



NARUC
National Association of
Regulatory Utility Commissioners

NASEO
National Association of
State Energy Officials

NARUC-NASEO Task Force on Comprehensive Electricity Planning

National Council on Electricity Policy 2021 Annual Meeting
September 13, 2021

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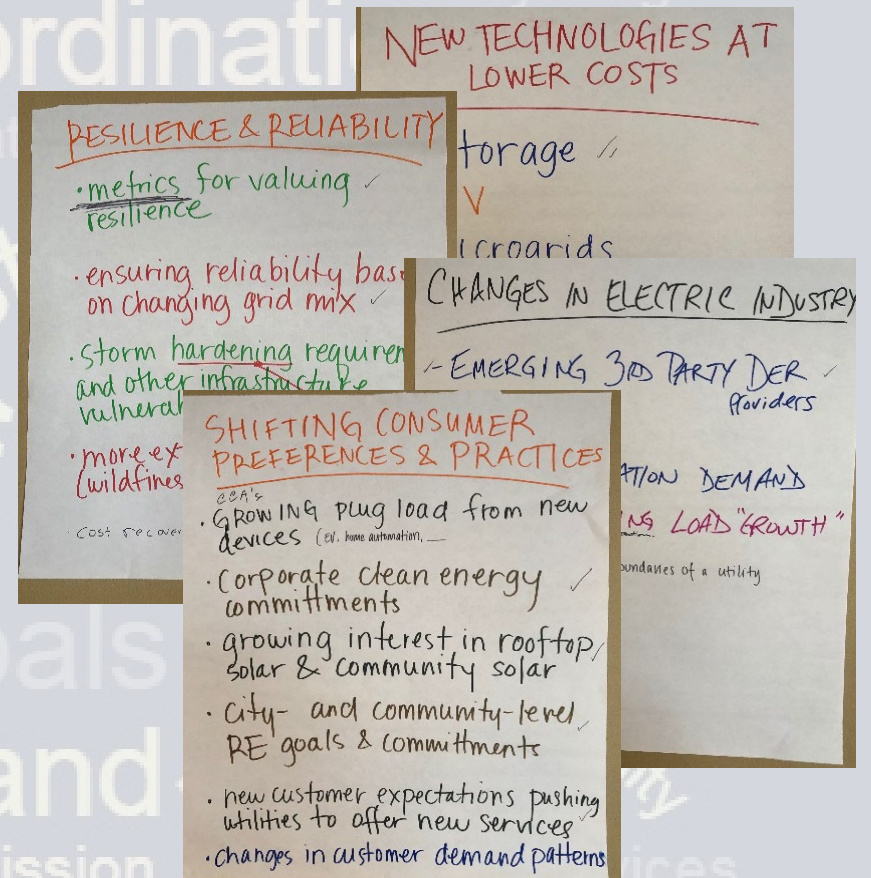
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Johanna.Zetterberg@hq.doe.gov

Outline

- Task Force participants and process – in brief
- Planning process building blocks
- Cohort roadmaps – five unique visions for aligned planning
- Resources
- Anticipated implementation challenges

Key Trends Driving Need for Change

- Resilience and reliability
- Regulatory trends
- Coordination needs and benefits
- Policy/legislative interests
- Fuel price and other cost uncertainties
- Shifting consumer preferences / practices
- Changes in electric industry
- New technologies at lower costs



15 States & Territories Participated

Arizona

Arkansas

California
(co-vice chair)

Colorado
(co-chair)

Hawaii

Indiana
(co-chair)

Maryland

Michigan

Minnesota

North Carolina

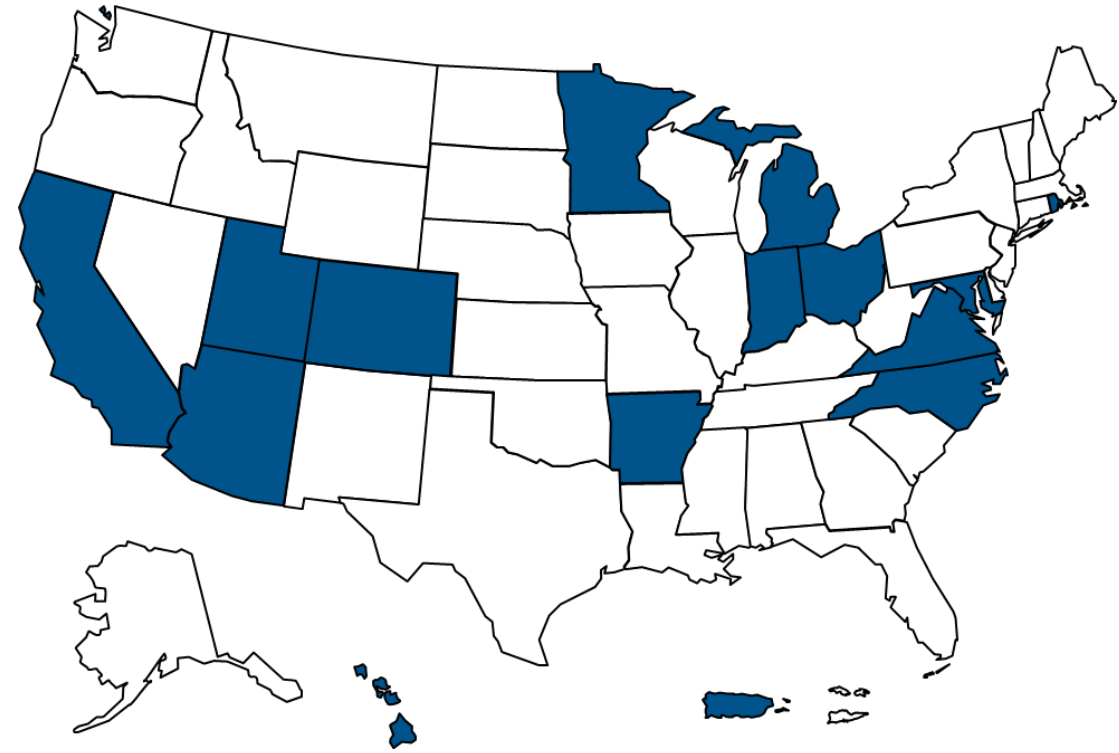
Ohio
(co-vice chair)

Puerto Rico

Rhode Island

Utah

Virginia



Diverse:

- Geography
- Market models (e.g., retail competition, wholesale market)
- Planning approaches (e.g., state energy office roles, distribution system planning)
- State goals (e.g., grid mod, resilience, climate, clean energy, economic development)

Highly Collaborative Two-Year Process

Feb 2019 – Feb 2021
4 workshops

Identify key trends, form cohorts, articulate guiding principles, map status quo planning, begin identifying alignment needs

April 2019

Refine opportunities for planning process alignment with support from stakeholders and subject matter experts

“Process Maps”

October 2019

Consider what it takes to operationalize idealized aligned planning processes with utility planners

“Roadmaps”

September 2020

Support state action planning to build on the work of the Task Force

November 2020



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**NARUC-NASEO TASK FORCE
ON COMPREHENSIVE
ELECTRICITY PLANNING**



States Are Taking Action Steps

Arizona, California, Hawaii, North Carolina, Puerto Rico

More holistic analysis of distribution & resource needs & possible solutions

California, Colorado, Hawaii, Michigan, Minnesota, North Carolina, Rhode Island, Virginia

Align planning with state priorities (e.g., resilience, decarbonization, RE targets)

Arkansas, California, Hawaii, Minnesota, Puerto Rico, Rhode Island

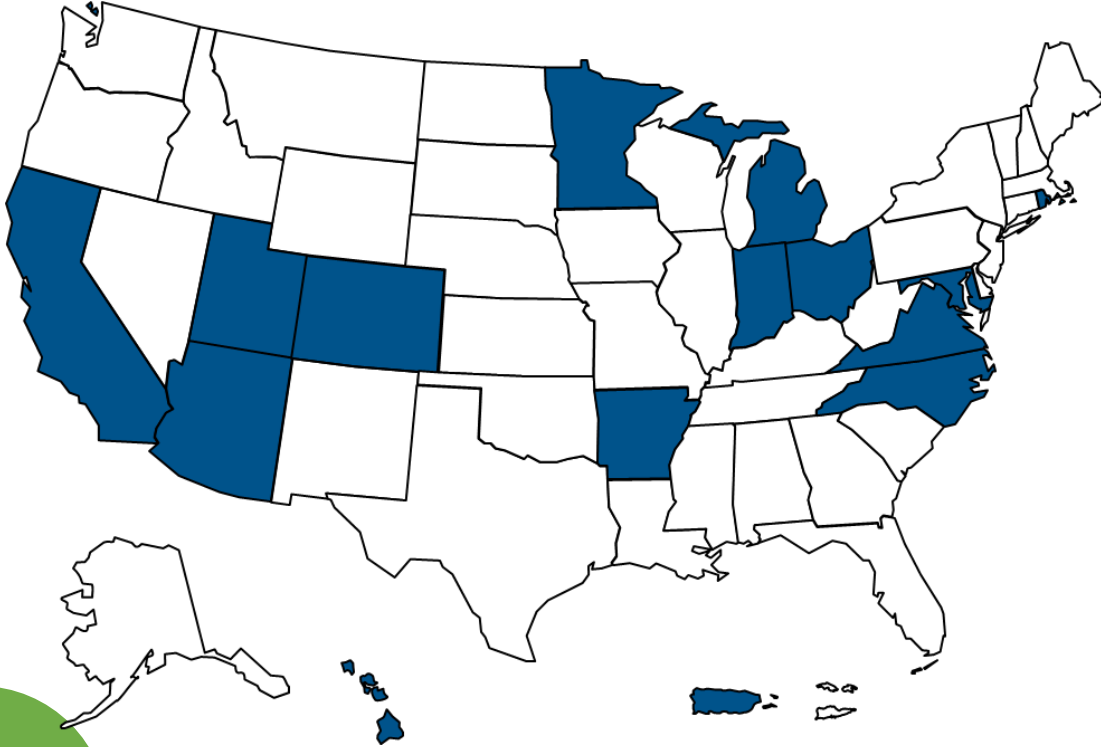
Expand availability of data for distribution planning

Hawaii, Maryland, Minnesota, North Carolina

Technical conferences / briefings on Task Force to support state road-mapping

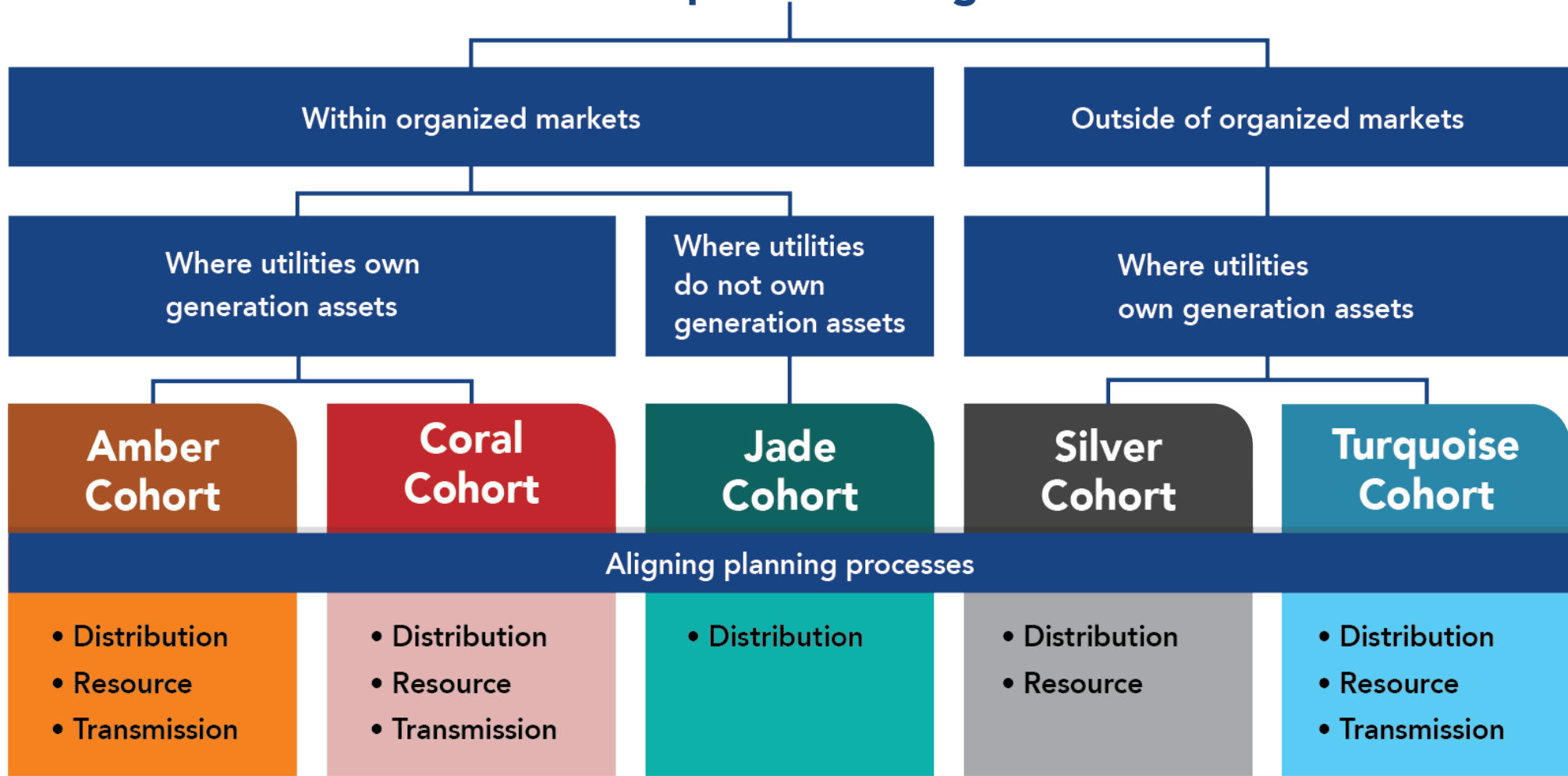
Arizona, Hawaii, Maryland

Create or expand dedicated forums for stakeholder input into planning



Teams of 3 States Each Developed Visions & Roadmaps

Task Force roadmaps were designed for states:



Source: NARUC-NASEO Task Force
Blueprint for State Action



**NARUC-NASEO TASK FORCE
ON COMPREHENSIVE
ELECTRICITY PLANNING**



Standard Building Blocks of Electricity System Planning Processes

Establish planning assumptions based on known future changes

Develop load and supply forecasts based on current trends

Describe target or desired trajectory incorporating policy goals

Identify system needs to meet targets, forecasts, and requirements

Collect and evaluate possible solutions to meet needs

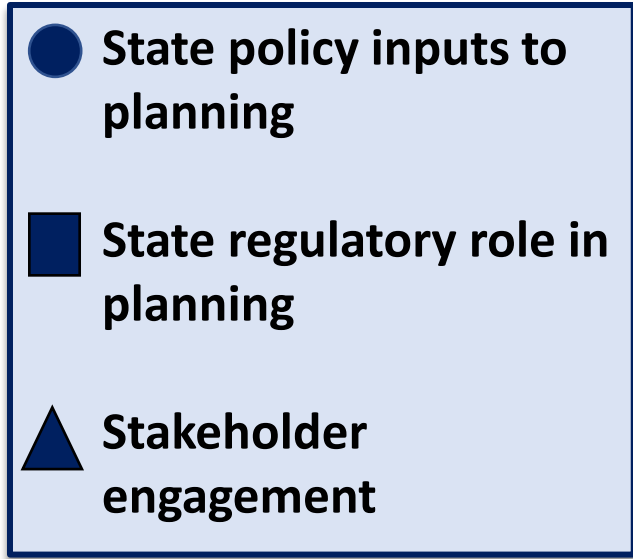
Apply criteria and select preferred solutions to meet needs

Finalize and adopt plan containing preferred solutions

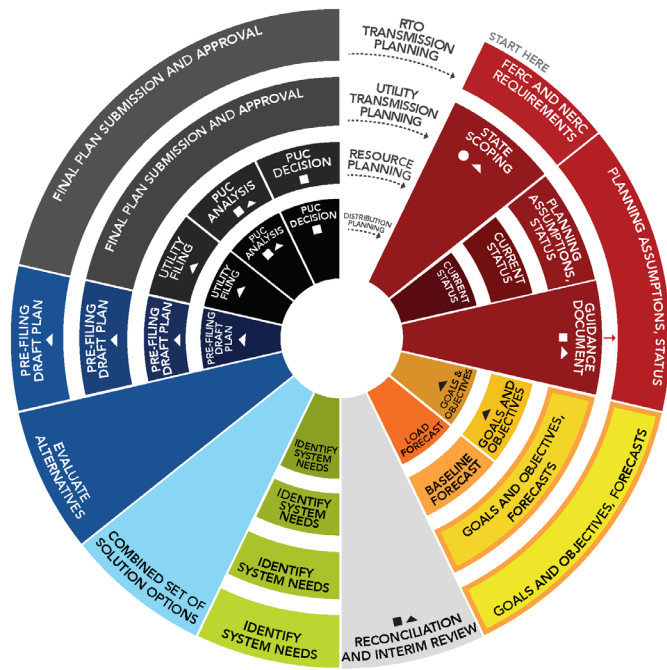
Implement preferred solutions

Source: Aligning Integrated Resource Planning and Distribution Planning—Standard Building Blocks of Electricity Planning Processes

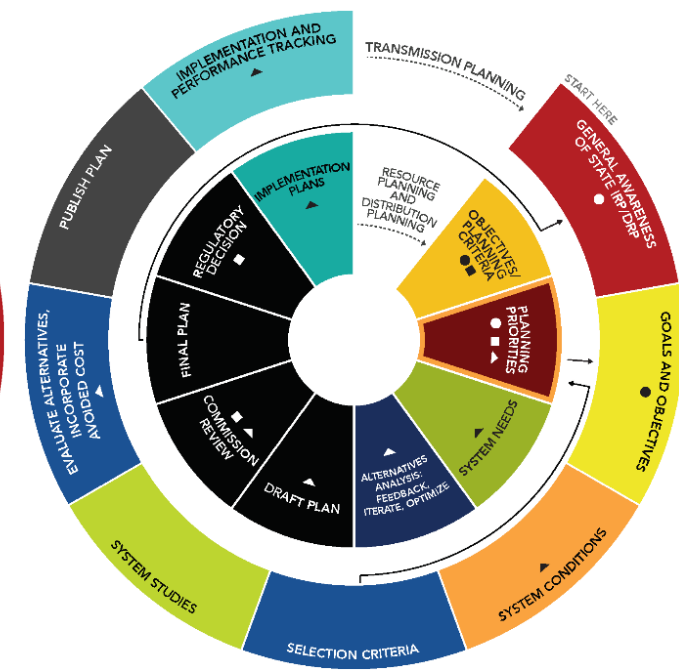
Visions for Aligned Planning



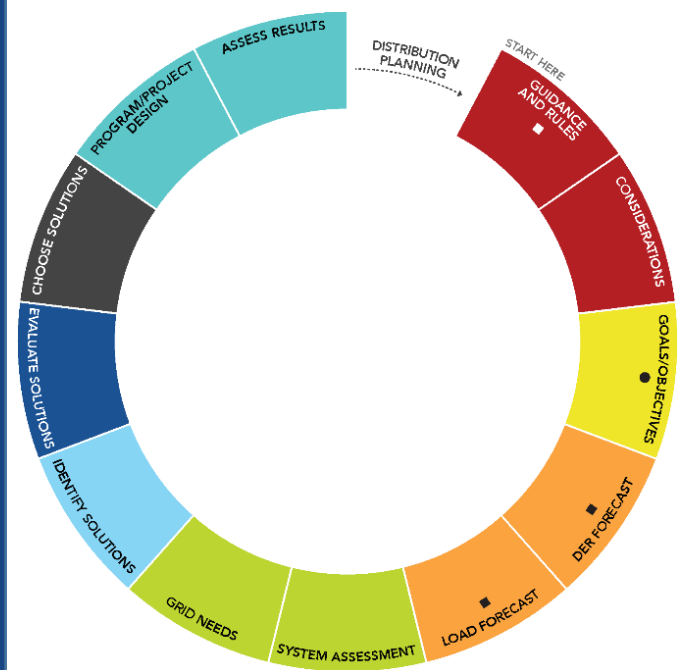
AMBER



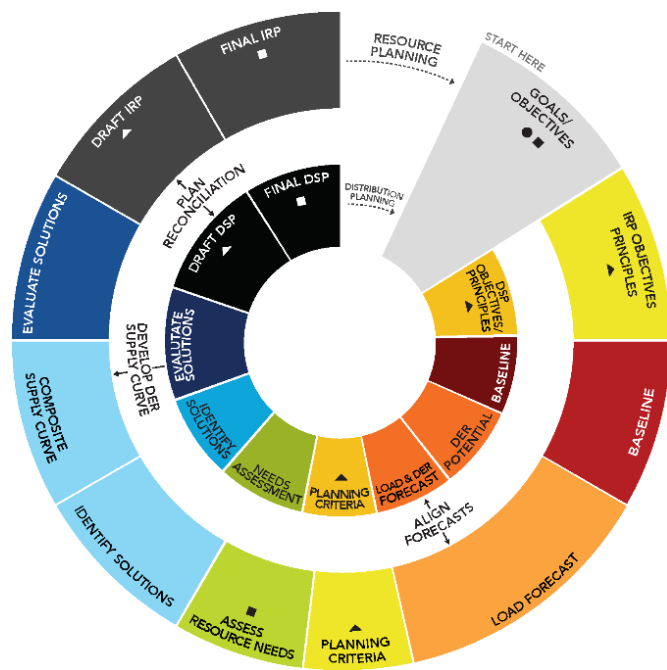
CORAL



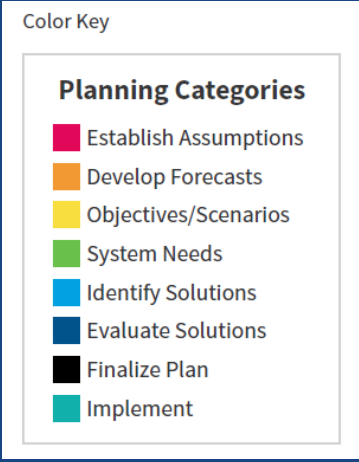
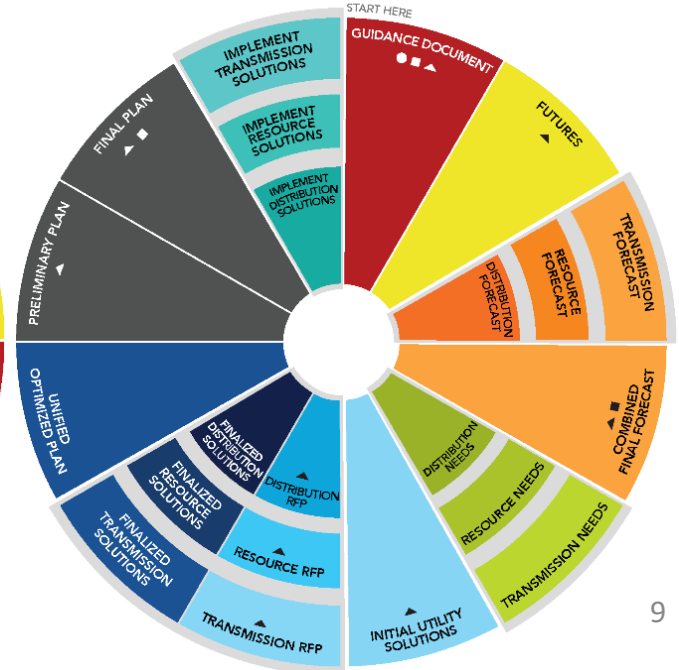
JADE



SILVER



TURQUOISE



Roadmap Example

February 2021

AMBER COHORT ROADMAP

NARUC-NASEO TASK FORCE ON COMPREHENSIVE ELECTRICITY PLANNING



A vision for an ideal process created by the Amber Cohort. The roadmap is based on the state of the industry and the needs of the public. For the purposes of this roadmap, the integration of distributed energy resources, which have not significantly impacted the distribution and transmission planning processes, is included. This roadmap includes:

- Identified or alligned
- Steps of each section
- Planning steps that
- Integrated planning
- Using both procedural
- Processes. Each section
- Developed by the Amber
- Cohort of the roadmap
- Is the status quo of



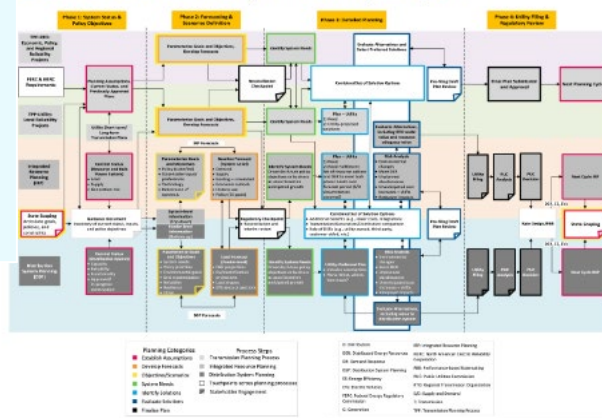
Introduction

About the State of Amber

Structure	Our state's investor-owned utilities own generation assets.
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 working to align distribution, resource, and transmission planning processes.
Additional Characteristics	<ul style="list-style-type: none"> Because transmission-owning utilities participate in an RTO, the cohort is considering the 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.
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 the 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.
We are doing this because we want to accomplish	<ul style="list-style-type: none"> Efficient, cohesive, and coherent planning processes that are able to achieve state policy goals. Flexibility of system State policy achievement Enabling future transformation Efficient regulation Reliability, safety, affordability, resilience
While keeping in mind	<ul style="list-style-type: none"> Least cost, reasonable rates Efficiency Utility health Cybersecurity
And trying to be responsive to	<ul style="list-style-type: none"> Digitalization Decarbonization/carbonization Flexibility and adaptability Cybersecurity threats Climate change Electrification

Amber Cohort Roadmap—NARUC-NASEO Task Force on Comprehensive Electricity Planning | 3

Amber Cohort Flowchart of Idealized Comprehensive Electricity Planning Process



Amber Cohort Roadmap—NARUC-NASEO Task Force on Comprehensive Electricity Planning | 5

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



Color Key

Planning Categories

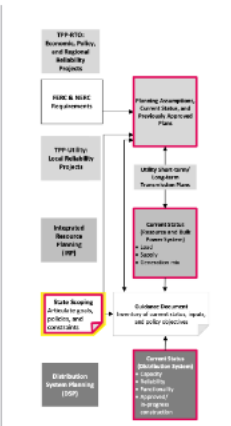
- Establish Assumptions
- Develop Forecasts
- Objectives/Scenarios
- System Needs
- Identify Solutions
- Evaluate Solutions
- Finalize Plan
- Implement

Phase 1: System Status and Policy Objectives

This process step is carried out in Phase 1 to set the common foundation for the rest of the planning cycle. Known information about the system—including scheduled additions to retirement of facilities from the systems over the planning horizon, as well as policy objectives that the planning processes should consider—are documented in Phase 1 and used with stakeholders through a guidance document before moving to the next step.

As a preliminary process step, the Intended State Scope of the planning processes is defined at the state level to apply to the RTO, DSO, and TPO. This initial step includes identifying the state goals for the outcomes of the planning processes, the policies that outline the intended direction of the planning processes, and the planning process estimates. The outcomes of stakeholder engagement at this initial stage help set the scope for the rest of the planning processes. It is also important at the beginning of Phase 1 to review and confirm that the forecast assumptions are reasonably consistent across the Distribution, RTO, and Transmission Planning processes. TPO planning assumptions for both the RTO and the individual utilities are also shaped by Federal Energy Regulatory Commission (FERC) and North American Electric Reliability Corporation (NERC) requirements.

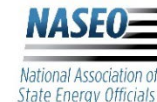
This stage of the planning cycle incorporates previously approved Utility Short-term and long-term Transmission Plans, with information such as voltage, location, scheduled in-service dates, drivers, siting, and financing. These plans impact TPO and RTO planning assumptions and set the foundation for the current status of the system. The current status of the system includes information about the assets and facilities, such as current projects in progress and projects that have been approved for development, along with the associated timelines.



8 | Amber Cohort Roadmap—NARUC-NASEO Task Force on Comprehensive Electricity Planning



NARUC-NASEO TASK FORCE ON COMPREHENSIVE ELECTRICITY PLANNING



Amber Cohort – Profile

About Amber: A Fictional, Representative State

Structure	
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, resource, and transmission planning processes
Additional Characteristics	
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 We are facing 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
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
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
And trying to be responsive to	<ul style="list-style-type: none"> Digitization Decarbonization/carbonization Flexibility and adaptability Resiliency Cybersecurity threats Climate change Electrification

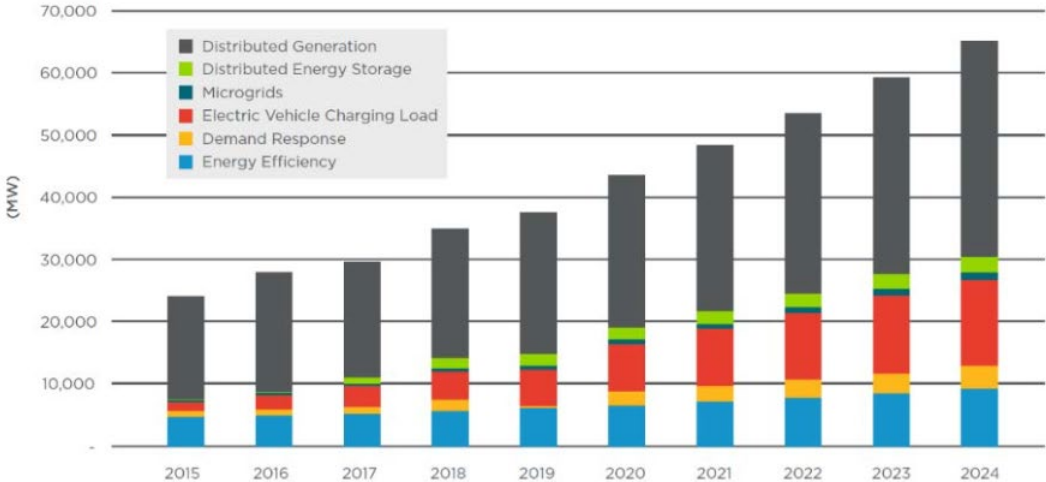


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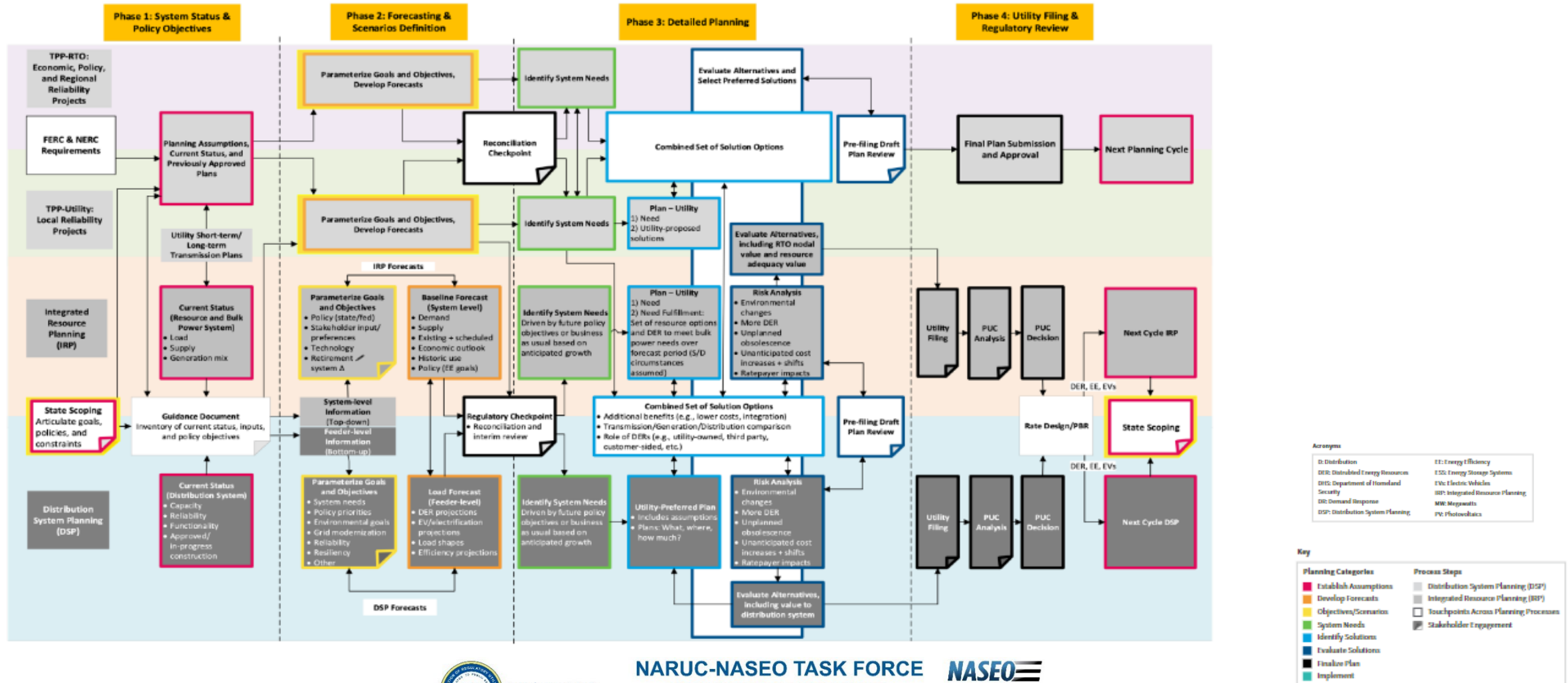
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Figure 2 – U.S. Annual Installed DER Power Capacity Additions by DER Technology, 2015-2024



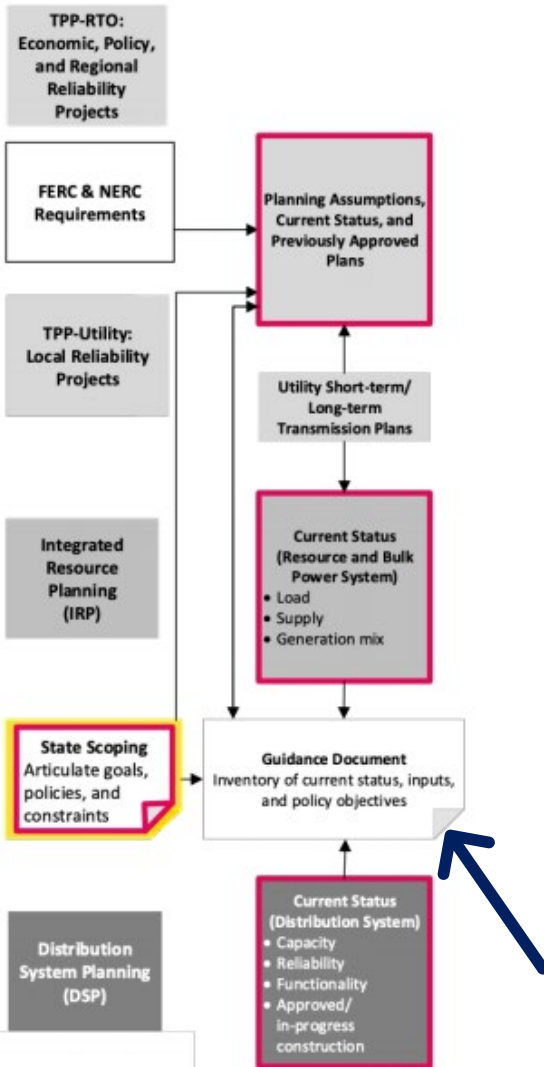
Amber Flowchart

Amber Cohort Flowchart of Idealized Comprehensive Electricity Planning Process

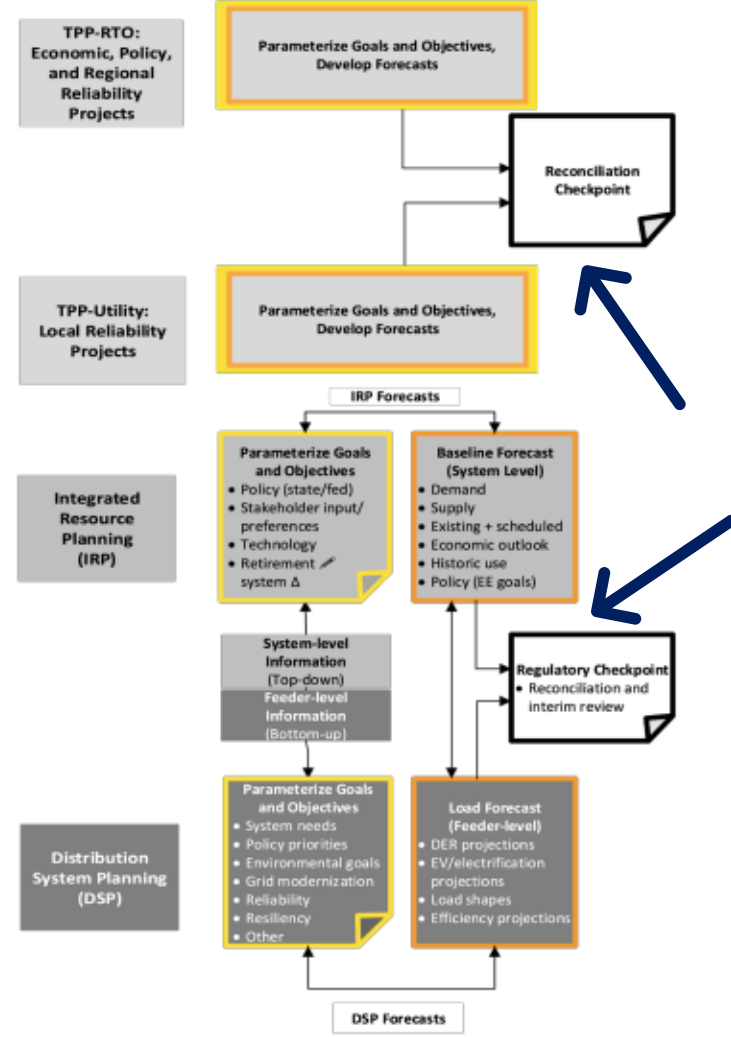


Amber Cohort Innovations

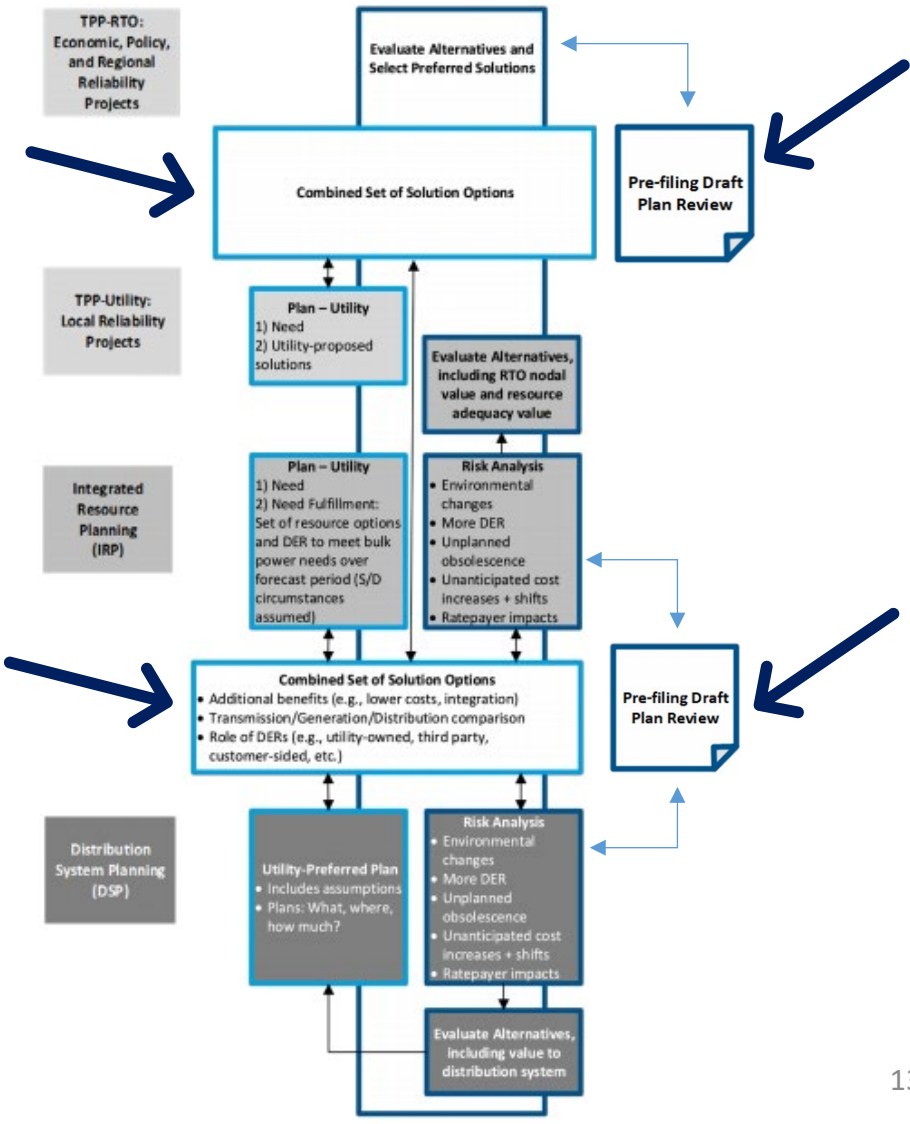
Phase 1: System Status and Policy Objectives



Phase 2: Forecasting and Scenario Definitions



Phase 3: Detailed Planning



Coral Cohort – Profile

About Coral: A Fictional, Representative State

Structure

Regulatory	Our state's investor-owned utilities are vertically integrated and own generation assets
Market	Our state is located within an RTO/ISO market
Planning Processes	Our state is seeking to align distribution, resource, and transmission planning processes

Additional Characteristics

A few other characteristics you should know	<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 ability to benefit from their experts and resources 	
We are doing this because we want to accomplish	<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 	<ul style="list-style-type: none"> Continuous improvements Adaptive to technology change Risk mitigation Access to data
While keeping in mind	<ul style="list-style-type: none"> Market dynamics Limitations on regulatory authority 	<ul style="list-style-type: none"> Potential for a theoretical federal policy Improvements of planning and modeling tools
And trying to be responsive to	<ul style="list-style-type: none"> Market developments and technology change Customer engagement/customer preferences 	<ul style="list-style-type: none"> Political realities Concerns over cost shifting Concerns over evolving utility role



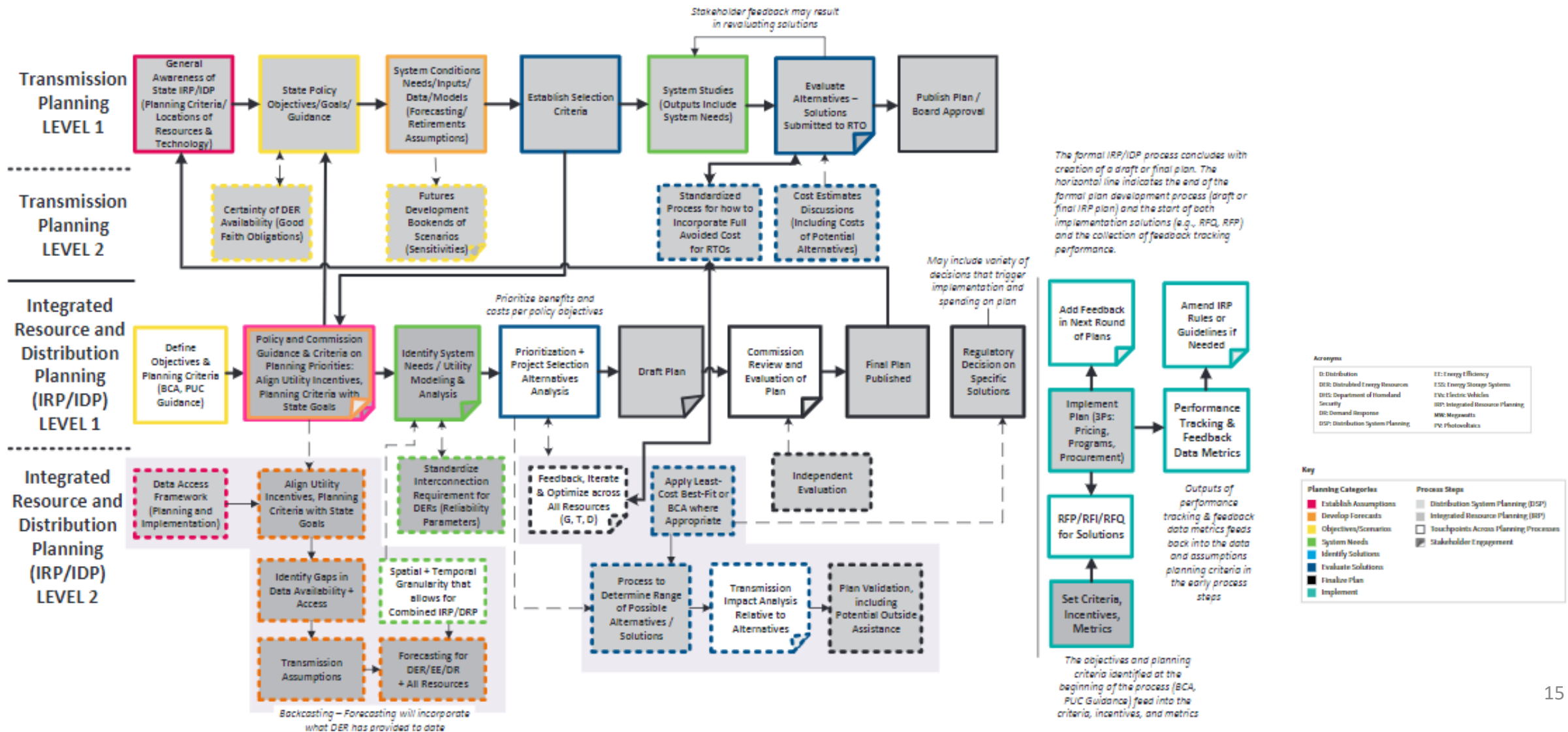
<https://www.ferc.gov/electric-power-markets>



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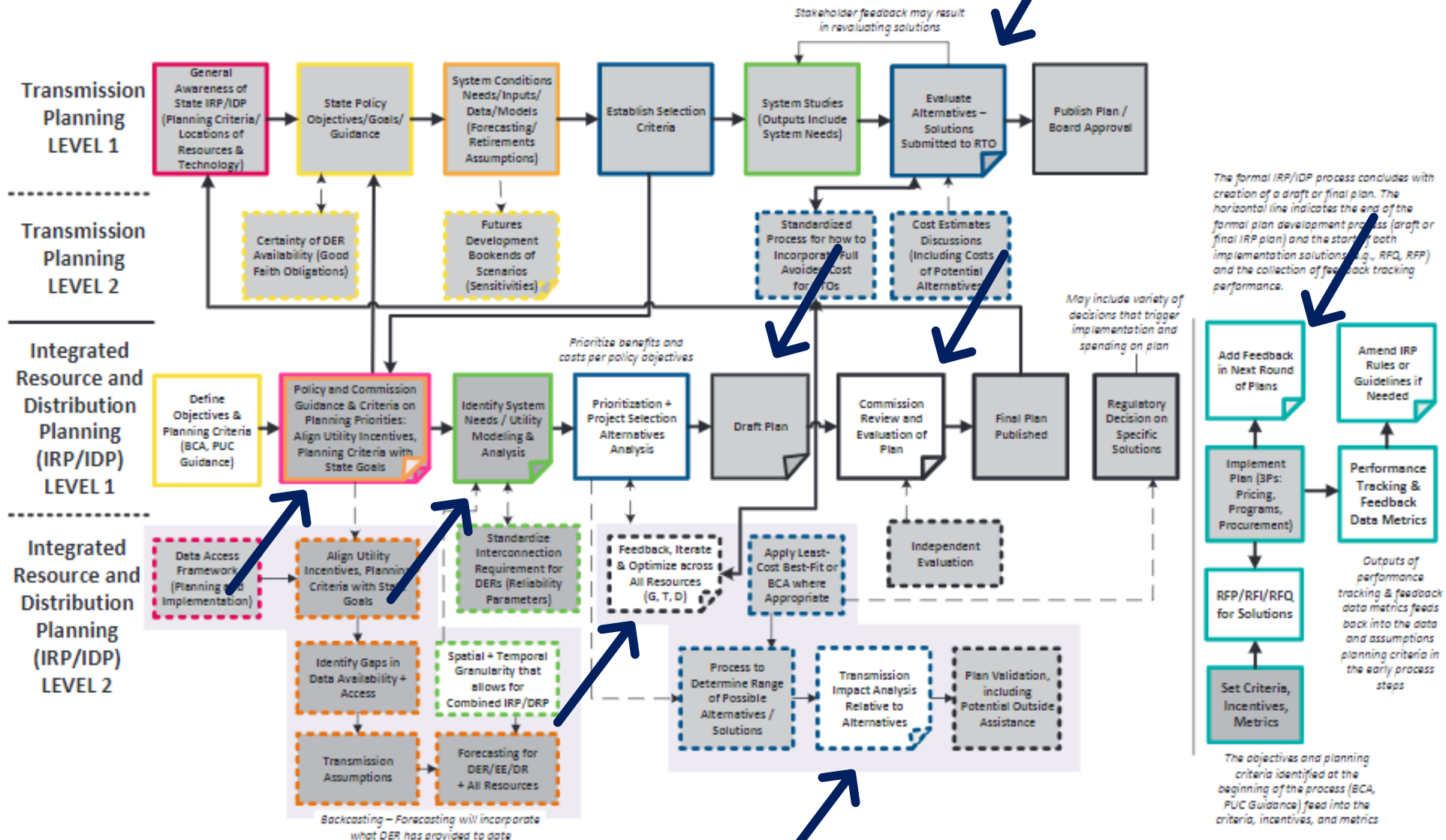
Coral Flowchart

Coral Cohort Flowchart of Idealized Comprehensive Electricity Planning Process



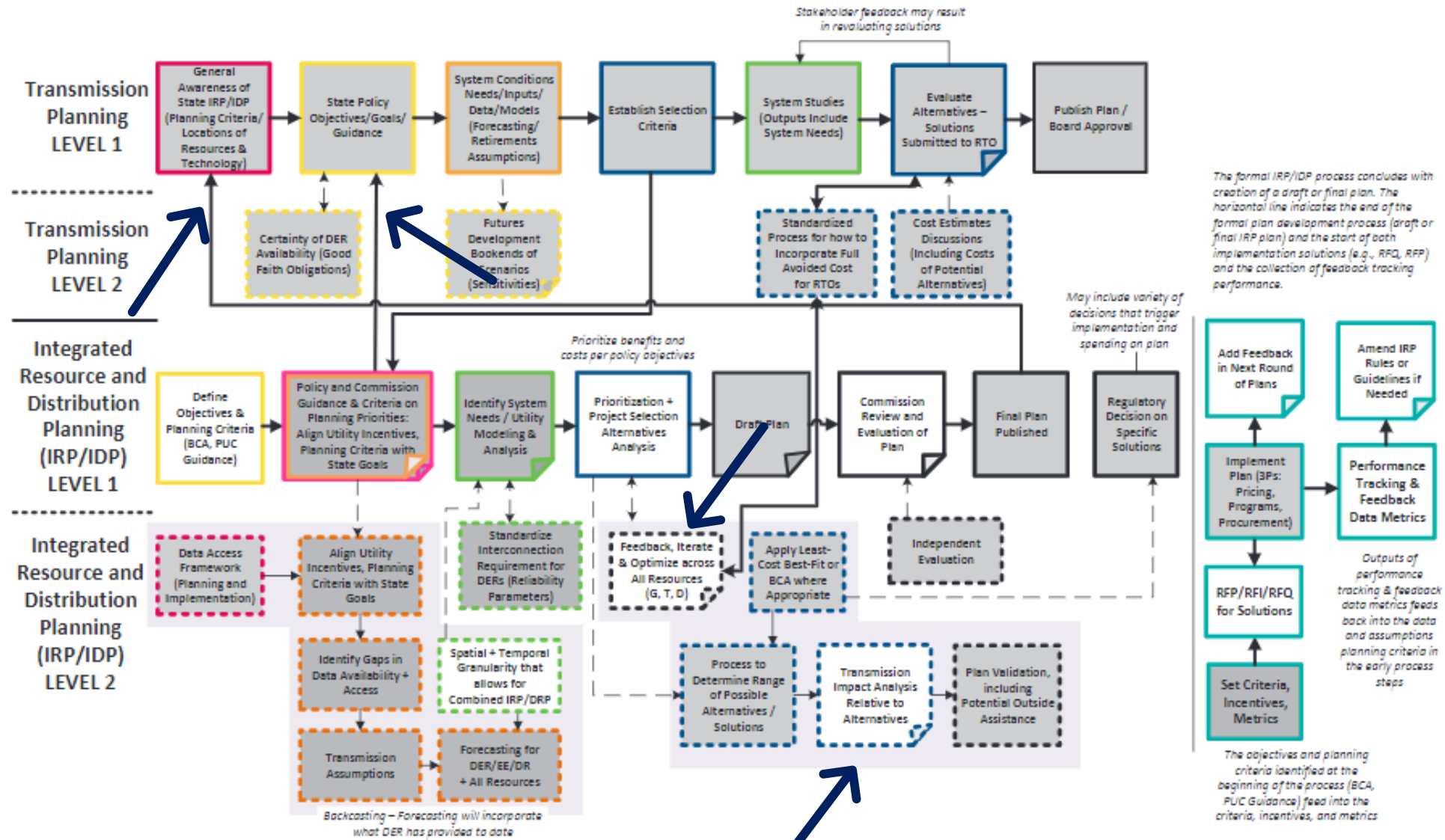
Coral Cohort Innovations

Stakeholder Engagement



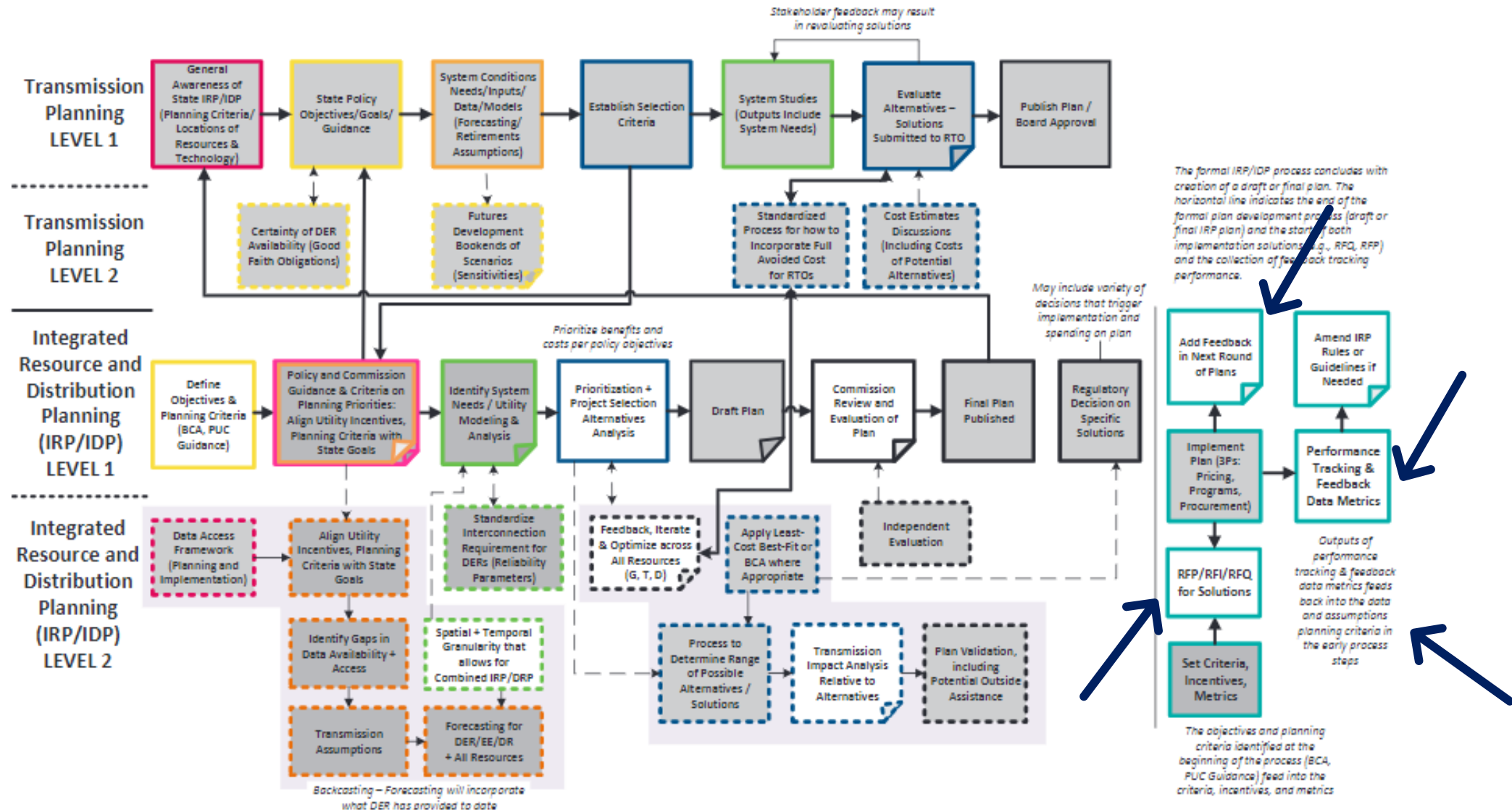
Coral Cohort Innovations

Linkages between IRP/IDP and transmission plans

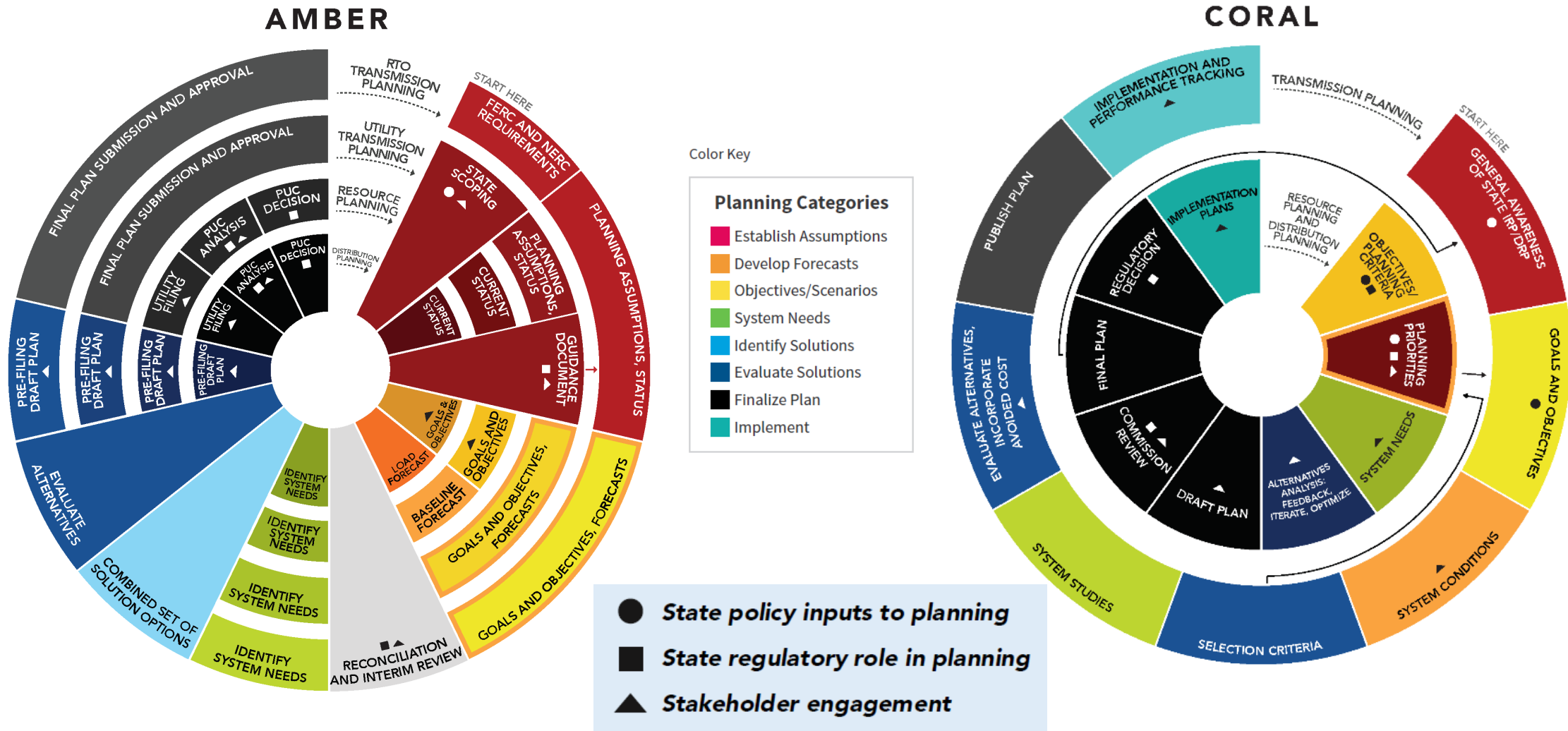


Coral Cohort Innovations

Feedback Loops



Summary of Two Different Vision Options



Silver Cohort – Profile

About Silver: A Fictional, Representative State

Structure

Regulatory	Our state's investor-owned utilities own generation assets
Market	Our state is located outside of an RTO/ISO market
Planning Processes	Our state is seeking to align distribution and resource planning processes

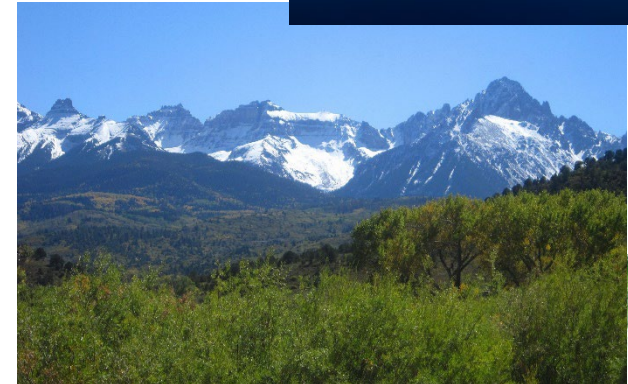
Additional Characteristics

A few other characteristics you should know	<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
We are doing this because we want to accomplish	<ul style="list-style-type: none"> Achieving a functional, comprehensive planning process that integrates all of the components of the electricity system
While keeping in mind	<ul style="list-style-type: none"> Environmental needs Technical requirements Affordability
And trying to be responsive to	<ul style="list-style-type: none"> New customer needs and the capability of integrating new technology

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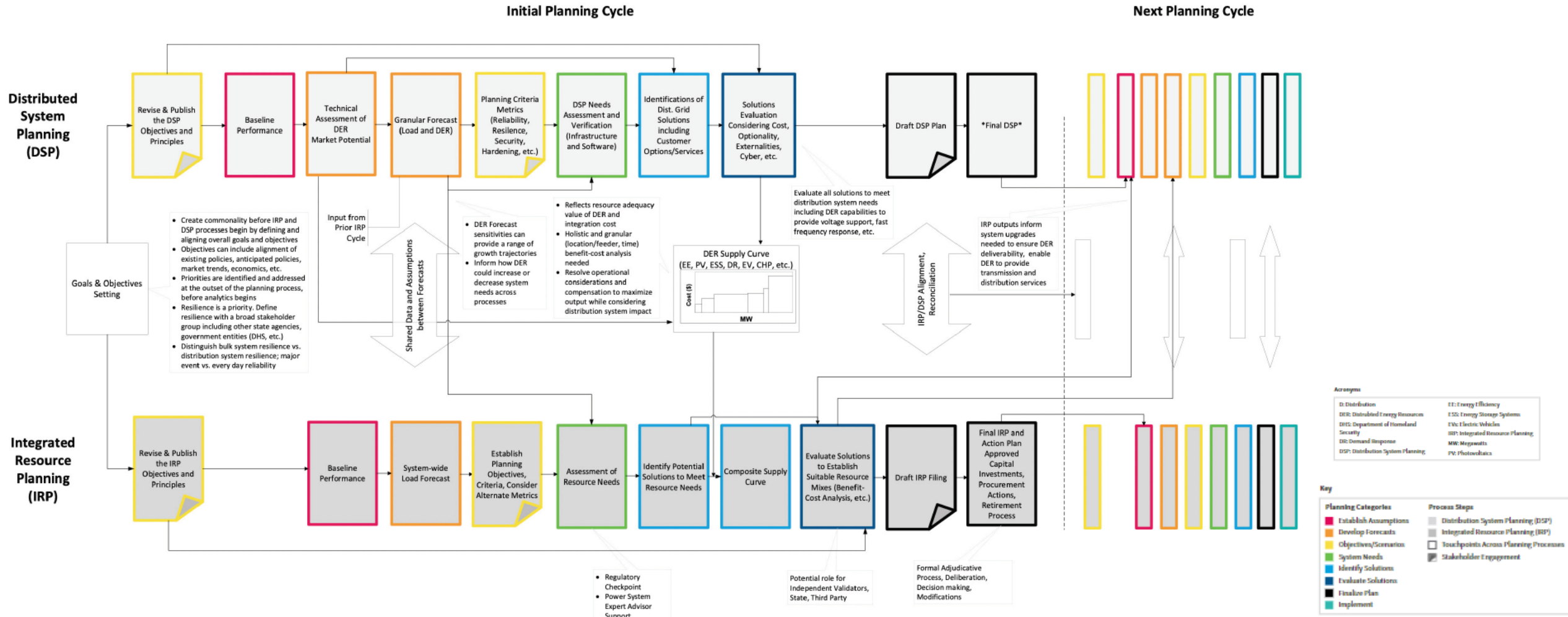
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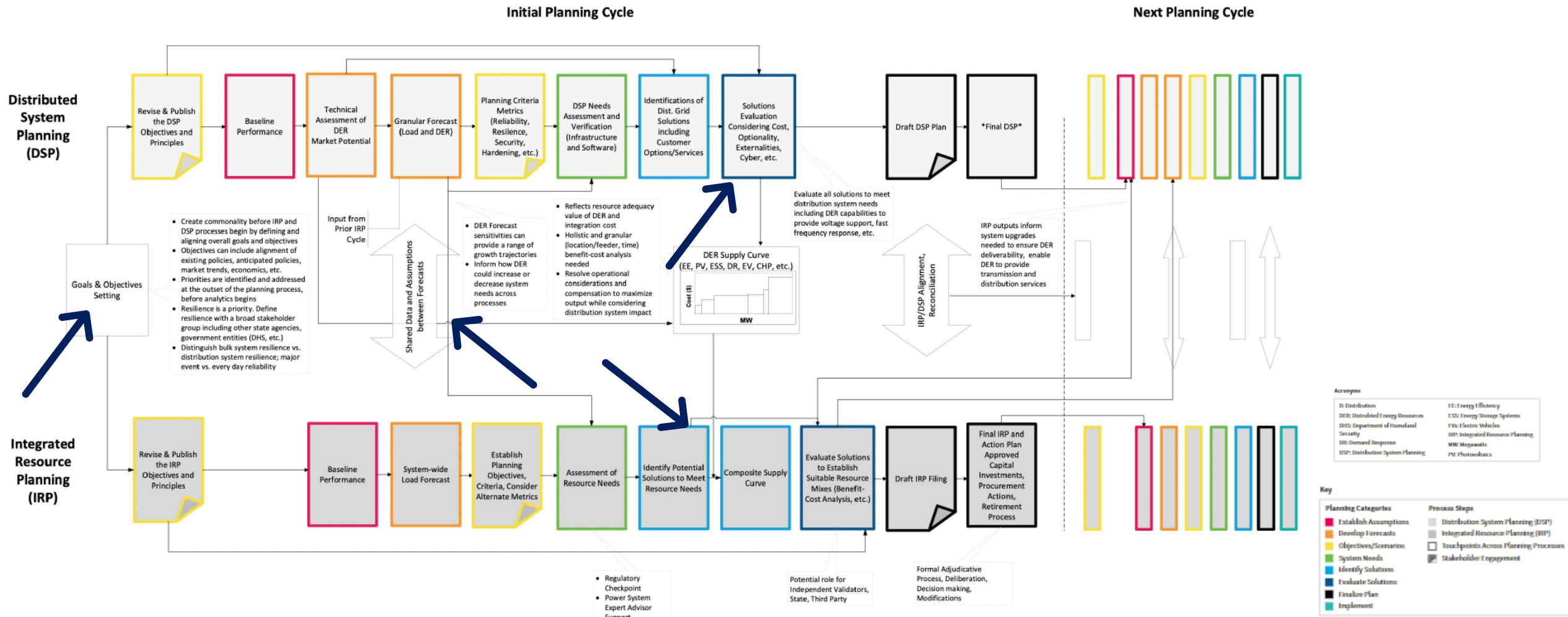
Silver Flowchart

Silver Cohort Flowchart of Idealized Comprehensive Electricity Planning Process



Silver Cohort Innovations

Silver Cohort Flowchart of Idealized Comprehensive Electricity Planning Process



Turquoise Cohort – Profile

About Turquoise: A Fictional, Representative State

Structure

Regulatory

Our state’s investor-owned utilities own generation assets

Market

Our state is located outside of an RTO/ISO market

Planning Processes

Our state is seeking to align distribution, resource, and transmission planning processes

Additional Characteristics

A few other characteristics you should know

- 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

- 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

While keeping in mind

- Preserving the value proposition of the utility-driven system (reliability, affordability, security)

And trying to be responsive to

- Promoting data-driven results that are verifiable



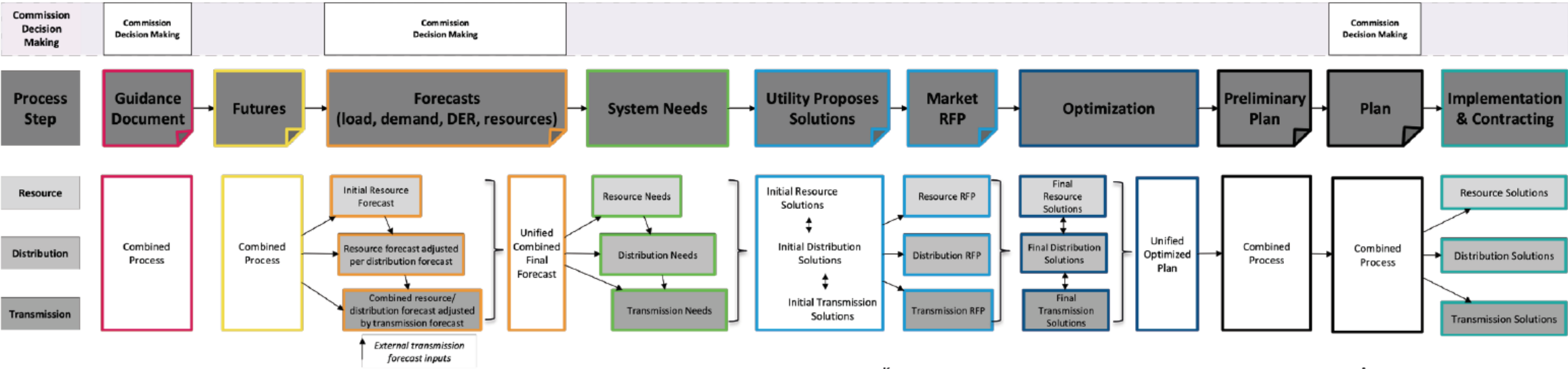
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Turquoise Flowchart

Turquoise Cohort Flowchart of Idealized Comprehensive Electricity Planning Process



Key

Planning Categories	Process Steps
<ul style="list-style-type: none"> ■ Establish Assumptions ■ Develop Forecasts ■ Objectives/Scenarios ■ System Needs ■ Identify Solutions ■ Evaluate Solutions ■ Finalize Plan ■ Implement 	<ul style="list-style-type: none"> Transmission Planning Process Integrated Resource Planning Distribution System Planning Touchpoints Across Planning Processes Stakeholder Engagement

Acronyms

DER: Distributed Energy Resources
 IRP: Integrated Resource Planning
 RFP: Request for Proposal

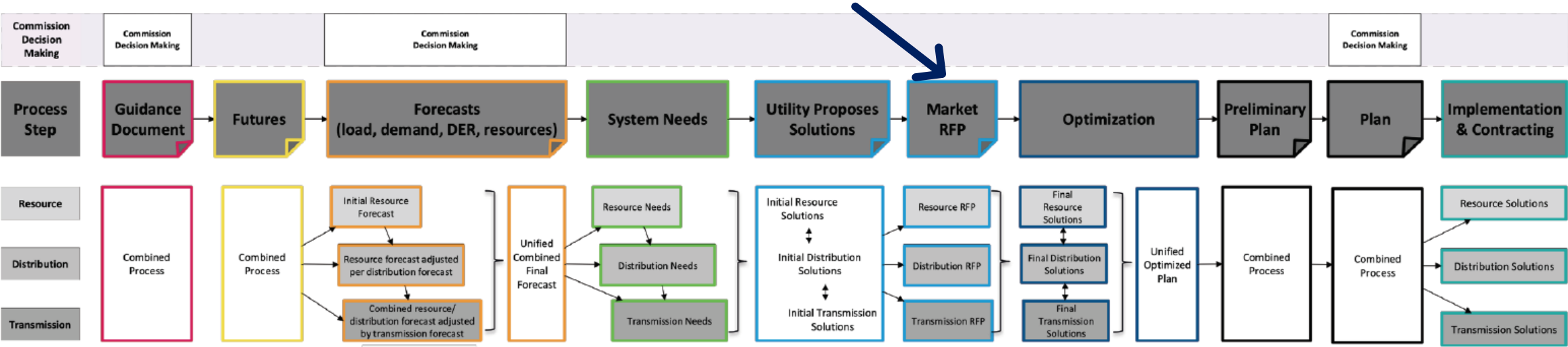


**NARUC-NASEO TASK FORCE
ON COMPREHENSIVE
ELECTRICITY PLANNING**



Turquoise Flowchart

Turquoise Cohort Flowchart of Idealized Comprehensive Electricity Planning Process



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Acronyms

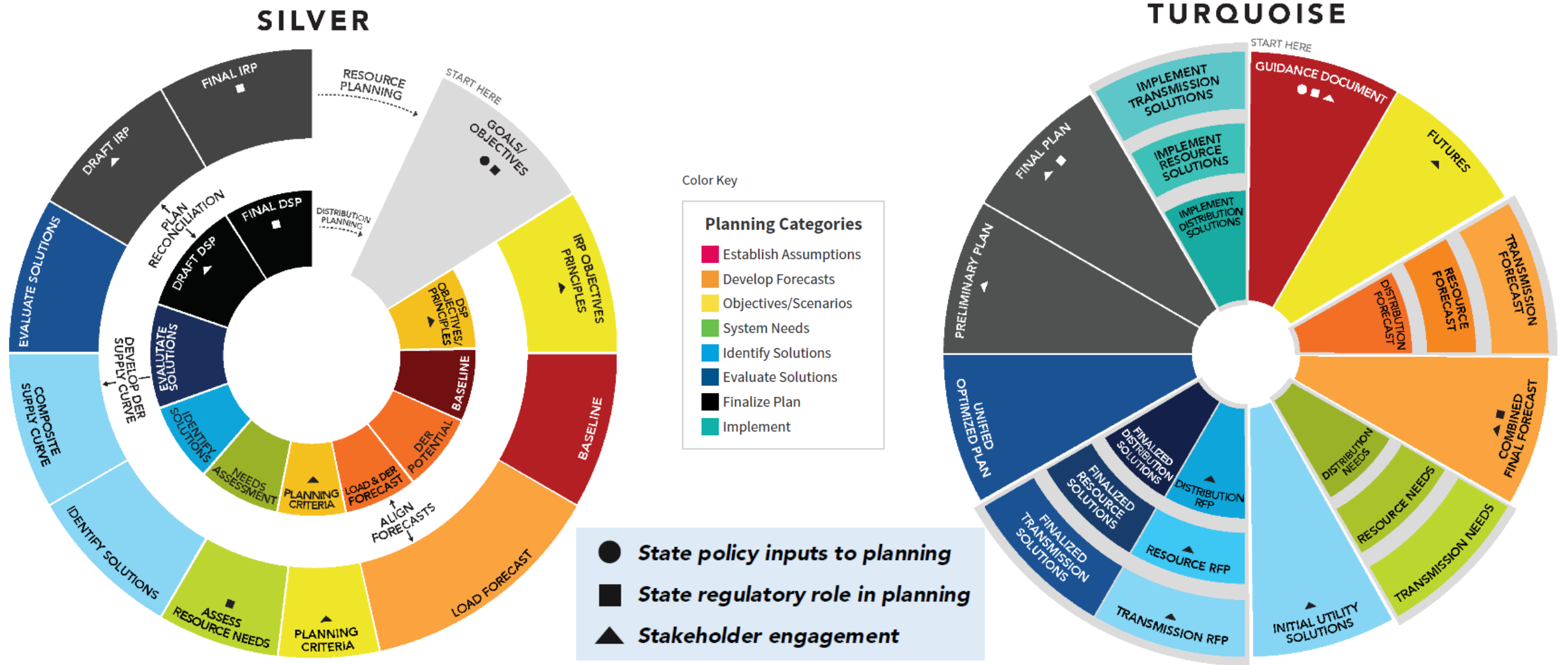
DER: Distributed Energy Resources
 IRP: Integrated Resource Planning
 RFP: Request for Proposal



NARUC-NASEO TASK FORCE ON COMPREHENSIVE ELECTRICITY PLANNING



Summary of Two Different Vision Options



Jade Cohort – Profile

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	<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
We are doing this because we want to	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> State policy Stakeholder interests



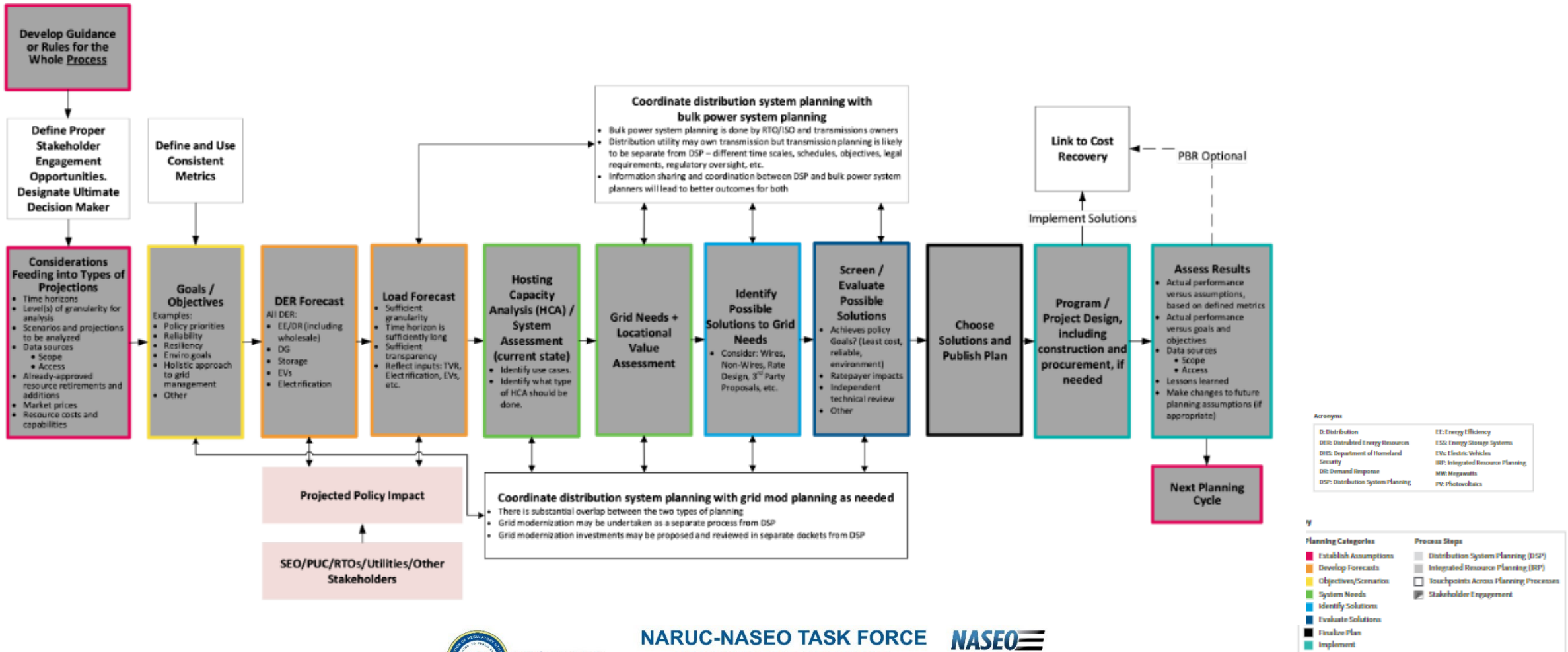
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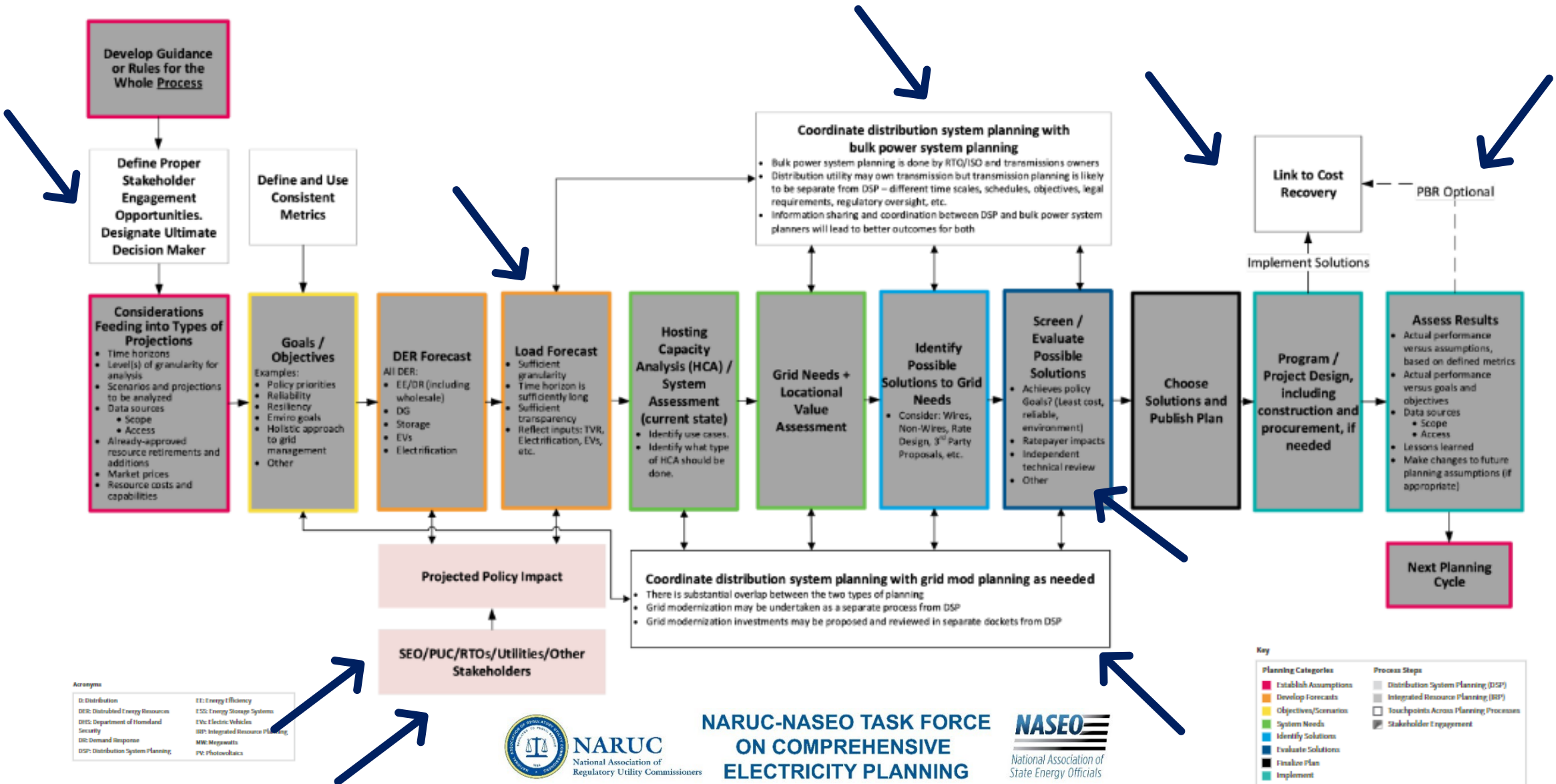
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Jade Flowchart

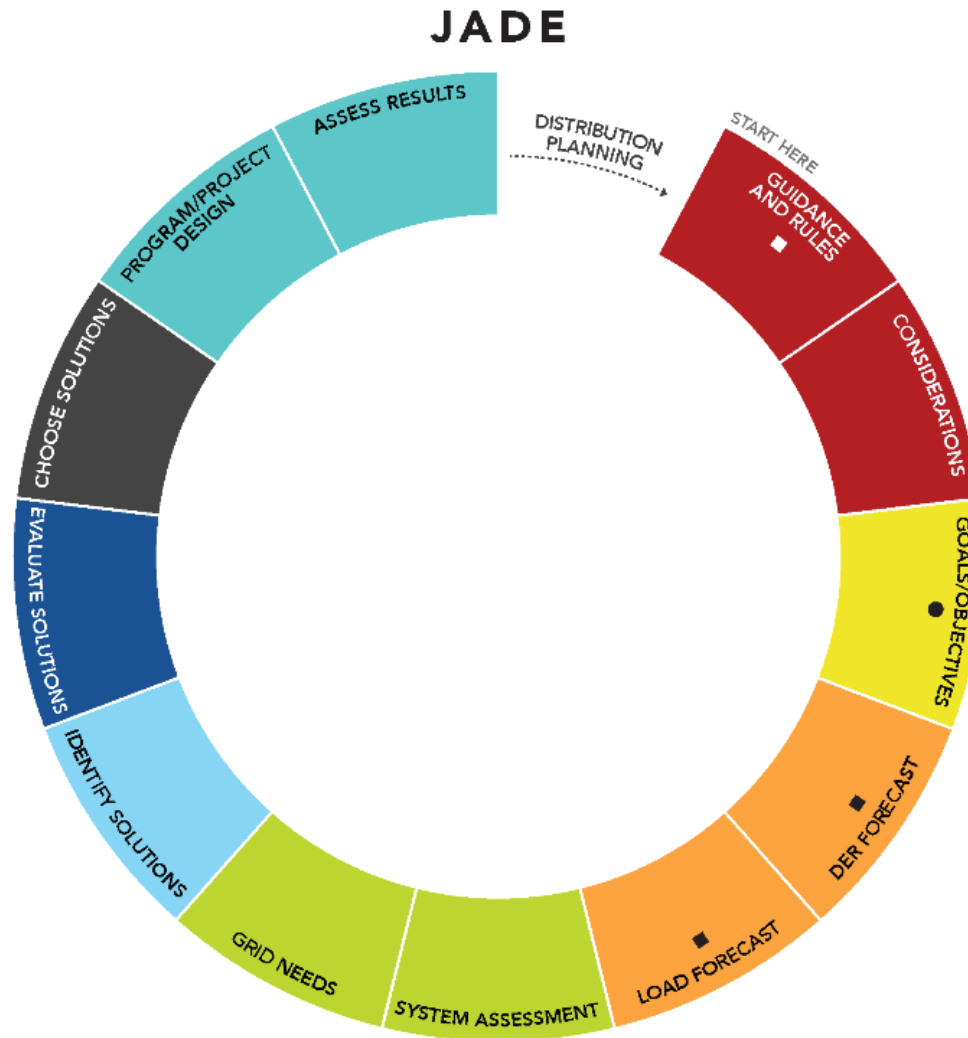
Jade Cohort Flowchart of Idealized Comprehensive Electricity Planning Process



Jade Innovations



Interpreting Vision Diagrams



Color Key

Planning Categories

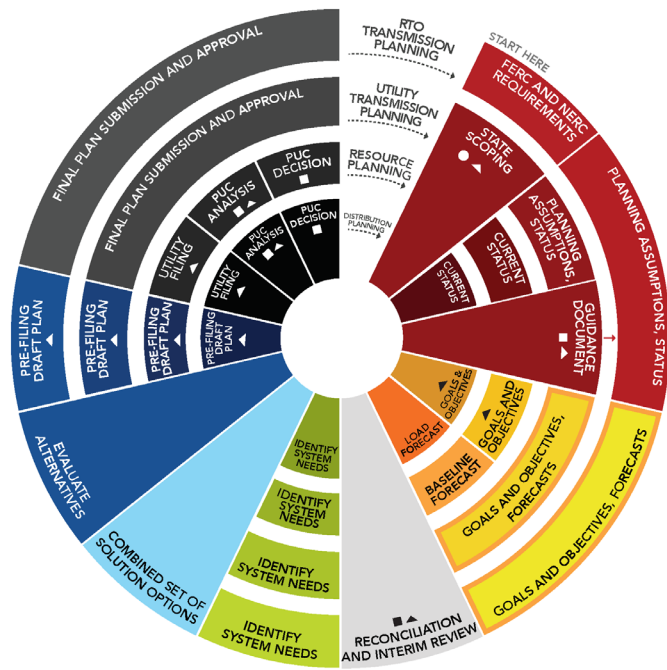
- Establish Assumptions
- Develop Forecasts
- Objectives/Scenarios
- System Needs
- Identify Solutions
- Evaluate Solutions
- Finalize Plan
- Implement

- *State policy inputs to planning*
- *State regulatory role in planning*
- ▲ *Stakeholder engagement*

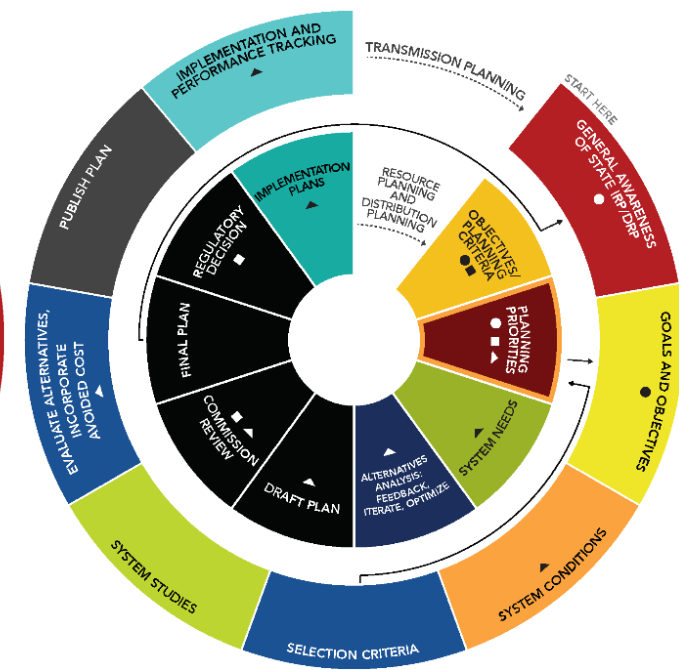
Roadmap Questions?

- State policy inputs to planning
- State regulatory role in planning
- ▲ Stakeholder engagement

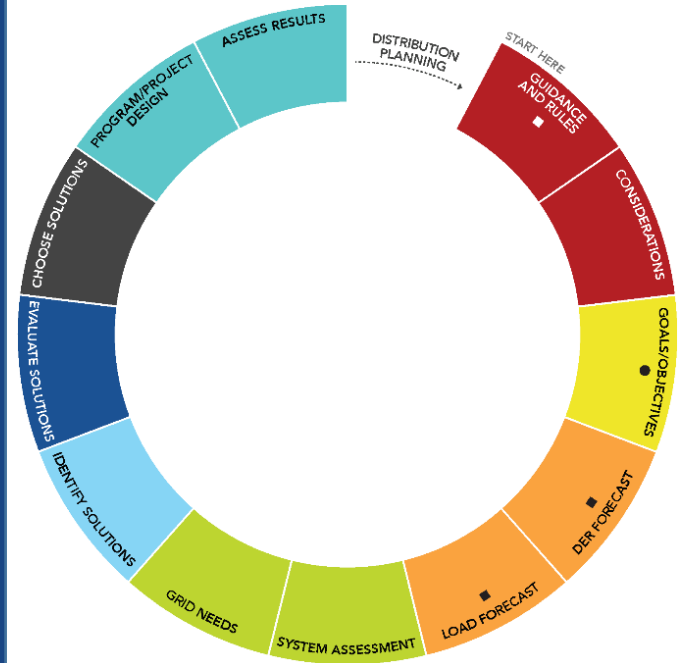
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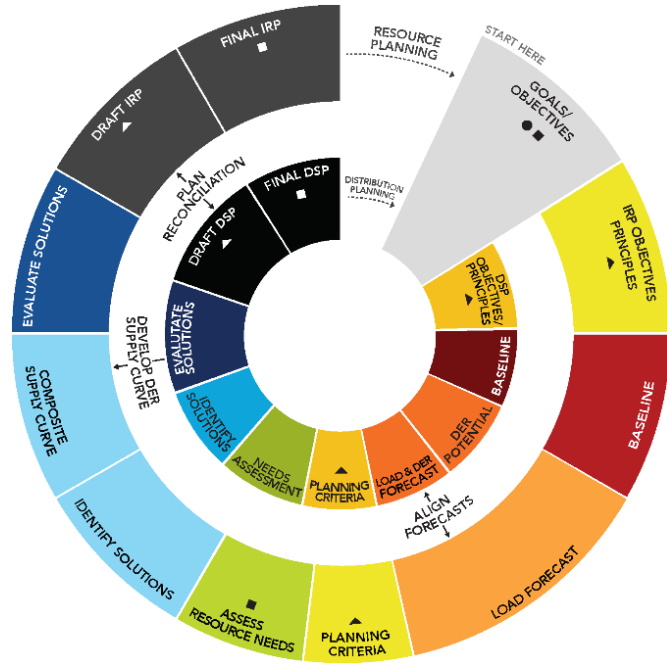
CORAL



JADE



SILVER



TURQUOISE

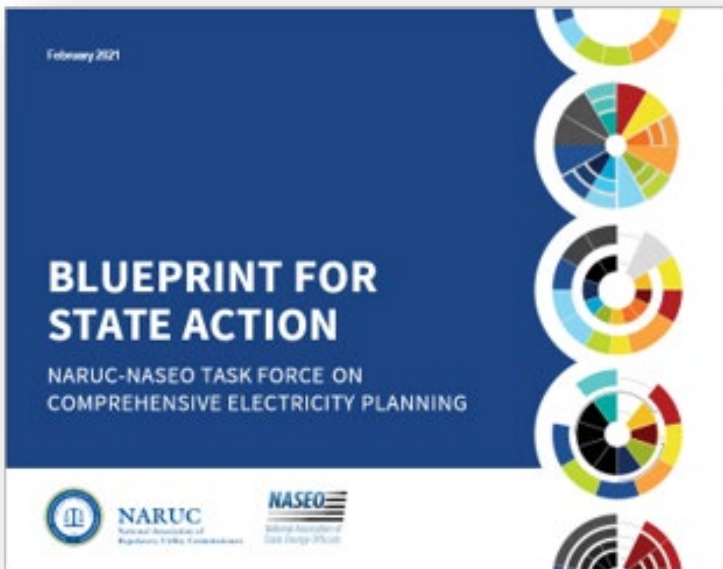


Color Key

Planning Categories

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

The Blueprint for State Action offers Question Prompts within Three Steps



Step 1

Identify goals and starting point for electricity system planning

Step 2

Establish vision for better aligned planning

Step 3

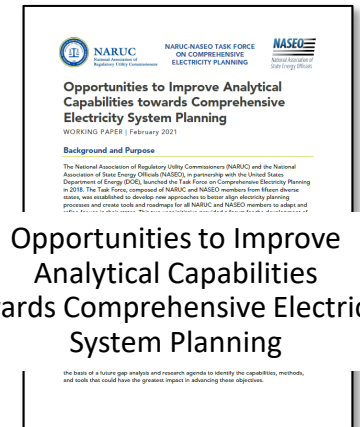
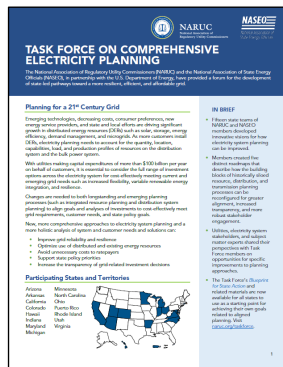
Develop an action plan for achieving the vision

Comprehensive Electricity Planning

Task Force Resources

All Task Force materials are now available: www.naruc.org/taskforce

Task Force members, NARUC and NASEO staff, technical and subject matter experts, and others developed a robust set of resources to support state decision makers in advancing aligned electricity system planning processes.



Task Force Briefing Paper: Standard Building Blocks of Electricity System Planning Processes



Comprehensive Planning Library: resources across 15 topical areas

Topic Area	Description
1 Data Access	Customer data access and transparency; sensing, communications, and stability of the distribution grid
2 Rate-making	Approaches to rate design, state approaches to performance-based regulation, traditional cost of service, etc.
3 Distribution System Planning (DSP)	The fundamentals of distribution system plans and planning approaches (e.g., when to start, level of granularity, technical tools and methods) underlying the utility DSP engineer perspective and the regulatory process
4 Emerging Distribution System Planning (DSP) Practices	Emerging DSP methods and tools for identifying system needs, identifying projects and alternatives, conducting hosting capacity analysis, and assessing locational value
5 Forecasting	Tools and frameworks for forecasting load and DER adoption
6 Grid Modernization	References related to enabling a more advanced distribution grid
7 Planning Coordination	References on synchronizing data, assumptions, and modeling scenarios to align and coordinate planning processes
8 Planning Criteria	References highlighting key planning criteria metrics and considerations
9 Procurement Strategies	RFPs, competitive bids, and other generation procurement strategies; lessons learned from local government/large customer renewable energy procurements
10 Resilience	Incorporating resilience into grid planning, including accommodating microgrids
11 Rural DER Integration	Approaches to determine the suitability of DER in rural areas
12 Scenario and Risk Analysis	Assessing scenarios and risk such as environmental changes, higher DER penetration, unpriced environmental, unanticipated cost increases, cost shifts, resource impacts, etc.
13 Solution Evaluation	Prioritization and sequencing of distribution grid investments, methods for economic evaluation of options to optimize resources and deliver value to customers
14 Stakeholder Engagement	Best practices for structuring efficient and effective stakeholder engagement in utility planning
15 Utility Best Practices for Integrated Planning	Utility best practices that align with integrated planning inputs, assumptions, and methods used by utilities



NARUC-NASEO TASK FORCE ON COMPREHENSIVE ELECTRICITY PLANNING



Anticipated Challenges and Potential Solutions to Implementing Aligned Planning

Actions for State Decision-Makers

Likely Challenges	Possible Solutions
Overcoming institutional inertia and resistance to beginning distribution system planning or integrated planning processes	<ul style="list-style-type: none"> • Support s • Identify o • Develop a • Establish • Focus on • Require a • Provide a • Require g • Direct the • Provide ir • Seek and • Identify a • Formally • Ask utiliti
Ensuring new planning processes add value, are not overly burdensome or slow, and connect to other efforts	<ul style="list-style-type: none"> • Work with • Issue PUC • Specify re • Review st • Encourag • Leverage • Incentiviz • Establish orders • Provide a • Clearly sig

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



Thank you!

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