DER INTEGRATION & COMPENSATION INITIATIVE

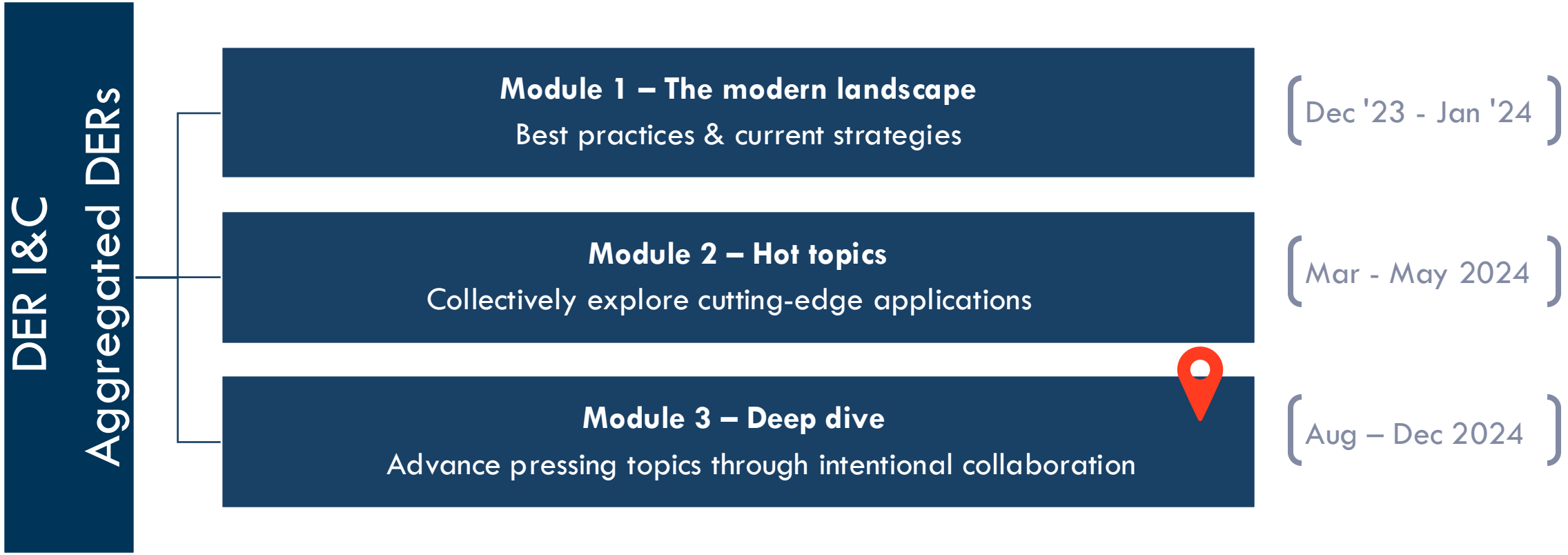
PLANNING FOR A MODERN DISTRIBUTION SYSTEM

WORKSHOP #4

November 20, 2024

Overview of the DER I&C Initiative

The DER I&C Initiative 2023-24 curriculum is designed around three sequential modules



Planning for a Modern Distribution System

Convene and support state members to help build their capacity to effectively plan for and navigate changes across the distribution system.

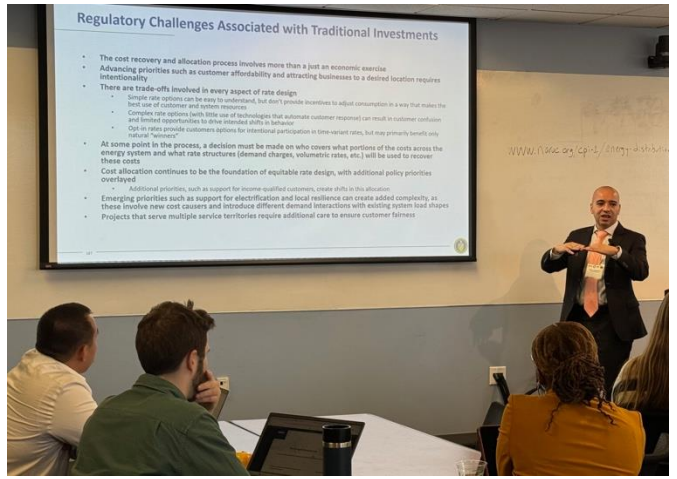
Objectives:

- Inform key state decision makers
- Raise and evaluate risks and opportunities of options
- Bring different perspectives to the table

Workshop Series Arc

In-person training on Integrated Distribution System Planning 2.0: Planning for Electrification and Distributed Energy Resources

- Hosted by NARUC, NASEO and Berkeley Lab, funded by USDOE
  - **Limited travel stipends available.** Reach out before making travel arrangements:
    - Jessica Diaz (jdiaz@naruc.org)
- All new curriculum! Participants will learn:
  - Best practices across the U.S. for planning distribution systems
  - How to incorporate electrification and DERs in local grid planning
  - How to design stakeholder-informed planning processes to achieve state goals
  - Challenges and potential solutions
  - Questions to ask utilities
- Office hours with trainers
- Half-day State Action Planning Workshop facilitated by RMI
  - Apply learning to develop plans for advancing distribution planning in your state
  - Engage in interactive discussions and peer exchange to support implementation



- ***Charlotte, December 11-12* - Register now!***
- ***Detroit, March 11-12 - Register now!***
- ***Salt Lake City, April 23-24 -*** Register soon

**Tour EPRI Power Delivery and Utilization Lab in Charlotte on Dec. 13*

Today's Agenda

Objectives:

- Walk away knowing how distribution plans interface with, and can be leveraged to support, other regulatory processes once they have been developed
- Develop clear next steps or actions that they can take building on the content delivered through the workshop series

Agenda:

Time (ET)	Session
2:00-2:10pm	**Welcome:** Overview of today
2:10-3:10pm	**Panel:** Expert speakers and state practitioners will discuss: 1. Using distribution plans to inform grid modernization investment decisions 2. Coordinating distribution planning with multi-year rate plans 3. Coordinating distribution planning with other planning processes (e.g. IRPs, State Plans) 4. Using distribution plans to inform pricing, program, and procurement design
3:10-3:20pm	**Break**
3:20-3:50pm	**Breakout discussion:** Join a breakout on one of the four topics
3:50-4:25pm	**Putting it all together:** group reflections on the workshop series and next steps
4:25-4:30pm	**Future resources and opportunities**

Working Norms

- **Please participate!**
- **Be present**
- **Respect confidentiality**
  - For breakout sessions we will use the Modified Chatham House Rule: you can say who was there, what was said, but not who said what
- **Consider ex parte**
  - If you are concerned about *ex parte* communications during break-out sessions, you are welcome to switch rooms at your discretion

MINNESOTA
PUBLIC UTILITIES COMMISSION

IDP and Grid Modernization

NARUC-NASEO Cohort on Planning for Modern Distribution System

November 20, 2024

Hanna Terwilliger

Analyst Coordinator – Distribution System Planning

Minnesota Integrated Distribution Plans

IDP Requirements

1. **Every 2 years**
2. **Utilities must hold at least 1 stakeholder meeting prior to filing, covering DER Forecasts, 5-Year Investment Plan and System Capabilities**
3. **Filing Requirements**

A. Baseline Data
   - System
   - Financial
   - DER

B. Hosting Capacity and Interconnection

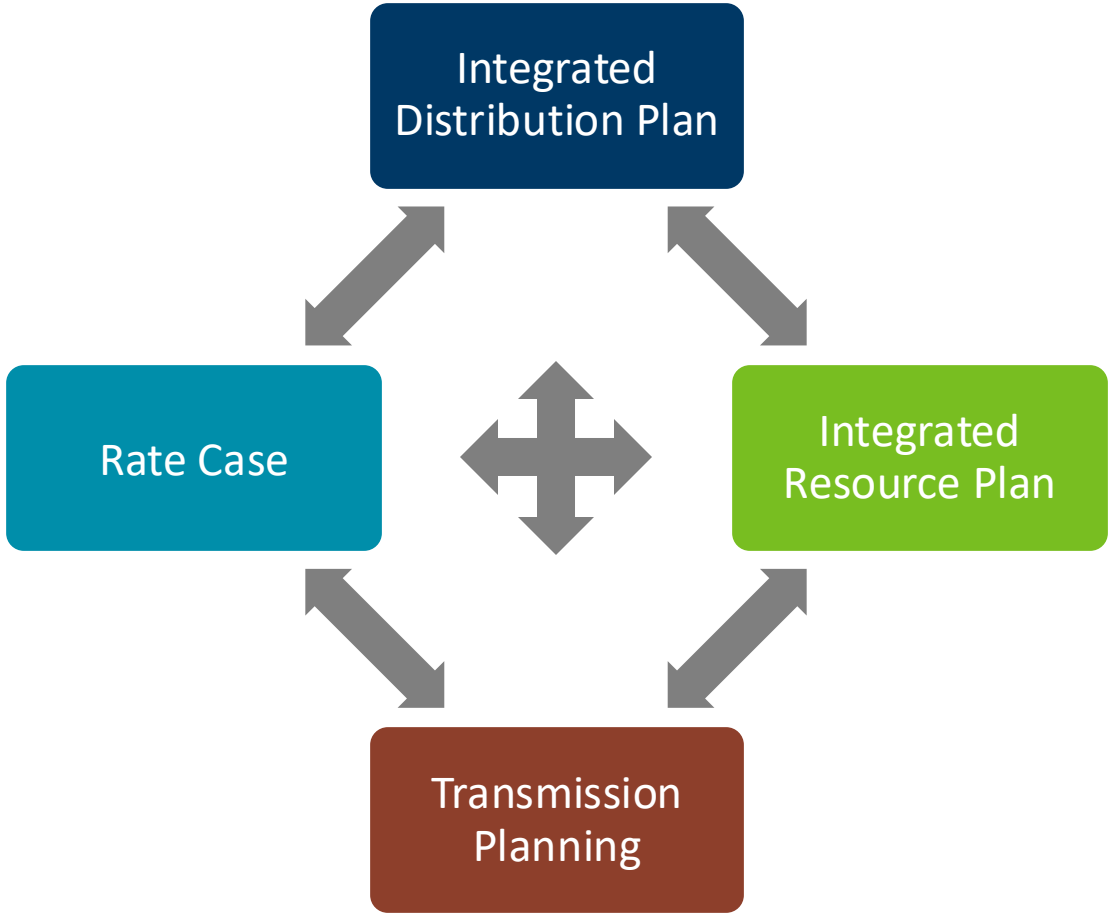
C. DER Futures Analysis (Scenario Planning)

D. Long-Term Distribution System Investment Plan *(5 & 10 year)*

E. Non-Wires Alternatives Analysis

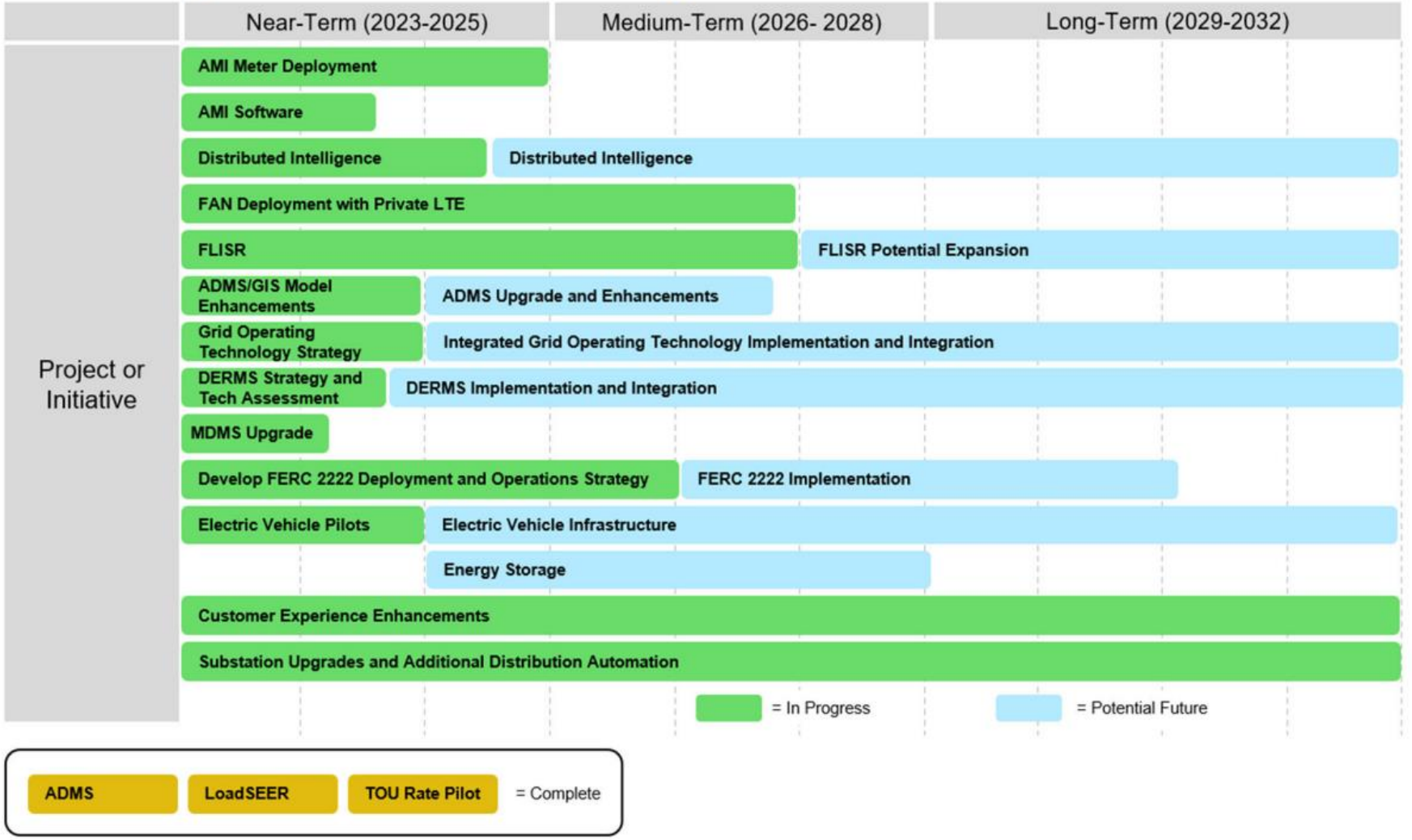
F. Transportation Electrification Plan (IOUs only)

Process Coordination



Grid modernization - Illustrative Plans

Figure C - 1: Illustrative Long-Term Grid Modernization Plan



Evaluating Grid Modernization Initiatives

- Xcel Energy 2023 Integrated Distribution Plan (Docket 23-452)
  - Planned Net Load (PNL)
  - Distributed Energy Resource Management System (DERMS)
  - Flexible Interconnection (FI)
  - Proactive Grid Upgrades for DERs and Electrification

MINNESOTA
PUBLIC UTILITIES COMMISSION

Thank you!

Hanna Terwilliger

Hanna.Terwilliger@state.mn.us

HOW DISTRIBUTION PLANNING CAN TIE TO RATE CASES

Scott A. Struck, Director
Integrated Distribution Planning Division
Public Utilities Bureau
Illinois Commerce Commission
scott.struck@illinois.gov

MULTI-YEAR INTEGRATED DISTRIBUTION PLANS

220 ILCS 5/16-105.17

- Grid Plans are designed to:
  - Align utility investments with Illinois' climate goals
  - Ensure utility expenditures are cost effective
  - Provide delivery rates that are affordable to all customers, including low-income customers
  - Promote energy equity – at least 40% of benefits to disadvantaged communities
  - Ensure opportunities for robust public participation through transparent planning processes
  - Achieve approved performance metrics
- Filed every four years
  - Next Grid Plan due on or before January 20, 2026.
  - Will cover years 2027-2030

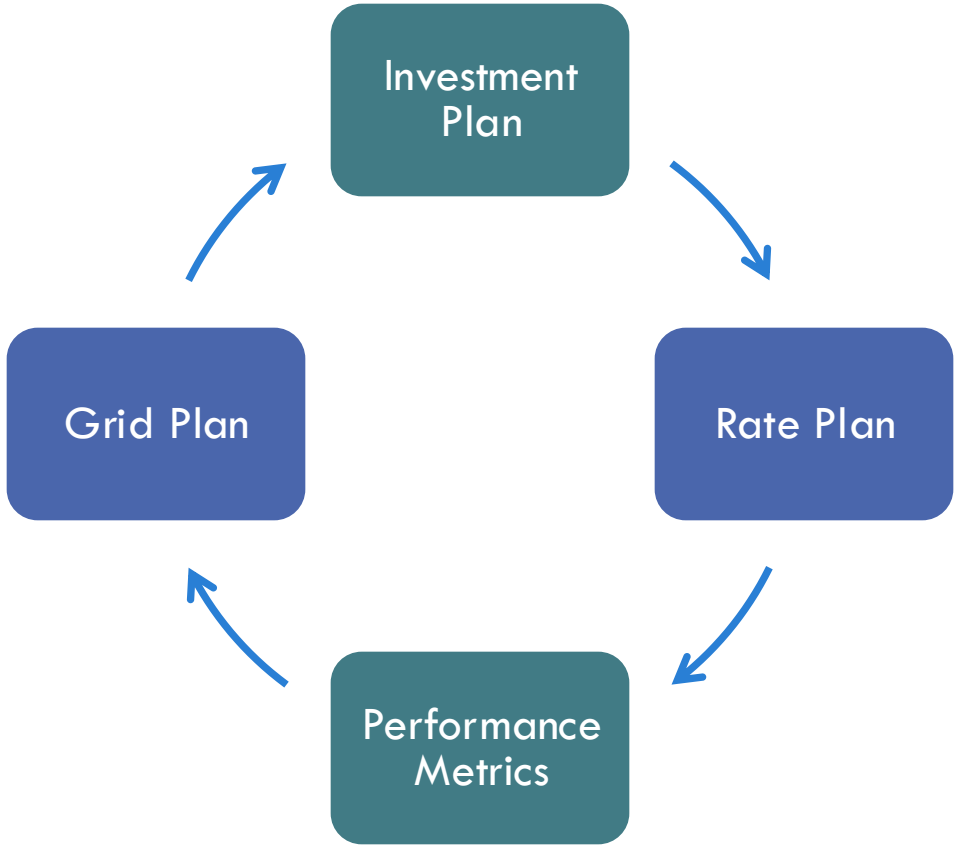
MULTI-YEAR RATE PLANS

220 ILCS 5/16-108.18

- Rate Plans are designed to:
  - Sets revenue requirements for each of the subsequent four years after the end of the current plan
  - Annual reconciliation
    - True up forecast to actual
    - Set reward or penalty for performance
  - Four-year investment plan must be consistent with the corresponding Multi-Year Integrated Distribution Plan
    - "That an investment is different from that described in the Multi-Year Integrated Grid Plan shall not imply the imprudence or unreasonableness of that cost or investment. The sole fact that an investment is the same or similar to that described in the Multi-Year Integrated Grid Plan shall not imply prudence and reasonableness of that investment."
- Filed every four years
  - Next Rate Plan due on or before January 20, 2027
  - Will be effective for 2028-2031

RELATIONSHIP OF RATE PLAN TO GRID PLAN

- Multi-Year Rate Plans
  - Investment plan must be consistent with Multi-Year Integrated Distribution Grid Plan
- Multi-Year Integrated Distribution Plans
  - Designed to achieve Performance Incentive Mechanisms from Multi-Year Rate Plan
- Grid Plans and Rate Plans apply to same period?



Distribution Planning in Hawai‘i’s Integrated Grid Planning

Clarice Schafer, Hawai‘i PUC

November 20, 2024

NARUC-NASEO Distributed Energy Resources Integration and Compensation Initiative

Recent History

- IGP Opening Order – July 2018 Link
  - Despite expected benefits, PUC acknowledged integrating three traditionally separate planning processes would present significant challenges.
  - Conventional distribution planning process had largely been conducted internal to the Companies, outside of commission and public view.
  - Guiding Principles:
    - “Employ enhanced tools for modeling distributed generation to inform both system and distribution-level planning and operations”
    - “Integrating planning processes should allow a variety of distributed and grid-scale resources, potentially resulting in significant customer savings”

Process

- 6 Years (2018-2024)
- 7 Siloed working groups → One stakeholder technical working group
- Independent Technical Advisory Group
- Comprehensive User-Friendly Website
- Iterative modeling process
  - RESOLVE
  - LoadSEER and Synergi
  - PLEXOS
  - PSSE/PSCAD

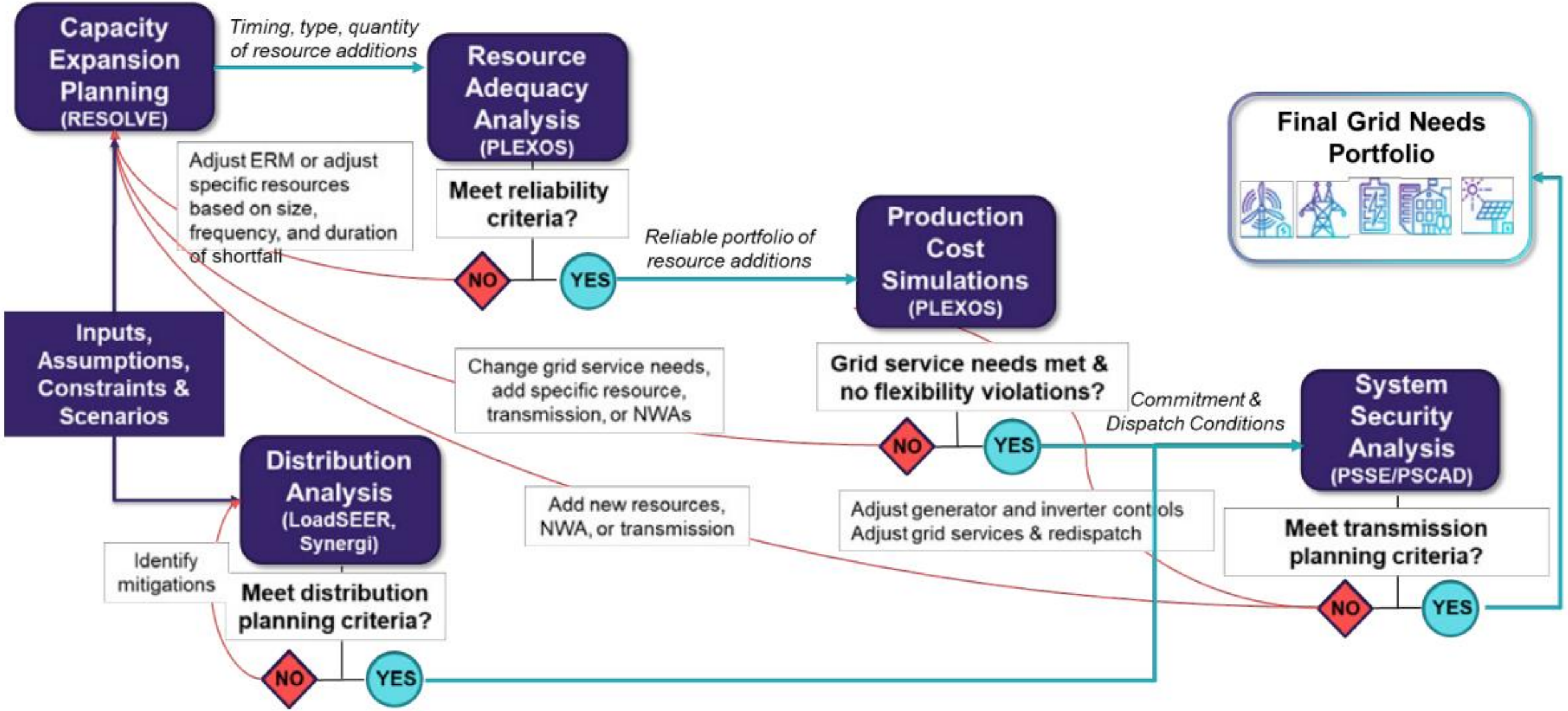


Figure 8-1. Grid needs assessment modeling framework (adapted from HNEI)

Outcomes

- June 2020 Distribution Planning Methodology
- Nov 2021 Grid Needs Assessment & Solution Evaluation Methodology
- Appendix E: Location-Based Distribution Grid Needs

- Incomplete integration of the generation, transmission, and distribution planning processes.
  - Feedback loops exist between the three components of planning, yet the studies and analyses that contribute to each component are largely carried out on their own

- Other areas that would benefit from tighter integration with IGP include grid modernization, grid hardening, & energy efficiency programming.

- Distribution system grid needs (e.g., load-driven and hosting capacity) should play a greater role in informing the development of potential future DER programs and policies.

Links to Resources

- Relevant PUC Orders
  - Accepting 2023 Final IGP Report & Providing Guidance – March 2024
  - Providing Direction & Guidance on the Next Round of IGP – Sept 2024
  - Approving with Modifications HECO's Grid Needs Assessment – June 2022
- HECO Planning Documents
  - July 2024 Action Plan
  - Nov 2023 Supplemental Response
  - May 2023 IGP
    - Appendix E: Location-Based Distribution Grid Needs
  - Nov 2021 Grid Needs Assessment & Solution Evaluation Methodology
  - June 2020 Distribution Planning Methodology
- HECO IGP Website

Mahalo

Clarice Schafer, Supervising Utility Analyst
Hawaii Public Utilities Commission
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808-586-3754

Additional Resources from HECO's May 2023 IGP

Appendix E: Location-Based Distribution Grid Needs

1. **Forecast Stage**: Develop circuit-level forecasts based on the corporate demand forecast.
2. **Analysis Stage**: Determine the adequacy of the distribution system.
3. **Solution Options Stage**: Identify the grid needs requirements.
4. **Evaluation Stage**: Evaluation of solutions.

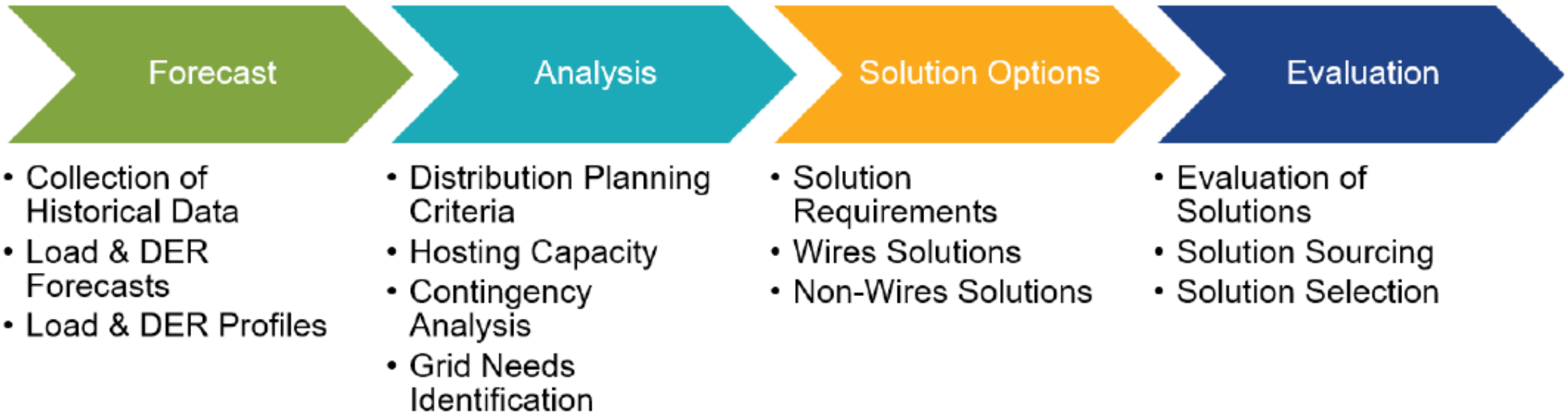


Figure 1-1: Stages of the Distribution Planning Process

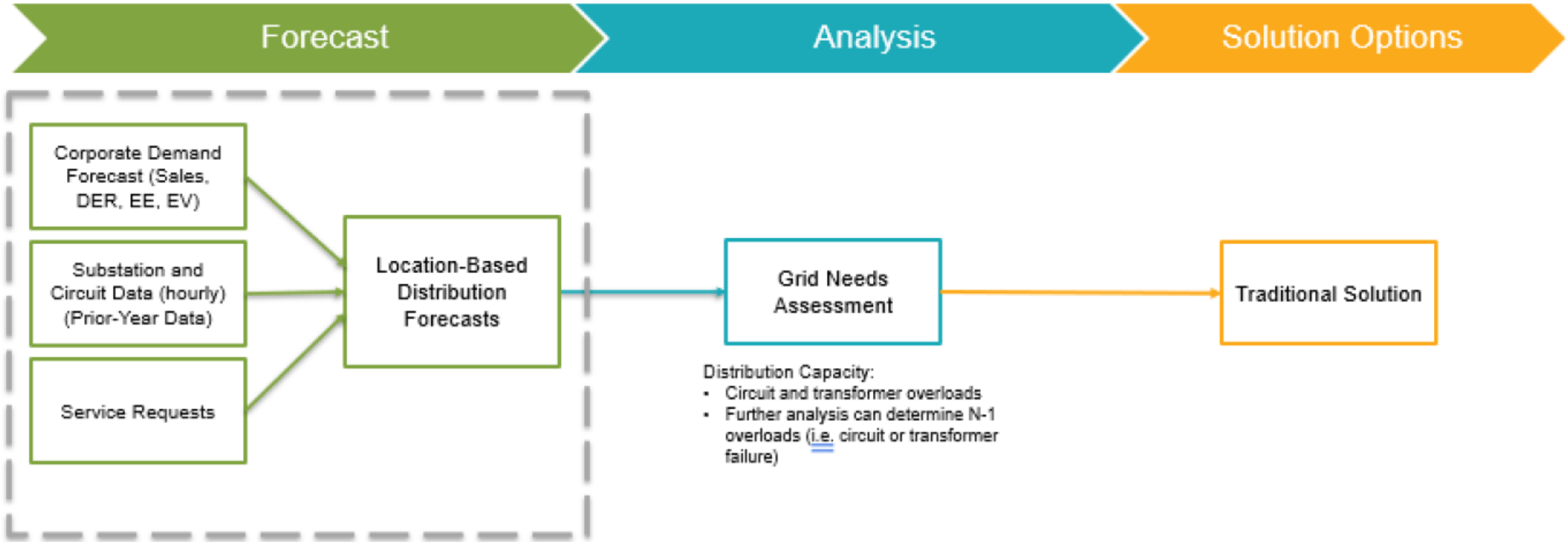


Figure 1-2 Location-Based Distribution Grid Needs Identification Stages

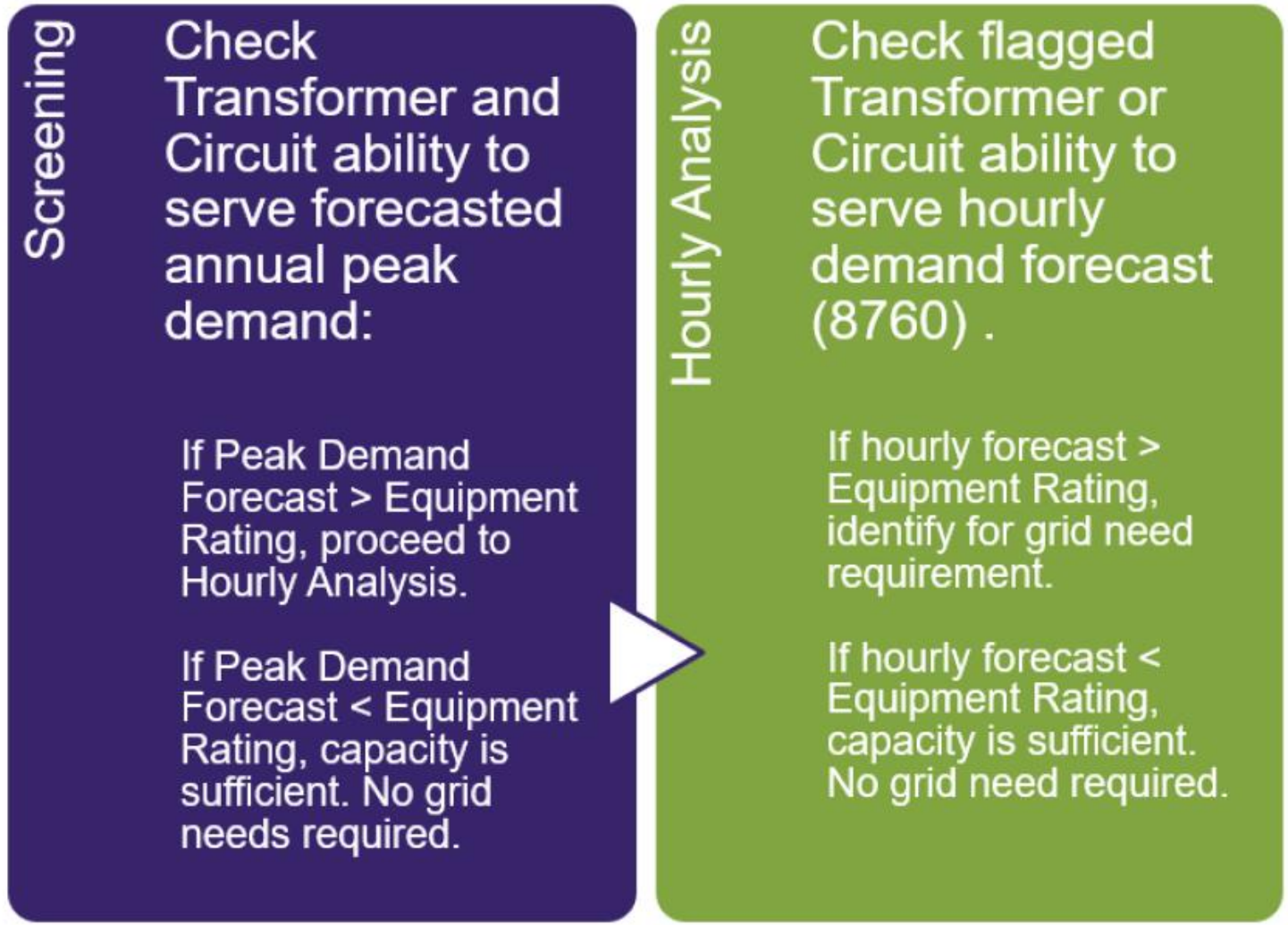


Figure 2-2: Summary of Screening and Hourly Analysis Process

Table 3-1: Grid Needs Assessment Summary

Island	Total Substation Transformers	Total Circuits	Total (Tsf and Ckt)	Total Grid Needs			
				Scenario 1 (Base)	Scenario 2 (High Load)	Scenario 3 (Low Load)	Scenario 4 (Fast Adoption)
O'ahu	204	393	597	22	42	19	29
Hawai'i Island	82	148	230	3	3	3	4
Maui Island	62	93	155	1	1	1	1
Lana'i	1	3	4	-	-	-	-
Moloka'i	2	8	10	-	-	-	-
Total (All Islands)	351	645	996	26	46	23	34

Table 3-18: Minimum Grid Needs Solutions Identified

Island	Scenario 1 (Base)	Scenario 2 (High Load)	Scenario 3 (Low Load)	Scenario 4 (Fast Adoption)
O'ahu	12	25	10	14
Hawai'i Island	3	3	3	4
Maui	1	1	1	1
Lāna'i	-	-	-	-
Moloka'i	-	-	-	-
Total	16	29	14	19

The total cost of distribution upgrades needed for the minimum wires solutions is summarized below.[24]

Table 3-19: Minimum Grid Needs Solutions Identified – Cost Summary (Wires Solutions)

Island	Scenario 1 (Base)	Scenario 2 (High Load)	Scenario 3 (Low Load)	Scenario 4 (Fast Adoption)
O'ahu	$47,173,000	$67,576,000	$48,201,000	$56,103,000
Hawai'i Island	$2,680,000	$2,680,000	$2,680,000	$3,153,000
Maui	$63,000	$63,000	$63,000	$63,000
Lāna'i	-	-	-	-
Moloka'i	-	-	-	-
Total	$49,916,000	$70,319,000	$50,944,000	$59,319,000

Hawai‘i Island

Project	Substation Transformer	Circuit	Operating Date	Traditional Solution	Cost Estimate (Nominal $)
Halaula – Recircuiting	HALAULA	HALAULA 2	2023	New switch and recircuiting	$65,000
Honomu – Voltage Conversion	HONOMU	HONOMU 1	2023	Voltage conversion and tie	$999,000
Ookala – Voltage Conversion	OOKALA	OOKALA 11	2023	Voltage conversion and tie	$1,616,000
Total					$2,680,000

Figure 8: Future Hosting Capacity Enhancements

	Current HECO HC analysis	Future HECO HC analysis
Model Unique DER Programs (Non-Export & Smart Export)	x	✓
Advanced Inverter (VV/VW)	x	✓
Time Series (576/8760)	x	✓
Probabilistic model	x	✓
Add PV in realistic installation sizes	x	✓
Add PV in locations that make sense	x	✓

2020 Distribution Planning Methodology

U.S. DEPARTMENT OF ENERGY
Office of Electricity

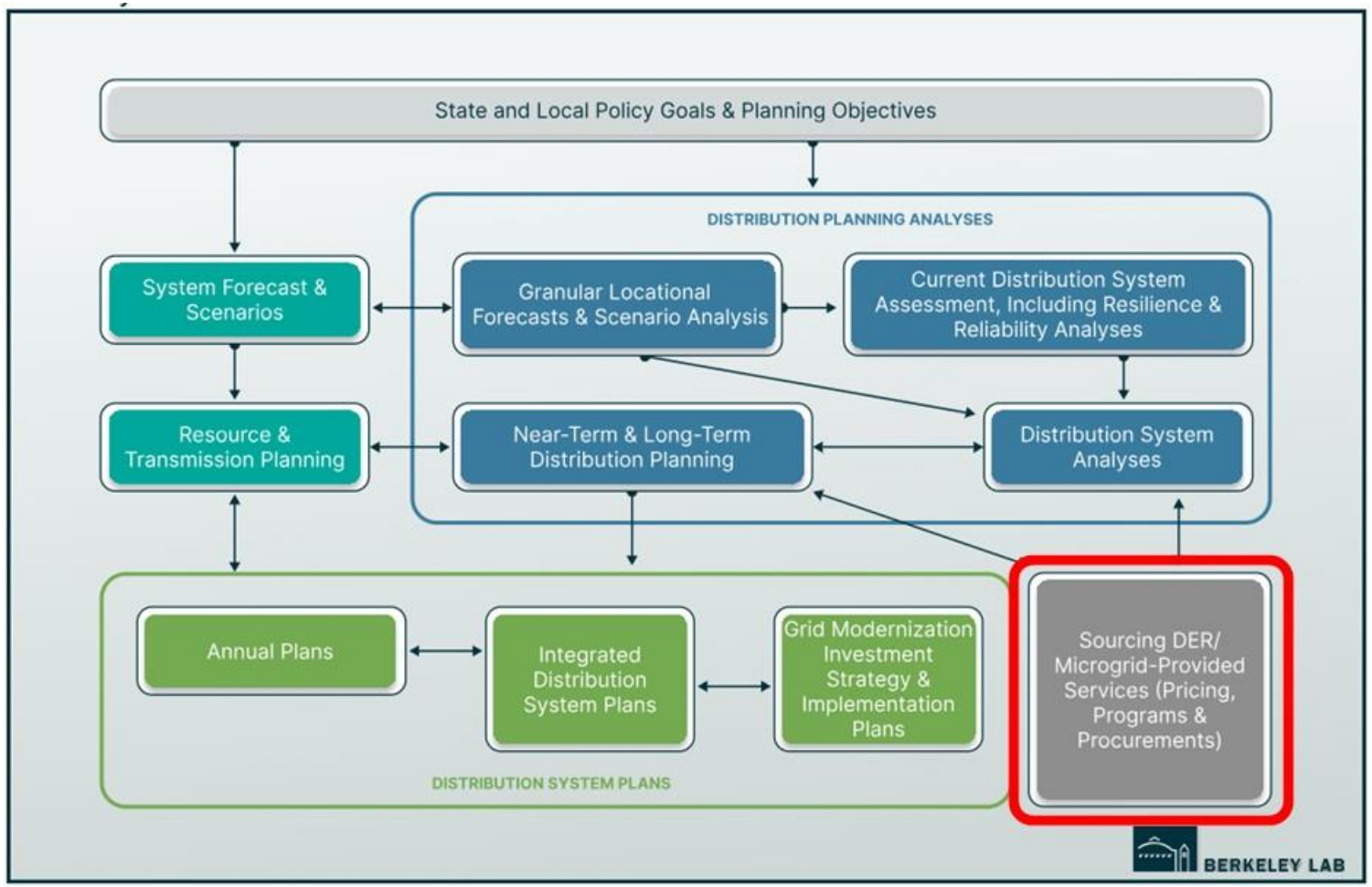
IDSP Sourced DER Grid Services

Paul De Martini
Newport Consulting

Presented to NARUC-NASEO Cohort on Planning for a Modern Distribution System **November 20, 2024**

IDSP Informs DER Pricing, Programs, and Procurement

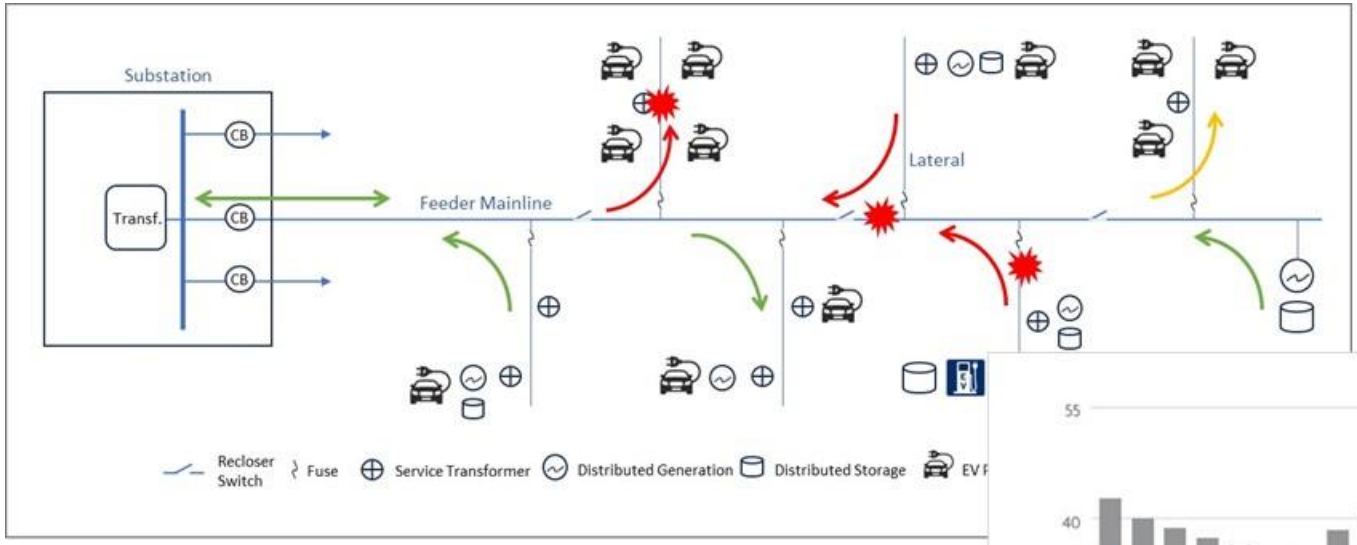
The “Sourcing Services” section of the interactive IDSP framework provides information on geotargeting programs and non-wires alternatives procurements.



https://emp.lbl.gov/projects/integrated-distribution-system-planning

IDSP Identifies Grid Needs, Sourcing Requirements & Evaluation

IDSP is the process that determines distribution grid needs that provide the solution requirements for DER services and evaluates the cost-effectiveness of the various alternatives. Managing the energy exports and load at the source via a combination of rates and geo-targeted programs overlaid with procurements can provide cost-effective mitigation.



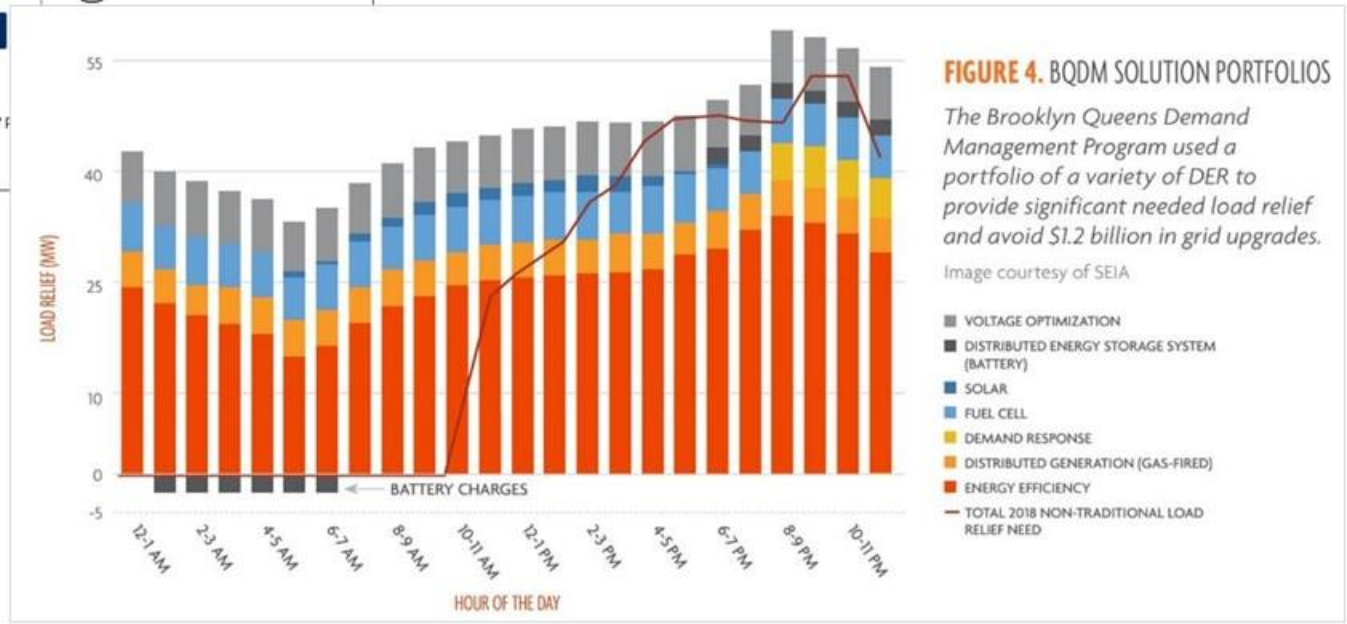


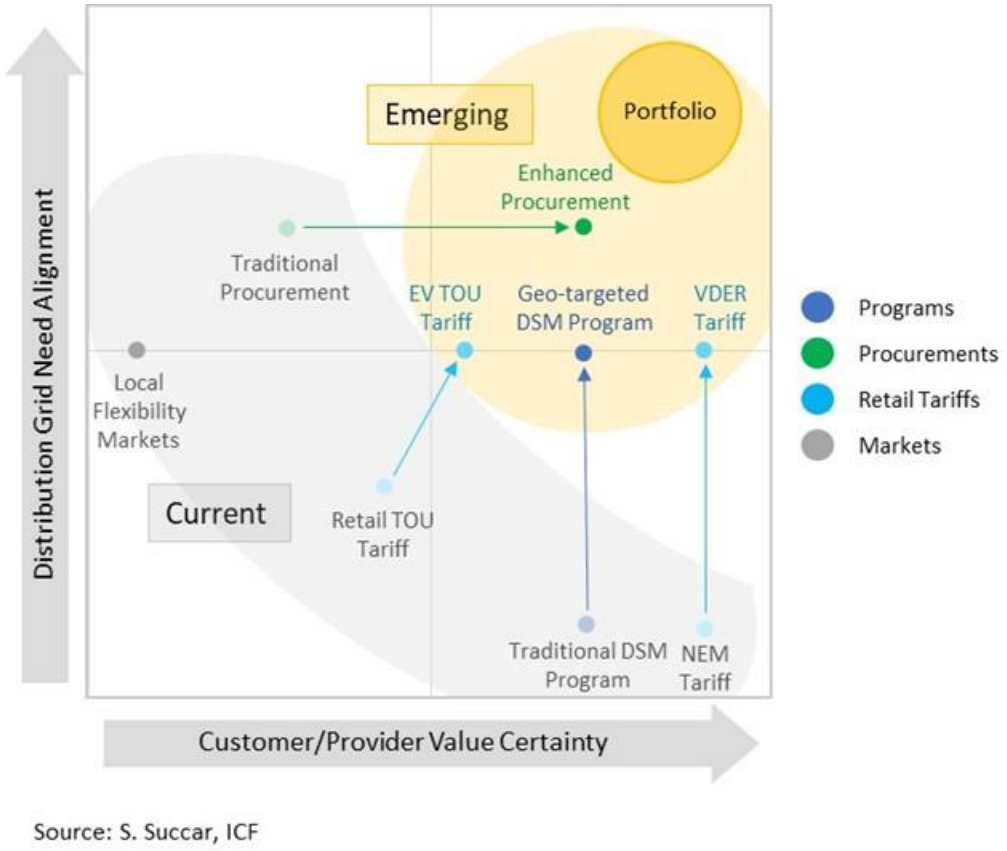
FIGURE 4. BQDM SOLUTION PORTFOLIOS

The Brooklyn Queens Demand Management Program used a portfolio of a variety of DER to provide significant needed load relief and avoid $1.2 billion in grid upgrades.

Image courtesy of SEIA

Distribution Grid Needs Require a Portfolio Approach

No one sourcing method can fully address distribution grid needs cost-effectively. Rates, programs, and procurements each have different ratepayer cost implications. However, enhancements to the 3Ps are required to address distribution needs.



Source: S. Succar, ICF

Sourcing Method	Incremental Ratepayer Cost
Tariffs/Price Signal (VDER, TOU, CPP)	Relatively low cost for billing changes and customer communications
DSM/Demand Flexibility Programs (Geo-targeted and temporal)[61]	None, if the existing authorized program funding is redirected to geo-targeted /temporal needs
Procurement/Bi-lateral Contract	Cost is based on competitive proposals but typically capped at the deferred/avoided distribution value.
Local Flexibility Market	Market implementation cost + cost of purchased flexibility service at market prices

P. De Martini and S. Succar, *Distribution Grid Services Evolution*, DOE, final draft under review (December 2024)

See: DOE Distribution Grid Transformation Program – Distributed Resource Utilization Project Library

Break
See you at the :27!

Breakouts

Self-Select Breakouts:

- Select a breakout room where you would like to discuss the topic in further detail with our expert and state practitioner speakers:

Breakout Room #	Topic	Speakers in the Room
1	**Using distribution plans to inform grid modernization investment decisions**	Hanna Terwilliger, Minnesota PUC
2	**Coordinating distribution planning with multi-year rate plans**	Scott Struck, Illinois Commerce Commission
3	**Coordinating distribution planning with other planning processes**	Clarice Schafer, Hawaii PUC
4	**Using distribution plans to inform pricing, program, and procurement design**	Paul De Martini, Newport Consulting

Housekeeping:

- Please help balance participant numbers in rooms.
- If you have **ex parte communication processes in place** between workshop participants, please use your discretion and hop out of a room to join another.

What our workshop series has covered

	Workshop #1 – Getting Started	Workshop #2 – Tools and Analysis (Part 1)	Workshop #3 – Tools and Analysis (Part 2)	Workshop #4 – Integrating distribution plans
When	**August**	**September**	**October**	**November**
Objectives	• Refine key challenges with understanding distribution system needs and develop concrete distribution planning goals. • Build capacity to translate state-specific policy objectives into distribution-system planning guidance.	• Expand understanding of the distribution forecasting process and how to interface with a utility's forecast. • Walk away with at least one actionable guideline or piece of feedback you can provide on a distribution forecast.	• Understand how to assess utility decisions, or proposed decisions, in IDSP processes using tools and analyses. • Walk away with at least one tool or analysis they can utilize to meet their state's policy objectives.	• Walk away knowing how distribution plans interface with other regulatory processes. • Develop clear next steps or actions building on the content delivered through the workshop series.

Reflection

Take 4 minutes to journal on your own:

- *What was one problem you were experiencing with advancing Dx planning in your state when you first started this workshop series?*
- *What is one concrete action you're most excited to take to address the problem you stated above?*
- *What new resources do you have available?*
- *Who from this workshop series would you like to speak to again?*

Trio Share out

We will now separate you into groups of three. As you discuss, please be sure to give each other time to share their actions and reflections.

- *Please share what your action is*
- *Please share what resources you plan to use. Is there anyone from this series you would like to follow up with?*

Plenary Share Out & Some Polls (Menti)

Or go to: https://www.menti.com

And enter code: 1715 5712

What's Ahead

In-Person Trainings

Regional Trainings for States on Integrated Distribution System Planning 2.0: Planning for Electrification and Distributed Energy Resources

- December 11-12, 2024 - Charlotte, NC
  - Optional site visit to EPRI's Charlotte Laboratory on the morning of Dec 13
  - **Please Register by This Friday!**
- March 11-12, 2025 – Detroit, MI
  - **Register here**
- April 23-24, 2025 – Salt Lake City, UT
  - Registration forthcoming

Final Report Out

Final workshop report out will be shared in the next few weeks

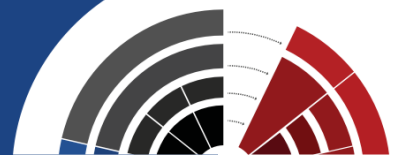
- Recap of Workshop 4
- Additional resources for IDSP
- Future cohort communications
- **Resource Library**

Keeping In Touch

- Thank you for providing feedback on your preferred communication methods.
- We will be reaching out with future ways to keep in touch with this cohort.
- If you *do not* want to be included in future cohort communications please email Stephanie.







NARUC
National Association of Regulatory Utility Commissioners

NASEO
National Association of State Energy Officials

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

Recruiting state members now!
Expressions of interest due January 15, 2025

www.naruc.org/core-sectors/electricity-energy/comprehensive-electricity-planning1/

What to Expect

- Support for states in better understanding **forecasting, modeling, planning techniques**, and both **demand- and supply-side options** for meeting projected load growth.
- Educational, creative, and collaborative process to develop multiple approaches for **aligning distribution, resource, and transmission planning** to respond to new loads.
- **Two in-person workshops; virtual peer sharing and expert learning** sessions in 2025-2026.
- **Support for select modeling runs** to improve understanding.
- **Updated roadmaps and resources** for comprehensive electricity planning and modeling.
- **Input from stakeholders and regulated entities**.

TENTATIVE TIMELINE:

NOV 2024-JAN 2025:
NARUC and NASEO invite members to submit expressions of interest in participating.

FEB 2025:
NARUC and NASEO announce full roster of Initiative members.

SPRING 2025:
First in person workshop.

FALL 2025:
Share updated roadmaps and resources on comprehensive energy planning.

WINTER 2025-26:
Second in person workshop on modeling.

SPRING 2026:
Release comprehensive planning approaches and modeling, including templates and state examples.

www.naruc.org/core-sectors/electricity-energy/comprehensive-electricity-planning1/

Thank you for joining today!

Upcoming members-only NARUC-NASEO Events:

- **Deep Dive Technical Assistance Opportunity for State Energy Offices and Public Utility Commissions**
  - **Friday, November 22 | 3:00-4:00 pm ET: National Lab Technical Assistance webinar and information session:** https://lbnl.zoom.us/webinar/register/WN_hIrEdLxcRMSnYPrvbPo3fg#/registration
  - Recording of November 14, 2024 webinar (focused on State Energy Offices)

CONTACT US

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www.naruc.org/core-sectors/energy-resources-and-the-environment/der-integration-compensation/