

TEP Integrated Resource Plan



Advisory Council Meeting

August 16, 2019

Welcome

JEFF YOCKEY DIRECTOR, RESOURCE PLANNING



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



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



Renewable Energy Goals



TEP's Declining CO₂ Emissions

2017-2018

B

2019-2021

2021-2023



CO, EMISSION REDUCTIONS

Renewable Energy is 30% of Retail Load in 2021

Emission Rate Emissions

Contributing Factors 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

- 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
 - 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



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

