APS RPAC Meeting
08/04/2023
MEETING AGENDA

Welcome & Meeting Agenda
Matt Lind
1898 & Co.

Regulatory Update
Todd Komaromy
APS

IRP Reference Case
Akhil Mandadi
APS

APS’s Clean Energy Accounting
Mike Eugenis
APS

Next Steps & Open Discussion
Matt Lind
1898 & Co.
Meeting Guidelines

**Member Engagement**
RPAC Member engagement is critical. Clarifying questions are welcome at any time. There will be discussion time allotted to each presentation/agenda item, as well as at the end of each meeting.

**Action Items**
We will keep a parking lot for items to be addressed at later meetings.

**Meeting Minutes**
Meeting minutes will be posted to the public website along with pending questions and items needing follow up. We will monitor and address questions in a timely fashion.

**Preliminary Content**
Meetings and content are preliminary in nature and prepared for RPAC discussion purposes. Litigating attorneys are not expected to participate.
July Meeting Recap

• APS detailed the latest regulatory changes and updates. The 2023 IRP filing date has been moved to November 1st, 2023.

• APS provided an update on its transmission interconnection reform and outlined key milestones in the process.

• EPRI informed RPAC Members about the ongoing climate change scenario analysis and asked for feedback on plausible extreme scenarios.

• APS summarized resource adequacy study results for RPAC members including planning reserve margin and effective load carrying capability.
Following Up

• Action Items from Previous Meetings:
  • No immediate action items

• Ongoing Commitments:
  • Distribute meeting materials in a timely fashion (3 business days prior)
  • Transparency and dialogue
Staff’s Proposed Timeline for Review of Submitted Integrated Resource Plans

Stakeholder comments due: **1/31/2024**
LSEs responses filed: **5/29/2024**

ACC Staff assessment and Proposed Order: **8/31/2024**
RFP Schedule

Ironwood Site Visit
August 1, 2023
8:00am – 10:00am MST

Agave Site Visit
August 1, 2023
1:00pm – 2:00pm MST

Proposal Submission and Fees Due
September 6, 2023

Shortlisted Respondents Notified
October 2023 – November 2023

Anticipated Contract Executions
November 2023 – March 2024
Discussion & Questions
APS’s Clean Energy Commitment

- APS uses two types of metrics to report the relative shares of different types of generation in its portfolio: **Renewable Energy Percentage** and **Clean Energy Percentage**. To report the renewable energy share, similar accounting conventions specified in the existing Arizona Renewable Energy Standards are used, under which each utility's share of renewables is expressed as a percentage of annual customer retail sales.

**Clean Energy Commitments**

- **100% clean, carbon-free electricity by 2050**
- **65% clean energy by 2030 with 45% renewable energy**
- **Eliminate coal by the end of 2031**
Renewable Energy Percentage

- Renewable metric is based off actual retail sales and is measured over entire year
- Historical Distributed Generation (DG) as well as forecasted installations for the current year are considered part of the target.
- Self-consumed DG is included in the denominator to prevent overcounting of DG
- Is **not** a REC-based standard – differing from ACC’s Renewable Energy Standards definition

\[
\text{Renewable Energy} \% = \frac{R + DE_{load} + DG_{YTD}}{RS + DG_{SelfConsumed}}
\]
The Clean Energy Percentage differs from the Renewable Energy in a few respects:

1. The calculation takes generation losses into account (measuring output at generator bus)
2. Includes nuclear generation (Palo Verde)
3. Includes distributed generation (rooftop solar)
4. The energy mix is explicitly adjusted to include the load impact of DSM programs
5. Includes market purchases made at negatives prices

\[
Clean\ Energy\ % = \frac{\text{Nuclear} + \text{Renewable (including DG)} + \text{DSM} + \text{Clean Purchases}}{\text{Energy Requirement including DSM & DG}}
\]
Discussion & Questions
IRP Reference Case
IRP Reference case identifies an optimal portfolio under various constraints and a base set of assumptions on uncertain variables

Portfolio selected in reference case is NOT the preferred portfolio. APS will evaluate portfolios selected across each of the cases before determining a preferred portfolio.

### External environment

<table>
<thead>
<tr>
<th><strong>Load growth</strong></th>
<th><strong>Capital costs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak load growth of ~3.5% p.a. from 2023-2032</td>
<td>Reflect 2022 ASRFP baseline pricing &amp; utilize NREL ATB for price curves</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Natural gas prices</strong></th>
<th><strong>Market prices</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Forecast</td>
<td>E3 revised 2023 prices</td>
</tr>
</tbody>
</table>

### APS-specific assumptions

#### Financial
- 2.5% Inflation
- 6.74% WACC

#### EE and DSM
- In accordance with most recent DSM Implementation Plan

#### Four Corners Exit
- Exit in 2031

#### Carbon Price
- $20.72/ton CO2e (internal assumption)

#### Clean Energy Commitment
- 45% Renewable / 65% Clean by 2030
IRP Reference Case – “Need” Identification
## New Resource Alternatives – LTCE Runs

### National Renewable Energy Laboratory (NREL)

- Advanced Nuclear
- Small Modular Reactor
- Large-Frame Combustion Turbine
- Combined Cycle (CCGT)
- CCGT w/ Carbon Sequestration 90%
- Concentrated Solar Power
- Geothermal
- Biomass

### APS RFP

- Battery Energy Storage System (BESS) – 4hr
- Battery Energy Storage System (BESS) – 5hr
- Utility Solar – Single-Axis Tracking
- Solar + BESS – 4hr (PVS-4hr)
- Solar + BESS – 5hr (PVS-5hr)
- Southwest Wind
- Microgrid
- Pumped Storage Hydro
- Compressed Air Energy Storage (CAES)

### Energy Information Administration (EIA)

- Aeroderivative Combustion Turbine

### Guidehouse

- Energy Efficiency Portfolios
LTCE Run Details

Updates to the model version 1 shared on June 26, 2023, with the RPAC Modeling Committee (RMC):

- Model data revisions
- Introduced transmission wheeling in addition to maximizing utilization of existing transmission and new build transmission
- Included updated results of ELCC and PRM from the 2023 APS Resource Adequacy Study discussed in the July RPAC meeting
- Introduced monthly natural gas transport limits as constraints

New Modeling data to be shared with RMC:
- LTCE model picking the reference case
- PCM model with the picked reference case
Key Model Considerations

- Liquidated Damages modeling for coal plant operations
- Co-optimization of transmission expansion along with resource expansion
- Updated resource contribution to reliability navigating the loop between capacity expansion and resource adequacy considerations
- Monthly Gas Transport Limitations modeling
Loads and Resources – New Reliable Capacity Built
New Reliable Capacity Built: Short-term focus
Loads and Resources – New Nameplate Capacity Built

New Resources Nameplate Capacity

Year

Nameplate Capacity (MW)

2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038

Energy Efficiency  New Renewables  New PVS  New Microgrid  New Natural Gas  New Energy Storage
Loads and Resources - Reliable vs Nameplate Capacity
Loads and Resources: Short-term focus

Reliable Capacity vs Nameplate Capacity

- Energy Efficiency
- New Renewables
- New PVS
- New Microgrid
- New Natural Gas
- New Energy Storage

Year:
- 2025
- 2026
- 2027
- 2028
- 2029

Capacity (MW):
Reference Case Portfolio – Peak Capacity
Reference Case Portfolio – Energy
Other Portfolio Characteristics
Discussion & Questions
IRP Timeline

Key Milestones

September RPAC Meeting: 9/22/2023

Public Stakeholder Meeting #2: 9/27/2023
IRP Filing: 11/01/2023