

February 2021

BLUEPRINT FOR STATE ACTION

NARUC-NASEO TASK FORCE ON
COMPREHENSIVE ELECTRICITY PLANNING



NARUC
National Association of
Regulatory Utility Commissioners

NASEO
National Association of
State Energy Officials



Table of Contents

Welcome: A Note from the NARUC-NASEO Task Force Leadership	3
Acknowledgements	5
NARUC-NASEO Task Force on Comprehensive Electricity Planning Resources Available	7
Introduction	8
Task Force on Comprehensive Electricity Planning	8
Goals of the Blueprint for State Action	9
How to Use the Blueprint for State Action: Three Planning Steps and Resources	10
Step 1: Identify Goals and Starting Point	13
Step 2: Create a Vision for Better Aligned Planning	21
Step 3: Develop an Action Plan for Achieving the Vision	29
Appendix: Challenges and Solutions to Implementing Aligned Planning	33

A Note from the NARUC-NASEO Task Force Leadership

Hello fellow NARUC and NASEO members,

Thank you for your interest in the NARUC-NASEO Task Force on Comprehensive Electricity Planning. Since the outset of this multiyear initiative, members from 15 states have been excited to be part of the process to reimagine how electricity system planning processes can achieve greater alignment after being siloed for decades. As direct participants in the Task Force, we were each driven by our own state-level motivations. As the chairs and co-chairs of this initiative, we clearly see the collective progress being made through this effort, which will benefit the U.S. electricity system and all Americans who rely on it every day.

Our drivers to initiate this work included the following, and they are as relevant today as we conclude the work as they were when we began two years ago:

- Improve grid reliability and resilience
- Optimize use of distributed and existing energy resources
- Avoid unnecessary costs to ratepayers
- Support state policy priorities
- Increase the transparency of grid-related investment decisions

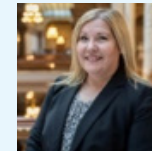
This NARUC-NASEO Task Force on Comprehensive Electricity Planning Blueprint for State Action summarizes our work and offers practical ways to accelerate state actions in aligning electricity system planning approaches, building upon the experience of the 15 Task Force member states. By providing this Blueprint for State Action, we hope state leaders and others involved in electricity system planning will leverage the resources developed by the Task Force to improve decision making and take actions to better align planning processes to meet their unique needs. The Blueprint for State Action is not intended to be prescriptive. Instead, we provide five different approaches to more comprehensive electricity planning developed by five groups of states during the two-year Task Force. The approaches are intended to be examples you can use or refer to as a starting point for your state.

We wish you well on your journey toward identifying and implementing a set of state-specific action steps toward aligned planning. Together, we hope to embrace a more resilient, efficient, and affordable energy system.



Co-Chair

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Colorado Public Utilities Commission



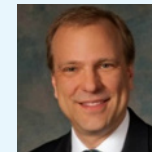
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Acknowledgements

The Task Force leadership recognizes and is grateful for the NARUC and NASEO members who dedicated their time and expertise to benefit current and future colleagues who are aligning system planning in their own states. The following members participated in one or more Task Force workshops during the course of the initiative. They are listed with their title and organizational affiliation at the time of their participation.

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Task Force members were significantly and ably supported by an extensive team of organizers, facilitators, and subject matter experts. The Task Force leadership and members offer their thanks to these dedicated staff. They are listed with their organizational affiliation at the time of their participation.

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NARUC-NASEO Task Force on Comprehensive Electricity Planning Resources Available

Through the Task Force on Comprehensive Electricity Planning, Task Force members, NARUC and NASEO staff, technical and subject matter experts, and others have developed a robust set of resources to support state decision makers in advancing aligned electricity system planning processes. Task Force materials are now available on the Task Force website: www.naruc.org/taskforce.

Task Force Resources

- [Factsheet](#) provides a synopsis of the Task Force goals, members, and resources.
- [Blueprint for State Action](#) supports states seeking to further align electricity system planning processes in ways that meet their own goals and objectives. The Blueprint provides a step-by-step approach for states to develop and implement a plan or series of actions to better align planning processes, based on the experience of Task Force member states.
- [Task Force Cohort Roadmaps](#) describe five distinct visions for an ideal comprehensive electricity planning process created by Task Force members. The process is viewed from the state perspective on how to align or integrate distinct planning processes that, historically, have not significantly informed one another. Each roadmap explains one vision for aligned planning, including both procedural and analytical steps, alongside points of evidence for innovative approaches that appear in the vision.
- [Opportunities to Improve Analytical Capabilities towards Comprehensive Electricity System Planning](#) outlines potential data, tools, and methods for conducting integrated analyses across key points in electricity planning processes that could help achieve the visions of the Task Force. This scoping study will be used to conduct a gap analysis and develop a research agenda for approaches and capabilities in areas such as load forecasting, solution evaluation, and system optimization within planning.
- [Standard Building Blocks of Electricity System Planning Processes](#) shares information about the color-coded framework cohorts used to describe their vision for aligned planning processes in consistent terms.
- [Comprehensive Electricity Planning Library](#) enables further learning about important issues related to comprehensive electricity planning by linking to existing publications and webinars. The library is organized across 15 key topical areas.
- [Member State Summary Information](#) includes a 2018 snapshot of each of the 15 member state's electricity system profile, organizational responsibilities, policy goals, and existing planning processes.

Introduction

Task Force on Comprehensive Electricity Planning

Emerging technologies, decreasing costs, consumer preferences, new energy service providers, and state and local efforts are driving significant growth in distributed energy resources (DERs) such as solar, storage, energy efficiency, demand management, and microgrids as well as bulk power system renewable generation. These investments increasingly require regulatory and policy innovation and a greater emphasis on comprehensive planning to manage system complexities and avoid unnecessary costs associated with operating the grid.

With utilities making capital expenditures of more than \$100 billion¹ per year on behalf of customers, it is essential to consider the full range of investment options across the electricity system for cost-effectively meeting current and emerging grid needs such as increased flexibility, variable renewable energy integration, and resilience. As more customers install DERs, electricity planning needs to account for the quantity, location, capabilities, load, and production profiles of resources on the distribution system and the bulk power system.

The National Association of Regulatory Utility Commissioners (NARUC) and the National Association of State Energy Officials (NASEO), in partnership with the United States Department of Energy (DOE), launched the Task Force on Comprehensive Electricity Planning in 2018. The Task Force was established to develop new approaches to better align electricity planning processes and create tools and roadmaps for all NARUC and NASEO members to adapt and refine for use in their states. This two-year initiative provided a forum for the development of state-led pathways toward planning a more resilient, efficient, and affordable grid that will best support evolving state policies.

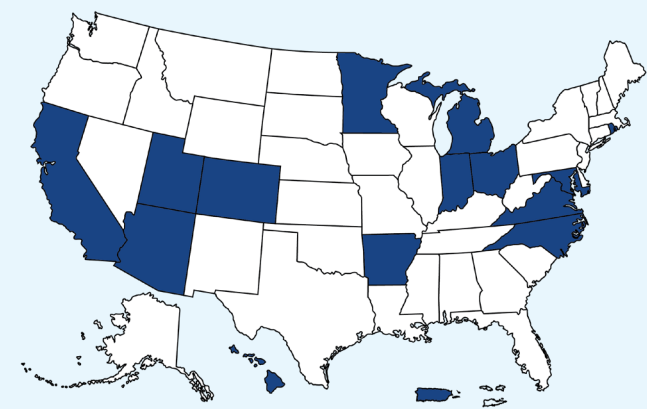
NARUC and NASEO members from 15 states participated in the NARUC-NASEO Task Force (see Figure 1). The states are diverse and broadly representative of the nation based on their geography, market models, planning approaches, and state goals.

Task Force member states were organized into five cohorts, based on their market and regulatory structures and the planning processes they sought to align (see Figure 2). Cohorts were tasked with developing approaches to describe their vision for idealized planning: what planning steps need to happen in what sequence to better align planning processes.

¹ Edison Electric Institute. Industry Capital Expenditures. October 16, 2019. https://www.eei.org/issuesandpolicy/Finance%20and%20Tax/EEI_Industry_Capex_Functional_2019.10.16.pdf

Changes are needed to both longstanding and emerging planning processes, such as integrated resource planning and distribution system planning, to align goals and analyses of investments to cost-effectively meet grid requirements, customer needs, and state policy goals.

Figure 1: Participating States and Territories



Arizona	Indiana	Ohio
Arkansas	Maryland	Puerto Rico
California	Michigan	Rhode Island
Colorado	Minnesota	Utah
Hawaii	North Carolina	Virginia

Figure 2: Overview of Task Force Cohort Structure

COHORT	Coral	Turquoise	Amber	Silver	Jade
REGULATORY STRUCTURE	Utilities own generation assets				Utilities do not own generation assets
MARKET STRUCTURE	Within organized markets	Outside organized markets	Within organized markets	Outside organized markets	Within organized markets
PLANNING PROCESSES ADDRESSED	Focused on aligning distribution, resource, and transmission planning			Focused on aligning distribution and resource planning	Integrated distribution planning (combined with other energy planning & programs)

Task Force Effort Definitions

Cohorts are groups of Task Force members from three states, organized by similar market and regulatory structures.

Cohort members joined four interactive workshops over two years to collaborate with each other, stakeholders, subject matter experts, and utility planners to design five new approaches for aligning various resource, transmission, and distribution system planning processes. At the conclusion of the effort, participants committed to implementing relevant lessons learned to better align their own states' planning processes.

Goals of the Blueprint for State Action

This Blueprint for State Action is a tool to support states seeking to further align electricity system planning processes in ways that meet their own goals and objectives. The Blueprint provides a step-by-step approach for states to develop and implement a plan or series of actions to better align planning processes, based on the experience of Task Force member states.

States that may wish to leverage the resources in this Blueprint could include those that:

1. Currently oversee multiple utility and programmatic planning processes and seek to coordinate them for greater visibility, more valuable stakeholder participation, and better-informed decision making
2. Desire to adequately prepare for or actively increase integration of many different types of DERs—either due to ongoing customer adoption or to leverage scalable distributed technologies to defer or avoid more costly grid infrastructure upgrades
3. Are embarking on new distribution planning efforts and want to strategically define what a distribution system planning process should encompass, while connecting it to relevant existing or future efforts such as resource planning, grid modernization, and customer-engagement programs

4. Seek to identify how to achieve new or ambitious goals (e.g., decarbonization, electrification, resilience, clean peaks) economically by holistically considering a wide range of options

How to Use the Blueprint for State Action: Three Planning Steps and Resources

The Blueprint for State Action is intended to be a modular, flexible tool for use by your state’s team of leaders, champions, regulators, staff, and others. State teams are encouraged to gather available information at each of the three steps of the planning process (see Figure 3) and augment and revise this information as your team continues to learn more about your state’s current planning approaches, needs, and desired trajectory. Some sections of this Blueprint for State Action will vary in relevance based on a state’s particular context, including what planning processes already exist and where the state might be within a planning cycle.

To help guide your state’s team through its journey of aligning planning processes, the Blueprint for State Action offers question prompts for each of these three steps (see Table 1).

States’ key decision makers can use these questions to help them design planning activities. The questions are directed toward groups of people; they are not intended to be answered by a single individual.

The next three sections of the Blueprint for State Action detail the three steps of the planning process. The questions pertaining to each step are followed by a brief description of how the information gathered will be valuable and examples of how Task Force members approached the questions. After working through the Blueprint, your team might choose to develop a formal or public document as your action plan or create an internal roadmap.

The Task Force member states created teams of leaders from the Public Utility Commission and State Energy Office to reflect multiple views of electricity planning for their states. Your team might include members from one or more state agency, consumer advocates, governor’s energy advisors, and/or other decision makers based on your aspirations for aligned planning.

Figure 3: Overview of the NARUC-NASEO Task Force’s Three Steps Toward Comprehensive Electricity Planning

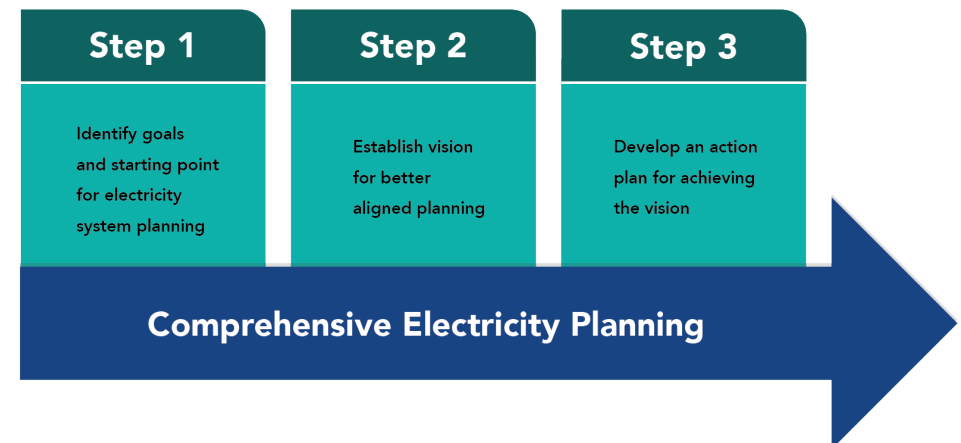


Table 1: Summary of Questions in the Blueprint for State Action

Suggested questions to guide you through Step 1	
A.	What problem(s) are you trying to solve that electricity planning can help address? What are the key drivers of change affecting your electricity system? What electricity-related goals is the state striving to achieve?
B.	What are 3–5 essential criteria or guiding principles that need to be met to ensure that a new aligned planning process is successful?
C.	What are the current planning requirements, timelines, and constraints for your state? What key policy documents, proceedings, programs, guidance, planning cycles, and other directives do you currently have that guide planning? Who are the key actors who perform planning activities, and what are their responsibilities?
D.	What is your starting point? Draft a simplified depiction of the current planning processes in your state that you want to tackle.
Suggested questions to guide you through Step 2	
A.	What gaps do you see in your state’s current state of planning? Where are opportunities for greater alignment that do not currently exist? Who is not involved currently but has an important stake in the process or outcomes?
B.	Whom will you involve in creating your planning process vision, and how and when will they be involved?
C.	What does your new vision of aligned planning look like? What is a preferable set of planning processes or points of alignment among steps for your state? Use the Task Force-developed materials as a starting point and/or create your own.
	C.1. Identify which Task Force cohorts are most relevant to your regulatory and market situation and planning goals.
	C.2. Review any relevant cohort’s roadmap to understand its state-developed, expert-informed visions for better aligned planning. Decide if you want to use a Task Force roadmap or create your own.
D.	Does your desired vision align with your guiding principles? Does it fill the gaps you identified in the current state of planning (Step 2.A)?

Suggested questions to guide you through Step 3

A.	What format will your state action plan take? Are you developing an internally facing or externally facing document? How detailed does it need to be to support your next steps? With whom will you share it, for what purpose, and when?
B.	Comparing the current state of planning to your vision and desired outcomes, what are the key differences, and what steps will you have to take to achieve each outcome? Have you completed any to date?
	B.1. What unanswered questions or missing information do you need to clarify (and from whom) before solidifying the action steps?
	B.2. What does the sequence of key steps need to look like?
	B.3. What key dates need to factor into the state action steps?
	B.4. Which steps connect with other organizations' planning efforts (e.g., ISO/RTO transmission plans, air quality plans) that need to be considered?
C.	Which stakeholders will need to be involved in implementation of the action plan , including those who have not previously been involved?
	C.1. Who might be key actors and allies for advancing your goals?
	C.2. Which constituents are likely to oppose your implementation plan for aligned planning, and what are their concerns?
	C.3. What is (are) going to be the key message(s) for bringing others on board?
D.	Who will oversee implementation of your state's proposed action steps?
	D.1. How will you know when you have successfully met your desired outcomes for comprehensive electricity planning?
	D.2. What is a sizable near-term step to demonstrate initial progress and create momentum?
E.	How will you track progress , identify new changes needed, and pivot to apply new strategies when appropriate?

Recommendation: Review the entire Blueprint for State Action before starting your planning process to identify what information is necessary or valuable, and why and when you will need it.

Step 1: Identify Goals and Starting Point

Suggested questions to guide you through Step 1

- | | |
|-----------|---|
| A. | What problem(s) are you trying to solve that electricity planning can help address? What are the key drivers of change affecting your electricity system? What electricity-related goals is the state striving to achieve? |
| B. | What are 3–5 essential criteria or guiding principles that need to be met to ensure that a new aligned planning process is successful? |
| C. | What are the current planning requirements, timelines, and constraints for your state? What key policy documents, proceedings, programs, guidance, planning cycles, and other directives do you currently have that guide planning? Who are the key actors who perform planning activities, and what are their responsibilities? |
| D. | What is your starting point? Draft a simplified depiction of the current planning processes in your state that you want to tackle. |

Task Force members noted:

- “We were concerned about the extent of the utility’s monopoly in defining and forecasting grid needs, grid solutions, and all associated costs.”
- “Our state and utilities are focused on maintaining and enhancing the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state’s energy policies. We utilize various planning processes at the resource (generation), transmission, and distribution system level. As these systems become more interdependent, we are developing best practices for integrated planning to evaluate all resources types and solutions on a level playing field, where and when possible.”
- “We anticipate starting a new distribution system planning docket and want to strategically design the new process to complement our existing resource and transmission planning processes.”
- “Our governor established new decarbonization and electrification targets. We need to figure out how to meet those targets cost effectively and in ways that support customer preferences as we develop a more integrated distribution system planning process.”

The first stage of state action planning is to clearly articulate what problems you are trying to solve that greater alignment of planning processes might help address: What are your goals? Also critical is gaining an understanding of your state’s current planning processes: What is your starting point? Who are the key actors and other major stakeholders?

Task Force members iteratively answered these questions for themselves; below are examples of the outputs and approaches they took for each step.

- A. What problem(s) are you trying to solve** that electricity planning can help address? What are the key drivers of change affecting your electricity system? What issues or problems have you identified due to inadequate alignment or coordination between different planning processes and responsible entities? What electricity-related goals is the state striving to achieve?
- B. What are 3–5 essential criteria or guiding principles** that need to be met to ensure that a new aligned planning process is successful?

Each cohort of Task Force members developed guiding principles for comprehensive electricity planning. Guiding principles connect state policies and organizational priorities to a vision for aligned planning. These principles can be thought of as criteria and are touchstones for validating any new approaches. A good principle allows you to answer the question, “If we take this step, will the new approach be in keeping with what we wanted to accomplish?”

Commonly articulated Task Force member guiding principles are summarized in Figure 4.

With greater alignment of transmission, resource, and distribution planning, states and electric utilities could:

- Improve grid reliability and resilience
- Optimize use of distributed and existing energy resources
- Avoid unnecessary costs to ratepayers
- Support state policy priorities
- Increase the transparency of grid-related investment decisions

Ultimately, individual cohorts articulated their drivers for change, starting points, and guiding principles in a series of statements that describes their motivations, as shown in Figure 5.

Task Force Trends Driving the Need for Change

Task Force members identified dozens of trends in eight categories driving the need for change in their states:

1. Resilience and reliability
2. Regulatory trends
3. Coordination needs and benefits
4. Policy/legislative interests
5. Fuel price and other cost uncertainties
6. Shifting consumer preferences/practices
7. Changes in electric industry
8. New technology at lower costs

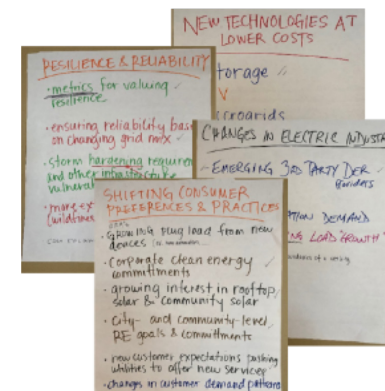


Figure 4: Guiding Principles Frequently Referenced by Task Force Cohorts

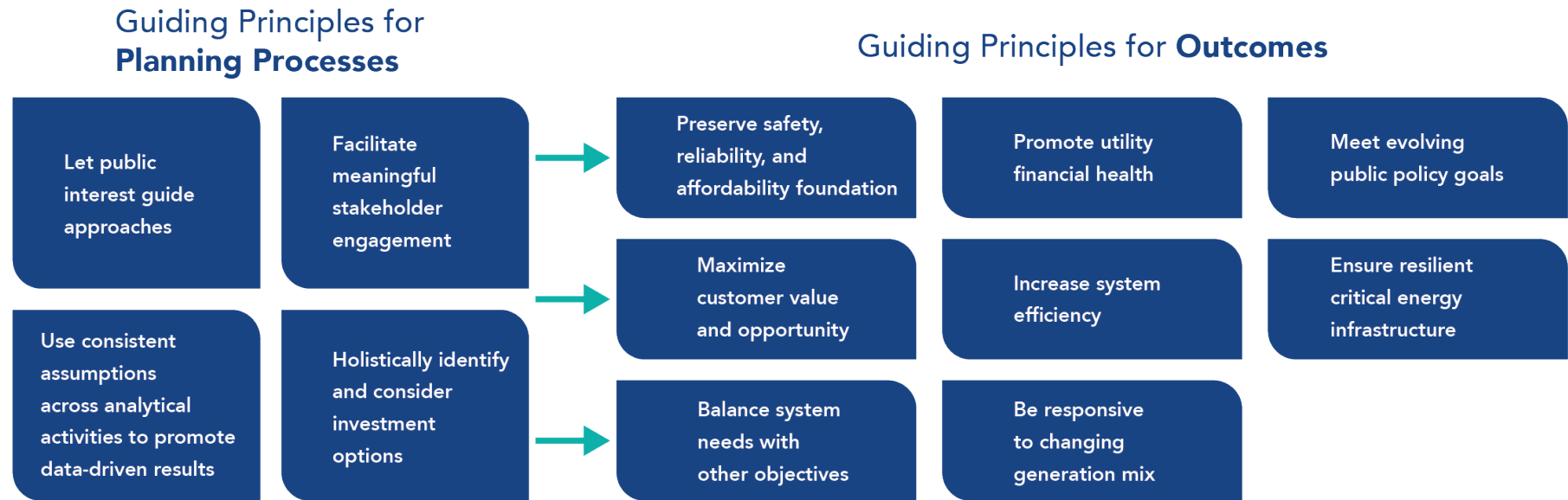


Figure 5: Task Force Cohort Characteristics and Motivation

Task Force Cohorts					
	Amber	Coral	Jade	Silver	Turquoise
A few other characteristics you should know...	<ul style="list-style-type: none"> • Because transmission-owning utilities participate in an RTO, the cohort is considering two distinct and parallel transmission planning processes: one conducted by the utilities and the other by the RTO • Increased weather-related damage and costs • New transmission and generation siting driven by supply fleet transition and load growth • Very limited or no retail competition 	<ul style="list-style-type: none"> • We are pragmatic, but take calculated risks • We are collaborative across our region • We are in two RTOs with the ability to benefit from their experts and resources 	<ul style="list-style-type: none"> • We have retail competition • The policy path in our state could be volatile/may not be locked in • Cold and ice can be high-impact resilience events 	<ul style="list-style-type: none"> • We have unique geography and are vulnerable to particular weather events and natural disasters • There is no retail competition • We have flat or declining load 	<ul style="list-style-type: none"> • Competing energy policies • Large amounts of space between load centers, which requires a unique approach to transmission planning
We are doing this because we want to accomplish...	<ul style="list-style-type: none"> • Effective, cohesive, and coherent planning processes that are able to achieve state policy goals 	<ul style="list-style-type: none"> • Affordability/cost effectiveness • Core regulatory requirements • Leadership guided by public interest • Visibility into system needs • Holistic view of alternatives • Continuous improvements • Adaptive to technology change • Risk mitigation • Access to data 	<ul style="list-style-type: none"> • Optimizing utility investments and the integration of customer and third-party resources to achieve cost efficiency • Enhancing operations and maintenance through increased visibility into the system and better utilization of data analytics • Increasing transparency around distribution system planning, including capital investment strategy 	<ul style="list-style-type: none"> • Achieving a functional, comprehensive planning process that integrates all of the components of the electricity system 	<ul style="list-style-type: none"> • Preserving pathways for innovation and customer options that preserve the robustness of system planning & fairness of cost causation and allocation • A holistic planning approach that focuses on maintaining a flexible system that can respond to a changing generation mix • Transparency of planning processes • Pathways for allowing DERs the opportunity to compete fairly in the system planning process and provide cost-effective outcomes

Task Force Cohorts

	Amber	Coral	Jade	Silver	Turquoise
While keeping in mind...	<ul style="list-style-type: none"> Flexibility of system State policy achievement Enabling future transformation Efficient regulation Reliability, safety, affordability, resilience Least cost, reasonable rates Efficiency Utility health Cybersecurity 	<ul style="list-style-type: none"> Market dynamics Limitations on regulatory authority Potential for a theoretical federal policy Improvements to planning and modeling tools 	<ul style="list-style-type: none"> Generation assets and connections to generation and transmission Availability of resource and transmission assets, storage, and combinations of resources Rate structures and beneficial values Regulatory jurisdiction lines can be blurry between transmission and distribution Effects of plans others make for transmission and generation 	<ul style="list-style-type: none"> Environmental needs Technical requirements Affordability 	<ul style="list-style-type: none"> Preserving the value proposition of the utility-driven system (reliability, affordability, security)
And trying to be responsive to...	<ul style="list-style-type: none"> Digitization Decarbonization/ carbonization Flexibility and adaptability Resiliency Cybersecurity threats Climate change Electrification 	<ul style="list-style-type: none"> Market developments and technology change Customer engagement/ customer preferences Political realities Concerns over cost shifting Concerns over evolving utility role 	<ul style="list-style-type: none"> State policy Stakeholder interests 	<ul style="list-style-type: none"> New customer needs and the capability of integrating new technology 	<ul style="list-style-type: none"> Promoting data-driven results that are verifiable

-
- C. What are the current planning requirements, timelines, and constraints for your state?** What key policy documents, proceedings, programs, guidance, planning cycles, and other directives do you currently have that guide planning? Who are the key actors who perform planning activities, and what are their responsibilities?

Answers to this question could include the current status and timing of planning processes, existing authorities for planning, existing policy directives, and linkages with other processes. Task Force members took an inventory of their current planning processes and statutory/policy goals at the outset of the effort. An example of a resulting state profile is provided in Figure 6.

- D. What is your starting point?** What existing planning processes (or partial planning processes) are you considering? Draft a simplified depiction of the current planning processes in your state that you want to tackle. Include connection points that exist now and roles and responsibilities of key actors.

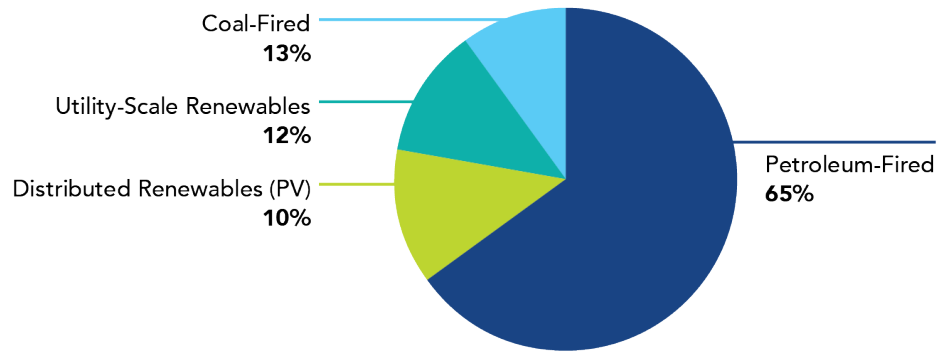
Task Force members were grouped in cohorts according to the scope of the planning processes they were tackling. One cohort from restructured states focused on integrated distribution planning and aligning with grid modernization, electric vehicles energy efficiency, and other distribution-level policies and programs. Two cohorts originally focused on aligning distribution and resource planning processes, though one ultimately expanded the scope to include consideration of transmission planning processes. Two cohorts sought alignment across distribution, resource, and transmission planning processes. Additional information about the five cohorts is provided in Step 2.C.

Task Force Resources

Additional profiles of participating states can be found on the Task Force website, <https://www.naruc.org/taskforce/participating-states/>.

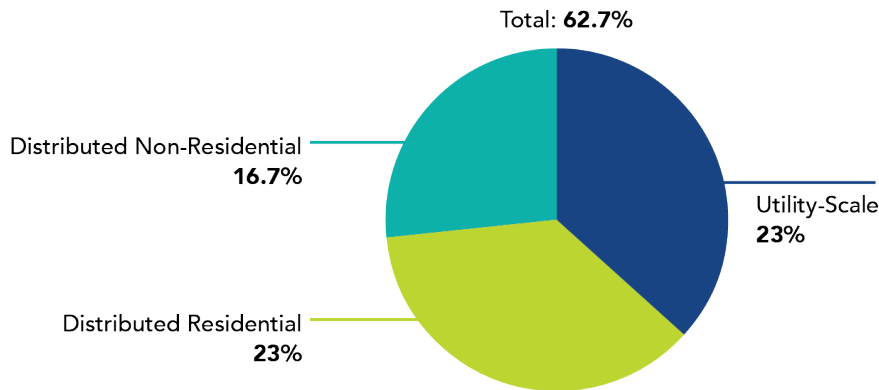
Figure 6: Example of a Task Force Member State Profile

Net Electricity Generation, 2018



Source: EIA Electricity Data Browser

Nameplate Installed PV Capacity as Percentage of Peak Load, 2017



Source: ICF Analysis of EIA and Wood Mackenzie Power & Renewables Data

Market Overview

	Retail Competition	Retail load served by incumbent utilities only
	Distribution Utility Owns Generation	Yes, utilities are vertically integrated
	Region/ISO /RTO	Investor-owned utilities (IOUs) manage both resource adequacy and transmission planning
	Regulated Electric Utilities	1 IOU with 3 subsidiaries; 1 cooperative

State Targets

	Renewable Energy	100% electricity from renewable sources by 2045
	Energy Efficiency	4,300 GWh reduction from 2008 electricity consumption by 2030 through efficiency and conservation
	GHG Emissions Reductions	10% reduction from 1990 levels by 2020; 2.5% annual reduction starting 2022; carbon neutral by 2045

One approach that helped members organize their view of current and future planning processes was grouping their processes into a series of fundamental system planning categories. The eight categories, or building blocks (see Figure 7), are color-coded and provide a common language across states and cohorts while preserving diversity in approach.

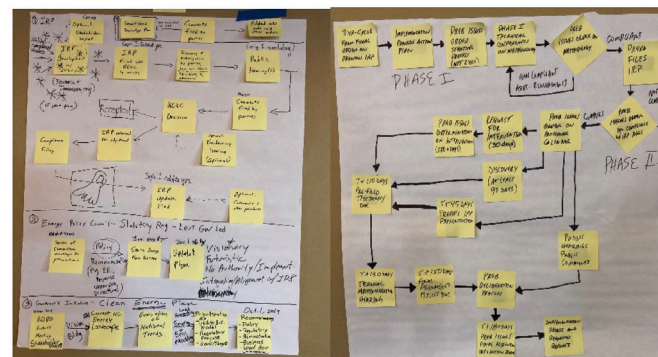
More information is available in the [two-page briefing paper](#) *Aligning Integrated Resource Planning and Distribution Planning—Standard Building Blocks of Electricity System Planning Processes*.

Task Force members drafted representations of planning that outlined the current state of planning in their states, as shown in Figure 8.

Figure 7: Task Force Building Blocks—Eight Fundamental Categories in System Planning



Figure 8: Preliminary Drafts of Current State Planning



Step 2: Create a Vision for Better Aligned Planning

Suggested questions to guide you through Step 2

- | | |
|------------|--|
| A. | What gaps do you see in your state's current state of planning? Where are opportunities for greater alignment that do not currently exist? Who is not involved currently but has an important stake in the process or outcomes? |
| B. | Whom will you involve in creating your planning process vision, and how and when will they be involved? |
| C.* | What does your new vision of aligned planning look like? What is a preferable set of planning processes or points of alignment among steps for your state? Use the Task Force-developed materials as a starting point and/or create your own.
C.1. Identify which Task Force cohorts are most relevant to your regulatory and market situation and planning goals.
C.2. Review any relevant cohort's roadmap to understand its state-developed, expert-informed visions for better aligned planning. Decide if you want to use a Task Force roadmap or create your own. |
| D. | Does your desired vision align with your guiding principles? Does it fill the gaps you identified in the current state of planning (Step 2.A)? |

*This step is likely to be the most time consuming and important in your efforts toward planning alignment.

Once your state team has laid out and discussed your starting point, goals, and key state initiatives, the next step is to develop a vision of better aligned planning. The questions below can help you describe your vision. You can jumpstart your efforts by reviewing the five cohort planning approaches developed through the Task Force initiative.

- A. What gaps do you see in your state's current state of planning?** Where are opportunities for greater alignment that do not currently exist? Who is not involved currently but has an important stake in the process or outcomes? This effort of critically examining your state's current processes will offer some starting points when beginning to articulate a new vision for planning.

B. Whom will you involve in creating your planning process vision, and **how and when** will they be involved? The sequence and approach to engagement, in addition to who is involved, will matter greatly and vary in each state. Task Force members worked in state teams that included key leaders from the public utilities commission and the state energy office. They maintained ownership over the development of their vision document, but invited key stakeholders to participate at different points to ensure a wide range of viewpoints informed the document's development.

Initially, Task Force members documented their understanding of current state planning processes, identified goals that needed to be met, established guiding principles (see Step 1.B), and found gaps and alignment opportunities. Then they invited representative stakeholders and subject matter experts from across the electricity system to offer input for the development of a new vision for aligned electricity system planning. These stakeholders included utilities, organizations that commonly participate in integrated resource planning processes, and organizations with a stake in the outcomes of the initiative that do not generally participate in such processes.

Stakeholder and subject matter expert categories included the following:

- Demand-side management (DSM) or demand response (DR) providers and aggregators
- DER developers, technology providers, and advocates
- Electric utilities (investor owned, municipalities, cooperatives)
- Energy efficiency (EE) program administrators, providers, and implementers
- Environmental groups
- Federal Energy Regulatory Commission (FERC)
- Large energy consumers
- Low-income and consumer advocates
- Renewable energy developers
- Regional transmission organizations (RTOs) and independent system operators (ISOs)
- State environmental and state air regulators
- State legislators
- Transportation interests

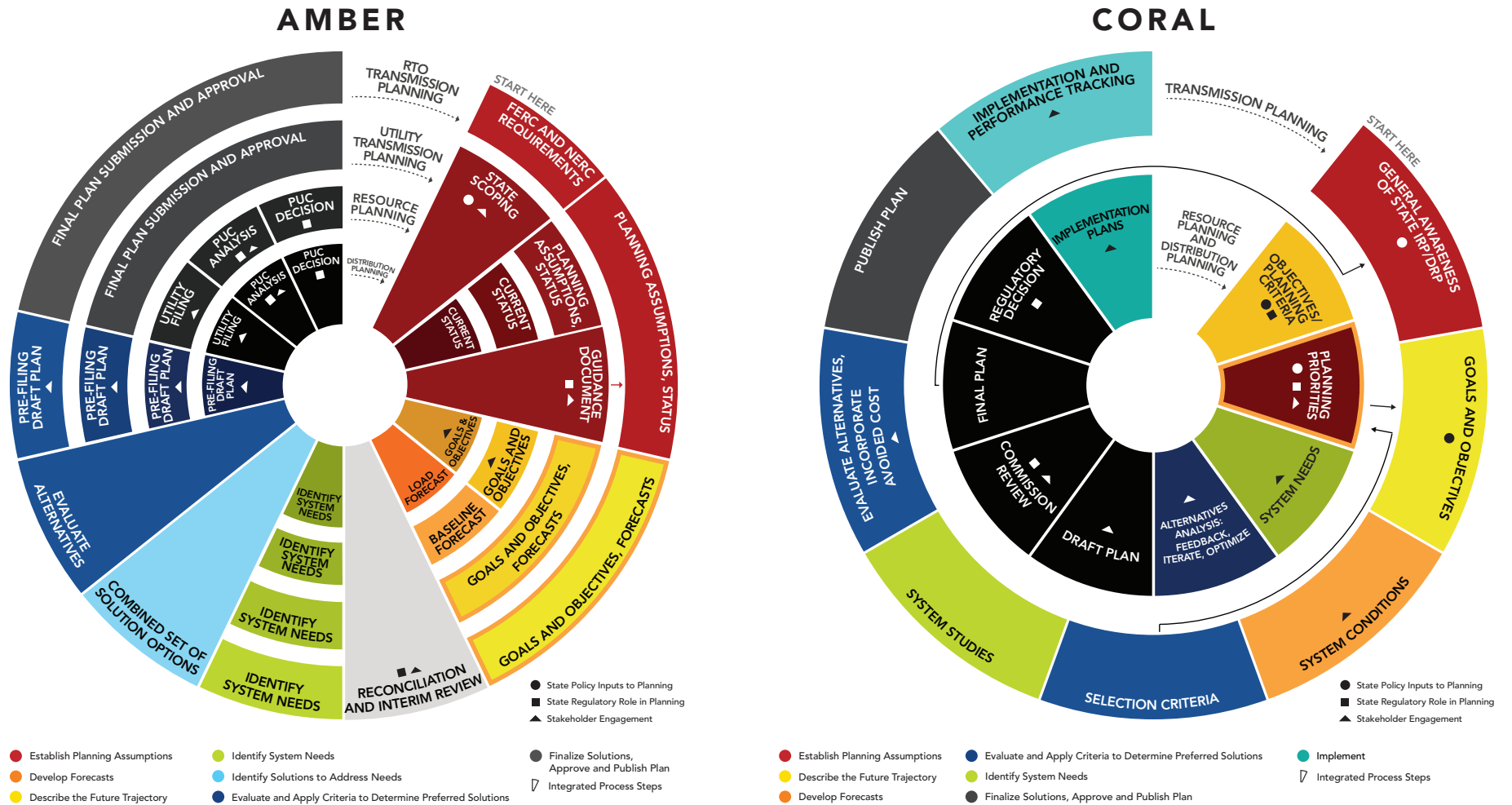
Roadmaps describe the five cohorts' visions for an ideal comprehensive electricity planning process by explaining the planning processes one section at a time, including both procedural and analytical steps.

- C. What does your **new vision of aligned planning** look like? What is a preferable set of planning processes or points of alignment among steps for your state? Task Force members in each cohort created a series of roadmaps to describe their vision for better aligned planning. These materials were informed by key stakeholders, subject matter experts, and utility planners from across the country. Each roadmap was created by a group of states from a specific type of market and regulatory structure consistent with a set of guiding principles. These roadmaps offer a useful starting point for creating your own state-specific vision for better aligned planning processes.

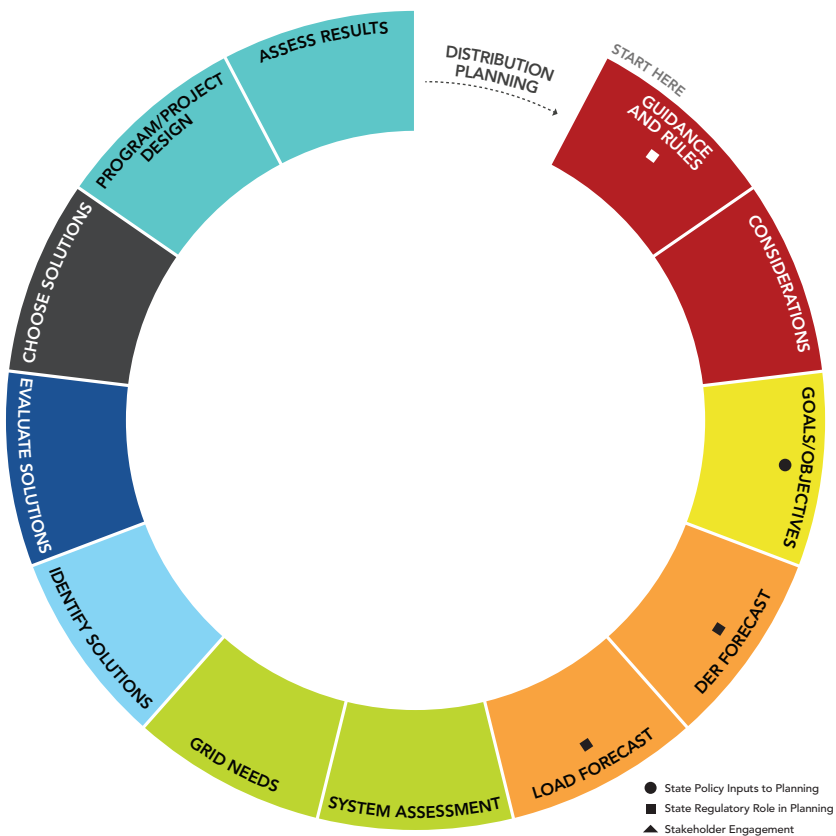
The five circular diagrams shown in Figure 9 highlight each cohort's vision for aligned electricity planning and emphasize touchpoints and opportunities for greater alignment of planning processes. These diagrams serve two purposes: they are the executive summary of each cohort's roadmap, and they facilitate comparisons across the five visions. To view each cohort's complete roadmap, please visit www.naruc.org/taskforce/roadmaps.

Each diagram is composed of one to four rings that represent distribution, resource, and transmission planning. Starting at the top and proceeding clockwise around the planning cycle, the wedges represent sequential steps. Where wedges stretch across multiple rings, the cohort envisions an integrated approach to completing that step. Where arrows connect one step to another, the cohort envisions a cross-check, data or information flow, or an alignment opportunity. The color of each step is consistent with the planning categories described in the Task Force's [two-page briefing paper, *Aligning Integrated Resource Planning and Distribution Planning—Standard Building Blocks of Electricity System Planning Processes*](#). The sequence of the categories differs across cohort visions for aligned planning.

Figure 9: Task Force Cohorts' Aligned Planning Summary Diagrams



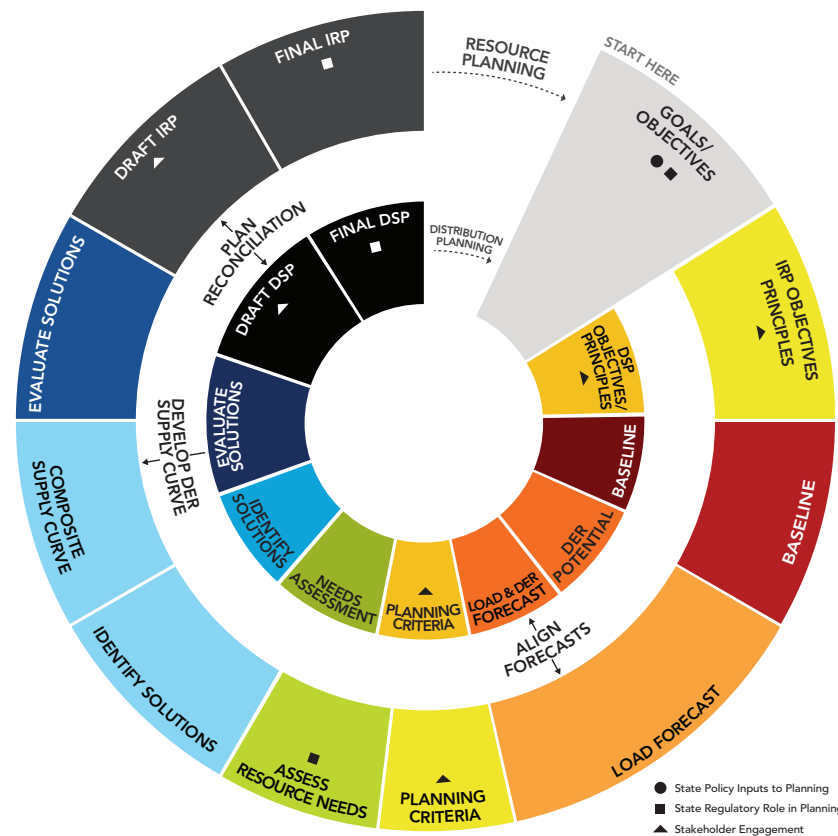
JADE



- Establish Planning Assumptions
- Identify System Needs
- Finalize Solutions, Approve and Publish Plan
- Describe the Future Trajectory
- Identify Solutions to Address Needs
- Implement
- Develop Forecasts
- Evaluate and Apply Criteria to Determine Preferred Solutions

- State Policy Inputs to Planning
- State Regulatory Role in Planning
- ▲ Stakeholder Engagement

SILVER



- Describe the Future Trajectory
- Identify System Needs
- Finalize Solutions, Approve and Publish Plan
- Establish Planning Assumptions
- Identify Solutions to Address Needs
- Evaluate and Apply Criteria to Determine Preferred Solutions
- Develop Forecasts
- Integrate Process Steps

- State Policy Inputs to Planning
- State Regulatory Role in Planning
- ▲ Stakeholder Engagement

TURQUOISE

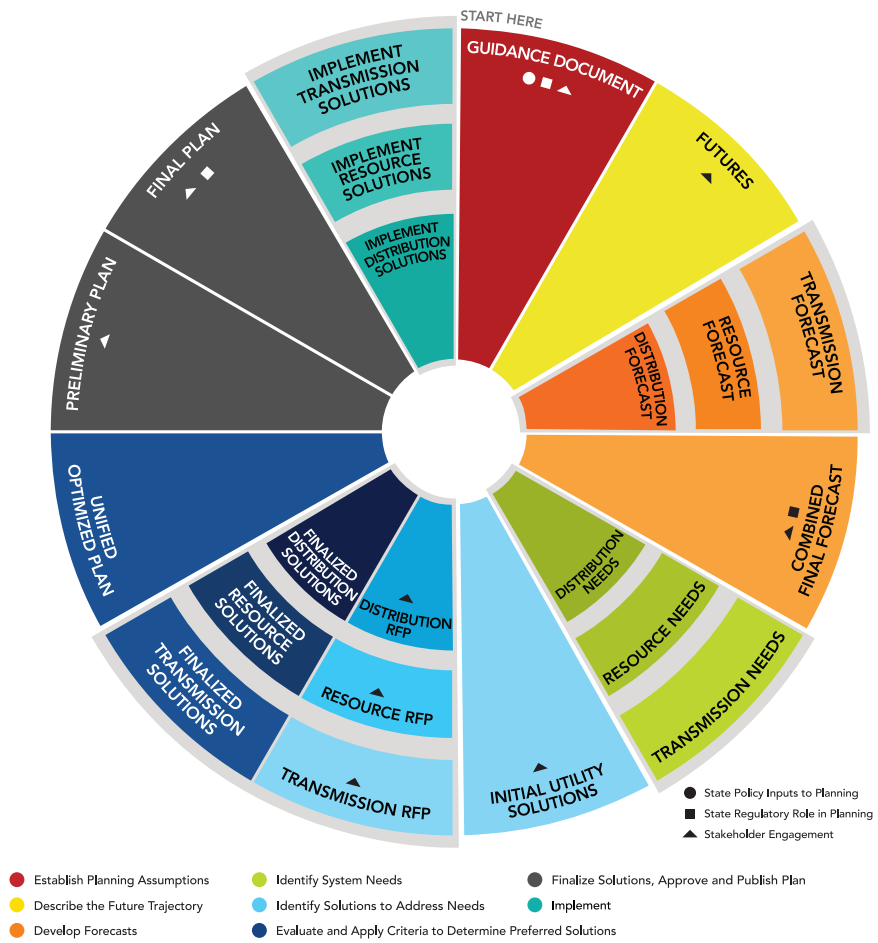
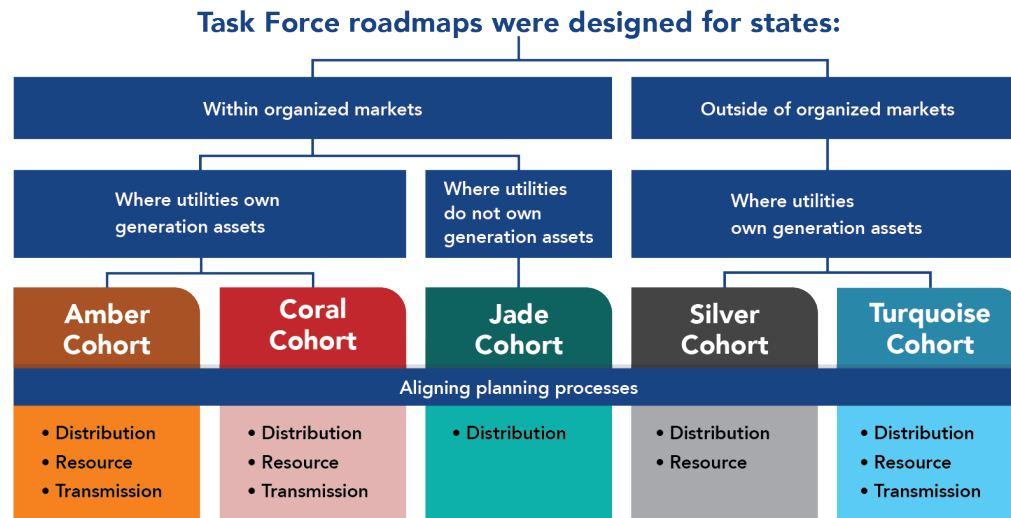


Figure 10: Simplified Framework for Identifying Relevant Roadmaps to Review



Explore the roadmaps:



C.1. Identify which Task Force cohorts are most relevant to your regulatory and market situation and planning goals by reviewing Figure 10. The Task Force roadmaps were designed to be relevant to other states with similar market and regulatory characteristics. By identifying one or more cohort(s) that are similar to your state, you will be well situated to dive into relevant cohort materials as your starting point.

C.2. Review any relevant cohort’s roadmap to understand its state-developed, expert-informed visions for better aligned planning. Each Task Force roadmap describes that cohort’s vision for aligned planning and provides additional details and examples of each planning step. The roadmaps are illustrative—the cohort states will be using these as a starting point for their own state-specific efforts.

Once your state has identified cohorts whose efforts are similar to your desired trajectory, please review the corresponding cohort roadmap(s). Roadmaps for each cohort can be accessed on the Task Force website or by clicking the cohort boxes to the left.

You might find that one roadmap is particularly relevant or that multiple roadmaps have compelling elements. Once you have reviewed the roadmap(s), you can decide if you want to use a Task Force-developed roadmap as a starting point, use a relevant portion or portions of the roadmap, or create your own.

D. **Does your desired vision align** with your guiding principles? Does it fill the gaps you identified in the current state of planning (Step 2.A)? The last step each Task Force cohort took before finalizing its vision and roadmap was a cross-check against its original goals, guiding principles, and feedback from stakeholder and utility planner conversations.

Task Force Roadmaps Offer Examples of How to Improve Planning Processes

Task Force roadmaps articulate approaches to comprehensive system planning that achieve the following goals:

- **Clearly setting expectations** at the outset for utilities, public utility commissions, state energy offices, and stakeholders about the process and what it is trying to accomplish
- Identifying better approaches for **stakeholder engagement** at critical steps in the planning process
- Encouraging cost-effective **integration of DERs** by evaluating a range of solutions and procurement strategies to optimize grid investments and maximize value for customers
- Coordinating and **syncing data, assumptions, and modeling scenarios** to holistically consider grid needs and solutions across the entire system (generation, transmission, distribution)
- Expanding on the **fundamentals of distribution system planning** to incorporate emerging methods (e.g., multi-scenario forecasting, hosting capacity analysis, non-wires alternatives, locational value)
- Acknowledging the contributions of **energy efficiency as a resource**, including impact of energy efficiency in forecast assumptions and solution identification

Step 3: Develop an Action Plan for Achieving the Vision

Now that you know what your starting points are and have established a vision for an improved set of planning processes, it is time to create a plan for achieving the vision.

A. What format will your state action plan take? Are you developing an internally facing or externally facing document? How detailed does it need to be to support your next steps? With whom will you share it, for what purpose, and when? The text box on page 30 includes several ideas for action steps considered by Task Force members.

B. Comparing the current state of planning to your vision and desired outcomes, what are the **key differences**, and **what steps will you have to take to achieve each outcome?** Have you completed any to date? You may wish to holistically examine logistical, administrative or legal, technical, and data needs. For example, is new legal authority needed through state legislation?

Task Force members identified key gaps between where their state planning processes were and what the drafters thought was needed.

In thinking through potential action steps, Task Force members anticipated what some of the likely barriers to achieving the vision might be, and they worked together to identify ideas for successful implementation. Many commonly identified challenges and potential solutions are summarized in the Appendix: Challenges and Solutions to Implementing Aligned Planning.

B.1. What **unanswered questions or missing information** do you need to clarify (and from whom) before solidifying the action steps?

B.2. What does the **sequence** of key steps need to look like? What is the critical path? What requires action, and by whom? Working backwards from key goals or milestones, what needs to happen and when?

Suggested questions to guide you through Step 3

A.	What format will your state action plan take? Are you developing an internally facing or externally facing document? How detailed does it need to be to support your next steps? With whom will you share it, for what purpose, and when?
B.	Comparing the current state of planning to your vision and desired outcomes, what are the key differences , and what steps will you have to take to achieve each outcome? Have you completed any to date? B.1. What unanswered questions or missing information do you need to clarify (and from whom) before solidifying the action steps? B.2. What does the sequence of key steps need to look like? B.3. What key dates need to factor into the state action steps? B.4. Which steps connect with other organizations' planning efforts (e.g., ISO/RTO transmission plans, air quality plans) that need to be considered?
C.	Which stakeholders will need to be involved in implementation of the action plan , including those who have not previously been involved? C.1. Who might be key actors and allies for advancing your goals? C.2. Which constituents are likely to oppose your implementation plan for aligned planning, and what are their concerns? C.3. What is (are) going to be the key message(s) for bringing others on board?
D.	Who will oversee implementation of your state's proposed action steps? D.1. How will you know when you have successfully met your desired outcomes for comprehensive electricity planning? D.2. What is a sizable near-term step to demonstrate initial progress and create momentum?
E.	How will you track progress , identify new changes needed, and pivot to apply new strategies when appropriate?

In project management, a critical path is the sequence of dependent tasks allowing you to complete a project.

Task Force members noted:

“We see the need for a new stakeholder working group on integrated distribution planning to be established, which can be incorporated into existing engagement efforts to ensure coordination and appropriate attention from utilities and stakeholders.”

“We think that a new docket will be needed to ensure that the state’s utilities are making progress toward state-required greenhouse gas goals. Within this proceeding, we will ask the utilities and intervenors to consider how to align the current suite of planning dockets---leveraging the Task Force on Comprehensive Electricity Planning roadmaps as a starting point.”

“We are establishing new integrated resource planning rules that require consideration of distribution system assets, a stakeholder advisory group, and independent review of utility forecasts.”

Best practice: Make sure the team identifies an internal staff lead. Who is going to be tasked with the mundane but essential actions to keep moving forward incrementally (e.g., setting up meetings, tracking to do lists, establishing routine communications)?

B.3. What **key dates** need to factor into the state action steps? Are there established schedule requirements or certain dates influencing the effort to align planning processes (e.g., terms expiring, rate case schedule, report due the legislature, or Integrated Resource Planning [IRP] filing requirements)? Are there any upcoming opportunities for new efforts or announcements (e.g., new leadership, regulations process, or Task Force announcement)?

B.4. Which steps connect with **other organizations’ planning** efforts (e.g., ISO/RTO transmission plans, air quality plans) that need to be considered?

Ideas for Action Steps

Some options for state action steps include:

- Adopting an expanded integrated resource planning, integrated distribution planning, or integrated grid planning requirement
- Involving stakeholders in setting objectives/goals of planning exercises, or in other planning steps prior to filing of draft plan
- Keeping goals and objectives consistent across different planning exercises
- Developing goals and metrics for resilience planning
- Increasing spatial and/or temporal granularity of load forecasts
- Developing load forecasts for electrification of fossil-fueled energy end uses (e.g., electric vehicles, buildings)
- Periodically developing potential studies and DER forecasts for all DER types—technical potential, cost curves, etc.
- Using common load forecasts across planning exercises (with updates or explained changes as appropriate)
- Sharing load and DER forecast data with regional reliability coordinator/RTO/ISO where relevant
- Developing and publishing hosting capacity maps
- Using common benefit/cost analysis framework for evaluating all DERs
- Linking cost recovery and utility returns to performance rather than goals
- Engaging other state agencies in utility planning: SEO, air quality, transportation
- Considering retail rate design changes and DER programs as potential solutions to grid needs
- Considering non-wires solutions to transmission and distribution system needs
- Using competitive procurement processes; allowing third-party bids to meet identified grid needs
- Assessing procurement outcomes/resource performance against planning goals and assumptions

- C. Which **stakeholders will need to be involved in implementation of the action plan**, including those who have not previously been involved? What kinds of input and perspectives will you want from stakeholders and when (e.g., based on the planning processes that are in scope for your action plan, or based on data and information needed to enhance planning)? How will engagement be structured? Will there be criteria and rules outlined for stakeholder participation? How will they be defined?

Task Force members envisioned including stakeholders in a variety of key steps of aligned planning (e.g., goal and objectives setting at the outset of a planning cycle, data and projections about DER growth, suggestions for alternative solutions to infrastructure needs, comments on utility proposals).

- C.1. Who might be **key actors and allies** for advancing your goals? Who needs to do what? Task Force members thought about roles and responsibilities for the public utility/service commission, state energy office, governor’s office, state legislature, nongovernmental organizations, utilities, and other key stakeholders.
- C.2. Which **constituents are likely to oppose your implementation plan** for aligned planning? What are the key concerns to be aware of and how might opposition be demonstrated? What actors, allies, or opposition might be associated with certain action steps? See Appendix: Challenges and Solutions to Implementing Aligned Planning for examples of solutions to common challenges.
- C.3. What is (are) going to be the **key message(s)** for bringing others on board? Who is creating and putting out those messages?

Task Force members noted:

“Bringing customer representatives, distributed energy resource providers, environmental groups, business interests, and others into an advisory group to participate in electricity system planning should lead to a more holistic consideration of options.”

“Collaboration among state regulators, planners, electric utilities, and stakeholders has begun and will continue to deepen. Finding ways to bring communities into electricity planning decision making is the next key strategy for leveraging new technologies and improving resilience in a cost-effective manner.”

Task Force Resources

Task Force members identified stakeholder engagement as a critical component to reach desired outcomes for aligned planning. The Task Force Library includes best practices for structuring efficient and effective stakeholder engagement in electricity planning, including NARUC’s 2021 report: [Public Utility Commission Stakeholder Engagement: A Decision-Making Framework](#). The Task Force Library is available online:

www.naruc.org/taskforce/resources/

Task Force members noted:

“It is important to integrate the perspectives from traditionally underrepresented stakeholders into planning processes. By making organization changes, we have elevated the importance of environmental justice in our state. Additionally, through a new environmental justice screening tool we are hoping to strengthen these considerations in integrated resource planning by the utilities.”

“Our vision is for a new Task Force to include state energy agencies, local electric distribution utilities, large energy users, municipal planners and decision makers, and energy, environment, and justice stakeholders. The Task Force’s mission will be to examine how the grid could evolve in support of renewable energy-friendly zones accommodating local DER development and smart siting principles.”

Task Force Resources

Task Force members, NARUC and NASEO staff, technical and subject matter experts, and others compiled a comprehensive set of resources to enable further learning about important comprehensive electricity planning issues. The Comprehensive Electricity Planning Library is organized across 15 key topical areas and can be accessed online at:

www.naruc.org/taskforce/resources.

D. **Who will oversee implementation** of your proposed state action steps? What is the structure of leadership and collaboration among the key actors involved in implementation? Who is the ideal owner or endorser (e.g., governor or other person) of the set of action steps, or action plan if you choose a more formalized approach? How will momentum be maintained?

A common and valuable tool for outlining who will be involved in implementing key actions is a RACI chart, on which you can identify who is responsible, accountable, needs to be coordinated with, and who should remain informed during the implementation of your state action steps.

D.1. How will you know when you have **successfully met your desired outcomes** for comprehensive electricity planning? What types of metrics or indicators will you establish to track progress in completing your action plan? Who will track progress, and how will they do it? What will you use to demonstrate ongoing accomplishments toward your vision and goals to stakeholders and others who were involved in developing the vision?

D.2. What is a **sizeable near-term step** to demonstrate initial progress and create momentum? Are any new events necessary to kick off the efforts?

Members of the Task Force are taking steps to apply the principles and strategies they developed through concrete actions such as:

- Promoting a more holistic analysis of both distribution and resource system needs and possible solutions
- Exploring opportunities to strategically align electricity planning processes to meet state-specific priorities—such as resilience, decarbonization, or renewable energy targets—through docketed proceedings or other initiatives
- Facilitating the availability of data for improved distribution planning, such as voltage studies, hosting capacity analyses, and distributed energy resources siting analyses
- Holding technical conferences or briefings on Task Force results to support state-specific conversations about opportunities to align planning processes
- Informing new and existing advisory or working groups to offer dedicated forums for stakeholder input into planning efforts

E. How will you **track progress**, identify new changes needed, and pivot to apply new strategies when appropriate? Will you establish a cyclical or event-based review of electricity system planning to determine whether your state is meeting current and forecasted needs? Who will evaluate whether new action steps are needed to align planning in light of new trends, new state goals or legislated requirements, or a change in trajectory, and when?

Challenges and Solutions to Implementing Aligned Planning

In fall 2020, members of the Task Force on Comprehensive Electricity Planning anticipated potential challenges to implementation of their visions for aligned planning and collaborated to identify possible solutions. The tables in this appendix represent a consolidated and lightly edited version of members' contributions. The content is intended to offer a starting point for other state teams considering implementation of aligned planning, but is not an exhaustive list of challenges nor action steps.

The tables on the following pages include actions to address likely challenges that would be initiated by state decision-makers (e.g., public utility commissions, state energy offices, state legislatures), electric utilities, and/or regional transmission organizations (RTOs). In practice, people from more than one of these organizations would likely collaborate to overcome challenges that arise in implementing comprehensive electricity planning.

Actions for State Decision-Makers

Likely Challenges	Possible Solutions
<p>Overcoming institutional inertia and resistance to beginning distribution system planning or integrated planning processes</p>	<ul style="list-style-type: none"> • Support state legislation to require a formal planning process • Identify or cultivate a governor-supported champion • Develop a change management plan; prioritize possible actions; incrementally address highest priorities; focus on one action to get started • Establish discrete action steps within existing or new non-litigated proceedings (e.g., rulemakings) • Focus on specific integration efforts within litigated proceedings (via a party) or petition public utilities commission (PUC) to act • Require an overarching mapping of grid solutions across dockets • Provide and regularly update an overarching mapping of inter-related regulatory dockets • Require greater utility transparency around planned investments • Direct the utility to create and update a hosting capacity map • Provide incentives to reduce resistance (e.g., incentives for consideration of non-wires alternatives) • Seek and frame comprehensive planning within context of regulatory reform • Identify and leverage utility’s interest in integrating proceedings • Formally or informally direct the utility to present a distribution plan in a public setting • Ask utilities to propose an alternative way to get to same outcome if there are differences in preference for direction
<p>Ensuring new planning processes add value, are not overly burdensome or slow, and connect to other efforts</p>	<ul style="list-style-type: none"> • Work with legislature to clearly vest commission with authority to balance utility interests and public interests • Issue PUC decision-setting expectations for utility to meet • Specify roles and responsibilities of all parties (utility, commission, energy office, stakeholders) in decision-making • Review state–utility relationship to find mutual benefits • Encourage leadership that supports innovation (regulatory, utility, and policy/legislative) • Leverage external experts and process facilitators • Incentivize desired policy outcomes from distribution system planning • Establish a docketed process with strong commission and staff involvement, issue continued and repeated notices, and promptly release decisions and orders • Provide and regularly update an overarching mapping of inter-related regulatory dockets • Clearly signal to utilities how to plug distribution experts into aligned planning processes (e.g., require multiple utility divisions to be represented in meetings together) • Ask utilities how it would look if they truly viewed distributed energy resources (DERs) as a resource alternative (would they be seeking more or less energy efficiency, demand response, storage, etc.?) • Require consideration of transmission issues in generation and distribution planning processes

Likely Challenges	Possible Solutions
Aligning and managing time frames, information, and solutions across planning processes	<ul style="list-style-type: none"> • Identify needs of each planning process to enable greater information transparency and integration • Show time horizons of the planning processes in a state action plan • Identify specific data that need to be shared and how that will happen • Create procedural schedule that follows planning best practices; adhere to procedural schedule; triage work to accommodate time limitations • Compress timelines where possible to prevent data from becoming stale due to quickly changing technology costs and availability • Identify functional requirements in a technology-neutral matter, and in sufficient detail to evaluate and choose among alternatives • Require consideration of transmission issues in generation and distribution planning processes • Leverage existing processes and approaches to overcome jurisdictional separation between states and RTOs (e.g., leverage regional state committees, cultivate relationships with RTO leadership, propose tariff changes to RTO processes to better align with states' planning) • Establish new mechanisms to actively collaborate with RTOs, such as narrowly focused memoranda of understanding (MOUs) between state commissions and RTOs as a tool to facilitate transparency, collaboration, and shared subject matter expertise when addressing specific topics (e.g., modeling, data sharing, etc.); MOUs could be used on a state-by-state basis or regionally (e.g., via Organization of Midcontinent Independent System Operator [MISO] States) • Participate in the development of North American Electric Reliability Corporation (NERC) reliability guidelines on DER modeling and data, as individual states or regional state committees
Ensuring data and analysis needs are met to support informed decision-making	<ul style="list-style-type: none"> • Create state-level framework for data needs and data management best practices • Collaborate to develop a national framework for data sharing and best practices (e.g., security, privacy, access) • Empower an entity or entities (agency or utility) to access the data, create the infrastructure, and develop the methodological underpinnings to dispatch, quantify, and compensate load-based and other DERs • Increase and attract skilled workers into state workforce and energy sector (e.g., big data expertise, data scientists), as engineering and technical details are easy to overlook by those who are not steeped in it • Establish clear guidance for utility planning to ensure that state policy requirements are being modeled from a system perspective, even if it is challenging to do so with current tools • Leverage utility test bed and pilots; establish criteria, timeline, and data for evaluation of results • Make utility planning tools available to stakeholders to allow consistent comparison of alternative solutions
Ensuring data and analysis needs are met to support informed decision-making	<ul style="list-style-type: none"> • Create state-level framework for data needs and data management best practices • Collaborate to develop a national framework for data sharing and best practices (e.g., security, privacy, access) • Empower an entity or entities (agency or utility) to access the data, create the infrastructure, and develop the methodological underpinnings to dispatch, quantify, and compensate load-based and other DERs • Increase and attract skilled workers into state workforce and energy sector (e.g., big data expertise, data scientists), as engineering and technical details are easy to overlook by those who are not steeped in it • Establish clear guidance for utility planning to ensure that state policy requirements are being modeled from a system perspective, even if it is challenging to do so with current tools • Leverage utility test bed and pilots; establish criteria, timeline, and data for evaluation of results • Make utility planning tools available to stakeholders to allow consistent comparison of alternative solutions

Likely Challenges	Possible Solutions
Defining priorities within optimization and decision-making	<ul style="list-style-type: none"> • Acknowledge tradeoffs between desired outcomes (e.g., lowest total cost, resource adequacy, distribution reliability, transmission reliability targets) • Establish state guidelines for benefit-cost analysis or least-cost best-fit analysis across distribution, generation, and transmission processes • Ask experts (e.g., Electric Power Research Institute [EPRI], National Renewable Energy Laboratory [NREL], Lawrence Berkeley National Laboratory [LBNL], etc.) what optimization opportunities and tools are available
Limited PUC staff and resources to manage complex PUC-driven processes	<ul style="list-style-type: none"> • Improve legislative direction and include increased PUC funding (Fixed Utility Fund) and staffing • Seek federal funding from the U.S. Department of Energy (DOE) or in-kind support from National Laboratories • Request technical assistance from non-governmental organizations supported by private foundations focused on energy • Request more support from stakeholders • Bring in outside consulting to develop work plan if there is increased funding • Develop multistep, multiyear plan of discrete actions • Support an outside entity developing modeling software that can be used at little or no cost by all parties, or make utility planning tools available to stakeholders to allow consistent comparison of alternative solutions
Traditional utility business model does not incent comprehensive planning and investment approaches	<ul style="list-style-type: none"> • Compare incremental performance-based regulation (PBR) versus new utility business model • Consider PBR mechanisms to better align utility and customer interests, even in planning • Launch PBR docket and implement • Accommodate targeted transition, rather than immediate full implementation (e.g., establish metrics for monitoring, then evaluation, then adjustments)
Managing narrow stakeholder interests and emerging with clear direction that reflects insights from all parties	<ul style="list-style-type: none"> • Seek state legislation that establishes clear policy priorities for electricity sector investments • Issue PUC guidance to establish clear strategic direction • Structure stakeholder engagement to designate specific stakeholders at specific checkpoints; issue PUC guidance related to stakeholder involvement • Docket all comments to create transparent processes • Include all parties in the planning process, while ensuring facilitator clearly communicates who will make final decisions • Strive for consensus on objectives • Invite independent voices to help provide context • Ensure that relevant experts (e.g., utility distribution planners, regulatory personnel, program designers) are in the room to inform the discussion; adjust which experts participate as needed based on the topics • Ensure there is sufficient education to enable constructive exchange
Need for continuing education for all parties	<ul style="list-style-type: none"> • Ensure stakeholders are apprised and engaged • Figure out compelling messaging to entice parties to participate • Request NARUC and others sponsor regular events and workshops for commissioners on planning reforms • Support development of an Energy Leadership Academy for new legislative, utility commission, and state energy office staff • Recruit educate, and assist champion(s) in conducting education campaign • Identify how actions at the Federal Energy Regulatory Commission (FERC) might impact state DER activity (e.g., orders on storage, energy efficiency, aggregators of retail customers)

Actions for Utilities

Likely Challenges	Possible Solutions
Uncertainty about integrating new technology into power system operations	<ul style="list-style-type: none"> Facilitate early consideration of operational impacts from new technologies, and host conversations with impacted utility colleagues at project onset Expand internal training to lead to more nuanced distribution operation management (e.g., distinguishing between types of DERs) Stimulate discussion of how DERs present career opportunities for distribution engineers Encourage distribution engineer/distribution planner participation in DER stakeholder processes Develop a change management plan; prioritize possible actions; incrementally address highest priorities
Insufficient agreement on attributes of DERs	<ul style="list-style-type: none"> Identify functional requirements in a technology-neutral matter, and with sufficient detail to evaluate/choose between alternatives Conduct targeted local studies on DER attributes Foster partnerships with stakeholders in applying for technical support from National Laboratories, DOE, and others Encourage distribution engineer/distribution planner participation in DER stakeholder processes Leverage utility test beds and pilots; conduct pilot programs to test out different use cases; establish criteria, timeline, and data for evaluation of results
Insufficient tools for conducting integrated analyses	<ul style="list-style-type: none"> Collaborate with other utilities or in-state organizations to share costs of developing improved tools for modeling Expand staff training and capacity building Conduct open requests for information to identify tools and resources that are available for specific analyses Seek partnerships to promote data sharing; require vendors to leverage open-source tools Resist black box modeling; secure support from National Laboratories or universities, disclose data assumptions and inputs, make models public to reduce back-and-forth over assumptions and conclusions, build capacity in state decision-making bodies
Insufficient data availability and transparency for stakeholders; confidentiality of information and data used for analysis and decision-making	<ul style="list-style-type: none"> Establish inventory of available data Establish clear use cases for data to inform data portal design and data requests Establish clear rules on access to data Avoid information dump/overload; use publicly available datasets where possible; release relevant and anonymized data to parties in proceedings with nondisclosure agreements Identify and share minimum list of parameters and inputs used for modeling Gather best practices from other states regarding nondisclosure agreements Involve the “right people” who understand the rationale for data requests and can help find solutions if the specific request(s) does not work Propose an alternative way to get to same outcome if there are differences in preference for direction Set clear objectives for grid modernization based on planning needs Improve cost-benefit analysis of data transparency and availability

Likely Challenges	Possible Solutions
Overcoming stakeholder skepticism of utility-led processes and managing narrow interests	<ul style="list-style-type: none"> • Request public conference/docketed proceeding • Outline clear strategic direction within stakeholder engagement process • Include all parties in the process, but have a facilitator clearly articulate who will make final decisions • Reach consensus on objectives • Invite independent voices to help provide context • Ensure knowledgeable utility staff (e.g., sometimes regulatory, sometimes distribution engineers, sometimes customer service or program design) are in the room to inform the discussion • Ensure there is sufficient education to enable constructive exchange

Actions for Utilities and Regional Transmission Organizations (RTOs)

Likely Challenges	Possible Solutions
Few iterative feedback loops for analysis and communication across generation, distribution, and transmission	<ul style="list-style-type: none"> • Increase engagement between utilities and RTOs to create iterative communication touch points within planning processes • Consider transmission issues in generation and distribution planning processes • Encourage transmission owner participation in utility integrated resource planning/integrated distribution planning processes • Work with RTO to provide data earlier, and more fully consider alternatives to transmission • Leverage or support development of state guidelines for benefit-cost analysis or least-cost best-fit analysis across distribution, generation, and transmission processes • Establish new mechanisms to actively collaborate with state decision-makers such as narrowly-focused memoranda of understanding (MOUs) between state commissions and RTOs as a tool to facilitate transparency, collaboration, and shared subject matter expertise when addressing specific topics (e.g., modeling, data sharing, etc.); MOUs could be used on a state-by-state basis or regionally (e.g., via Organization of MISO States)
Concerns about bulk power system (BPS) reliability impacts from increasing levels of distribution-level DERs, which hampers planning	<ul style="list-style-type: none"> • Invest in technical studies being conducted by utilities, EPRI, National Laboratories (e.g., develop methods for creating DER growth scenarios for use in transmission planning—funding might be available from DOE, state research agencies) • Engage collaboratively with industry (BPS operators, RTOs, distribution utilities, NERC) and academic/research entities studying solutions (e.g., develop standards for distribution-transmission interface operations to manage/mitigate DER impacts on BPS) • Directly perform pilot studies of potential solutions and share findings across utility, RTO, NERC (funding might be available from DOE, national laboratories, state research agencies) • Create utility inventory of DER by capabilities and inverter settings • Review NERC reliability guidelines on DER modeling and data; engage in development of future iterations • Identify and share minimum list of parameters and inputs used for modeling • Involve the “right people” who understand the rationale for data requests and can help find solutions if the specific request(s) does not work

This material is based upon work supported by the U.S. Department of Energy under award numbers DE-OE0000818 and DEOE0000810.

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About NARUC

NARUC is a non-profit organization founded in 1889 whose members include the governmental agencies that are engaged in the regulation of utilities and carriers in the fifty states, the District of Columbia, Puerto Rico and the Virgin Islands. NARUC's member agencies regulate telecommunications, energy, and water utilities. NARUC represents the interests of state public utility commissions before the three branches of the federal government. www.naruc.org.

About NASEO

NASEO is the only national non-profit association for the governor-designated State Energy Directors and the over 3,000 staff of their offices from each of the 56 states and territories. Formed by the states in 1986, NASEO facilitates peer learning among state energy officials, serves as a resource for and about state energy policy, and advocates the interests of the state energy offices to Congress and federal agencies. www.naseo.org.

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