Committees on Energy Resources and the Environment and Electricity

Real World, Real Progress, Real Challenges: Evolving to Align Electricity Planning Approaches
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)
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
Integration of Interdependent Energy Resources is enabled by advances in Digitization, Information and Communication Technologies – Realizing the full value of all energy resources.

…Best Serves the Customer
Traditional Activities Involved in Integrated Resource Planning Model

- Identify Goals
- Load Forecast
- Existing Resources

- Need for New Resources
  - Supply
  - Demand
  - T&D
  - Rates

- Define Suitable Resource Mixes
- Uncertainty Analysis

- Social & Environmental Factors
- PUC Approval & Public Participation
- Monitor
- Acquire Resources

Is This Sufficient


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
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

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

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

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
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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

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5 Case Studies

5 Utility Case Studies (Pending – Q1 2019)
Integrated Energy Network Planning Resources

July 2018

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

EPRI Product ID# 3002010821

Sept 2018

IEN-P Annotated Bibliography

EPRI Product ID# 3002014288

2019 (Pending)

IEN-P Case Studies – Vol. 1

EPRI Product ID# 3002014644

Case Studies of 10 Integrated Energy Network Planning Challenges – Volume 1

Forthcoming
Integrated Energy Network Planning (IEN-P)

Providing Greater Visibility into the Future

“Helping to Inform”

NARUC-NASEO System Planning Task Force
Together…Shaping the Future of Electricity
Committees on Energy Resources and the Environment and Electricity
Integrated Grid Planning
Putting portfolio, transmission, and distribution planning into practice
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
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
FORECASTS AND ASSUMPTIONS
Based on customer needs and feedback, previous planning cycle results, and policy goals

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

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.

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

STAKEHOLDER AND CUSTOMER ENGAGEMENT
IGP & Solution Sourcing Process

SYSTEM NEEDS IDENTIFICATION
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IGP Enables Convergent Outcomes

Discrete Objectives Converge Thru Unifying Planning & Solution Selection Process

- Affordability
- Resiliency
- Renewable Energy
- Distributed Energy Resources
- Electrification of Transportation
- Economic Development
- Other Policies

Inputs, Forecasts & Assumptions
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
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 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

T&D Needs (Resource)

T&D Needs Planning
(Non-Resource)

STakeholder Engagement
Committees on Energy Resources and the Environment and Electricity
When Was It Built?

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

- Renewable (non-hydro)
- Hydro
- Natural Gas
- Nuclear
- Coal

12 GW
10 GW
8 GW
6 GW
4 GW
2 GW

Reductions In Coal Capacity

<table>
<thead>
<tr>
<th>Year</th>
<th>Midwest</th>
<th>Michigan</th>
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<tr>
<td>2016</td>
<td>-10%</td>
<td>-16%</td>
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<tr>
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<td>-18%</td>
<td>-33%</td>
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<tr>
<td>2025</td>
<td>-24%</td>
<td>-49%</td>
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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

• Click on e-dockets
  – Consumers Energy IRP [U-20165](http://www.michigan.gov/mpsc/0,4639,7-159-80741--.00.html)
  – Distribution plans [U-20147](http://www.michigan.gov/mpsc/0,4639,7-159-80741--.00.html)
  – IRP parameters
  – Demand response potential studies
  – Performance-based ratemaking
• [https://www.michigan.gov/mpsc/0,4639,7-159-80741--.00.html](https://www.michigan.gov/mpsc/0,4639,7-159-80741--.00.html)
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