate four GHG emissions in the transportation sector, including carbon dioxide. The U.S. Supreme Court ruled in favor of Massachusetts et al., enabling the EPA to regulate GHGs in the transportation sector under the Clean Air Act.[33]

b. Transportation Objectives in State Energy Plans

Figure 6. States with Transportation Objectives



30 DSIRE, http://www.dsireusa.org
31 DSIRE, http://www.dsireusa.org
32 http://www.eia.gov/forecasts/steo/realprices/
33 http://www.c2es.org/federal/analysis/judicial/massachusetts-et-al-v-epa-et-al

At least 29 states have goals related to the transportation sector (Figure 6). Ten state plans specifically advocate for the development of biofuels and ethanol, six include recommendations to develop compressed natural gas (CNG) vehicles and infrastructure, and nine support the deployment of electric vehicles (EVs) and charging infrastructure (discussed in greater detail below). These categories are not mutually exclusive—a single state may have goals related to all fuel types.

Further analysis below delves deeper into three alternative vehicle fuel and charge options – electric, natural gas, and biofuels. However, it should be noted that statewide energy plans include transportation goals beyond alternative fuel vehicles. A majority of the plans include recommendations to reduce vehicle miles traveled through a number of mechanisms, including increasing the use of public transportation and encouraging transit-oriented development, shared ride services and opportunities, and telecommuting opportunities for the state's workforce. In addition to reducing GHG emissions, reducing roadway congestion is a motivating factor for these recommendations.

A final note before moving into each of the three fuel types discussed is that only three of the top 10 ethanol producing states specifically discuss ethanol production in their state energy plans—Illinois, Indiana, and North Dakota.[34] Connecticut, on the other hand, discusses both ethanol and other biofuels, as well as natural gas vehicles, in its plan, and it ranks as having the ninth-highest gasoline prices in the nation in 2010.[35] Vermont's plan supports increased deployment of natural gas and electric vehicles, and it is in the top 10 states with the highest per capita expenditure on motor gasoline and motor gasoline prices.[36] Through these examples, one can see that state energy plans are a means for a state to achieve any number of goals in the transportation sector that may or may not be directly correlated with resource and consumption trends within the state.

c. Electric Vehicles (EV) Transportation Progress

The EV industry has received steady federal support through congressional legislation since 2005. The Energy Policy Act of 2005 included plug-in electric vehicle (PEV) tax credits, as did the Energy Independence and Security Act of 2008, the Emergency Economic Stabilization Act of 2008, and the American Recovery and Reinvestment Act of 2009 (ARRA). These Acts also included billions of dollars in grants to support the domestic manufacturing of PEV components. Part of President Barack Obama's energy agenda included a goal of getting one million PEVs on the road by 2015.[37] To that end, the federal government has invested significant funding in support of EV infrastructure.

States have undertaken a number of regulatory, legislative, or programmatic initiatives to promote EV deployment. Of the states that specifically discuss EVs in their plans—Arkansas, District of Columbia, Hawaii, Illinois, Oklahoma, Oregon, Vermont, Washington, and West Virginia—all have enacted some type of law, regulation, or program to support EV deployment.[38] One year after Washington State's energy plan was adopted in 2010, the state took a number of actions to promote EV deployment, including the passage of H1571, which prohibits the state's Utilities and Transportation Commission (UTC) from regulating EV charging facilities owners if these entities are not subject to regulation by the UTC as electrical companies.[39]

To date, the United States has 4,688 electric charging stations with high interstate concentrations along the Interstate 95 corridor on the East Coast, along the West Coast from California to Washington, and along a corridor running east to west from North Carolina to Tennessee. Clusters of EV

34 www.eia.gov/state/sed/sep_produ/pdf/P4.pdf
35 http://www.eia.gov/beta/state/seds/data.cfm?incfile=sep_sum/html/rank_pr_mg.html
36 Ibid.
37 http://www.c2es.org/docUploads/PEV-State-of-Play.pdf
38 http://www.afdc.energy.gov/laws/matrix/tech
39 http://www.electricdrive.wa.gov/policy.htm

charging stations can also be found around Chicago, Dallas, Houston, Austin, San Antonio, and Denver.[40]

Natural gas vehicle and fuel goals exist in six state plans—Arkansas, Connecticut, Idaho, Kentucky, Vermont, and Washington. Connecticut, Idaho, and Vermont all specifically recommend converting state fleet vehicles to run on CNG. Half of the six aforementioned plans were adopted in 2010 and 2011 when natural gas wellhead prices had dropped from $7.97 per thousand cubic feet in 2008 to $3.95 per thousand cubic feet by 2011.[41] It is not surprising, however, that a few states included natural gas vehicles in plans dated before 2009. Compressed natural gas qualified as an alternative fuel under the Energy Policy Act of 1992, and when used under certain conditions, is exempt from federal taxes.[42] Hundreds of CNG fueling stations exist in the United States (527 public CNG stations), with particularly high concentrations in California, Oklahoma, and the corridor from the District of Columbia to Massachusetts.[43]

In the fall of 2011, a number of governors signed a memorandum of understanding (MOU) to promote the use of natural gas vehicles and issued a request for proposals to develop a high-quality, affordable original-equipment-manufacturer fleet natural gas vehicle that will also meet the needs of the general public. By the fall of 2012, 14 governors had signed on to the MOU.

Ten state energy plans discuss biofuels specifically—Connecticut, Illinois, Indiana, Iowa, Kentucky, North Carolina, North Dakota, Oregon, Virginia, and West Virginia. Many of these plans encourage the production and use of biofuels to offset the use of fossil fuels for transportation and heating, and have strong agricultural economies poised to profit from increased biofuels production. Most plans emphasize the state's encouragement of environmentally and economically sustainable production of biofuels and suggest the completion of a needs and cost assessment before investing in new biofuel production. Some state plans—Iowa, Kentucky, North Carolina, and North Dakota—discuss biofuels as a strategic area in which the state can become a national leader and bring significant revenue and jobs to the state.

Six of the 10 state plans that listed biofuels as a goal were written in or before 2008. Prior to 2006, two states had renewable fuels standards (RFS)—Minnesota and Hawaii—and no national RFS existed. Then, a national RFS was created through the Energy Policy Act of 2005. Between 2005 and 2008, nine more states adopted an RFS.[44] By the end of 2008, E10—a gasoline blend of 10% ethanol and 90% fossil gasoline constituted 70% of gasoline sold at the pump in the United States. This mixture kept gasoline prices 17 cents per gallon lower than they would have been without the ethanol mixture.[45]

The passage of the Energy Independence and Security Act of 2007 significantly expanded the EPA's RFS. Compliance with the RFS in 2008 required nine billion gallons of renewable fuel to be blended into transportation fuel; under the Act, this amount was increased fourfold to 36 billion gallons.[46] With these more aggressive federal requirements, state policymakers and regulators may not have deemed it necessary to include biofuel requirements in the state plans.

In 2012, the United States had 2,270 E85 (a high-level gasoline-ethanol blend containing 51% to 83% ethanol) fueling stations. These stations are concentrated in the Midwest from Ohio to Nebraska and North Dakota to Tennessee.

40 Alternative Fuels Data Center.
41 http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm
42 Alternative Fuels Data Center.
43 http://www.afdc.energy.gov/fuels/natural_gas_locations.html
44 http://www.nrel.gov/docs/fy08osti/43513.pdf
45 http://www.nrel.gov/analysis/pdfs/44517.pdf
46 http://www.epa.gov/otaq/fuels/renewablefuels/index.htm

iv. Oil/Petroleum Products

a. Oil/Petroleum Products Motivations

Between the mid-1980s and 2005, U.S. imports of oil and refined petroleum products grew steadily. In the last several years, however, this trend has reversed. In 2011, 45% of the petroleum consumed in the United States was imported from foreign countries, putting foreign dependency at the lowest levels since the mid-1990s. This change is the result of increased domestic oil production, changes in consumer preferences and behavior, the economic downturn, and efficiency gains.[47] Net imports in petroleum are expected to continue to decline over the next decade.[48] Continued reduction of oil imports through fuel switching, efficiency, and increased domestic production can enhance energy security and independence, drive economic development, and better position the country's political bargaining power overseas.

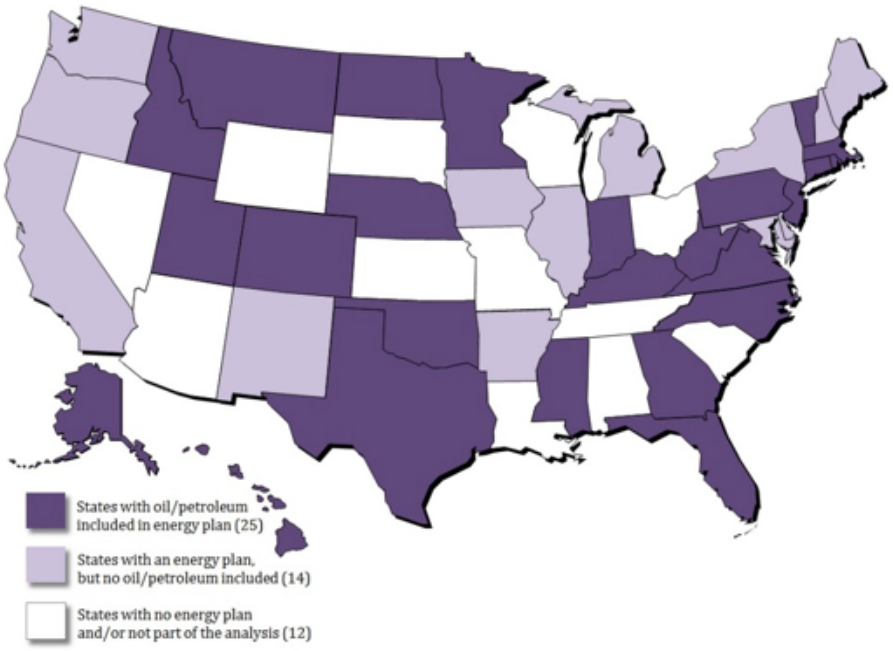
Although the United States is reducing its dependence on foreign oil, we are still subject to oil price volatility due to the fact that oil is a globally priced commodity. When global oil prices spike, U.S. prices spike as markets pull the product to the highest bidder—foreign or domestic. Reducing oil consumption—whether of domestic or foreign origin—will help shield the country from volatile pricing as the economy becomes less dependent on oil.

Due to factors that include reduced reliance on foreign oil and promotion of responsible development of in-state oil production, approximately 25 states have goals in their plans related to oil and refined products consumption or production. Of these 25 states, 12 were ranked among the top 25 crude oil–producing states as of July 2012 (by British thermal units [Btu] produced).[49] Four states—Alaska, Indiana, Montana, and Oklahoma—call for increased in-state oil production. All of the plans except for Indiana's were written in 2010 or 2011. Recommendations range from the 2010 Alaska Energy Pathway supporting offshore oil drilling to the 2011 Schweitzer Energy Policy (Montana's plan) urging oil leasing on federal land.

47 http://www.eia.gov/energy_in_brief/article/foreign_oil_dependence.cfm
48 http://www.eia.gov/forecasts/aeo/MT_liquidfuels.cfm#net-imports
49 http://www.eia.gov/beta/state/rankings/?sid=US#/series/46

b. Oil/Petroleum Products Objectives in State Energy Plans

Figure 7. States with Oil and Petroleum Products Objectives



The state energy plans of both net importers and exporters of oil address oil infrastructure (mainly pipelines and storage). Six states—Alaska, Georgia, Idaho, Mississippi, Rhode Island, and Utah—include language relating to pipeline infrastructure, encouraging technology development to extend pipelines and prolong their operating lives.

A few state energy plans also address financial mechanisms to support the oil industry. The state energy plans of Connecticut, North Dakota, and Oklahoma identify tax credits and exemptions as a means of supporting the oil industry within their states. The 2007 Energy Plan for Connecticut proposed a cap on the gross receipts tax (which is a tax on oil wholesalers that is capped when the wholesale price of gasoline reaches $1.75 per gallon) while the 2011 Oklahoma First Energy plan proposed a gross production tax credits for oil and gas drilling throughout the state.

Recommendations to reduce consumption of oil and petroleum products are also included in state energy plans. To reduce consumption of home heating oil, the 2007 Energy Plan for Connecticut requires that all residential and commercial heating oil contain a 20% mix of biofuels by 2020. The Massachusetts Clean Energy and Climate Plan for 2020 (2010) also includes recommendations to expand energy efficiency to reduce home heating oil consumption. As demonstrated earlier, state energy plans also include recommendations for decreasing consumers' reliance on gasoline and diesel fuel.

c. Oil/Petroleum Products Progress

Although the United States remains dependent on foreign oil, it was also the third-leading global supplier of oil in 2011, producing 9,023,000 barrels (Bbl) per day, behind only Saudi Arabia (11,146,000 Bbl per day) and Russia (10,213,000 Bbl per day).[50]

Many of the legislative and R&D initiatives to support hydraulic fracturing and carbon capture and sequestration mentioned earlier also support domestic oil production and the associated industry.

v. Innovation/Emerging Technology

a. Innovation/Emerging Technology Motivations

States have been actively developing and integrating innovative technologies into the energy system, particularly in the electricity grid, for the following reasons:

- State clean energy and energy efficiency targets need to be met.
- Regional and national energy emergencies have highlighted the need for greater outage management capabilities.
- Transmission congestion is worsening, thus there is a need to increase load management capabilities.
- Federal and state air quality regulations are becoming more stringent.

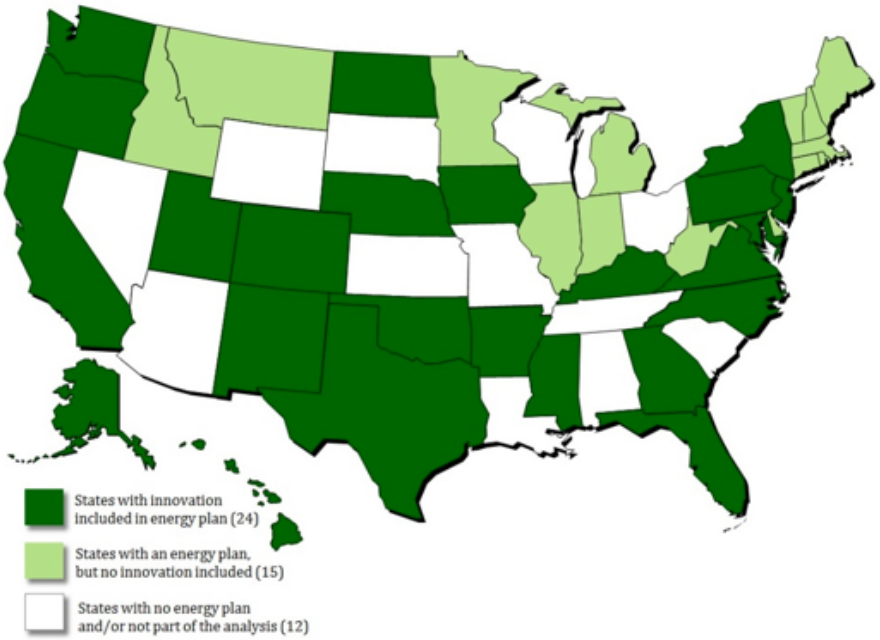
The Energy Independence and Security Act of 2007 authorized $100 million in funding per fiscal year from 2008 to 2012 under Title 13; established a matching program to states, utilities, and consumers to build smart grid capabilities; and created a Grid Modernization Commission to assess the benefits of demand response and to recommend needed protocol standards.[51] The Act also directed the National Institute of Standards and Technology (NIST) to coordinate the development of smart grid standards, which the Federal Energy Regulatory Commission would then promulgate through official rulemakings.[52] In 2009, ARRA also provided significant federal investments—to be matched by industry funding—in grid modernization.[53]

As investments in grid modernization increase, so do the concerns around cyber security. A number of cyber security breaches within the electricity sector have occurred in the past decade, one of which resulted in the power plant safety monitoring system going offline for five hours at the Ohio Davis-Besse nuclear power plant.[54] The North American Electric Reliability Corporation has incorporated cyber security standards into their Critical Infrastructure Protection Standards. Utility collaborations, DOE initiatives, and state initiatives such as NARUC's Committee on Critical Infrastructure continue to address smart grid and cyber security issues.

50 http://www.api.org/policy-and-issues/policy-items/american-energy/~/media/Files/Policy/American-Energy/Energy-In-Charts-2012_HiRes_FINAL.ashx
51 Library of Congress, http://www.thomas.gov/cgi-bin/query/z?c110:H.R.6.ENR
52 DOE, Federal Energy Regulators Propose Priorities for Smart Grid Standards, http://apps1.eere.energy.gov/news/news_detail.cfm/news_id=12364, March 25, 2009.
53 U.S. Office of Electricity Delivery & Energy Reliability, http://energy.gov/oe/technology-development/smart-grid/recovery-act-smart-grid-investment-grants
54 http://www.naseo.org/data/sites/1/documents/publications/NASEO_Smart_Grid_and_Cyber_Security_for_Energy_Assurance_rev_November_2011.pdf

b. Innovation/Emerging Technology Objectives in State Energy Plans

Figure 8. States with Innovation and Emerging Technology Objectives



At least 24 states listed innovation, emerging technologies, or R&D as a state energy priority within their energy plans. More specifically, the plans can be evaluated in the following manner:

- Twenty-two referenced R&D.
- Eight included smart grid or advanced metering as a recommendation.
- Four focused on vehicle-to-grid initiatives or innovation in the transportation sector.
- Twelve discussed financing and funding mechanisms to achieve greater energy innovation and encourage the development and commercialization of emerging technologies.

Each of these states referenced increasing energy prices in their discussion of motivation or drivers for creating the energy plan. Additionally, at least half of these states made reference to the idea of state economic growth opportunities through the development of their state's energy sector. Of those states that focused on innovation or emerging technologies in their energy plans, at least 14 of them currently have a program or incentive in place to support emerging technologies and further R&D. Table 3 lists those states and their current supporting incentives or programs.

Table 3. State Programs or Incentives Supporting Innovation or Research & Development (R&D)

State	Program or Incentive Supporting Innovation or R&D
Alaska	Emerging Energy Technology Grant Fund
Arkansas	AR HCR 1007: Study and Funding for Lignite Research; Small Business Revolving Loan Fund; Industrial Energy Technology Revolving Loan Fund
California	Energy Technology Assistance Program
Colorado	Colorado Renewable Energy Collaboratory

New Jersey	NJ Business Incubation Network; Technology Incubator Network; Edison Innovation Green Growth Fund
New York	Energy Innovation Hubs; Energy Frontier Research Centers
Oklahoma	Oklahoma Energy Initiative
Pennsylvania	PA Energy Development Authority loans for advanced energy projects; Small Business Advantage Grant Program; PA Green Energy Loan Fund
Texas	Innovation Prizes (energy storage & clean coal); Texas Emerging Technology Fund; Texas Enterprise Fund; Texas Center for Workforce Innovation & Competitiveness
Utah	Utah Research Triangle
Virginia	Virginia Coastal Energy Research Consortium; Universities Clean Energy Development & Economic Stimulus Foundation; Virginia Energy Initiative

At least 11 of the 24 states have an innovation, emerging technologies, or R&D program, initiative, or collaborative in place. At least five states—Colorado, New Jersey, New York, Utah, and Virginia—have energy consortiums (also called collaborations or networks) specifically focused on advancing energy technologies by gathering regional technology leaders, businesses, research groups, and universities.

Research and development was most commonly referenced as a mechanism for advancing traditional and clean energy technologies. Of the 22 states that listed energy research or R&D within their plan, 14 of them suggested that R&D be increased for renewable energy technologies and applications. Transportation was listed by eight states for R&D efforts—most of these plans suggest that the state focus on alternative fuels and biofuels R&D. The states that recommended R&D be increased in the areas of natural gas, petroleum, coal, and nuclear power were all ranked as having the largest sources of these energy fuels. North Dakota, Utah, and Virginia all recommended increasing R&D for natural gas, petroleum, and coal (each of these states also rank high in terms of consumption of these fuels).

c. Innovation/Emerging Technology Progress

Efforts to advance the clean energy economic sector within each state emerged as a new theme across the country in more recent plans, largely as part of state economic recovery strategies. Efforts and funding to support energy R&D increased across states, with 29 states creating new policies or programs to support clean energy R&D between June 2010 and August 2011.[55] State support was often in the form of partnerships with universities, research institutions, or private industries, and the provision of financial support for the development or distribution of clean and advanced energy technology.[56]

State innovation and incubation programs help support start-up companies with new clean energy patents. According to second-quarter 2012 results for the Clean Energy Patent Growth Index (CEPGI), the United States led all other countries in the number of energy patents. Toyota had the most Clean Energy patents, while fuel cell, solar, and wind patents all increased. The CEPGI has provided an indication of the trend of innovative activity in the clean energy sector in the United States since 2002. Results reveal the CEPGI to have a value of 786 granted U.S. patents, which is the highest quarterly

55 NGA, Clean Energy Actions by State 2011 Update, http://www.nga.org/cms/home/nga-center-for-best-practices/center-publications/page-eet-publications/col2-content/main-content-list/clean-and-secure-energy-2011.html
56 NGA, Clean Energy Actions by State 2011 Update, http://www.nga.org/cms/home/nga-center-for-best-practices/center-publications/page-eet-publications/col2-content/main-content-list/clean-and-secure-energy-2011.html

total since tracking of the CEPGI began and the fourth consecutive record-breaking quarter.[57]

Of the eight states that listed smart grid in their energy plan, at least four of them have taken actions to support advances in smart grid between June 2010 and August 2011.[58] Table 4 summarizes actions that each of these states have taken to support smart grid and demand-side management programs.

Table 4. State Actions to Support Smart Grid/Demand-Side Management

State	Action to Support Smart Grid and Demand-Side Management
Arkansas	Issued an order to open an investigative proceeding on smart grid, advanced metering infrastructure (AMI), and demand response. The order is part of the Public Service Commission's Sustainable Energy Resources Action Plan, which required utilities "to report in detail on their current use of and future plans for Smart Grid, DR, and AMI projects and investments in Arkansas."
California	Required public utilities to file smart grid deployment plans by July 2011.
Mississippi	Urged all state agencies to define the smart grid for the purposes of creating jobs and encouraging customer energy savings in the state (SCR 665).
New York	The New York State Public Service Commission approved a policy statement that would establish regulatory policies and set forth guidelines for utilities to follow regarding the development of smart electric grid systems and associated efforts to modernize the electric grid.

vi. Natural Gas

a. Natural Gas Motivations

The United States has experienced a drastic change in the supply of domestic natural gas resources over the last few years. Domestic supply surged when hydraulic fracturing technology and horizontal drilling techniques made shale gas in shale formations across the country economically viable. Shale gas now constitutes approximately 16% of U.S. natural gas production and is expected to grow as the resource is further exploited.[59]

Ample supply led to downward pressure on natural gas prices. After more than three decades of volatile price escalation—particularly in the period between 1995 and 2008, when U.S. natural gas wellhead prices rose from $1.55 per thousand cubic feet to $7.97 per thousand cubic feet—the price dropped to $3.67 per thousand cubic feet in 2009. The public and private sectors alike are responding to these price signals. American manufacturing companies are making large investments in domestic production activities; companies and government agencies are converting their vehicle fleets to natural gas drivetrains and building out natural gas vehicle infrastructure; and the power generation sector is investing in natural gas–fired power plants to replace aging coal plants and meet growing demand.

The landscape for natural gas production and consumption is markedly different today than it was just a few years ago.

State energy plans, regardless of the date written, recognize the importance of natural gas to the American economy, as 22 states included recommendations pertaining to natural gas production and consumption. Ten states included recommendations to increase new, in-state production. All but three of these plans were written in 2008 or more recently, reflecting the increased domestic supply and are located within the shale play boundaries illustrated in Figure 9.

57 Renewable Energy World, http://www.renewableenergyworld.com/rea/partner/heslin-rothenberg-farley-mesiti-p-c-7929/news/article/2012/10/clean-energy-patents-hit-high-in-q2-clean-energy-patent-growth-index1, October 30, 2012.
58 The information in the table comes from NGA, Clean Energy Actions by State 2011 Update, http://www.nga.org/cms/home/nga-center-for-best-practices/center-publications/page-eet-publications/col2-content/main-content-list/clean-and-secure-energy-2011.html
59 http://www.eia.gov/forecasts/aeo/source_natural_gas_all.cfm#natgas

b. Natural Gas Objectives in State Energy Plans

Figure 9. States with Natural Gas Objectives

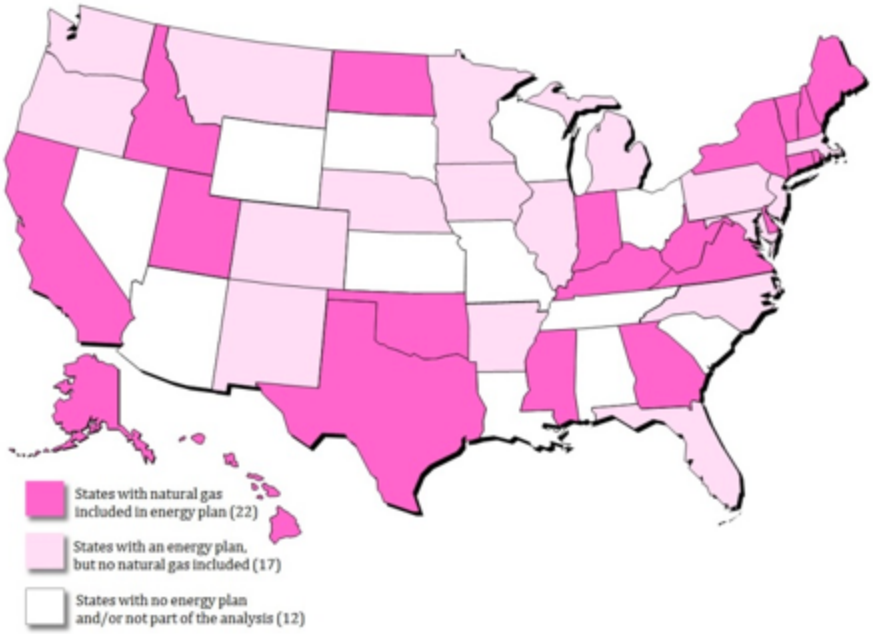
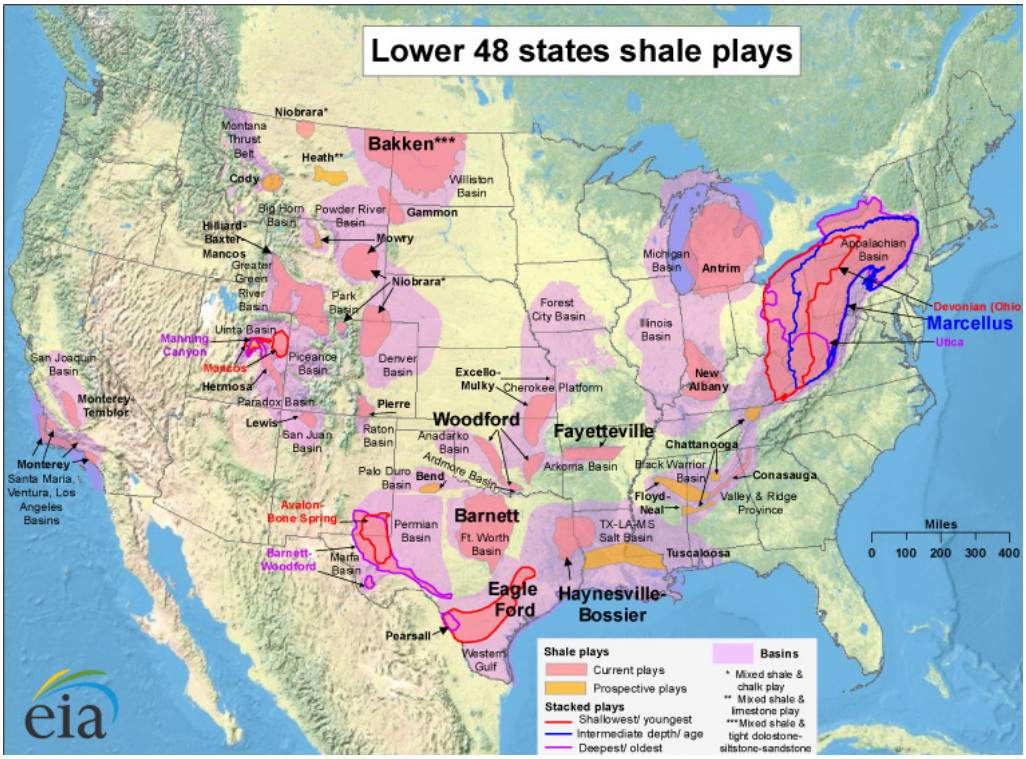


Figure 10. Natural Gas Shale Plays



Source: Energy Information Administration, http://www.fossil.energy.gov/programs/oilgas/shalegas/index.html.

Beyond production capabilities, states sought to expand infrastructure capacity and capabilities. Fourteen states included such recommendations, most commonly citing a desire to expand pipeline and storage capacity to enhance power generation, heating, and industrial activities. The states making such a recommendation were split among those exporting excess natural gas supply and those net consumer states that want to increase natural gas imports.

Three states—California, Colorado, and Kentucky—promoted increasing R&D to examine natural gas storage and reduce GHG emissions associated with natural gas production and transport. Six states—Connecticut, Georgia, Hawaii, Oklahoma, Texas, and Utah—specifically addressed the role of natural gas in electricity generation through the goals and actions included in their state energy plans. As part of these goals, recommendations were made to utilize natural gas to integrate intermittent renewable resources and use natural gas–fired generation to increase grid reliability and energy security.

A number of state energy plans discussed the need to reduce natural gas consumption. This number is difficult to quantify because natural gas efficiency strategies may be discussed in terms of broader energy efficiency and demand-response objectives within the state plan. Demand reduction is driven by the desire to reduce energy costs, lower GHG emissions, and increase energy security. Natural gas usage in the transportation sector is discussed in the transportation section of this report.

c. Natural Gas Progress

Between 2008 and 2011, U.S. natural gas production increased by 14.5%. States that have historically produced significant amounts of natural gas—Louisiana, Oklahoma, Texas, and Wyoming—continue to do so. The 2011 Oklahoma First Energy Plan supports efforts to continue natural gas production, calling natural gas the state's "flagship fuel."[60] Arkansas, Colorado, North Dakota, Pennsylvania, and Utah have experienced the fastest rate of production growth in recent years.[61] Tying this goal to its plan, the Empower North Dakota Comprehensive Energy Policy 2008–2025, North Dakota set a goal to increase natural gas processed in-state by 64% between 2008 and 2012.[62]

Infrastructure and consumption trends in some sectors are experiencing similar growth. Miles of main pipeline in the United States have increased by 15.2% between 2000 and 2010. By November 2012, the year-to-date natural gas–fired electricity generation was 27% ahead of 2011 figures.[63] Florida has exhibited the greatest total growth in natural gas–fired electricity generation since 2002, while New Hampshire has grown the most on a percentage basis.[64] New Hampshire's 10 Year State Energy Plan (2002) recommended monitoring and developing new natural gas infrastructure.

vii. Industrial Energy Efficiency

a. Industrial Energy Efficiency Motivations

In 2011, industrial energy consumption constituted more than 30% of total U.S. primary energy consumption.[65] In addition, the U.S. industry and manufacturing sector constitutes 11% of the nation's gross domestic product (GDP) and employs 12 million people in predominantly high-skilled jobs. As one of the predominant sectors of energy consumption, the industrial sector accounts for facilities and equipment used to produce and process goods, mainly in areas such as chemical production, petroleum

60 NASEO plan database site (www.naseo.org/stateenergyplans)
61 http://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_VGM_mmcf_a.htm
62 NASEO, www.naseo.org/stateenergyplans
63 http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_1
64 http://www.eia.gov/electricity/data/state/generation_annual.xls
65 U.S. Energy Information Administration, Today in Energy, http://www.eia.gov/todayinenergy/detail.cfm?id=8110, accessed December 19, 2012.

refineries, metal and steel assembly. Because these are generally large-scale operations, the idea of running such facilities more efficiently through an environmental management system has been a consideration since the early 1970s. However, it wasn't until 1996, with the introduction by the International Organization for Standardization (ISO) of ISO 14000, that a global framework was instituted to account for and improve energy efficiency, environmental impacts, waste reduction, and overall facility productivity.

ISO 14000 is the International Standard for Environmental Management and exists to assist organizations in determining how their operations negatively affect the environment (by complying with laws, regulations, and other environmentally oriented requirements). It also provides tools to companies to improve and control such impacts through energy efficiency practices.[66] Another key ISO specification is ISO 50001, which is the International Standard for Energy Management. This set of requirements addresses creating, implementing, maintaining, and improving an energy management system. In addition, it aims to improve energy-related performance and energy efficiency continuously, through the collection of data and measurement of results.[67]

In conjunction with the ISO 50001 standard, the DOE developed the Superior Energy Performance certification, which provides industrial facilities with a plan for attaining continuous gains in energy efficiency.[68] It incorporates ISO 50001 with a methodology for verifying energy performance improvements, and was initially piloted in 2008 at five industrial facilities in Texas, through funding by the DOE and the Texas State Energy Conservation Office. It has since been deployed at industrial facilities throughout the country.

Included in industrial energy efficiency this overview is combined heat and power (CHP), which is an approach to generating electric power and useful thermal energy from a single fuel source or cogeneration. CHP, which can be up to 75% more efficient than conventional systems, is a form of distributed generation that does not refer to a single technology but rather to an integrated energy system sited at, or near, the energy-consuming facility. As of October 2011, 82 gigawatts of CHP have been installed across nearly 4,000 industrial and commercial facilities, with Texas accounting for 17,240 megawatts of installed capacity.[69] This represents just over 8% of current U.S. generating capacity.[70]

In addition to this, President Obama's recent Executive Order, "Accelerating Industrial Energy Efficiency," along with a number of other market factors, have brought renewed attention to CHP as both an economically and environmentally viable component of the industrial sector and its facilities.

b. Industrial Energy Efficiency Objectives in State Energy Plans

Although the United States has experienced a steady increase in industrial energy efficiency over the past three decades, there are still a number of opportunities for energy savings. As this sector is increasing productivity while simultaneously reducing expenses (mainly through energy savings), it has found energy-efficiency investments to be a beneficial means for achieving a number of goals. Of the state energy plans examined, 19 specifically reference the industrial and/or manufacturing sectors (in varying degrees). On the higher end of common themes, 12 states call out industrial as it relates to

66 International Organization for Standardization, ISO 14000, http://www.iso.org/iso/home/standards/management-standards/iso14000.htm, accessed December 20, 2012.
67 International Organization for Standardization, ISO 50001, http://www.iso.org/iso/home/standards/management-standards/iso50001.htm, Date accessed December 20, 2012.
68 DOE, Superior Energy Performance, http://www1.eere.energy.gov/manufacturing/tech_deployment/sep.html, accessed December 20, 2012.
69 Todd Currier and Greg White, Industrial Energy Efficiency/CHP Working Group Executive Summary, ICF International, http://www1.eere.energy.gov/seeaction/pdfs/seeaction_ie_chp_executive_summary.pdf, March 25, 2011.
70 EPA, Combined Heat and Power: Frequently Asked Questions, http://www.epa.gov/chp/documents/faq.pdf, January 6, 2012.

fuel input (e.g., waste to energy, combined heat and power, and/or fuel switching).[71] Many facilities using these technologies are able to promote flexibility and effectiveness through the combination or conversion of various fuel types.

Other common themes throughout the energy plans are evident in areas of efficiency and demand management, and can be found in eight of the state energy plans.[72] Such language outlines methods such as, but not limited to, partnerships with universities, state agencies, and utilities to provide engineering analyses to industrial establishments that work to improve energy efficiency. Beyond efficiency, three states—Iowa, New Jersey, and Rhode Island—offer financing options, such as industrial revenue bonds, to help support current and future capacities, as well as facility expansions.

Two states—Mississippi and Rhode Island—have policy or regulatory reforms in place to address the industrial sector, including the adoption of codes for industrial facilities and the review of siting issues and standby rates associated with cogeneration, respectively. Lastly, one state, New Jersey, has established numeric goals to coincide with its inclusion of the industrial sector in its energy plan, by setting targets related to peak loads, retail rates, and capital costs (e.g., solar installations on industrial facilities).

Many state energy plans include strategies to capture benefits of energy efficiency and CHP opportunities in industrial processes by encouraging more robust utility investments in CHP applications. Of the plans collected, 17 states reference CHP in one fashion or another, specifically as it correlates to the industrial sector.[73] Highlights from the plans that mention CHP include offering financial incentives, encouraging cogeneration to spur economic development, suggesting that energy standards be revised to include CHP, and suggesting that streamlined permitting of CHP be implemented to encourage energy efficiency in industrial sites.

Other common themes include language stating that waste heat as a byproduct can be used for space and water heating and that removing barriers associated with distributed generation will help promote an increased use of CHP technologies.

c. Industrial Energy Efficiency Progress

As the industrial sector continues to grow, and now more than ever adheres to environmental standards, companies such as Volvo and the Dow Chemical Company have implemented ISO 50001 and Superior Energy Performance standards. Through this, they have achieved significant energy and monetary savings. The Dow Chemical Company achieved an energy savings of 17.1% over two to three years at its manufacturing plant in Texas City, Texas, while Volvo Trucks implemented an energy management standard in accordance with ISO 50001 and achieved Superior Energy Performance certification at its facility in Dublin, Virginia (resulting in a 25.8% energy reduction over a two to three year period). Although these examples are large companies, it should be noted that ISO 50001 can be implemented at companies of any size.

As of 2012, there were up to 130 gigawatts of untapped CHP potential, equal to 40% of the total installed capacity of coal-fired power plants in the United States in 2011, and nearly five times the amount of coal-fired generation capacity set to retire between 2012 and 2016.[74]

71 These states include Delaware, Georgia, Kentucky, Nebraska, New Jersey, New York, Oklahoma, Rhode Island, Vermont, Virginia, Washington, and West Virginia.
72 These states include Alaska, Connecticut, District of Columbia, Maryland, Minnesota, Oklahoma, Washington, and West Virginia.
73 These states include Connecticut, Florida, Georgia, Hawaii, Idaho, Kentucky, Maine, Maryland, Michigan, Mississippi, New Jersey, New York, Oklahoma, Oregon, Rhode Island, Vermont, and Washington.
74 U.S. Energy Information Administration, Today in Energy, http://www.eia.gov/todayinenergy/detail.cfm?id=7290, accessed December 20, 2012.

Although new CHP capacity additions have lagged in recent years due to the economic recession and previously volatile natural gas prices, market conditions are changing. Current and projected low natural gas prices, combined with a suite of EPA air regulations, create opportunities for CHP deployment. In addition, many states have enacted an RPS and/or an EERS, with a number of them including waste energy recovery as part of their RPS.

viii. Coal and Clean Coal Technology

a. Coal and Clean Coal Technology Motivations

Across the United States there are more than 1,400 coal-fired generation units in operation at more than 600 power plants.[75,76] In 2011, 42% of U.S. electricity generation came from coal-fired power plants. That number is down from 49% back in 2007 (when coal consumption in the electric power sector was at an all-time high since 1950). A number of state, regional, and federal events have shaped the states' approaches to coal-fired electricity generation in the last 5 to 10 years.

At an executive level, the EPA has taken a number of regulatory actions that impact fossil fuel–fired power generation.[77] These actions include the issuance of the 2008 Greenhouse Gas Mandatory Reporting Rule, the 2011 final Utility Mercury Air Toxics Standard, and the 2012 proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, also known as the Carbon Pollution Standard for New Sources.[78,79,80] Regulatory uncertainty makes building new coal power plants more difficult to justify in light of low natural gas prices and increased federal regulatory stringency.

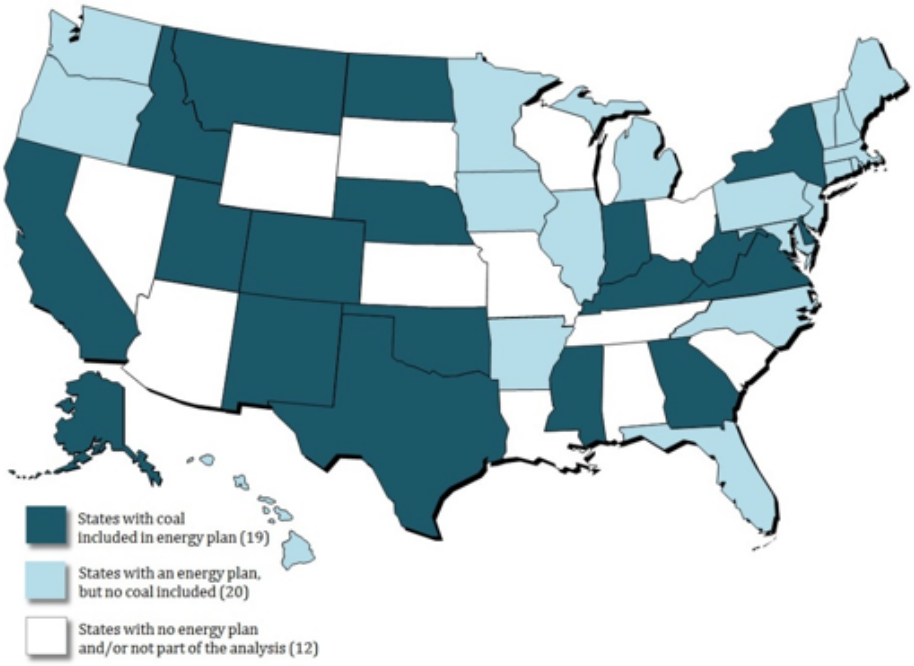
At the regional and state levels, there have been a number of efforts to limit carbon emissions within the electricity sector or increase the quantity of low- or zero-emissions resources in the generation mix. These include the Regional Greenhouse Gas Initiative, the Western Climate Initiative, and California's Global Warming Solutions Act of 2006 (which has regional implications because it limits the amount of GHGs produced by in-state generators and those importing power into the state). These state and regional efforts all focus on the power sector and will therefore impact the use of coal-burning technology.

In addition to the challenges above, coal-fired power plants across the country are aging, and the average age of a U.S. coal plant is now 43 years. This aging infrastructure, combined with the federal air regulations and generally lower natural gas prices, leads some analysts to project 59,000 to 77,000 megawatts of coal plant capacity will be retired over the next five years.[81]

75 http://www.eia.gov/energy_in_brief/role_coal_us.cfm
76 http://www.eia.gov/totalenergy/data/annual/showtext.cfm?t=ptb0703
77 Many of these actions are rooted in the U.S. Supreme Court's 2007 decision in *Massachusetts v. EPA that found that GHGs are air pollutants under the Clean Air Act and relegated the determination of whether GHGs threaten public health and welfare to the* EPA. Late in 2009, the EPA found that current and future levels of GHGs threaten public health and welfare. http://www.epa.gov/carbonpollutionstandard/pdfs/20120327factsheet.pdf
78 http://www.epa.gov/ghgreporting/basic-info/index.html
79 http://www.epa.gov/mats/pdfs/20111221MATSsummaryfs.pdf
80 http://epa.gov/carbonpollutionstandard/pdfs/20120327factsheet.pdf
81 http://www.brattle.com/NewsEvents/NewsDetail.asp?RecordID=1187

b. Coal and Clean Coal Technology Objectives in State Energy Plans

Figure 11. States with Coal and Clean Coal Technology Objectives



Nineteen states included recommendations pertaining to coal and/or clean coal. Many plans emphasize the use of coal generating plants to meet increasing demands for electricity. A majority of the plans (16) make recommendations to research, incentivize, or otherwise encourage the use of clean coal technologies on new and existing coal-fired power plants. Integrated gasification combined cycle (IGCC) and geological sequestration or carbon capture sequestration (CCS) are the most commonly cited examples of clean coal technologies. Partnerships with universities or other research centers are encouraged in numerous plans. Three states—Oklahoma, Texas, and Virginia—have plans that recommend the state assist industry players in navigating state and federal environmental and safety regulations for coal plants.

States with large coal resources are typically more reliant on coal-fired electricity generation. It is not surprising, therefore, that eight of the top 12 coal-producing states are among those with energy plans focused on developing a cleaner fleet of coal plants and offering some form of permitting or regulatory assistance to the coal industry.[82] For these states, the continued ability to use coal for electricity generation is an issue of economic development.

It is interesting to note that 10 of the 19 plans referenced above were written during the period between 2009 and 2011.[83] It was in 2009 that the EPA ruled that GHG emissions were hazardous to public health and welfare by impacting climate change. Given the reliance on coal-fired electricity generation, states around the country may be experiencing pressure to find a means of producing low-emissions electricity using coal resources.

82 Those states are Colorado, Indiana, Kentucky, Montana, New Mexico, North Dakota, Texas, Virginia, and West Virginia. Two of the other top coal-producing states do not have a statewide energy plan. http://www.nma.org/pdf/c_production_state_rank.pdf
83 Alaska, California, Delaware, Mississippi, Montana, Nebraska, New York, Oklahoma, Utah, and Virginia.

c. Coal and Clean Coal Technology Progress

In 2010, the United States experienced the greatest increase in coal capacity since 1985—adding nearly 7 gigawatts of new capacity[84]—and coal continues to be the dominant source for electricity generation. However, low natural gas prices and additional federal environmental regulations are putting pressure on an aging coal fleet. In fact, the utility industry is set to retire approximately 10% of the total U.S. coal capacity by 2016.[85] The majority of retirements are slated to occur in the Southeast, Mid-Atlantic, and Ohio River Valley regions of the country.[86] These constraints on the electric generation fleet have forced utilities and policymakers in these regions to consider alternatives to traditional coal-fired generation.

One alternative is to continue pursuing clean coal technology development and deployment. Since the release of their respective energy plans, the states of California, Colorado, Indiana, Kentucky, Montana, New York, North Dakota, Texas, and West Virginia all passed legislation to support clean coal and/or carbon capture and sequestration projects through various means, including developing financial incentives and setting operational requirements for carbon dioxide sequestration projects.[87,88]

Kentucky's state energy plan, the 2008 Intelligent Energy Choices for Kentucky's Future, includes a goal of deploying carbon management technologies at 50% of coal-based energy applications by 2025. To achieve this goal, the plan calls for continued support of the Carbon Management Research Group (CMRG),[89] a consortium of the state's major power companies, the University of Kentucky's Center for Applied Energy Research, and the Commonwealth of Kentucky's Energy and Environment Cabinet. The CMRG currently has three research projects focusing on carbon capture and sequestration.

ix. Nuclear Power

a. Nuclear Power Motivations

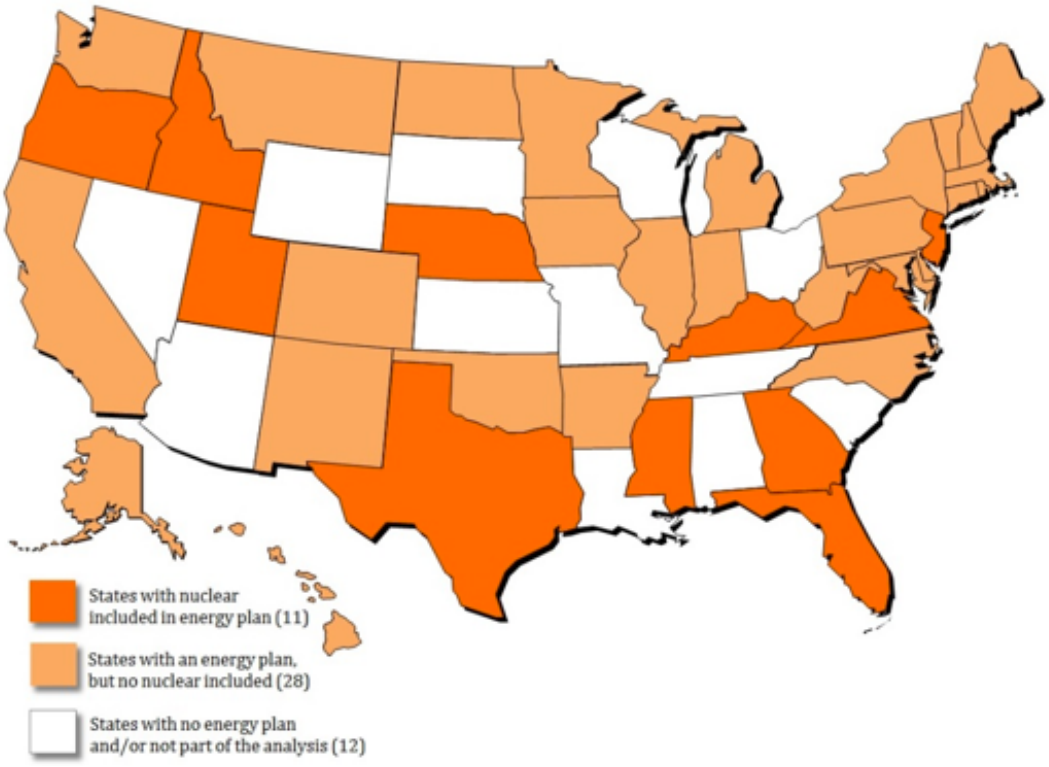
As of June 2012, the United States is the largest producer of nuclear power generation (by kilowatt-hour) worldwide, having produced almost 800 billion kilowatt-hours in 2011.[90] Domestically, nuclear power accounts for approximately 20% of total U.S. electricity production,[91] with more than 100 operating reactors and approximately 65 nuclear power plants.[92]

Nuclear waste disposal is an unresolved domestic matter. Further, the impacts of the earthquake and subsequent tsunami at Japan's Fukushima Daiichi nuclear power plant in 2011 resulted in a global examination of the use of nuclear power.[93]

84 http://www.netl.doe.gov/coal/refshelf/ncp.pdf
85 http://www.reuters.com/article/2012/10/08/us-utilities-brattle-coal-idUSBRE8970LV20121008
86 http://www.eia.gov/todayinenergy/detail.cfm?id=7330
87 National Governor's Association, *Clean State Energy Actions 2011 Update*, Advanced Coal and Clean Coal.
88 Southeast Regional Carbon Sequestration Partnership and the South States Energy Board, Carbon Capture and Sequestration Legislation in the United States of America, http://www.secarbon.org/files/CCS_Legislation_2011.pdf, July 2011.
89 Carbon Management Research Group, University of Kentucky, Center for Applied Energy Research, http://www.caer.uky.edu/powergen/cmrg/home.shtml, accessed December 3, 2012.
90 http://www.eia.gov/energy_in_brief/nuclear_industry.cfm
91 http://www.epa.gov/cleanenergy/energy-and-you/affect/nuclear.html
92 http://www.eia.gov/energy_in_brief/nuclear_industry.cfm
93 http://www.eia.gov/energy_in_brief/nuclear_industry.cfm

b. Nuclear Power Objectives in State Energy Plans

Figure 12. States with Nuclear Power Objectives



Approximately one-third of state energy plans (11) include nuclear power as a portion of their state energy planning efforts. Five of the 11 states that highlight nuclear power in their energy plans were ranked among the top 25 nuclear energy–producing states in 2009 (by Btu produced).[94] Of the 31 states with at least one commercial nuclear reactor, seven include nuclear power within their state energy plans.[95]

The majority of the aforementioned 11 states call for the expansion of nuclear generating capacity and deploying next-generation nuclear energy technologies at power plants. Such an example exists in Kentucky, whose 2008 energy plan acknowledges that "nuclear power will be an important and growing component of the nation's energy mix, and Kentucky must decide whether nuclear power will become a significant part of meeting the state's energy needs by 2025."

Workforce development is another aspect of the nuclear energy industry addressed in state energy plans. The energy plans in Kentucky, Mississippi, and Virginia either suggest an assessment or full development of workforce training (to support the construction and operations of nuclear power plant facilities). In addition, as in the cases of Idaho and Virginia, the energy plan calls for working with community colleges or expanding university programs, respectively, in areas such as nuclear power and energy engineering. Texas' plan recommends developing a partnership between institutions of higher education and industries to research opportunities for nuclear fuel cycles, as well as the recycling of spent fuel.

94 These states include Florida, Georgia, New Jersey, Texas, and Virginia. http://www.eia.gov/beta/state/seds/seds-data-complete.cfm#ranking3
95 http://www.eia.gov/energy_in_brief/nuclear_industry.cfm

c. Nuclear Power Progress

As of early 2012, the Nuclear Regulatory Commission (NRC) reported having active applications for 28 new nuclear reactors.[96] Alternatively, since 2008, 16 states have taken action to restrict new nuclear power capacity additions in some way, ranging from the prohibition of public service companies in New York recovering costs associated with nuclear power through rates, to Oregon prohibiting the consideration of new nuclear facilities until the federal government has a fully operational nuclear waste disposal facility.[97] Nuclear energy remains a divisive domestic issue, and the impact of state energy plans in this area may be subject to specific global and national issues.

H. Financing and Funding Mechanisms and Programs

Once a state has determined its priorities through the development of an energy plan, the question arises as to how the state will pay for the proposed recommendations and initiatives. Many state energy plans give clear examples of potential funding mechanisms or funding resources for implementing various actions within the plan. Some state energy plans indicate an exact dollar amount for a particular recommended action. For example, the Maryland 2011 energy plan includes an anticipated total budget needed for each of the programs suggested in meeting a specific goal. Most of the recommended programs also include some discussion of the state's return on investment for that particular program.

One trend is the shift states are making toward self-sustaining financing mechanisms that do not require states to provide loans or grants without a self-replenishing mechanism. This shift includes a move toward long-term financing mechanisms that are not subject to decline due to political preferences. As a result, revolving loan funds have gained traction in recent years. Revolving loan funds have been in use since the early 1970s to trigger reductions in direct federal financing. By 1990, a small handful of states, such as Texas, had established their own RLF programs with funds such as oil overage charges. Through ARRA, an increased number of states have designed and implemented an energy RLF program as a tool to provide long-term/low-interest loans from their initial funding.[98]

Property Assessed Clean Energy (PACE) is another financing mechanism that has been gaining traction. Although PACE was placed on hold in the residential sector, it has moved forward as a viable financing mechanism in the commercial sector. This mechanism with no or low upfront costs allows commercial property owners to borrow money to pay for renewable energy and/or energy efficiency improvements. The amount borrowed is typically repaid over a period of years through a special assessment on the owner's property. Currently, 12 commercial PACE programs are operating in the United States, with another 10 emerging commercial PACE programs in progress.[99]

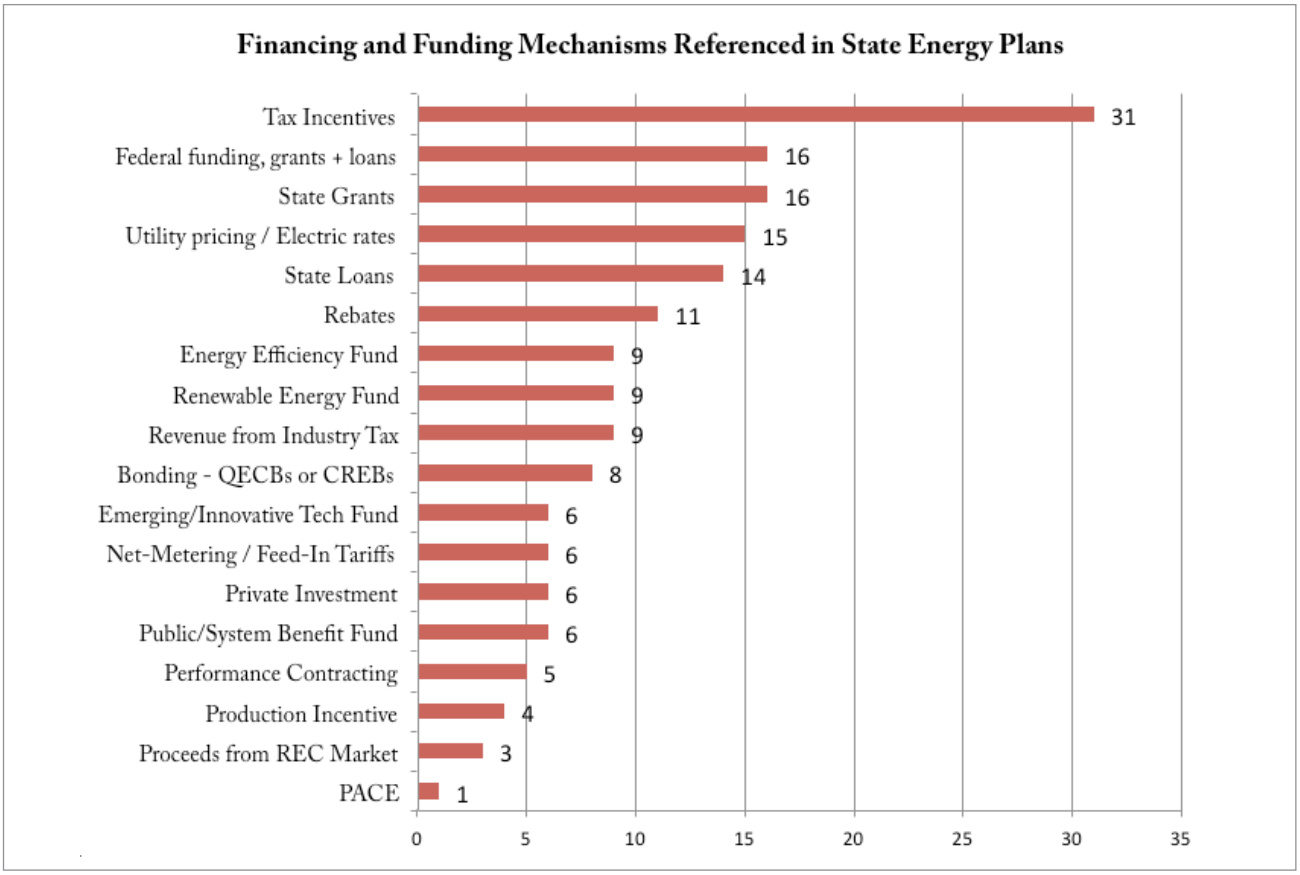
Sustainable and successful financing mechanisms are important to states in a number of ways. Financing mechanisms, such as interest rate buy-downs and RLFs, allow for lending that may not otherwise be made available to energy projects or emerging energy technology investment. Commercial banks are not accustomed to lending for energy projects and may not have the internal expertise to effectively evaluate energy-related investments, risks, and returns. Certain financing mechanisms (e.g., interest rate buy-downs, energy rebates, low-interest loans, and low-income home energy assistance programs) are specifically designed to support low-income households, which spend a larger portion of

96 http://www.eia.gov/energy_in_brief/nuclear_industry.cfm
97 http://www.nga.org/cms/home/nga-center-for-best-practices/center-publications/page-eet-publications/col2-content/main-content-list/clean-and-secure-energy-2011.html
98 NASEO, State Energy Revolving Loan Funds – Overview and Trends, http://www.naseo.org/Data/Sites/1/documents/selfs/state_energy_rlf_report.pdf.
99 NASEO and Lawrence Berkeley National Laboratory, Commercial PACE Status Update, http://www.naseo.org/data/sites/1/documents/committees/financing/notes/2012-04-05-Zimring.pdf, April 5, 2012.

their annual budgets on energy.[100] Economic incentives can address perceived market failures, such as externalities where energy end-users do not pay the full cost or benefit to society of their energy consumption, and other barriers such as the uncertainty and risk associated with recoupment of the costs of energy investment in the future, as well as behavioral or cultural reluctance to adopt new energy technologies.[101]

Figure 13 summarizes the financing mechanisms and programs suggested throughout the 39 energy plans reviewed for this report. The most common financing mechanism recommended across all plans was tax incentives (which include property, corporate, personal, sales, and income tax incentives) to increase the use of clean energy resources.

Figure 13. Financing and Funding Mechanisms and Programs[102]



100 American Electric Power, Rising Energy Costs and Low-Income Households, http://www.aep.com/about/IssuesAndPositions/Financial/RisingCost-Low-Income.aspx

101 IEA, The Future of Energy Efficiency Finance, http://www.iea.org/media/workshops/2012/energyefficiencyfinance/Background.pdf

102 Several of the financing mechanism titles include more than one type of finance incentive.

- " Tax Incentives" include property, sales, and income tax incentives for renewable energy and energy efficiency, as well as for oil, gas, coal, and mining.
- "Emerging/Innovative Technology Fund" includes renewable energy and energy efficiency, as well as innovative technology development for clean coal, natural gas, and petroleum.
- "Revenue from Industry Tax" includes fuel-use taxes, taxes on the oil and gas industries, and hydrogen tax revenues.
- "Federal Funding, Grants, and Loans" includes federal funding from a wide range of agencies, and funding for numerous energy projects: energy efficiency, weatherization, agricultural development, renewable energy, natural gas, or mining operations.
- "State Grants" and "State Loans" include those grants and loans that are issued by the state; in some states this may include only state funds, but in others it may include a mix of state funding and federal funds received by the state.
- "Utility Pricing/Electric Rates" refers to green pricing to support increased renewable energy use as well as state review of utility costs and revenue requirements for clean energy generating systems. This differs from the "Public/System Benefit Fund" category, which refers to a small charge on consumers' energy bills to be used to support energy programs or projects.

Three state energy plans—Indiana, Maryland, and Massachusetts—suggest using proceeds from renewable energy certificate (REC) or emissions trading markets to fund new energy efficiency and renewable energy projects. Both the Massachusetts and Maryland energy plans direct the state to use the proceeds from their participation in the Regional Greenhouse Gas Initiative (RGGI) auctions to fund new energy efficiency and renewable energy projects. The Massachusetts Clean Energy and Climate Plan for 2020 specifies that Massachusetts will invest over 80% of its auction proceeds in energy efficiency, with smaller amounts for renewable energy and other consumer benefit programs. These proceeds enable the state to expand its energy efficiency programs administered by the state's electric utilities over a three-year period (from 2010 to 2012). Additionally, in 2009, the Massachusetts Department of Housing and Community Development took advantage of $4 million in carbon dioxide allowance proceeds to replace more than 1,300 heating system units in low-income households.[103] Because Qualified Energy Conservation Bonds (QECBs) first became available for use in 2009 and the U.S. Department of the Treasury did not issue guidance on their use until 2012, only one state, Vermont, included this as a financing mechanism within its energy plan. Vermont's 2011 energy plan suggests using a portion of the state's QECB allocations to leverage energy improvement financing and for financing new clean energy projects. Because these are a relatively new financing mechanism, states are just now beginning to issue their QECB allocations.

I. Frequency of Plan Reviews and Updates

Planning processes are often cyclical rather than one-time events. A cyclical process requires review and revision of the plan at regular intervals. Of the plans reviewed from 39 states, 14 require a regular review process. Some states require—typically within the same legislation that established the energy planning process—that the plan be reviewed in regular intervals. Other plans suggest that the plan be updated as needed. Kentucky, an example of a state that does not require a regular review process, describes its state energy plan as a "living" document that should be updated on a case-by-case basis.

A cyclical process ensures regular review of the plan to ensure it reflects current energy needs, policy, resources, and other factors (e.g., price, supply, technology). The California Energy Commission (CEC) is required to prepare a biennial integrated energy policy report (IEPR) for the governor and state legislature, with updates due in even years. The IEPRs keep the Energy Action Plan process active and current. The Energy Action Plan is intended to capture recent changes in the policy landscape and describe intended activities to accomplish those policies.

Connecticut and Oregon also require a biennial review and update of the existing energy plan. The Oregon Department of Energy is required to review, present findings to the state legislature, and write updates for the State of Oregon Energy Plan every two years.[104]

A few states require a more frequent review cycle. Both Maryland and Massachusetts require an annual review of the energy plan and charge the State Energy Office with submitting a progress report to the governor and state legislature, respectively, at the end of each fiscal year. These reports contain documented successes and recommendations for additional actions or programs to achieve the energy plans' goals.

In February 2012, the Georgia Environmental Facilities Authority published the 2012 Georgia Energy Report, an update to the 2006 State Energy Strategy for Georgia. The prior update was com-

103 RGGI, Inc., Investment of Proceeds from RGGI CO2 Allowances, http://www.rggi.org/docs/Investment_of_RGGI_Allowance_Proceeds.pdf, February 2011.

104 Oregon is now currently working on its first 10-year energy action plan, which, if passed, is expected to replace the current plan. The Ten Year Energy Action Plan Task Force is an advisory committee appointed by Governor John Kitzhaber and is comprised of five Design Teams: Energy Efficiency and Demand Management; Resource Mix; Siting Issues; Transportation; and Governance.

pleted in 2009. The original 2006 energy plan proposed a continuous planning process to update the State Energy Strategy on a periodic basis. The energy plan urges the governor to develop a schedule for updating the State Energy Strategy at regular intervals, such as every three to four years, and establish the protocol for handling revisions. The state is currently on track in providing energy plan updates every three years.

In those states that do not have a predefined or mandated regular review and amendment process, the state energy plan is typically updated or replaced with the transition of newly elected officials. Most commonly, when a new governor is elected, he or she may issue an energy vision statement that also directs the State Energy Office or other planning body to create a new state energy plan based upon the governor's vision. In other instances, the state energy plan is updated or replaced in response to a major event or perceived challenge (e.g., a large natural disaster impacting energy supplies or a drastic rise or fall in energy prices).

J. Success Metrics and Implementation

Benchmarks for measuring success, or instructions for metrics and verification of the plan's effectiveness, can be built into the plan during the planning process. Inclusion of the state's current energy profile and suggestions for verifying changes can provide a system by which the plan's overall effectiveness and achievement of goals can be measured. A review of the status of meeting these benchmarks is helpful at regular intervals to ensure the plan is sufficiently doing what it is intended to do. As an example, Kentucky's plan, Intelligent Energy Choices for Kentucky's Future, clearly lays out the results that can be achieved if the plan is implemented, including the number of new jobs from a booming, diversified energy sector; production of four billion gallons of liquid fuels and 135 billion cubic feet of synthetic gas from coal; and a 50% reduction in net per capita carbon emissions. The Kentucky Department for Energy Development and Independence is responsible for measuring and tracking such metrics.

Another example, is the Rhode Island Energy Plan 2002, which directs the State Energy Office to develop and implement a measurement and evaluation plan independent of the Energy Plan. The Rhode Island measurement and evaluation plan is to consist of an annual energy savings report on its energy programs to track the response of government agencies to the recommendations of this plan.

Georgia's energy plan directs the Georgia Environmental Facilities Authority (the State Energy Office) to review the implementation of the plan and publish an annual analysis, the Energy Strategy Update, that describes implementation status and the strategy's impact on providing affordable, reliable, and environmentally responsible energy in Georgia. Examples of the type of data collected include the number of homes weatherized, the reduction in energy consumption, the amount of state funds allocated to energy efficiency retrofits in state facilities, and the number of people

Typical Energy Plan Format

Vision:
This is the overall purpose or objective of the plan from which all primary goals are developed.

Goals:
A plan may have only a few primary energy goals or several. Some plans have very specific primary goals, while others contain broad energy goals that are further defined by the plan's objectives and recommended actions.

Objectives:
Each primary goal is typically followed by objectives, which further define the goal and establish more specific priorities for achieving the goal.

Recommended Actions/Policies:
Each primary goal typically includes a set of specific recommendations outlining actions or policies needed to achieve the primary goal.

trained in new energy-related jobs. This annual review is intended to provide the state with current data to continuously improve the strategy and policies implemented.

Both the New York and Texas energy plans include specific sections offering implementation guidance and strategies for achieving the goals and recommended actions presented within the plan. The New York energy plan presents an implementation plan in a chart format that lists and identifies recommendations, action items, lead agencies, supporting agencies, collaboration and other action needed for progress, as well as milestones for completion.[105] New York's Planning Board tracks the progress of these activities and report on that progress annually via the Energy Planning website, www.nysenergyplan.com.

In Texas, the state's major energy regulatory, permitting, research, and assistance programs are dispersed throughout seven state agencies. The plan's implementation guidance acknowledges that the split of jurisdiction causes confusion for business and industry, and makes it more difficult to carry out a cohesive energy policy. The implementation plan suggests that Texas should create a council of member agencies or designate an official tasked with coordinating energy functions, and includes a list of the primary roles that the council or official should have.[106]

Next Steps and Conclusion

As of early 2013, there are at least 21 states with energy plans currently under development. At least five of these states did not have an energy plan at the time of NASEO's analysis. NASEO plans to continue to track the states' energy planning efforts to provide guidance and support to further promote the states' leadership in the energy sector. NASEO will also provide direct technical assistance to states on planning processes and substantive elements of state energy plans.

NASEO's primary goal in this effort is to encourage state energy planning and to institutionalize and formalize the process for state energy planning so that every state conducts quality planning efforts that capture the economic and environmental benefits of energy resources. In light of the lack of a comprehensive federal energy policy or plan, this is the states' opportunity to lead the way in shaping the nation's energy future. NASEO intends for these efforts to help build consensus toward a national plan that reflects states' energy priorities. Another goal is to highlight the expertise that lies within the State Energy Offices. Energy planning helps lay the foundation for an open conversation about expectations and goal setting in the energy forum

Although statewide energy plans differ in everything from their general format to their goals and recommendations, they all serve as a roadmap for achieving a prosperous and secure energy future. Achieving such a vision is beneficial for both the public and private sectors. Motivated by a desire to promote economic development, reduce GHG emissions, and increase energy reliability, the state energy plans analyzed in this report demonstrate that the states' visions are achieved through a wide mix of resources, infrastructure projects, financing mechanisms, and balance of deployment and R&D activities that rely on public-private partnerships.

There is no single method for producing a state energy plan. Some plans are mandated by legislation or Executive Orders. They differ in their outlook dates and the frequency with which they are updated. Though many states have tasked the State Energy Offices as the lead organizing and authoring agen-

105 See Volume I, Section 7 of the 2009 New York State Energy Plan for the implementation plan that identifies actions that will be taken over the planning horizon to advance the recommendations laid out in the State Energy Plan.
106 See page 70 of the Texas State Energy Plan for the plan's implementation guidance and list of roles and responsibilities for the recommended Council or Official.

cies, most state energy plans are produced through extensive stakeholder engagement processes involving other state agencies, private sector interests, and input from the general public. Also, although the emphasis on development of energy resources within the state varies, the majority of plans stress the development of a diversified energy portfolio to meet the states' economic, environmental, and security objectives. State energy plans provide an assessment of current and future energy supply and demand, examine existing energy policies, identify emerging energy challenges and opportunities, encourage economic development, and promote the wise use of resources.

A well-developed comprehensive energy plan can serve multiple functions. Such a plan can be referenced by policymakers in developing new energy incentives, rules, and regulations that may directly support one or more goals within the plan. This same plan can serve as a resource for public utility commissions and utilities that want to take a more proactive role in developing new energy resources or expanding existing electricity programs or directives. Industry, businesses, and investors may look at an energy plan to understand and capitalize on the state's energy priorities. State energy plans, individually and collectively, also inform the federal government of growing trends and energy priorities as well as states' energy, financial, or technical needs—allowing federal agencies to pinpoint where their support is most needed.

Overall, the energy planning process and a well-developed energy plan can position states to be more resilient to changes beyond the states' control, such as fluctuations in the global market for energy, federal regulatory changes, natural and manmade disasters. Additionally, a well-designed plan that is broadly supported by stakeholders, state officials, and agencies can assist states in adapting to and capitalizing on the ever-changing social, political, technological, and financial drivers in the energy arena. The energy planning process, which may include regular review and updating of a plan, is a beneficial means of bringing stakeholders together outside of the regulatory process.

Appendix A: Resources for States

The following is a list of resources for state and local governments interested in learning more about energy planning and plan development at both the state and community levels.

General Resources for States

1. The DOE Technical Assistance Program blog provides a brief overview of the strategic energy planning process. It offers connections with technical and programmatic experts, and share best practices about renewable energy and energy efficiency programs with your peers Read blog post: Every Journey Begins with a Single Step: the Strategic Energy Planning Process, December 2, 2010.

2. The DOE EERE Factsheet: Community Greening: How to Develop a Strategic Energy Plan, July 2009 provides for a more detailed description of strategic energy planning processes and considerations for community-level energy planning.

3. NASEO is collecting state energy plans and preparing a series of related resources. Visit http://www.naseo.org/stateenergyplans for more information.

4. For information on complementary finance incentives, policies, and rules and regulations to state energy goals, see the Datatbase of State Incentives for Renewables & Efficiency at: http://www.dsireusa.org/.

5. The Center for Climate and Energy Solutions (which succeeds the Pew Center on Global Climate Change) tracks state and regional climate activities. To view maps and descriptions of state and regional climate actions, visit: http://www.c2es.org/states-regions.

Decision and Analysis Tools for States

Below is a list of online resources for conducting analysis and comparing energy priorities.

1. The DOE's Office of Energy Efficiency and Renewable Energy offers a list of energy analysis tools. Visit the website to find analysis tools—models, software, and calculators—for analysis activities. Many of these tools cut across clean energy technologies or intersect topics such as market and policy analysis. A full list and direct links to Energy Analysis Tools is available at: http://www1.eere.energy.gov/analysis/tools.html.

2. The DOE's Office of Energy Efficiency and Renewable Energy provides a list of data resources for energy analysis. Visit the website to find select sources of data on energy efficiency and renewable energy technologies from throughout EERE and from the DOE national laboratories. These data resources provide information such as prices, savings, use, and state statistics by technology. Also included are links to more comprehensive data collections, policy data resources, and supply and demand forecasts. To access the list and direct links to data resources, visit: http://www1.eere.energy.gov/analysis/data.html.

3. The Argonee National Laboratory's Transportation Technology R&D Center has created the GREET Model, which allows users to assess GHGs, regulated emissions, and energy use in the transportation sector. For more information and to download the latest version of the GREET Model, visit: http://greet.es.anl.gov/.

4. The National Energy Technology Laboratory offers a wide range of energy analysis models and tools for both conventional and clean energy technology types. For a full list of models/tools and direct links to each, visit: http://www.netl.doe.gov/energy-analyses/refshelf/PubSearchResults.aspx?Source=PubType&PubTypeId=6&Offset=0

Appendix B: List of State Energy Plans Reviewed in this Report

State	Date	Plan Title
Alabama	-	-
Alaska	2010	Alaska Energy Pathway
Arizona	2013	-
Arkansas	2010	APSC Sustainable Energy Resources (SER) Action Guide
California	2010	Energy Action Plan 2008 Update
Colorado	2007	Colorado Climate Action Plan
Connecticut	2006 2007	Connecticut's Energy Vision 2007 Energy Plan for CT
Delaware	2009	Delaware Energy Plan 2009–2014
District of Columbia	2009 2010	Green DC Agenda Climate of Opportunity
Florida	2006 2008	Florida's Energy Plan Governor's Action Team on Energy and Climate Change Final Report
Georgia	2006	State Energy Strategy for Georgia
Hawaii	2000	Hawaii Energy Strategy
Idaho	2007	Idaho Energy Plan
Illinois	2009 2009	Illinois Energy Plan Governor Quinn's Comprehensive Energy Strategy
Indiana	2006	Indiana's Strategic Energy Plan
Iowa	2011	Energy Independence Plan
Kansas	-	-
Kentucky	2008	Intelligent Energy Choices for Kentucky's Future
Louisiana	-	-
Maine	2009	State of Maine Comprehensive Energy Plan
Maryland	2011	EmPowering Maryland
Massachusetts	2010	Massachusetts Clean Energy and Climate Plan for 2020
Michigan	2007	Michigan 21st Century Energy Plan
Minnesota	2001	Energy Planning Report
Mississippi	2010	Mississippi Energy Policy Institute's Roadmap for Mississippi's Energy Future
Missouri	-	-
Montana	2011	Schweitzer Energy Policy
Nebraska	2011	2011 Nebraska Energy Plan
Nevada	-	-
New Hampshire	2002	New Hampshire's 10 Year State Energy Plan
New Jersey	2011	2011 Energy Master Plan
New Mexico	-	Clean Energy Plan
New York	2009	2009 New York State Energy Plan
North Carolina	2010	North Carolina's Strategic Plan for Biofuels Leadership
North Dakota	2008	Empower North Dakota Comprehensive State Energy Policy 2008–2025
Ohio	-	-

Oklahoma	2011	Oklahoma First Energy Plan
Oregon	2011	State of Oregon Energy Plan 2011-–2013
Pennsylvania	2008	Energy Development Plan
Rhode Island	2002	Rhode Island Energy Plan
South Carolina	-	-
South Dakota	-	-
Tennessee	-	-
Texas	2008	State Energy Plan 2008
Utah	2011	Governor's 10-Year Strategic Energy Plan
Vermont	2011	Vermont Comprehensive Energy Plan
Virginia	2010	The Virginia Energy Plan
Washington	2010	2010 State Energy Strategy Update and Biennial Energy Report with Indicators
West Virginia	2007	West Virginia Energy Opportunities
Wisconsin	-	-
Wyoming	-	-

APPENDIX C: List of Acronyms

Organization	Acronym
American Council for an Energy Efficient Economy	ACEEE
California Energy Commission	CEC
Independent System Operator	ISO
National Association of Regulatory Utility Commissioners	NARUC
National Association of State Energy Officials	NASEO
National Governors Association	NGA
National Institute of Standards and Technology	NIST
Office of Energy Efficiency and Renewable Energy	EERE
Office of Weatherization and Intergovernmental Programs	OWIP
United States Department of Energy	DOE
United States Environmental Protection Agency	EPA
United States Government	USG
Utilities and Transportation Commission	UTC

Full Name/Title	Acronym
American Recovery and Reinvestment of 2009	ARRA
Carbon Capture Sequestration	CCS
Clean Energy Patent Growth Index	CEPGI
Combined Heat and Power	CHP
Compressed Natural Gas	CNG
Electric Vehicle	EV
Energy Efficiency Resource Standard	EERS
Greenhouse Gas	GHG
Gross Domestic Product	GDP
Integrated Energy Policy Report	IEPR
Integrated Gasification Combined Cycle	IGCC
Memorandum of Understanding	MOU
Plugin Electric Vehicle	PEV
Property Assessed Clean Energy	PACE
Qualified Energy Conservation Bonds	QECBs
Regional Greenhouse Gas Initiative	RGGI
Renewable Energy Certificate	REC
Renewable Fuel Standard	RFS
Renewable Portfolio Standard	RPS
Research and Development	R&D
State Energy Assurance Guidelines	EA Guidelines
State Energy Program	SEP

State	Abbreviation
Alabama	AL
Alaska	AK
Arizona	AZ
Arkansas	AR
California	CA
Colorado	CO
Connecticut	CT
Delaware	DE
*District of Columbia	DC
Florida	FL
Georgia	GA
Hawaii	HI
Idaho	ID
Illinois	IL
Indiana	IN
Iowa	IA
Kansas	KS
Kentucky	KY
Louisiana	LA
Maine	ME
Maryland	MD
Massachusetts	MA
Michigan	MI
Minnesota	MN
Mississippi	MS
Missouri	MO
Montana	MT
Nebraska	NE
Nevada	NV
New Hampshire	NH
New Jersey	NJ
New Mexico	NM
New York	NY
North Carolina	NC
North Dakota	ND
Ohio	OH
Oklahoma	OK
Oregon	OR
Pennsylvania	PA
Rhode Island	RI
South Carolina	SC
South Dakota	SD
Tennessee	TN

Texas	TX
Utah	UT
Vermont	VT
Virginia	VA
Washington	WA
West Virginia	WV
Wisconsin	WI
Wyoming	WY