MEETING AGENDA

Welcome & Meeting Agenda
Matt Lind
1898 & Co.

Transmission Timelines
Nick Schlag
E3

2023 ASRFP Update
Derek Seaman
APS

IRP Key Themes
Mike Eugenis
APS

Update on Western Market
Exploratory Group (WMEG) Results
Brian Cole
APS

Next Steps & Open Discussion
Matt Lind
1898 & Co.

Break
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.
August Meeting Recap

• APS detailed the latest regulatory changes and updates. The 2023 IRP filing date has been moved to November 1st, 2023. Stakeholder comments are due Jan 31, 2024. LSEs responses will be filed on May 31, 2024.

• APS defined how their Renewable Energy Percentage and Clean Energy Percentage are calculated.

• APS explained the 2023 IRP reference case (Base Case) and some of the key modeling considerations that shape it.

• APS shared the IRP timeline and upcoming meetings. Public Stakeholder meeting #2 is scheduled for September 27th, 2023.
Following Up

• Action Items from Previous Meetings:
  • Additional source for APS’s Clean Energy Commitment. Includes definitions of clean and renewable energy goals.
    Link to Clean Energy section of Pinnacle West Corporate Responsibility Report

• Ongoing Commitments:
  • Distribute meeting materials in a timely fashion (3 business days prior)
  • Transparency and dialogue
2023 ASRFP Update
Derek Seaman, APS
Overview & Schedule

- RFP publicly available at aps.com/rfp
- Proposals received September 6th
- Weekly calls ongoing between APS and Independent Monitor.
- Results are still being finalized

<table>
<thead>
<tr>
<th>Event</th>
<th>Important Dates</th>
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<tbody>
<tr>
<td>RFP Release</td>
<td>June 30, 2023</td>
</tr>
<tr>
<td>Confidentiality Agreement DUE</td>
<td>September 6, 2023</td>
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<tr>
<td>Bidder’s Conference</td>
<td>July 26, 2023</td>
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<tr>
<td>Proposal(s) &amp; Proposal Fee(s) DUE</td>
<td>September 6, 2023</td>
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<tr>
<td>Shortlist Respondents Notified</td>
<td>October – November 2023</td>
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<tr>
<td>Anticipated Contract Execution</td>
<td>November 2023 – March 2024*</td>
</tr>
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</table>
Overview & Schedule

• 333 Registered PowerAdvocate Entities (164 different companies)
  • Includes duplicate companies per RFP requirement for multiple submissions
• 113 Signed Confidentiality Agreements
• 61 Different Entities submitted into the ASRFP
• 115 base bids
  • 102 unique project sites
  • A total of 193 bid variations were received
  • Compares with 74 base bids and 128 pricing variations in the 2022 ASRFP

All numbers subject to change
Minimum Participation Screening

- Notified Respondents of non-conformance with opportunity to cure
- Proposed cure period and accepted modifications reviewed by IM
- Bids are still being reviewed and cured for conformance

<table>
<thead>
<tr>
<th>Total Base Bids</th>
<th>Conforming Bids at Submission</th>
<th>Non-Conforming Bids at Submission</th>
</tr>
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<tbody>
<tr>
<td>115</td>
<td>87</td>
<td>28</td>
</tr>
</tbody>
</table>

All numbers subject to change
ASRFP Early Reactions

- Diverse resource offerings including
  - Standalone battery energy storage, solar and wind
  - Hybrid solar plus energy storage
  - Thermal resource
  - DSM resource
  - Long duration energy storage, hydrogen and nuclear

- Received proposals for all opportunities

- Early-stage evaluation show prices are relatively unchanged when compared to the 2022 ASRFP
### Remaining Steps

<table>
<thead>
<tr>
<th>SEPTEMBER</th>
<th>OCTOBER</th>
<th>NOVEMBER &amp; Beyond</th>
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<tbody>
<tr>
<td>CONFORMING/INITIAL SCREENING</td>
<td>QUALITATIVE EVALUATION</td>
<td>QUANTITATIVE EVALUATION</td>
</tr>
<tr>
<td>Verify eligible resource</td>
<td>Verify Experience</td>
<td>Review pricing</td>
</tr>
<tr>
<td>Verify completion of datasheets</td>
<td>Verify Site Control, Interconnection</td>
<td>Review technical details for compliance</td>
</tr>
<tr>
<td>Very completion of requested documents</td>
<td>Safety ratings</td>
<td>IM Review</td>
</tr>
<tr>
<td></td>
<td>Financial risk review</td>
<td></td>
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<tr>
<td>IM Review</td>
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</tbody>
</table>

- Initial focus on bids that can reach COD by summer 2026
- Currently evaluating interconnection status and impact of FERC queue reform
- Projects with COD of 2027+ will be negotiated no sooner than Q1 of 2024
Discussion & Questions
Update on Western Market Exploratory Group (WMEG) Result
Brian Cole, APS
Goals of Market Participation

- Reliability
- Customer Cost Savings
- Clean Energy Integration
WMEG Participation

Note: Map boundaries are approximate and for illustrative purposes only
Overall Take-Away from Study Results

APS, SRP, and TEP are assessing both CAISO and SPP market options. This study suggests that SPP is a viable and potentially superior option from a cost production standpoint. As a result, we will continue to pursue the build-out of the SPP market option to ensure the best outcome for our market goals.

Overall, production cost differences between footprints are modest.

APS, SRP, and TEP showed slightly greater cost savings in SPP Markets+ footprints than in CASIO EDAM footprints.
Purpose of Study

This study assessed production costs only (generation dispatch) in various market footprints and scenarios.

The main report is limited to WECC-wide results and does not include individual company results. Each entity has individual results.
Significance

The results demonstrate the potential production cost savings for different market scenarios and footprints.

These production cost results are one part of the overall assessment of market participation and are expected to be only a portion of the overall savings of a combined resource adequacy and day-ahead market scenario.
Footprints Studied

Market Footprints and Seam Treatment

CBS looked at various footprints as part of the Core CBS Study.

The Main Split footprint is used as the base footprint in all Core Study modeling.

A subset of members opted for modeling extra market cases of additional footprints.

Map Legend
- EDAM
- Markets+

*Not explicitly shown: The difference between Markets Bookend and Main Split is WAPA SNR sub-BA is part of EDAM in the Main Split

Figures provided by Greg MacDonald from PSE
Main Study Results (WECC-wide)

Results with a CAISO WECC-wide footprint (compared to BAU* case):

WMEG entities show an overall cost increase of $20M.

Non-WMEG (mainly CA) entities show an overall cost decrease of $80M.

Overall cost decrease of $60M (0.6%) WECC-wide

Results with split footprints (compared to BAU* case):

WMEG entities show a cost decrease of $26M.

Non-WMEG (mainly CA) entities show a cost increase of $247M.

Overall cost increase of $220M (2.3%) WECC-wide

*BAU means current participation in real time markets in both CAISO and SPP. The WECC total production costs are projected to be $9.732 Billion in 2026 in BAU Case.
Main Study Results

WECC-wide

WMEG vs. Non-WMEG
## APS Study Results

<table>
<thead>
<tr>
<th>Case</th>
<th>Net Cost ($Millions)</th>
<th>% Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAU (2026)</td>
<td>536.3</td>
<td>N/A</td>
</tr>
<tr>
<td>EDAM Bookend (2026)</td>
<td>523.5</td>
<td>2.4%</td>
</tr>
<tr>
<td>Main Split (2026)</td>
<td>507.5</td>
<td>5.7%</td>
</tr>
<tr>
<td>Markets+ Bookend (2026)</td>
<td>502.9</td>
<td>6.6%</td>
</tr>
<tr>
<td>Alt Split 1 (2026)</td>
<td>524.9</td>
<td>2.2%</td>
</tr>
<tr>
<td>Alt Split 2 (2026)</td>
<td>512.1</td>
<td>4.7%</td>
</tr>
<tr>
<td>Alt Split 3 (2026)</td>
<td>526.8</td>
<td>1.8%</td>
</tr>
<tr>
<td>Alt Split 4 (2026)</td>
<td>488.2</td>
<td>9.9%</td>
</tr>
</tbody>
</table>

- All day-ahead cases result in additional cost savings over current market participation (BAU).
- Cases with a split footprint and where APS is in SPP M+ have greater savings than cases where APS is in CAISO EDAM.
APS Study Results

APS Report Results
Net Costs 2026

Footprint Studied

- APS In Markets+
- APS In EDAM
- BAU
Arizona entities see benefits in day-ahead market participation from a production cost standpoint.

This holds true in single market and multiple footprint (market) scenarios.

It is important for Arizona entities to be aligned in our decision to maximize benefits.

There is a risk in not joining a day ahead market if others do.

Northwest – Southwest diversity is important and is an important factor in footprint selection.

Arizona entities see greater benefit when in the same market as NW entities.

Arizona entities also see greater benefit when in the same market as NW entities and are in a separate market from CA.
Recall: APS, SRP, and TEP are assessing both CAISO and SPP market options. This study suggests that SPP is a viable and potentially superior option from a cost production standpoint. As a result, we will continue to pursue the build-out of the SPP market option to ensure the best outcome for our market goals.

From a production cost study standpoint, APS, SRP, and TEP benefit most in a market footprint that includes the NW and SW but excludes CA due to load and resource diversity and the sharing of such. In addition, overall production cost savings are relatively modest as compared to the BAU case (real time market operations).

Market-to-market coordination (seams) is important for overall market efficiency. The cost-benefit study showed that by adding better market-to-market coordination, WECC-wide costs could be reduced by $150M (~1.5%) in a 2030 case. It indicates that since most of the savings can be realized by non-WMEG members (mostly CA), CA should have an incentive to negotiate those market-to-market agreements.

Production cost results are one part of the decision-making process of joining a market. The next focus of analysis will be around realizing the potential market benefits via transmission deliverability, assessing future long-term regional opportunities, and finalization of market tariffs and critical business practices.
Discussion & Questions
Time for a Break

Break Duration 10 min.

Meeting will resume at \text{hh:mm}
Transmission Timelines
Nick Schlag, E3
Multiple Studies Point to Importance of Transmission to Enable Access to High-Quality Renewable Resources

Studies of interregional transmission often highlight a wide range of benefits:

• Reduced energy costs
• Increased reliability & resilience
• Improved operational efficiency
• Increased competition and market liquidity
• Reduced congestion
• Delivery of remote, high-quality renewable resources

A number of recent studies indicate that scaling clean energy will require significant future investments in transmission.

Transmission Buildouts Across a Range of 100% Clean Energy Scenarios

Source: NREL, Examining Supply-Side Options to Achieve 100% Clean Energy by 2035
While Need for Transmission is Well-Understood, Development to Date Has Been Limited

+ Over the past two decades, a large number of long-distance transmission projects have been proposed in the West

+ Only a small number of those projects have reached construction or operations phase

+ Most of those that have achieved operations have done so on timelines much longer than originally planned

Source: RETI 2.0 Western Outreach Project Report
# Key Steps to Developing New Transmission

<table>
<thead>
<tr>
<th>Stage</th>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Need determination</td>
<td>Utility/planning org/system operator determine need (reliability, economic, policy) for a new project</td>
</tr>
<tr>
<td>Siting &amp; Permitting</td>
<td>Regulatory approvals</td>
<td>Compliance certification from state regulator to approve construction of a project (e.g., Certificate of Public Convenience and Necessity)</td>
</tr>
<tr>
<td></td>
<td>Environmental permits</td>
<td>Permits from federal and state entities that ensure project addresses and mitigates environmental concerns</td>
</tr>
<tr>
<td></td>
<td>Right of way (ROW) acquisition</td>
<td>Purchase land for project right of way</td>
</tr>
<tr>
<td>Commercial</td>
<td>Offtake agreements</td>
<td>Negotiate offtaker agreements transmission capacity</td>
</tr>
<tr>
<td></td>
<td>Financing</td>
<td>Secure required equity and/or debt financing</td>
</tr>
<tr>
<td>Engineering &amp; Construction</td>
<td>Design</td>
<td>Develop engineering plans for project</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Procure resources and labor and begin construction</td>
</tr>
</tbody>
</table>
Transmission development timelines vary based on many factors including project voltage, line length, and permitting requirements.

E3 analyzed data for transmission projects expected to come online from 2023 onwards across the United States and found that the average time to develop small (< 200 kV) projects and the average time to build large projects (>200 kV) is 12 years.

The tail ends of these timelines could be significantly longer – with small projects taking up to 11 years and large projects taking up to 18 years to get built.

Notes:
1. Planning timeline has been assumed to be the time between public announcement and initiating the permitting process.
2. COD is assumed to mark the end of the construction period.
3. Average length of small projects analyzed is 18.2 miles. Longer pipelines could have higher construction times.
4. Average length of large projects analyzed is 190 miles.
Interstate Transmission Development Time

A review of over 30 transmission projects initiated after the 2005 Energy Policy Act found that new transmission takes an average of over 10 years to complete

- The quickest line reviewed was sited and built in only four years, while the longest project has been ongoing for over 16 years

Interstate transmission lines generally take longer to site than lines that remain within a single jurisdiction

- Long distance interstate transmission lines will frequently take 15 years or more to site and construct

Source(s):
Harvard Kennedy School Belfer Center: The Challenges of Decarbonizing the U.S. Electric Grid by 2035
Harvard Dataverse: Review of transmission lines since 2005
Permitting and Routing Can Cause Significant Delays

SunZia Project

+ Nearly 17 years was required to get full approval from the Bureau of Land Management (BLM)
  • Project developers initially thought approvals would take 5 years
+ Routes have changed several times throughout the project development
  • Route needed to be revised to accommodate private lands, Department of Defense property, migratory bird patterns and opposition from stakeholder groups (San Carlos Apache Tribe and Archaeology Southwest).
  • Each adjustment delayed the approval of local, state and federal permits
  • In 2018, the New Mexico Public Regulation Commission voted unanimously to reject the SunZia project due to inadequate information on routing

TransWest Express Project

+ 10-year permitting process that involved securing approvals from 4 states, 14 local governments and many private landowners along the proposed route
  • Massive delay in approval from the federal government which owns two-thirds of the land that the transmission line will cross.
  • Pushback from some environmental groups over potential impacts on natural resources and from private landowners contributed to delays
  • Unanimous approval from the Wyoming Industrial Siting Council in 2019, the last of the state and federal approvals needed to move forward with the project that was first proposed in 2005

Timelines by Development Phase for SunZia and Transwest Express

- Planning & Pre-Permitting
- Federal & State Permitting
- EPC

Notes: overall project timelines sourced from a combination of public sources and re-categorized due to overlapping horizons

Sources:
Harvard Dataverse: Review of transmission lines since 2005
Berkeley Lab: Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2022
Transwest Express: https://www.transwestexpress.net/
NM Political Report: During groundbreaking of SunZia transmission line, lawmakers discuss the future of New Mexico’s electric grid
WSJ News: The U.S. ‘Fast-Tracked’ a Power Project. After 17 Years, It Just Got Approved
US Department of the Interior: Bureau of Land Management: DOI-BLM-WY-0000-2010-0001-EIS
Federal Action and Proposals to Accelerate Transmission Development

Several federal actions and policy proposals are aimed at reducing the time to develop transmission

- **Westwide Energy Corridor Designation (BLM):** Designated 5,000 miles of energy corridors as preferred locations for energy transport including siting of transmission and distribution infrastructure
- **Coordination of Federal Authorizations for Electric Transmission Facilities (DOE NOPR):** Proposes to develop a Coordinated Interagency Transmission Authorizations and Permits Program to streamline permitting and environmental reviews process, improve interagency communication, engage communities earlier in the review process, and provide more certainty to developers by creating a standard and transparent process

Other proposals aim to address issues related to transmission planning and cost allocation

- **Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection (FERC NOPR):** Aims to address shortcomings in current transmission planning practices by including a long-term assessment of transmission needs and considering a broader set of transmission benefits when assessing allocation of costs of regional transmission facilities

Discussion & Questions
Key Themes & Development Strategy

Reliability
- Renewables availability
- Four Corners replacement

Risk mitigation
- Transmission & nat. gas constraints
- Durability of resource decisions
Transmission Development Critical

- Wind Access
- Market Connectivity
- Customer Demand
- Optionality
Early Results Show Durability of Near-Term Resource Selections

Nameplate capacity additions (in GW)

- Continued investment in renewables as most cost effective option
  - Impacts of IRA > $2B
- Natural gas & demand side resources key for capacity and transmission efficiency

<table>
<thead>
<tr>
<th>Year</th>
<th>Natural Gas</th>
<th>Microgrid/DR</th>
<th>Wind</th>
<th>Solar</th>
<th>Battery Storage</th>
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<tr>
<td>2023-2027</td>
<td>6.2</td>
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- 2023: 44,136 GWh
- 2032: 69,146 GWh

- Nuclear: 16%
- Coal: 21%
- Gas+Oil: 15%
- Renewables + DE: 19%
- DSM: 16%
- Purchases: 23%
Discussion & Questions
Next Steps
Matt Lind, 1898 & Co.
IRP Timeline

Key Milestones

October RPAC Meeting: 10/25/2023

Public Stakeholder Meeting #2: 9/27/2023
IRP Filing: 11/01/2023
Public Stakeholder Meeting #3: Early Nov.