

Distribution planning regulatory practices

Lisa Schwartz (Berkeley Lab) and Juliet Homer (Pacific Northwest National Laboratory) — Contributions by Alan Cooke (PNNL)

**Integrated Distribution System Planning Training
for MISO/Midwest Region
October 13-15, 2020**

In this presentation

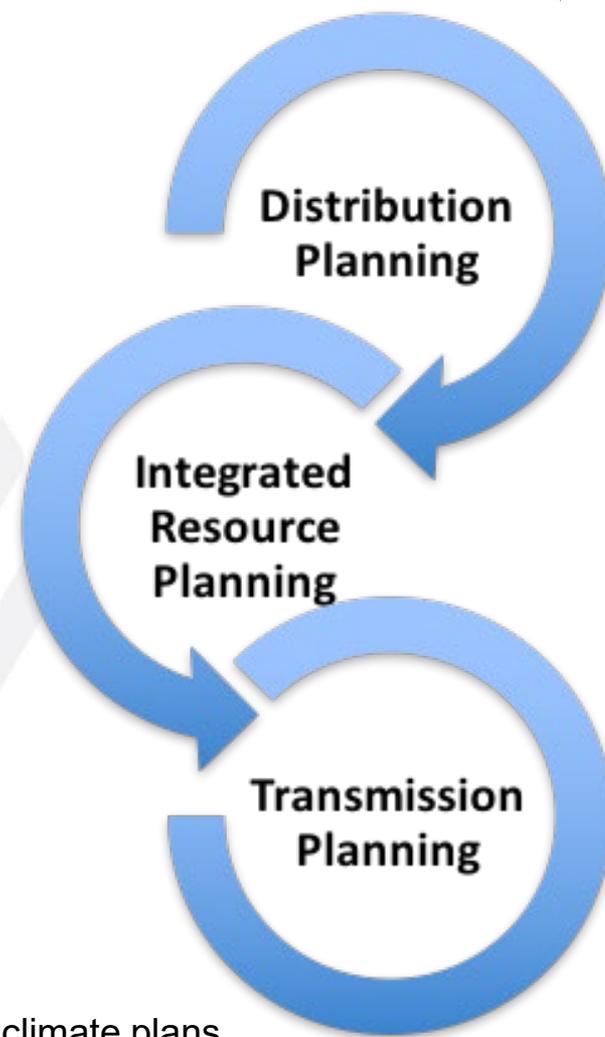
- ▶ Electricity planning activities and drivers
- ▶ State objectives, requirements and filing elements
- ▶ Selected regulatory issues
 - Non-wires alternatives (NWA) procurement strategies
 - Hosting capacity analysis
 - Data-related requirements
 - Stakeholder engagement
 - Getting started with an integrated distribution planning proceeding
 - Emerging issues
- ▶ Resources for more information
- ▶ Extra slides: State-specific approaches



Electricity planning activities and drivers

Electricity planning activities

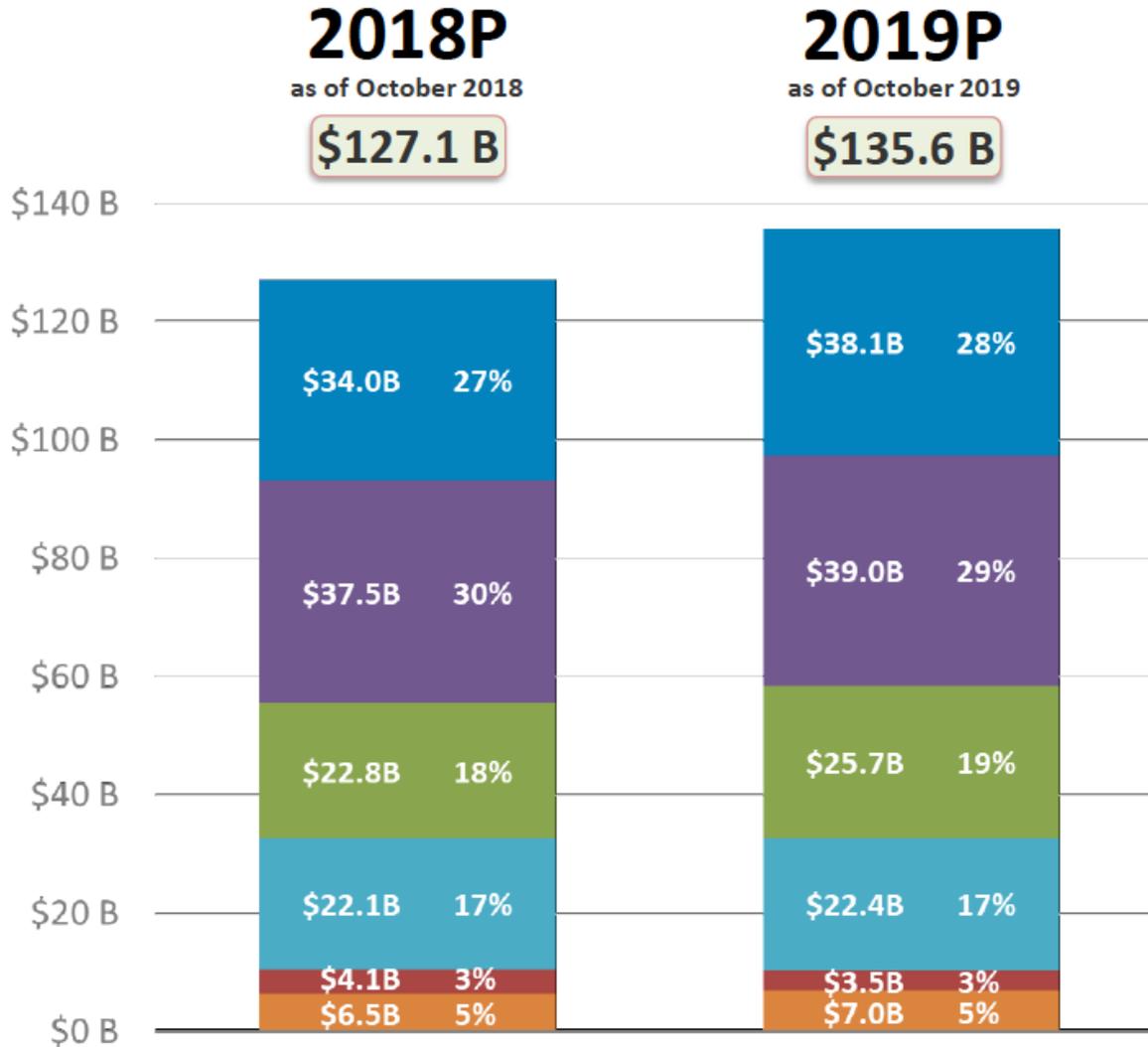
- ▶ **Distribution planning - Assess needed physical and operational changes to local grid**
 - Annual distribution planning process
 - Identify and define distribution system needs
 - Identify and assess possible solutions
 - Select projects to meet system needs
 - Long-term utility capital plan
 - Includes solutions and cost estimates, typically over a 5- to 10-year period, updated every 1 to 3 years
- ▶ **Integrated resource planning (IRP)* - Identify future investments to meet bulk power system reliability and public policy objectives at a reasonable cost**
 - Consider scenarios for loads and distributed resources; impacts on need for, and timing of, utility investments
- ▶ **Transmission planning – Identify future transmission expansion needs and options**



Also: energy efficiency, demand-side management, electrification and climate plans

**For states with vertically integrated utilities*

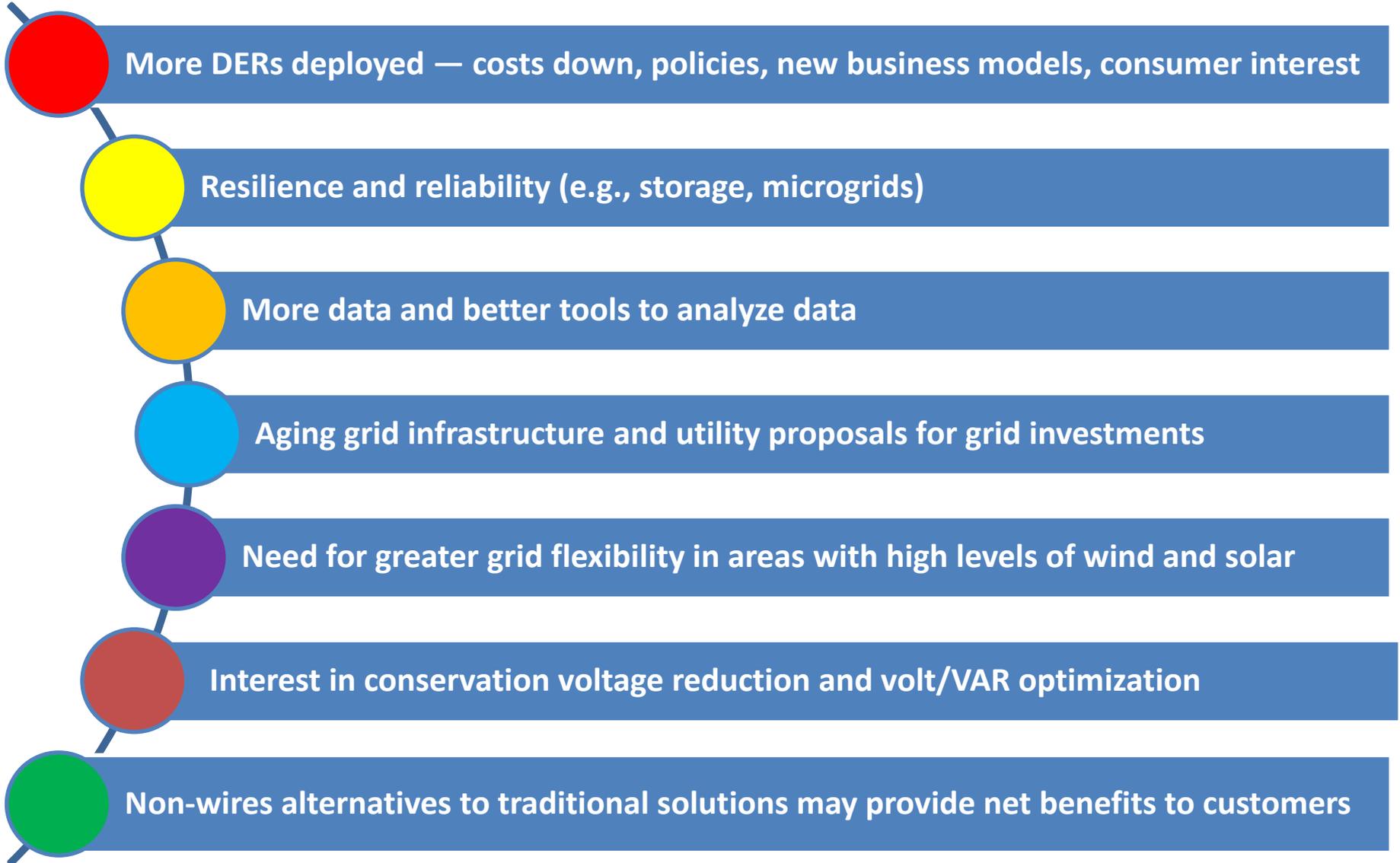
One reason states are increasingly interested in distribution planning



► Distribution system investments account for the largest portion (29%) of capex for U.S. investor-owned utilities: \$39B (projected) in 2019

- Generation
- Distribution
- Transmission
- Gas-Related
- Regulatory Compliance
- Other

States are responding to a variety of drivers for improved distribution planning.



Other potential benefits from improved distribution planning processes

- ▶ Makes transparent utility plans for distribution system investments holistically, before showing up individually in a rider or rate case
- ▶ Provides opportunities for meaningful PUC and stakeholder engagement
 - Can improve outcomes
- ▶ Considers uncertainties under a range of possible futures
- ▶ Considers all solutions for least cost/risk
- ▶ Motivates utility to choose least cost/risk solutions
- ▶ Enables consumers and third-party providers to propose grid solutions and participate in providing grid services

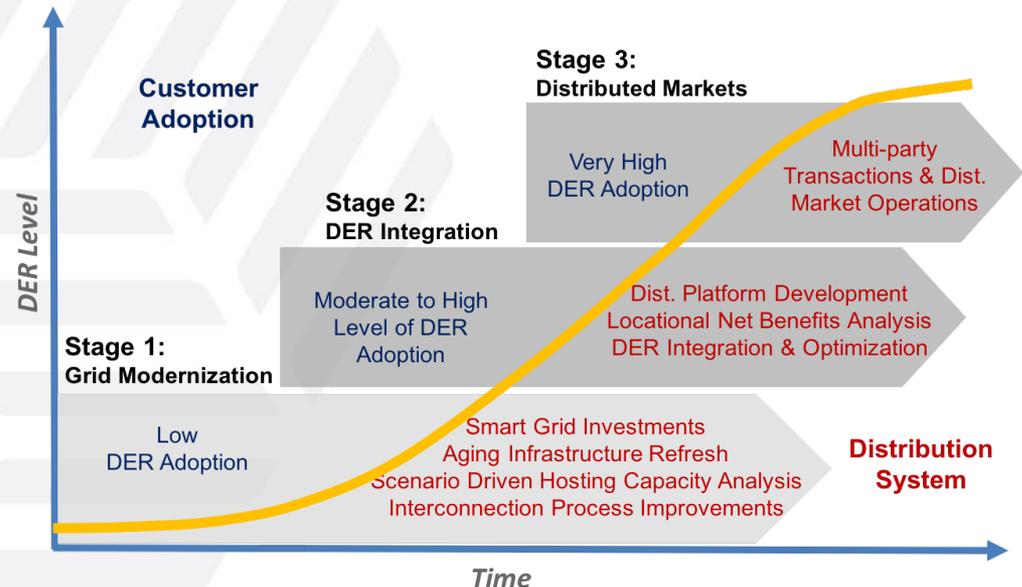


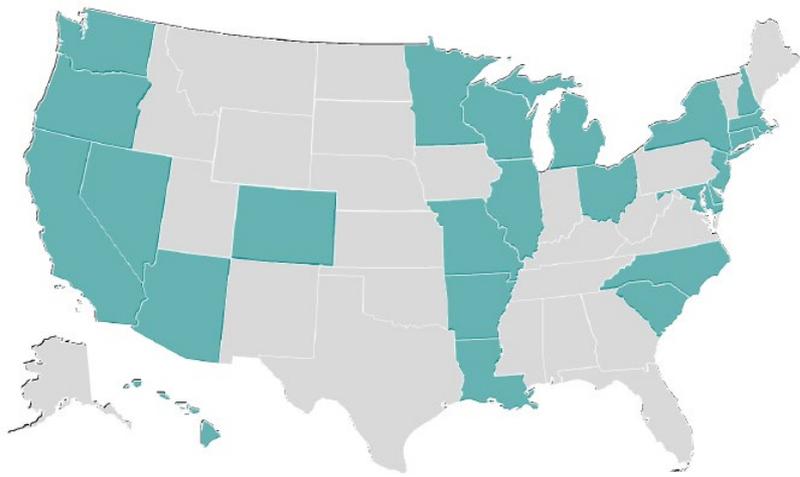
Figure from [De Martini and Kristov \(2015\)](#), for Berkeley Lab

State objectives, requirements and filing elements

Example state objectives for distribution planning

- ▶ **Michigan:** Safety, reliability and resiliency, cost-effectiveness and affordability, and accessibility (order in [U17990 and U-18014 dockets](#))
- ▶ **Nevada ([SB 146](#)):** “reductions or increases in **local generation capacity** needs, avoided or increased **investments in distribution infrastructure**, **safety** benefits, **reliability** benefits and **any other savings the distributed resources provide** to the electricity grid for this State or costs to customers of the electric utility or utilities.”
- ▶ **Minnesota ([Stat. §216B.2425](#)):** “...enhancing **reliability**, improving **security** against cyber and physical threats, and by increasing **energy conservation opportunities** by facilitating communication between the utility and its customers through the use of two-way meters, **control** technologies, energy **storage and microgrids**, technologies to enable **demand response**, and other innovative technologies.” *[emphasis added]*
- PUC objectives ([8/30/18 order in Docket 18-251](#)):
 - Safety, security, reliability, and resilience of the grid, at fair and reasonable costs, consistent with state energy policies
 - Greater customer engagement, empowerment and options
 - Efficient, cost-effective, accessible grid platforms for new products and services; opportunities for adopting new distributed technologies
 - Ensure optimized use of grid assets and resources to minimize total system costs





State legislative and regulatory activities

Common Components	Range of Requirements
Data Sharing and Transparency	Share a broad range of data including feeders, substations, operating voltages/ratings, load assumptions/forecasts, etc.
Hosting Capacity	Defining methods and tools, sharing maps, leveraging in planning and interconnection analysis. The granularity requested varies from requiring a node-level to feeder-level analysis. The frequency of updates ranges from monthly to annually.
Non-Wires Alternatives (NWAs)	Develop screening processes or criteria that can be used to identify when a grid need should be reviewed as a potential for NWAs. The consideration and assessment of NWAs in the investment plans varies by state – from being required to evaluate a NWA on every infrastructure investment to infrastructure projects of \$1 million or greater.
Distribution System Plan Requirements	Provide annual documentation of the planning process and outline their distribution system investment plans to provide the scale of grid needs over a 5-year period. Some utilities are also required to define changes to the planning process in order to better incorporate DER.
Locational Value	Discussions are still in the early stages on this as is a longer-term component of the overall efforts. Some states like CA and NY are beginning to develop methods to assess locational value.

States with distribution planning requirements

	California	Colorado	Delaware	District of Columbia	Florida	Hawaii	Illinois	Indiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Nevada	New Hampshire	New Jersey	New York	Ohio	Oregon	Pennsylvania	Rhode Island	Texas	Utah	Vermont	Virginia	Washington
Distribution system plan requirement	•	•	•	•		•	•	•	•	•	•	•	•	•	•		•				•				•	
Grid modernization plan requirement	•					•					•		•		•		•									
Hosting capacity analysis/mapping requirement	•			•		•					•	•	•	•	•		•									
Non-wires alternatives / locational value requirements	•	•	•	•		•			•			•	•	•	•		•				•					
Storage Mandates or Targets	•										•			•		•	•		•						•	
Benefit-Cost Methodology / Guidance	•								•					•	•		•				•					
Storm hardening requirements					•					•															•	
Required reporting on poor-performing circuits and improvement plans		•	•		•		•			•	•		•			•	•	•	•	•	•	•	•	•		•

Example state requirements*

► Distribution system plans

[California](#), [Delaware](#), [Indiana](#), [Hawaii](#),
[Maine](#), [Maryland](#), [Michigan](#),
[Minnesota](#), [Nevada](#), [New York](#), [Rhode
Island](#), [Virginia](#)

► Grid modernization plans

[California](#), [Hawaii](#), [Massachusetts](#),
[Minnesota](#), [Ohio](#)

- Utilities in other states have filed grid modernization plans even absent requirements (GA, NC, SC, TX).

► Hosting capacity analysis/maps

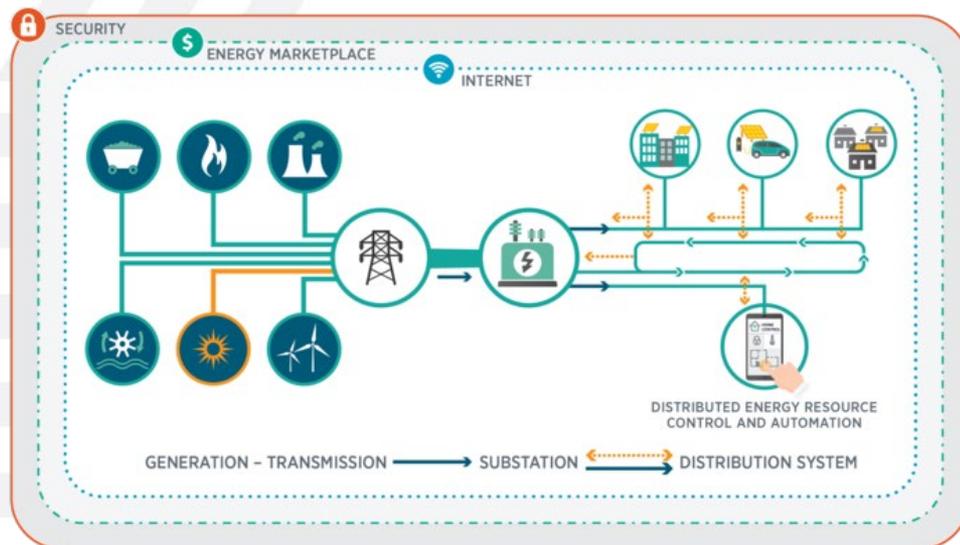
[California](#), [Hawaii](#), [Michigan](#),
[Minnesota](#), [Nevada](#), [New York](#)

► NWA/locational value

CA, CO, DE, DC, HI, ME, MI, MN, NV, NH,
NY, RI

► Benefit-cost handbook or guidance

[California](#), [Maryland](#), [Nevada](#), [New York](#),
[Rhode Island](#)



Procedural elements (1)

► Frequency of filing

- Typically annual or biennial
- Every 3 years (e.g., NV)
- *Considerations:* alignment with utility distribution capital planning, IRP filing cycle, workload, making and tracking progress on goals and objectives

► Planning horizon

- 3 year action plan — NV (+ 6-yr forecasts), DE (+ 10-yr long-range plan)
- 5 years – NY, CA (+ 10-yr grid modernization vision), HI (+ plan to 2045), MI (+ 10-15 yr outlooks), MN (+ 10-yr Modernization & Infrastructure Investment Plan)
- 5-7 years - Indiana
- *Considerations:* short- and long-term investments, coordination with IRP, granularity of distribution planning

► Stakeholder engagement

- Covered later in this presentation



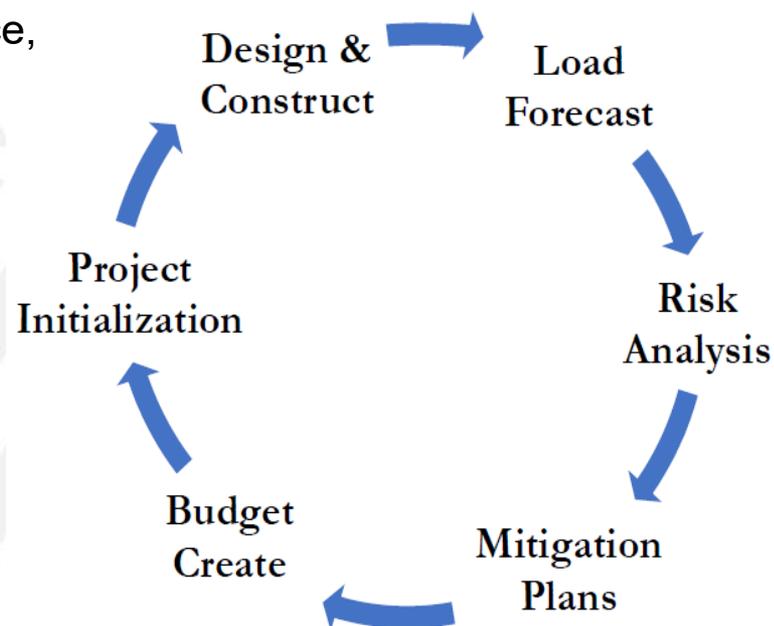
Procedural elements (2)

- ▶ Confidentiality for security or trade secrets — for example:
 - Level of specificity for hosting capacity maps
 - Peak demand/capacity by feeder
 - Values for reliability metrics
 - Contractual cost terms
 - Bidder responses to RFPs
 - Proprietary model information



Substantive elements (1)

- ▶ **Baseline information on current state of distribution system**
 - Such as system statistics, reliability performance, equipment condition, historical spending by category
- ▶ **Description of planning process**
 - Load forecast – projected peak demand for feeders and substations
 - Risk analysis for overloads and mitigation plans
 - Budget for planned capacity projects
 - Asset health analysis and system reinforcements
 - Upgrades needed for capacity, reliability, power quality
 - New systems and technologies
 - Ranking criteria (e.g., safety, reliability, compliance, financial)
- ▶ **Distribution operations — vegetation management and event management**



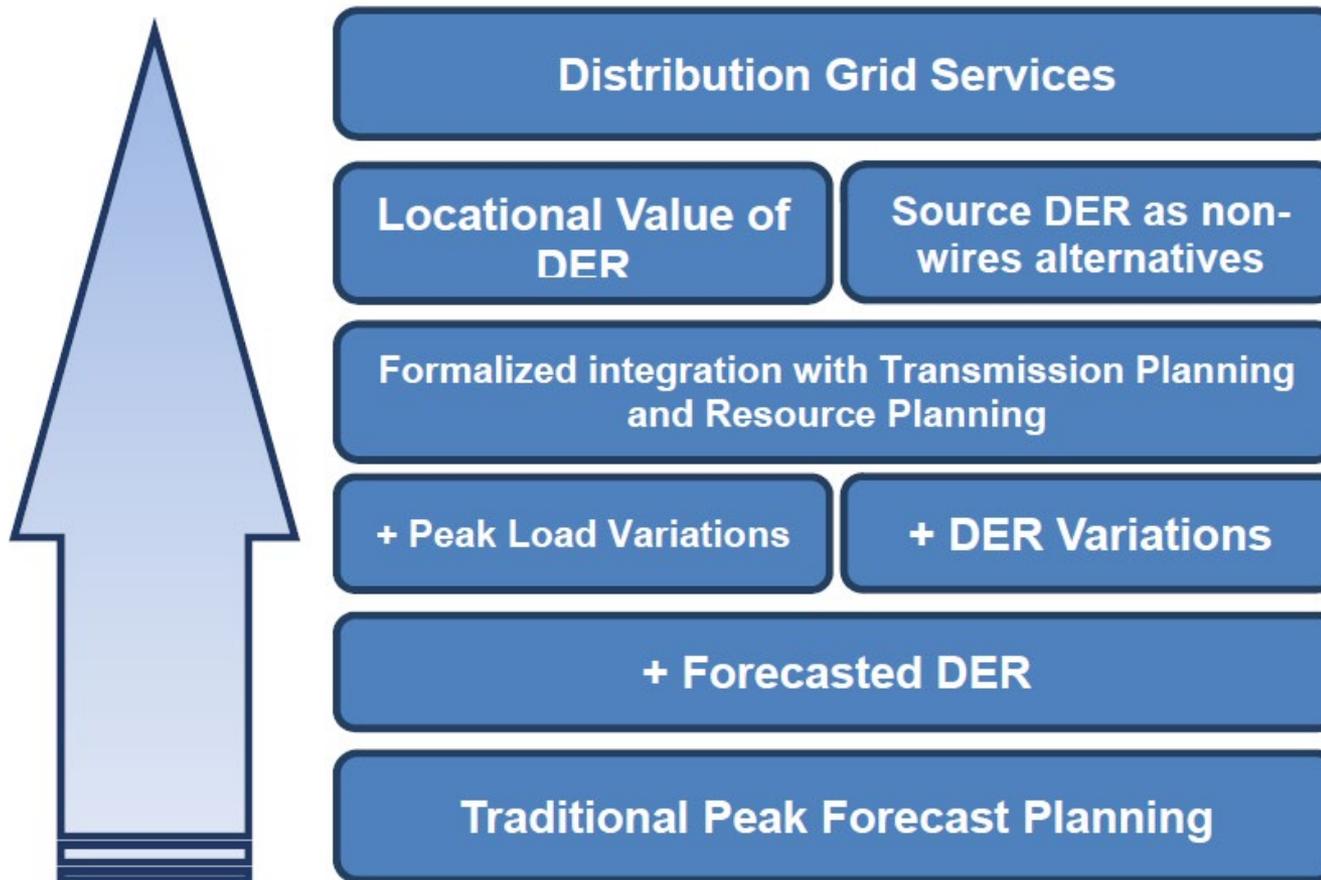
Source: Xcel Energy, [Integrated Distribution Plan](#), Nov. 1, 2019

Substantive elements (2)

- ▶ DER forecast
 - Types and amounts
- ▶ Hosting capacity analysis
 - Including maps
- ▶ NWA analysis
- ▶ Grid modernization strategy
 - May include request for certification for major investments
- ▶ Action plan
- ▶ Additional elements may include:
 - Long-term utility vision and objectives
 - Ways distribution planning is coordinated with integrated resource planning (if applicable)
 - Customer engagement strategy
 - Summary of stakeholder engagement
 - Proposals for pilots



Evolution in distribution planning practices



Source: Xcel Energy, [Integrated Distribution Plan](#), Nov. 1, 2019

NWA procurement strategies

Considering non-wires alternatives

- ▶ Non-wires alternatives (NWA) are options for meeting distribution (and transmission) system needs related to load growth, reliability and resilience.
 - Single large DER (e.g., battery) or portfolio of DERs that can meet the specified need
- ▶ Objectives: Provide load relief, address voltage issues, reduce interruptions, enhance resilience, or meet local generation needs
- ▶ Potential to reduce utility costs
 - Defer or avoid infrastructure upgrades
 - Implement solutions *incrementally*, offering a flexible approach to uncertainty in load growth and potentially avoiding large upfront costs for load that may not show up
- ▶ Typically, the utility issues a competitive solicitation for NWA for specific distribution system needs and compares these bids to planned traditional grid investments (e.g., distribution substation transformer) to determine the lowest reasonable cost solution.



NWA procurement strategies: New York (1)

- ▶ As part of annual capital planning, each utility must routinely identify candidate projects (load relief, reliability) for non-wires alternatives, post information to websites and issue RFPs. Utilities jointly provided [suitability criteria](#) (March 2017) for NWA projects and [described how criteria will be applied](#) (May 2017) in capital plans and procurement processes.

Criteria	Potential Elements Addressed	
Project Type Suitability	Project types include Load Relief and Reliability*. Other categories currently have minimal suitability and will be reviewed as suitability changes due to State policy or technological changes.	
Timeline Suitability	Large Project	36 to 60 months
	Small Project	18 to 24 months
Cost Suitability	Large Project	≥ \$1M
	Small Project	≥ \$300k

NWA procurement strategies: New York (2)

Projects, Needs and Default Solutions: Example Consolidated Edison RFPs for Non-Wires Alternatives

Project (RFP year)	Need	Default Solution
Hudson Network (2017)	Amount: 7.1 MW Location: West 50th St. Substation Overload period: 1-8 pm (5 pm peak) When: 2021 (summer)	Feeder upgrades to reduce potential overloads
Columbus Circle Network (2017)	Amount: 4 MW Location: West 42nd St. No. 2 Substation Overload period: 2-7 pm (6 pm peak) When: 2021 (summer)	Feeder upgrades to reduce potential overloads
West 42nd Street Load Transfer Project (2017)	Amount: 42 MW (total, varies by year) Location: W. 42nd St. No. 1 Substation Overload period: 9 am-7 pm (2-3 pm peak) When: 2021-2027 (starting May 2021)	Transfer 55 MW of load from W. 42nd St. No. 1 Substation to Astor Substation before summer 2021

Sources: Con Edison 2017a, Con Edison 2017b, and Con Edison 2017c

See [Joint Utilities NWA Opportunities](#) and [REV CONNECT](#)

NWA procurement strategies: California

► Distribution Investment Deferral Framework [decision](#) (Feb. 2018) created an annual process for consideration of DERs

■ *“The central objective...is to identify and capture opportunities for DERs to cost-effectively defer or avoid traditional IOU investments that are planned to mitigate forecasted deficiencies of the distribution system.”*

■ Utilities file annually (now consolidated):

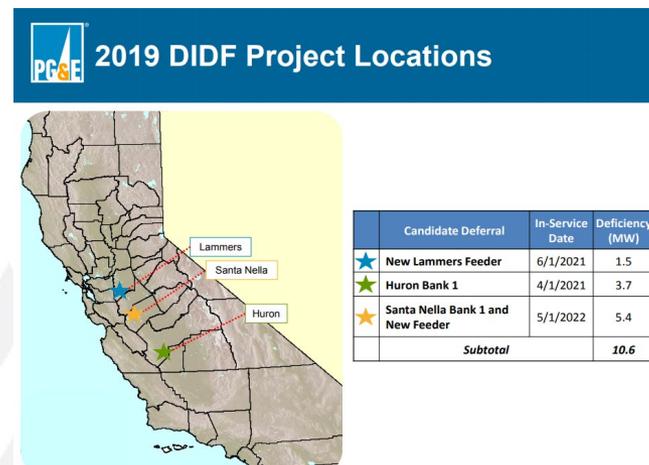
- 1) Grid Needs Assessment ([example GNA](#)) — main driver for Distribution Resources Plan
- 2) Distribution Deferral Opportunity Report (DDOR)

■ Recommend deferral opportunities for competitive annual solicitations

- Examples: [SCE](#), [PG&E](#), [SDG&E](#)

■ May 2019 [update](#) modified requirements

- \$/MWh and locational net benefit analysis values for prioritizing projects
- Additional requirements for GNA narrative and datasets
- Additional project-specific data required for planned investments and candidate deferral project shortlist

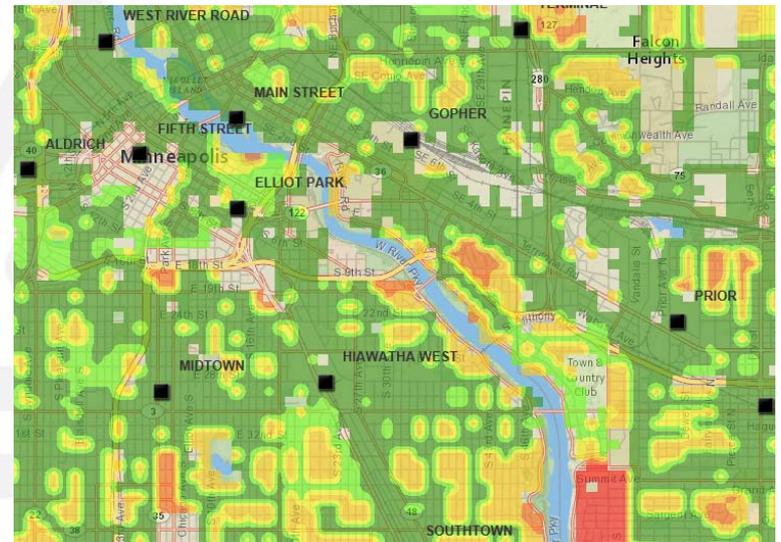


Source: [PG&E](#) presentation on 2019 RFO for local distribution capacity relief in 3 areas

Hosting capacity analysis

Example hosting capacity analysis requirements: Minnesota (1)

- ▶ State law ([§216B.2425](#), 2015) requires Xcel Energy to conduct a distribution study to identify interconnection points for small-scale distributed generation and system upgrades to support its development
- ▶ PUC requires analysis of each feeder ≤ 1 MW and potential distribution upgrades necessary to support expected distributed generation levels, based on utility's IRP filings and Community Solar Gardens program
- ▶ Utility filed 1st hosting capacity analysis on 12/1/16 ([Docket 15-962](#))
 - [Commission's Aug. 1, 2017 decision](#) requires filing Nov. 1 each year
 - Provided guidance for future analysis, including reliable estimates and maps of available hosting capacity at feeder level
 - Details to inform distribution planning and upgrades for efficient integration of distributed generation
 - Detailed information on data, modeling assumptions and methodologies

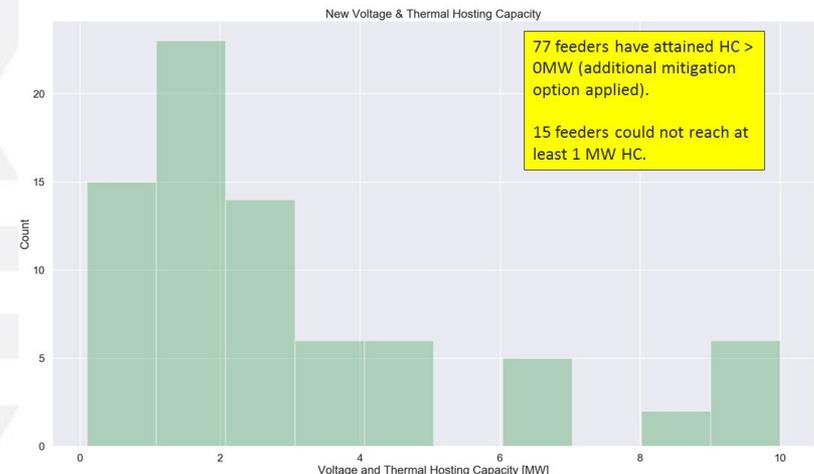


Example heat map result. Xcel Energy, 2019

Example hosting capacity analysis requirements: Minnesota (2)

- ▶ [Aug. 15, 2019, order](#) (Docket 18-684) required further improvements
 - Work with stakeholders to improve value of analysis, with more detailed data in maps
 - Provide spreadsheet with hosting capacity data by substation and feeder, with peak load, daytime min. load, installed generation capacity, and queued generation capacity
 - For feeders with no hosting capacity, identify “The full range of mitigation options ... including a range of potential costs ... and financial benefits....”
 - Identify cost and benefits of replacing or augmenting initial interconnection review screens and supplemental review and automating interconnection studies

- ▶ [July 23, 2020, order](#) (Docket 19-666)
 - Adopts long-term goal to use hosting capacity analysis in interconnection fast-track screens
 - Requirements for analysis due Nov. 2, 2020
 - Estimate costs for more frequent updates
 - Evaluate costs and benefits for other use cases
 - ◆ Replacing or augmenting initial interconnection review screens and supplemental review
 - ◆ Automating interconnection studies
 - Discuss information and resources required for a *load* hosting analysis and how it could help achieve state energy policy goals for beneficial electrification



Source: Xcel Energy, [Integrated Distribution Plan](#), Nov. 1, 2019

Data-related requirements

Data-related requirements

- ▶ Commissions are addressing data accessibility in distribution planning proceedings, recognizing “limited data visibility could lead to inefficient customer and grid investments” ([HPUC 2019](#)).
- ▶ Two types of data accessibility are being addressed
 - 1. **Customer usage data** - Making AMI interval data available to customers and third parties to support planning and decision-making
 - Some states are requiring utilities to use and/or evaluate feasibility of Green Button framework (Example: DC, NY, CA, HI and IL)
 - ◆ [Download My Data](#) – standard enables customer to download their data
 - ◆ [Connect My Data](#) – data exchange protocol which allows automatic transfer of data from utility to third party on customer authorization
 - Some states requiring “15/15 rule” when sharing aggregated customer data
 - ◆ An aggregation sample must have more than 15 customers and no single customer’s data may comprise more than 15 percent of the total aggregated data
 - 2. **System level data** – Making system level data available to support customer and third-party solutions
 - Increasingly common to require hosting capacity maps to be shared online
 - New York, DC and California are examples of states with more detailed system data sharing requirements – see next three slides



System data sharing requirements

Example 1: New York

- ▶ New York – Each utility has a [data sharing portal](#) that includes the following

February 2020 7

LINKS TO UTILITY DATA PORTALS

[National Grid](#) [Orange & Rockland](#) [NYSEG](#) [RG&E](#) [Central Hudson](#) [Consolidated Edison](#)

 **JOINT UTILITIES OF NEW YORK**

Click on the logo for the Joint Utilities System Data portal!

Joint Utilities of New York System Data Portal

<input type="checkbox"/> Distributed System Implementation Plans	<input type="checkbox"/> Load Forecasts
<input type="checkbox"/> Capital Investment Plans	<input type="checkbox"/> Historical Load Data
<input type="checkbox"/> Planned Resiliency / Reliability Projects	<input type="checkbox"/> NWA Opportunities
<input type="checkbox"/> Reliability Statistics	<input type="checkbox"/> Queued DG
<input type="checkbox"/> Hosting Capacity	<input type="checkbox"/> Installed DG
<input type="checkbox"/> Beneficial Locations	<input type="checkbox"/> SIR Pre-Application Information

System data sharing requirements

Example 2: California

- ▶ By [order](#), California utilities required to make datasets available as part of Grid Needs Assessments & Distribution Deferral Opportunities filings, including:

- ▶ **Grid needs**

- By circuit, substation, and sub-transmission capacity service
 - Peak load (five years)
 - DER growth (EE, DR, PV, EV, storage)
 - Facility loading %
 - Current year demand
 - 5 year forecasted demand
 - Forecasted percentage deficiency above the existing rating over five years
 - Forecasted MW deficiency over five years
 - Anticipated season or date by which distribution upgrade must be installed

- ▶ **Distribution deferral opportunities**

- Planned investments
 - Project description
 - Distribution service required
 - Type of traditional capital investment equipment to be installed
 - In-service date
 - Deferrable by DERs? Y/N
 - Number and composition of customers
- Candidate deferrals
 - Expected performance and operational requirements
 - Specific locational values
 - Distribution service required
 - Expected magnitude of DER service provision (MW/kWA)
 - Duration and timing of the deficiency and associated DER service requirements
 - Unit cost of traditional mitigation
 - Contingency plans

System data sharing requirements

Example 3: District of Columbia

- ▶ Following [MEDSIS working group recommendations](#), DC PSC required dedicated [data sharing website](#)
- ▶ Datasets below were requested by MEDSIS Data Information Access and Alignment working group
- ▶ Some data sets require secure access and some requested data sets are not yet available

Data Type	Frequency	Granularity	Availability
Capital Investment Plan – General Overview	Annual, 10 year forecast period	System	Current; Public (Pepco's Annual Consolidated Report)
Load forecast	Annual, 10 year forecast period	Substation	Current; Public (Pepco's Annual Consolidated Report)
Reliability statistics (SAIFI, CAIDI)	Annual (ACR)	Feeder level	Current; Public (Pepco's Annual Consolidated Report)
Planned resiliency/ reliability projects	Annual	Varies by project	Current; Public (Pepco's ACR and Rate Case Construction Report)
Load data	Annual (ACR)	Feeder (Historic)	NDA
Hosting Capacity	Quarterly	Feeder level	Hosting Capacity Map; Website
<u>Beneficial Location</u>	N/A	N/A	<u>Not Available</u>
Existing DER Capacity	Monthly	Feeder level	Heat Map; Website

Data Type	Frequency	Granularity	Availability
Circuit Capacity/ Design Criteria	Static (updated as projects are implemented)	Feeder level	Critical Energy Infrastructure Information (CEII); <u>Secure access required.</u>
Physical Attributes	Static (updated as projects are implemented)	Node level	Critical Energy Infrastructure Information (CEII); Secure access required.
Protective devices	Static (updated as projects are implemented)	Feeder level	Critical Energy Infrastructure Information (CEII); Secure access required.
Voltage profile	Static (updated as projects are implemented and with changes in load information)	Feeder level	Critical Energy Infrastructure Information (CEII); Secure access required.
Circuit impedance models	Static (updated as projects are implemented)	Feeder level	Critical Energy Infrastructure Information (CEII); Secure access required.

Stakeholder engagement

Stakeholder engagement

► Requirements

- *Before plan is filed:* Varies from one timely meeting required (MN) to significant upfront input through working groups (e.g., CA, DC, HI, MI, NH, NY)
- *After plan is filed:* Opportunity to file comments

■ Examples:

- [Hawaii](#) - Stakeholder council, technical advisory panel, ad-hoc working groups
- [New Hampshire](#) - Stakeholder group with specific responsibilities to make recommendations on:
 - ◆ Assumptions and metrics
 - ◆ Load and DER forecasting methodology
 - ◆ Hosting capacity, interconnection, and locational value approach
- [New York](#) - Surveys, newsletters, webinars, meetings, and designated **website** with links to various sources of information –

The Joint Utilities of New York

<h4>DSP Enablement Efforts</h4> <hr/> <p>In order to keep stakeholders informed of the work the Joint Utilities of New York are doing to advance the enablement of Distributed System Platforms (DSPs) under REV and provide information on related 2020 stakeholder engagement activities, the Joint Utilities publish quarterly newsletters. Please email any feedback or questions to info@jointutilitiesofny.org.</p> <p style="text-align: center;">SUMMARY DOCUMENT</p>	<h4>2020 DSIP Filings</h4> <hr/> <p>The Joint Utilities filed their most recent Individual DSIP on June 30, 2020. The DSIP documents provide extensive information on each utility's recent progress, current activities, and future plans as the companies continue the transition toward a more distributed, integrated, and customer-centric electricity system.</p> <p style="text-align: center;">2020 INDIVIDUAL DSIPS</p>
<h4>Hosting Capacity</h4> <hr/> <p>Click on the button below for utility-specific links for Stage 3 Hosting Capacity displays and upcoming stakeholder engagement sessions focused on Hosting Capacity.</p> <p style="text-align: center;">LEARN MORE</p>	<h4>Non-Wires Alternatives</h4> <hr/> <p>Click on the button below for links to each utility's current Non-Wires Alternatives (NWA) webpage for information on current NWA opportunities and related solicitations.</p> <p style="text-align: center;">LEARN MORE</p>
<h4>EV DCFC Incentive Program</h4> <hr/> <p>Effective February 7, 2019, the NYPSC authorized an incentive program for DCFC charging stations. DPS Staff released a whitepaper on January 13, 2020 recommending a Make-Ready Program. Click on the button below for more information related to New York Electric Vehicle efforts and for links to each utility's EV web portals.</p> <p style="text-align: center;">LEARN MORE</p>	<h4>Webinars: JU DSP Efforts</h4> <hr/> <p>To help inform the development of the 2020 DSIPs, the Joint Utilities held stakeholder webinars on December 11, 2019 and April 23, 2020. The Joint Utilities shared the results of the recent stakeholder survey and requested additional stakeholder feedback on the proposed 2020 DSIP structure based on the survey results. Click below for webinar slides and recordings.</p> <p style="text-align: center;">JU STAKEHOLDER WEBINARS</p>

New York – Joint Utilities stakeholder engagement opportunities summarized in [newsletter](#)

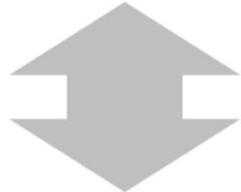
Recent and Upcoming JU Stakeholder Engagement



Hawaii – Integrated Grid Planning Stakeholder Engagement

Hawaiian Electric IGP Process

Education & Information



Input & Feedback



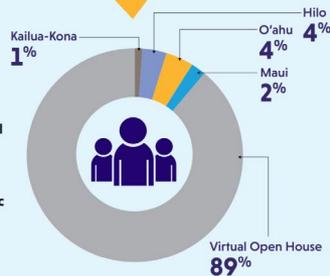
Engagement Goal:

Connect with the public by providing a general overview of the Integrated Grid Plan and gather their input on various topics.

1,421

total connections within the following groups

IGP is about being part of the conversation to shape our renewable energy future together



17 Participants
Kealahou High School
Kailua-Kona, Hawai'i
03.03.2020

52 Participants
Hilo High School
Hilo, Hawai'i
03.05.2020

61 Participants
Hawaii Pacific University
Honolulu, O'ahu
03.10.2020

31 Participants
Hawaiian Electric
Kahului, Maui
03.12.2020

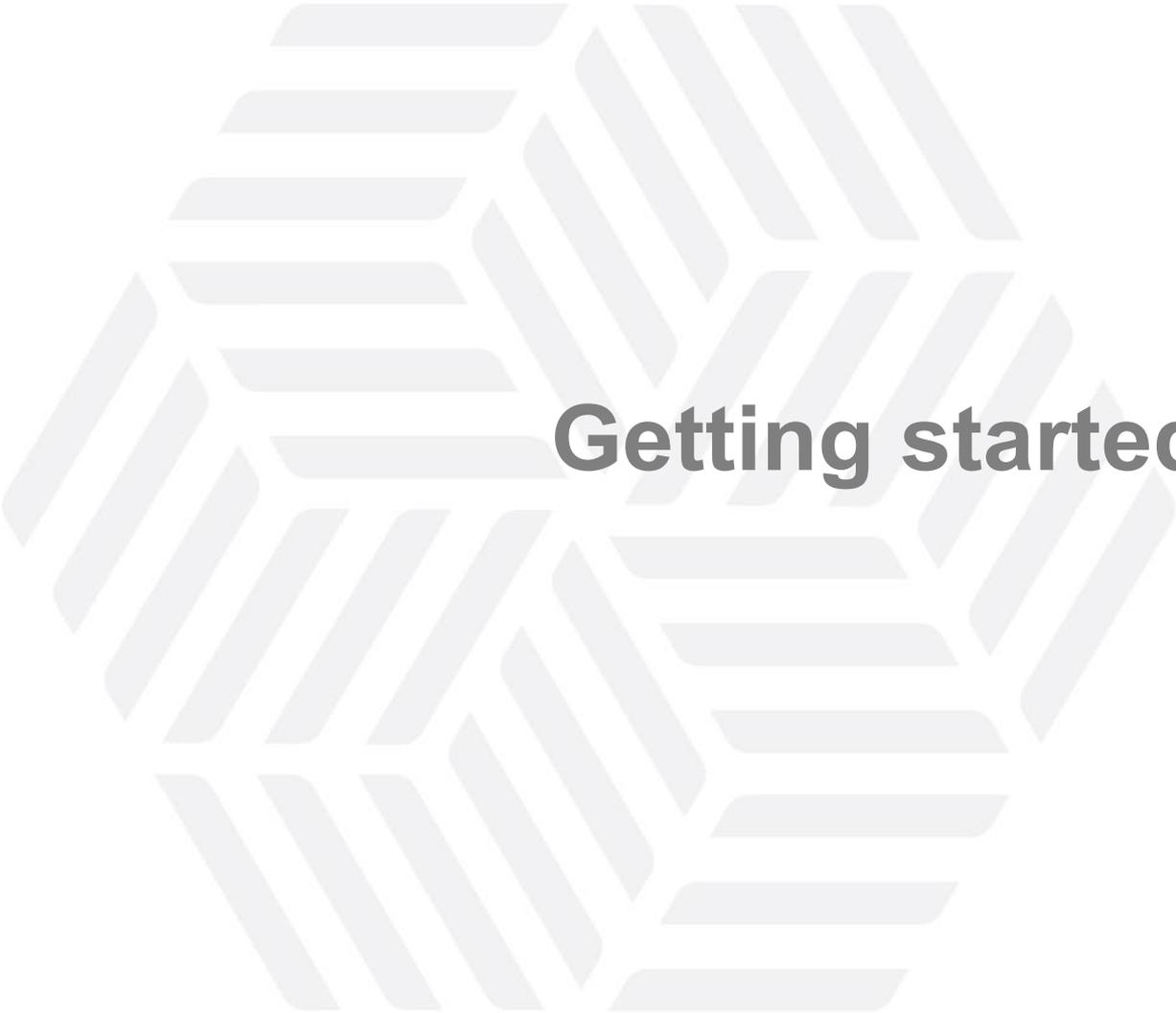
- Forecasting Assumptions
- Resilience
- Distribution Planning
- Market

Industry peer group of experts participating voluntarily to advise on processes, methodologies, & technologies

Integrated Grid Planning

Stakeholder Council Meeting
August 18, 2020

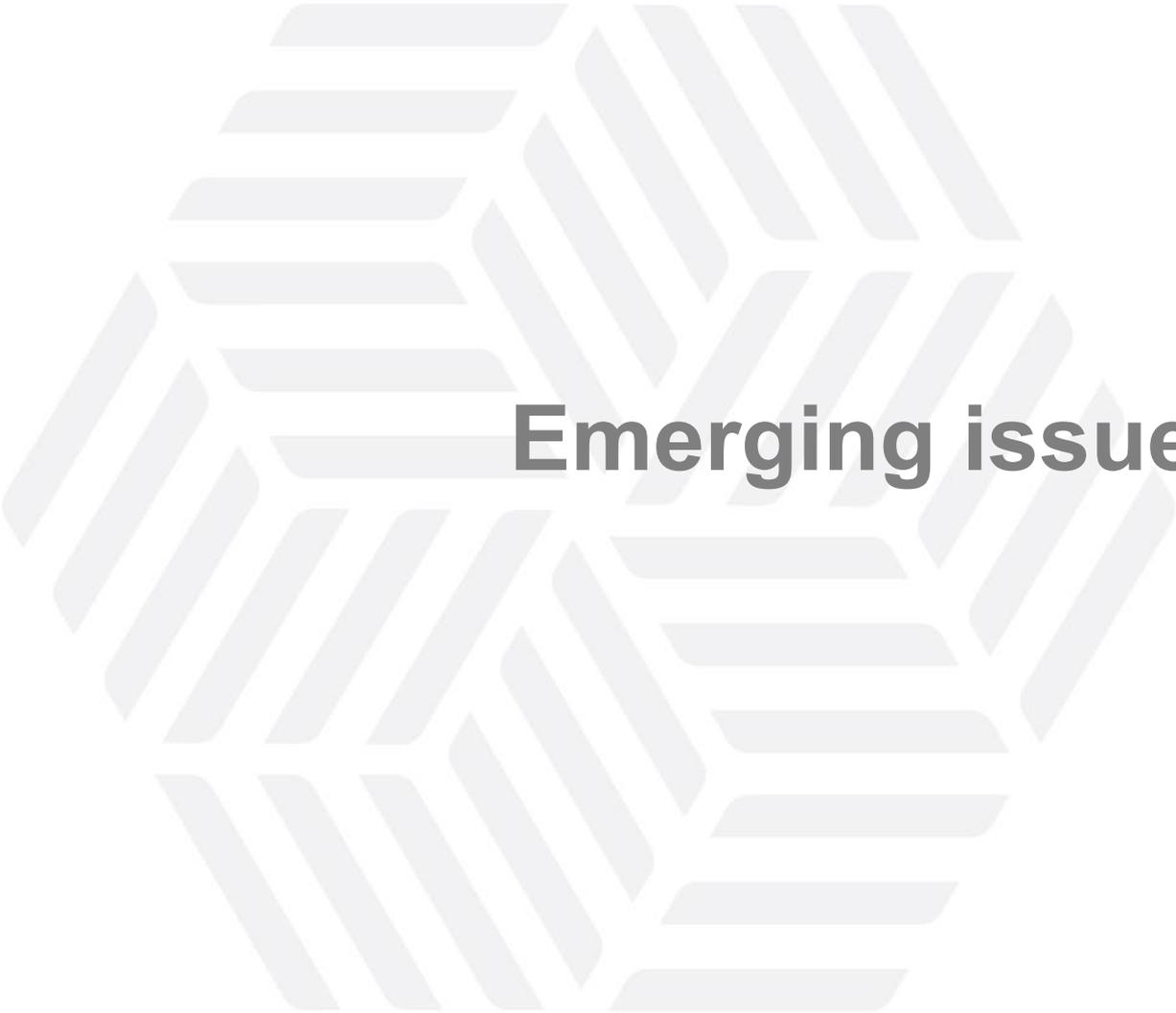
LISTENING+ INTEGRATING+ COLLABORATING
to Reach 100% Renewables



Getting started

Getting starting with an IDSP proceeding: What others have done

- ▶ Develop staff report or white paper outlining DSP needs, goals, and vision
 - Example: [Oregon PUC Staff White Paper](#)
- ▶ Issue surveys or targeted questions to utilities and stakeholders
 - Example [utility survey](#) from Minnesota
 - [Utility survey, stakeholder survey](#) and follow-up [stakeholder questions](#) used in Oregon
 - Initial meetings or workshops
 - Review and discuss surveys and questions
 - Understand current processes, data, systems and filings
- ▶ Host targeted presentations or trainings for staff and stakeholders, including reviewing DSP guidelines from other states and utility filings
 - Examples: [Colorado](#), [Oregon](#)
- ▶ Require utilities to develop stakeholder engagement plan prior to technical planning
 - Example: Joint Utilities of NY [stakeholder plan and timeline](#)
- ▶ Require utilities to develop initial distribution system plan to report on current system and processes. Example: New York [April 20, 2016, order](#)
 1. Develop plan and timeline for [stakeholder engagement](#) (May 5, 2016)
 2. File [Initial DSIP](#) addressing current planning, operations, and administration and identifying immediate changes to meet state energy goals (June 30, 2016)
 3. File [Joint DSIP](#) addressing tools, processes and protocols developed jointly or under shared standards (Nov. 1, 2016)



Emerging issues

Emerging Issues (1)

► Fire risk (see “Extra Slides” for more information)

- CA utilities required to file [Wildfire Mitigation Plans](#) that include:
 - ID high risk zones and develop de-energization plans
 - Enhanced inspection, repair/replacement and vegetation management
 - Strategy for sectionalization of lines to minimize areas subject to de-energization
 - Automatic reclosers strategy to prevent possible downed lines from starting fires
 - Identifying maximum wind tolerance of lines and mapping to weather forecasts
 - Significant metric analysis to track plans & performance

► Affordability

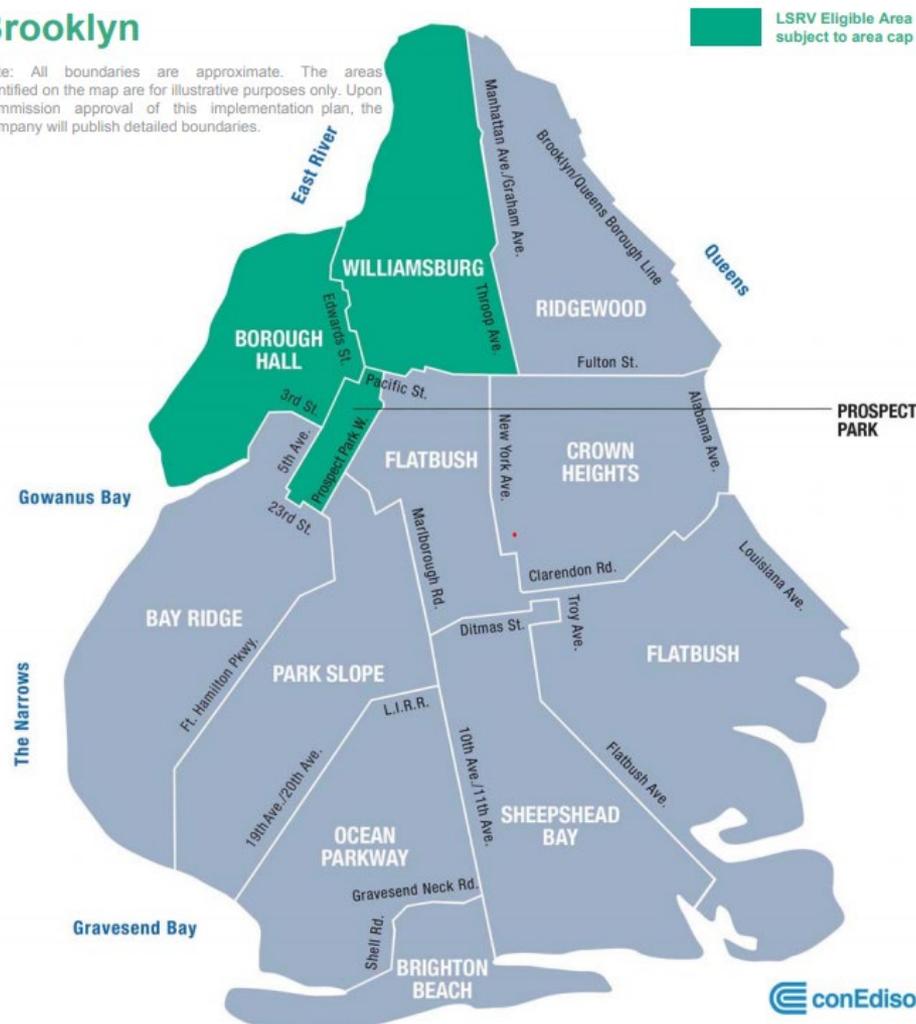
- CA PUC recent decision in [affordability](#) docket establishes 3 metrics
 - Hours at minimum wage required to pay for essential utility services
 - Vulnerability index of various communities
 - The ratio of utility service charges to household income after deducting housing and other essential utility services (affordability ratio)
- NY PSC is examining low income affordability with a target level of 6% of gross income. May 2016 [order](#) directed utility filings and adopted a framework for addressing low income customer needs

Emerging Issues (2)

- ▶ DER compensation tariffs based on locational benefit
 - New York [Value Stack tariff](#) compensates DER based on location, in addition to energy, capacity, environmental and demand reduction
 - Locational specific relief value (LSRV) zones are identified by each utility based on utility-defined criteria
 - Response to event calls in LSRV zones results in additional DER compensation

Brooklyn

Note: All boundaries are approximate. The areas identified on the map are for illustrative purposes only. Upon Commission approval of this implementation plan, the Company will publish detailed boundaries.



Source: Con Edison [LSRV Zone Map](#)

Resources for more information

U.S. Department of Energy's (DOE) [Modern Distribution Grid](#) guides

[Integrated Distribution Planning: Utility Practices in Hosting Capacity Analysis and Locational Value Assessment](#), by ICF for DOE, 2018

Alan Cooke, Juliet Homer, Lisa Schwartz, [Distribution System Planning – State Examples by Topic](#), Pacific Northwest National Laboratory and Berkeley Lab, 2018

Juliet Homer, Alan Cooke, Lisa Schwartz, Greg Leventis, Francisco Flores-Espino and Michael Coddington, [State Engagement in Electric Distribution Planning](#), Pacific Northwest National Laboratory, Berkeley Lab and National Renewable Energy Laboratory, 2017

Tom Eckman, Lisa Schwartz and Greg Leventis, [Determining Utility System Value of Demand Flexibility From Grid-interactive Efficient Buildings](#), Berkeley Lab, 2020

Berkeley Lab's [Future Electric Utility Regulation reports](#)

Berkeley Lab's [research on time- and locational-sensitive value of DERs](#)

[Summary of Electric Distribution System Analyses with a Focus on DERs](#), by Y. Tang, J.S. Homer, T.E. McDermott, M. Coddington, B. Sigrin, B. Mather, Pacific Northwest National Laboratory and National Renewable Energy Laboratory, 2017

J.S. Homer, Y. Tang, J.D. Taft, D. Lew, D. Narang, M. Coddington, M. Ingram, A. Hoke. [Electric Distribution System Planning with DERs — Tools and Methods](#)

Smart Electric Power Alliance, [Integrated Distribution Planning: A Framework for the Future](#), 2020

Forthcoming from Berkeley Lab — email Lisa Schwartz to request a draft:

- ▶ T. Woolf, B. Havumaki, D. Bhandari, M. Whited and L. Schwartz. *Benefit-Cost Analysis for Utility-Facing Grid Modernization Investments: Trends, Challenges and Considerations.*
- ▶ N. Mims Frick, S. Price, L. Schwartz et al. *Locational Value of DERs.*

Contact



Lisa Schwartz, Deputy Department Head
Electricity Markets and Policy Department
Berkeley Lab

(510) 486-6315; lcschwartz@lbl.gov

<https://emp.lbl.gov/>

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Juliet Homer, Senior Energy Research
Engineer/Analyst
Energy and Environment Directorate
Pacific Northwest National Lab

(509) 375-2698; juliet.homer@pnnl.gov

<https://epe.pnnl.gov/>



Extra Slides: State-Specific Approaches

California (1)

- ▶ [AB 327](#) (2013) requires utilities to prepare Distribution Resource Plans (DRPs) that identify optimal locations for the deployment of DERs.
- ▶ [PUC proceeding](#) on DRPs includes 3 tracks ([order](#) instituting rulemaking):
 - [Track 1](#) – Hosting capacity and locational value methods and initial pilots
 - [Track 2](#) – Additional demonstration pilots related to a) location benefits, b) distribution operations with DERs, and c) microgrids
 - [Track 3](#) – Three policy issues
 - [DER Adoption and Distribution Load Forecasting](#)
 - [Grid Modernization Investment Guidance](#)
 - [A Distribution Investment Deferral Process](#)
- ▶ Series of Working Groups formed – all materials available online:
 - Locational Net Benefits Analysis (LNBA) [Working Group](#)
 - Integration Capacity Analysis (ICA) [Working Group](#)
 - DER Growth Scenarios and Distributed Load Forecasting [Working Group](#)
 - Integrated Distributed Energy Resources Competitive Solicitations Framework [Working Group](#)

- ▶ LNBA method consistent across IOUs, based on Avoided Cost Calculator enhanced to include location-specific values
 - Staff [proposed major changes](#) to [DER Avoided Cost Calculator](#) in Nov. 2019
 - [CPUC adopted recommendations](#) in *Staff Proposal on Avoided Cost and Locational Granularity of Transmission and Distribution Deferral Values*
 - Specified T&D values will be estimated through Distribution Investment Deferral Framework and CAISO planning processes
 - Unspecified distribution deferral value will be estimated through updates to the Avoided Cost Calculator considered in Integrated DER rulemaking ([14-10-003](#))
- ▶ Integration Capacity Analysis (ICA)
 - 9/9/19 [workshop](#) on long-term refinements, culmination of a request for comments on ICA data and online map functionality
 - [Utilities request](#) that interconnection use case be the top priority (relative to policy and planning use cases) because CA Rule 21 is currently under revision. Utilities want ICA to be highly accurate for generation sources.

California (3)

- ▶ Integration Capacity Analysis (ICA) – incorporation of results into the tariff governing DER integration (CA Rule 21)
 - The CPUC assigned commissioner issued a [proposed decision](#), which the full commission voted to sign on 9/24/2020, revising CA Rule 21 and giving guidance on hosting capacity issues.
 - Eliminates the Fast Track eligibility size cap – any size project up to the ICA value (i.e., hosting capacity limit) may use Fast Track interconnection process; projects may require supplemental study if they fail a screen not included in the ICA
 - Gives utilities guidance on updating the ICA values and tracking the information outside of required monthly updates, and for labeling ICA values that need to be updated
 - Gives utilities guidance on developing/updating screens including short circuit contribution, projects potentially causing issues at transmission facilities, and other screens

CPUC Order: Wildfire Mitigation Efforts - 1

(Rulemakings 18-12-005, 18-10-007, Investigation 19-11-013)



In response to the growing severity and risk of forest fires, California moved to mitigate and address the risks of fires started by utility infrastructure.

- ❖ R.18-10-007 requires and approved wildfire mitigation plans (WMPs).
 - [SB 901](#) (2018) listed mitigation plans contents, gave CPUC short window to approve plans
 - Between June 3 and June 6, 2019, CPUC approved first round of mitigation plans
 - In December 2019 CPUC staff issued draft, [revised guidelines](#) for WMPs
 - By [resolution](#), in January 2020 the CPUC ordered utilities to file 2020 WMPs
 - In June 2020, the CPUC ratified the CPUC Wildfire Safety Division's approvals with conditions of the 2020 WMPs
- WMPs include considerable [public outreach](#). The CPUC ordered that a language is prevalent if 1,000 or more people speak it within the utility's service territory, and outreach must be in any language that is thus designated as prevalent. By statute, outreach must be in English, Spanish, and the top 3 primary languages regardless of prevalence.

CPUC Order: Wildfire Mitigation Efforts - 2

(Rulemakings 18-12-005, 18-10-007, Investigation 19-11-013)



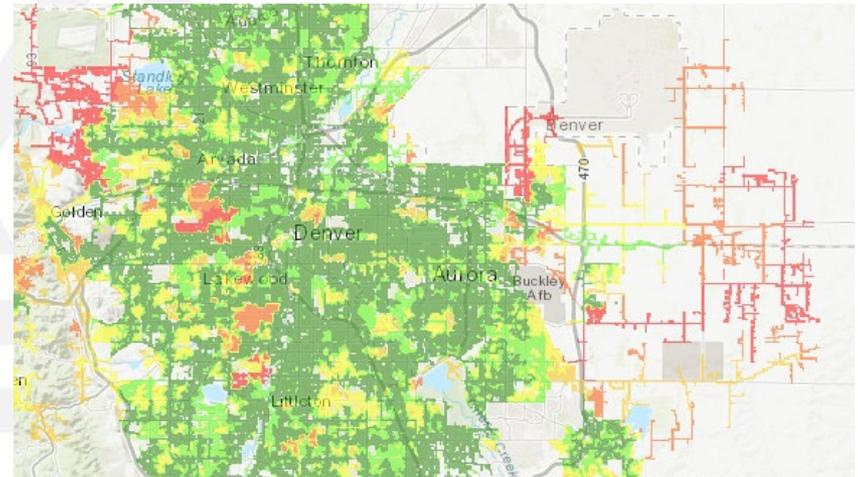
- ❖ The CPUC WMP [template](#) requires plans and 5 years of historical data on:
 - Historical number of fires started by utility plant/equipment, no. of injuries and deaths due to fires, and various measures of the no. and value of assets and structures damaged or destroyed
 - Historical “near misses” – where equipment failure could have started a fire but did not
 - Steps taken to assess and reduce fire risk – equipment inspections, replacement or repair of equipment at risk of causing fires and plant hardening steps such as undergrounding
 - Number of public safety power shutoff (PSPS) events and number of customers affected
 - Type and number of steps taken to reduce the number of PSPS events and no. of customers affected, e.g., line sectionalization, assistance with backup generation, and pursuing microgrid opportunities
 - Vegetation management steps including hazard tree management, expanded clearances around facilities, brush management around poles and drought related inspections
 - Weather monitoring and forecasting – the plans detail steps and granularity of forecasting particularly in high fire-risk area and includes assessment of fire risk, accounting for how dry the forests and vegetation are.

CPUC Order: Wildfire Mitigation Efforts - 3

(Rulemakings 18-12-005, 18-10-007, Investigation 19-11-013)

- ❖ The CPUC wildfire mitigation [roadmap](#) includes 4 priority items
 - Utility WMPs – focus on understanding risk; continued improvement, including the use of a [maturity model](#)
 - Metrics - developing / tracking metrics to assess progress and performance
 - Detailed risk assessment – modeling risk to support resource allocation
 - Data and analytics

- ▶ [SB 19-236](#) (2019) requires PUC to promulgate rules establishing filing of a distribution system plan (DSP), including:
 - Methodology for evaluating costs and net benefits of using DERs as NWA
 - Threshold for size of new distribution projects
 - Requirements for DSP filings, including:
 - Consideration of NWA for new developments (>10,000 residences)
 - Load forecasts from beneficial electrification programs
 - Forecast of DER growth
 - Planning process for cyber and physical security risks
 - Proposed cost recovery method
 - Anticipated new investments in distribution system expansion
 - Economic impacts of NWA
 - Estimated year when peak demand growth merits analysis of new NWA
 - Public interest in approval of NWA
 - Ratepayer benefits from NWA
 - Benchmarks or accountability mechanisms



[Xcel Energy](#) hosting capacity map (Denver area)

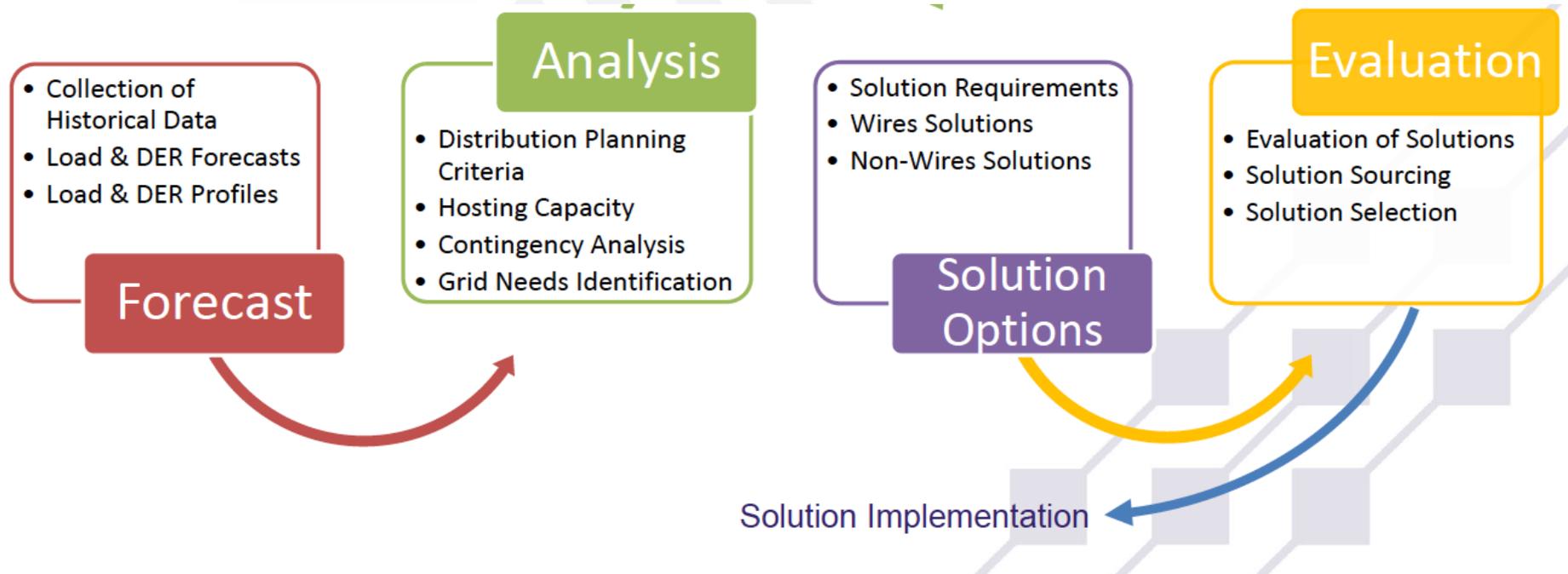
Colorado (2)

- ▶ In Proceeding No. [17M-0694E](#), initiated through [Decision No. C17-0878](#) (Oct. 26, 2017), the Commission examined implementation of an Integrated Distribution System Planning process and invited comments on:
 - “...initial regulatory steps that the Commission should take to ensure that investor-owned electric distribution systems have the capability to handle increased penetration of distributed generation, storage, and certain load building technologies such as electric vehicles.”
 - Stakeholder engagement, including Distribution System Planning work group
- ▶ Pre-rulemaking proceeding recently completed ([No. 19M-0670E](#))
 - Decision No. [C19-0957](#) seeks comments and information on initial regulatory steps to meet requirements of SB 19-236
 - Series of informational [workshops](#)
- ▶ Rulemaking forthcoming

Hawaii (1)

- ▶ HPUC rejected piecemeal investment proposals and required Hawaiian Electric Companies (HECO) to file a comprehensive Grid Modernization Plan.
- ▶ [Order No. 34281](#) provided guidance for a holistic, scenario-based grid modernization strategy to inform review of discrete projects submitted by utility
- ▶ Integrated Grid Planning process ([Order 35569](#))
 1. Develop forecasts and assumptions that will drive planning
 2. Collectively identify needs - resources, T&D
 3. Identify solutions - resource, T&D that can be achieved through procurement, pricing and program options
 4. Evaluate and optimize resource and T&D solutions, submit 5-year plan to PUC with proposed investments, pricing and programs
- ▶ Hawaiian Electric Companies (HECO) [Integrated Grid Plan](#) incorporates procurement *into planning itself* and merges G, T & D planning processes
 - Integrates solution procurement
 - Identifies gross system needs, coordinates solutions, and develops an optimized, cost-effective portfolio of assets
 - Allows a variety of distributed and grid scale resources to provide power generation and ancillary services
 - Stakeholder council, technical advisory panel, ad-hoc working groups

Hawaii (2)



Source: HECO presentation to Puerto Rico Energy Bureau, Jan. 10, 2020

Hawaii (3) — Grid modernization principles

[HRS § 269-145.5\(b\)](#) – *In advancing the public interest, the commission shall balance technical, economic, environmental, and cultural considerations associated with modernization of the electric grid, based on principles that include but are not limited to [emphasis added]:*

- *Enabling a **diverse portfolio of renewable energy resources**;*
- *Expanding options for customers to manage their energy use;*
- *Maximizing interconnection of distributed generation to the State's electric grids on a cost-effective basis at non-discriminatory terms and at just and reasonable rates, while maintaining the reliability of the State's electric grids, and allowing such access and rates through applicable rules, orders, and tariffs as reviewed and approved by the commission;*
- *Determining fair compensation for electric grid services and other benefits provided to customers and for electric grid services and other benefits provided by distributed generation customers and other non-utility service providers; and*
- *Maintaining or enhancing grid reliability and safety through modernization of the electric grids.*

[Order 32491](#) – The Commission adopted additional principles related to:

- **Grid platforms** for new products, services, opportunities for distributed energy resources
- **Optimization of grid assets** and resources to minimize total system costs
- Greater **customer engagement** and options for consuming and providing energy services
- Enhancing **safety, security, reliability, and resilience** at fair and reasonable costs
- **Comprehensive, transparent and integrated distribution system planning**

- ▶ Commission required 3 IOUs to establish stakeholder collaboratives to develop performance metrics, incl. for distribution planning and operations
 - First raised in [IURC Order in Cause 44602](#) for Indianapolis Power and Light (IPL) (3/16/16), then in an [IURC order in Cause 44967](#) for Indiana Michigan Power Company and its [compliance filing](#)
 - Also see NIPSCO (Cause 44688) and I&M (Cause 44967)
- ▶ [IRP rule](#) requires utilities to consider effects of distributed generation on distribution system planning (and other types of planning)
- ▶ Transmission, Distribution, and Storage System Improvement Charge (2013 legislation) to encourage T&D investments for safety, reliability, modernization; amended in 2019 by [HB 1470](#) in part to include advanced technology investments
 - 5-7 year plans for Indiana URC approval; detailed project descriptions all yrs
 - For capital projects only (e.g., *not* for vegetation management)
 - Charge limited to 80% of “approved capital expenditures and TDSIC costs”; remaining 20% addressed in general rate case

- ▶ Distribution planning is one of [six topics](#)* addressed in [PC 44 - Transforming Maryland's Electric Grid proceeding](#).
 - PC-44 working group progress: proposing a statewide EV program, refining interconnection rules and processes, developing and proposing retail supplier regulations, and designing both time varying rates and storage ownership pilots
 - [Benefits and Costs of Utility Scale and Behind the Meter Solar Resources in Maryland](#) - Final report November 2018:
 - Presents benefits and costs as they accrue to (1) the bulk power system, (2) local power distribution systems, and (3) society and the economy
 - [Original RFP](#) for consultant to study benefits & costs of distributed solar in IOUs' service areas
- ▶ Orders in [Case No. 9406 \(BGE rate case\)](#) and [Case No. 9418 \(Pepco rate case\)](#) required a five-year distribution investment plan within 12 months
 - [BGE distribution investment plan](#) and [Pepco plan](#) filed
- ▶ [Senate Bill 573](#) required an energy storage pilot program. [PUC order](#) August 2019 established energy storage pilot.
 - In December 2019, working group [proposed metrics and value streams](#) that energy storage applications should consider.

*Other topics: rate design, EVs, competitive markets/customer choice, interconnection process and energy storage

Massachusetts

- ▶ [Requirements](#) for each electric distribution company to submit grid modernization plans every three years that include (next due July 2020):
 - A [three-year short-term investment plan](#) that the Department will review to determine which investments are eligible for preauthorization, and
 - A [five-year strategic plan](#) outlining how the company intends to meet the DPU's grid modernization objectives.
- ▶ DPU ruled on Grid Modernization Plans in [May 2018 Order](#)
 - Denied AMI requests but approved reliability/resilience-related requests for ADMS, automation and Volt/var optimization – mentioned recent frequency of large storms
 - Required utilities to file performance metrics, a joint utilities proposed evaluation plan, a model Grid Modernization Factor tariff
 - In April 2019, joint utilities filed [Grid Modernization Plan Performance Metrics](#), for each utility to use to measure progress towards grid modernization.
 - Required utilities to file Annual Grid Modernization Reports with updated projections, and metrics (feeder and substation, system level infrastructure, performance)
- ▶ [House Bill 4857](#) (August 2018) – Established Clean Peak Standard and requirements for *Annual Resiliency Reports* for distribution systems with heat maps of congested/constrained areas

Michigan (1)

- ▶ PSC initially ordered utilities (in rate cases) to file 5-year distribution investment & maintenance plans “to increase visibility into the needs of maintaining the state’s system and to obtain a more thorough understanding of anticipated needs, priorities, and spending.”
 - Commission consolidated all 3 utility filings into [Case No. U-20147](#) (April 2018)
- ▶ Following comments on draft plans, utilities filed final plans:
 - [DTE Electric](#) (2018), [Consumers Energy](#) (2018), [Indiana Michigan](#) (2019)
- ▶ [PSC 2018 Staff Report - Distribution Planning Framework](#) for an “open, transparent, and integrated electric distribution system planning process”
 - PSC [Order](#) on staff recommendations: “*framework ... is to be used as a guide for the next iterations of distribution plans....*” “*Unconventional solutions, including targeted EE, DR, energy storage, and/or customer-owned generation, that could displace or defer investments in a cost-effective, reliable, and timely manner should be considered and evaluated.*”

Michigan (2)

- ▶ Sept. 2019 [order](#) in docket [U-20147](#):
 - Utilities must file their next distribution investment and maintenance plans by June 30, 2021.
 - PSC staff will examine the value of resilience (and its role in cost-benefit methodologies for rate cases and alignment of distribution plans with IRPs) for the next phase of distribution plans. Staff will file a summary of the stakeholder process—including discussions on the value of resilience—for input into distribution plans by April 1, 2020.
 - Utilities will “continue to develop detailed distribution plans over a five-year period, but also include in the plan their vision and high-level investment strategies 10 and 15 years out. This approach is consistent with the planning horizons used in IRPs.”
- ▶ [Stakeholder workshops](#) – June-November 2019
- ▶ [MPSC Staff report](#) on stakeholder workshops – April 1, 2020

- ▶ [Michigan Statewide Energy Assessment](#) by PSC staff (Sept. 11, 2019) recommends utilities:
 - ***“better align electric distribution plans with integrated resource plans to develop a cohesive, holistic plan and optimize investments considering cost, reliability, resiliency, and risk. As part of this effort, Staff, utilities, and other stakeholders should identify refinements to IRP modeling parameters related to forecasts of distributed energy resources (e.g., electric vehicles, on-site solar) reliability needs with increased adoption of intermittent resources, and the value of fuel security and diversity of resources in IRPs. A framework should also be developed to evaluate non-wires alternatives such as targeted energy waste reduction and demand response in IRPs and distribution plans.”***
 - ***“work with Staff and stakeholders to propose a methodology to quantify the value of resilience, particularly related to DERs. In addition, the value of resilience should be considered in future investment decisions related to energy infrastructure in future cases.”***

Michigan (4)

- ▶ [MI Power Grid](#) - Maximize benefits of integrating new energy technologies & optimizing grid investments for reliable and affordable electric service
- ▶ MPSC issued Oct. 17, 2019, [order](#) launching the initiative:
 - *“No later than June 30, 2020, the Commission Staff shall file in this docket a status report on utility pilot projects, summarizing efforts to date, providing recommendations for objective criteria to apply when evaluating proposed utility pilot projects, and identifying potential areas for additional pilot proposals.”* Report [here](#).
 - Optimizing grid investments and performance will include quantifying *“the value of resilience, particularly as it relates to distributed energy resources”*
 - Priority work areas include grid security and reliability metrics (Case Nos. [U-20629](#) and [U-20630](#))
- ▶ Utilities must file their next distribution system plans in final form by Sept. 30, 2021, consistent with updated guidance in the Commission’s [Aug. 20, 2020, order](#) in [Case No. U-20147](#).
 - The plans will articulate the utilities' decision criteria to screen projects for NWA analysis and consider pilots for DERs beyond energy efficiency and demand response.
 - PSC staff will file by May 27, 2021, findings and recommendations relating to methodologies or frameworks for evaluating NWAs.

Minnesota (1)

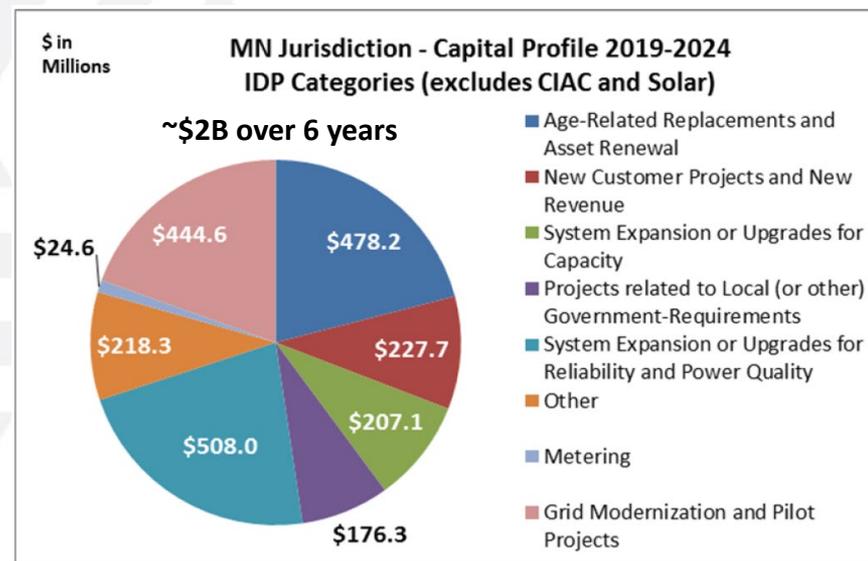
- ▶ [Minn. Stat. §216B.2425](#) (2015) requires largest utility to submit biennial transmission and distribution (T&D) plans to PUC
 - *“identify ... investments that it considers necessary to **modernize the transmission and distribution system by enhancing reliability, improving security against cyber and physical threats, and by increasing energy conservation opportunities** by facilitating communication between the utility and its customers through the use of two-way meters, control technologies, energy storage and microgrids, technologies to enable demand response, and other innovative technologies.”*
 - May ask Commission to **certify priority projects and approve costs through a rider** — a finding that the project is consistent with requirements of this statute, not a prudency determination
 - Analyze hosting capacity for *small-scale distributed generation resources* and to *identify necessary distribution upgrades to support [their] continued development*
- ▶ Xcel Energy filed its [1st grid modernization report](#) in 2015 ([Docket 15-962](#)) and [2nd grid modernization report](#) in 2017 ([Docket 17-776](#))

Minnesota (3)

- ▶ In 2018, the Commission set [Integrated Distribution Planning \(IDP\) requirements for Xcel Energy \(Docket No. 18-251\)](#) and [requirements for smaller regulated utilities](#)
 - Docket Nos. 18-253 (Otter Tail), 18-254 (Minnesota Power), 18-252 (Dakota Electric)
- ▶ Most requirements are the same across utilities
- ▶ Fundamental provisions
 - 10-year Distribution System Modernization and Infrastructure Investment Plan
 - ◆ Including a 5-year action plan, based on internal business plans and DER future scenarios
 - ▶ Base case, medium and high — specifying methods and assumptions
 - Coordination with Integrated Resource Planning (except for Dakota Electric, a distribution coop)
 - Utility holds at least one “timely” meeting prior to filing; PUC staff can convene a stakeholder meeting during public comment period
 - Data specified for filing - Baseline distribution system, financial data, DER deployment
 - For projects >\$2M, analyze how non-wires alternatives (NWAs) compare with traditional grid solutions in terms of viability, price and long-term value
 - ◆ Specify project types (e.g., for load relief or reliability), timelines and cost thresholds

Minnesota (4)

- ▶ Xcel Energy filed its [1st IDP](#) Nov. 1, 2018 (Docket 18-251)
- ▶ [2nd IDP](#) filed Nov. 1, 2019 (Docket 19-666)
 - Grid modernization report required by statute now filed in combination with IDP filing
 - Commission's [July 23, 2020, order](#) in Docket 19-666
 - Approved certification requests for AMI and Field Area Network - "All future cost recovery will be based upon the Company accomplishing Commission-approved metrics and performance evaluations for the certified projects."
 - Also certified Advanced Planning Tool, with enhanced capabilities for DER adoption scenarios, hosting capacity, NWA, load forecasting, and integration with other planning
 - Required [Xcel to file rate design roadmap](#)
- ▶ Next Xcel IDP due Nov. 1, 2021, with continued *annual* updates of baseline financial data and NWA analysis
- ▶ Filings by other regulated utilities
 - MN Power (19-684), Dakota Electric Association (19-674), Otter Tail Power Co. (19-693)



Nevada (1)

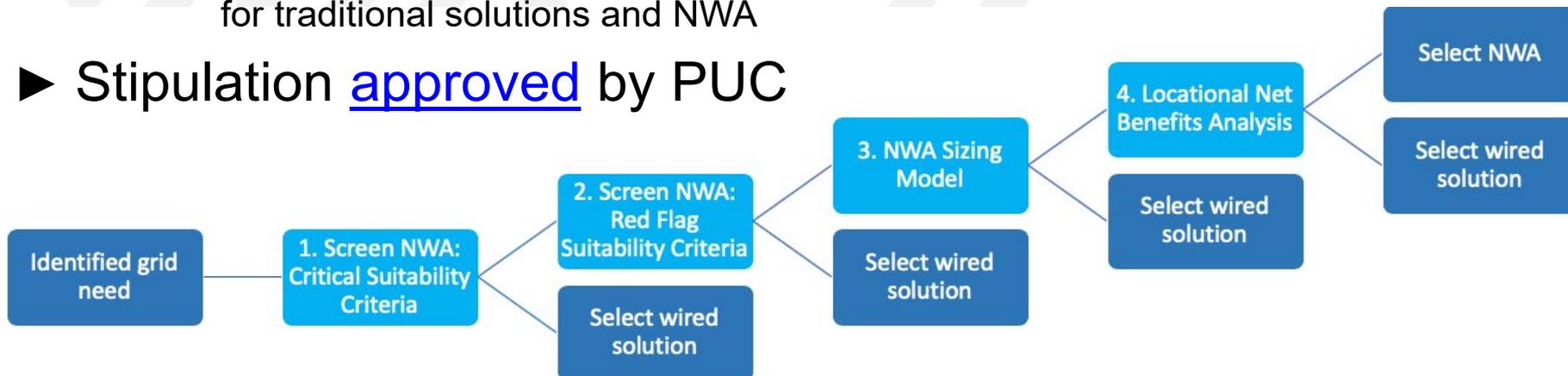


- ▶ [SB 146 \(2017\)](#) requires utilities to file distributed resource plans (DRPs) to evaluate locational benefits and costs of distributed generation, energy efficiency, storage, electric vehicles and demand response technologies.
 - DRP identifies standard tariffs, contracts or other mechanisms for deploying cost-effective distributed resources that satisfy distribution planning objectives.
 - DRP is filed with IRP every 3 years and covers utility's 3-year IRP action plan
- ▶ PUC adopted [temporary planning regulations](#) in 2018 and [permanent regulations](#) in 2019 ([D-17-08022](#))
 - 6-year forecast of net distribution system load (down to feeder level) and distributed resources
 - Hosting capacity analysis and public access to utility's online distribution maps/data
 - Grid Needs Assessment compares traditional and DER solutions for forecasted T&D system constraints
 - *"A utility may recover all costs it prudently and reasonably incurs in carrying out an approved DRP, in the appropriate separate rate proceeding."*

Nevada (2)

- ▶ NV Energy filed its [1st DRP in April 2019](#) ([Docket D-19-04003](#))
 - Distribution system and distributed resource load forecast
 - Hosting capacity analysis
 - Grid Needs Assessment identifying distribution system constraints
 - NWA analysis
 - Utility's suitability/screening tool identified 10 distribution system projects and 107 transmission projects for NWA analysis
 - Locational net benefit analysis
 - considered 8 costs and benefits; identified 3 projects with similar estimated costs for traditional solutions and NWA

- ▶ Stipulation [approved](#) by PUC



New York (1)

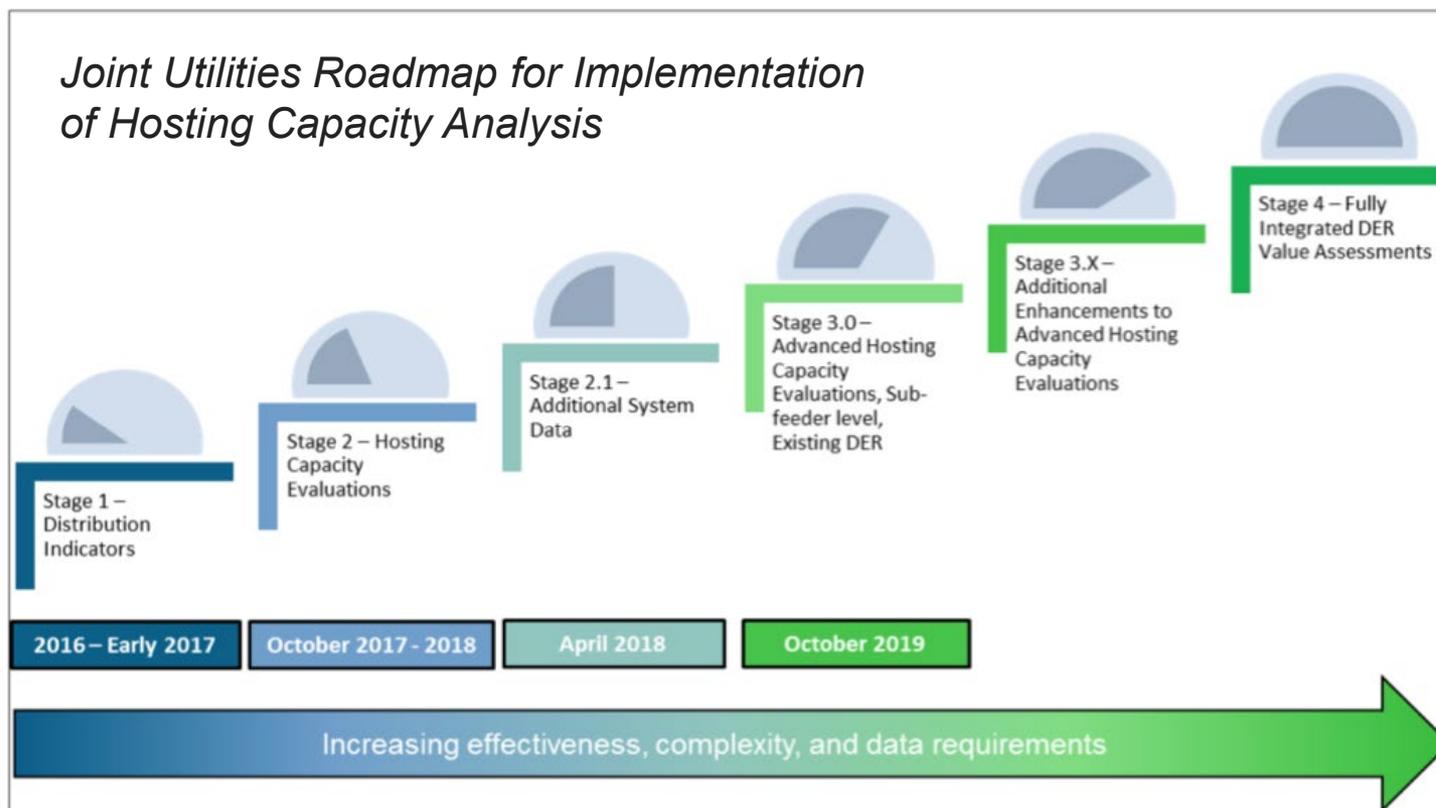
- ▶ [Reforming the Energy Vision](#) – Utilities file Distributed System Implementation Plans (DSIP) every two years
- ▶ [Hosting capacity maps](#) required for all circuits ≥ 12 kV
- ▶ [Value Stack tariff](#) – successor tariff to Net Energy Metering based on value stack of actual costs and benefits
 - Location-specific relief zones
 - Payments to DER (including storage) projects based on energy, capacity, environmental, demand reduction and locational system relief value
 - NY DPS released an updated [Value Stack Order](#) in April 2019.
 - ◆ Demand reduction value is based on a fixed window of peak hours
 - ◆ Locational system relief value uses a call system where eligible projects may receive compensation for responding during utility call windows. Calls made 21 hours in advance. At least ten calls windows a year guaranteed for each LRSV zone.
 - July 2020 [order](#), the PSC set successor rates that allow NEM to continue, but starting 1/1/2022, new mass market PV must use new Value Stack
 - PV owners must pay a Customer Benefit Charge (CBC) to fund a share of public benefit programs
 - [Solar Value Stack Calculator](#) estimates revenue under value tariff

New York (2)

- ▶ Updated [NY PSC DSIP Guidance](#) (April 2018) – Must include sections on:
 - Integrated planning, advanced forecasting, grid operations, energy storage integration, electric vehicle integration, energy efficiency integration and innovation, distribution system data, customer data, cyber-security, DER interconnections, advanced metering infrastructure, hosting capacity, beneficial locations for DERs and NWAs, and procuring NWAs
 - DSIP also must address governance, marginal cost of service studies, and utility’s most recent Benefit-Cost Analysis Handbook
 - Utilities filed their 2nd DSIPs in June 2020; see [NYSEG/RG&E](#); [CONED](#); [O&R](#); [National Grid](#); [Central Hudson](#)
- ▶ Each utility must maintain a Benefit-Cost Analysis Handbook ([BCA order](#))
 - Common handbook template provides a consistent and transparent methodology and presents general BCA considerations and notable issues on data collection required
 - Definitions and equations for each benefit and cost are provided along with key parameters and sources. Where applicable, utilities customize the handbook to account for utility-specific assumptions and information.
 - The NYDPS regularly updates a capacity spreadsheet for calculating avoided costs for Installed Capacity auctions.
 - The utilities filed their 3rd version of the BCA Handbooks in June 2020; see [NYSEG/RG&E](#); [CONED](#); [O&R](#); [National Grid](#); [Central Hudson](#)

New York (3)

- Distribution System Implementation Plans - [Docket 16-M-0411](#)
 - [Pilot Integrated Energy Data Resource](#) launched 1/1/20 - Database and web analytics platform to help DER developers identify, evaluate and initiate DER development
- [Hosting capacity maps](#) — e.g., National Grid maps PV >300kW at sub-feeder level



- ▶ PUCO's [PowerForward initiative](#) - reviewed technological and regulatory innovation that could enhance the consumer electricity experience.
 - Workshops with industry experts “to chart a path forward for future grid modernization projects, innovative regulations and forward-thinking policies”
 - Recommendations will be adapted to each utility on a case-by-case basis in individual proceedings.
- ▶ [PowerForward Roadmap](#) released August 2018 - vision for the modernization of Ohio's grid with a series of recommended next steps
 - Distribution utilities to file grid architecture status reports & current state planning assessments in April 2019, followed by applications for grid arch investments
 - Utilities filed respective grid architecture status reports on April 1, 2019.
 - October 2018 - two separate working groups/dockets: [Distribution System Planning](#) and [Data and the Modern Grid](#)
- ▶ Distribution System Planning Workgroup (EnerNex) [final report](#) and Data and Modern Grid Workgroup [final report](#) issued Jan 2020
- ▶ OH Commission approves Duke [PowerForward rider](#) in Dec 2018 to recover capital and O&M costs for new PowerForward related initiatives
- ▶ [Distribution system reliability code](#), [distribution circuit performance codes](#) and annual reliability compliance filings

Pennsylvania

- ▶ [Distribution System Improvement Charge](#) can be used to recover reasonable and prudent costs to repair, improve or replace eligible distribution property
 - Long Term Infrastructure Improvement Plans (LTIIIPs) must be filed
 - In January 2020, regulators approved grid modernization investments for four FirstEnergy utilities based on LTIIIPs ([Metropolitan Edison, Penelec, PennPower, WestPenn Power](#))
 - Investments approved included: ADMS, DMS, Distribution Automation, SCADA
- ▶ [Distribution reliability code](#) directs PSC to regulate distribution inspection & maintenance plans, requires utilities to report quarterly on worst-performing circuits and make annual compliance filings ([2016 PA reliability report](#))