



APS RPAC Meeting

09/22/2023



MEETING AGENDA



Welcome & Meeting Agenda

Matt Lind
1898 & Co.



2023 ASRFP Update

Derek Seaman
APS



Update on Western Market Exploratory Group (WMEG) Results

Brian Cole
APS



Break

Matt Lind
1898 & Co.



Transmission Timelines

Nick Schlag
E3



IRP Key Themes

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.



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

Event	Important Dates
RFP Release	June 30, 2023
Confidentiality Agreement DUE	September 6, 2023
Bidder's Conference	July 26, 2023
Proposal(s) & Proposal Fee(s) DUE	September 6, 2023
Shortlist Respondents Notified	October – November 2023
Anticipated Contract Execution	November 2023 – March 2024*





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

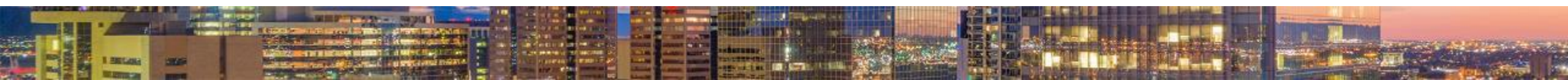
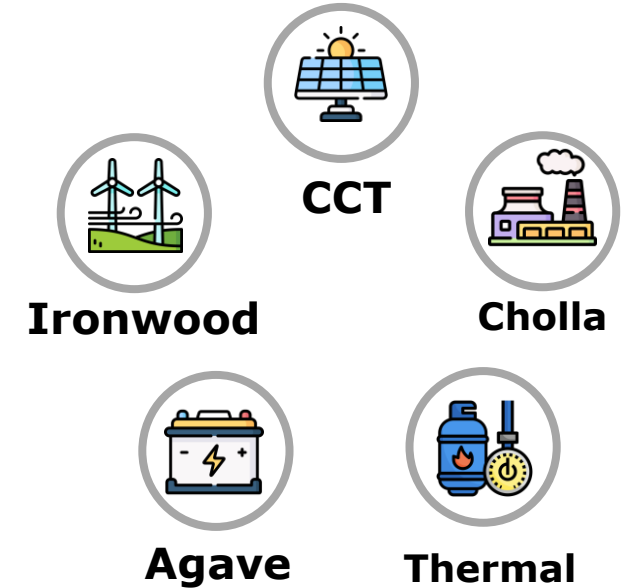
- Notified Respondents of non-conformance with opportunity to cure
- Proposed cure period and accepted modifications reviewed by IM
- Bids are still being reviewed and cured for conformance

Total Base Bids	Conforming Bids at Submission	Non-Conforming Bids at Submission
115	87	28

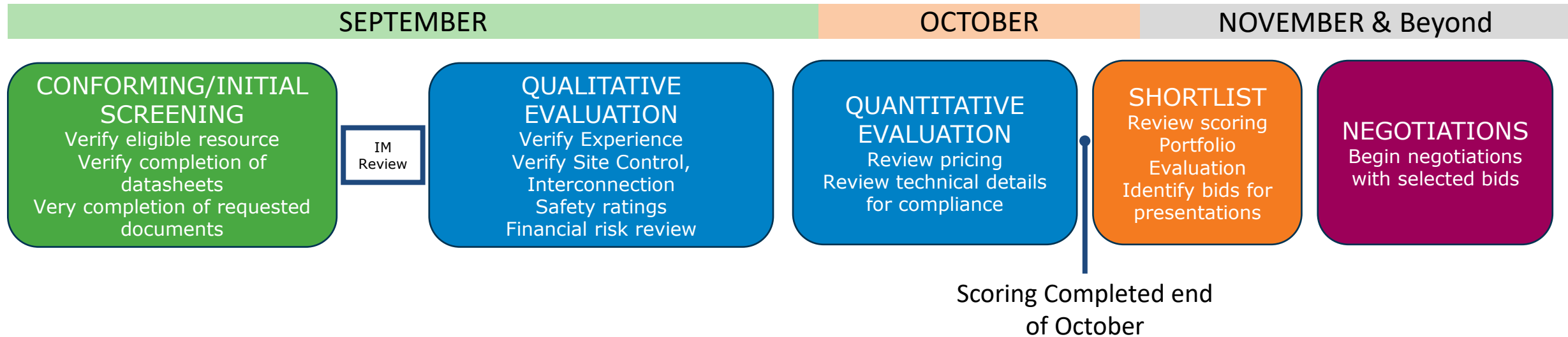
All numbers subject to change

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



- 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

Western Market Exploratory Group (WMEG)

**Production Cost Study Results
Summary**

September 2023



Goals of Market Participation



Reliability

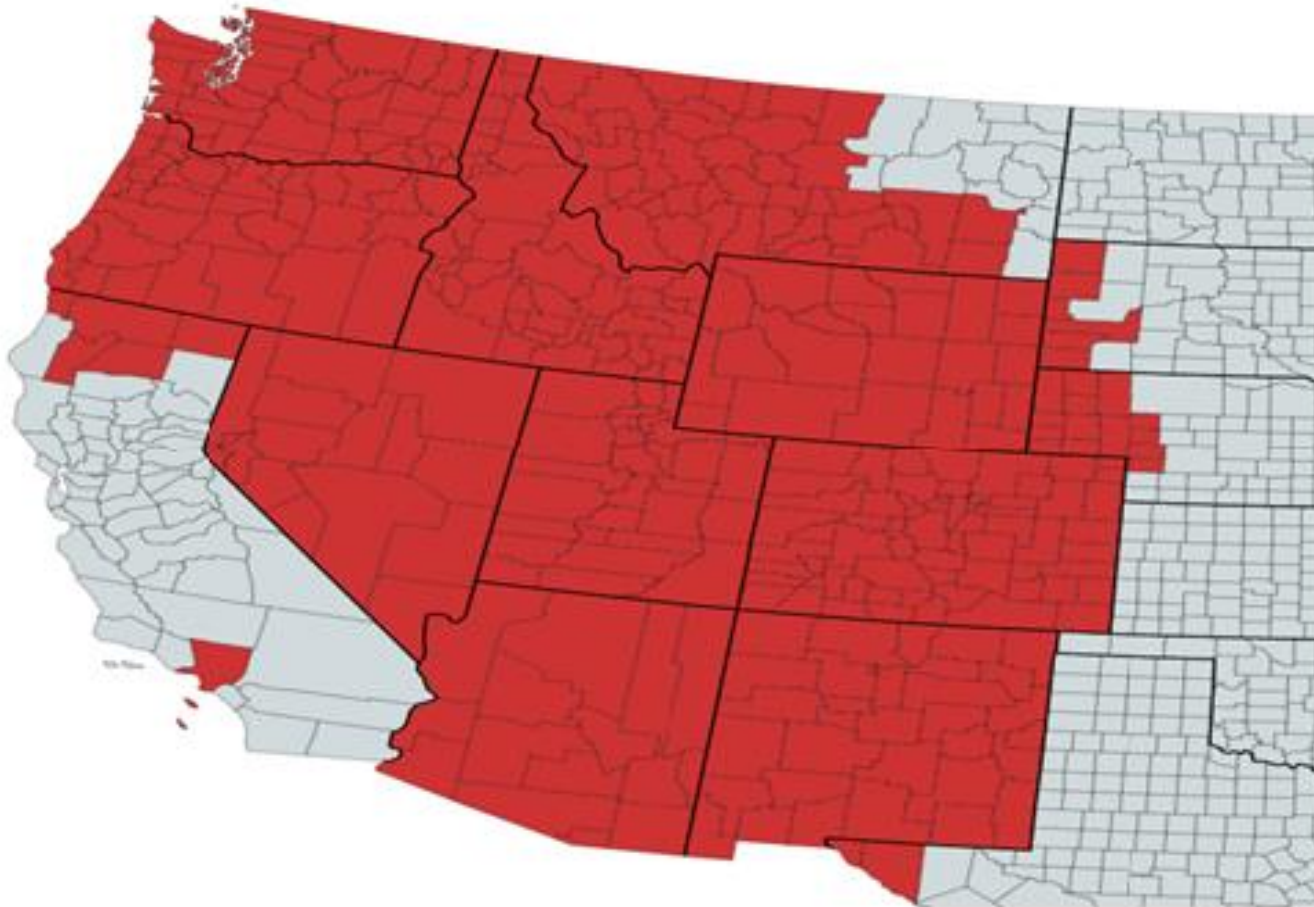


Customer
Cost Savings



Clean Energy
Integration

WMEG Participation



- | | |
|--------------|--------------|
| APS | Puget Sound |
| SRP | Xcel |
| TEP | Avista |
| AEPCO | BANC |
| PNM | BPA |
| Black Hills | Chelan |
| LADWP | El Paso |
| Portland | Grant |
| Seattle | Northwestern |
| Platte River | Tacoma |
| NV Energy | Tri-State |
| PacifiCorp | WAPA |
| Idaho | |

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

A white downward-pointing triangle with a maroon outline is positioned above the text box.

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

A white downward-pointing triangle with a maroon outline is positioned above the text box.

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.

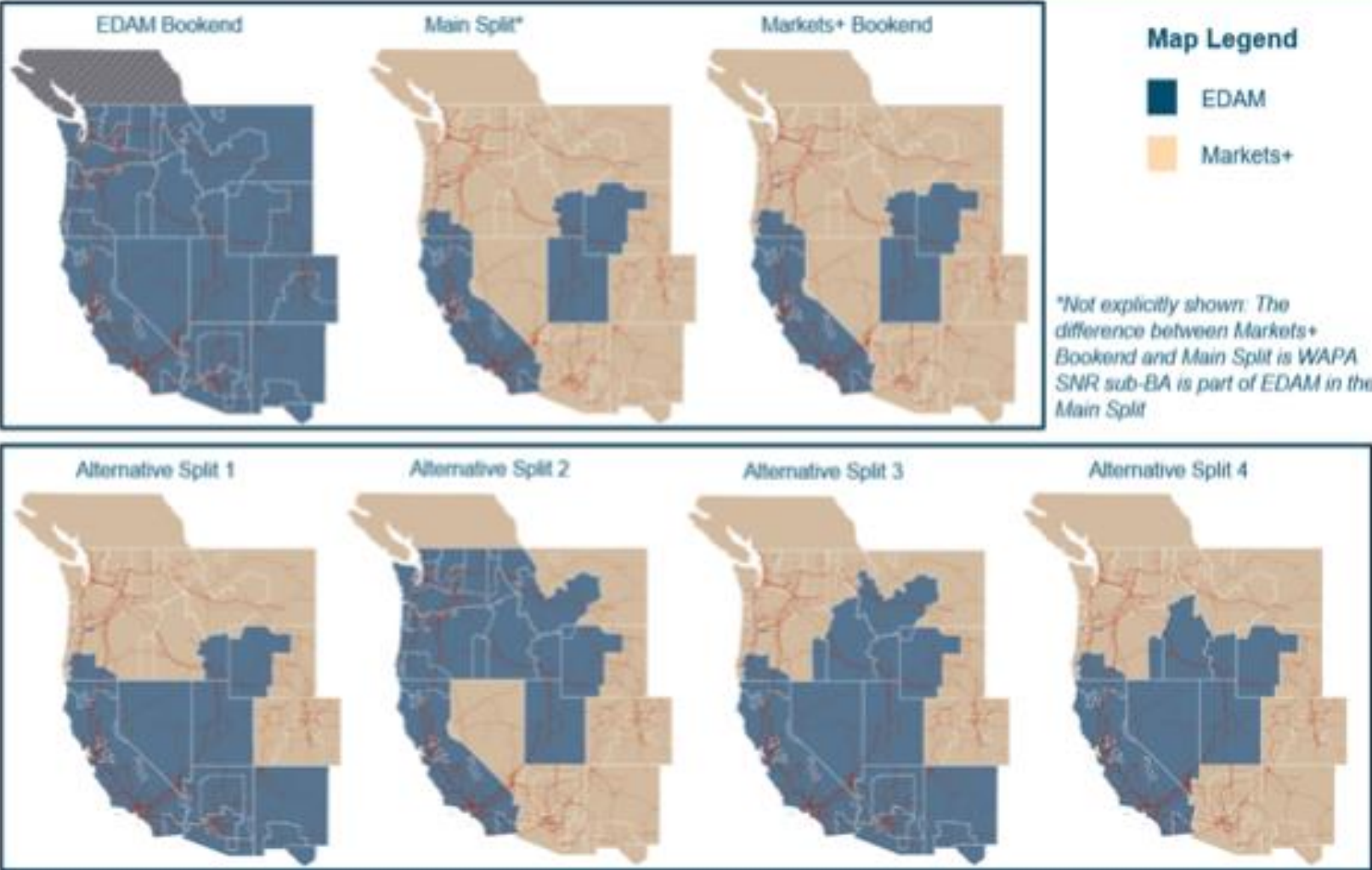


Market Footprints and Seam Treatment

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**



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.

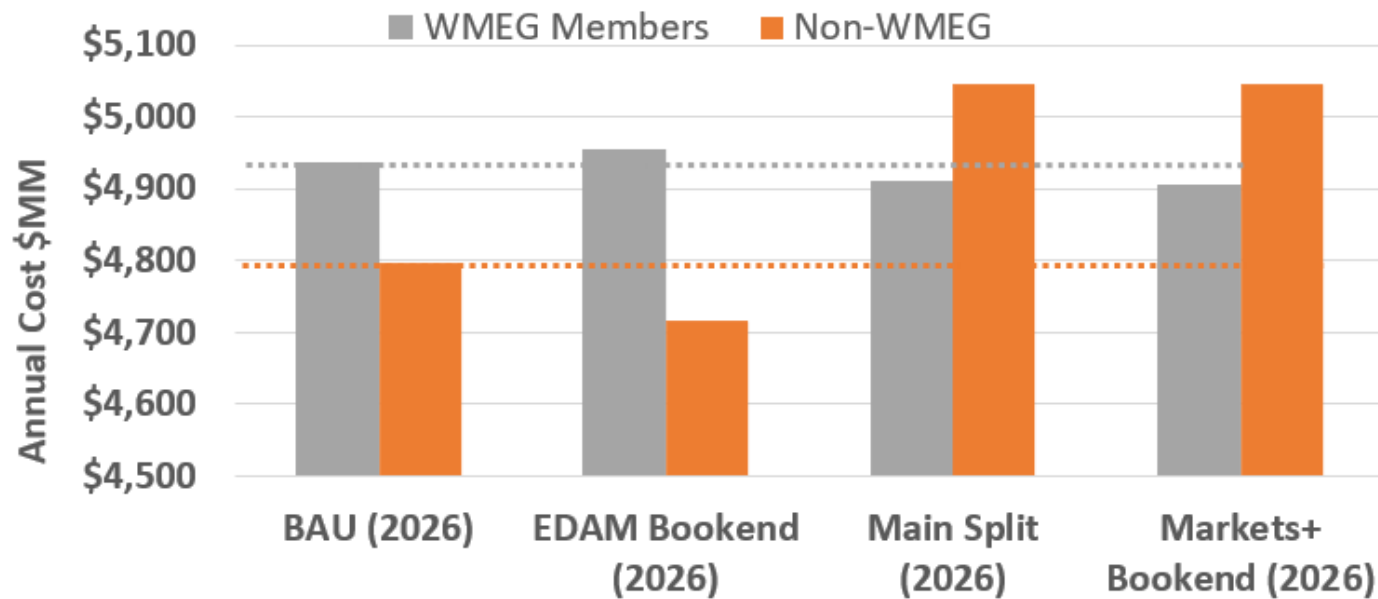
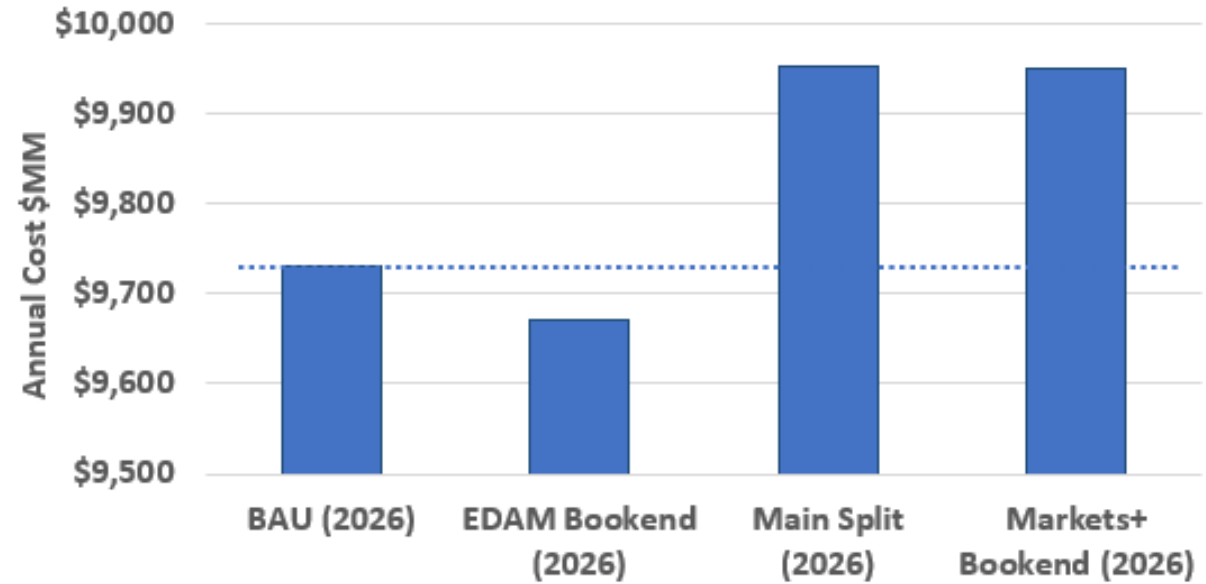
Non-WMEG (mainly CA) entities show a cost increase of \$247M.

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



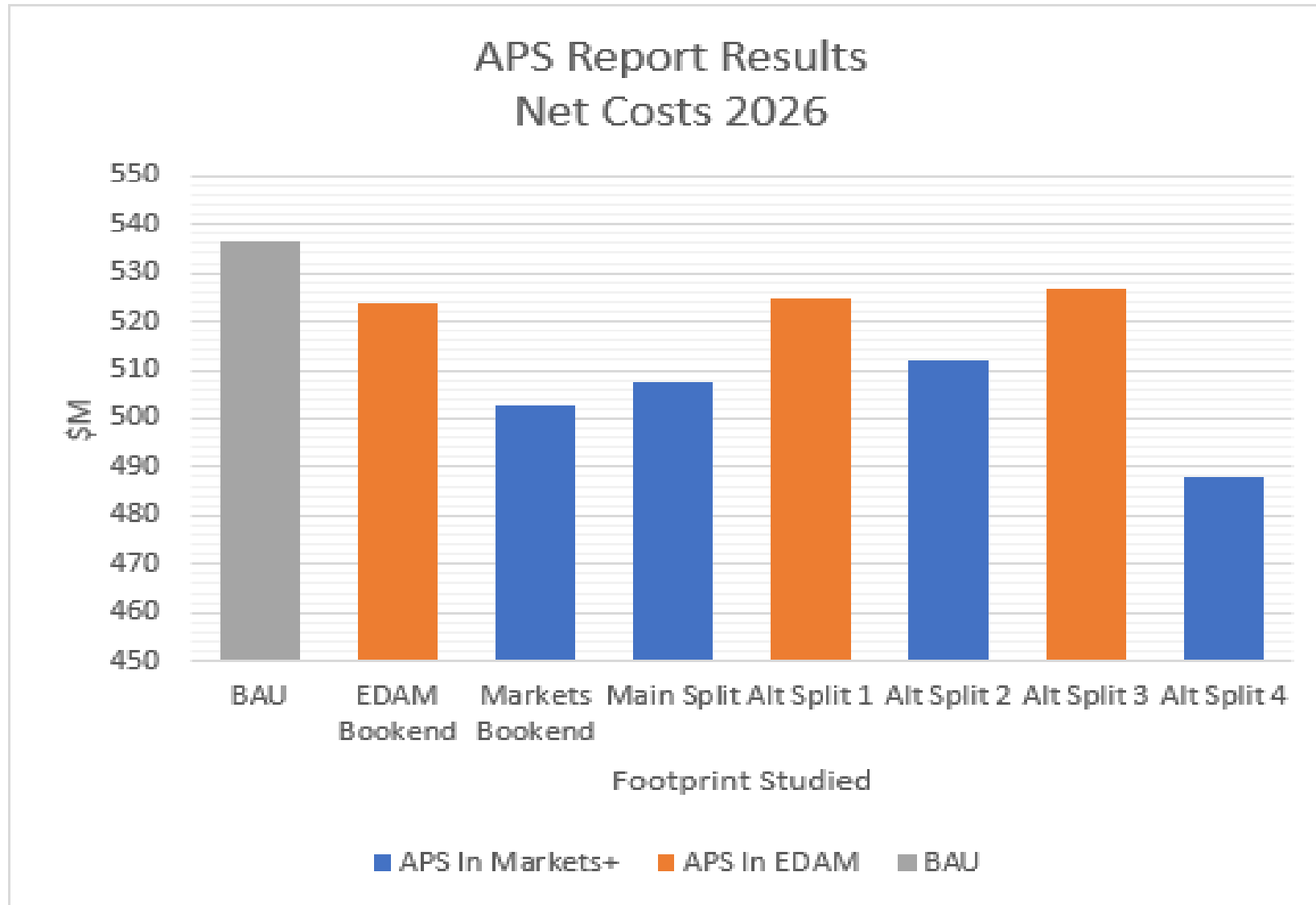
WMEG vs. Non-WMEG

APS Study Results

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

- 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



Take-Aways for Arizona Entities

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.

Summary

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.

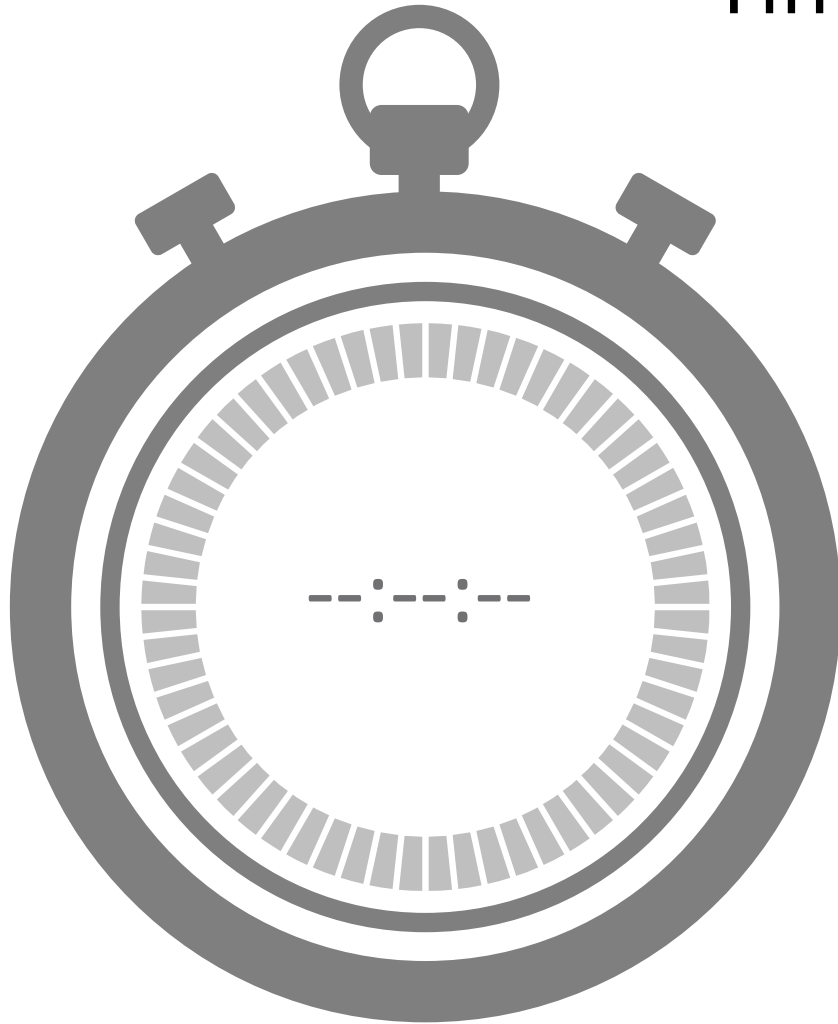


Discussion & Questions



Break

Time for a Break



Break Duration 10 min.

Meeting will resume at





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

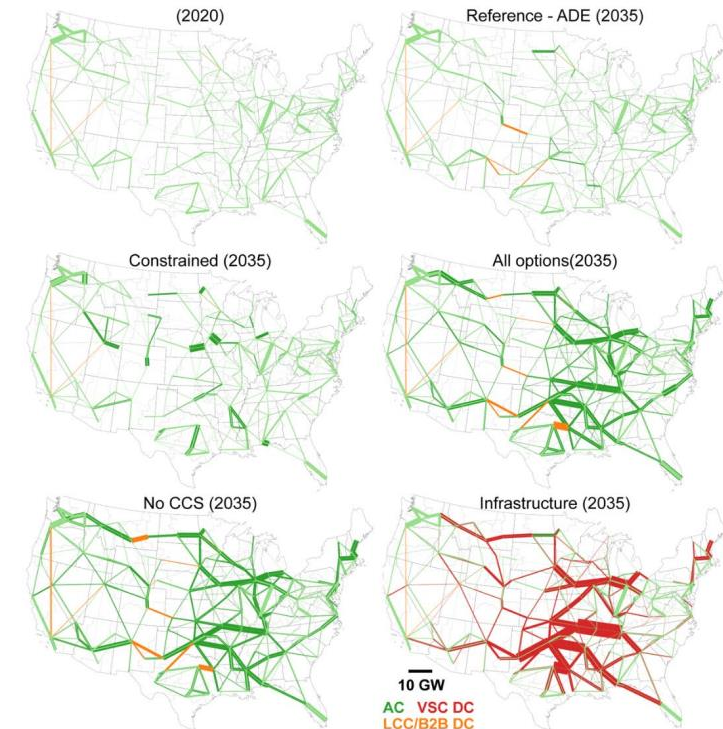


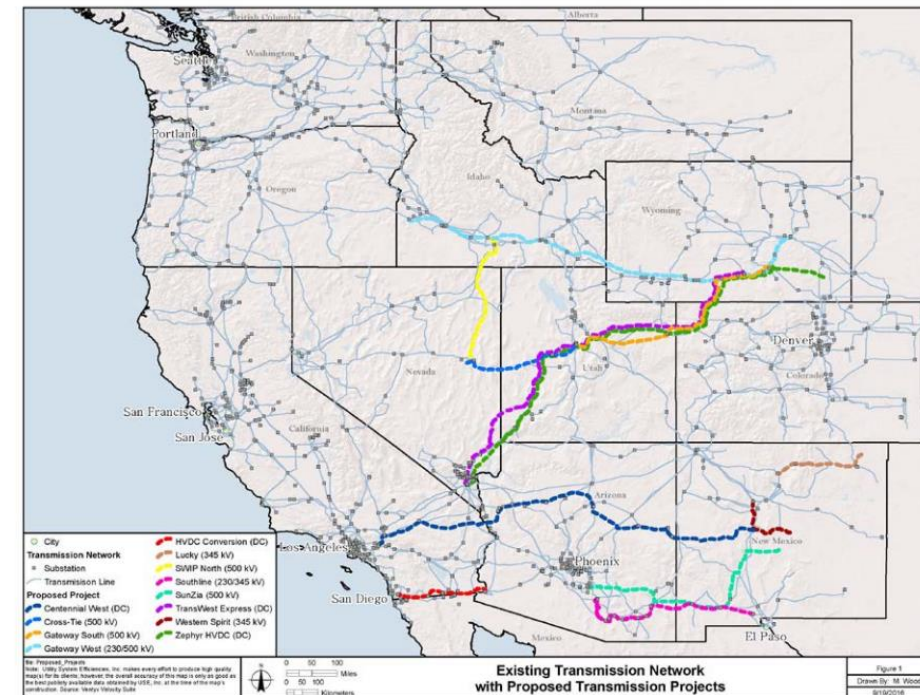
Figure 27. Maps of transmission capacity in 2020 and 2035 (ADE demand case) show substantial additions into wind-rich regions of the United States.

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

Proposed Interregional Transmission Projects as of 2016



Source: [RETI 2.0 Western Outreach Project Report](#)

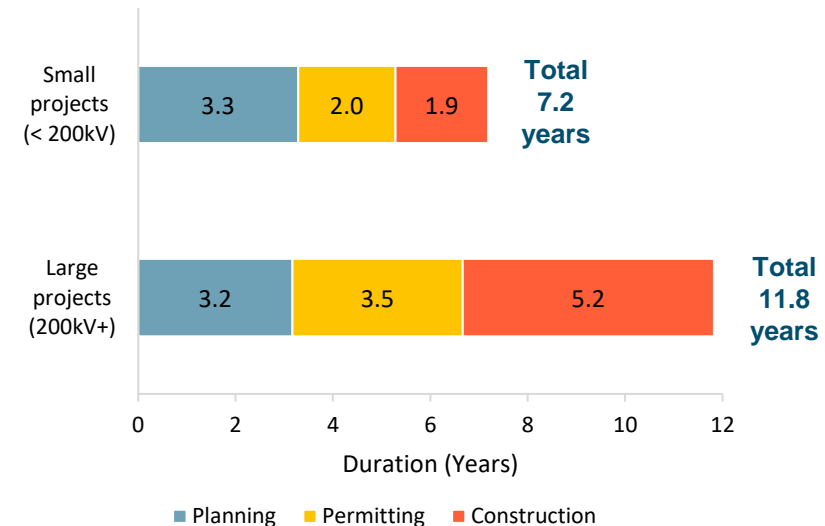
Key Steps to Developing New Transmission

Stage	Step	Description
Planning	Need determination	Utility/planning org/system operator determine need (reliability, economic, policy) for a new project
Siting & Permitting	Regulatory approvals	Compliance certification from state regulator to approve construction of a project (e.g., Certificate of Public Convenience and Necessity)
	Environmental permits	Permits from federal and state entities that ensure project addresses and mitigates environmental concerns
	Right of way (ROW) acquisition	Purchase land for project right of way
Commercial	Offtake agreements	Negotiate offtaker agreements transmission capacity
	Financing	Secure required equity and/or debt financing
Engineering & Construction	Design	Develop engineering plans for project
	Construction	Procure resources and labor and begin construction

Transmission Development Timelines

- + Transmission development timelines vary based 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

Average Duration of US Transmission projects by Development Phases



Source: S&P Global

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

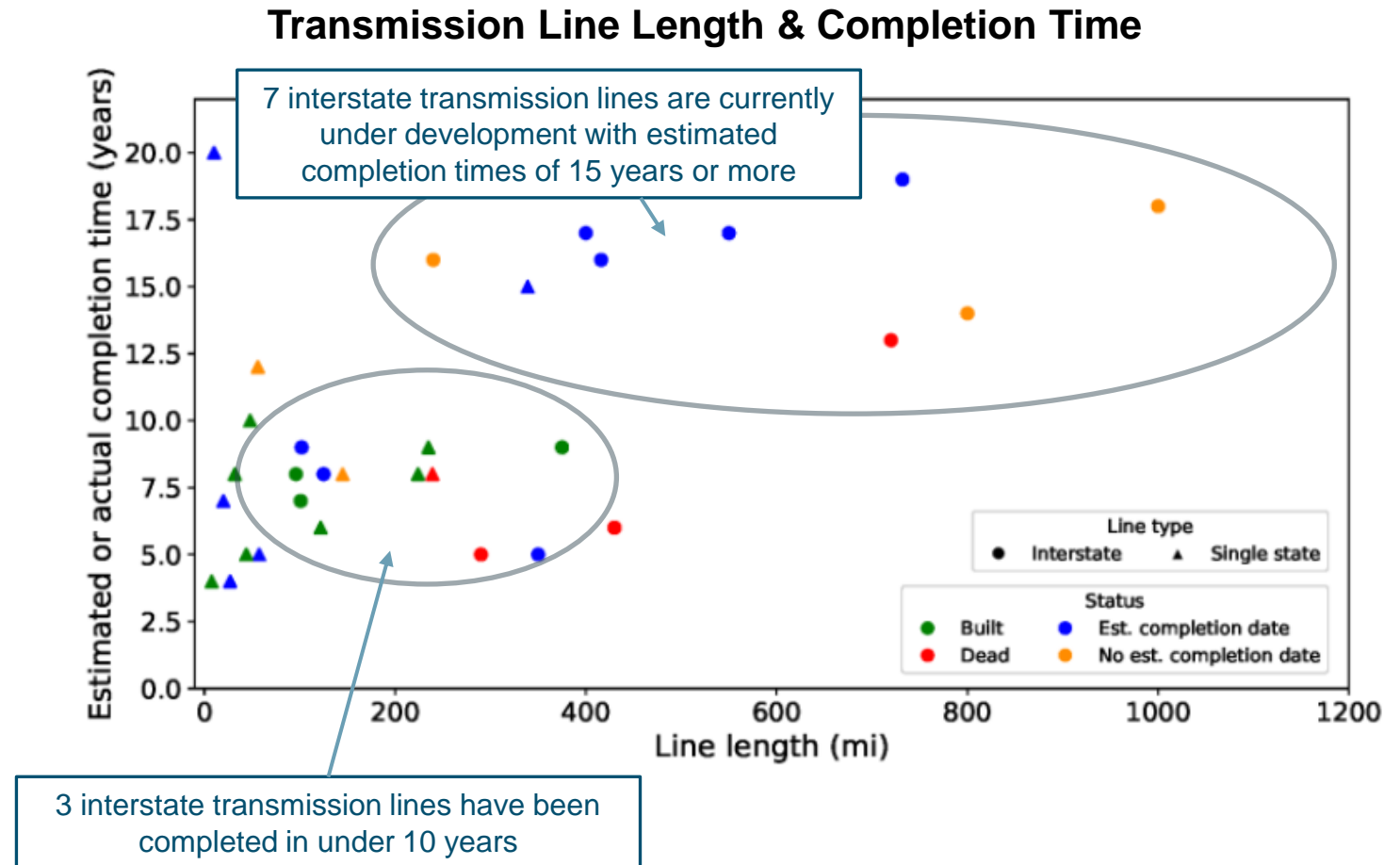
Interstate Transmission Development Time

+ 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

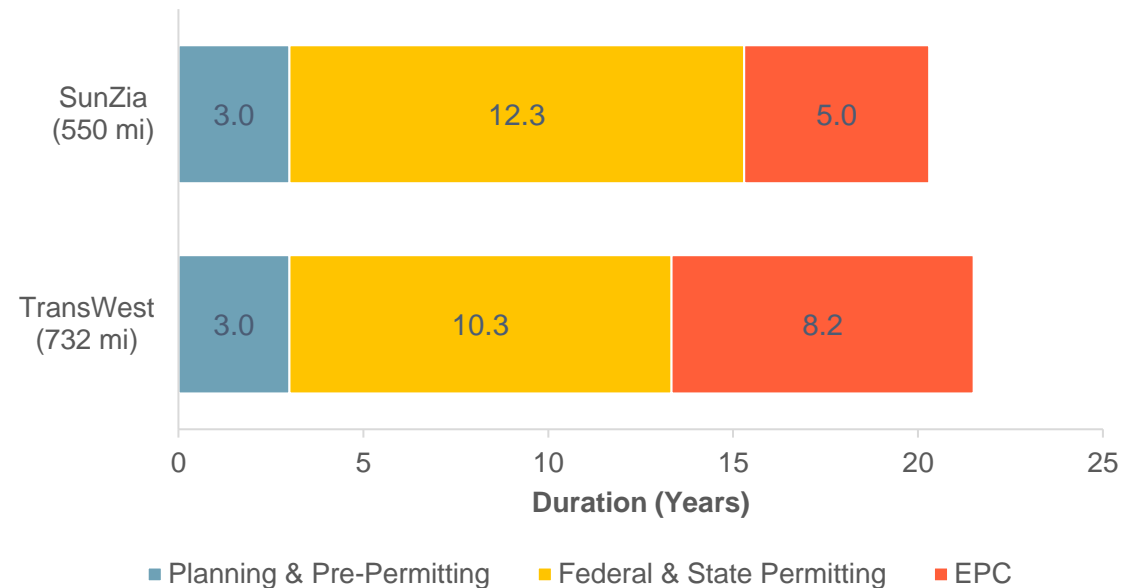
Sunzia Project

- + **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



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
Pattern Energy: <https://patternenergy.com/projects/sunzia-wind/>
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-NM-0000-2021-0001-RMP-EIS
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

BLM Energy Corridors



Source(s):
BLM, USFS, DOE - [Energy Policy Act of 2005 Section 368 Energy Corridor Review, Final Report: Regions 1-6 \(April 2022\)](#)



Discussion & Questions



IRP Key Themes
Mike Eugenis, APS



Key Themes & Development Strategy

Reliability

Renewables availability

Four Corners replacement

Risk mitigation

Transmission & nat. gas constraints

Durability of resource decisions



Transmission Development Critical



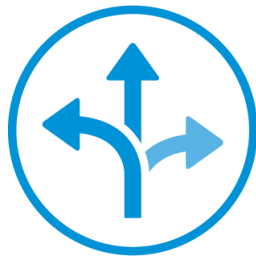
Wind Access



**Market
Connectivity**



**Customer
Demand**

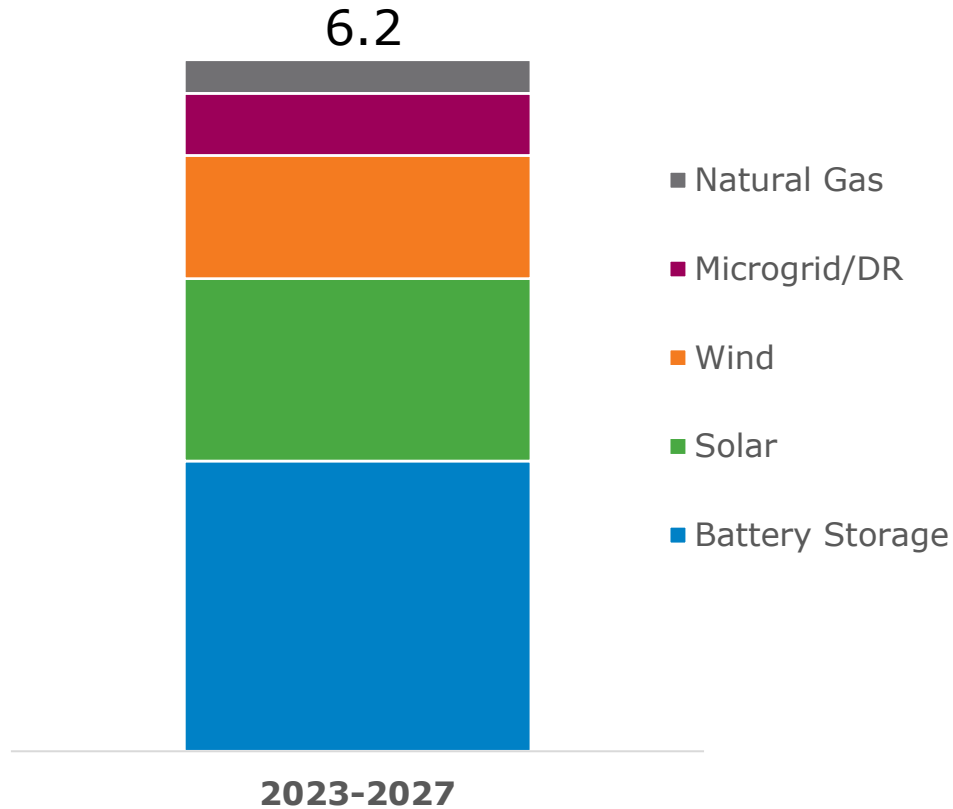


Optionality

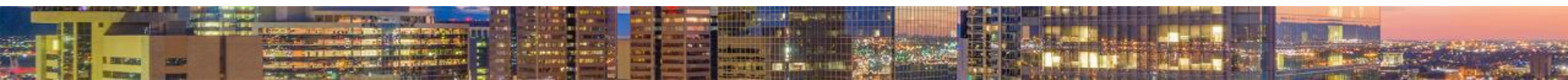
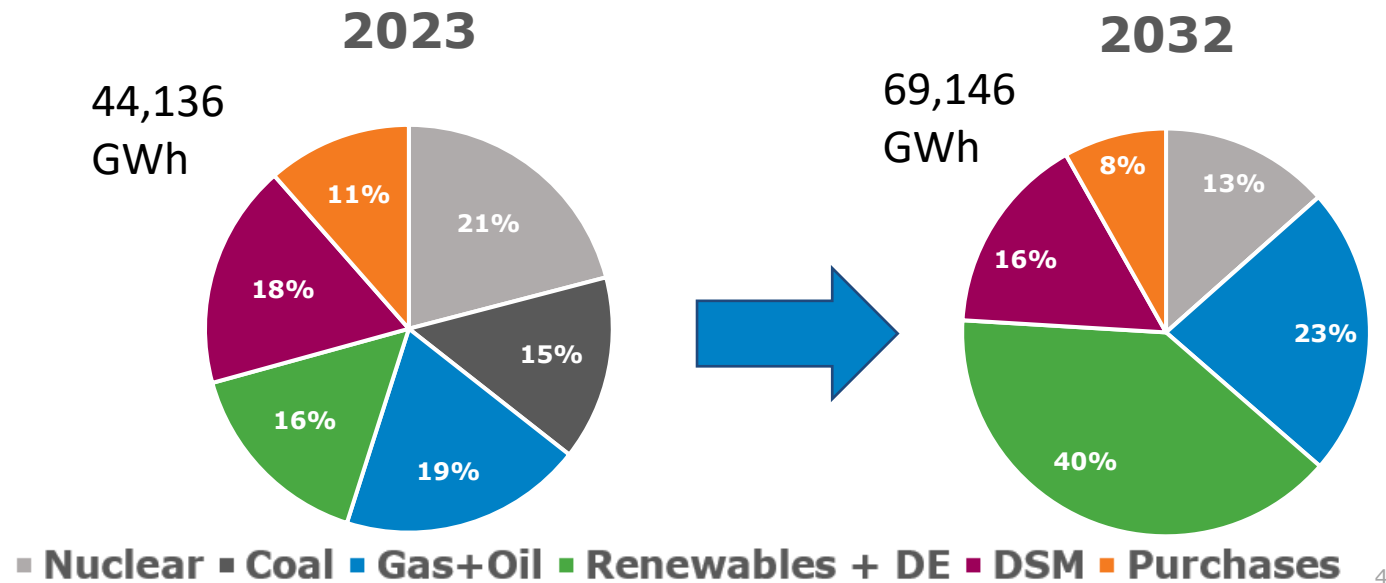


Early Results Show Durability of Near-Term Resource Selections

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





Discussion & Questions



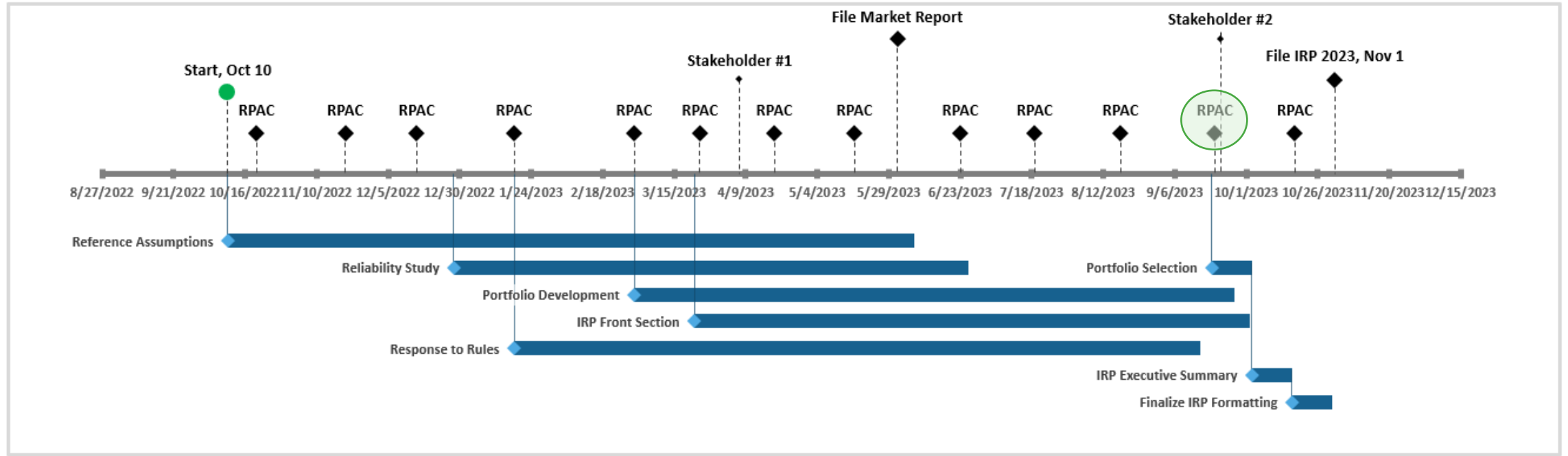
Next Steps

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.

