NARUC Winter Policy Summit

Committees on Energy Resources and the Environment and Electricity

Real World, Real Progress, Real Challenges: Evolving to Align Electricity Planning Approaches

NARUC
National Association of Regulatory Utility Commissioners

NASEO
National Association of State Energy Officials

NARUC-NASEO Task Force on Comprehensive Electricity Planning

NARUC Winter Policy Summit

February 11, 2019

Hon. Jeff Ackermann (CO), Task Force co-chair

Hon. Beth Trombold (OH), Task Force co-vice-chair

NARUC-NASEO Task Force

Purpose: Develop new pathways for aligned electricity planning

- **Distribution level planning (e.g., distribution system planning, grid modernization)**
- **Resource level planning (e.g., integrated resource planning, RPS compliance)**

- **4 workshops over 2 years (start spring 2019)**
  - **Two member-only workshops**
  - **Two member-stakeholder workshops**

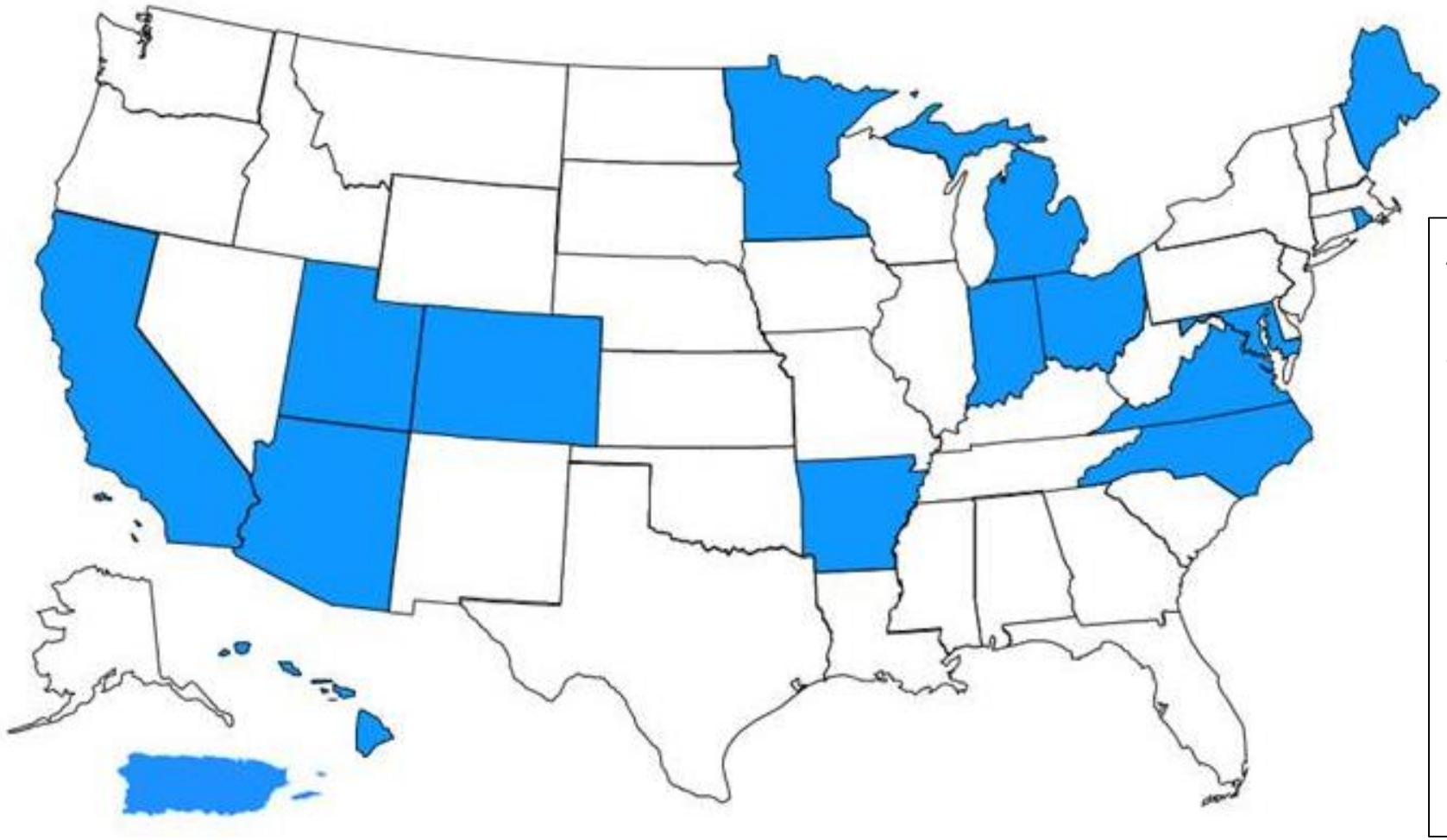
- **State leaders collaborate through a facilitated process**
  - **Commission and state energy office from each state working together**

Targeted Outcomes

1. **Innovation**: Pioneer new tools and roadmaps for aligning planning to meet state needs
   - Participants will convene in multi-state cohorts with others operating in similar market, regulatory, and policy environments
2. **Action**: Apply insights to directly benefit state action
   - Each state will develop concrete steps / an action plan at the end of the initiative
3. **Replication**: NARUC and NASEO will publish templates to support all members

Participants will be supported by each other, technical experts, and facilitators

16 States will represent NARUC & NASEO members



Accepted 16 states from 21 requests

Selected States Ensure Diversity in:

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

NARUC Winter Policy Summit

Committees on Energy Resources and the Environment and Electricity

Unpacking Integrated Energy Network Planning

"Real World, Real Progress, Real Challenges: Evolving to Align Electricity Planning Approaches"

JOINT SESSION: Electricity and Energy Resources & the Environment Committees

Anda Ray
Senior Vice President, External Relations and Technical Resources, EPRI

NARUC Winter Policy Summit
Washington, D.C.
February 11, 2019

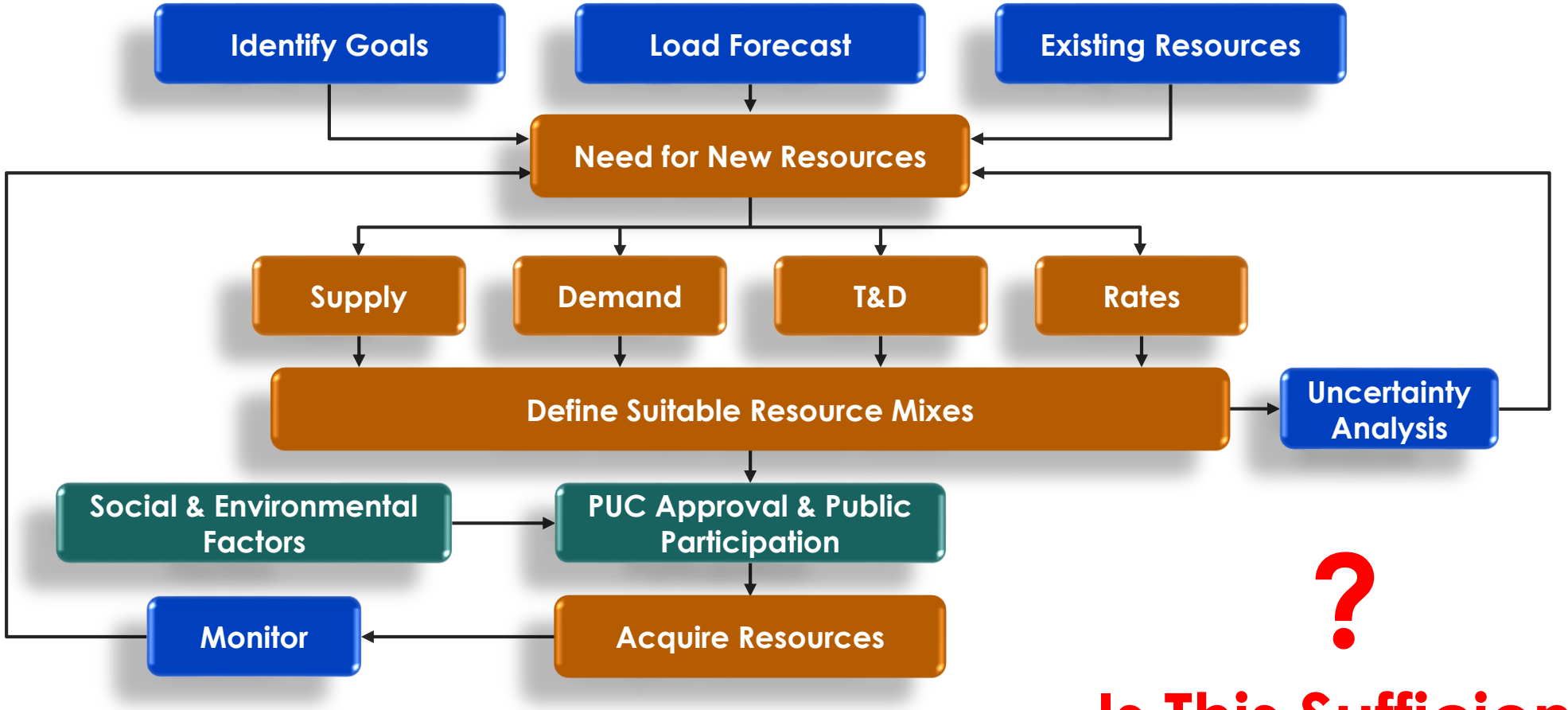
Integrated Energy Network

Source:
EPRI 3002009917
February 2017

…Best Serves the Customer

Integration of Interdependent Energy Resources is enabled by advances in Digitization, Information and Communication Technologies – Realizing the full value of all energy resources.

Traditional Activities Involved in Integrated Resource Planning Model



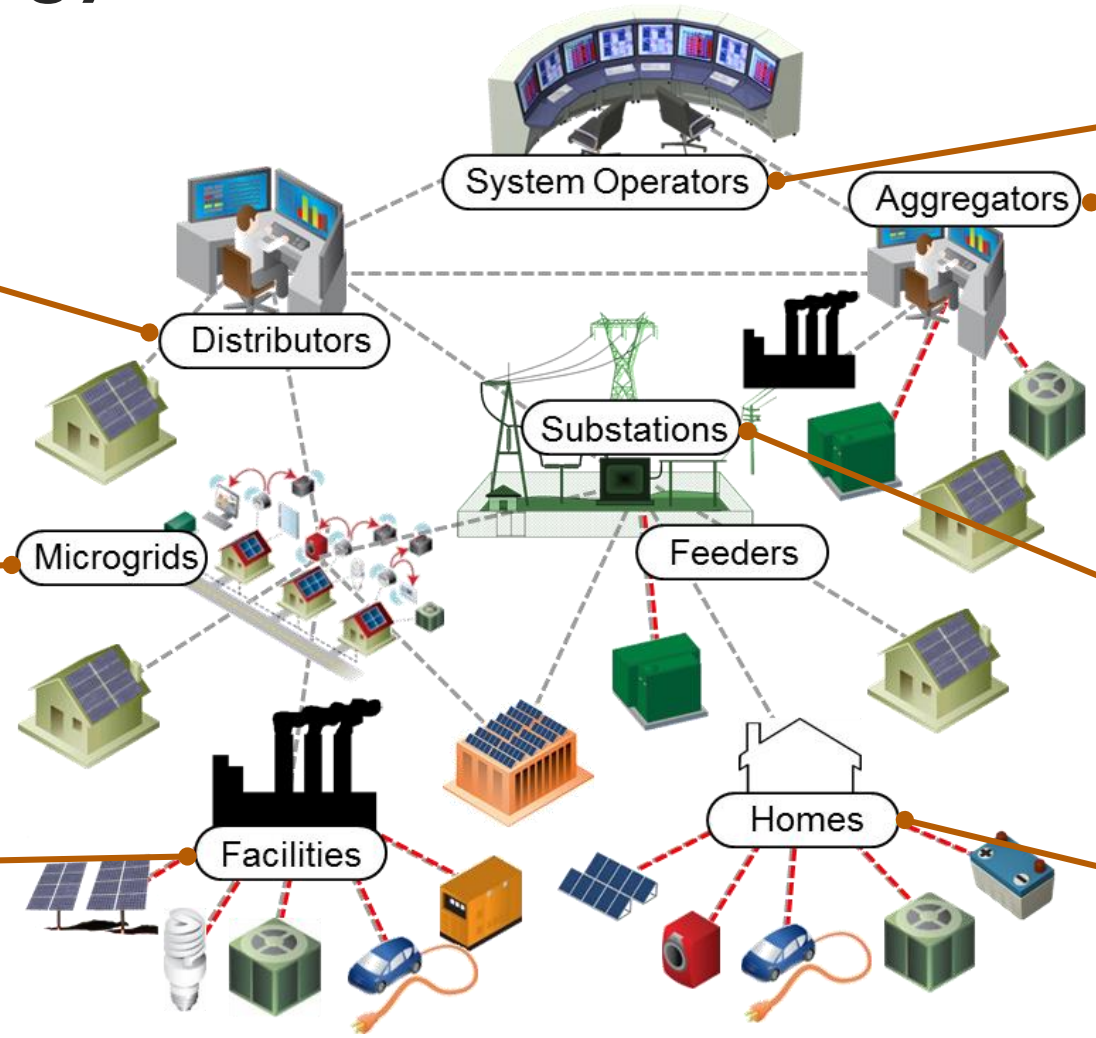
?

Is This Sufficient

Source: EPRI based on Hirst, E. (December 1992) *A good integrated resource plan: Guidelines for electric utilities and regulators.* US DOE, Oak Ridge National Laboratory

Traditional Primary Focus on Resource Adequacy Objectives

Integrated Energy Network Enables a Shared Integrated Grid



Expanded distribution-level ancillary services

Improved "handshakes" in T&D planning

Connections to other critical infrastructure

Harmonizing system operations, with greater ISO-level visibility

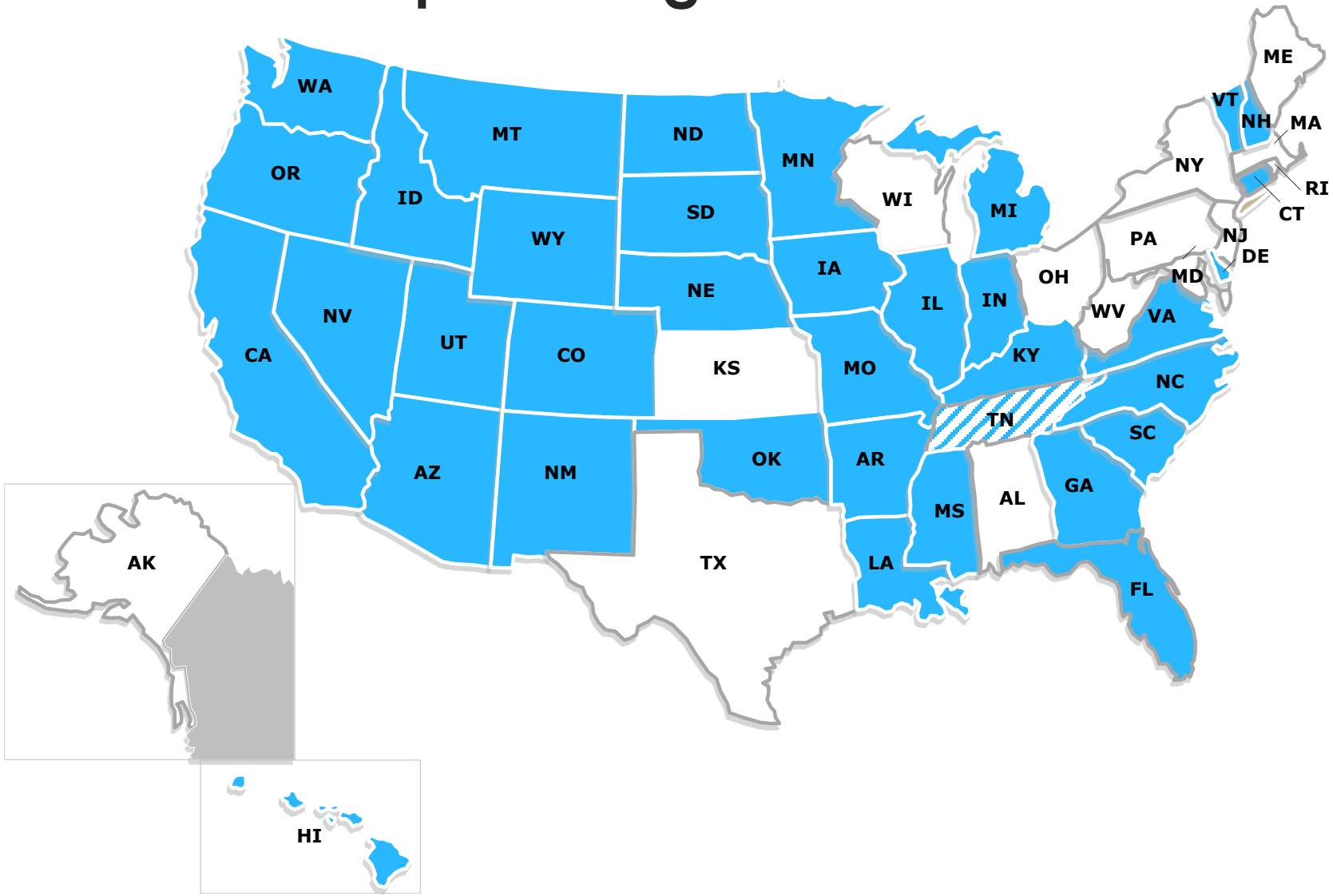
Enhanced DER valuation and targeting

Rising importance of T&D system interaction

Evaluation of non-wires alternatives

Integrated Energy Network Planning in Practice in a *Multi-Party Grid*

More Than 30 States Require Integrated Resources Plans or Similar



States that Required Integrated Resources Planning as of 2015

Source: Adapted from United States Environmental Protection Agency Energy and Environment Guide to Action 2015. Based on research conducted for EPA by Synapse Energy Economics, updated from Synapse 2013. Additional updates by EPRI 2018.

What is Needed in Integrated Resource Planning?

Integrated

Spans all electricity supply resources and demand-side options, generation, transmission and distribution planning, and other key resources/infrastructure.

Energy

Extends beyond electricity.

Network

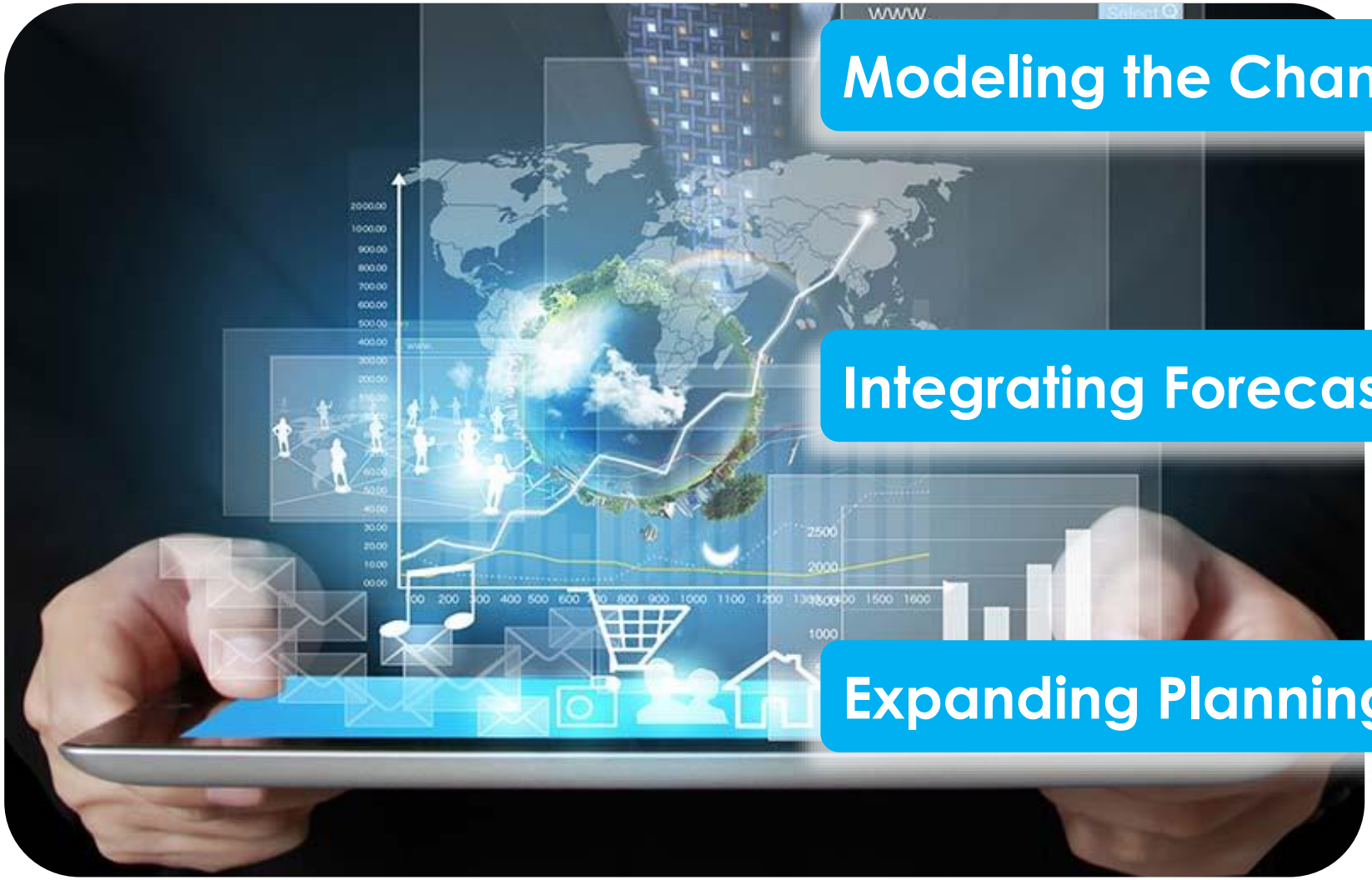
Involves the entire electric grid, the energy network, and associated infrastructure.

Planning

Provides a strategic framework to enhance long-term electric sector investment planning.

Integrated Energy Network Planning (IEN-P)

The Integrated Energy Network: Critical Resource Planning Challenges

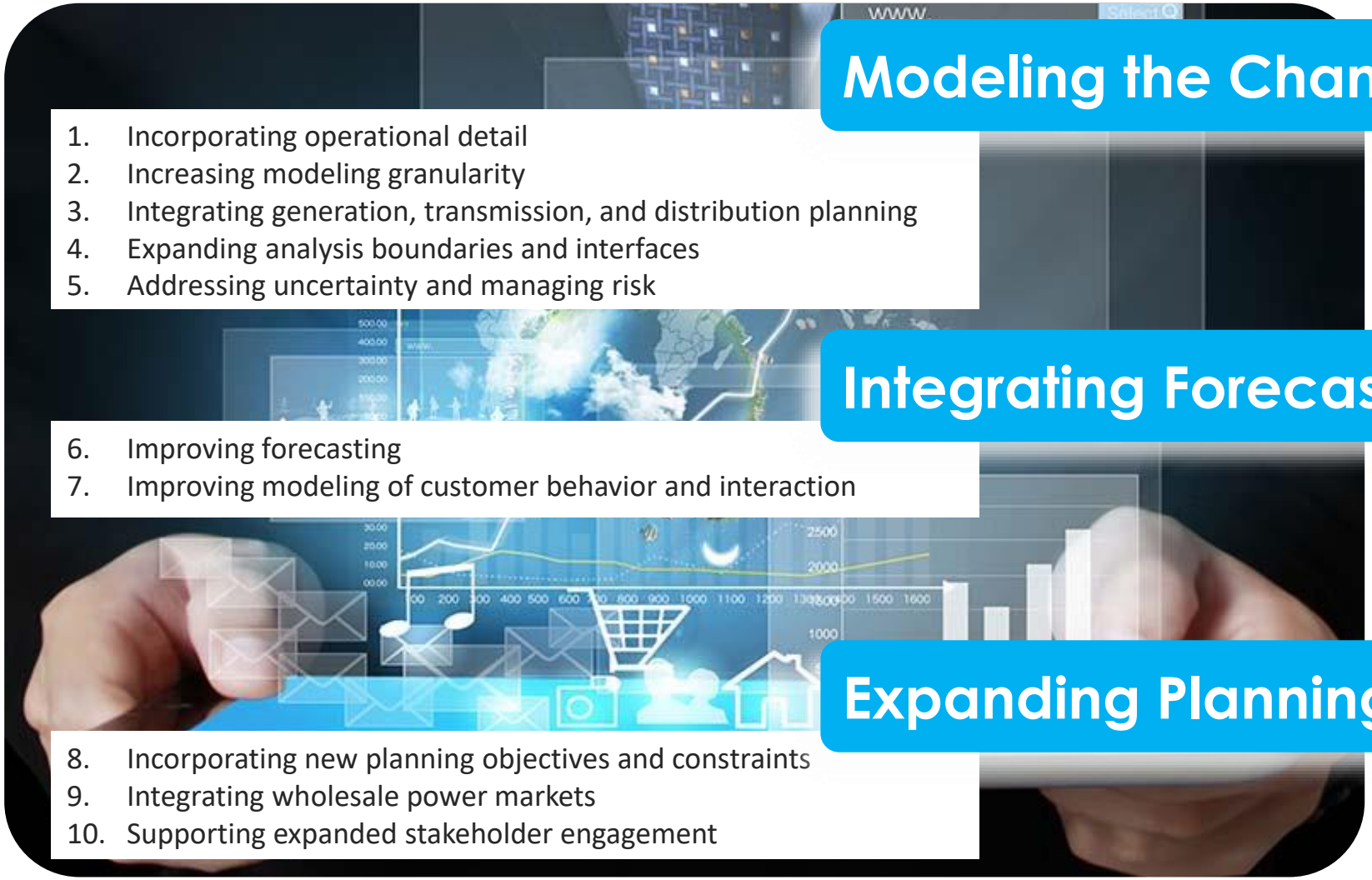


Modeling the Changing Power System

Integrating Forecasts

Expanding Planning Boundaries

The Integrated Energy Network: 10 Critical Resource Planning Challenges



Modeling the Changing Power System

1. Incorporating operational detail
2. Increasing modeling granularity
3. Integrating generation, transmission, and distribution planning
4. Expanding analysis boundaries and interfaces
5. Addressing uncertainty and managing risk

Integrating Forecasts

6. Improving forecasting
7. Improving modeling of customer behavior and interaction

Expanding Planning Boundaries

8. Incorporating new planning objectives and constraints
9. Integrating wholesale power markets
10. Supporting expanded stakeholder engagement

IEN-P Report

The Integrated Energy Network: Critical Resource Planning Challenges

1. Incorporating operational detail
2. Increasing modeling granularity
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7. Improving modeling of customer behavior and interaction

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10. Supporting expanded stakeholder engagement

Modeling the Changing Power

Integrating Forec

Expanding Plann

175 Citations for Completed EPRI Research Related to Each of the Resource Planning Challenges

Annotated Resources for Regulators and Planners

The Integrated Energy Network: Critical Resource Planning Challenges

- Incorporating operational detail
- Increasing modeling granularity
- Integrating generation, transmission, and distribution planning
4. Expanding analysis boundaries and interfaces
- Addressing uncertainty and managing risk

6. Improving forecasting
7. Improving modeling of customer behavior and interaction

8. Incorporating new planning objectives and constraints
9. Integrating wholesale power markets
- Supporting expanded stakeholder engagement

Modeling the Changing Power

Integrating Forec

Expanding Plann

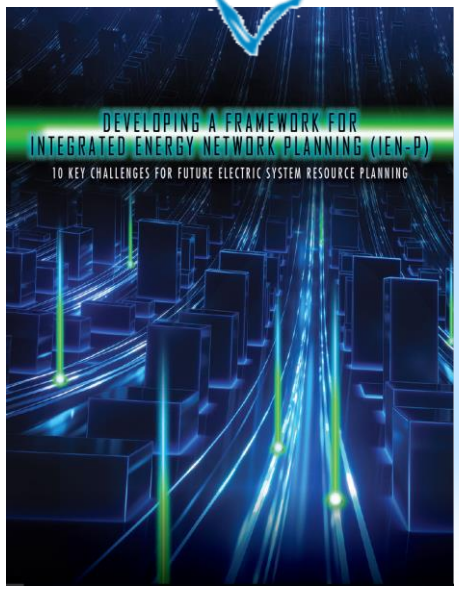
5 Utility Case Studies

(Pending – Q1 2019)

5 Case Studies

Integrated Energy Network Planning Resources

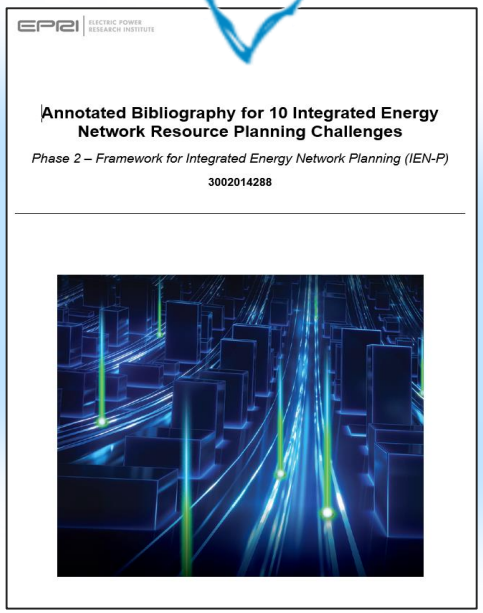
July 2018



EPRI Product ID# 3002010821

Developing an Integrated Energy Network Planning (IEN-P) Framework

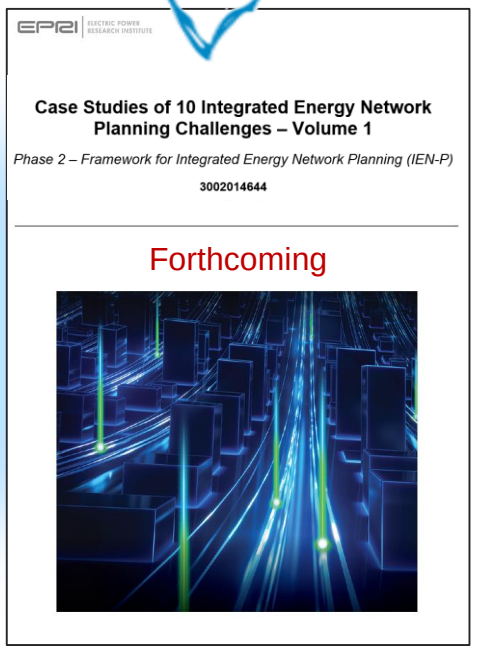
Sept 2018



EPRI Product ID# 3002014288

IEN-P Annotated Bibliography

2019 (Pending)



EPRI Product ID# 3002014644

IEN-P Case Studies – Vol. 1

Integrated Energy Network Planning (IEN-P)

Providing Greater Visibility into the Future

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

"Helping to Inform"

NARUC
National Association of Regulatory Utility Commissioners

NASEO
National Association of State Energy Officials

U.S. DEPARTMENT OF ENERGY

NARUC-NASEO System Planning Task Force

Together...Shaping the Future of Electricity

NARUC Winter Policy Summit

Committees on Energy Resources and the Environment and Electricity

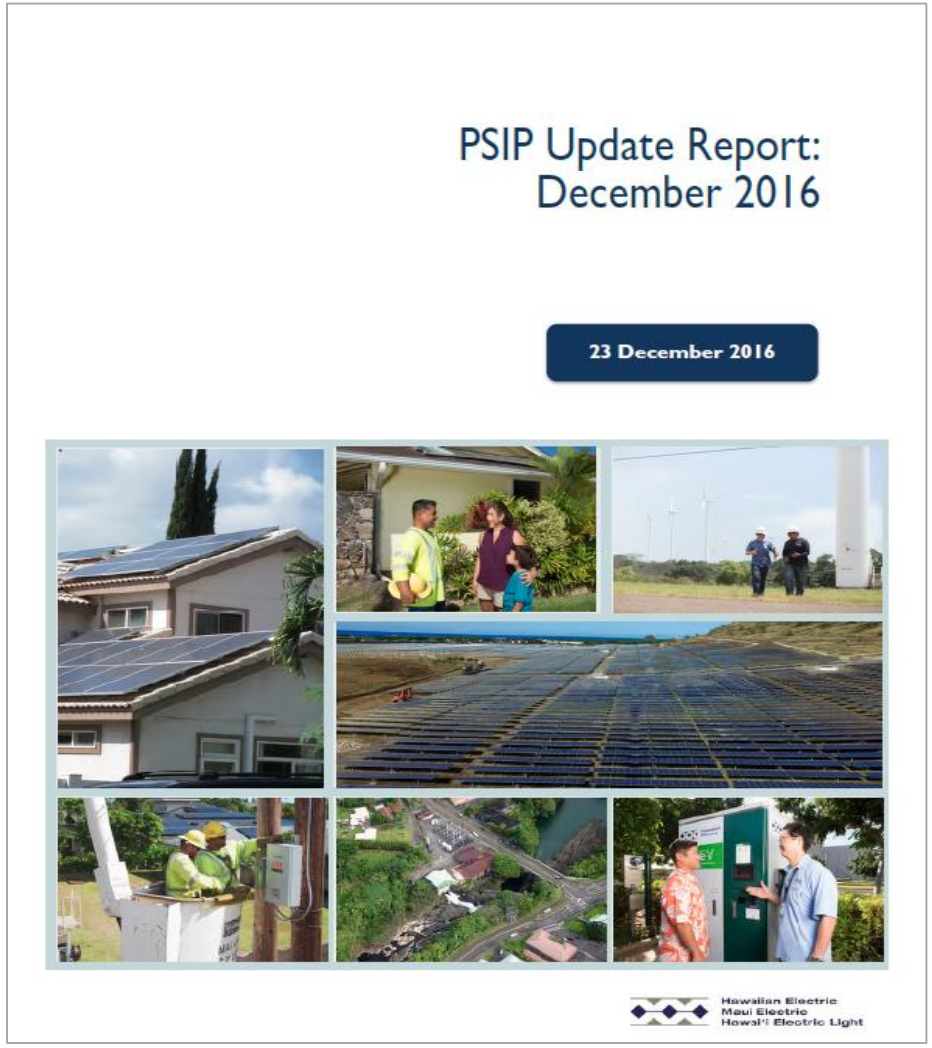
Integrated Grid Planning

Putting portfolio, transmission, and distribution planning into practice

Hawaiian Electric
Maui Electric
Hawai‘i Electric Light

February 11, 2019

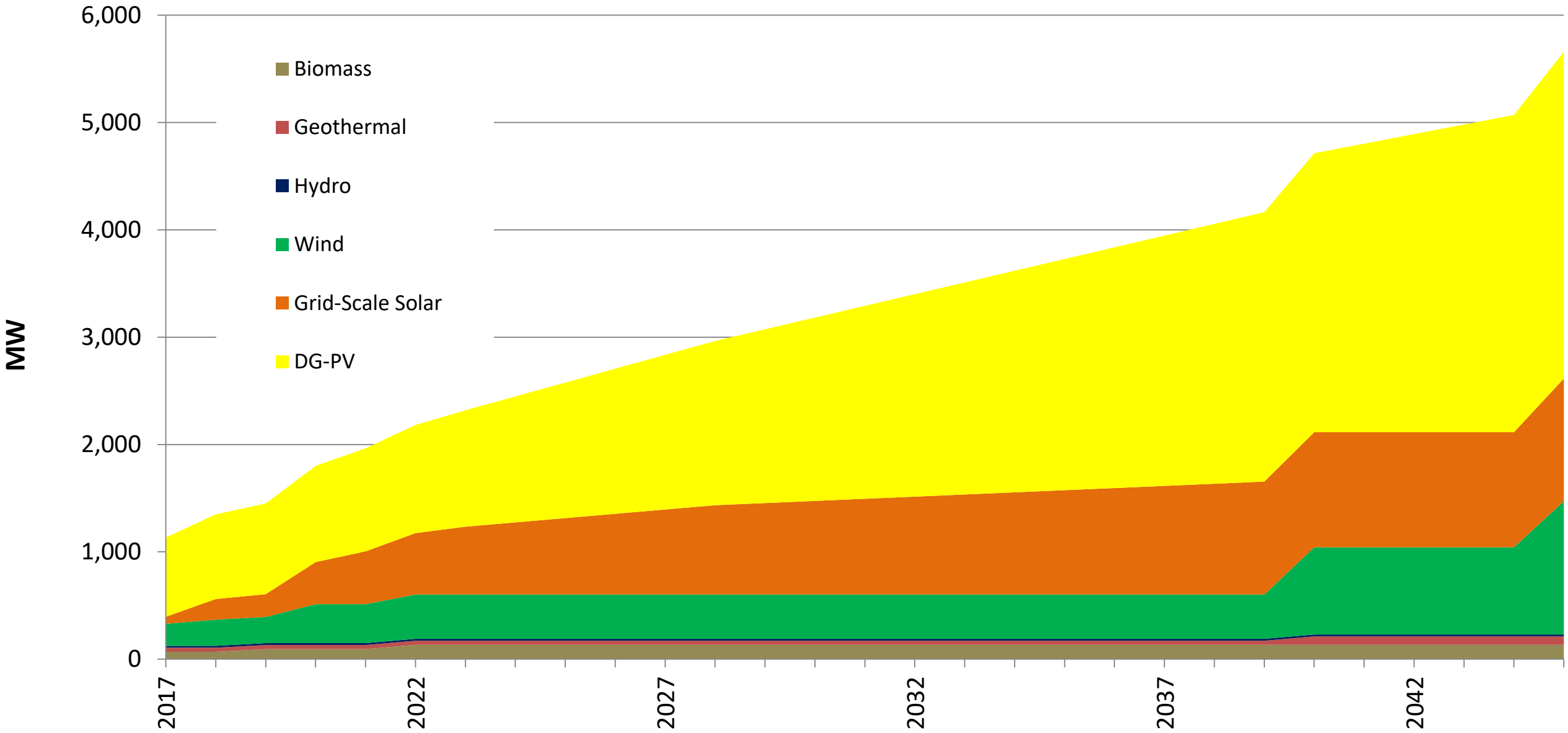
Power Supply Improvement Plan



- Considers multiple long-range pathways to inform development of specific near-term actions that the Hawaiian Electric Companies will take from 2017 through 2021 to accelerate the achievement of Hawaii's 100 percent Renewable Portfolio Standard (RPS) by 2045
- Accepted by the PUC in July 2017

Hawaiian Electric
Maui Electric
Hawai'i Electric Light

https://www.hawaiianelectric.com/about-us/our-commitment/investing-in-the-future/integrated-grid-planning



Hawaiian Electric
Maui Electric
Hawai'i Electric Light

Stakeholder Feedback

"The absence of such unified valuation [integrated planning] *has the real potential to create market inefficiencies and inconsistent assessment of resource selection."*

Hawaii PUC DR D&O p. 96

Feedback

- ***Need to create value for all customers***
- Need for integrated analysis
- Need market based alternatives to evaluate
- Technology neutral
- Need for portfolio optimization
- Utility plans must address broader utility capital program

Process Challenges

- ***Not sustainable to ensure customer value***
- Serial not integrated analysis
- Stacked values – not optimized
- Avoided proxy cost vs competitive bid prices
- Stakeholder tendency to debate the theoretical
- Complexity & contentious process

What is Integrated Grid Planning (IGP)?

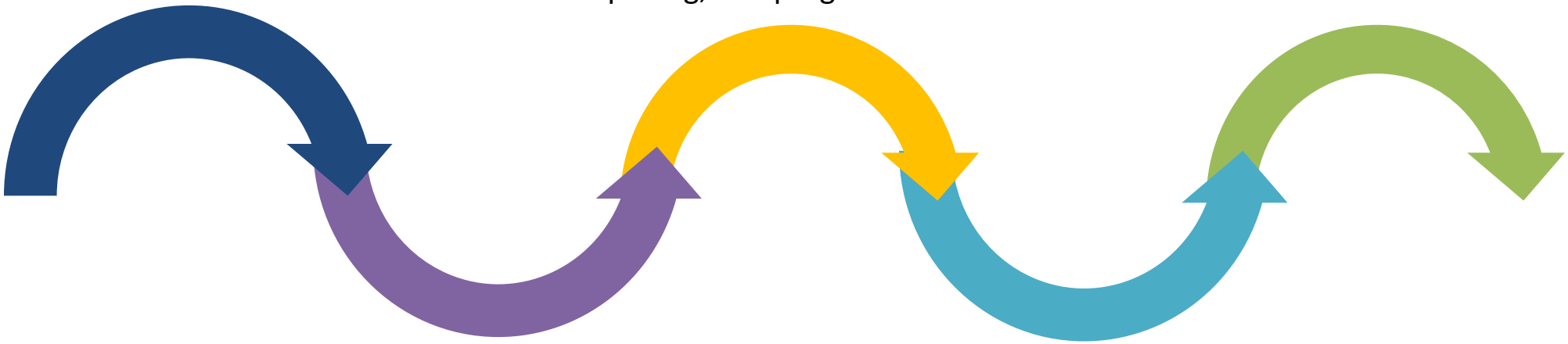
- Integrated grid Planning
  - Integrates planning analysis for resources, transmission and distribution to ensure the net requirements for the system are transparently identified & optimized
  - Integrates market-sourced alternatives into the analysis instead of relying on theoretical price/cost assumptions
  - Integrates stakeholders' input and feedback into the overall process
- Creates opportunities to optimize resource, transmission, and distribution solutions to provide customer value
- Resulting in better value for customers
- Creates greater market opportunities for developers & aggregators

PATHWAYS TO 100 PERCENT RENEWABLE ENERGY

FORECASTS AND ASSUMPTIONS
Based on customer needs and feedback, previous planning cycle results, and policy goals

SOLUTION SOURCING
Identification of least cost, best fit solution options to fulfill grid needs through the establishment of a marketplace through procurements, pricing, and programs.

COMMISSION REVIEW OF PLAN
Seek commission approval of 5-year plan with discrete investments, programs, and pricing proposals.

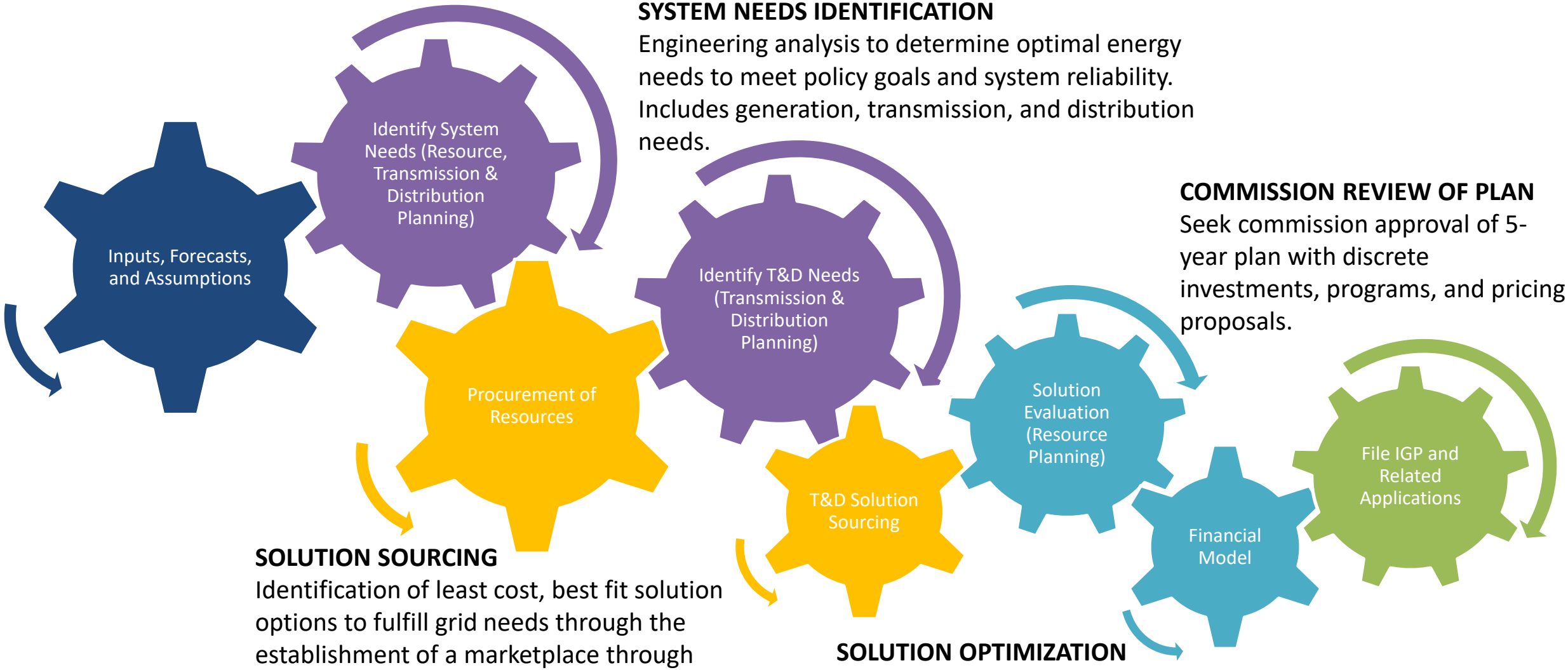


GRID NEEDS IDENTIFICATION
Engineering analysis to determine optimal energy needs to meet policy goals and system reliability. Includes generation, transmission, and distribution needs.

SOLUTION OPTIMIZATION
Evaluation and optimization of resource and transmission and distribution solutions acquired through marketplace. Includes an optimized 5-year grid plan.

STAKEHOLDER AND CUSTOMER ENGAGEMENT

IGP & Solution Sourcing Process



SYSTEM NEEDS IDENTIFICATION
Engineering analysis to determine optimal energy needs to meet policy goals and system reliability. Includes generation, transmission, and distribution needs.

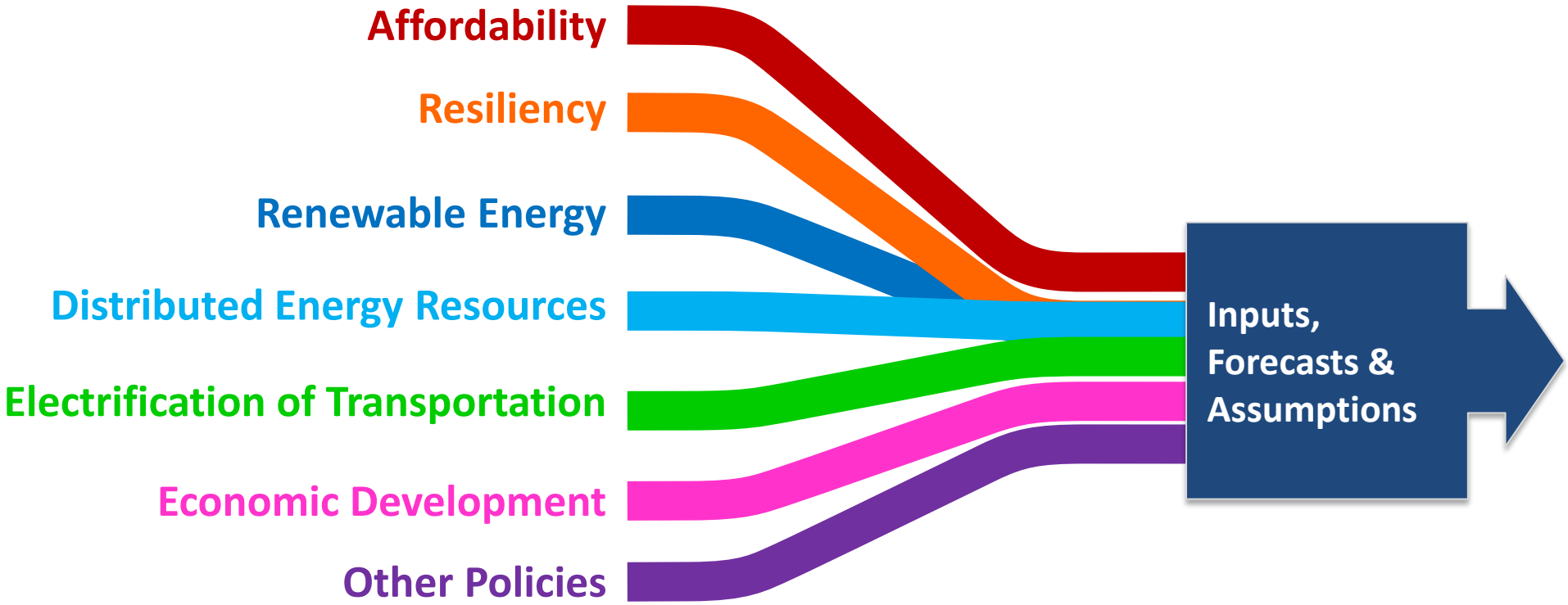
COMMISSION REVIEW OF PLAN
Seek commission approval of 5-year plan with discrete investments, programs, and pricing proposals.

SOLUTION SOURCING
Identification of least cost, best fit solution options to fulfill grid needs through the establishment of a marketplace through procurements, pricing, and programs.

SOLUTION OPTIMIZATION
Evaluation and optimization of resource and transmission and distribution solutions acquired through marketplace. Includes an optimized 5-year grid plan.

IGP Enables Convergent Outcomes

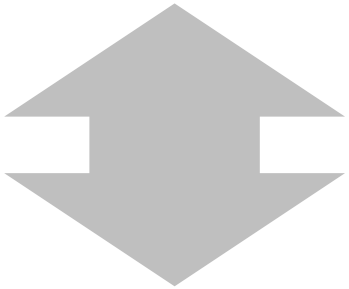
Discrete Objectives Converge Thru Unifying Planning & Solution Selection Process



Stakeholder Engagement Model

Hawaiian Electric Companies IGP Process

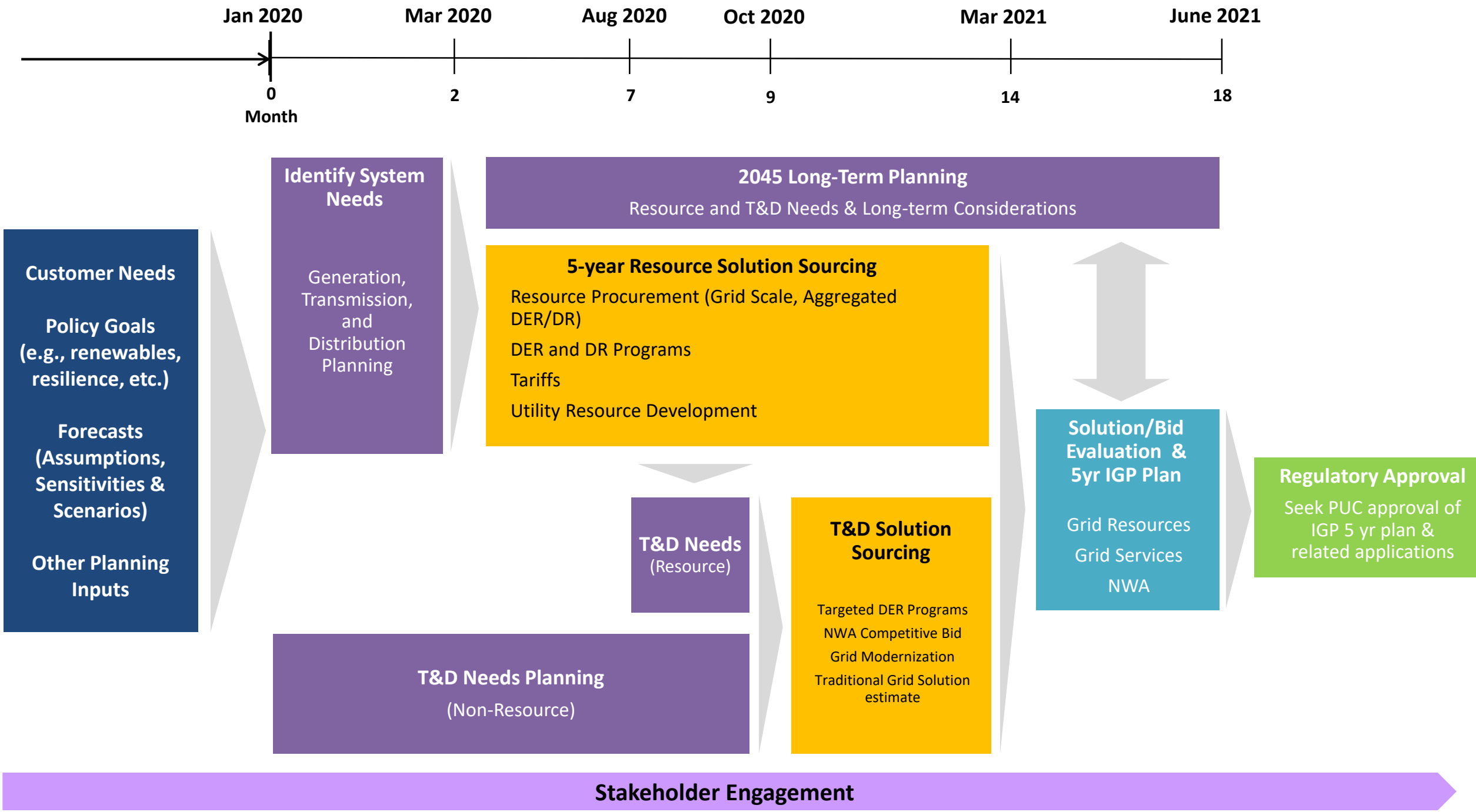
Education & Information



Input & Feedback

- Broad Public Engagement
- Stakeholder Council
- Technical Advisory Panel
- Individual Stakeholder Engagement
- Working Groups

Hawaiian Electric
Maui Electric
Hawai'i Electric Light


Jan 2020
Mar 2020
Aug 2020
Oct 2020
Mar 2021
June 2021
0
Month
2
7
9
14
18
Customer Needs
Policy Goals (e.g., renewables, resilience, etc.)
Forecasts (Assumptions, Sensitivities & Scenarios)
Other Planning Inputs
Identify System Needs
Generation, Transmission, and Distribution Planning
2045 Long-Term Planning
Resource and T&D Needs & Long-term Considerations
5-year Resource Solution Sourcing
Resource Procurement (Grid Scale, Aggregated DER/DR)
DER and DR Programs
Tariffs
Utility Resource Development
T&D Needs
(Resource)
T&D Needs Planning
(Non-Resource)
T&D Solution Sourcing
Targeted DER Programs
NWA Competitive Bid
Grid Modernization
Traditional Grid Solution estimate
Solution/Bid Evaluation & 5yr IGP Plan
Grid Resources
Grid Services
NWA
Regulatory Approval
Seek PUC approval of IGP 5 yr plan & related applications
Stakeholder Engagement

Hawaiian Electric
Maui Electric
Hawai‘i Electric Light

Mahalo!

Learn more at: www.hawaiianelectric.com/IGP

NARUC Winter Policy Summit

Committees on Energy Resources and the Environment and Electricity

Chairman Sally Talberg

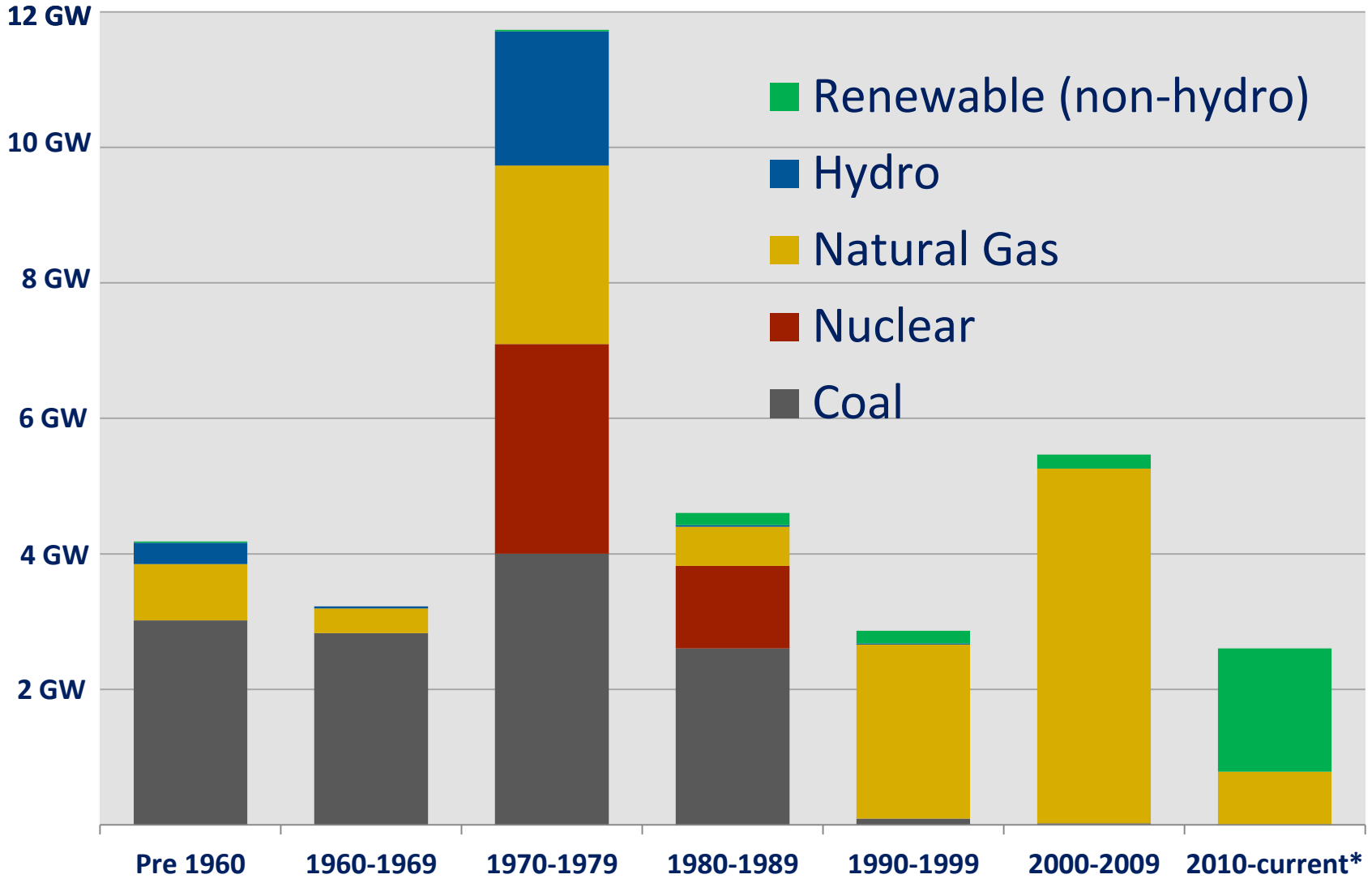
Presentation to NARUC Energy Resources & Environment Committee

February 11, 2019

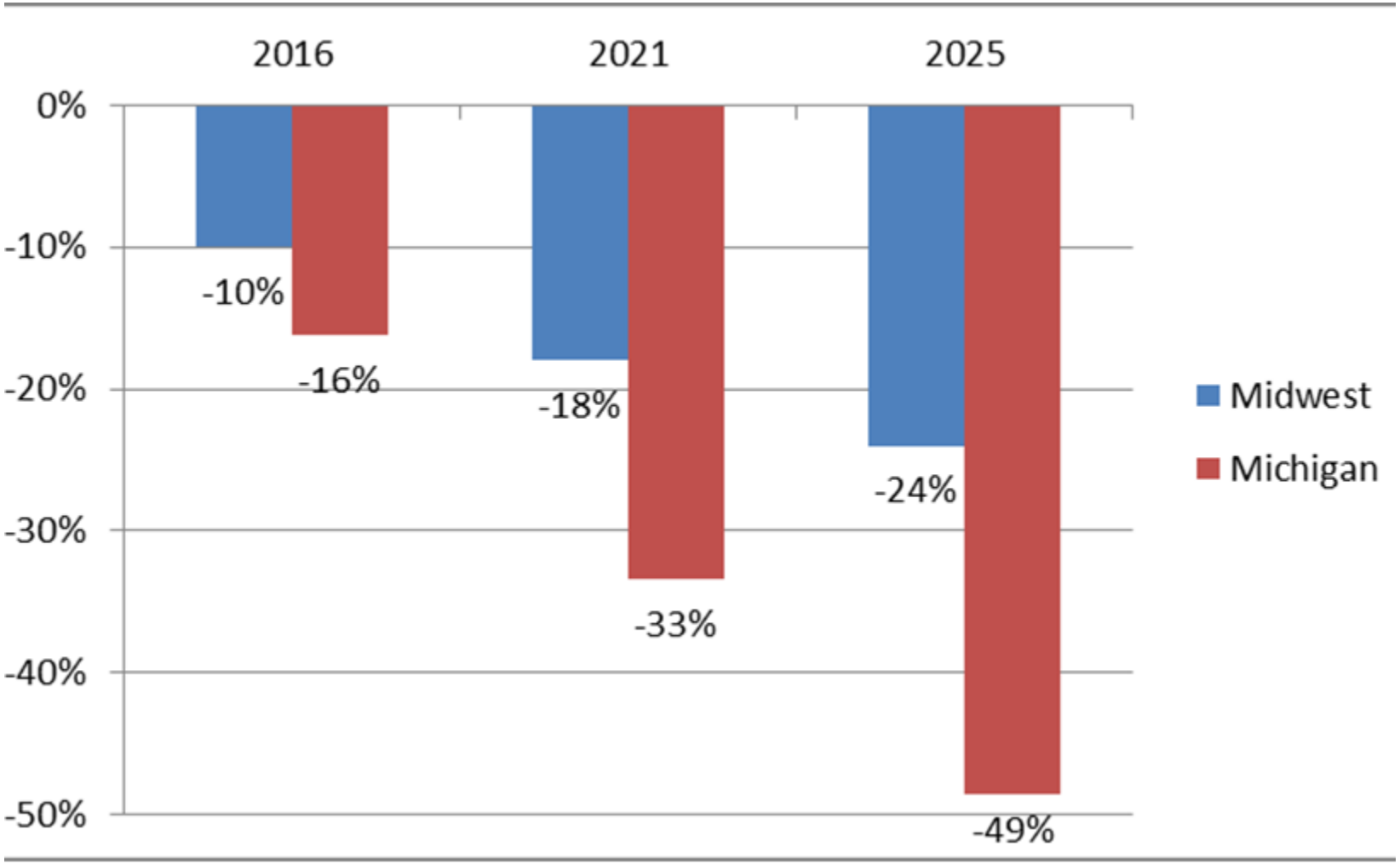
MPSC
Michigan Public Service Commission

When Was It Built?

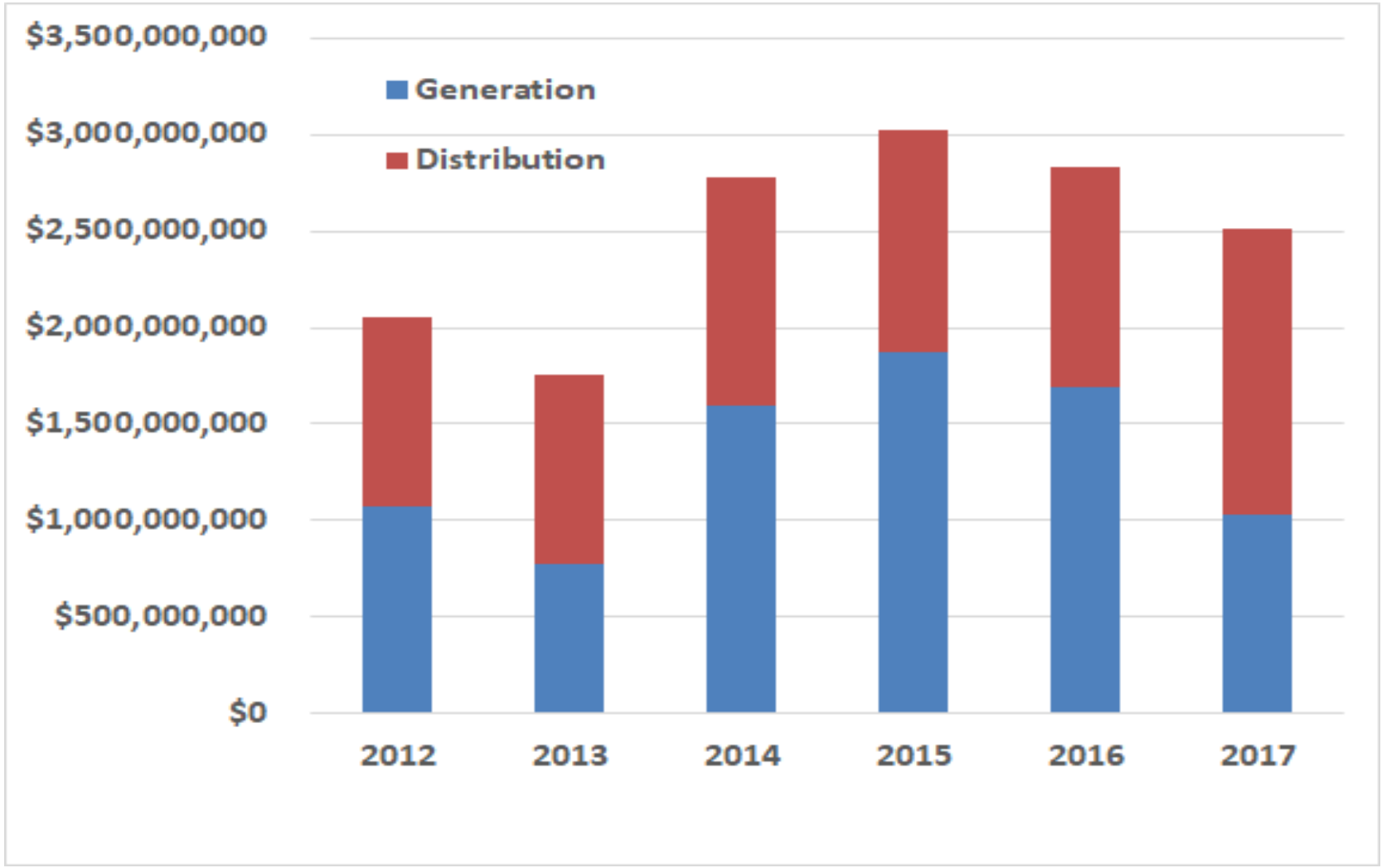
Michigan generation capacity by in-service date, based on EIA data through 2017*



Reductions In Coal Capacity



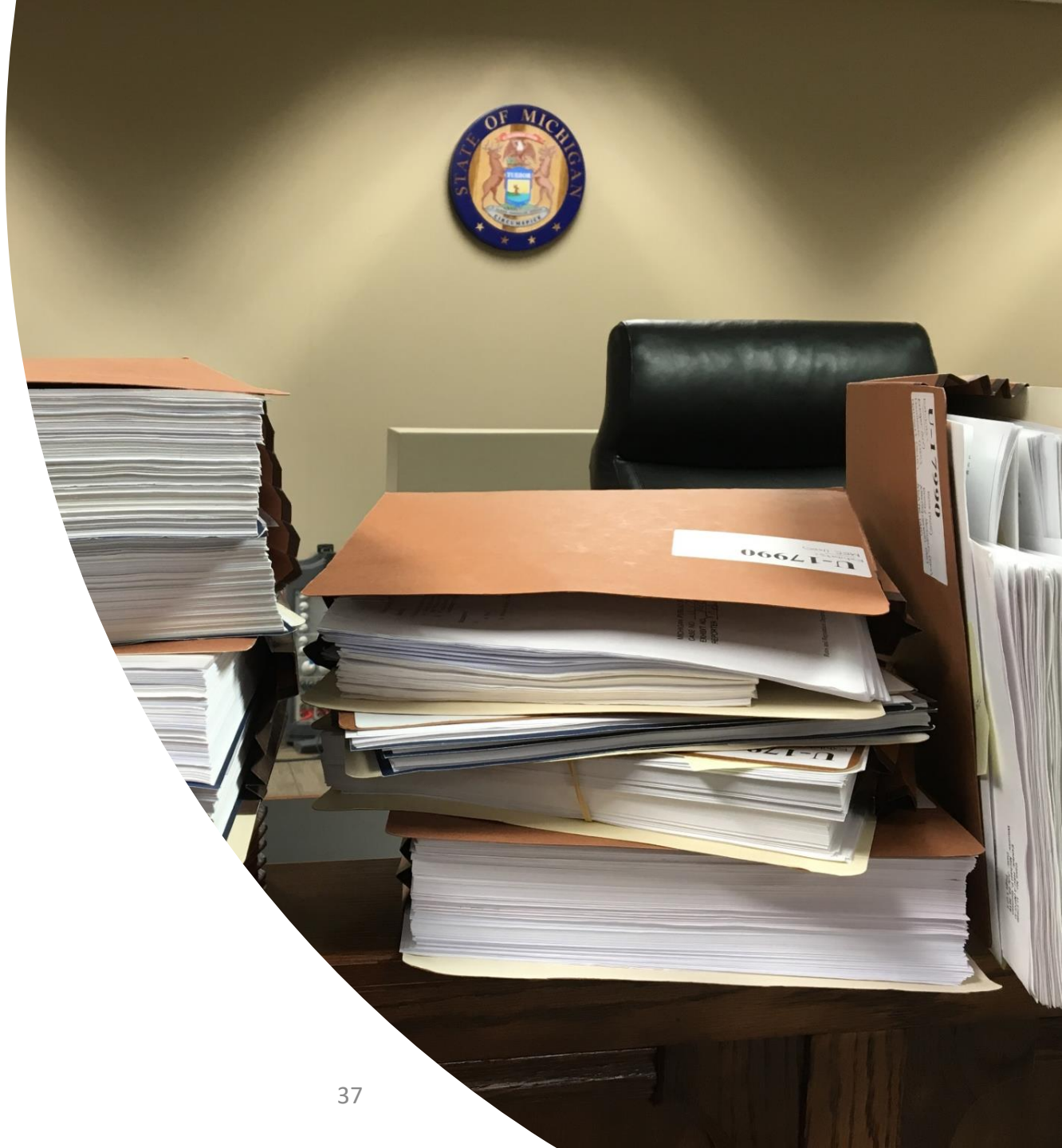
CapEx Incremental Investment: Electric



DTE Energy and Consumers Energy investment and depreciation

Current Status

- Consumers Energy IRP - MPSC Initial Decision April 2019; other IRPs throughout year
- July 2019 – Initial statewide assessment examining energy supply and delivery vulnerabilities and contingency planning
- Completed first distribution plans early 2018, next plans early 2020 (currently separate from IRPs)



Current Limitations

- Technology moves faster than regulation
- Limitations in decision tools and processes
  - Ability of modeling tools to address real-time operational reliability
  - Alternative analyses siloed, varying timelines and decision criteria
  - Resource procurement largely asset specific
  - Resource attributes (e.g., storage) not fully recognized
- Competing interests
- Inefficient interconnection processes

Planning Integration Opportunities

- NASEO-NARUC Task Force!
- Mapping various planning processes, timelines, decision criteria, assumptions
- Better align operations with planning
- Partner with DOE, RTOs, national labs on modeling tool enhancement
- Improve forecasting methods
- Adapt business and regulatory models

References

- **www.Michigan.gov/MPSC**
- **Click on e-dockets**
  - **Consumers Energy IRP U-20165**
  - **Distribution plans U-20147**
- **www.Michigan.gov/energylegislation**
  - **IRP parameters**
  - **Demand response potential studies**
  - **Performance-based ratemaking**
- https://www.michigan.gov/mpsc/0,4639,7-159-80741---,00.html,

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