July 2026

JASPER ROADMAP

NARUC-NASEO INITIATIVE: COMPREHENSIVE ELECTRICITY PLANNING IN AN ERA OF LOAD GROWTH

NARUC
National Association of Regulatory Utility Commissioners

NASEO
National Association of State Energy Officials

Table of Contents

Introduction . . . 3

Development of the Flowchart and Roadmap . . . 3

How to Use the Roadmap . . . 4

Additional Resources . . . 4

Jasper Flowchart . . . 5

Jasper Flowchart Description . . . 6

Phase 1: Planning Environment . . . 8

Phase 2: Scenario Definition and Forecasting . . . 9

Phase 3: Solution Development and Evaluation . . . 10

Phase 4: Regulatory Review . . . 12

Acknowledgments and Disclaimers . . . 13

Planning Categories

- Establish expectations & assumptions
- Develop scenarios
- Develop forecasts
- Identify system needs
- Identify solutions
- Evaluate solutions
- Finalize plan

About Jasper: A Fictional, Representative State	
Regulatory	
Our state's investor-owned utilities	**own generation assets**
Market	
Our state is located	**within an RTO/ISO market**
Planning Processes	
Our state is seeking to align	**distribution, generation, and transmission planning processes**

Introduction

This roadmap document describes a vision for best-in-class comprehensive electricity planning, shown in a flowchart and accompanying descriptive text. This idealized planning process is viewed from the state perspective, specifically a collaboration between the State Public Utility Commission (PUC) and State Energy Office. The roadmap was the result of robust engagement with a cohort of National Association of Regulatory Utility Commissioners (NARUC) and National Association of State Energy Officials (NASEO) members drawn from 24 states and Washington, DC who joined the **NARUC-NASEO Initiative: Comprehensive Electricity Planning in an Era of Load Growth**. Initiative members attended virtual and in-person workshops to collaborate in articulating their priorities for better aligning distribution, resource, and transmission planning.

This roadmap includes:

- A flowchart of the entire integrated or aligned planning process
- Brief descriptions and explanations of each section of the flowchart
- A color key—outlining each box in the flowchart—to allow for comparison with other cohort roadmaps. The colors align with seven generalized procedural and analytical planning steps that typically characterize electricity system planning processes.

While these practices may not reflect current planning across all jurisdictions, the roadmap describes what could be implemented over time as utility capabilities, data and analytical sources, resource availability, and regulatory frameworks evolve.

The roadmap is intended to support states considering taking actions to increase the alignment of their own electricity system planning processes by providing:

- A high-level understanding of the sequence of steps included in an electricity planning process
- Descriptions of ideal information flows and coordination points represented in the vision, as articulated by NARUC and NASEO members
- Starting points for all states, particularly those with similar characteristics to the Jasper cohort

Development of the Flowchart and Roadmap

An original set of five comprehensive electricity planning flowcharts and roadmaps were developed by a group of Commissioners and State Energy Office leaders from 15 states in 2018 to 2021. These resources were used by numerous states as starting points for enhancing their electricity planning processes. Given significant load growth projections and technological changes in the planning landscape since then, in 2025 NARUC and NASEO launched an

initiative to refresh the original roadmaps to support state decision makers facing today's evolving challenges.

Through virtual and in-person collaborations over more than a year, members from 24 states and Washington, DC gathered to identify upgrades that would make the roadmaps relevant and actionable in an era of load growth. Researchers from the U.S. Department of Energy's (DOE) national laboratories, industry leaders, and subject-matter experts also provided input to ensure the new flowcharts and roadmaps are accurate, practical, and reflective of current and emerging industry best practices.

How to Use the Roadmap

It is important to recognize what the flowchart and the roadmap do and do not address. These materials describe the key activities, milestones, and regulatory actions that comprise the planning processes, focusing on their substance, but without trying to place them on a timeline or calendar, and without indicating which entities or actors are responsible for which activities (except where a regulatory decision is obviously the role of a PUC). In other words, the flowchart and accompanying roadmap focus only on the "what"—the procedural and analytical steps that make up each planning process and the actions proposed for coordinating or integrating the processes.

While the flowchart is presented visually from left to right, in practice many steps are iterative, overlapping, and can occur in parallel. The authors have attempted to indicate where these iterations are particularly important, but any practical implementation of the flowchart will surely result in a dditional iteration. Accordingly, the flowchart does n ot need to be used as a whole: states will adapt pieces and parts of the idealized planning process that best suit their policy and regulatory contexts.

Additional Resources

During development of the roadmap, the authors identified where existing guidance, resources, or examples could support operationalizing the major process steps described in the roadmap. These references will be accessible on a public website that is searchable and can be filtered by planning process building blocks. In some cases, gaps in available resources may signal areas where new tools and approaches are needed to better align planning processes.

Flowchart Key

PLANNING CATEGORIES

- Establish expectations & assumptions
- Develop scenarios
- Develop forecasts
- Identify system needs
- Identify solutions
- Evaluate solutions
- Finalize plan
- White boxes: Coordination checkpoint

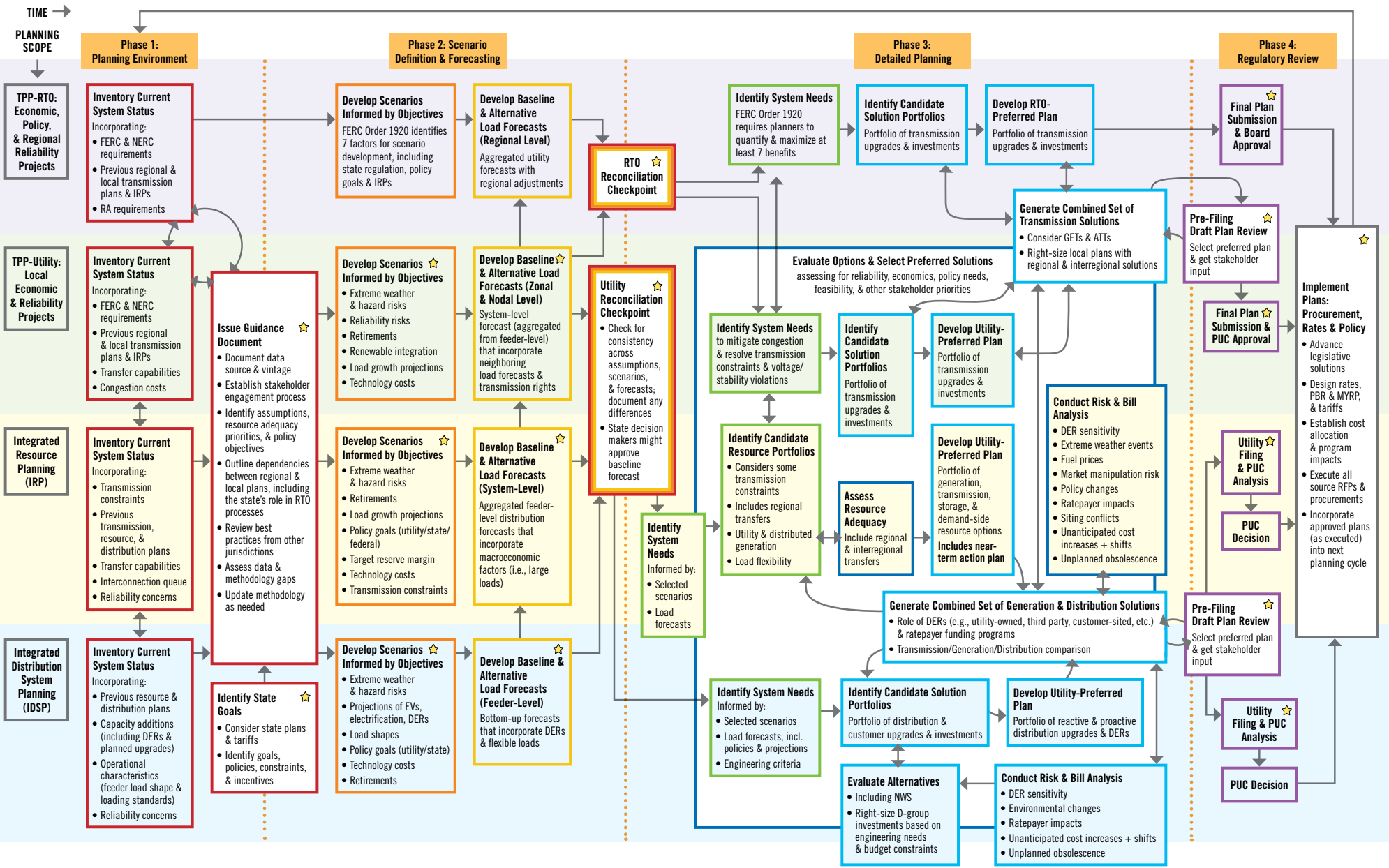
- Stakeholder engagement
- Information flows
- Iteration step (curved arrows)

- RTO transmission planning
- Utility transmission planning
- Integrated resource planning
- Integrated distribution system planning

ACRONYMS

D: Distribution
DER: Distributed Energy Resources
DR: Demand Response
EE: Energy Efficiency
EVs: Electric Vehicles
FERC: Federal Energy Regulatory Commission
G: Generation
IDSP: Integrated Distribution System Planning
IRP: Integrated Resource Planning
MYRP: Multi Year Rate Plan
NERC: North American Electric Reliability Corporation
NWS: Non-Wires Solutions
PBR: Performance-based Regulation
PUC: Public Utilities Commission
RFP: Request for Proposals
RTO: Regional Transmission Organization
TPP: Transmission Planning Process

Jasper Flowchart



Jasper Flowchart Description

The Jasper flowchart outlines what an ideal comprehensive planning process could look like for a hypothetical state where utilities own generation assets (are vertically integrated) and are within a Regional Transmission Organization (RTO) or Independent System Operator (ISO) market.

The Jasper flowchart highlights checkpoints and synergies between four distinct planning scopes that exist today within utilities and utility regulation:

- Transmission Planning performed by the Regional Transmission Organization (TPP-RTO)
- Transmission Planning performed by the individual transmission-owning utilities (TPP-Utility)
- Integrated Resource Planning (IRP)
- Integrated Distribution System Planning (IDSP)

Each section of the Jasper flowchart contains specific process steps with information flows, as indicated by colored boxes and arrows.

The present roadmap was created to be a companion to the flowchart, and provide a more detailed description of the various elements of comprehensive electricity planning and points of coordination across the planning scopes.

Together, the flowchart and roadmap describe a comprehensive set of planning activities and coordination points that better align the four distinct planning scopes described above. These steps are explained in more detail on the following pages: each section focuses on one portion of the flowchart.

The Jasper flowchart includes the process steps and relationships between the planning scopes for transmission (TPP), resource (IRP) and distribution (IDSP) planning. The TPP is represented in two coordinated planning scopes: the top line for the RTO TPP focuses on economic, policy, and regional reliability projects, and the second line is for the Utility TPP that focuses on local utility economic and reliability planning. In CAISO, these two TPPs are collapsed into one TPP that encompasses all types of transmission upgrade needs and projects.

The Jasper flowchart structures these planning processes in four sequential phases:

- **Phase 1. Planning Environment:** The first phase establishes a common foundation for the various planning scopes by taking inventory of the current power system status, identifying policy objectives that will guide planning, and translating this information into a guidance document.

Enabling Conditions

Cohort participants discussed two underpinning issues that need to be considered if a state intends to implement the comprehensive planning process described throughout the roadmap.

- **Access to data and information:** To successfully complete a comprehensive electricity planning process, decision makers and stakeholders will need data and information from the relevant utilities throughout the process. Acquiring information in a timely and transparent manner requires coordinated data sharing across multiple organizations. For example, early in the distribution system planning process, planners will need information on distribution circuit-level hosting capacity to target distributed energy resource (DER) development to locations with available capacity. Later in the process, third-party providers of non-wires solutions (NWS) will need information on identified system needs and proposed upgrades to respond to utility solicitations or requests for proposals (RFPs). NARUC's Grid Data Sharing Framework can be a starting point for states that do not have existing data sharing agreements in place.
- **Up-to-date methodologies for evaluating new technologies:** New technologies often lack a track record that can give grid operators confidence in their performance capabilities and reliability; additionally, their costs can vary significantly from one planning cycle to the next. These factors challenge the ability to perform traditional benefit-cost analyses to determine preferred solutions and may lead to the rejection of new technologies in favor of familiar solutions. Comprehensive electricity planning requires supplementary processes for obtaining reliable, current information on non-traditional technology options that can offer potential solutions to the system needs identified in the planning processes.

- **Phase 2. Scenario Definition and Forecasting:** The second phase develops the different planning scenarios as well as baseline and alternative load forecasts for the planning horizon.
- **Phase 3. Detailed Planning:** The third phase involves identifying system needs, proposing candidate solutions to meet those needs, evaluating the potential options, and determining the preferred solution set. Phase 3 includes a holistic review across all four planning processes to identify the optimal set of solutions that collectively address all the system needs and culminates in draft transmission plans as well as a combined resource and distribution plan that are published for stakeholder review prior to formal submission for approval or acknowledgement by the relevant body.
- **Phase 4. Regulatory Review:** The fourth phase includes the formal process whereby a utility regulatory commission or an RTO governing board approves or acknowledges and implements the plans.

Between these phases, the cohort identified several **coordination checkpoints** to improve alignment across planning scopes. At the end of Phase 1, a **Guidance Document** is developed to establish a common understanding of current electricity system conditions and policy objectives across planning scopes. At the end of Phase 2, a **Utility Reconciliation Checkpoint** and an RTO Reconciliation Checkpoint provide the opportunity to assess consistency of scenarios and load forecasts across planning scopes and document any justified differences. Finally, **Pre-Filing Draft Plans** are released at the end of Phase 3 for stakeholder review and comment before plans are formally approved or acknowledged by the regulatory or governing body.

The flowchart also highlights opportunities to better coordinate other planning and regulatory processes with these electricity planning scopes. For instance, other state efforts, including economic, land use, resilience, and disaster risk and mitigation plans, should inform the **state goals** and planning priorities that are identified in Phase 1 and help shape the solutions evaluated in Phase 3. In addition, non-infrastructure solutions that are typically developed through separate regulatory proceedings, such as rate design reforms, performance incentives, and tariffs, should be considered alongside traditional electricity infrastructure investments. Integrating these tools into planning processes, particularly in the IRP and IDSP processes, can help advance energy efficiency, demand response, and other strategies that may cost-effectively address system needs.

Phase 1: Planning Environment

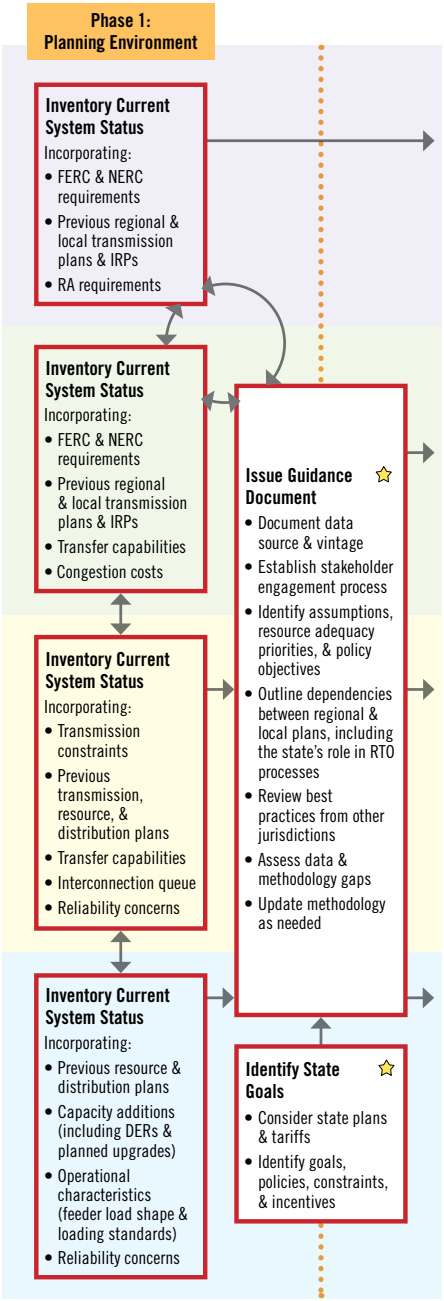
The process steps carried out in Phase 1 set the common foundation for the rest of the planning cycles. Known information about the current electric system, including scheduled additions and retirements over the planning horizon, as well as policy objectives that the planning processes should consider, are documented in Phase 1 and socialized with stakeholders through a guidance document before moving to Phase 2.

Phase 1 of the planning cycle incorporates previously approved or acknowledged utility short-term and long-term transmission plans, integrated resource plans, and distribution plans from prior cycles. These plans inform the **current system status**, influencing planning assumptions and baseline system conditions of this planning cycle. The current system status also includes an inventory of existing and planned electricity assets, including the generation mix, interconnection queue status, and fuel supply conditions.

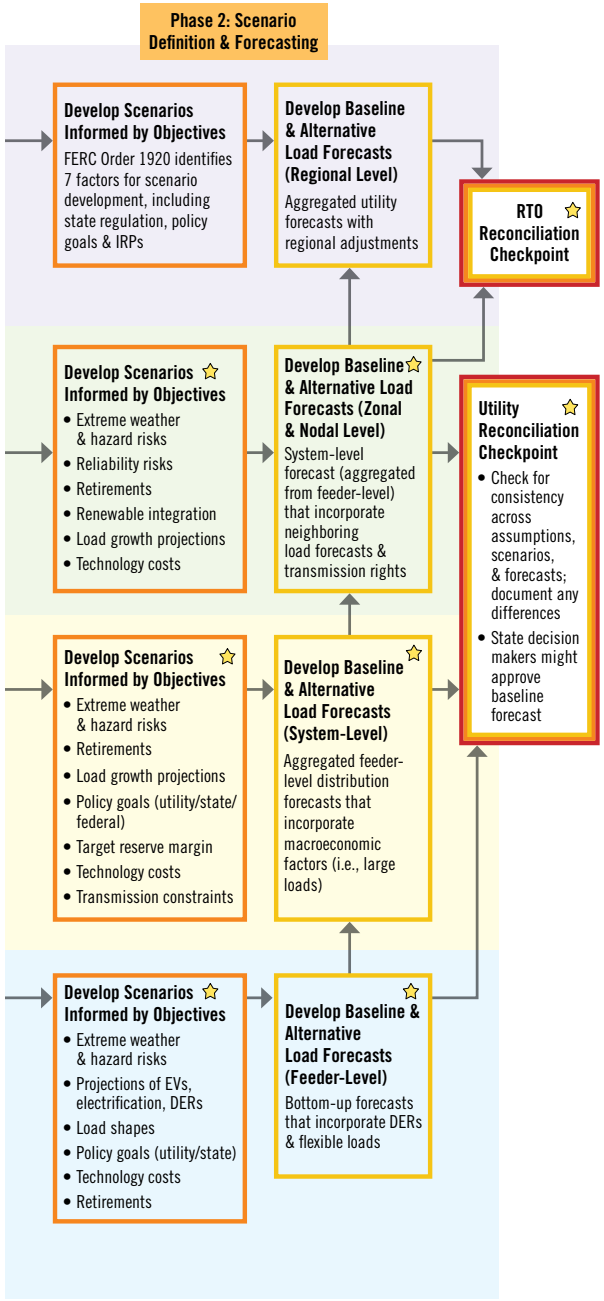
Phase 1 also identifies **state goals** to apply to the IRP, IDSP, and TPP planning processes. This step includes articulating the state goals for planning outcomes, the policies that outline the intended planning process direction, and the planning process constraints. This should consider other state plans, including state energy security, state energy, economic, land use, resilience, and disaster risk and mitigation plans.

The state goals and current system status for DSP, IRP, and TPP feed into the **guidance document**, a public document formally adopted or acknowledged by the State Utilities Commission in some manner. The Guidance Document serves as a common foundation or consistency check across IRP, IDSP, and Utility TPP, while also providing state input to the RTO TPP. Its purpose is to create a shared view of the current electric system status and policy objectives, so that data, methodologies, and planning assumptions can be reasonably aligned across planning processes. Achieving this alignment requires the development and sharing of data across multiple organizations and stakeholders.

The guidance document should also outline processes for stakeholder engagement and inter-agency coordination, including the respective roles of states, utilities, RTOs, and the Federal Energy Regulatory Commission (FERC) in transmission planning. As shown by the curved arrows in the flowchart, this coordination process is often iterative. Notably, a state may have less influence on the TPP of a multi-state RTO than on its jurisdictional utilities' planning.[1] For example, one state in an RTO may have a goal for 100% clean energy by a certain date, even if that goal is not shared by other states in the RTO. While the RTO's TPP may not fully reflect that objective, the state's jurisdictional utilities' transmission plans would incorporate it. Aligning the current status of regional and local transmission systems early in the planning process is critical to ensuring that planning assumptions, analyses, and outcomes remain relevant and consistent across jurisdictions.



1 FERC requires RTOs to incorporate both state policy and utility plans into their regional planning processes: "Local and regional transmission planning processes must consider transmission needs driven by public policy requirements established by state or federal laws or regulations. Each public utility transmission provider must establish procedures to identify transmission needs driven by public policy requirements and evaluate proposed solutions to those transmission needs." Source: https://www.ferc.gov/industries-data/electric/electric-transmission/order-no-1000-transmission-planning-and-cost



There should be an opportunity for stakeholder review and comment before the guidance document is finalized. Once the guidance document is adopted and included in the procedural record for the state's planning processes, it should be referred to throughout the subsequent phases to ensure that later decisions are aligned with state policy goals. For example, the regulatory checkpoint in Phase 2 and the pre-filing draft plan in Phase 3 could be assessed for alignment with the policy provisions in the guidance document.

Phase 2: Scenario Definition and Forecasting

Phase 2 entails developing the planning scenarios and load forecasts, taking into account the system status and policy objectives documented in the Guidance Documents. At the end of Phase 2, there is a second regulatory checkpoint to check consistency across the assumptions, scenarios, and forecasts and document any differences before the detailed planning analysis begins.

Phase 2 **develops scenarios** informed by policy objectives and projected system conditions. These scenarios are designed to capture the inherent uncertainty in long-term planning by representing a range of plausible future conditions.

This phase should establish a common set of core assumptions and scenarios that can be shared across DSP, IRP, and TPP, while allowing each process to develop additional scope-specific variables as needed. For example, assumptions around extreme weather and hazard risks, technology costs, load growth projections, and planned retirements may be developed once and used across processes. More granular inputs, such as costs of distribution feeder upgrades or load shapes, may be developed within the relevant planning scope.

This approach supports alignment across planning scopes while preserving flexibility to appropriately evaluate scope-specific risks and constraints. Notably, FERC Order 1920 requires regional transmission planners to solicit state input and consider state laws and regulations in scenario design, creating the opportunities for greater alignment between regional transmission planning and utility-level planning processes.

Phase 2 also includes the **development of baseline and alternative load forecasts**. Given the uncertainty associated with projected load growth, particularly from large loads, planners may evaluate a range of scenarios reflecting different assumptions about large load materialization, electrification projections, and DER adoption.

Load forecasts across planning scopes should be developed using consistent methodologies and assumptions. Ideally, bottom-up, feeder-level forecasts would be developed and then aggregated to support system-level generation and transmission planning. Using common bottom-up forecasts promotes consistency across planning scopes.

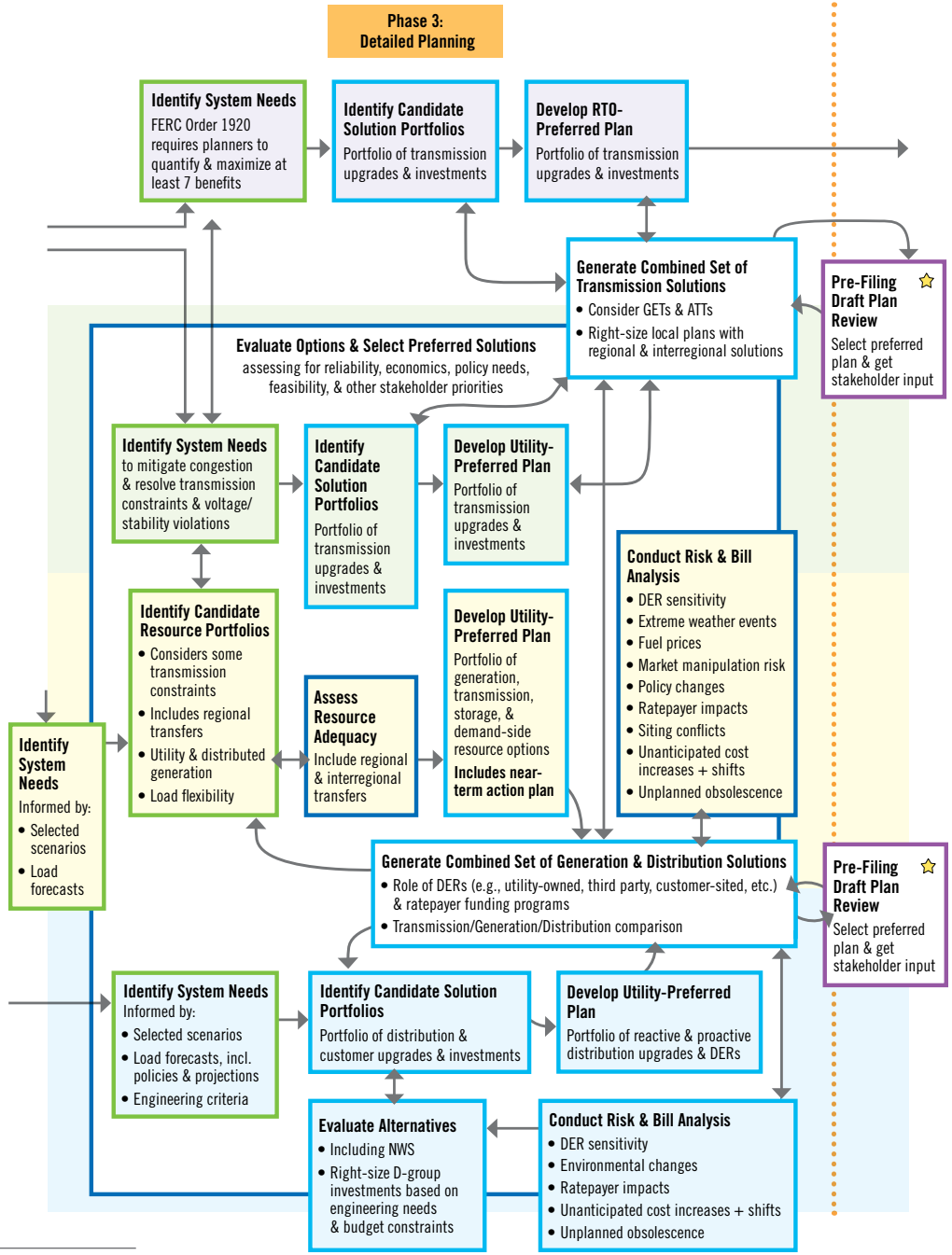
At the end of Phase 2, there is a **regulatory checkpoint for reconciliation and interim review** that provides an opportunity to check that assumptions, scenarios, and forecasts are reasonably consistent across the IRP, IDSP, and TPP. Any differences are documented and investigated at this review step. Phase 2 ends with a written record of the assumptions, scenarios, and forecasting results and summarizes all the information developed in Phase 1 and Phase 2. This checkpoint includes stakeholder input and may function as a standalone regulatory process, and the state commission may or may not formally adopt it.

Phase 3: Detailed Planning

In Phase 3, the planners execute the models and analyses to identify and address the infrastructure needs that will arise during the planning horizon. This phase includes the iterative process of identifying candidate solutions, evaluating the proposed options, and determining the preferred set of solutions. This includes a whole-system review of proposed options across planning scopes to determine the optimal set of solutions that collectively meet all the system needs. At the culmination of Phase 3, draft plans of preferred solutions are released for stakeholder review and comment before formal submission for commission review and action.

The vertical **Evaluate Options and Select Preferred Solutions** step reflects emerging best practices for aligning solution development and evaluation across different utility planning scopes.

Using the policy objectives and planning goals identified in the Phase 1 Guidance Document, along with scenarios and load forecasts developed and reconciled in Phase 2, planners identify **system needs** expected to arise over the relevant planning horizons. The specific factors evaluated may vary across planning scopes and timeframes. For example, all planning scopes consider the need to reliably serve projected load, while transmission planning may also evaluate congestion and voltage violations.



Planners then **identify candidate solution portfolios** to address the identified system needs. Candidate solutions should reflect the interconnected nature of generation, transmission, and distribution planning. For instance, IRP portfolios should account for the transmission constraints and regional transfer limits identified in the transmission planning processes and consider not only conventional generation resources, but also distributed generation and load flexibility.

Candidate portfolios are then **evaluated** against reliability, economics, feasibility, and other stakeholder priorities established in the Phase 1 Guidance Document. While they often incorporate least-cost optimizations, the models and evaluation criteria may vary by planning scope. For example, IRPs should include wide-area **resource adequacy assessments** that account for regional and interregional capacity transfers. Planners should also **evaluate alternatives** in addition to conventional resources. In some cases, third parties may propose alternatives through competitive solicitations, such as for non-wires solutions in the IDSP. The resulting portfolios are then documented in **preferred plans** for each planning scope.

The **Generate Combined Set of Solutions** step represents the emerging best practice of assembling and evaluating a combined portfolio of regional and local transmission solutions as well as generation and distribution solutions, rather than identifying and assessing options solely within individual planning scopes. By considering comprehensive solution sets, planners can identify opportunities where investments in one part of the system may reduce or defer the need for investments elsewhere. For instance, cost-effective distribution-level resources may offset the need for more expensive transmission upgrades. This stage also serves as a coordination point across entities, particularly between RTOs and utilities, though coordination processes vary by region. For example, local transmission plans can be right-sized with regional goals to consider larger, more efficient transmission projects. As indicated by the curved arrows, the process of identifying and generating a combined set of solutions is iterative, and may lead planners to refine their candidate solution options and preferred plans.

Planners then run a **risk and bill analysis** on the combined solution portfolios. Risk criteria, such as policy changes, siting challenges, environmental changes, unanticipated costs, and unplanned obsolescences, are identified throughout the planning process and may be outlined in the Guidance Document. This analysis is especially important in evaluating unconventional solutions with new or emerging technologies. Bill impact analysis should also be conducted to ensure selected portfolios remain affordable for customers. The results of these analyses may further inform refinements to utility preferred plans before development of the draft plan.

In the transition between Phases 3 and 4, the preferred solutions identified in Phase 3 are compiled into **pre-filing draft plans** which are published for stakeholder review and comment. The drafts should outline key assumptions, identified needs, and the proposed

solutions, including when and where they will be implemented. The draft plan review process is iterative, and stakeholder input may flow back into the process steps of Phase 3 outlined above and result in modifications to the plans prior to final submissions for formal regulatory review in Phase 4. Developing a pre-filing draft plan in Phase 3 for stakeholder review is a substantial change from the way things are currently done, particularly for IDSP. This allows planners to ensure buy-in and work out the challenges in advance of formally filing a plan.

Phase 4: Regulatory Review

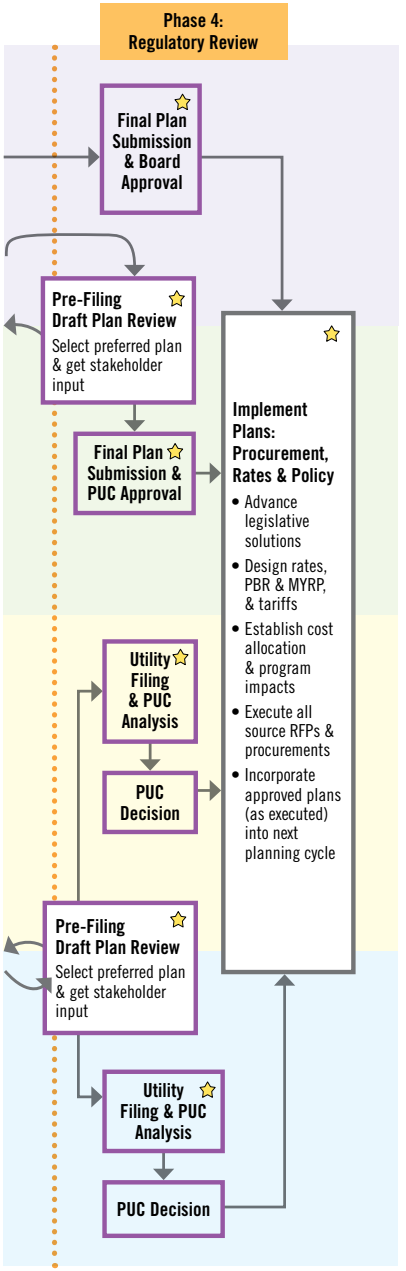
After the analysis is completed in Phase 3 and stakeholder comments on the draft plans are received and considered, the information is formalized into a utility plan submitted for regulators to review and make decisions. The RTO transmission plan is typically submitted to the RTO's governing board for approval. Once plans are formally approved for implementation, the outcomes of the planning cycles up to this point become inputs into the next planning cycles and state goals.

In Phase 4, after the needs have been identified and preferred solutions have been determined, the utility finalizes their plan which undergoes **analysis by the PUC**. This PUC review process involves extensive back-and-forth information requests between the PUC and the utility. The PUC may conduct additional analysis and may also seek independent expert input to help inform its review.

There is also a formal comment period for stakeholders to provide inputs to the PUC regarding the utility plan, before the **PUC issues a formal decision**. The cohort expects that the volume of stakeholder intervention in the PUC proceeding will be less than in the past due to the opportunity stakeholders had to review and comment on the pre-filing draft plans.

The process of plan submission to PUC approval is not always linear. The **PUC decision** may involve partial approvals or remands, sending portions of the plan back to Phases 2 or 3. The PUC decision may also introduce non-infrastructure solutions. For instance, new rate designs, performance incentives, and tariffs could be offered, particularly in the IRP and IDSP processes to promote energy efficiency and demand response program participation. Newly developing best practices would encourage these non-infrastructure solutions to be considered earlier in the planning process, including during scenario development in Phase 2 and alternatives evaluation in Phase 3.

It is important to note that while the pre-filing draft plans in Phase 3 will include information regarding both IRP and IDSP processes, there may be separate final IRP and IDSP plans that will be submitted for regulatory review. For TPP, there may be one plan for the utility's local upgrades, and another plan by the RTO, or a combined TPP that incorporates all transmission system upgrades. All of the approved plans should be incorporated into the next planning cycle, shaping the inputs, assumptions, and state goals established in Phase 1.



Participants in the NARUC-NASEO Initiative: Comprehensive Electricity Planning in an Era of Load Growth were from the following 24 states and Washington, DC:

California
Colorado
Connecticut
District of Columbia
Illinois
Indiana
Iowa
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Missouri
New Hampshire
New Mexico
New York
North Carolina
North Dakota
Pennsylvania
South Carolina
Utah
Virginia
Washington

Acknowledgments and Disclaimers

This publication and its companion roadmaps were the result of robust engagement with NARUC and NASEO members from 28 state agencies across 24 states and Washington, DC who joined the **NARUC-NASEO Initiative: Comprehensive Electricity Planning in an Era of Load Growth** and attended virtual and in-person workshops. Participants contributed their own perspectives and expertise throughout the development of these materials, not formal positions of their states. States represented include the list at left.

The initiative was led by Danielle Sass Byrnett in the Center for Partnerships & Innovation at NARUC and Kirsten Verclas at NASEO. Text and graphics were prepared by Celia Tandon, Katerina Stephan, Athindra Venkatraman, and Kaitlyn Bunker of RMI under contract to NARUC.

In addition, a diverse group of experts representing federal agencies, DOE National Laboratories, utilities, research institutions, nonprofit organizations, industry associations, and technology providers provided insights to support development of the flowcharts and roadmaps. Feedback from dozens of reviewers was incorporated to ensure that the flowcharts and roadmaps reflect current and emerging best practices to support state decision-makers. Particular thanks are due to Juan Pablo Carvallo, Lawrence Berkeley National Laboratory, for his detailed review of an earlier version of the Jasper roadmap.

This publication is based upon work supported by DOE under award numbers DE-OE0000925 and DE-OE0000924. This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

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 50 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. The NARUC Center for Partnerships & Innovation (CPI) builds relationships, develops resources, and delivers training to assist state commissions contending with complex current and emerging issues. NARUC CPI conducts work across five key energy areas and many topics within each: generation; transmission; distribution; customers; and critical infrastructure preparedness, response, and resilience.

About NASEO

NASEO is the only national nonprofit organization representing the governor-designated energy directors and their offices – the State Energy Offices – from the 56 States and Territories across the nation. Formed by the states in 1986, NASEO facilitates sharing of best practices among states, serves as a technical and policy resource for states, and advocates the interests of State Energy Offices to Congress and federal agencies.

NARUC-NASEO Initiative: Comprehensive Electricity Planning in an Era of Load Growth