Electricity Trends and Critical PUC Activities

NGA Workshop for State Energy Advisors

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About Carl

• PhD, Game Theory & Productivity Measurement
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1 Electricity Sector Trends
Wind Costs Dropped a Decade Ago

Wind Cost Per Kwh (US)

- 55 ¢ / kwh
- 22x Price Decline
- 2.5 ¢ / kwh
Solar is Following Close Behind
This Year’s News is the Battery Cost Slide

Source: BloombergNEF. Data adjusted to be in real 2018 dollars.
Existing Plants vs. Xcel Bids

- **COAL**: $0.037/kWh
- **GAS**: $0.030/kWh
- **NUCLEAR**: $0.025/kWh
- **SOLAR**: $0.029/kWh
- **WIND**: $0.018/kWh

Existing Plant Average Fuel and O&M from USEIA Table 8.4 Electric Power Annual 2016
Critical State PUC Activities
The Big Grid is Still Relevant

But Decentralized Resources are Growing

Distribution Planning and Grid Modernization Activities Include …

- **Hosting capacity analysis** – How much distributed solar, storage, and other resources can the grid hold in any given location?
- **Non-wires alternatives** – How can DER help to defer infrastructure upgrades and reduce customer costs?
- **Advanced forecasting** – How much DER can utilities expect, and how can those expectations be better coordinated with planning to avoid unnecessary investments?
- **Improved operations** – How can the utility control the output of distributed energy resources to improve reliability and resilience?
PBR Initiatives are Spreading

Source: Advanced Energy Economy
Combining Renewables Produces a Smoother Profile that Aligns Better with System Needs

Texas Transmission has Enabled Diversity

Increasing Resource and Geographic Diversity Has Significantly Reduced Curtailments and Stabilized Prices

Source: U.S. Energy Information Administration, based on the Electric Reliability Council of Texas (ERCOT) for curtailments and SNL Energy for electricity prices.
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

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