



# Non-Wires Alternatives for Distribution Systems: Introduction and State Practices

Guillermo Pereira, Ph.D.

IEEE PES Energy and Policy Forum

March 23, 2026

*This work was funded by the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.*

# Agenda

- Background
  - *What are non-wires alternatives (NWAs)?*
  - *Why are NWAs important?*
  - *Roles and responsibilities*
- NWA process
  - *What are the key steps to implement NWAs?*
- State practices
  - *Jurisdictions requiring NWA analysis in distribution system planning*
  - *Characteristics of legislative and regulatory requirements*
- Case studies
  - *Examples of evolving state requirements in regulatory proceedings*
- Best practices
- LBNL resources



# BACKGROUND

# What Are Non-Wires Alternatives?

- Also called non-wires solutions (NWS), non-wires alternatives (NWAs) are **technologies (e.g., grid-edge resources—GERs) or operating practices that reduce grid congestion and manage peak demand to offset the need to make additional utility investments** in conventional assets like substations and feeders
- Examples of technology and operating practices include batteries, gas generators, microgrids, time-varying rates, geotargeted load management programs, and dynamic phase balancing
- Utilities leverage data from the **grid needs assessment** in their distribution plan to identify infrastructure projects that are **candidates for potential NWAs**
- NWAs can be implemented through utility procurements (solicitations/request for proposals), pricing mechanisms (time-varying pricing), and geotargeting programs

# Why Are NWAs Important?

## Affordability



NWAs reduce costs if they defer or mitigate infrastructure upgrades

## Reliability



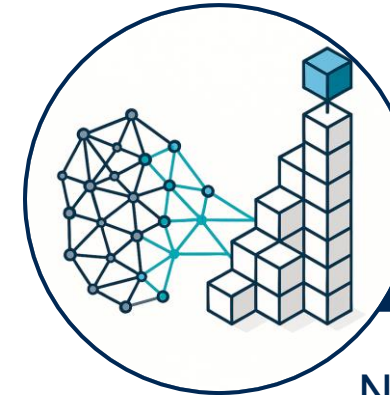
NWA may ease system constraints, reducing reliability risks

## Flexibility



NWAs expand the menu of options available to solve grid needs

## Scalability



NWAs can be expanded incrementally, as grid needs evolve

# Roles and Responsibilities (1)

## Public Utility Commissions

- Establish guidance for regulated utilities on NWA analysis and implementation
- Establish cost recovery mechanisms
- Review proposed NWAs in utility filings

## Utilities

- Establish NWA screening criteria, evaluation standards, and implementation processes
- Conduct solicitations for grid needs suitable for NWAs
- Potentially own and operate NWAs, if permitted by state
- Review NWA operational performance against contract requirements

## State Energy Offices

- Conduct studies on NWA potential, barriers, and opportunities
- Participate in or facilitate stakeholder meetings to address NWA issues
- Participate in regulatory commission proceedings, including technical meetings, to ensure NWA processes and procured solutions align with and support state policies and programs

Source: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)

# Roles and Responsibilities (2)

## Consumer Advocates

- Participate in stakeholder meetings to address NWA issues
- Participate in regulatory proceedings, including technical meetings, and provide recommendations for improvement and feedback
- Advocate for opportunities for consumers to participate in and be fairly compensated for the NWA value provided by GERs

## Developers

- Participate in stakeholder meetings to address NWA issues
- Participate in regulatory proceedings to support the development of NWA requirements and processes
- Participate in utility solicitations for NWAs
- May own and operate NWAs

## Other Stakeholders

- Ensure that NWA processes and procured solutions align with economic development and other interests

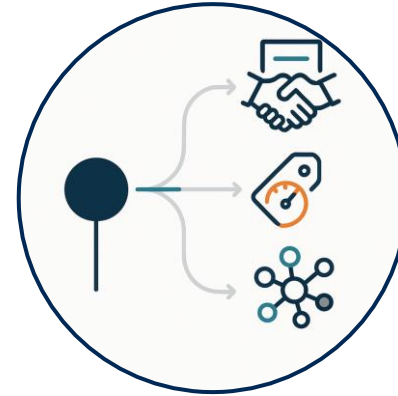
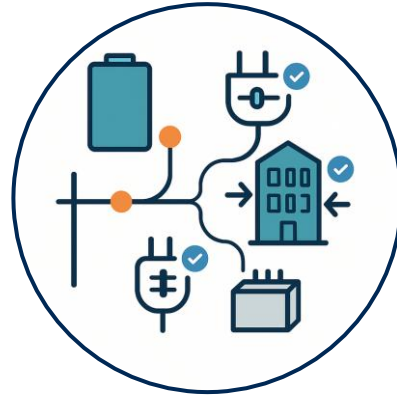
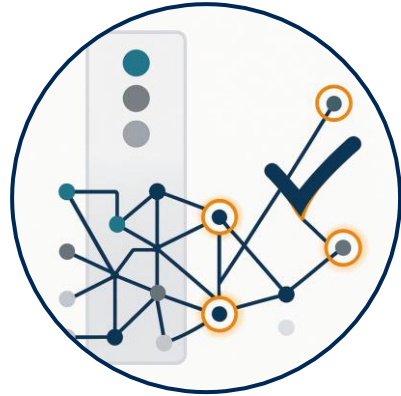
Source: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)



# NWA PROCESS

# NWA Process

The following process outlines the key steps within distribution system planning that inform NWAs decision making



Step 1

Step 2

Step 3

Step 4

Step 5

Conduct grid needs assessment

Apply suitability criteria to near-term grid needs to identify NWA opportunities

Identify eligible GERS

Select implementation pathway(s) (procurements, pricing, programs)

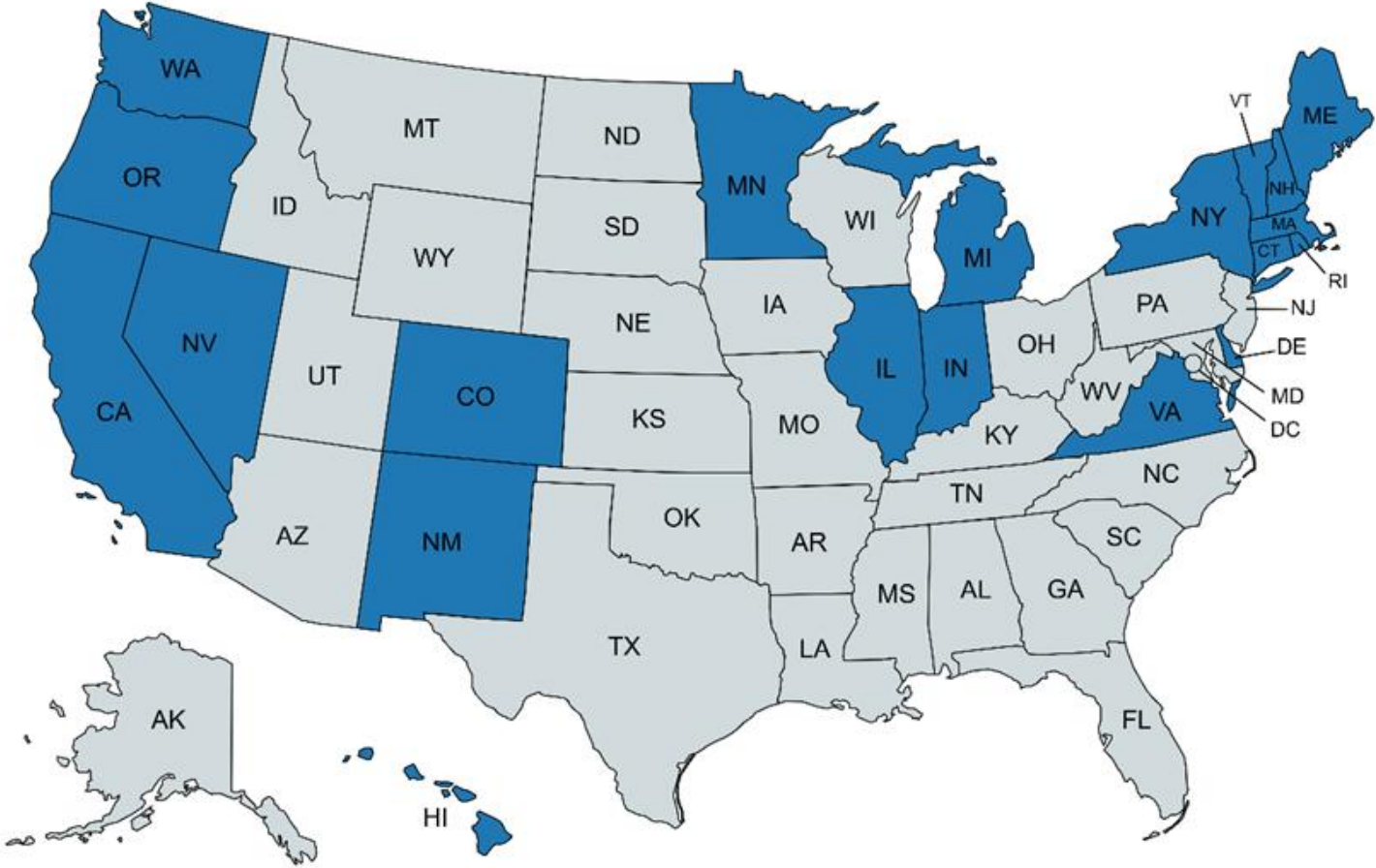
Operate and monitor performance

Sources: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)  
Schwartz et al., 2024, [State Requirements for Electric Distribution System Planning](#)



# STATE PRACTICES

# Jurisdictions Currently Requiring NWA Analysis in Distribution Planning



Source: Schwartz et al., 2025, [State Distribution Planning Requirements](#)

# Characteristics of State Requirements

Resource Eligibility



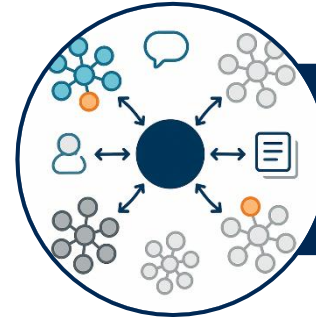
Implementation Pathway



Screening Criteria



Stakeholder Engagement



Cost-effectiveness



Oversight



# Characteristics of State Requirements



Legislative and regulatory requirements can identify the GERs eligible to be included in NWA solutions

## Resource Eligibility

Eligible GERs generally include demand response, distributed generation (e.g., diesel, gas, and solar), and energy storage

Some states include energy efficiency or electric vehicles as eligible resources

Source: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)

# Characteristics of State Requirements



## Resource Eligibility

### Colorado

*“NWAs can include one or multiple DER, including but not limited to demand response measures, energy efficiency, energy storage, and distributed generation. NWA projects can include these and other investments individually or in combination to meet the specified need.”*

Source: CO PUC, [Proceeding No. 20R-0516E, Decision No. C21-0665](#)

# Characteristics of State Requirements



## Resource Eligibility

### Connecticut

*“The Authority does not place limitations on eligible technology types for NWS projects. Premature limitations may inhibit innovation by EDCs [electric distribution companies] and third-party bidders and development of new options in the marketplace.”*

Source: CT PURA, [Docket No. 17-12-03RE07](#), Decision November 9, 2022

# Characteristics of State Requirements



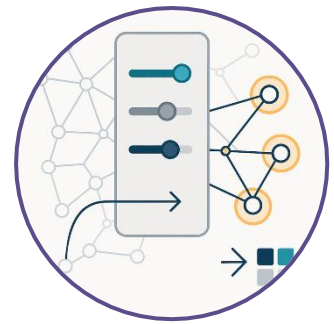
## Resource Eligibility

### Pennsylvania

*“[...] the Commission recognizes that electricity storage assets can be used by EDCs [electric distribution companies] to maintain or to increase the reliability or the resilience of the electric distribution system on a temporary basis or permanent basis. The Commission encourages the consideration of such assets when [cost effective and proper] reasonable and prudent, specifically as an alternative [non-wires solution] NWS. The Commission encourages EDCs to consider electricity-storage assets as part of their system planning.”*

Source: PA PUC, [Proceeding No. M-2020-3022877, Order April 4, 2024](#)

# Characteristics of State Requirements



State requirements can specify criteria for identifying which grid needs the utility must review for potential NWAs

## Screening Criteria

### Project Type

States can identify the types of grid needs suitable for NWA, which may include thermal load or capacity issues, and voltage constraints

### Timing of Grid Need

States can establish a required minimum lead time for the grid need

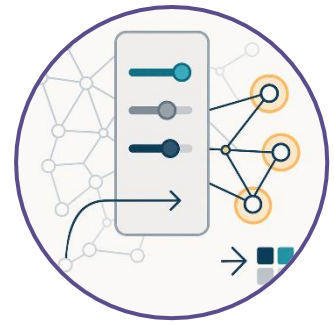
### Traditional Solution Cost

States can specify a project cost threshold for considering NWAs.

For example, a traditional investment must cost more than a certain amount to justify the resources needed to consider NWAs.

Source: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)

# Characteristics of State Requirements



## Delaware

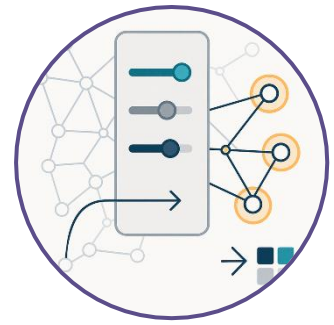
### Screening Criteria

### Project Type

*“Non-wires alternatives in whole, or in part, shall be considered as solutions to capacity and/or major asset condition related system performance issues.”*

Source: DE PSC, [Docket No. 18-0935, Order No. 9541](#)

# Characteristics of State Requirements



## Screening Criteria

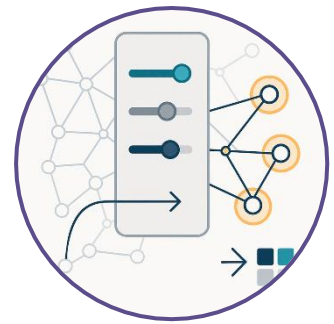
### Timing of Grid Need

## Connecticut

*Projects where grid service is needed within the calendar year are characterized as “unlikely.”*

Source: CT PURA, [Docket No. 17-12-03RE07, Decision November 9, 2022](#)

# Characteristics of State Requirements



## Screening Criteria

### Traditional Solution Cost

## Minnesota

*“Xcel shall provide a detailed discussion of all distribution system projects in the filing year and the subsequent 5 years that are anticipated to have a total cost of greater than two million dollars. For any forthcoming project or project in the filing year, which cost two million dollars or more, provide an analysis on how non-wires alternatives compare in terms of viability, price, and long-term value.”*

Source: MN PUC, [Docket No. E-002/M-23-452, Order September 16, 2024](#)

# Characteristics of State Requirements



NWAs must be cost-effective.

Legislative and regulatory requirements can specify cost-effectiveness assessments and required processes, including the development of a cost-effectiveness handbook with guidance on the inputs for the analysis

## Cost-Effectiveness

Value streams included in the cost-effectiveness evaluation vary

Commonly included benefits include avoided energy costs and avoided generation, transmission, and distribution capacity costs

Source: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)

# Characteristics of State Requirements



## Cost-Effectiveness

### New York

*Utilities are required to file Distributed System Implementation Plans that include a benefit-cost analysis (BCA), including a publicly accessible version of the most recent BCA handbook and calculations of analysis input parameters.*

Source: NY DPS, [Case 14-M-0101, Proposed Commission Guidance for the Electric Utilities' 2023 DSIP Update Filings](#)

# Characteristics of State Requirements



## Cost-Effectiveness

### Illinois

*Plans must include “an identification of potential cost-effective solutions from nontraditional and third-party owned investments that can meet anticipated grid needs, including but not limited to distributed energy resource procurements, tariffs or contracts, programmatic solutions, rate design options, technologies or programs that facilitate load flexibility, nonwires alternatives and other solutions intended to meet the objectives stated [...]”*

Source: IL ICC, [Docket 22-0486, Order July 21, 2022](#)

# Characteristics of State Requirements



## Implementation Pathway

Legislative and regulatory requirements can define the implementation pathway for viable NWA solutions, including procurements (e.g., competitive solicitations), utility pricing and programs.

Source: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)

# Characteristics of State Requirements



## Colorado

### Implementation Pathway

*“For all major distribution grid projects identified as meeting all the NWA suitability screening, the utility shall conduct a technology-neutral competitive solicitation for NWAs to defer, reduce, or avoid the costs of the major distribution grid projects.”*

Source: CO PUC, [Proceeding No. 20R-0516E, Decision No. C21-0665](#)

# Characteristics of State Requirements



## Maine

*“ [T]he nonwires alternative must be prudently procured in accordance with this section.*

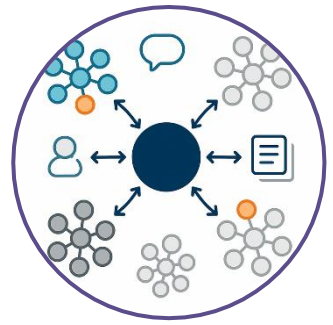
*1. Behind the meter alternatives. [T]he investor-owned transmission and distribution utility shall contract with the Efficiency Maine Trust to deliver the nonwires alternative through the trust's programs.*

*2. Grid-side alternatives. [T]he commission shall determine an entity, which may include but is not limited to the investor-owned transmission and distribution utility or a 3rd party, to deliver the nonwires alternative and shall make orders as necessary.”*

Source: ME MRS, [Title 35-A, Part 3, Chapter 31, Subchapter 2, 3132-D](#)

## Implementation Pathway

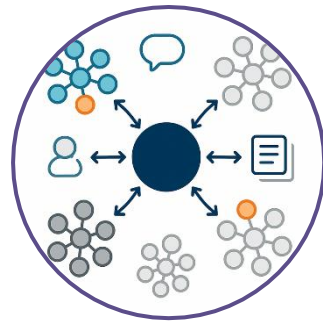
# Characteristics of State Requirements



## Stakeholder Engagement

Legislative and regulatory requirements can establish stakeholder engagement processes to inform NWA planning

# Characteristics of State Requirements



## Oregon

### Stakeholder Engagement

*“i) Proactively engage stakeholders regarding possible non-wire solutions or larger projects in impacted communities. Engagement of the local community may include in-person meetings located in the community; presentation of the project scope, timeline, rationale; discussion of proposed utility projects and the value and risks associated with options; and solicitation of public comment, particularly to understand community needs and opportunities.*

*[...]*

*iii) Consider engagement of local governments and Tribal nations for input on possible non-wire solutions, larger projects, as well as on other policies intersecting distribution system planning.”*

Source: OR PUC, [Docket UM 2005, Order No. 24-421](#)

# Characteristics of State Requirements



## Oversight

Legislative and regulatory requirements can establish certain NWA implementation oversight characteristics, such as the requirement to select an independent monitor to facilitate the NWA process or to submit updated information to facilitate the commission's analysis of NWA implementation progress.

# Characteristics of State Requirements



## Oversight

### Connecticut

*“[...] the Non-Wires Solutions Process Monitor (PURA Process Monitor) will be selected and hired as a consultant and extension of staff for the Authority, independent of the EDCs and other stakeholders. The PURA Process Monitor will serve several roles, and will be required to have relevant administrative, economic, and engineering expertise.”*

Source: CT PURA, [Docket No. 17-12-03RE07, Decision November 9, 2022](#)



# CASE STUDIES

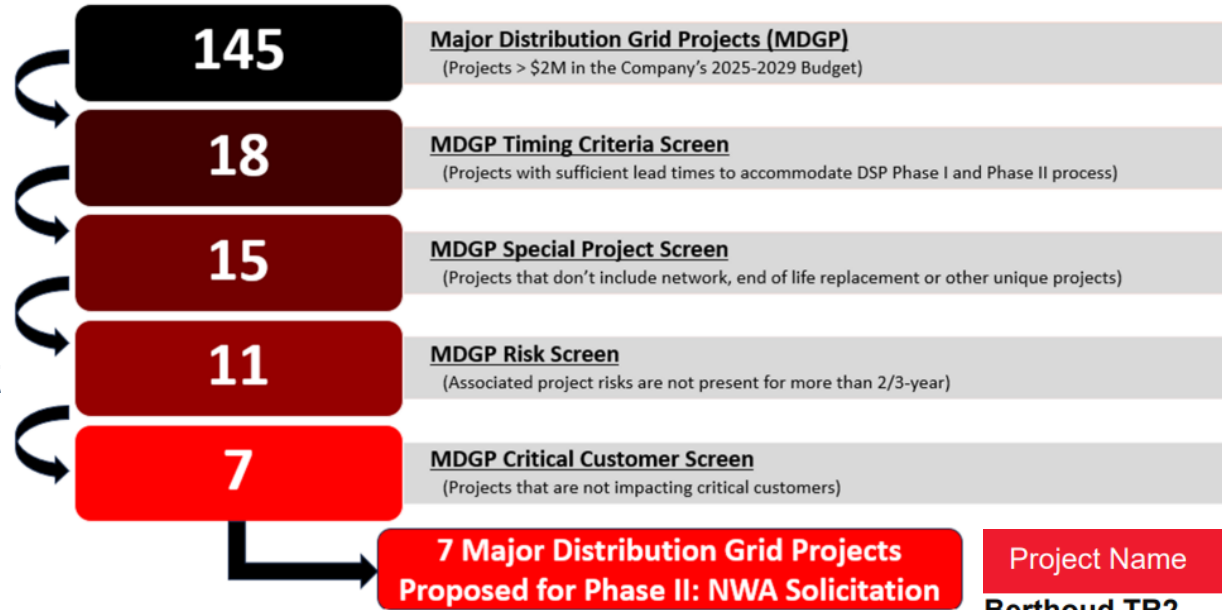
# Case Studies

- State requirements can evolve in regulatory proceedings, shaped by commission staff and stakeholder analysis and recommendations, and commission orders
- The following examples illustrate NWA utility proposals, intervenor positions, and commission orders
- Information included in the slides is illustrative; for the full content, consult cited sources

# Colorado – Public Service Company of Colorado (PSCO) (1)

## PSCO 2024 Distribution System Plan Filing

PSCO identified 145 projects that meet or exceed the \$2 million threshold to be considered Major Distribution Grid Projects



After applying the additional criteria (timing, special project, risk, and critical customer), the utility proposed seven grid needs for solicitation

Project Name	Project Type	Planning Division
Berthoud TR2	New Bank	Northern
COBB1397 Feeder	Feeder	Northern
Dakota TR3	New Bank	Denver Metro
Daniels Park TR1	New Bank	Southeast Metro
GREE1043 Feeder	Feeder	Southeast Metro
RUSS2578 Feeder	Feeder	North Metro
West TR3	New Bank	Southwest Metro

Source: PSCO, 2024, [Distribution System Plan](#)

# Colorado – *Public Service Company of Colorado (PSCO)* (2)

## Summary of Various Intervenor Positions

- Emphasized limited use of granular data and non-generating NWAs (e.g., targeted demand response, energy efficiency, or energy storage) for the downtown Denver system, where GER export is prohibited
- Discussed short turnaround between RFP issuance and response date
- Called for clearer cost-benefit analysis
- Critiqued the screening process that excludes 90% of projects from consideration

Sources: PSCO et al., 2024, [Proceeding No. 24A-0547E, NWA/TDA Settlement Agreement](#)  
CO PUC, [Proceeding No. 24A-0547E, Decision No. C25-0903](#)

# Colorado – *Public Service Company of Colorado (PSCO)* (3)

## Proceeding Outcome

PSCO and a majority of intervenors filed a settlement agreement:

- Parties agreed to pursue five of the seven proposed projects, “provided that these projects have not been materially altered by the time the Commission issues a final decision”
- RFPs for the five NWAs will be released on a staggered schedule, and bidders can address multiple NWAs in a single proposal
- Modification to future NWA processes
  - Rolling solicitations
  - Timing screens will be broadened by ~1 year to allow for more NWA opportunities to be considered
  - NWA RFPs will be allowed to consider specific technologies

Sources: PSCO et al., 2024, [Proceeding No. 24A-0547E, NWA/TDA Settlement Agreement](#)  
CO PUC, [Proceeding No. 24A-0547E, Decision No. C25-0903](#)

# Colorado – *Public Service Company of Colorado (PSCO)* (4)

## Proceeding Outcome (continued)

### Commission order

- Finds that the settlement agreement is likely to address many of the shortcomings identified by the parties
  - Is also likely to result in a greater number of viable NWA proposals
- Supports the consideration of non-generating NWAs for the downtown Denver network

Sources: PSCO et al., 2024, [Proceeding No. 24A-0547E, NWA/TDA Settlement Agreement](#)  
CO PUC, [Proceeding No. 24A-0547E, Decision No. C25-0903](#)

# Illinois – Commonwealth Edison (1)

## ComEd 2024 Multi-Year Integrated Grid Plan

Based on its NWA framework, ComEd identified six projects that meet the screening criteria for further analysis (e.g., operational integration, economic feasibility)

Three of these projects did not pass cost-effectiveness tests, and three were waiting for analysis

Source: ComEd, 2024, [Multi-Year Integrated Grid Plan](#)

Project Name	Project Description	Project Driver	Benefit Cost Analysis Ratios	Comments
Chicago Business District (Randolph)	ComEd analysis indicates that load growth for the Chicago Business District (CBD) will exceed the networks' eight substation capacity by 2033, largely driven by New Business Loads & feeders that are being retired.	Capacity Relief and obsolescence support	PCT: 1.04 UCT: 0.45 RIM: 0.44 TRC: 0.44	Of all scenarios that were analyzed, none of them resulted in a TRC ratio greater than or near 1. As such, none of the NWA scenarios were deemed cost-effective.
Chicago Business District (Randolph)	ComEd analysis indicates that new business load growth for the Chicago Business District (CBD) will exceed the networks' eight substation capacity by 2033, largely driven by New Business Loads & feeders that are being retired.	Capacity Relief and obsolescence support	PCT: 1.04 UCT: 0.45 RIM: 0.44 TRC: 0.44	Of all scenarios that were analyzed, none of them resulted in a TRC ratio greater than or near 1. As such, none of the NWA scenarios were deemed cost-effective.
Wilmington	ComEd analysis indicates that new load growth in the area will exceed the capacity at existing substations	Capacity Relief	To Be Determined	Data is being prepared for NWA Analysis
Keslinger	ComEd analysis indicates that new load growth in the area will exceed the capacity at existing substations	Capacity Relief and required feeder terminal connections for growth	To Be Determined	Data is being prepared for NWA Analysis
Rockwell (West Side)	ComEd analysis indicates that new load growth in the area will exceed the capacity at existing substations	Capacity Relief and required feeder terminal connections for growth	To Be Determined	Data is being prepared for NWA Analysis

# Illinois – *Commonwealth Edison* (2)

## Intervenor Positions

### Constellation

- NWAs are too narrowly defined, resulting in no projects being selected
- Excessive lead time and investment threshold (3 years and \$3 million)
- An independent NWA monitor would improve process fairness and impartiality, frequency of RFPs, and selection of approved projects

### Joint NGOs

- Recommends more urgency to screen and procure NWAs

### Commission staff

- Stakeholder workshops will provide an opportunity to address improvements to the framework

Source: IL ICC, 2024, [Docket 22-0486, Order December 19, 2024](#)

# Illinois – *Commonwealth Edison* (3)

## Proceeding Outcome

### Commission order

- Commission did not adopt specific recommendations in this docket and indicated that these would be better addressed through a follow-on proceeding
- Commission agreed that ComEd's process is too restrictive, given its failure to identify any NWA, and directed that these concerns should be addressed in the follow-on proceeding
- Commission agreed that ComEd seems to lack urgency in the review and incorporation of NWAs

Source: IL ICC, 2024, [Docket 22-0486, Order December 19, 2024](#)

# Illinois – Commonwealth Edison (4)

## Follow-on proceeding

Commission initiated stakeholder workshops on Solution Soliciting Opportunities

The workshops will inform development of rules to comply with the statutory requirement:

*“(K) Identification of potential cost-effective solutions from nontraditional and third-party owned investments that could meet anticipated grid needs, including, but not limited to, distributed energy resources procurements, tariffs or contracts, programmatic solutions, rate design options, technologies or programs that facilitate load flexibility, **non-wired alternatives**, and other solutions that are intended to meet the objectives described at subsection (d). [...] The Commission shall establish rules determining data or methods for Solution Sourcing Opportunities.” [emphasis added]*

Source: IL ICC, 2025, [Solution Sourcing Opportunities Workshops](#)

# Illinois – Commonwealth Edison (5)

## Follow-on proceeding (continued)

Kick-off meeting in December 2025; table shows remaining schedule

- Established the scope of the workshops, including addressing NWA issues identified in ComEd’s plan
- NWA scope includes:
  - Defining grid need
  - Screening and evaluation
  - Timing, oversight, and data
  - Cost recovery
  - Ownership models
  - Procurement and competitive access
  - Integration with grid planning

## Timeline

- Proposed rule to be filed mid-2027
- Final rules for 2030 grid plan cycle filed in 2028

Date	Time	Workshop Topic
12/10/2025	1pm-2:30pm	Kickoff Meeting
2/24/2026	12:30pm-3pm	Integration with Grid Planning
3/26/2026	9am-12pm	NWA Process and Evaluation
4/23/2026	9am-12pm	NWA Process and Evaluation
5/26/2026	9am-12pm	Cost Recovery and Ownership
6/23/2026	9am-12pm	Procurement and Market Access
7/21/2026	9am-12pm	Follow-up on open issues
9/22/2026	9am-12pm	Strawman Proposal
11/10/2026	9am-12pm	Review of Comments

Sources: IL ICC, 2025, [Solution Sourcing Opportunities Workshops](#)  
IL ICC, 2025, [Solution Sourcing Opportunities Kick-Off Meeting](#)



# BEST PRACTICES

# Best Practices (1)

## Requiring an NWA analysis to be included in the plan

- Assessing NWAs enables the utility to identify opportunities to implement technologies or operating practices to meet specific grid needs and offset more expensive utility investments, delivering affordability and reliability benefits

## Define clear screening criteria

- Reduces resources needed to conduct the analysis and facilitates identification of viable NWA opportunities

## Establish a cost-effectiveness evaluation framework

- Identifying the types of benefits and costs, and valuation methods, can improve transparency and alignment with state goals

Sources: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)  
Schwartz et al., 2024, [State Requirements for Electric Distribution System Planning](#)

# Best Practices (2)

## Implement robust stakeholder engagement processes

- Facilitates identification of potential solutions and improves alignment between utility and stakeholder priorities

## Improve NWA implementation processes

- Assessing challenges and lessons learned from implementation pathways (procurements, pricing, and programs) can inform future process improvements (e.g., using standard procurement terms and conditions, refining suitability criteria)

Sources: Schwartz et al., 2024, [Interactive Decision Framework for Integrated Distribution System Planning](#)  
Schwartz et al., 2024, [State Requirements for Electric Distribution System Planning](#)



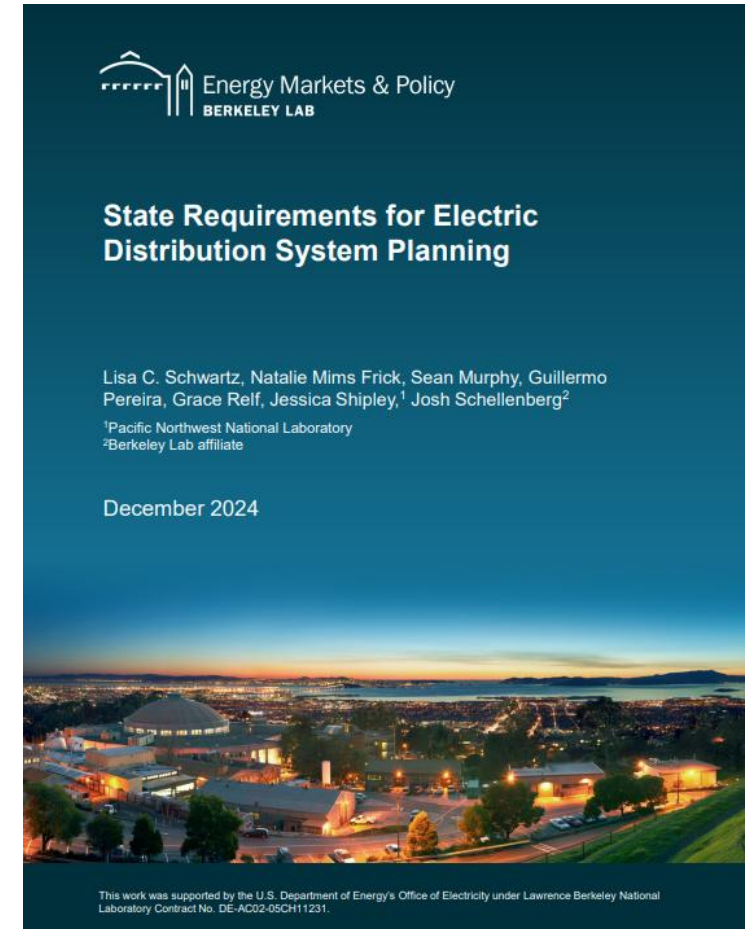
# LBLN RESOURCES

# State Distribution Planning Requirements Report

- State goals and objectives
- Procedural requirements
- Stakeholder engagement
- Forecasting loads and GERs
- Hosting capacity analysis
- Baseline information requirements
- Grid modernization strategy
- Grid needs assessment
- **Non-wires solutions**
- Reliability and resilience analyses
- Pilots
- Coordination with other planning processes

Reviews state requirements and utility approaches and offers best practices

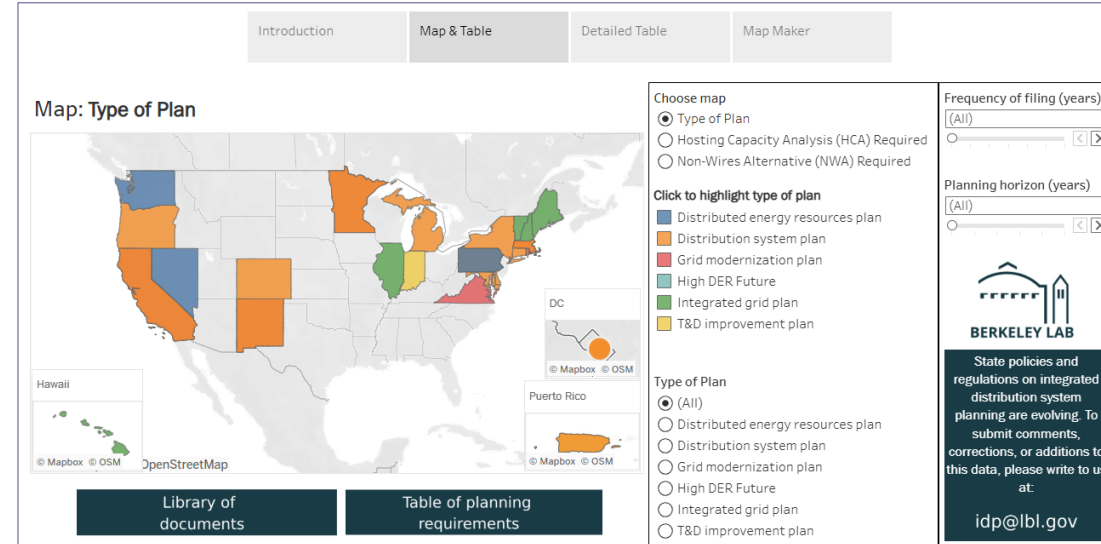
Includes links to legislation; regulatory requirements, proceedings, and orders; and filed utility plans



<https://emp.lbl.gov/publications/state-requirements-electric>

# State Distribution Planning Requirements: Data Visualization & Online Catalog

- Dataviz, online catalog, individual state summaries, and document library provide information on legislative and regulatory requirements for electric companies to file some type of distribution system plan in 22 states, Puerto Rico, and DC
  - Will be updated this spring
- Data visualization provides **an interactive interface** to identify state-by-state requirements for:
  - Types of distribution plans filed
  - Filing frequency/planning horizon
  - **Non-wires alternatives**/hosting capacity analyses
- Detailed information by state:
  - Legislative and regulatory requirements, proceedings, and orders
  - Filed utility plans and type of regulatory action taken
  - State planning goals and objectives
  - Term of action plan
  - Stakeholder engagement

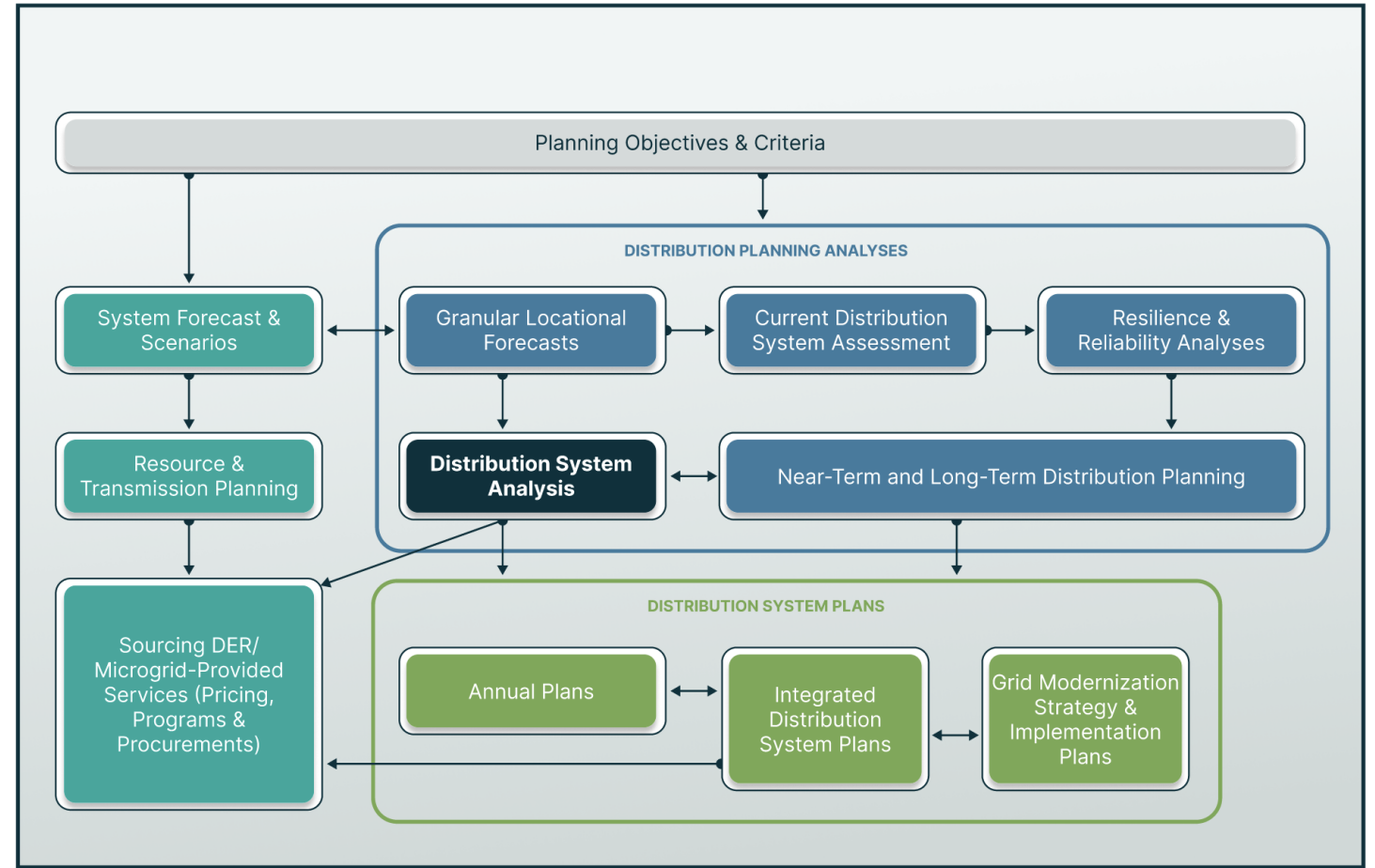


<https://emp.lbl.gov/state-distribution-planning-requirements>

# Interactive IDSP Framework (1)

## Topics included

- Hosting Capacity Analysis
- Value of GERS
- Interconnection
- Forecasting Loads and GERS/EVs
- Distribution Investment Strategy
- Functional Requirements Analysis
- **NWA Procurements**
- **Geotargeting Programs**
- Stakeholder Engagement
- Multi-Objective Decision-making
- Cost-Effectiveness Framework for Investments
- Threat-Based Risk Assessment
- Worst-Performing Feeder Analysis
- Asset Management Strategy
- Coordinated Planning
- Scenario Analysis



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

# Interactive IDSP Framework (2)

What's included for each topic?

- Overview
  - What is it?
  - Why is it important?
  - Key questions (Q&A)
- Roles and Responsibilities
- Best Practices
- State Practices
- Utility Practices
- Flow Chart (e.g., inputs/outputs)
- Tools
- Annotated Resources List

**Sourcing DER/Microgrid Services (Pricing, Programs & Procurements)**

Non-Wires Alternatives  
Geotargeted Programs  
Grid Codes  
Standard Services Agreements  
Distribution-Level Markets

**INTRODUCTION >**  
**PROCUREMENTS FOR NON-WIRES > ALTERNATIVES**  
**GEOTARGETED PROGRAMS >**

OVERVIEW	ROLES & RESPONSIBILITIES	BEST PRACTICES	STATE PRACTICES	UTILITY PRACTICES	FLOW CHART	TOOLS	RESOURCES
----------	--------------------------	----------------	-----------------	-------------------	------------	-------	-----------

**OVERVIEW**

**What are procurements for non-wires alternatives?**

Non-wires alternatives (NWAs), also called non-wires solutions, are distributed energy resources (DERs) such as energy storage, energy efficiency, and demand flexibility that provide grid services at specific locations to defer or mitigate traditional utility infrastructure investments such as feeder and substation upgrades. NWAs may provide load relief, reduce power interruptions, address voltage issues, improve resilience, and meet local energy needs.

NWA procurement follows the utility's grid needs assessment to determine the location and timing of constraints on the distribution system. Procurement typically is through a competitive solicitation, such as a request for proposals (RFP) or auction for third party solutions. Some states allow utilities to own NWAs, such as batteries.



## Contacts

Guillermo Pereira: GPereira@lbl.gov

## For more information

**Download** publications: <https://emp.lbl.gov/publications>

**Sign up** for our email list: <https://emp.lbl.gov/mailling-list>

**Follow** us on social media: @BerkeleyLabEMP and @BerkeleyLabEMP.bsky.social

## Acknowledgements

This work was funded by the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.

The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof, or The Regents of the University of California.



## Disclaimer

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor The Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or The Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof, or The Regents of the University of California.

Ernest Orlando Lawrence Berkeley National Laboratory is an equal opportunity employer.

## Copyright Notice

This manuscript has been authored by an author at Lawrence Berkeley National Laboratory under Contract No. DE-AC02-05CH11231 with the U.S. Department of Energy. The U.S. Government retains, and the publisher, by accepting the article for publication, acknowledges, that the U.S. Government retains a non-exclusive, paid-up, irrevocable, worldwide license to publish or reproduce the published form of this manuscript, or allow others to do so, for U.S. Government purposes