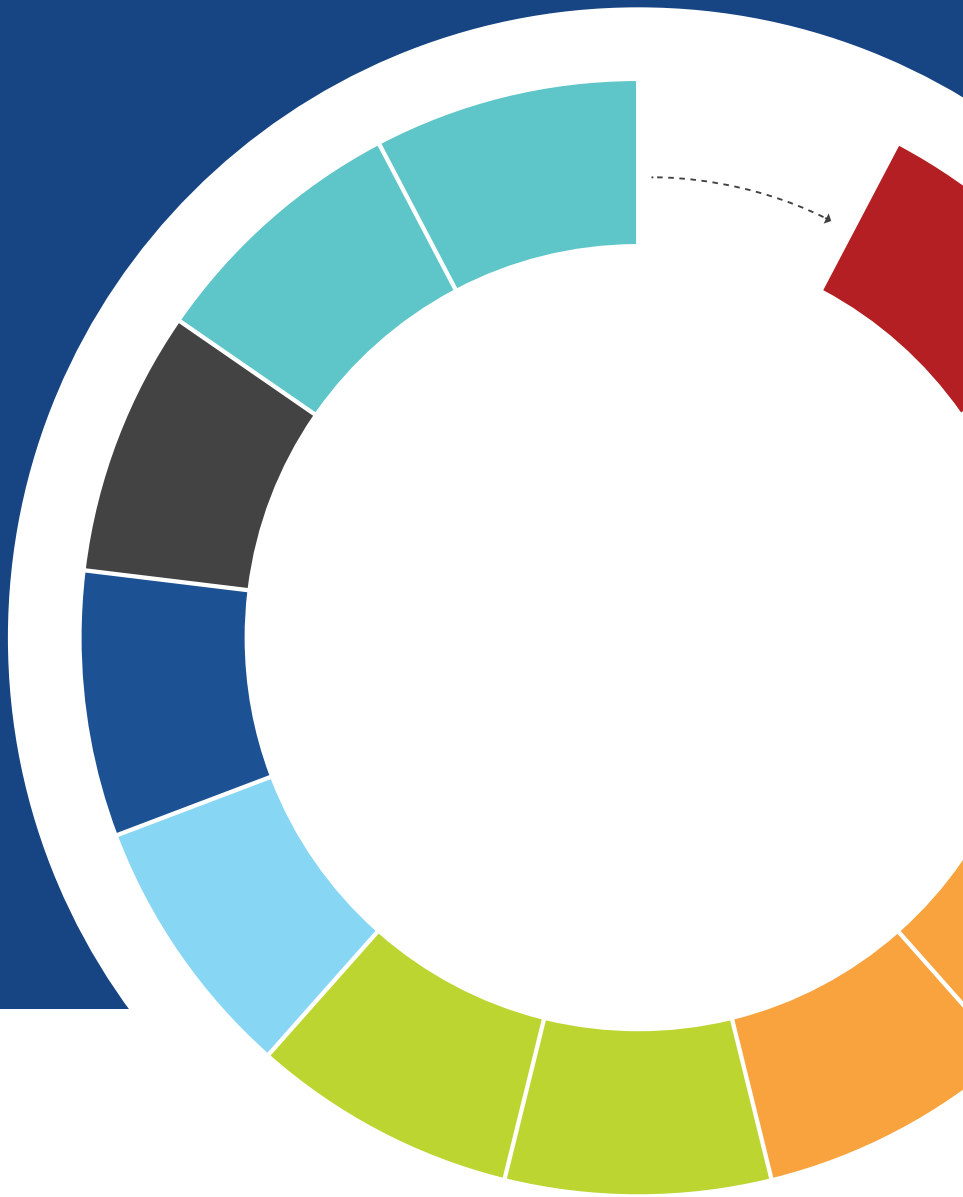
February 2021

JADE COHORT ROADMAP

NARUC-NASEO TASK FORCE ON COMPREHENSIVE ELECTRICITY PLANNING



NARUC
National Association of Regulatory Utility Commissioners

NASEO
National Association of State Energy Officials

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Introduction

This roadmap document describes a vision for an ideal comprehensive electricity planning process created by the members of the NARUC-NASEO Task Force on Comprehensive Electricity Planning – Jade cohort.[1] This idealized planning process is viewed from the state perspective, specifically a collaboration between the public utility commission and state energy office. For the purposes of this roadmap, a comprehensive electricity planning process refers to the alignment or integration of distinct planning processes that, historically, have not significantly informed one another (i.e., distribution planning processes, utility and non-utility clean energy programs). This roadmap includes:

- A flowchart of the entire integrated or aligned planning process.
- Brief descriptions and explanations of each section of the flowchart.
- Points of evidence for innovative planning steps that appear in the vision.

The roadmap explains the ideal, integrated planning process one section at a time, including both procedural and analytical steps in the planning processes. Each section identifies the specific innovations developed by the Jade cohort, accompanied by a brief discussion of the rationale for these changes in comparison to the status quo of electricity system planning.

About Jade: A Fictional, Representative State

Structure	
Regulatory	**Our state's investor-owned utilities** do not own generation assets
Market	**Our state is located** within an RTO/ISO market
Planning Processes	**Our state is seeking to align** distribution planning processes
Additional Characteristics	
A few other characteristics you should know	• 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
We are doing this because we want to	• Optimize utility investments and the integration of customer and third-party resources to achieve cost efficiency • Enhance operations and maintenance through increased visibility into the system and better utilization of data analytics • Increase transparency around distribution system planning, including capital investment strategy
While keeping in mind	• Generation assets and connections to G & T • 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
And trying to be responsive to	• State policy • Stakeholder interests

1 Cohorts are groups of Task Force members from three states, organized by similar market and regulatory structures. Members of each cohort worked as a team to define and support their fictional, representative state. Each cohort was given a color name.

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 the innovations introduced by the cohort and represented in the vision.
- Starting points for all states, particularly those with similar characteristics to the Jade cohort.

How to Read the Roadmap

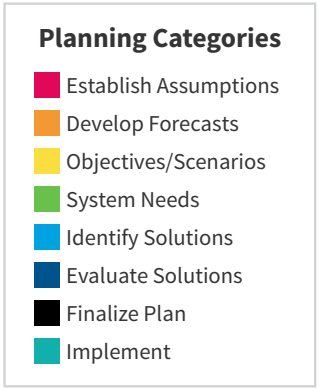
The roadmap describes the substantive activities, specific milestones, regulatory actions, and other deliberate aspects of this cohort's vision that comprise an ideal planning process. It describes the necessary sequences, dependencies, and relationships among steps, actions, and information flows (e.g., where the outputs from one step are leveraged as inputs to the next step), depicted by arrows.

- The roadmap contains **guidance, resources, and examples** of emerging and promising approaches currently being implemented, which offer points of evidence for innovations that states and utilities have already incorporated into their efforts, demonstrating the feasibility of these approaches. In places where no guidance, resources, or examples are included, new efforts might be needed to enable or demonstrate an innovation's viability.
- The roadmap uses a **color key**—outlining each box in the flowchart—to allow for comparison with other Task Force cohort roadmaps. The colors align with eight generalized procedural and analytical planning steps that typically characterize electricity system planning processes. For further descriptions of these general steps, see the two-page briefing paper *Aligning Integrated Resource Planning and Distribution Planning – Standard Building Blocks of Electricity System Planning Processes*.[2]

The roadmap does not place planning steps on a timeline or calendar and does not indicate a responsible entity or actor for various steps because such details will necessarily vary across states.[3]

Guidance, resources, and examples are accompanied by this symbol:

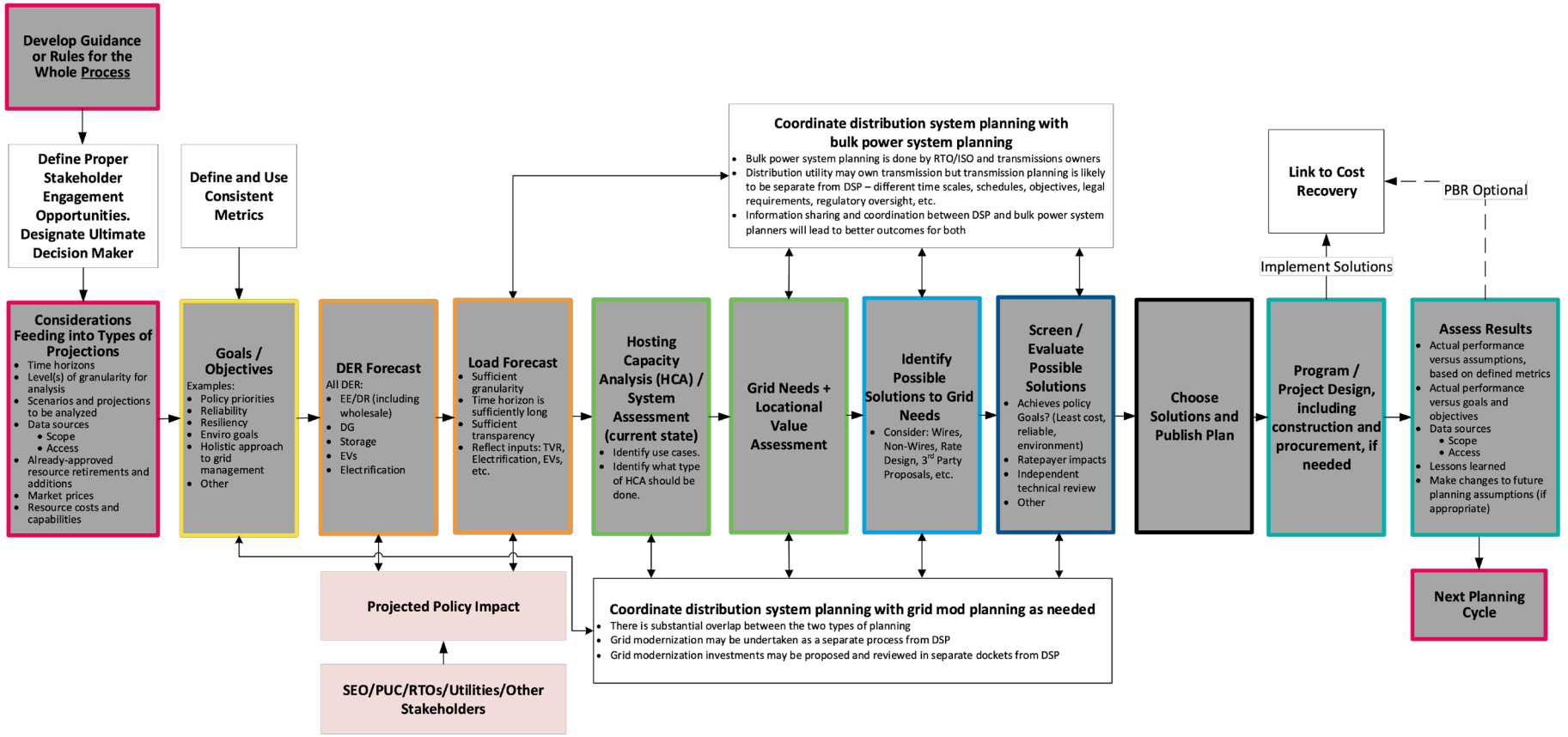
Color key used in flowchart and vision summary:



2 Kristov, Lorenzo. "Aligning Integrated Resource Planning and Distribution Planning: Standard Building Blocks of Electricity System Planning Processes." Discussion Draft for NARUC- NASEO Task Force on Comprehensive Electricity Planning. July 2019.

3 While timing differences between processes are important, timelines were not broken out in order to reduce the number of complexities when mapping the relationships between the distribution, resources, and transmission processes.

Jade Cohort Flowchart of Idealized Comprehensive Electricity Planning Process



Key

Planning Categories

- Establish Assumptions
- Develop Forecasts
- Objectives/Scenarios
- System Needs
- Identify Solutions
- Evaluate Solutions
- Finalize Plan
- Implement

Process Steps

- Distribution System PlanningDevelop Forecasts
- Public Policy
- Touchpoints Across Planning Processes
- Stakeholder Engagement

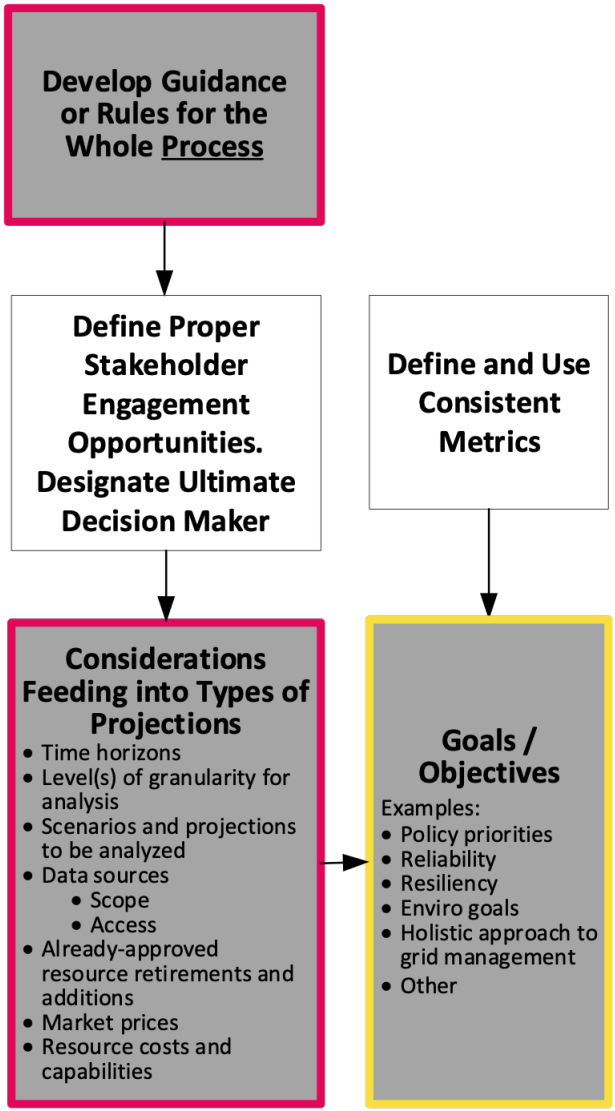
Acronyms

DER: Distrubted Energy Resources	HCA: Hosting Capacity Analysis
DG: Distrubted Generation	ISO: Independent System Operator
DR: Demand Response	PBR: Performance-based Ratemaking
DSP: Distribution System Planning	RTO: Regional Transmission Organization
EE: Energy Efficiency	SEO: State Energy Office
EVs: Electric Vehicles	TVR: Time-varying Rates

Jade Roadmap Features

The Jade cohort envisioned several innovative steps that represent a departure from traditional planning practices. These innovations include:

- **Transparency in distribution planning**. In some ways, the entire process envisioned in this roadmap is innovative, compared to traditional distribution planning, because it introduces a measure of transparency to how decisions are made about investments in the distribution system.
- **Potential for multiple stakeholder engagement opportunities**. Stakeholders may be engaged at multiple points in the process, not merely at the end of the process when a draft plan is filed by the utility at the Commission. Ideally, the Commission itself decides at the outset of the planning process how stakeholders will be allowed to participate. Stakeholders could *potentially* be involved in each and every step of the planning process, where their input and engagement are most needed to support good planning outcomes. In all cases, stakeholder involvement is conducted in a manner that is consistent with existing state practices and any legislative mandates.
- **Flexibility**. At several key steps, the flowchart identifies a list of options or things to consider that allows for flexible interpretation and flexible implementation by any state that wants to adapt the map to local norms.
- **Links between the distribution system planning (DSP) process and bulk power system planning**. Although this map is for restructured utilities in a regional transmission organization (RTO), the flowchart notes multiple steps where coordination between DSP planners and bulk power system planners (principally at the RTO) needs to occur to get ideal results from both planning processes.
- **Breadth of potential solutions**. The flowchart draws attention to the range of possible solutions to distribution needs, including wires, non-wires, third-party solutions, and rate designs. It also notes some criteria that might be used to screen and compare potential solutions.
- **Links between implementation steps**. The flowchart notes the connection between implementation steps and cost recovery, which is always on the mind of utilities and regulators but does not appear on most DSP flowcharts. The map also includes an assessment step as part of implementation, and notes that the results achieved by the plan may be linked to cost recovery through a performance-based regulation (PBR) mechanism.



Establish Assumptions and Identify Objectives

As a first step, the Public Utility Commission will **develop guidance or rules for the planning process** to be used by all affected utilities. Variations in the process may be appropriate for different types of utilities, and can be specified in the guidance or rules, but the goal for this step is to promote as clear and consistent an approach as possible. When developing guidance or rules for the first time, the Commission may choose to first engage utilities and other parties in a series of educational meetings, with the goal of building a common understanding across all parties of the relevant terminology and issues. These meetings could include a review of previous planning practices and outcomes (if applicable), and input on establishing a problem statement or explanation of the purpose of the DSP process.

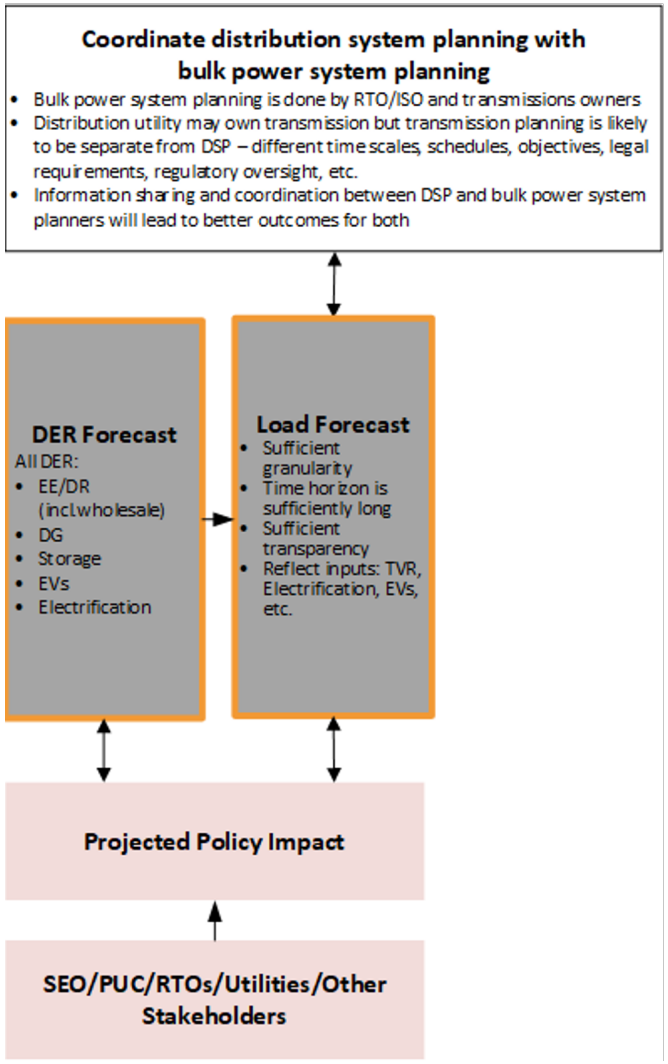
One of the key outcomes of the guidance or rules development step is that the Commission also determines the role of stakeholders in subsequent steps of the planning process (e.g., the steps in the process when input must or may be sought from different types of stakeholders or experts, and how that input will be documented and considered by planners).

The guidance or rules will further outline **important factors that will be considered** when developing the planning assumptions that feed into different types of projections. Guidance includes specifications related to time horizons for forecasting and investment planning; the expected level of granularity for the analysis (spatially and temporally); the types of scenarios and projects to be analyzed; acceptable sources of data for model inputs and how those data may, or may not, be accessed by others; information about already-approved resource retirements and additions; current and projected market prices; and resource costs and capabilities. When considering data sources and data access, the transparency of data and the uses of data are considered in order to inform the planning process and to enable evaluation and assessment of outcomes as the plan is implemented. Care also is taken to ensure that the planning process is designed in such a way that it can be completed fast enough to allow the utility to make both the routine and non-routine investments necessary for reliable and cost-efficient service.

In the next step, **goals and objectives** that will flow through to all aspects and steps of the planning process are specified. These can include, for example, policy priorities, reliability, resiliency, environmental goals, a holistic approach to managing and operating the grid, and other objectives. **Metrics** for achieving the specified goals are defined that will be used consistently throughout the planning process and for all affected utilities. For example, standard reliability metrics are defined and consistently used to assess progress toward reliability goals. The goals and objectives are established early in the process, and unlike the metrics, these can vary from one utility to the next, as appropriate. Goals and objectives may originate from legislation or from previously established regulations, orders, or corporate commitments made by utilities. Additional goals and objectives may be developed as part of the planning process, potentially with input from stakeholders, if so directed in the Commission's guidance or rules.

Existing Guidance, Resources, and Examples

- **Key Commission decisions regarding a DSP proceeding**. Mid-Atlantic Distributed Resources Initiative. Integrated Distribution Planning for Electric Utilities: Guidance for Public Utility Commissions. October 2019. pp. 6–9.
- **Proceeding to investigate integrated planning (example)**. Hawaii Public Utilities Commission, Docket No. 2018-0165. See Order No. 35569, Instituting a Proceeding to Investigate Integrated Grid Planning. See also Order No. 36218 and Order No. 36725 providing guidance.
- **Distribution planning proceeding (example)**. Michigan Public Service Commission, Case No. U-20147. See Order No. U-20147-0001 opening the docket on April 12, 2018 and Order No. U-20147-0029 from November 21, 2018, and Order No. U-20147-0039 from September 11, 2019 setting forth additional guidance.
- **Framework for distribution planning (example)**. Nevada Public Utility Commission, Docket No. 17-08022, Investigation and rulemaking to implement Senate Bill 146 (2017).
- **Distribution planning filing requirements (example)**. Minnesota Public Utility Commission, Docket No. CI-18-251 (established distribution planning filing requirements for Xcel, formalizing the structure of DSP).
- **Aligning the distribution planning framework with Commission objectives**. Michigan Distribution Planning Framework: MPSC Staff Report. September 1, 2018.
- **Distribution planning stakeholder process**. MI Power Grid. Electric Distribution Planning Stakeholder Process: MPSC Staff Report. April 1, 2020.
- **Engaging stakeholders in integrated planning**. Hawaiian Electric Company's Integrated Grid Planning. Stakeholder Engagement.
- **Expanding stakeholder participation to improve diversity, equity, and inclusion**. Oregon Public Utility Commission Report to the Legislature. Actively Adapting to the Changing Electricity Sector. pp. 19–20.
- **Goals and objectives**. Maryland's Statement of Guiding Principles, In the Matter of Transforming Maryland's Electric Distribution Systems to Ensure That Electric Service Is Customer-Centered, Affordable, Reliable and Environmentally Sustainable in Maryland. p. 3.
- **Planning objectives**. Minnesota's Integrated Distribution Planning Requirements for Xcel Energy. Docket No. E-002/CI-18-251, Order Approving Integrated Distribution Planning Filing Requirements for Xcel Energy. Issue Date: August 30, 2018.
- **Planning objectives**. Michigan's Overarching Goals for Distribution System Planning. Michigan Public Service Commission Issue Brief. Electric Distribution System Planning. October 11, 2017. p. 2.
- **Consistent metrics**. NARUC-NASEO Task Force on Comprehensive Electricity Planning. Planning Criteria Metrics for Distribution System Planning. September 25, 2019. Webinar recording.



Develop Forecasts

Forecasting is the next step and takes place in two separate parts. **The Distributed Energy Resource (DER) Forecast** includes energy efficiency (EE) and demand response (DR), including EE and DR resources that bid directly into the wholesale market, as well as distributed generation (DG), storage, electric vehicles (EVs), and electrification measures. The **Load Forecast** incorporates the impacts of the forecasted DERs and time-varying rates (TVR) with the projected end-use energy demand of customers. It is important that these forecasts have sufficient granularity, a time horizon that is sufficiently long, and sufficient transparency to enable an accurate assessment of grid needs (in the next step of the planning process).

Forecasting has adequate data standardization and incorporates scenario analysis to capture policy uncertainties. In addition, several types of projections are developed for both DER and Load Forecasts, including short- and long-term, current and planned resources; location-specific forecasts; and projections that include resources cleared in the wholesale market.

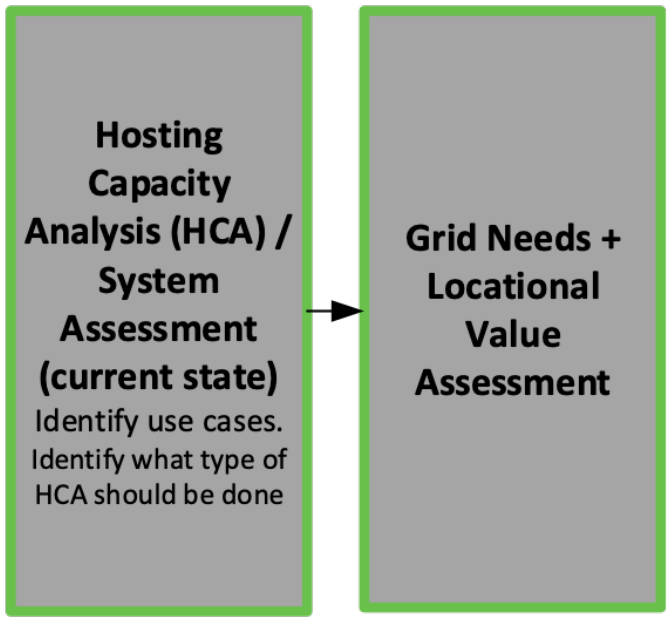
Each jurisdiction will decide for itself which entity or entities will be responsible for developing the Load Forecast; however, in all cases, the forecast is developed with coordinated input from distribution system planners and bulk system planners (principally at the Regional Transmission Operator [RTO]/Independent System Operator [ISO] or with transmission owners). This is the first of several instances in the planning process where information sharing and coordination between distribution planners and bulk power planners occur, improving outcomes for both. At a minimum, distribution system planners would provide a Net Load Forecast to the bulk power system planners that includes the impacts of DERs. Or, at the request of the bulk system planners, separate DER Forecasts and Gross Load Forecasts could be provided. In turn, bulk system planners would provide information to distribution system planners about DERs bidding directly into the wholesale market.

Projected policy impacts could influence the DER Forecast and Load Forecast. These forecasts account for the impact of state policies that require, encourage, or reward customers for deploying DER or managing load.

States have flexibility regarding whether or how to involve **stakeholders**, which could include state energy offices (SEOs), public utility commission (PUC) staff, RTO/ISO representatives, utilities, and other stakeholders, in the forecasting process. Stakeholders may provide useful signals about the likelihood of future DER and load scenarios that may affect forecasts. Stakeholder input may help utilities incorporate new or challenging elements into forecasting where utilities may have less experience (e.g., heating electrification or electric vehicles). Working groups may be an effective way to engage stakeholders at this stage in the process.

Existing Guidance, Resources, and Examples

- **Multiple scenario forecasts**. Lew, Debra, GE Energy Consulting. Emerging distribution planning analyses. Mid-Atlantic Distribution Systems and Planning Training and NARUC-NASEO Task Force on Comprehensive Electricity Planning. March 7–8, 2019.
- **Forecast Working Group**. ISO-New England Distributed Generation Forecast Working Group.
- **Stakeholder Working Group process** (Rate Design, Electric Vehicles, Competitive Markets and Customer Choice, Interconnection, and Energy Storage). In the Matter of Transforming Maryland's Electric Distribution Systems to Ensure That Electric Service Is Customer-Centered, Affordable, Reliable and Environmentally Sustainable in Maryland. p. 5.
- **Forecasting DERs**. McCabe, Kevin, National Renewable Energy Laboratory. Forecasting load on the distribution and transmission system with distributed energy resources. Mid-Atlantic Distribution Systems and Planning Training and NARUC-NASEO Task Force on Comprehensive Electricity Planning. March 7–8, 2019.
- **Forecasting DERs**. NARUC-NASEO Task Force on Comprehensive Electricity Planning. There's a Major Change Headed Our Way: Forecasting DERs for Planning Purposes. July 23, 2019. Panel recording. See presentation slides from panelists, including Juliet Homer, Senior Energy Research Engineer, Energy Policy and Economics Group, Pacific Northwest National Laboratory; Kevin Kushman, President, Integral Analytics, Inc.; and Patrick McCoy, Distributed Energy Strategy, Grid Strategy and Operations, Sacramento Municipal Utility District.



Assess System Needs

System needs are assessed in two discrete steps. First, **Hosting Capacity Analysis (HCA)** is conducted as part of a broader assessment of the current state of the distribution system. This involves characterizing both capabilities and limitations of the current system at a granular/detailed level. Because there can be multiple types of HCA and multiple possible use cases for HCA, the planning use case needs to be clearly defined in this step, possibly with input from stakeholders, in order to ensure that an effective HCA is conducted.

Next, the results of the system assessment, the HCA, and the DER and Load Forecasts are combined to identify any future distribution **grid needs**. By incorporating HCA in the identification of system needs, the planning process can consider not only what is needed to accommodate future load, but also what is needed to enable the integration of DERs at sufficient levels to meet the objectives and goals of the jurisdiction. Using the same data, the locational value of DERs also can be assessed at a granular geographic level. The system assessment step also should consider any needs related to the condition of existing grid assets. Options exist for this kind of routine asset management. Some expenses, particularly those that are relatively inexpensive and require immediate action to maintain or restore reliability, may be managed outside of the DSP process (e.g., as an asset management program with a defined annual budget).

Existing Guidance, Resources, and Examples

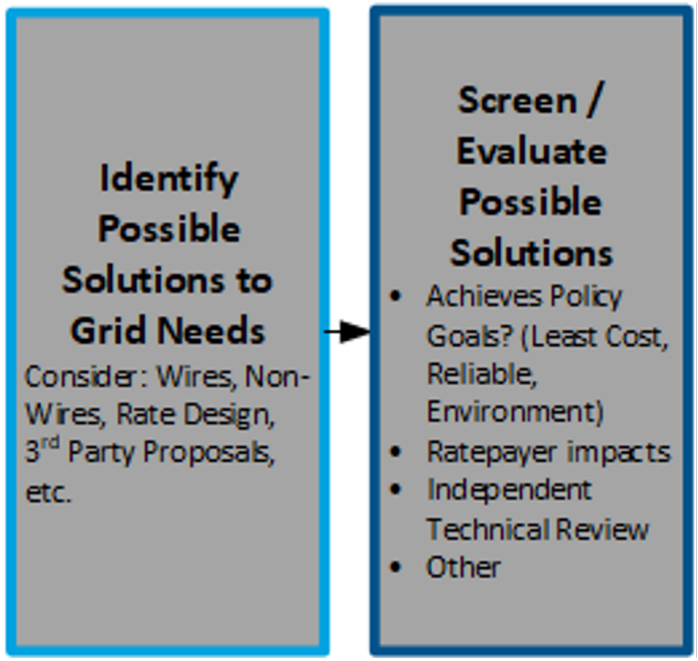
- **Hosting capacity analysis and locational value**. Lew, Debra, GE Energy Consulting. Emerging distribution planning analyses. Mid-Atlantic Distribution Systems and Planning Training and NARUC-NASEO Task Force on Comprehensive Electricity Planning. March 7–8, 2019.
- **Hosting capacity analysis and locational value**. U.S. Department of Energy. Utility Practices in Hosting Capacity Analysis and Locational Value Assessment. Review Draft. September 2019.
- **Hosting capacity analysis and DSP.** Mid-Atlantic Distributed Resources Initiative. Integrated Distribution Planning for Electric Utilities: Guidance for Public Utility Commissions. October 2019. pp. 33–38.
- **Hosting capacity analysis and planning**. ICF. Where's the Value in Hosting Capacity Analysis? November 2017.
- **Regulator's Guide to Hosting Capacity**. Stanfield, S., Safdi, S., & Baldwin Auck, S. Optimizing the Grid: A Regulator's Guide to Hosting Capacity Analyses for Distributed Energy Resources. Interstate Renewable Energy Council. Latham, New York. December 2017.

Identify and Evaluate Solutions

After needs are identified, the next step is to **identify possible solutions** to those needs. A comprehensive range of potential solutions to distribution system needs are considered holistically, including wires solutions (i.e., traditional infrastructure investments such as substations, transformers, wires), non-wires solutions (e.g., targeted deployments of DERs that defer or avoid the need for a wires investment), utility operational changes or maintenance activities, third-party or customer-based solutions, and rate designs. In restructured states, utilities are often limited in the types of investments they are authorized to make (e.g., precluded from owning generation assets) and may be hesitant to allow third parties to own and operate assets on the distribution system. Stakeholder input may be invited as part of solution identification.

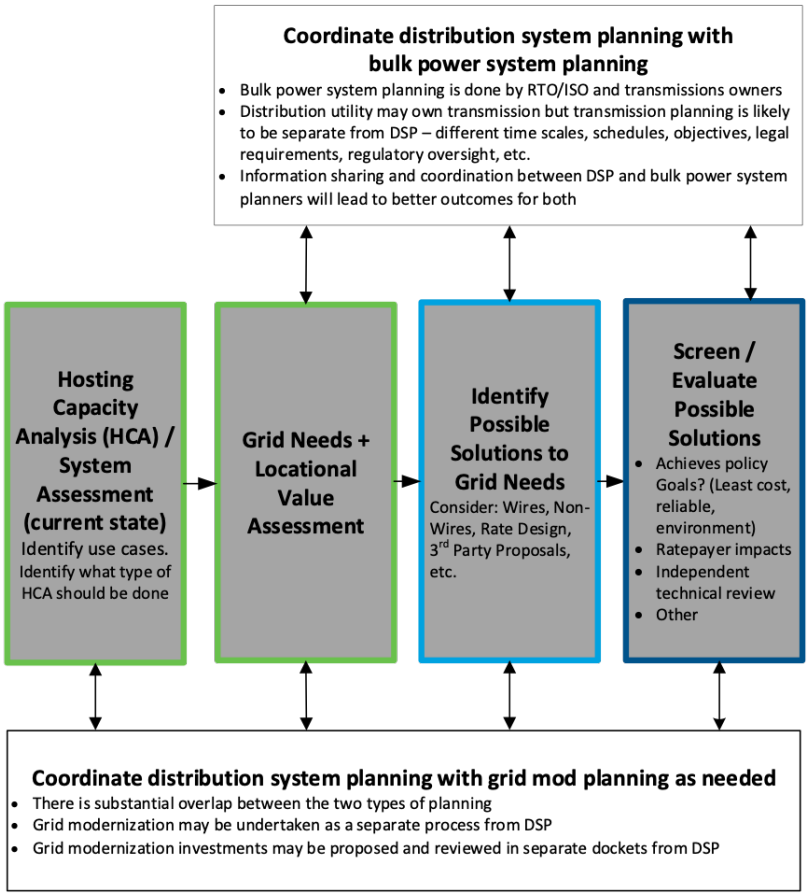
Evaluation criteria are used to **screen and compare potential solutions** on a fair and equitable basis. Planners determine whether each possible solution achieves the established policy goals and analyze the impact of the solution on rates or ratepayers. For example, if a jurisdiction has adopted specific goals for one of the standard reliability metrics (SAIDI[4] or SAIFI[5]), each potential solution would be screened to see how well it addresses those goals. Or, if a jurisdiction has a policy goal related to electric vehicles, the screening process would evaluate whether each solution is consistent or inconsistent with achieving that goal. If there are differences in the certainty that a given solution will perform as expected, or performance is dependent or contingent upon other actions outside the control of the planners, non-performance risk can be factored into the evaluation criteria. Ratepayer impacts are most often evaluated based on the present value revenue requirement of each solution, often with separate values developed for different planning scenarios or to test the sensitivity of the results to key data inputs (e.g., technology costs). The screening and evaluation step requires clearly identified criteria and may involve an independent technical review to confirm that proposed solutions actually satisfy the needs identified. The evaluation criteria may be jurisdiction specific. States can develop unique approaches to screening criteria to identify solutions that meet their circumstances.

Throughout the assessment of system needs and the identification and evaluation of possible solutions, separate coordination with bulk power system planning and with grid modernization planning takes place.



4 System Average Interruption Frequency Index (SAIFI) is the average number of sustained interruptions per consumer during the year. It is the ratio of the annual number of interruptions to the number of consumers.

5 System Average Interruption Duration Index (SAIDI) is the average duration of interruptions per consumer during the year. It is the ratio of the annual duration of interruptions (sustained) to the number of consumers.



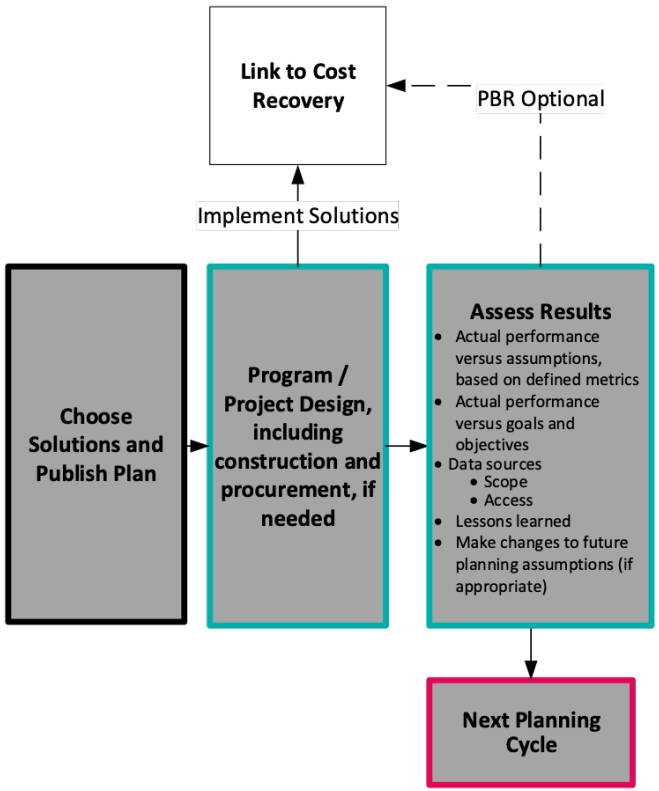
Coordination between distribution system planners and bulk system planners at the RTO/ISO helps ensure that the planning process leads to better outcomes as system needs are identified and as solutions are developed and evaluated. There is value in coordination for both parties because changes to the distribution system can affect bulk power system needs, prices in the wholesale market could affect the economic viability of non-wires solutions, and so forth. Information sharing and alignment between distribution planners and bulk system planners lead to more optimal solutions across both levels of the system. However, although full integration of DSP and transmission planning is theoretically possible, in restructured states, this approach is not likely to be practical and is not part of this flowchart. While the distribution utility may own transmission, transmission planning is likely characterized by different time scales, schedules, objectives, legal requirements, regulatory oversight, and other characteristics.

Coordination between DSP and grid modernization may also lead to better outcomes (e.g., lower consumer costs, more consumer choice and empowerment, greater reliability), depending on how grid modernization is defined and its relationship with DSP. Grid modernization initiatives can potentially encompass a broad range of activities and decisions designed to anticipate, plan for, and accommodate changes in technologies, consumer preferences, and how electricity is generated, delivered, and used. Jurisdictions will vary in whether they treat DSP as part of a grid modernization initiative or as a separate regulatory proceeding. In any event, there is substantial overlap between these types of planning, even if they are undertaken in separate processes, and a holistic approach to all types of distribution system investment is desired. System needs or solutions identified in grid modernization proceedings may be the same or similar to system needs or solutions identified by distribution system planners.

However, investments in grid modernization may have already occurred or may be proposed and reviewed in dockets separate from DSP. For example, a utility proposal to install advanced metering infrastructure could enable new rate designs and potentially expand the set of possible solutions for meeting grid needs. Or, the utility may have plans for an advanced distribution management system that enables integration of higher levels of DERs. In either case, the proposal could be reviewed by regulators as part of a DSP process, or in a grid modernization docket, or as separate and distinct regulatory proceedings. Information sharing across any and all related processes and a holistic approach to decision making help promote transparency, avoid unnecessary increases in costs for ratepayers, and may enable synergies that result in increased ratepayer benefits.

Existing Guidance, Resources, and Examples

- **Non-wires solutions implementation**. Rocky Mountain Institute. The Non-Wires Solutions Implementation Playbook: A Practical Guide for Regulators, Utilities, and Developers. 2018.
- **Evaluation of non-wires solutions**. Pacific Energy Institute. NWA Opportunity Evaluation: Survey of Current Practice. March 2020.
- **Examples and case studies of non-wires alternatives**. E4TheFuture, Peak Load Management Alliance, and Smart Electric Power Alliance. Non-Wires Alternatives: Case Studies from Leading U.S. Projects. November 2018.
- **Examples of northeast state leadership in non-wires**. Northeast Energy Efficiency Partnerships. State Leadership Driving Non-Wires Alternatives Projects and Policy. 2017.
- **Identifying system needs and sourcing solutions**. Joint Utilities of New York Non-Wires Alternatives (NWA) Identification and Sourcing Process and Notification Practices. Supplemental Information on the Non-Wires Alternatives Identification and Sourcing Process and Notification Practices. Filed with the New York Public Service Commission on May 8, 2017.
- **Rate design to meet planning needs**. Regulatory Assistance Project. Smart Rate Design for a Smart Future. 2015.
- **Interaction between grid modernization and DSP**. NARUC-NASEO Task Force on Comprehensive Electricity Planning. DSPx Volume 4: Planning for Resilient Modern Grid. December 17, 2019.
- **Utility grid modernization investments**. Woolf, Tim, Synapse Energy Economics. Benefit-Cost Analysis for Utility-Facing Grid Modernization Investments. Mid-Atlantic Distribution Systems and Planning Training and NARUC-NASEO Task Force on Comprehensive Electricity Planning. March 7–8, 2019.
- **Grid modernization and DSP**. PowerForward: A Roadmap to Ohio's Electricity Future. August 2018.
- **Coordination between transmission and distribution operations**. Gridworks. Coordination of Transmission and Distribution Operations in a High Distributed Energy Resource Electric Grid. North American Electric Reliability Corporation, National Council of Electricity Policy Annual Meeting. May 8, 2018. Presentation.
- **Engaging stakeholders in a grid modernization process**. D.C. Public Service Commission. DC MEDSIS Stakeholder Working Group Report. Prepared by Smart Electric Power Alliance. May 31, 2019.
- **Integrated planning coordination**. Electric Power Research Institute. Developing a Framework for Integrated Energy Network Planning (IEN-P). July 2018.



Finalize Plan and Implement

In the final steps, **solutions are chosen**, and the plan is reviewed and published. Stakeholders may be invited to review the draft plan and have an opportunity to provide feedback and challenge the conclusions before it is finalized and accepted or approved by regulators. After publishing the plan, the final step is to implement the plan, including **designing programs and projects**, which may include construction and procurement.

The process also includes an **assessment** step as part of implementation and indicates that the results achieved by the plan **may be linked to cost recovery** through a PBR mechanism. The assessment step compares actual performance of the solutions implemented with assumed performance and with the goals and objectives of the planning process, based on the defined metrics and data sources identified at the outset of the planning process. If a PBR mechanism is in place, it is especially important to use clearly defined metrics and transparent data sources because the mechanism's outcomes will affect utility revenues. By identifying lessons learned in implementation, planners can make changes to future planning assumptions (if appropriate) in the **next planning cycle**. Assessment results and lessons learned also may be shared with legislators/policymakers to enable their consideration of changes to relevant public policies.

In subsequent planning cycles, states may start with a review of the guidance or rules identified in the first step of this process and update them if/as necessary. States may want to avoid starting from scratch on guidance/rules during every planning cycle.

Existing Guidance, Resources, and Examples

- **Final Integrated Distribution Plan**. Xcel Energy. Integrated Distribution Plan (2020–2029). Docket No. E002/M-19-666. November 1, 2019.
- **Final Distributed Resources Plan**. NV Energy. Docket No. 19-04003, Joint application of Nevada Power Company d/b/a NV Energy and Sierra Pacific Power Company d/b/a NV Energy for approval of First Amendment to 2018 Joint IRP, a Distributed Resource Plan. See NV Energy Original Filing dated April 1, 2019 and Public Utility Commission of Nevada Order dated August 1, 2019.
- **Final Distribution Plans**. Michigan Public Service Commission Case No. U-20147.
  - Indiana Michigan Power Company. Indiana Michigan Power Company's Five-Year Distribution Plan (2019–2023). April 3, 2019.
  - DTE Electric. DTE Electric Company's Distribution Operations Five-Year (2018–2022) Investment and Maintenance Plan. MPSC Case No. U-20147. October 5, 2018.
  - Consumers Energy. Consumers Energy Company's Electric Distribution Infrastructure Investment Plan (2018–22). April 13, 2018.
- **Performance-based regulation**. State of Hawaii Public Utilities Commission. Performance-Based Regulation. Website includes PBR docket details, videos of PBR workshop recordings, and presentation slides.
- **Performance-based regulation**. Lowry, Mark Newton, & Woolf, Tim. Performance-Based Regulation in a High Distributed Energy Resources Future. Lawrence Berkeley National Laboratory. January 2016.

Vision Summary

This circular diagram is a representation of the Jade cohort's vision for aligned electricity planning, highlighting the vision and emphasizing the touchpoints and opportunities for greater alignment of electricity planning processes. The diagram serves two purposes: it is the executive summary of the cohort's roadmap and is designed in a way to facilitate comparison with other cohorts' visions.

To structure their roadmap, the cohort relied on eight foundational categories of planning, indicated by the color of each step. The sequence of the categories in this diagram is specific to the Jade cohort's vision for aligned planning.

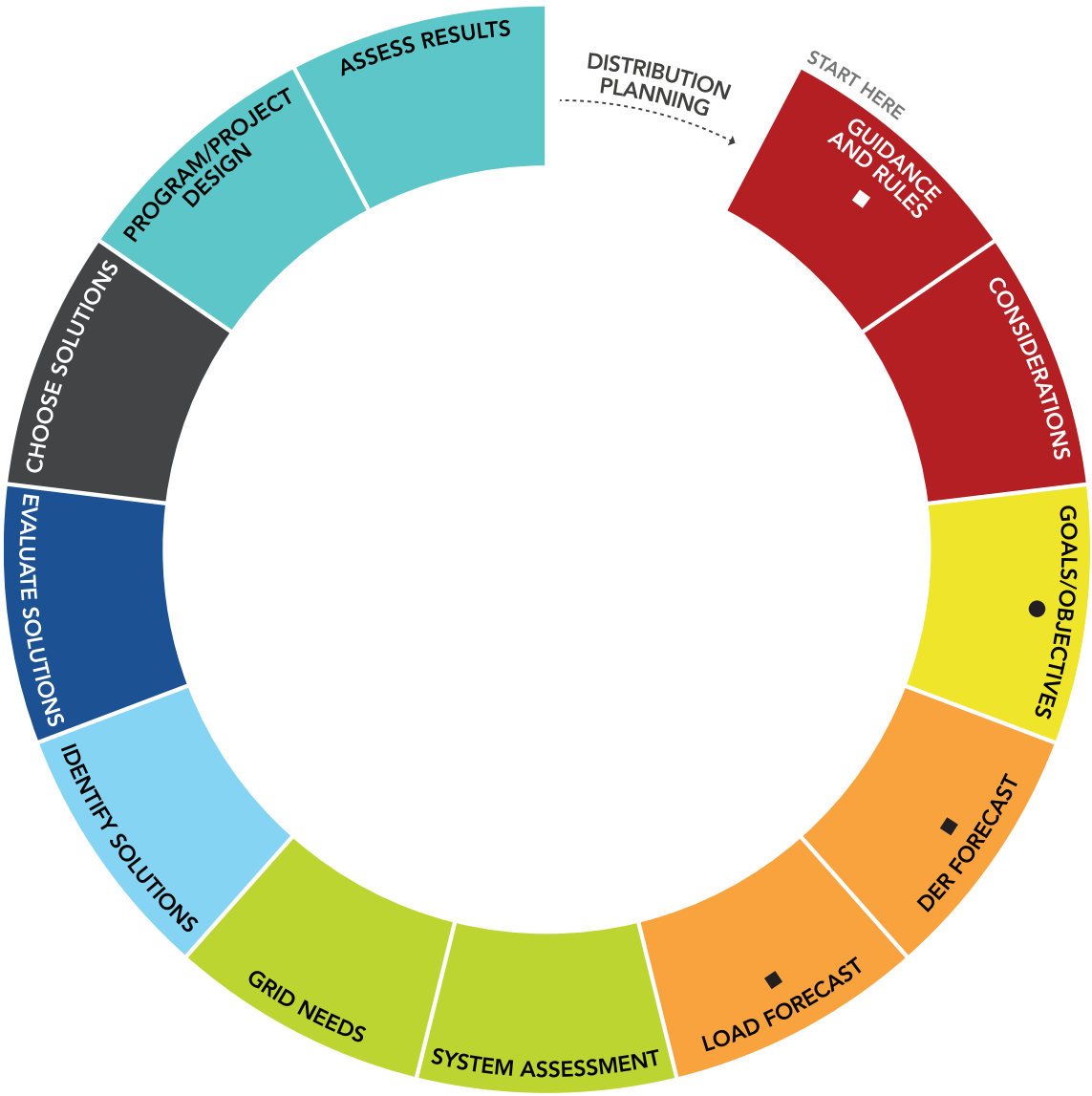
The Jade diagram shows one ring that represents integrated distribution planning. Starting at the top and proceeding clockwise around the planning cycle, the wedges represent sequential steps.

This roadmap document explains the Jade cohort's vision in greater detail, expanding upon the diagram to include a flowchart of the entire integrated or aligned planning process, brief descriptions and explanations of each section of the flowchart, and points of evidence for innovative planning steps that appear in the vision.

Planning Categories

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

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



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.

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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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