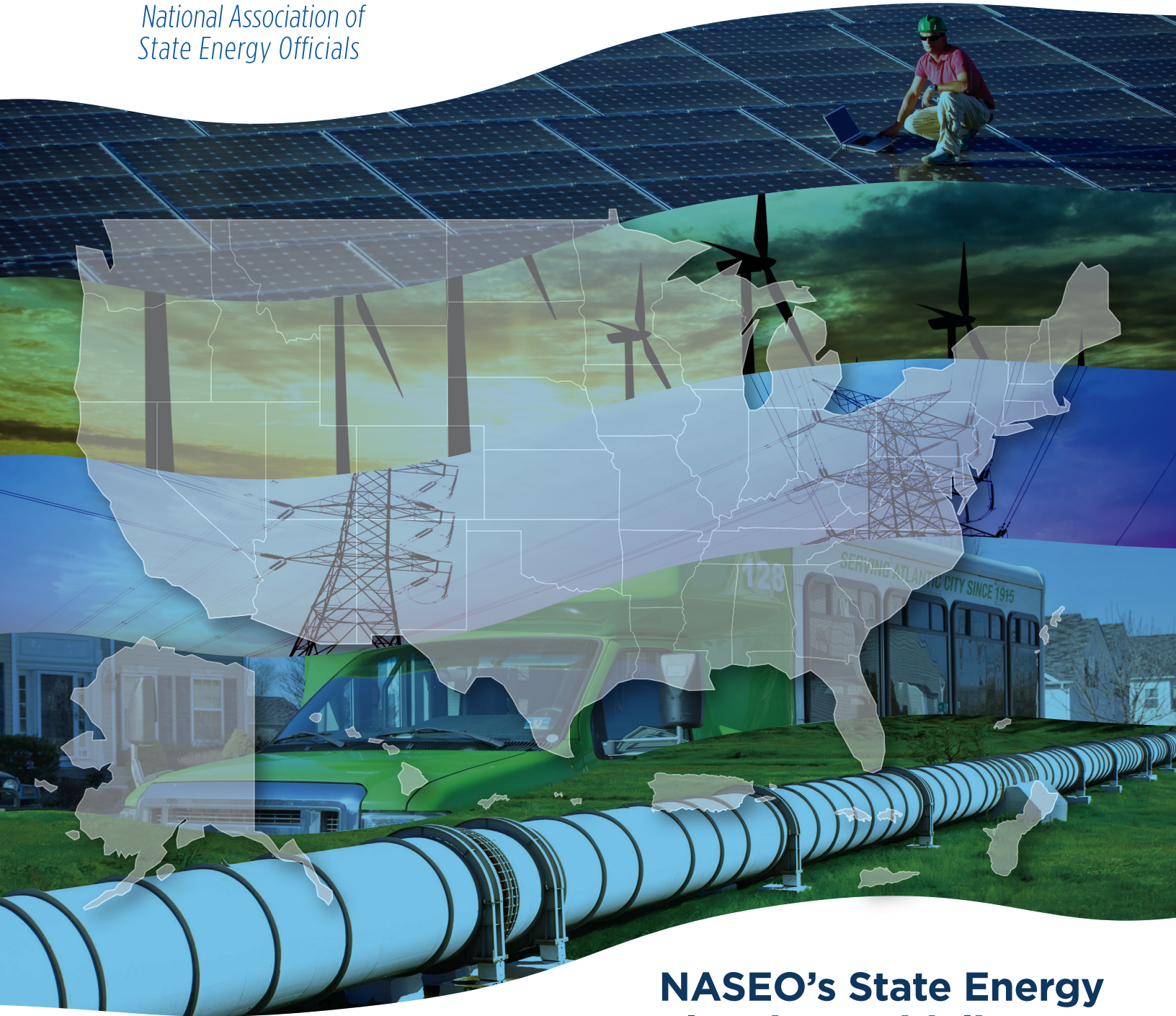




*National Association of
State Energy Officials*



NASEO's State Energy Planning Guidelines

Guidance for States in Developing
Comprehensive Energy Plans and
Policy Recommendations

Acknowledgements

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Table of Contents

Acknowledgements	1
List of Figures and Tables	3
Executive Summary	4
Introduction	7
The <i>Guidelines</i>: A Step-by-Step Process	9
Step 1: Establish a Requirement and Scope for a State Energy Plan.....	12
Step 2: Convene the Planning Team	18
Step 3: Develop the Vision for the State Energy Plan.....	21
Step 4: Collect and Analyze Data and Project Future Energy Needs	23
Step 5: Garner Stakeholder and Public Input and Feedback	28
Step 6: Outline Goals and Recommended Actions to Meet the Vision	32
Step 7: Draft the State Energy Plan.....	36
Step 8: Finalize, Adopt, and Implement the Plan	39
Step 9: Conduct Outreach and Education.....	40
Step 10: Monitor Progress and Update the Plan	40
Conclusion	43
Appendix A: Select Data Sources for State Energy Plans	44
Appendix B: Models for Energy and Emissions Data Analysis	46
Appendix C: Resources for Energy Forecasts	47

List of Figures and Tables

Figures

Figure 1. Steps in the State Energy Planning Process.....10
Figure 2. Key Stakeholders in the Planning Process.....17
Figure 3. General Outline for a State Energy Plan36

Tables

Table 1: Pros and Cons of Various State Energy Plan Initiation Methods.....12
Table 2: State Energy Plans by Legislation or Executive Order.....13

Executive Summary

State Energy Directors conduct comprehensive energy planning at the direction of the Governor or Legislature to establish a strategy or framework to meet current and future energy needs in a cost-effective manner, enhance energy system reliability, expand economic opportunity, and address environmental quality. State energy plans enable states to capitalize on existing energy resources, infrastructure, and human capital through targeted goals and directives to encourage economic development and, at the direction of the Governor, set forward-thinking energy policies for the state. In addition, they allow states to address stakeholder-identified objectives such as fostering competitive energy markets, promoting diverse energy supplies, and ensuring energy affordability and reliability. The National Association of State Energy Officials (NASEO) has tracked and analyzed states' energy plans for a number of years, and has identified best practices and lessons learned in planning process design and approach. The *NASEO State Energy Planning Guidelines* (the *Guidelines*) provide State Energy Directors with guidance, information and best practices that result in data-driven, stakeholder-supported comprehensive state energy plans and policy recommendations that address the unique needs and energy opportunities of their state.

NASEO prepared the *Guidelines* because the 56 State and Territory Energy Directors generally lead comprehensive energy planning processes on behalf of their Governors and Legislatures and play a key role in developing and implementing energy policies and programs at the state level. Because of this, the *Guidelines* recognize the leadership role of State Energy Directors and their offices in the development and review of state energy plans. While a State Energy Office may lead the planning process, collaboration with other state agencies throughout the development of a plan is encouraged to leverage the expertise and resources of those agencies and to ensure that state policy objectives are aligned across state government. Engaging the public and private sectors, local governments, investor and consumer owned utilities, petroleum product providers, and non-governmental organizations (NGOs), also allows the state to develop a holistic plan that integrates various energy sector priorities and supports stakeholder goals. State and local government agencies rely on state energy plans to inform legislative, administrative, and regulatory decisions and actions, and the private sector uses these plans to inform and guide their investment decisions.

The *Guidelines* suggests planning practices and processes to consider when developing state energy plans, but generally does not recommend particular energy topics or policies. Each plan must address state-specific needs, economic opportunities, legal authorities, and organizational structures. A well-designed energy plan should help state decision makers:

- Identify and vet strategies to accelerate energy-related economic development, and ensure policies and programs reflect market needs and opportunities;
- Ensure that new and existing policies and programs related to grid modernization, energy emergency preparedness, energy efficiency, and others are coordinated and complementary;
- Build consensus around state energy policy and investment decisions;
- Build a long-term energy roadmap that is based on widely accepted data and analysis;
- Manage risk (e.g., physical and cyber security) associated with energy markets to ensure that system reliability and integrity are maintained;
- Assign responsibility for specific energy actions and provide resources for successful implementation of plan recommendations;
- Enhance transparency and accountability within state government; and
- Serve as a guide for economic development, workforce training, and prudent stewardship of a state's natural resources.

There are a number of recommended actions that a state energy plan might include, depending upon the plan's declared goals and direction from Governors and Legislatures. For instance, energy efficiency goals can be supported by recommendations to implement cost-effective energy retrofits of public facilities, encourage private-sector financing of energy efficiency projects, and utilize utility ratepayer-supported energy efficiency programs. States seeking to reduce their dependence on imported oil may implement policies that promote the responsible development and use of in-state oil and natural gas resources or alternatives where those resources do not exist. Economic development goals may be met by outlining policies and programs in the state energy plan that will expand access to natural gas in rural and underserved areas. States seeking to create a more diverse electricity generation fuel mix may, for example, consider policies to extend the viability of existing nuclear power plants and/or increase the use of in-state renewable resources, and can use the state energy plan to examine emerging energy technologies, grid modernization opportunities, resource availability, and means to ensure electric grid reliability utilizing variable power sources. The *Guidelines* are a resource for states as they develop their goals and refine or update existing plans and policies. Within the *Guidelines* are the following ten steps that NASEO recommends for the comprehensive energy planning process:

Step 1: Establish a Requirement and Scope for a State Energy Plan

Step 2: Convene the Planning Team

Step 3: Develop a Vision for the State Energy Plan

Step 4: Conduct Data Collection and Projection Analyses

Step 5: Garner Public Input and Feedback

Step 6: Establish Goals and Recommended Actions to Meet the Vision

- Step 7:** Draft the State Energy Plan
- Step 8:** Finalize, Adopt, and Implement the Plan
- Step 9:** Conduct Outreach and Education
- Step 10:** Monitor Progress and Update the Plan

Since NASEO’s development of the original edition of the *Guidelines* in 2014, more than 20 states have developed new state energy plans or updated their existing plans. Many of these plans acknowledge the complex and rapid changes that are occurring in the energy sector in the form of, for example, low-cost, abundant natural gas and oil; renewable power and fuels; new energy efficiency and storage technologies; transportation electrification; retention of baseload nuclear power plants; physical and cyber security of the of the petroleum, natural gas, and electric systems; energy workforce development; climate change actions and resilience impacts; and affordability and equity for low-income consumers. Given the rate of changes to our energy system and the blurring of lines between producers and consumers of electricity, the time was right to significantly update NASEO’s *Guidelines* so states can leverage lessons learned, best practices and the latest thinking on state energy plan development and design.

The 2018 *Guidelines* include several important additions and changes from the previous edition, including:

- Updates to the recommended plan development process with lessons learned from managing stakeholder engagement and outreach;
- Guidance for states to consider in better engaging and addressing underserved energy markets;
- Information on and examples of the ways states are utilizing data in their plans, as well as potential future data needs for plan development; and
- Discussion of how to more deeply engage the executive branch in plan development as well as collaboration between different state agencies.

The *Guidelines* are a reference for states to use throughout the planning process and offer strategies for planners to assess the current energy landscape and set data- and consensus-driven goals. As State Energy Directors carry out the planning and policy development process on behalf of their Governors and Legislatures, the examples of robust data collection and stakeholder engagement recommended in this guidance document will aid states in producing a comprehensive plan that meets the needs of their citizens and maximizes the economic and environmental benefits of their energy resources. The *Guidelines* are a tool to aid state policymakers in ensuring that plans are comprehensive, strategic, and practical, and that they reflect a state’s unique energy needs and economic opportunities.

Introduction

Today's energy markets are in a state of constant change.ⁱ Many consumers and businesses seek more energy efficient products and demand a greater reliance on renewable power. The abundance of relatively affordable petroleum products has diminished states' policy focus on imported oil dependence. At the same time, products that were once powered primarily by petroleum products are now available in increasingly compelling electrified versions (e.g., vehicles, low-temperature heatpumps) and have the potential to increase electrical load. Most strikingly, a newfound abundance of low-cost natural gas has led to significant shifts away from coal for power generation as utilities take advantage of this trend to lower consumer electricity costs.

Well-designed planning processes address these changes and help to position a state to obtain, maintain, or regain an edge in the energy markets and economic competitiveness. Thus, the role of state energy plans and the state energy planning process is to help states comprehensively address these energy supply and demand challenges, target opportunities to support economic development, ensure a reliable energy supply, minimize societal costs, and maximize the benefits of energy production and efficient utilization.

A state energy plan is a package of strategic goals with recommended policy and program actions to support those goals. The recommended actions may involve the State Energy Director, the Governor, the Legislators, other state agencies, and the private sector. The attributes of an energy plan guide public – and in some cases private – policy and investment decisions, which may take the form of legislation, investment incentives, energy efficiency guidelines, and taxation. A comprehensive state energy plan encompasses current and trending fuel demand, supply, and price characteristics, as well as other factors such as job creation, economic development, environmental quality, energy security, resiliency, and health benefits. Planning can help to better prepare the energy system – asset owners and consumers – for market fluctuations and mitigate negative impacts.

The need for long-term energy planning is especially pronounced given the complexity and interdependency of energy infrastructure, and other critical infrastructure, and the gradual speed at which it can be upgraded. Many components of energy production and consumption infrastructure – power plants, transmission lines, transportation networks, pipelines, water and wastewater facilities, manufacturing, buildings, and homes – are aging and in need of upgrades or repairs. As these systems are replaced, thoughtful planning can ensure strategic investment in new infrastructure, and programs can help deliver economic, environmental, and health benefits throughout a state.

New energy challenges and opportunities have emerged in energy production, electricity, fuel distribution, manufacturing, construction, and transportation. Growth in domestic oil and natural gas production, increasingly cost-competitive renewable energy, changing weather patterns, and technological advances require new and innovative approaches to data analysis, forecasting, and policy assessment. States have an opportunity to develop energy plans that capitalize on new technologies and trends. However, these changes are accompanied by new challenges, such as an increased risk to critical infrastructure from both cyber-attacks and increasingly severe weather events. Sound planning helps prepare for and mitigate their impact, safeguard citizens, ensure the reliability of energy supplies, and protect the natural environment.

Comprehensive energy planning takes place in most states and is typically carried out by the State Energy Offices at the direction of Governors or Legislatures. Comprehensive planning helps address emerging and changing energy markets and establishes policies and programs that promote energy supply diversification and foster economic opportunities.ⁱⁱ Of the 42 state energy plans in existence in 2017, State Energy Offices led the development of or participated in the leadership team of 38 of the plans. While State Energy Offices typically serve as the lead author or coordinating entity, a state energy plan is most effective as a comprehensive, statewide coordination of policies and programs to meet defined goals and objectives. The interdependencies between the energy sector and others such as transportation, housing, finance, water, air quality, and agriculture reinforce the need for a coordinated approach.

As a Governor starts her or his term, they often turn to the State Energy Director to develop a comprehensive plan to offer recommendations, grounded in robust data and stakeholder engagement, for new state energy policies and programs. A comprehensive energy plan identifies strategies to encourage an array of energy, economic, and environmental benefits, including cost savings; job creation and retention; economic growth and competitiveness; air and water environmental quality; and security, reliability, and resiliency. Note that the plan itself is not intended to *produce* these benefits, only enable them. State energy plans provide a structure that is accepted by a broad stakeholder community, offers quantifiable and achievable goals, assigns responsibility to specific public and private entities, and links financing mechanisms to each goal to translate the plan into practical implementation.

Recognizing the enabling benefits and value of state energy planning, in 2017, NASEO conducted a baseline analysis of 24 state energy plans created between 2013 and 2016.ⁱⁱⁱ The plans analyzed by NASEO ranged from Governors' energy policy statements to legislatively required and regularly updated state energy frameworks for energy policy development. A baseline analysis of those state energy plans identified new and emerging trends across states and compared differing planning approaches. These *Guidelines* integrate lessons learned from

NASEO's baseline analysis, from input from seasoned State Energy Directors, and from discussions with planning experts. The sections that follow offer a recommended systematic planning process, including a step-by-step guide for states as well as best practices from state energy plans.

The *Guidelines*: A Step-by-Step Process

Based on NASEO's review of recently-updated or new state energy plans, as well as interviews with former and current State Energy Directors, our analysis has identified several key energy planning elements that have the greatest value. Energy plans should be:

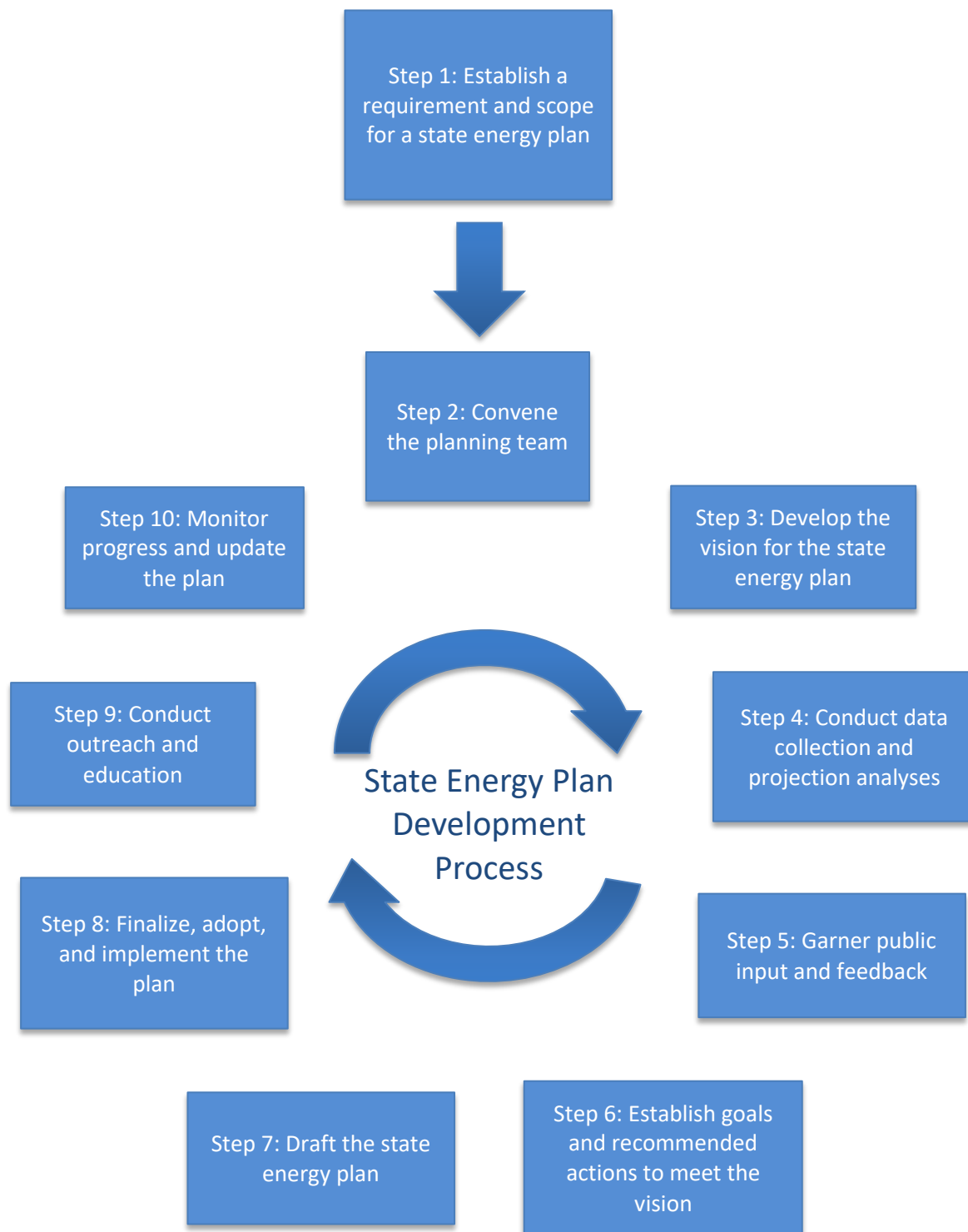
- **Comprehensive:** Takes into consideration a holistic perspective of the state's energy profile, including all energy resources and end-use sectors and input from the key public and private stakeholders;
- **Adaptable:** Projects future energy supply and demand and models the potential impacts of supply shifts, geopolitical risks and uncertainties, technological change, and other factors that affect near- and long-term energy needs;
- **Guiding:** Provides a framework that allows state and business decision makers to make informed and educated judgments based on the predictability ensured by a defined and structured plan; and
- **Strategic:** Offers a deliberate and vetted plan of action that lays out clear recommendations and actions that are set within goals that are measureable and achievable.

These *Guidelines* present 10 steps to guide states through the comprehensive energy planning process. Nevertheless, plans and processes will require customization and tailoring based on state requirements and resources. Although the various steps within this document are presented sequentially, some of the steps may need to be completed concurrently, repeated cyclically for routine evaluation, and updated periodically to ensure maximum impact.

A crucial step after the completion of a plan is examining its impacts on the state's policy, program, and market landscape. **In Washington, for example, the state energy office releases a state energy strategy every four years. Every two years, it issues a biennial report that examines whether the Legislature, Governor, and state agencies have taken the plan's recommended actions.** This cyclical process and compliancy review is an effective mechanism to ensure the plan is impactful.

The process flow chart, or "Steps in the State Energy Plan Development Process," presented below (Figure 1) illustrates the cyclical nature of the state energy planning process.

Figure 1. Steps in the State Energy Planning Process



The purpose of each of the steps is:

- **Step 1: Establish a requirement and scope for a state energy plan** to give the plan the appropriate influence and authority.
- **Step 2: Convene the planning team** that reflects a cross-section of energy sector stakeholders that will provide guidance on plan development.
- **Step 3: Develop an accurate vision** to reflect the plan’s overarching purpose and energy objectives.
- **Step 4: Conduct data collection and projection analyses** to establish a baseline and assessment for current and future energy needs.
- **Step 5: Garner public input and feedback** to collect insight from consumers, businesses, industry, and other stakeholders.
- **Step 6: Establish goals and recommended actions** to outline the strategy and process to achieve the vision and objective(s) of the state energy plan.
- **Step 7: Draft the State Energy Plan** to provide a clear representation of the planning process and recommended actions.
- **Step 8: Finalize, adopt, and implement the plan** to ensure that the plan meets the objectives as laid out in the authorizing vision and establish the plan as the strategy for meeting the state’s energy needs.
- **Step 9: Conduct outreach and education** to guarantee that the public is aware of the state energy plan and planning process as needed (e.g., provide minutes from planning team meetings) and recognizes it as the overarching state energy strategy.
- **Step 10: Monitor progress and update the plan** to assess the accomplishments and progress and formulate any necessary modification to the analysis or actions.

State energy planning processes vary in many ways, including in the structure of the planning team members, content of the plan, degree of detail, data and analysis employed, number of recommended actions, final plan length, and means of distribution. However, most state energy plans include the following:

- Assessment of the current energy profile, industries, and institutional capacity, with a focus on the unique energy assets within a state;
- Energy outlook, forecast, or projection of future needs including supply, demand, and costs;
- Vision of the desired energy future;
- Challenges to be addressed;
- Goals and strategies;
- Prioritized and specific actions with timeline and evaluation and measurement criteria; and
- Identification of potential financing and funding mechanisms to support implementation of the recommended actions.

While each state’s plan will be unique in substance based on factors such as energy resources, stakeholders, and scope, the steps provided in this guidance document can be applied to each state’s energy planning process to result in a comprehensive and valuable plan.

Step 1: Establish a Requirement and Scope for a State Energy Plan

The state energy planning process is often initiated through a top-level state authority such as an executive order, statute, or agency directive (see Table 1). This section explores how a state authority establishes the requirement for a state energy planning process or plan. For reference, links to executive orders or statutes that require an energy planning process and/or plan are provided. In addition, this section describes considerations for establishing a planning team, and discusses the resources required to develop a plan in the following subsections:

Step 1.a. – Establish a Requirement for State Energy Plan

Step 1.b. – Identify the Planning and Leadership Teams

Step 1.c. – Classify the Resources Needed to Develop a State Energy Plan

Table 1: Pros and Cons of Various State Energy Plan Initiation Methods

Initiation Method	Pros	Cons
<i>Statute</i>	Long-lasting; difficult to undo	May be difficult to pass; needs sponsor(s) to assist with passage
<i>Executive Order</i>	Relatively easy to implement	Can be changed/revoked by following administration
<i>Agency Directive</i>	Very easy to implement	Agency may not have proper statutory authority to act on own to create plan

Step 1.a. – Establish a Requirement for State Energy Plan

Typically, a Governor or Legislature initiates the state energy planning process through an executive order or enabling legislation that requires either a one-time planning event or a cyclical process that ensures revision, review, and evaluation of the plan at regular intervals. Executive orders and legislation generally offer a timeframe for a state energy plan’s development (e.g., three months to one year), as well as an outlook for the plan (e.g., 5, 10, or 20 years).

State energy plans that are required by executive order and/or statute possess authority and influence, increasing the likelihood of stakeholder participation and acceptance. A state energy plan that is rooted in a statute or executive order will give credence and weight to the plan and can improve acceptance by key stakeholders and the public, and will also provide consistency in long-term energy planning. After a plan is developed, integrating elements of the plan into state executive or legislative actions may also give it greater significance. The overall objective is to have a useful and guiding plan that stakeholders acknowledge as the framework for making energy policy and program decisions. Further, states that are required to have a plan and/or planning process often include an intermediate step between plan due dates that provide an opportunity to recognize accomplishments, update analyses, and assess external factors that may necessitate modifications to the plan.

Thirty states plus the District of Columbia have plans that were initiated through state legislation or executive order (see Table 2). An additional 12 state energy plans were either initiated by the Governor (without executive order) or created by a state agency (e.g., state energy office, administrative services division, economic development agency, environmental office, or other energy-related entity) that proactively identified a need for a plan.

Table 2: State Energy Plans by Legislation or Executive Order^{iv}

State	Energy Plan	Statute / Executive Order
Arizona	empower Arizona: Executive Energy Assessment and Pathways	Executive Order 2014 - 04
California	2015 Integrated Energy Policy Report (IEPR)	Warren Alquist Act (Division 15 of the Public Resources Code) Senate Bill 1389 (Bowen and Sher, Chapter 568, Statutes of 2002)
Colorado	Colorado State Energy Report 2014	Executive Order D 2011-003

Connecticut	2013 Comprehensive Strategy 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)
District of Columbia	EnergySmart DC	Clean and Affordable Energy Act of 2008 (CAEA)
Georgia	2014 Georgia Energy Report	Executive Order 02.28.06.02
Hawaii	Hawaii Clean Energy Initiative (HCEI) Road Map 2011 Edition	Section 226-18, Hawaii Revised Statutes (HRS)
Idaho	Idaho Energy Plan	HCR 062 (2006 session) and HCR 013 (2007 session)
Maine	Maine Comprehensive Energy Plan Update	Me. Rev. Stat. Ann. tit. 2 §9
Massachusetts	Massachusetts Clean Energy and Climate Plan for 2020	Chapter 298 of The Global Warming Solutions Act (GWSA, or the Act) of 2008, and as codified at M.G.L. (c. 21N)
Michigan	Michigan 21 st Century Energy Plan	Executive Directive No. 2006-02
Minnesota	Energy Policy and Conservation Quadrennial Report 2012	Minnesota Statutes, section 216C.18
Mississippi	Energy Works: Mississippi's Energy Roadmap	MS Code § 57-39-11 (2015)
Missouri	Missouri Comprehensive State Energy Plan	Executive Order 14-06
Montana	Montana Energy Future	Senate Bill No. 225 (Chapter 242, Laws of 1993) and Montana Code Annotated 90-4-1001
New Hampshire	New Hampshire's State Energy Strategy	HB 443 (2001 Session, not codified)
New Jersey	2015 Energy Master Plan	52:27:F-14
New York	2015 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	Energy Policy Council Report	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=Jobs 2014 Pennsylvania State Energy Plan	Pennsylvania Energy Development Authority and Emergency Powers Act of 1982
Rhode Island	Energy 2035: Rhode Island State Energy Plan	§ 42-11-10, Statewide Planning Program, Rhode Island General Laws
South Carolina	Energy in Action: South Carolina State Energy Plan	Section 48-52-210 of the South Carolina Code of Laws
Texas	State Energy Plan 2008	Executive Order RP-29
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	West Virginia Energy Plan 2013-2017	WV State Code 5B-2F-1d

Source: An Overview of Statewide Comprehensive Energy Plans: From 2002 to 2011. NASEO. July 2013. List updated in 2017 for plans created from 2012-2016.

Step 1.b. – Identify the Planning Team

For purposes of the *Guidelines*, the “planning team” will refer to the group of stakeholders tasked with leading the development of the state energy plan. Overall, the planning team is responsible for providing direction and maintaining the timeline and budget during the plan development process.

State energy planning executive orders and legislation generally designate an agency to lead the development of the plan, as well as particular energy representatives and/or government leads to serve on a planning team. Alternatively, the lead agency may assemble the planning team. The planning team is typically a subset of state agencies and the broader public stakeholder base that is interested in providing strategic direction for the plan. Identifying the appropriate stakeholders to involve in the planning team is a critical point in the process. While a large group may require careful management, getting buy-in from targeted leaders ensures a broad level of involvement from a cross-sector of energy players. The planning team will define the direction and substance of the plan, so it is important for the state to consider the end goal(s) before selecting the final lead and/or stakeholders to be involved in the planning process.

The stakeholders involved on the planning team will vary across states. According to NASEO's analysis, the majority (27) of the states with an energy plan as of early 2017 relied on the State Energy Office as the lead in outlining, drafting, and finalizing the plan. Of the 17 states that did not use the State Energy Office as the lead author for the state energy plan:

- Nine included the State Energy Office in the key stakeholder group responsible for authoring the plan;
- Six states had plans authored by the Governor's Office; and
- Two had plans developed by the Public Utility Commission (PUC).^v

Planning teams, whether prescribed in the legislation or executive order, or appointed by the Governor or lead agency, often include specified public (state and local) and private sector energy representatives by title or sector. **The New York State Planning Board consists of 13 members lead by the president and chief executive officer of the New York State Energy Research and Development Authority (NYSERDA, the state's energy office) and includes the chair of the public service commission; department heads from agriculture, state, labor, homeland security, health, transportation, environmental conservation, and budget; appointees of the Governor; speaker of the House; Senate president; and an officer of the independent system operator (non-voting).**

In states where a planning team is not required, the Governor may convene the cabinet secretaries or agency directors from energy, environment, economic development, agriculture, and other relevant authorities by request or specific appointment. The Governor may also decide to include Legislators and external representatives from local governments, utilities, businesses, investment firms, industry, consumer advocacy groups, energy companies, and other affiliations.

A comprehensive planning team will include energy-related public and private sector representatives that reflect the state’s industries, economic and intellectual capacity, and energy resources, drawing from the stakeholder groups identified in Figure 2.

Figure 2. Key Potential Stakeholders for the Planning and Leadership Teams

Public Sector	Private Sector
<ul style="list-style-type: none">• Governor’s office• Key energy legislator(s)• State Energy Office (SEO)• Public Utility Commission (PUC)• Environmental agencies• Related agency directors• Local government and tribal leaders• Military installation representatives• Consumer advocates• Research entities	<ul style="list-style-type: none">• Utility representatives• Major industry groups• Business leaders• Energy producers• Financial institutions• Private academic/research institutions• Energy-focused non-profit organizations• Environmental justice community• Others: civic groups, faith-based groups, community groups

The planning team should maintain regular and open communication with the Governor, Legislature, or other designated authority throughout the process. Coordination between the planners and leadership is essential in ensuring the plan stays on track and meets the intended needs.

Step 1.c. – Classify the Resources Needed to Develop a State Energy Plan

The budget and timeline for plan development must be determined before the planning process begins. When a state has required a planning process by legislation or executive order, budget and timeline are likely identified in the authorizing legislation or executive order. If the plan is delivered by a lead agency, it is likely that the agency’s budget will include a line item to cover the activities conducted under the energy planning process. If the plan is required, it should provide the expected outlook for the plan (e.g., 5-, 10-, and 20-year duration) and the schedule for drafting and reviewing the plan (e.g., the state’s energy plan will be drafted within one year and reviewed every two years). Otherwise, the planning team will identify and acquire the budget and establish the timeframe with guidance from state leadership.

States pay for energy planning using state appropriations, utility assessments, foundation funding, and in-kind resources such as national or private labs and universities. Where the planning process is designated to the State Energy Office or other agency, the effort generally becomes part of that agency’s annual budget. If the planning team is selected from a broader group of stakeholders, they typically volunteer or provide their time in-kind to the planning

process. If the state selects a contractor(s) to facilitate the planning process, perform data analysis and projections, and/or draft the plan, direct funding may be required. In this case, states often circulate a request for proposals to solicit contractors who will work closely with a lead agency or planning team to administer the process. Once the plan is finalized, states may conduct outreach and education, which will also require funds.

Federal programs also support the planning process for state energy plans. For example, the U.S. Department of Energy administers the U.S. State Energy Program, from which each state derives formula funding to support their state-identified energy priorities. This is the only cost-shared program administered by the U.S. Department of Energy that provides funds directly to the states for the Governor-designated State Energy Office to allocate in designing and implementing energy efficiency and renewable energy programs and demonstration projects. Competitive awards available under the U.S. State Energy Program also offer an opportunity to fund implementation of a state's plan.

The time it takes to complete the development of a state energy plan can range from several weeks to one year. The scope of the state energy plan will help to define the timeline and related milestones (this will be discussed further under Step 2). The total cost of the energy planning process will depend on the timeline, scope of the plan, use of consultant(s), and outreach and distribution.

Step 2: Convene the Planning Team

The second step in the energy planning process is to convene the planning team. From this point onward the steps outlined in this document may begin to occur in parallel. The following sub-steps are included in this section to support the administration of a planning team:

- Step 2.a.** – Define and assign roles and responsibilities
- Step 2.b.** – Establish a structured process for meetings and input
- Step 2.c.** – Set the timeline and milestones
- Step 2.d.** – Determine how to manage resources

While planning team structures vary across states, the key is to have an organized, effective, and engaged group of members with diverse subject matter expertise and market perspectives. By taking the time in early planning team meetings to establish a systematic process and division of responsibilities, the planning team's time will be spent on developing the plan rather than procedural issues.

Step 2.a. – Define and Assign Roles and Responsibilities

At the initial meeting of the planning team, the lead agency may designate specific leadership roles for the members (e.g., lead facilitator, chair, vice chair, secretary, treasurer, etc.) if these roles are not already defined. Roles may help delineate leadership in the event of gridlock in the decision-making process. Each of the roles should have well-defined responsibilities. For example, a secretary would be responsible for keeping a record of meeting discussion and decisions, which may prove helpful when engaging the public and making the planning process more transparent. Members of the planning team may also be assigned specific sections of the plan. For instance, a department of transportation may take the lead in developing the content for the transportation section of the plan, or a state environmental agency might take the lead analyzing air emissions impacts of the proposed energy strategies. These components of the comprehensive plan are integrated into a single document by the lead agency.

To delineate roles and responsibilities, the planning team may choose to draft bylaws or a charter. This will help confirm the planning team’s mission, scope, decision making process, and expectations. Beyond responsibilities for developing substantive content of the plan, duties might include leading meetings, logging action items, taking meeting minutes, and organizing meetings. Staff from various state agencies or planning team member organizations/companies may be brought in to support administrative duties, logistics, and/or facilitation.

The planning team may also want to develop a state energy plan website to publicly share the minutes from each meeting, input collected, analysis, and drafts of the plan as they become available. This is an effective tool to showcase the planning team’s efforts and share information as the energy planning process evolves. States have also utilized town hall style meetings and designated listservs to share updates and solicit feedback from interested stakeholders.

State Spotlight: Iowa Energy Plan

The [Iowa Energy Plan](#) was led by then-Lieutenant Governor Kim Reynolds as well as the Iowa Partnership for Economic Progress (IPEP) board members, the Iowa Energy Office (within the Economic Development Authority) and the Iowa Department of Transportation. They were supported by a consulting team and received specialized project support from two NGOs. The Iowa Energy Plan contracted out its data analysis to several consulting groups. Those groups ran a number of analyses on Iowa’s current energy mix, employment trends and projections, and future changes to the state’s energy mix based on different policy scenarios. The planning team then used those results to inform the policy options the plan presents later on in the document.

Step 2.b. – Establish a Structured Process for Meetings and Input

The planning team should consider setting up a system for decision-making (e.g., identifying voting versus non-voting members, consensus voting) and communications (e.g., in-person meetings versus virtual meetings, or a combination of both). Throughout the energy planning process, the planning team members' input will need to be collected, vetted, and prioritized. Early agreement on how to make decisions will maximize the effectiveness of the planning team.

Creating an agenda for each planning team meeting can help keep the discussion on track and monitor progress from one meeting to the next. Agendas should include time for updates from planning team members or workgroups, as well as prioritization and agreement on suggested actions or recommendations. Some states open their planning team meetings to the public.

Once the scope of the state energy plan is established, planning teams often create workgroups to review current state policies and resources and make specific recommendations within topic areas (e.g., energy efficiency, renewable energy, transportation). Workgroups bring together planning team members with certain expertise and background in specific topic areas. Separating the planning team into workgroups will allow the planning team to collect data and draft recommendations across a variety of sectors or topics concurrently. The working groups can then report their findings and suggestions to the full planning team for review.

If the plan is required under statute or initiated by the Governor or Legislature, the planning team should also hold an initial meeting with that authority to discuss the scope and outlook for the plan. In addition, scheduling recurring check-ins throughout the planning process with the authority will keep them apprised and ensure the plan is on track and in line with their expectations.

Step 2.c. – Set the Timeline and Milestones

The planning team will need to establish a clear timeline for the development of the plan with critical milestones defined throughout. Working back from the expected due date of the plan and identifying target points for completion of certain activities and progress measures will keep the planning team on track. **The 2015 New York State Energy Plan schedule of events illustrates a 70-month timeline with specific dates for planning board meetings, public comment periods, and interim and draft plan report submissions.^{vi} Development of the 2015 Rhode Island State Energy Plan took approximately 16 months from the time data collection and research commenced through the adoption of the plan in October 2015.^{vii}** The timeline for every state will be different depending upon the states' resources, priorities, and needs. As

stated earlier, many of these steps may occur in parallel. A Gantt chart may be an appropriate tool to establish the project timeline.^{viii}

Specific milestones in the state energy planning process may include scheduled planning team meetings, data collection due dates, submission for deliverables laid out by the working group, anticipated final draft date, and other key activities by date that must take place throughout the energy planning process. The steps laid out in the *Guidelines* provide a starting point for the establishment of specific milestones.

Step 2.d. – Determine How to Manage Resources

The planning team should be aware of and monitor the resources allotted to the energy planning process. Upfront consideration for key expenses (e.g., contractor costs to perform projection analysis for one month, outreach activities, state agency director and staff time) will promote the efficient use of resources. Identifying a planning team member to serve as treasurer or accounting director may improve the tracking of resources and budgets.

Step 3: Develop the Vision for the State Energy Plan

The vision is the guiding statement or set of statements that drive the remainder of the plan’s development. The initial prompt for the development of a state energy plan – through an executive order, legislation, or other means – may establish a scope or vision for the state’s energy future. Based on data and projections, the planning team should assess whether this scope is realistic and if any amendments are necessary (or possible). Otherwise, the planning team will develop the vision statement(s) for the state energy plan.

A focused vision statement(s) describes the overall objective of the plan. Vision statements are typically only a sentence or two in length. **South Carolina’s State Energy Plan presents the state’s policy priorities in one sentence: “The State Energy Plan is designed to maximize (to the extent practical) reliability, environmental quality, energy conservation, and energy efficiency while minimizing the cost of energy throughout the state.”** The plan’s policy directions or goals each support that vision.

Planning teams may also consider developing multiple vision statements by energy or end-use sector, focusing on thematic priorities; for example, **Wyoming’s state energy plan includes the following guiding principles, designed to encourage economic development and power the nation while preserving and protecting the state’s natural environment. The principles support:**

“Energy security that ensures a stable and reliable supply for our citizens, manufacturing, power generation, transportation and industrial bases; environmental cooperation that protects the state-federal partnership, provides for sustainable environmental protection, acknowledges the environmental gains supported by economic progress, and ensures that state governments play the primary role in regulation; energy affordability that allows all Americans to take advantage of our country’s robust energy resources to power communities and create jobs; and energy as an economic driver that powers modern civilization.”

Keep in mind that the vision for the plan should reflect the outlook for the plan (i.e., is the planning team considering a 5-year, 10-year, or 20-plus-year outlook?). The reality of particular energy resources and markets is such that certain actions may not be possible within a shorter timeframe. Vision statements often address the planning team’s broad and overarching priorities for the energy sector and include variations of the following declarative statements:

- “Demonstrate state leadership;”
- “Expand economic opportunities;”
- “Encourage investment;”
- “Save taxpayers money;”
- “Lead in research and development;”
- “Lower energy costs;”
- “Reduce risks and vulnerabilities;”
- “Capitalize on emerging technologies;”
- “Ensure affordability and reliability;”
- “Reduce the environmental impacts of energy use;”
- “Increase security, reliability, and resilience;” and
- “Enhance use and production of domestic resources.”

An important consideration in developing a State Energy Plan vision concerns equity and access issues. Specific portions of a state’s population—often those with limited financial means, living in apartment rentals or manufactured housing, or located in remote or rural areas—may receive a disproportionately low share of incentives, program resources, or opportunities to invest in energy upgrades than those with higher incomes or in centrally-located communities. The planning team may choose to have equity and access for these “underserved markets” be a high priority in their plan, and can use their Vision Statement to focus in on the need for custom-tailored policies and programs. ***For instance, a key principle in New Hampshire’s 2014 State Energy Strategy is to “Do more to reduce costs for our low-income neighbors” and cites the crucial need for customized and expanded programs:***

“New Hampshire’s low-income residents are the most vulnerable to high energy costs, as they spend a higher proportion of their income on energy yet have the least access to funding to make efficiency improvements to reduce those costs. Estimates show that more than 80,000 low income homes are in need of weatherization, but current

funding sources are sufficient to weatherize only approximately 1,000 homes annually. The State should consider mechanisms to increase funding to better meet this need, in cooperation with other programs that could have synergies in delivery.”

The vision statement should also be cognizant of the tremendous change underway in how electricity is generated and consumed, and its potential impact on disadvantaged populations. Consideration should be given to the danger of a bifurcated electricity marketplace where lower income communities do not receive the benefits of new technologies, services and products when these are enabled solely by the private market. States should also consider the role of distributed energy resources, the need for enhanced reliability and resiliency and the emerging potential of energy storage systems and microgrids. Grid modernization and other “smart” and emerging technologies should also be considered during the vision phase and potentially addressed in the State Energy Plan. *For example, South Carolina’s State Energy Plan addresses grid modernization within the context of resource planning, noting that:*

“Meeting customer expectations for power and providing immediate restoration when an outage does occur require enhancements and improvements to South Carolina’s electric infrastructure. A modernization of the existing infrastructure will...allow electric utilities to respond to challenges such as battery storage and microgrids, expanding customer expectations, and increasing environmental regulation.”

Step 4: Collect and Analyze Data and Project Future Energy Needs

Step 4 involves identifying the critical data sets that will lay the foundation for the state energy plan. Data collection and analysis enables the planning team to consider options within realistic parameters and set benchmarks for measuring progress.

Following data collection is the assessment of the state’s future energy needs based on projections of population; energy demand, supply, and price; and economic growth. It is incumbent upon all planning team members to ensure that the plan is based upon facts and robust methodology. This section explores the collection and analysis of these projections in the following substeps:

Step 4.a. – Collect and analyze state energy data and statistics

Step 4.b. – Collect and analyze projections of future energy needs

Step 4.a. – Collect and Analyze State Energy Data

The planning team should collect and analyze baseline data to understand the state’s current energy production, usage, and needs. Before launching the data collection process, the planning team should ask the following questions:

- What data does the state team need to complete a well-rounded and comprehensive plan?
- What is the current profile of the state’s energy resources, industry, and workforce capacity? What assets can the state highlight as part of its energy profile?
- What emerging social and economic factors will affect energy usage and demand?
- What data can be used to identify gaps or trends in the state energy landscape?
- What other energy-related plans and policies exist at the state level that can be leveraged by the state energy plan?

A planning team often uses a state agency, research entity (e.g., university, non-profit), or a consultant to conduct this analysis. While this step may seem overwhelming, specific entities within the state—including the state energy office and Public Utility Commission (PUC)—monitor and track energy data regularly. Relying on these agencies can help reduce resources expended by the planning team.

As a starting point, the planning team should review previous energy plans and relevant documents from other agencies, including environmental, transportation, economic development, and land use plans; end-use specific plans (e.g., an industrial or commercial buildings efficiency plan); topic-specific plans (e.g., a solar roadmap); and the energy assurance or security plan.^{ix} Reviewing complementary plans may help highlight gaps, reinforce cross-sector priorities, and ensure that the state is communicating its priorities consistently.

The planning team should evaluate state and local energy-related policies and programs, including statewide laws and funding sources, such as energy efficiency or renewable energy portfolio standards, building energy codes and (if any) state appliance energy efficiency standards, key regulations, statutes, codes, executive orders, etc. Local government entities may also have high quality/highly granular data that could inform the planning process, and may have local requirements and programs concerning building energy use and energy-related land-use and transportation planning. The planning team may want to review additional outside documents to identify any associated opportunities. These resources may include:

- Utility plans (e.g., integrated resource plans). These plans may or may not be readily available depending on content; the state’s PUC may be a useful point of access for

regulated utility information.^x Distributed renewable energy facilities should also be inventoried and considered during plan and policy development. Consumer-owned utilities may be able to provide additional information.

- Pipelines and storage facilities for refined petroleum products, including propane, as well as storage facilities and fueling sites for alternative fuels.
- National and international energy forecasts, to identify national and global trends. The most current Annual Energy Outlook produced by the U.S. Energy Information Administration (EIA) may be a useful starting point.^{xi}
- Corporate commitments, including corporate renewable energy and/or sustainability goals. Private sector entities within the state may offer potential opportunities to consider within the plan. Typically, these types of energy pledges are shared publicly through a major corporation's website.^{xii}
- Industrial and workforce capacities of the state. This includes an assessment of primary industries (e.g., mining, manufacturing, transportation, agriculture, financial, service, construction) related to the energy sector. The intellectual capacity evaluation includes a review of laboratories, research institutions, universities, entrepreneurs, and other entities whose mission is to promote technology development, create markets, promote investment, and commercialize products. The state energy plan can serve to encourage industry, technology, and investment growth, so a careful review of these capacities is important. Assessing the state's industry and intellectual capacities will help to ensure that the potential opportunities that exist in these areas are considered as part of the plan.

The planning team should also collect hard data of the state's energy profile, including statistics about energy usage by sector and end user, energy prices and expenditures, fuel imports and exports, transmission and distribution infrastructure, generation, and production. This information is available by state and territory on the U.S. EIA website, as well as through the U.S. Department of Energy's State and Local Energy Data (SLED) tool, which includes local-level data that may inform planning processes.^{xiii} This is also a key point at which a State Energy Office, PUC, or other state agency (e.g., emergency management) can contribute, given their responsibility for tracking and monitoring energy data. All of this data will provide the planning team with a clear and comprehensive account of the state's energy profile on which to base the energy plan's goals and recommended actions.

The planning team should also review basic energy and related economic, demographic, environmental, and other data from state, federal, and other sources. Data on average incomes, employment rates, poverty rates, housing profiles, distribution of industries (including agriculture, fisheries, and forestry), urban-suburban-rural profile of the state and its counties,

air quality “non-attainment” areas, and impaired waters are among other information that state energy planners can find useful for understanding energy-related needs and opportunities to address state objectives. Such data can come from federal, state or local agencies as well as private sources. Among federal data sources are the U.S. Departments of Agriculture, Commerce (including the Census Bureau and Bureau of Economic Analysis), U.S. Housing and Urban Development, U.S. Department of Interior, U.S. Department of Labor (including Bureau of Labor Statistics), and U.S. Department of Transportation and U.S. Environmental Protection Administration (EPA) as well as the U.S. EIA (with some data sources discussed below). State agriculture, economic development, environmental, housing, labor, transportation, and other agencies may have pertinent data. In addition, environmental information (e.g., emissions data, “nonattainment” areas for National Ambient Air Quality Standards) may also be collected. Technical tools, databases, and software for modeling environmental conditions are available through the EPA. The EIA also tracks some environmental data (e.g., annual emissions of carbon dioxide in the electric power industry by state). However, the state environmental or air agency generally monitors and has access to this information and can provide the necessary data elements. A list of data sources used in many state energy plans is included in Appendix A.

Spotlight: State Data Needs and EIA Data

Various types of data have been crucial to the development of many state energy plans. These include:

- Oil and natural gas operations, including data on water usage in the oil and natural gas industry; oil extraction, transportation, and distribution; and crude oil forecasts.
- Energy efficiency, including modeled and actual results of specific projects.
- Information on building stocks and associated energy uses; public facility energy consumption data, including the MUSH (municipalities, universities, schools, and hospitals) market; and information on energy use and billing for all utilities (not just investor-owned utilities--IOUs).
- Energy-related R&D expenditures.

During the energy planning process, states should identify data needs and consider whether additional effort should be made to collect hard-to-obtain data. One helpful resource for states is offered by the U.S. Energy Information Administration (EIA). EIA offers a wide range of information that states can access to inform their state energy plan. EIA’s State Energy Portal website includes data on:

- Electricity statistics, including the largest power plants by generation capacity, retailers of electricity, retail sales and revenue, generation mix, and net metering;
- Projections of energy supply and demand, and trends in generation sources through 2050;
- Consumption statistics, including household energy use, and petroleum and natural gas usage by sector; and
- Summary and analysis sections for each state.

States can use this data to develop baselines, set goals, and inform policy decisions.

After collecting data, the final stage is to conduct analyses to identify opportunities for improvements in the energy system. This is the starting point for the development of the goals in the state energy plan. Many planning teams conduct a Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis or gap analysis to determine the starting point and set goals.^{xiv} Showing where the state is currently underutilizing its energy resources can provide a powerful visual to interested stakeholders and can be used to support the state’s proposed policy actions. The gap analysis can also be enhanced by stakeholders who can provide “on-the-ground” insights and experiences relevant to specific issues or market segments. Appendix B includes sample tools that may be used by states to understand system limitations and identify opportunities for improvement.

Data collection will be combined with the projections developed in the next step to formulate a complete perspective of the state’s current and future energy needs and, ultimately, to inform the objectives, goals, and actions of the energy plan.

Step 4.b. – Collect and Analyze Projections of Future Energy Needs

Quantifying the state’s future energy needs can be based on projected electricity and transportation fuel production and consumption patterns separated by source and/or end-use sector. The factors that influence these projections will include energy availability and price expectations, environmental impacts, and climatological models. The planning team may consider developing projections based on different assumptions to identify sensible pathways forward within the energy plan.

Some utility and supplier data will be useful in this process. Electric utilities may be required to file sales and demand forecasts with the public utility commission. Some of this data may not be readily available to protect competition; if these types of entities are part of the planning team, collection this data may be a much easier task.

Studies of “energy potential” should also be consulted or developed for various energy resources, including for conventional fuels, renewable energy, and energy efficiency. Such studies will help shape the assumptions used in the planning process. Studies regarding transmission and distribution of energy or industry forecasts provide data to consider as well. Energy savings potential studies may be particularly useful in crafting strategies for underserved market segments such as low-income residences and facilities and housing located in rural and remote areas. As an example, several states and communities have taken stock of energy use in their affordable multifamily properties in order to inform the development of specific utility and financing programs in this market.^{xv}

Economic forecasts and models are important to the planning process because they project the data around different environmental and/or economic policy scenarios to determine the range of potential impacts to a state's energy infrastructure and economy in the future. Thus, economic and environmental forecasting should be part of the cost-benefit or risk management framework that a state employs in the course of developing a state energy plan. EIA has much of this data available for use on its website to assist State Energy Officials and other members of the planning team with the planning process. Planning teams can pull this data directly from the site to aid in their analyses. A list of resources that may help states when developing energy forecasts is included in Appendix C.

State energy planners may wish to consider special attention to underserved and challenged communities and sectors in planning future energy needs, including needs for energy-related services, investment, and assistance. Demographic projections prepared by economic development, social service, housing, transportation, and other agencies can signal needs and potential challenges and opportunities that may accompany the changing age structure of the population (e.g., aging populations have more retirees on fixed incomes), patterns of population movement (urban-suburban-rural split, growing or shrinking populations affect cost of utility service, and affect transportation and building energy use), and shifting profile of business and employment. Particular challenges may attend to low-income communities in both urban and rural areas. At the same time planning for such potential changes can help identify policy and program needs as well as opportunities, such as for using locally produced energy resources and improving energy efficiency.

The data collection and analysis process for state energy planning can be extensive. **Vermont and New Hampshire utilized a consultant to perform statistical energy and scenario modeling to develop the states' near- and long-term numeric goals and the supporting policy and programmatic recommendations included in their state energy plans. The 2011 Vermont Comprehensive Energy Plan also included the projected economic impact of the modeled electricity policies recommended within the plan.** While some states hire consultants, others collect and analyze data in-house. EIA data and other resources can empower a state to analyze information and develop projections internally, though each state will need to decide how best to allocate resources during the planning process.

Step 5: Garner Stakeholder and Public Input and Feedback

One of the most critical actions in the state energy planning process is that of public communication, which includes both outreach and gathering feedback. Communication will elevate the visibility of the plan, attract valuable input from energy stakeholders, facilitate public support, and improve government transparency and accountability. Broad acceptance

for the state energy plan is essential to reinforce it as the primary energy strategy for meeting future energy needs. Organized and facilitated engagement allows the public to be heard on the policies, programs, and solutions they hope the state will include in the comprehensive energy plan.

The approach to public communication will vary by state. Some state planning teams may choose to get public input before drafting the goals and action items. Others wait until a final draft is available to request public feedback. Often, teams employ a combination of these approaches to engage the public throughout the process. Increasingly, states are using an online format to collect public input; however, there are still many state planning teams that have held in-person public forums at locations throughout the state. Also, continuing lack of broadband availability in many rural areas and among low-income residents should be considered as planning teams seek input and communicate to stakeholders and the public at-large. The budget will affect this decision, as holding multiple in-person public forums can be costly.

To keep costs down, the planning team must be strategic in choosing the location, timing, and content of meetings (e.g., to cover both urban and rural areas, collect input from key target markets, and ensure that underserved and underrepresented market segments [such as low-income housing owners and tenants] have the opportunity to participate or voice their opinions). **The Steering Committee for the South Carolina State Energy Plan, a 12-member committee appointed by the South Carolina Energy Office with representatives from all sectors of the energy industry, managed five public meetings throughout the state as well as over 45 subcommittee meetings.**^{xvi} Planning teams sometimes choose to separate the forum participants into small groups to engage in topical discussions. A recorder should be on hand to capture the comments in a format that allows the planning body to deliberate later.

Announcements informing the public about the details of the public forums—dates, times, locations—often are distributed through local media, online news sites, and state agency communications. To prepare for the forums, states often request web-based registration and comment submission prior to the events. Building relationships with local government contacts can help raise awareness of these meetings and may bolster the public input process.

A summary from each of the public forums or a compendium of all public input can show how the recommendations collected were considered and incorporated into the final plan. The summary can be distributed on the state energy plan website,^{xvii} making the planning process more transparent and credible.

Broader public outreach might include an information campaign that can help facilitate active public participation, heighten awareness, and foster understanding of energy issues. Multiple types of outreach and communication strategies can be employed to support public involvement in the plan's development. Open educational events, tailored outreach (e.g., public transportation summits that promote alternative fuel and gasoline reduction measures), public training events, and workforce development opportunities that align with the plan's vision and goals, will offer a comprehensive public engagement approach. Factoring in the costs for these types of outreach is also a key component of the budget for the energy planning process.

State Spotlight: Missouri Comprehensive State Energy Plan

Governor Jay Nixon invited more than 50 leaders from across the state to participate in the development of the Missouri Comprehensive State Energy Plan in 2015 and established topic-focused Working Groups. The Missouri Division of Energy hosted seven public meetings, each around a different energy topic. Members of the public could attend those meetings and provide input. In addition, the Division set up a website to enable members of the public to provide comments on the draft Plan. Thanks to those efforts, 514 individuals served on one or more working groups, 394 members of the public participated in at least one public meeting, and the Division collected an additional 194 comments on the Plan through its website.

Step 5.a. – Best Practices to Consider When Engaging Stakeholders in the State Energy Plan Process^{xviii}

Stakeholder engagement is a vital component of the planning process. However, a poorly-designed stakeholder engagement process may lengthen the time needed to draft the state energy plan as well as create unnecessary conflict between stakeholders while failing to produce meaningful suggestions for plan improvements. The planning team should consider the following steps to create an efficient and constructive stakeholder engagement process.

1. Establishing Proper Parameters and Using a Straw Proposal

When beginning a stakeholder engagement process, the planning team should establish a clearly defined scope for the process and set of deliverables to be completed by its end. Identifying key pieces of the planning process that require stakeholder input, the time horizon for which to receive input on those pieces, and the process by which the team will gather stakeholder feedback is important to ensuring that the stakeholders understand the process and can present their feedback effectively in a timely manner.

In addition to establishing proper parameters around the stakeholder engagement process, an important aspect the planning team should consider when engaging stakeholders is the

development of a straw proposal of the plan and hypothesized policy goals. Stakeholder engagement is more focused and productive when stakeholders can respond to a high-level proposal instead of generating ideas for a plan without a framework. Providing background information and education around key concepts in the plan can also help stakeholders better grasp the planning team's vision and respond more constructively to questions proposed by the planning team or lead agency.

2. Encouraging Coalitions and Alternative Proposals

Creating coalitions of stakeholders with similar areas of energy expertise can help focus the discussion, but the planning team should consider limiting responses by coalitions of stakeholders to only the sub-elements of the plan on which they should focus. Identifying effective advocates for alternative proposals and introducing potential allies to one another can further strengthen the planning process. While groupthink may be an issue when creating coalitions of stakeholders, having a diverse set of viewpoints represented in each coalition may help to discourage groupthink and highlight potential deficiencies in certain policy solutions of which the team should be aware.

It may also be useful to allow stakeholders to come up with alternative proposals to what is originally presented in the draft plan. Alternative proposals to certain policy suggestions can strengthen the overall plan by identifying options that have merit but the team may not have considered earlier in the planning process. The team should consider encouraging the submission of alternative proposals to tackle a specific issue. When encouraging alternative proposals, the planning team should also provide multiple avenues to receive comments, to encourage submissions from stakeholders who may be uncomfortable sharing ideas in a group setting.

3. Responding to Constructive Comments

Oftentimes, stakeholders will provide substantial comments on the proposed plan. These comments are useful in helping the state focus or clarify its policy recommendations. If stakeholders provide constructive alternative proposals to policies outlined in the plan, states could prioritize written responses towards those proposals. The planning team can also respond to defenders of the status quo and supporters of the plan in its current form after they have responded to the alternative proposals. It may be useful to consider tallying or counting support for current proposals, or responding to themes in the comments, rather than to each comment individually, in order to reduce the time and energy needed for comment response. However, summarizing comments may leave out important smaller details that stakeholders had emphasized in the engagement process.

4. Comparing Alternative Policy Solutions

After the planning team has engaged and responded to stakeholder proposals, it may then compare alternatives for each policy within the current proposal. The final policy recommendation should be based on a comparison of proposed alternatives and an explanation of why the team is choosing to go in a certain direction with its final policy recommendation. The team should evaluate the pros and cons of each alternative, recognize that the preferred proposal may have drawbacks, and acknowledge that alternative proposals may have benefits as well.

Step 6: Outline Goals and Recommended Actions to Meet the Vision

The next step is for the planning team to determine the goals and recommended actions that will direct the state towards meeting the energy needs and vision.

Planning teams will develop goals and recommended actions in various ways. Goals can be separated into short-, medium-, and long-term time horizons to make the plan more manageable. Typically, goals and recommended actions fall into a few general implementation categories, such as:

- Policy actions and Executive Orders;
- Legislative authority;
- Regulatory actions; and
- Program development or enhancements (e.g., establishes an energy education program, create a revolving loan fund).

States should consider the independent role and jurisdictional authority of the Public Utility Commissions and other regulatory bodies if regulatory actions are addressed within the plan, as well as the role of unregulated consumer-owned electric and gas utilities. State plans that include policy recommendations that are adopted by the Governor can prompt the Public Utility Commission to take action, and Commissioners can use their expert judgement and statutory mandate to evaluate which policies to adopt during their proceedings. State energy plans can be used to expand the record used by Commissioners and can be used as the backbone for regulatory policy adoption.

Some teams choose to arrange their recommended actions by implementation measure, suggesting specific executive, legislative, agency, or private-sector actions. For actions that require financial support, the team should designate a specific financing mechanism. Possible financing mechanisms to consider are addressed later in this section. The following sub-steps

address how states should establish goals and define recommended actions to meet those goals as part of the overall vision for the plan:

Step 6.a. – Establishing goals

Step 6.b. – Developing recommended actions to meet each goal

Step 6.a. – Establishing Goals

State energy plan goals tend to be high-level directives in support of the overall vision. Those goals can be either mandatory or voluntary. Mandatory goals are established through regulation and are binding on certain parties to fulfill them. For example, a state’s Renewable Portfolio Standard requires its utilities to produce a certain percentage of their electricity from designated renewable sources by a certain date. Voluntary goals may be established through regulation or executive order to encourage entities to reach certain milestones on their own.

In many cases it may be useful for a planning team to construct goals by applying SMART goal principles.^{xix} SMART is an acronym that a state can use to guide its goal setting. Its criteria are commonly attributed to Peter Drucker's Management by Objectives concept. To help make sure state goals are clear and reachable, each goal should be:

- **Specific** (simple, sensible, significant);
- **Measurable** (meaningful, motivating);
- **Achievable** (agreed, attainable);
- **Relevant** (reasonable, realistic and resourced, results-based); and
- **Time bound** (time-based, time limited, time/cost limited, timely, time-sensitive).

Some examples of state energy plan goals are provided below:

- **Increase the amount of natural gas processed in North Dakota by 64 percent to 75 billion cubic feet per year by 2012 (Empower North Dakota 2008);**
- **Three end-use sector goals for Vermont by 2025: 10 percent renewable transportation, 30 percent renewable buildings, and 67 percent renewable electric power (Vermont Comprehensive Energy Plan 2016);**
- **By 2025, 50 percent of Kentucky’s coal-based energy facilities will be equipped with carbon management technologies (2008 Intelligent Energy Choices for Kentucky’s Future); and,**
- **Connecticut’s Low-Income Strategy: Develop programs to address health and safety pre-weatherization measures; incorporate energy efficiency measures into upgrades of state-administered housing; improve existing means-tested energy assistance**

programs; target funding to address split incentives; expand outreach and financing options for businesses in low-income communities to achieve energy efficiency (2013 Connecticut Comprehensive Energy Strategy).

The planning team should develop a detailed narrative explaining the rationale for each goal. The narrative for each goal should define the following:

- **Objective:** Identify the purpose of the goal and how the goal helps achieve the vision(s) for the plan;
- **Timeline and Milestones:** Establish a general time/date by which the goal should be met with any relevant milestones up to the final date of completion, as well as a metric to determine how the goal is met; and
- **Baseline:** Current state energy data, including electricity generation mix and energy workforce compositions, as well as historical energy use trends, will help establish a baseline and allow the state to measure progress towards achieving goals.

Federal policies and regulations may also influence the design of state energy plan goals. The U.S. Department of Energy, U.S. Environmental Protection Agency, Federal Energy Regulatory Commission, U.S. Department of Agriculture, U.S. Department of Transportation, and Internal Revenue Service are federal entities whose regulations and programs may directly affect comprehensive energy planning efforts. Leveraging federal policy drivers and programs that apply to the state's policy priorities is an effective way to enhance state-federal collaboration.

Step 6.b. – Develop Recommended Actions to Meet Each Goal

Once the planning team establishes its goals, policy and programmatic recommendations should be established to meet those goals. Recommendations should include detailed action plans and milestones for implementation. Where possible, responsibility for implementation or oversight of each recommendation should be assigned to a state agency. Each recommended action should outline particular funding mechanisms and measurement criteria based on existing state data to ensure the action is financially supported and tracked.

The planning team should also consider barriers to completing the recommended actions. The planning team may focus on accommodating emerging technologies, evolving consumer behaviors, possible environmental hazards, transmission challenges, and unpredictable supply, demand, and pricing issues. The estimated health, air, and economic benefits of the recommended actions may also be presented in the plan.

Coordinating the State Energy Plan with the Energy Emergency Plan

States are increasingly pursuing means to improve the reliability of energy systems serving their citizens. Recent natural disasters, pipeline accidents, and the growing threat of cyber security have substantially elevated Governors' interest in addressing energy emergency preparedness or energy assurance. In addition, grid modernization activities are also being addressed as part of state comprehensive energy planning to ensure economic growth and enhance the reliability of electricity critical infrastructure. For these reasons, it is imperative that the planning team review and evaluate the state's energy assurance plan to identify gaps and ensure consistency in messaging across plans. The energy assurance plan will detail the state's strategy to mitigate and respond to energy emergencies as well as build resiliency against future events. Also included in the energy assurance plan are the various state agencies' roles and responsibilities and detailed procedures for responding to an energy emergency (whether man-made or natural). The *NASEO-NARUC State Energy Assurance Guidelines* and *NASEO's Guidance for States on Petroleum Shortage Response Planning* were developed to assist states in their planning efforts.^{xx} To ensure that energy assurance and comprehensive energy planning reinforce one another, NASEO recommends that states include the following within their comprehensive state energy plans:

Regularly Update the State Energy Assurance Plan

Any number of factors can affect a state's exposure to vulnerabilities and threats within the energy sector. These include infrastructure capacity needs, availability of energy resources, natural disasters, emergent cyber threats, demographic shifts, and changes in global energy markets. In order to account for the changing energy landscape, states should review their current energy assurance plans at least every two years to include responses and actions to all hazards that might affect energy resources upon which they rely. Plans should also be updated if there has been any significant reorganization that results in a change to the roles and responsibilities of the agencies that are assigned in the plan. In addition, states should include an assessment of their petroleum and liquid fuels allocation plans since the petroleum and liquid fuels industry is more disparate and not subject to an overall state or federal regulatory regime as are the electricity and natural gas utilities.

Many energy assurance plans include emergency contact lists as appendices and it is important to keep these lists updated. Key state contacts include the states' designated Energy Emergency Assurance Coordinators; those contacts should be updated annually.^{xxi} Copies of the plans and lists should be maintained in both electronic and hard copy and in locations accessible during an emergency. The more data and information that are collected, analyzed, and organized prior to an emergency, the greater a state's ability to avoid or mitigate the effects of an energy emergency.

Most states have not updated their energy assurance plans since 2012, and there is not a strong history of tying these plans to a state's comprehensive energy plan. Going forward, the plans should reference one another and the goals in each plan should be synergistic particularly in how they relate to building more resilient energy infrastructure that can help mitigate risks.

Step 7: Draft the State Energy Plan

While these *Guidelines* provide direction for state energy planning teams in the overall development of an energy plan, this section provides an outline for the written plan itself. The content of a state energy plan will be unique to each state’s forecasted energy needs and constraints, as well as state-specific political, economic, and social drivers. Although plans differ in the specific vision, goals, and recommended actions, the following general content considerations can be applied to any state energy plan (see Figure 3).

Figure 3. General Outline for a State Energy Plan



A brief description of each of the general content elements of a state energy plan is below.

1. **Executive Summary.** Presents two to three pages that capture the essence or vision for the state energy plan. The executive summary should highlight explicit recommendations or action items, review topical areas discussed within the plan, and provide a brief description of the stakeholder engagement and plan development process. This section is often “from the Governor,” and in some plans the Governor provides an introduction or opening note to set the tone of the plan and his/her vision for the state’s energy sector.
2. **Scope and Purpose.** Provides an introduction that outlines the scope and overarching goals of the state energy plan and sets expectations for the reader.
3. **Vision.** Describes the vision in detail so that it clearly depicts the intended outcomes once all elements of the state energy plan are adopted and implemented. This section illustrates how the state energy plan’s recommendations harmonize with all current, applicable energy plans, policies, programs, laws, executive orders, and trends.
4. **Current Energy Profile, Policies, and Programs.** Presents the current energy profile of the state (e.g., characteristics of energy production, consumption data, prices and expenditures, import/export overview, etc.). This section should include visual aids (graphs, charts, etc.), as well as projected production and consumption trends based on work completed early in the planning process. It includes an assessment of existing policies and programs, including a review of their costs and benefits.
5. **Future Projections and Needs.** Addresses the energy forecast models used to inform the recommended actions and documents assumptions and key variables that may affect the projections.
6. **Goals and Recommended Actions.** Includes a complete listing of the goals and recommended actions being offered in the plan organized by responsible entity (e.g., Legislature, specific state agency), goal, energy type, or end-use sector. The recommended actions should follow the “SMART” framework outlined earlier in this document.
7. **Implementation and Timeline.** Establishes an implementing agency or strategy for the goals and recommended actions and includes milestones and duration to set an end date by which each should be accomplished.

8. **Financing Mechanisms.** Determines the “pay-for” strategies for the goals and recommended actions to ensure that the plan is financially sustainable.
9. **Measurement and Evaluation Strategies.** Explains the strategies used to measure results of the state energy plan, including specific metrics that will be used to gauge success in implementation of each goal and recommended action. This section should also clearly define responsibilities and assign leaders to implement each of the state energy plan’s specific recommendations.
10. **Challenges and Solutions.** Identifies specific barriers to completing the goals outlined in the energy plan (such as technological changes, evolving consumer behaviors, possible environmental hazards, regional transmission challenges, and unpredictable supply, demand, and pricing issues) and offers potential solutions.
11. **Summary.** Provides a summary section to review important elements of the state energy plan. This section should include commitments to report on plan implementation, procedures for modifying the plan, and a projected cycle for updating the plan.
12. **Glossary.** Includes a glossary of terms and abbreviations used in the plan.
13. **Acknowledgements.** Acknowledges the contributions of the lead planner, planning/advisory team, and other stakeholders who have provided key input.
14. **Appendices.** Includes appendices, such as data sets used, staff analyses performed in constructing specific state energy plan recommendations, complete documentation of assessments performed or used in the preparation of the state energy plan, etc.
15. **References and Resources.** Provides a list of references used in the development of the plan. Also provides any resources that support the plan.

Step 8: Finalize, Adopt, and Implement the Plan

This step focuses on the finalization and adoption of the state energy plan. Typically, the planning team will complete the written state energy plan and present it to the appropriate authority (e.g., Governor, Legislature) for approval. In some states, this will trigger a series of follow-on actions. Regardless, this step is needed to gain approval from the state authority to accept the plan and initiate implementation.

States will have a variety of follow-on actions. For example, **the statute authorizing the New Jersey Energy Master Plan requires the planning team to provide copies of the state energy plan to the Governor and members of the Legislature, advertise the existence of the plan in local media, and hold a series of public hearings. The planning team then considers the testimony provided at the public hearings and modifies the plan accordingly. Once the planning team adopts the plan, the final version is submitted to the Governor and Legislature.** The planning team or lead agency should respond to any final questions and defend or amend the plan as needed. Because the planning team is likely to have received updates throughout the planning process, the review and approval process may happen relatively quickly (depending on the state's requirements and associated timeline for approval). Once approved, the state energy plan should be made publicly accessible, and the state may begin to implement the policy and regulatory changes recommended in the plan.

The task of implementing certain policies or recommendations will usually be assigned to either the Governor's Office, the state Legislature, the State Energy Office, or other state agencies. The State Energy Office will often take the lead in coordinating actions and engage with decision makers to ensure that they are implementing the plan as written. Stakeholders may also use the plan as a tool to influence policy development in the Legislature, Governor's Office, or state PUC proceedings.

Obtaining the Governor's support for the plan as well as getting assistance from the Governor's office in implementing the plan can help ensure the plan stays on track. **As then-Lieutenant Governor, Kim Reynolds led the development of the Iowa Energy Plan in 2016, and as now-Governor, she has made plan implementation one of her administration's priorities.**

By maintaining communication between different state actors and acting as a plan "champion," the State Energy Office can help ensure that the plan is properly implemented and the state continues on its path toward its desired energy future.

Step 9: Conduct Outreach and Education

Once the state energy plan is approved, the state will provide it to key stakeholders, state agencies, local governments, businesses, industry, the media, and the public. The development of an overall outreach strategy will help the state to tailor its information to target audiences and build local understanding and support for the plan.

In some cases, the planning team may provide the state energy plan in various formats to accommodate widespread dissemination of the plan across multiple media outlets (e.g., version of record, press release, video presentation). Regardless of the format, states may consider using a graphic designer to give the final version(s) of the state energy plan a professional appeal.

Another option for building commitment and support is to host local events to showcase the plan and its recommended actions. These events can be held in various locations throughout the state or in the state capital, and the state may wish to host a series of meetings as a "road show" to unveil the finished product. Such public outreach may be required by legislation or statute. Community events help to build interest and commitment to implementation of the plan's various measures. The planning team may consider selecting a spokesperson(s) for the state energy plan outreach campaign and presentations. This spokesperson should hold a key role in the development of the state energy plan and be knowledgeable in the various energy issues presented within the plan.

The extent of the outreach strategy will depend on the state's planning budget. For limited budgets, a website is a cost-effective form of communication. For example, **the New York State Energy Planning Board, responsible for conducting the planning process, is also tasked with tracking the progress and recording milestones met in the implementation of the *New York State Energy Plan* on a public website, www.nysenergyplan.com.**

Step 10: Monitor Progress and Update the Plan

Following the release and distribution of the energy plan, the state should continue evaluating, tracking, and monitoring its progress. Before the plan is released, the planning team or assigned lead agency (e.g., the State Energy Office) should be tasked with tracking and monitoring the state energy plan.

The planning team should develop a strategy upfront to monitor plan implementation and progress. Each goal and recommended action in the plan should include verifiable metrics to ensure that progress can be clearly measured.

- **Measuring progress and implementation:** Progress can be measured in a number of ways—jobs created and retained, increases in state revenue from energy-related activities, energy savings, number of new installations, reduced greenhouse gas emissions, etc.
- **Process for collecting data:** The process by which data is measured, collected, and summarized should remain consistent in all monitoring efforts to ensure reliable progress reports and accurate success metrics. For example, if data on energy savings from public buildings is first collected and analyzed using a mechanism such as Portfolio Manager, all energy saving data should be collected using that same performance assessment tool.
- **Reporting protocol:** Progress should be reported consistently using a standard format and periodic reporting cycle (e.g., every two years).

States across the country recognize the importance of monitoring implementation progress. **The Rhode Island Energy Plan 2015 directs the State Energy Office to develop and implement a measurement and evaluation plan independently of the Energy Plan. The measurement and evaluation plan consists of an annual report that details progress made on implementing the plan’s recommended strategies and on the progress made towards achieving the plan’s performance goals.**

Public reporting can help to build accountability and transparency. Progress can be displayed through the state energy plan public website that tracks and monitors the plan milestones, timelines, and other developments. **Minnesota’s 2025 Energy Action Plan includes indicators of success to see if a strategy in a plan is working.**^{xxii} The agency monitoring progress for the plan should examine the policies and programs effectuated by other branches or agencies of state government, as energy production and consumption are affected by multiple facets of government. Energy initiatives by local governments, in aggregate or for larger municipalities, may also be considered when monitoring the progress and updating a plan.

Another public outlet to highlight the plan’s progress is a state press release distributed by the planning team or Governor. Periodic press releases can showcase successful implementation of the state energy plan and resulting benefits (e.g., number of jobs created, energy savings, new construction, advances in emerging technologies). This not only serves to alert the public to successes that can be attributed to the plan, but also highlights the legacy role of the state energy plan and keeps the roadmap timely and relevant.

The planning team or lead agency may need to modify the plan. If the state has not met or needs to adjust certain goals or action items, there should be a clear process for making

modifications. Prior to the plan's adoption and release, the planning team should establish a transparent process for modifying and updating the plan. This is the point at which the energy planning process comes full circle.

A cyclical energy planning process also should require review and revision of the plan at regular intervals. Establishing a schedule for regular plan updates will ensure that the plan adequately reflects current realities and the state's evolving energy objectives and needs.

The process for reviewing and amending the plan should include both necessary *ad hoc* modifications depending on changing circumstances (these can also be considered mid-course corrections) in addition to regular updates. In many states, the enabling legislation for the development of the state energy plan requires review at regular intervals (e.g., every two years). For example, **the California Energy Commission is required to prepare a biennial integrated energy policy report (IEPR) for the Governor and Legislature as an update to the energy plan, with updates due in even years. The IEPRs keep the Energy Action Plan (EAP) process active and current. The EAP is intended to capture recent changes in the policy landscape and describe intended activities to accomplish those policies. In Oregon, the state 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.**^{xxiii}

Elements that should be incorporated into the modification and amendment process include the following:

- Assigning responsibility for the review and update of the state energy plan to the most appropriate state agency as the lead and sub-agency(ies) as support.
- Evaluating the effectiveness of the state energy plan overall to assess whether the overarching objectives and goals are still relevant to the state's current energy landscape, capabilities, priorities, and needs.
- Updating the state energy plan with the following:
 - Verified energy data based on recent tracking and monitoring;
 - Current state energy policies and any recently enacted policies, laws, or regulations impacting the energy sector; and
 - New state energy goals, priorities, capabilities, and resources.
- Engaging stakeholders and the public to ensure continued acceptance of the state energy plan. This may include periodic meetings with stakeholders and the public to report on progress and solicit feedback on the plan to reflect the state's current energy landscape.
- Adopting the updated plan with endorsement from state leadership.

The method for modifying and updating the state energy plan should recognize the variability in the energy sector. The state’s energy needs, uses, resources, and capabilities will advance over time and raise the need for new and different responses and actions. This is where the justification for a flexible state energy plan is most evident. Depending on the state’s planning process, this step often completes the cycle and triggers it anew as the plan is monitored and updated according to the state’s needs.

Conclusion

Comprehensive state energy planning is a key tool for Governors and Legislatures to advance their state’s energy-related economic development, security, and environmental quality goals. Recommendations found within state energy plans – grounded in robust data collection and reflective of extensive stakeholder input – inform the development of policies that enable private sector innovation and lead to a prosperous energy future. As stated by Iowa Governor Kim Reynolds in Iowa’s State Energy Plan:

“Iowa recognizes and has identified energy as a key resource and area of strategic importance to the state’s economy and economic development efforts...State leaders want to ensure that we continue to lead well into the future. One way to make that happen is to develop a statewide, comprehensive energy plan that outlines clear goals and strategies to keep energy costs low and further facilitate economic development...Creation of the statewide energy plan will keep Iowa at the forefront of energy policy and will allow our state to develop a forward path for the future.”^{xxiv}

Utilizing the steps and considerations outlined in the *Guidelines* —development of a strong planning team, collection of appropriate data, establishment of targeted and quantifiable goals and actions, communication with the public, and measurement of progress — are critical to an effective and meaningful state energy plan, and will enable a state to achieve long-term energy goals.

Appendix A: Select Data Sources for State Energy Plans

Resource	Description	Website
EIA State Electricity Profiles	Includes maps and references to information and data on state energy use, prices, and expenditures, and the capacity and throughput of state and regional energy infrastructure.	http://www.eia.gov/electricity/state/
U.S. Census Bureau, American Community Survey	ACS compiles demographic data on the American people and workforce, and helps local officials, community leaders, and businesses understand the changes taking place in their communities.	https://www.census.gov/programs-surveys/acs/
U.S. Bureau of Economic Analysis	BEA's Regional Economic Accounts program produces detailed data on economic activity by region, state, metropolitan area, and county.	https://www.bea.gov/
U.S. DOE's 2017 U.S. Energy and Employment Report	Quantifies the number of traditional and emerging energy jobs in the U.S.	https://energy.gov/downloads/2017-us-energy-and-employment-report
U.S. Bureau of Labor Statistics	Provides data on the American workforce, including breakdowns by states and cities.	https://www.bls.gov/home.htm
USDA Census of Agriculture	A complete count of U.S. farms and ranches and the people who operate them, including plots of land that raise and sell more than \$1,000 of food or animal products. The Census of Agriculture is administered every five years.	https://www.agcensus.usda.gov/
U.S. DOT Pipeline and Hazardous Materials Safety Administration	PHMSA datasets include information on pipelines and hazardous materials, and can be broken down by state.	https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-mileage-and-facilities
U.S. Crude Oil, NG, and NG Liquids Proved Reserves	Detailed information can be found on crude oil, natural gas, and natural gas liquids proved reserves, as of 2010.	http://www.eia.gov/naturalgas/crudeoilreserves/pdf/uscrudeoil.pdf

DOE State and Local Energy Data (SLED) Tool	Provides energy data at the state and city level, including average and historical energy rates, fuel sources used by the utility for electricity generation, demand by sector, renewable resource maps, alternative fuel transportation prices, and policies and incentives for clean energy.	https://apps1.eere.energy.gov/sled/#/
DSIRE	A comprehensive source of information on state, federal, local, and utility incentives, and includes policies and regulations that support renewable energy and energy efficiency.	www.dsireusa.org
U.S. EPA Greenhouse Gas Reporting by Facility	Comprehensive greenhouse gas data reported directly to EPA from across the country are accessible to the public through EPA’s GHG Reporting Program.	www.epa.gov/ghgreporting/
U.S. EPA eGrid	A comprehensive source of data on the environmental characteristics of almost all electric power generated in the United States.	www.epa.gov/egrid
U.S. EPA Green Book	Provides detailed information about area National Ambient Air Quality Standards designations, classifications, and nonattainment status.	https://www.epa.gov/green-book
U.S. EPA, Air Markets Program Data	Allows users to search EPA data to answer scientific, general, policy, and regulatory questions about industry emissions.	http://ampd.epa.gov/ampd/
DOT Bureau of Transportation Statistics	BTS data collections include traffic, passenger flow, employment, commodity flow survey, transport movement of freight by mode of transportation, and other information.	https://www.bts.gov/
Alternative Fuels Data Center	Provides information, data, and tools to help fleets and other transportation decision makers find ways to reduce petroleum consumption through the use of AFVs and other fuel-saving measures. The AFDC also includes a “Laws and Incentives” page that tracks state and federal AFV initiatives.	https://www.afdc.energy.gov/

Appendix B: Models for Energy and Emissions Data Analysis^{xxv}

Model	Description
Power Sector Emissions Model	EPA's AVOIDed Emissions and geneRation Tool (AVERT)
Capacity Expansion Models	<p>Simulate the types of investments in electricity infrastructure that may need to be made in the future to meet capacity needs due to changes in electricity demand, fuel prices, and policies and regulation. Experts are usually required to run these models. Examples of capacity expansion models include:</p> <ul style="list-style-type: none"> ○ National <ul style="list-style-type: none"> ▪ National Energy Modeling System (NEMS) ▪ Regional Energy Deployment System (ReEDS) ▪ Integrated Planning Model (IPM) ▪ Haiku ▪ MARKAL (MARKet ALlocation) ○ Utility-Scale <ul style="list-style-type: none"> ▪ Resource Planning Model (RPM) ▪ Aurora ▪ System Optimizer ▪ Strategist ▪ PLEXOS
Production Cost (Grid Operations/ Unit Commitment and Dispatch) Models	<p>Simulate power systems over short time periods, typically minutes to hours, in order to determine the least-cost dispatch of generators to meet load needs of the system(s) in question. Examples of production cost models include:</p> <ul style="list-style-type: none"> ○ PROMOD ○ GE-Maps ○ PLEXOS ○ GridView
Network Reliability Models	<p>Simulate various specific situations to “stress-test” the transmission grid and determine how the system will react, and whether reliability will be threatened. Examples of network reliability models include:</p> <ul style="list-style-type: none"> ○ Positive Sequence Load Flow (PSLF) ○ Power System Simulator for Engineering (PSSE)

Appendix C: Resources for Energy Forecasts

Resource	Description	Website
EIA Analysis and Projections <i>(by state, covers all fuels and electricity)</i>	Provides analytical information and projections regarding a number of fuel types, including coal, natural gas, and nuclear, among others.	http://www.eia.gov/analysis/
Eastern Interconnect State Planning Council Studies	Information can be found on how to evaluate transmission development options throughout the eastern interconnection.	https://www.naruc.org/cpi/eispc-archive/
LBNL Estimates of the Remaining Market Potential of the U.S. ESCO Industry	Updated estimates of the remaining potential of the energy service company industry.	https://www.naesco.org/data/industryreports/LBNLrevised_market_potential_final_25apr2017.pdf
Guide for Conducting Energy Efficiency Potential Studies	Provides assistance to state officials, regulators, and legislators by identifying applications and examples for energy efficiency potential case studies.	http://www.epa.gov/energy/documents/suca/potential_guide.pdf
DOE's Energy Efficiency Potential Studies	Provides estimates of energy efficiency potential at the state level, as well as provides a catalog of state-level energy efficiency studies done by other organizations.	https://energy.gov/eere/slsc/energy-efficiency-savings-opportunities-and-benefits
Renewable Energy Technical Potential	Information (including maps and data) can be found on renewable energy technical potential across the nation.	http://www.nrel.gov/gis/re_potential.html
U.S. Energy and Employment Report	Nationwide data on jobs in electric power generation and fuels; transmission, distribution and storage; energy efficiency; and motor vehicles.	https://energy.gov/downloads/2017-us-energy-and-employment-report

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- ⁱ Business Council for Sustainable Energy, “2017 Sustainable Energy in America Factbook,” p.158. Accessed September 10, 2017. <http://www.bcse.org/sustainableenergyfactbook/#>.
- ⁱⁱ There are 10 state energy plans under development or review as of August 2017. NASEO Database of State Energy Plans. www.naseo.org/stateenergyplans.
- ⁱⁱⁱ Plans completed in 2012 were not included in the overview.
- ^{iv} For a comprehensive library of state energy plans, please visit <http://www.naseo.org/stateenergyplans>.
- ^{vv} For the purposes of this document, PUC refers to a state agency that regulates investor-owned utilities. Other terms that may describe this body include Public Service Commission (PSC) and State Corporation Commission (SCC).
- ^{vi} New York State Energy Plan, “2015 State Energy Plan Schedule of Events.” Accessed June 27, 2017. <https://energyplan.ny.gov/Process/Events>.
- ^{vii} Rhode Island Division of Planning, “Energy 2035: Rhode Island State Energy Plan,” p. vii, October 8, 2015. Accessed August 20, 2017. <http://www.planning.ri.gov/documents/LU/energy/energy15.pdf>.
- ^{viii} A Gantt chart is a bar chart that lays out the steps of a project with their expected start and end dates, as well as the work breakdown structures for each step. An example of a Gantt chart can be found at http://www.ct.gov/opm/lib/opm/pdpd_energy/arra/ea_arra_pmp_v01_2009_10_09_final_pdf_complete.pdf, p. 15.
- ^{ix} A comprehensive state energy plan is intended to be separate from a state’s energy assurance, energy emergency preparedness and response, or energy management plan. While energy volatilities may be considered as part of a comprehensive energy plan, energy assurance planning is focused on building a resilient critical energy infrastructure system that can adapt to or recover from an energy supply disruption. Both planning frameworks are crucial to the states’ security and public welfare. States may want to consider cross-referencing the plans. State Energy Assurance Guidelines, National Association of State Energy Officials. December 2009. www.naseo.org/energyassurance.
- ^x For an example of an IRP, please see <https://www.pacificorp.com/es/irp.html>.
- ^{xi} See AEO2013 Early Release Overview at <http://www.eia.gov/forecasts/aeo/er/>; See International Energy Outlook 2011 at: <http://www.eia.gov/forecasts/ieo/>.
- ^{xii} For an example of a corporate energy pledge, see <https://www.owenscorning.com/corporate/sustainability/journey/goals>.
- ^{xiii} For state-specific energy profiles and data, see EIA’s State Energy Profile pages at <https://www.eia.gov/state/>. To use DOE’s SLED tool, see <https://www.buildinggreen.com/newsbrief/local-energy-profiles-now-easier-doe-sled-tool>.
- ^{xiv} A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis is a strategic planning method by which organizations evaluate the external and internal factors that may favor or hinder them in reaching their goals. SWOT analyses are useful in identifying pathways forward based on existing issues that may direct plans in certain directions.
- ^{xv} Energy Efficiency for All (EEFA) has conducted energy efficiency potential studies for multifamily housing in Georgia, Illinois, Maryland, Michigan, Missouri, New York, North Carolina, Pennsylvania, and Virginia, and also houses a number of other multifamily housing studies (for instance, from Minnesota), at <http://energyefficiencyforall.org/resources/potential-energy-savings>.
- ^{xvi} South Carolina Office of Regulatory Staff, “Energy in Action: South Carolina State Energy Plan,” p. 13, 2016. Accessed July 14, 2017. <http://www.energy.sc.gov/files/EP%20FINAL.pdf>.
- ^{xvii} For an example of a state energy plan website, see <https://energyplan.ny.gov/>.
- ^{xviii} Galbraith, Maury, “Good Practices for Engaging Stakeholders and Making Progress on Energy Priorities,” Western Interstate Energy Board, <https://www.nga.org/files/live/sites/NGA/files/pdf/2016/1602PowerSector-EngagingStakeholders.pdf>, and Stearn, Christine, “Engaging Stakeholders for Power Sector Modernization,” Smart Electric Power Alliance.
- ^{xix} University of Virginia, “Writing SMART Goals,” accessed August 17, 2017. http://www.hr.virginia.edu/uploads/documents/media/Writing_SMART_Goals.pdf

^{xx} National Association of State Energy Officials, “State Energy Assurance Guidelines,” December 2009. Accessed August 15, 2017. <http://naseo.org/eaguidelines>.

^{xxi} For more information on the EEAC, see <http://naseo.org/eeac>.

^{xxii} Minnesota Department of Commerce, “Minnesota’s 2025 Action Plan.” Accessed November 6, 2017. <https://mn.gov/commerce/policy-data-reports/energy-data-reports/mn-action-plan.jsp>.

^{xxiii} Oregon adopted the *10-Year Energy Action Plan* in December 2012. However, the *State of Oregon Energy Plan* was the plan included in NASEO’s analysis.

<http://www.oregon.gov/energy/Ten Year/Ten Year Energy Action Plan Final.pdf>

^{xxiv} Iowa Energy Plan, page iii. <http://www.iowaenergyplan.org/docs/IowaEnergyPlan.pdf>

^{xxv} For more detail on the various models available, see

https://energy.gov/sites/prod/files/2016/02/f30/EP_SA_Power_Sector_Modeling_FINAL_021816_0.pdf.