Welcome

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July Meeting Feedback Discussion
Modeling Overview Feedback

- Consider additional Reserve Sharing opportunities
  - Discuss opportunities with a TEP subject matter expert
- Consider portfolios where we pay the coal “take or pay” but replace the energy with renewables
  - Run various coal retirement scenarios for Springerville and Four Corners
- Demand Side Management (DSM) assumptions and targeting customers with the most impact
  - DSM will be discussed in September
- Track water use of various portfolios
  - Dashboard metric showing groundwater versus surface water consumption
- Quantify the emissions from market purchases
  - Need a forecast of EPA’s eGRID database
  - Could also be used to account for market sales
Generation Emissions Accounting

Scope 1  
Emissions from Self Generation

Scope 3  
Emissions from Energy Purchased for Resale

NGCC=Natural Gas Combined Cycle | NGST=Natural Gas Steam | NGCT=Natural Gas Combustion Turbine | RICE=Reciprocating Internal Combustion Engine
Technology and Cost Projections Feedback

- Consider additional storage technologies
  - Broad discussion of storage technology development
  - Key to maintaining portfolio diversity
  - Model short duration based on economics of Lithium-ion
  - Identify and model best storage option for long-duration storage

- Consider an economics metric more meaningful than “Revenue Requirement”
  - Address during today’s discussion on revenue requirement
General Feedback from Advisors

- Community Values Statement
- Should the GHG reduction target be based on total mass or emission rate?
  - Rate reduction can still result in an increase in emissions
  - Total mass does not account for market sales or load growth
  - Both should be tracked
- TEP should coordinate with community members in citing renewable energy projects to reduce costs and realize co-benefits to the utility and the community
  - Other factors in citing renewable energy include interconnection, geographical diversity
  - Welcome community collaboration opportunities
- Portfolios should measure the contribution to local non-attainment of air quality standards
  - Dashboard metric showing local area NOx emissions
General Feedback from Advisors Cont.

- TEP should model different forms of clean energy and emission targets to identify benefits/tradeoffs of each
  - TEP is prepared to model multiple forms of clean energy targets
  - ACC request to model forms of energy targets proposed by Commissioners
  - Others identified by stakeholders

- TEP should participate in state-wide energy planning initiatives
  - TEP is participating in an effort lead by The Nature Conservancy to develop a Clean Energy Plan

- TEP’s IPR should separate the 5-Year Action Plan from the following ten year and should focus on the 5-Year Action Plan
  - Agreed

- TEP should consider the societal impacts (i.e. externalities) of various portfolios
  - Company will not take a position on particular externality metrics
  - Company will consider some form of societal costs as resources permit
Current List of Potential Portfolios

- Arizona Corporation Commission Proposed Portfolios
  - 85% clean energy by 2050 with carve outs
  - 85% clean energy by 2050 with 50% renewable energy by 2028 with carve outs
  - 85% clean energy by 2050 with 40% renewable energy by 2035 with carve outs
  - 80% clean energy by 2050
  - 80% clean energy by 2050 with 50% renewable energy by 2028
  - 80% clean energy by 2050 with 40% renewable energy by 2035

- Higher reserve sharing portfolio?

- Early coal retirement including “take or pay” penalty
  - 2025, 2030, 2035

- CO₂ emissions 26-28% below 2005 levels by 2025
**TEP’s Declining CO₂ Emissions**

**CO₂ EMISSION REDUCTIONS**

**Historical**
- 35% reduction in emission rate
- 33% reduction in total emissions

**Forecast**

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<th>Year</th>
<th>Contributing Factors</th>
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| A 2017-2018 | - The addition of Gila River 2 and an increase in wholesale sales contribute to higher emissions  
- Proportionally more combined cycle generation (900 lbs/MWh) reduces the emission rate |
| B 2019-2021 | - The addition of three renewable projects, the retirement of Navajo and the decrease in wholesale sales contribute to lower emissions  
- The decrease in emission rate due to new renewables is partially offset by proportionally less combined cycle generation |
| C 2021-2023 | - A 10% increase in load results in higher overall generation and thus higher emissions  
- The retirement of San Juan and proportionally more combined cycle generation to meet increasing load reduces the emission rate |

**Renewable Energy is 30% of Retail Load in 2021**
**Next Steps**

**Future Agenda Items**

- **September**
  - Energy efficiency / DSM
  - Demand response

- **October**
  - Greenhouse gas emission reductions
  - Carbon pricing assumptions

- **November**
  - Transmission assumptions
  - Distributed resources
  - Smart grid
  - Electric vehicles

**Next Meeting**

- Thursday, September 19

**Questions**