## **Coordinated Electricity Planning: Approaches to planning alignment and optimizing for emergent outcomes**

Matthew McDonnell, Esq. | 2021 NCEP Annual Meeting | September 14





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# Agenda

#### + Need for Comprehensive and Coordinated Electricity Planning

- + Integrated Planning Process
  - Planning Objectives + Criteria
  - System Forecast + Scenarios
  - Transmission Planning; DER / Microgrid Sourcing
- + Planning Alignment: Pulling the Pieces Together
- + Key Takeaways

### **The Need for Planning Coordination**



**Electric Power System** 

Natural Gas System

Source: McDonnell, Strategen 2021





# Why Comprehensive Electricity Planning?

A dynamically transforming power system now requires:

- + Renewed focus on resilience in the face of increased extreme weather events
- + Optimal integration of DERs to unlock their grid value
- + Equity considerations to ensure that disadvantaged populations are not adversely affected and have access to the benefits of it
- + Decarbonization of the power sector necessitates significant infrastructure deployment and customers cannot afford to bear costs of duplicate and inefficient investment

## **Integrated Planning Process**





## **1** Planning Objectives and Criteria





## **2** System Forecast and Scenarios

#### **Data flows and information sharing:**

- + Critical to ensure that models used across multiple planning processes (resource/transmission/distribution)
- + Renewed focus on resilience in the face of increased extreme weather events

#### **DER forecasts and assumptions:**

- + Many utilities today rely on simplistic approaches to forecasting DER adoption
- + To avoid unnecessary costs incurred by customers, modern DER adoption forecasting, tools and methods need the following attributes:
  - Customer-level results
  - On-demand analysis
  - Multi-DER modeling



## **3 Transmission Planning | Sourcing and Procurement**

#### **Transmission Planning:**

- + Significant increase in renewable energy generation is placing strain on existing transmission system; new additional transmission capacity needed
- + And yet transmission system may be a systemic weakness in an extreme weather future

#### **DER / Microgrid Integration:**

- + Material influx of DER (including EVs and microgrids) present opportunities to optimize existing capacity of transmission system and increase system resilience
- + Integrated approach necessitates folding DER squarely within the planning process allowing DER not just to modify load within a modeling tool, but also be dispatched as supply



## **Planning Alignment: Pulling the Pieces Together**





# Key Takeaways

- + Practical approach is needed to address emergent multiobjective planning criteria, including decarbonization, resilience and equity
- + Promise of more integrated planning rests on ability to reflect the full set of values that all resources can provide
- + Aligned objectives help promote congruent outcomes across planning processes
  - New information flows to promote internal consistency between models
- + State regulators are critical to building foundation for robust coordinated planning
  - Stakeholder-informed integrated distribution planning proceeding
  - New level of coordination between ISO/RTOs, distribution utilities, and regulatory commissions

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