WELCOME

KEVIN SKINNER
CORPORATE TRAINING PROGRAM MANAGER
Integrated Resource Planning Overview

JEFF YOCKEY
MANAGER, RESOURCE PLANNING

Tucson Electric Power
Integrated Resource Plan (IRP) Overview

- **Resource Need**
  - Load Forecast
  - Existing Resources

- **Resource Portfolios**
  - Technology Assessment
  - Future Resources

- **Scenarios**
  - Fuel and Market Pricing
  - Macroeconomics

**Just a Plan**
- Additional steps needed for specific actions
- Must be regularly updated

**Timing**
- 3-year planning cycle
- 15-year outlook
  - 2020-2035
Evolving Planning Objectives

- Reliability
- Affordability
- Environmental Performance
- Risk
Greenhouse Gas Reduction Goal

Science-Base GHG Reduction Targets
In Collaboration With

State of the Climate Science Report
Establish Corporate Science Based GHG Emission Reduction Targets for TEP
Identifying Plausible Scenarios for Carbon Reduction
Evaluating Implications of Scenarios
IRP Schedule

- **Kick-off Advisory Council**
  - May 2019

- **Public Workshop on Portfolios**
  - August 2019

- **ACC Workshop on Preliminary IRP**
  - September 2019

- **Final Advisory Council Meeting**
  - December 2019

- **File Final IRP**
  - April 1st 2020

- **File Preliminary IRP**
  - June-July 2019

- **DSM Workshop Q3 2019**

- **ACC Open Meeting on Preliminary IRP**
  - October 2019

- **TEP/UNSE Workshop on Pre-Final IRP**
  - January 2020
Advisory Council Overview

KEVIN SKINNER
CORPORATE TRAINING PROGRAM MANAGER
2019 Integrated Resource Plan Advisory Council

- Balance
- Deep Dive on Each Topic
- Transparency
How does planning occur in your organization?

- Planning cycle
- Planning horizon
- What groups do you involved (internal, external)
- Nexus between your plans and decision making
Planning Under Uncertainty

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Market Uncertainty

Permian

Palo Verde 24x7
Capital Expense Uncertainty

Combustion Turbine ($/kW)

Natural Gas Combined Cycle ($/kW)

Gila River Unit 2
Capital Expense Uncertainty

Solar Single-Axis Tracking ($/kW)

Wind ($/kW)
Deferral of Capital Expenses

San Juan Generating Station

Alternative to shutdown two units and install SNCR on other two

All units to retire by mid-2022

Navajo Generating Station

EPA requirement to install selective catalytic reduction (SCR) for Regional Haze

Investment of nearly $1 billion in each plant

Alternative to shutdown one unit and defer SCR to 2030

All units to retire by end of 2019
Mandated Resource Acquisitions

- Arizona Renewable Energy Standard and Tariff (REST)
  - 15% of retail load served from renewable energy by 2025
  - Phased in to allow for technology development

- What if the Arizona REST was 30% by 2021
  - Over $3 billion NPV in additional costs
  - Annual renewable costs exceed annual fuel costs with only a fraction of the generation

![Generation from Utility-Scale Renewable Projects (GWh)]

- $3.8 billion NPV (2010-2021)
- $630 million NPV (2010-2021)
Participant Activity

- What are the uncertainties that you plan around?
  - Economic
  - Technology
  - Geopolitical
  - Other

- What are the uncertainties that TEP should be planning around?
  - Economic
  - Technology
  - Geopolitical
  - Other
Diversification Benefits

Effect of future conditions on Total Fuel and Purchase Power Costs

CO₂ Price $5 - $20/ton
Natural Gas Price 2X; Market Price 1.5X
Summary

- The future is uncertain and strong forecasting tools do not change that.

- Avoid “big bets” – decisions involving significant expense yet which do not perform well across all reasonably foreseeable futures.

- The timing of resource acquisitions can have a significant impact on the cost effectiveness of those decisions.

- Diversification helps mute the impact of unfavorable future outcomes and provides opportunity to take advantage of favorable future outcomes.
Next Steps

Future Agenda Items
- Utility Revenue Formula
- Production Cost Modeling
- Model Input Assumptions
- Resource Adequacy
- Demand Side Management/Demand Response
- Greenhouse Gas Reductions/Carbon Pricing
- Transmission
- Distributed Resources/Smart Grid/Electric Vehicles

Meeting Times
- Exclude Monday and Friday??
- AM or PM
- 3rd Week
  - Tuesday through Thursday
- 2nd Week
  - Alternate days

Questions / Feedback