

Speaker Information



J. Michael Hagerty PRINCIPAL WASHINGTON, D.C.

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11 years of experience in utility and electric power industry planning and regulatory analysis, including utility resource planning, transmission planning, and generation interconnection processes

Since 2021, analyzed Duke's future resource needs to reliably serve load and achieve HB951 objectives, and participated in the 2023 and 2024 CTPC transmission planning studies

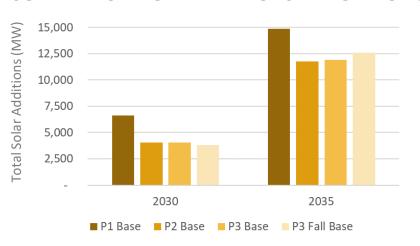
Supported transmission & generation developers, utilities, state regulators, and RTOs with transmission planning processes in ERCOT, SPP, MISO, NYISO, PJM, CAISO and ISO-NE

Evaluated generation interconnection across the country

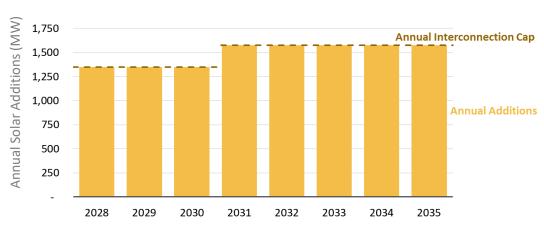
Solar & Storage are Cost-Effective Components of all CPIRP Portfolios

- EnCompass selects least-cost resources to reliably serve load and achieve HB951 goals
- 2035 portfolios include solar and storage, accounting for recent cost increases
 - -**Solar**: 11,800 14,900 MW
 - **Storage**: 4,300 6,700 MW
- Value highlighted by solar additions up to the Duke-specified interconnection limit
- Solar is selected because it is the least-cost source of zero-carbon generation; only clean resource being built in Duke's system

SOLAR PV CAPACITY ADDITIONS BY PORTFOLIO



P3 BASE SOLAR PV ANNUAL ADDITIONS

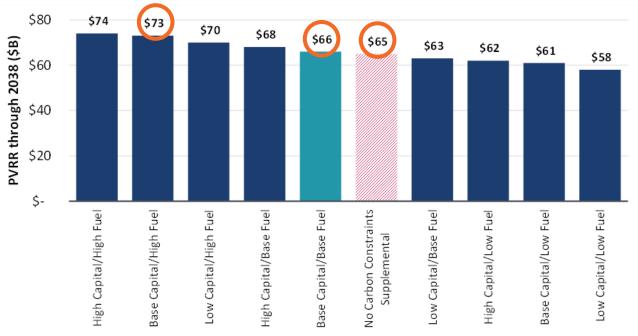


Solar Provides Ratepayers a Hedge against Volatile Gas Prices

Solar and other clean resources provide ratepayers a low-cost hedge against ratepayer cost volatility due to fluctuations in natural gas commodity prices

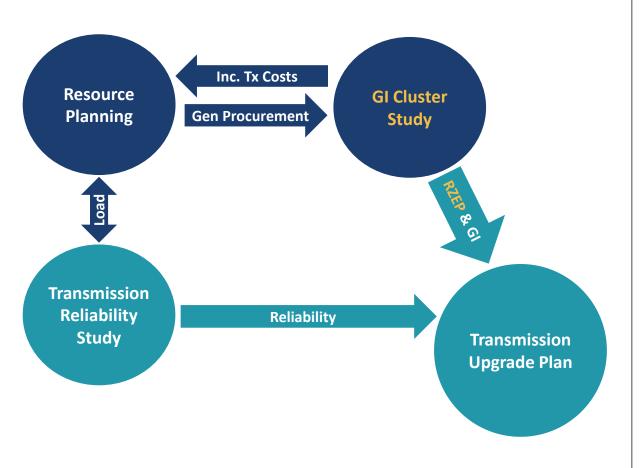
- Resources built to achieve HB951
 GHG reductions increase costs by \$1B
 (1.5%) over No Carbon Constraints
- High Fuel Cost case increases costs by \$7B, demonstrating scale of ratepayer exposure to gas prices
- No Carbon Constraints increases gas burn compared to P3 Base, further increasing ratepayer exposure to high gas prices

RATEPAYER COSTS FOR P3 BASE SENSITIVITY CASES (\$ BILLION)

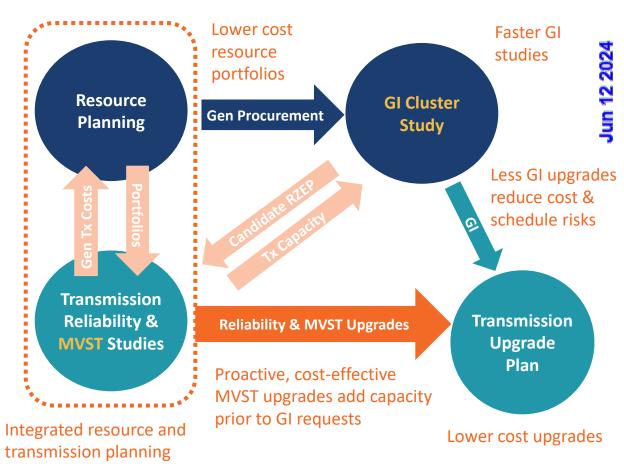


Proactive Transmission Planning is Key to Reducing Costs

Current Processwithout Proactive Transmission Planning



Updated Process with Proactive Transmission Planning



Recommendations for MVST Process

- 1. Proactively plan for future generation and load by incorporating realistic projections of anticipated generation mix, load levels, and load profiles over lifespan of upgrades
- 2. Account for full range of transmission project benefits and use multi-value planning to identify upgrades that cost-effectively address all categories of needs and benefits
- 3. Address uncertainties and high-stress grid conditions explicitly through scenariobased planning
- 4. Use comprehensive transmission network portfolios to address system needs and cost allocation more efficiently than a project-by-project approach
- 5. Jointly plan across neighboring interregional systems to recognize regional interdependence, increase system resilience, and take advantage of scale and geographic diversification benefits

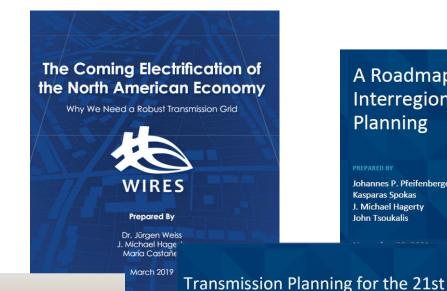
Reports on Transmission Planning and Benefit-Cost Analyses

The Brattle Group

The Benefits of Electric Transmission: Identifying and Analyzing the Value of **Investments**

July 2013

Judy W. Chang Johannes P. Pfeifenberge J. Michael Hagerty



A Roadmap to Improved **Interregional Transmission Planning**

Johannes P. Pfeifenberger Kasparas Spokas J. Michael Hagerty John Tsoukalis

New Jersey State Agreement Approach for Offshore Wind Transmission: Evaluation Report

PUBLIC REPORT



Generator Interconnection **Scorecard**

Benefit-Cost Analysis of Proposed New York AC Transmission Upgrades

PRESENTED TO

NYISO and DPS Staff

PRESENTED BY

Sam Newell Bruce Tsuchida J. Michael Hagerty Akarsh Sheilendranath

Nicole Irwin Lauren Regan

September 15, 2015

THE Brattle GROUP

The Brattle Group: Grid Strategies: Johannes Pfeifenberger Rob Gramlich Kasparas Spokas Michael Goggin J. Michael Hagerty Jay Caspary John Tsoukalis Jesse Schneider OCTOBER 2021

Century: Proven Practices that

Increase Value and Reduce Costs