



# APS RPAC Meeting

9/25/2024



# MEETING AGENDA



Welcome & Meeting Agenda  
Matt Lind  
1898 & Co.



Break



RPAC Update  
Mike Eugenis  
APS



ACC Staff Proposed Order – 2023 IRP  
Mike Eugenis  
APS



Regional Natural Gas Transport  
Update  
Nick Schlag  
E3



Western Market Update  
Tyler Moore  
APS



Microgrid RFP  
Sarah Noll  
APS



Next Steps & Closing Remarks  
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 follow-up items. Questions will be monitored and addressed in a timely fashion.



## Preliminary Content

Meetings and content are preliminary in nature and prepared for RPAC discussion purposes.



# July Meeting Recap

- APS announced that Todd Komaromy accepted another position within the company, and that Mike Eugenis, the new Director of Resource Planning, will manage the RPAC going forward.
- APS provided a preview of the July 31<sup>st</sup> IRP Stakeholder Workshop presentation.
- APS discussed the status of the 2023 All-Source RFP and gave a preview of the upcoming 2024 All-Source RFP.
- APS provided a refresher on the details of the Redhawk Expansion Project in advance of its CEC hearing before the Arizona Power Plant and Transmission Line Siting Committee which began on August 19<sup>th</sup>.

# Following Up

- Action Items from Previous Meetings:
  - APS committed to providing more information about natural gas transport in the West
- Ongoing Commitments:
  - Distribute meeting materials in a timely fashion
  - Transparency and dialogue





# RPAC Update

Mike Eugenis, APS

# RPAC Going Forward

- Anticipate that meetings will be held every two months, with additional touchpoints scheduled as relevant topics arise
- APS will share information regarding:
  - Resource planning and procurement processes
  - Resource Adequacy in the West
  - Legislative developments related to Resource Planning
- APS will seek additional stakeholder presentation opportunities in 2025





# Regional Natural Gas Transport Update

Nick Schlag, E3



# Regional Natural Gas Infrastructure Considerations

Arizona Public Service  
Resource Planning Advisory Council

September 2024



Energy+Environmental Economics

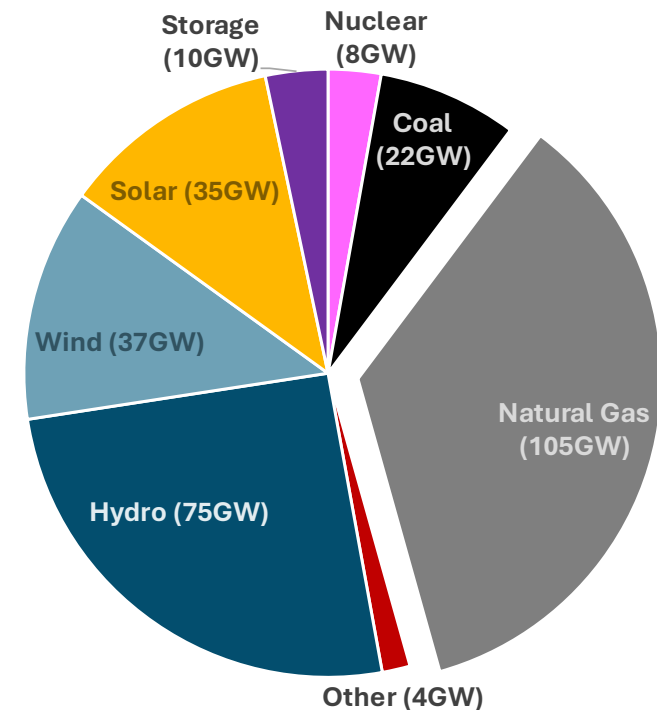
Nick Schlag, Partner  
Lakshmi Alagappan, Partner  
Jonathan Blair, Sr. Managing Consultant

# The Natural Gas-Electric Interface in the West

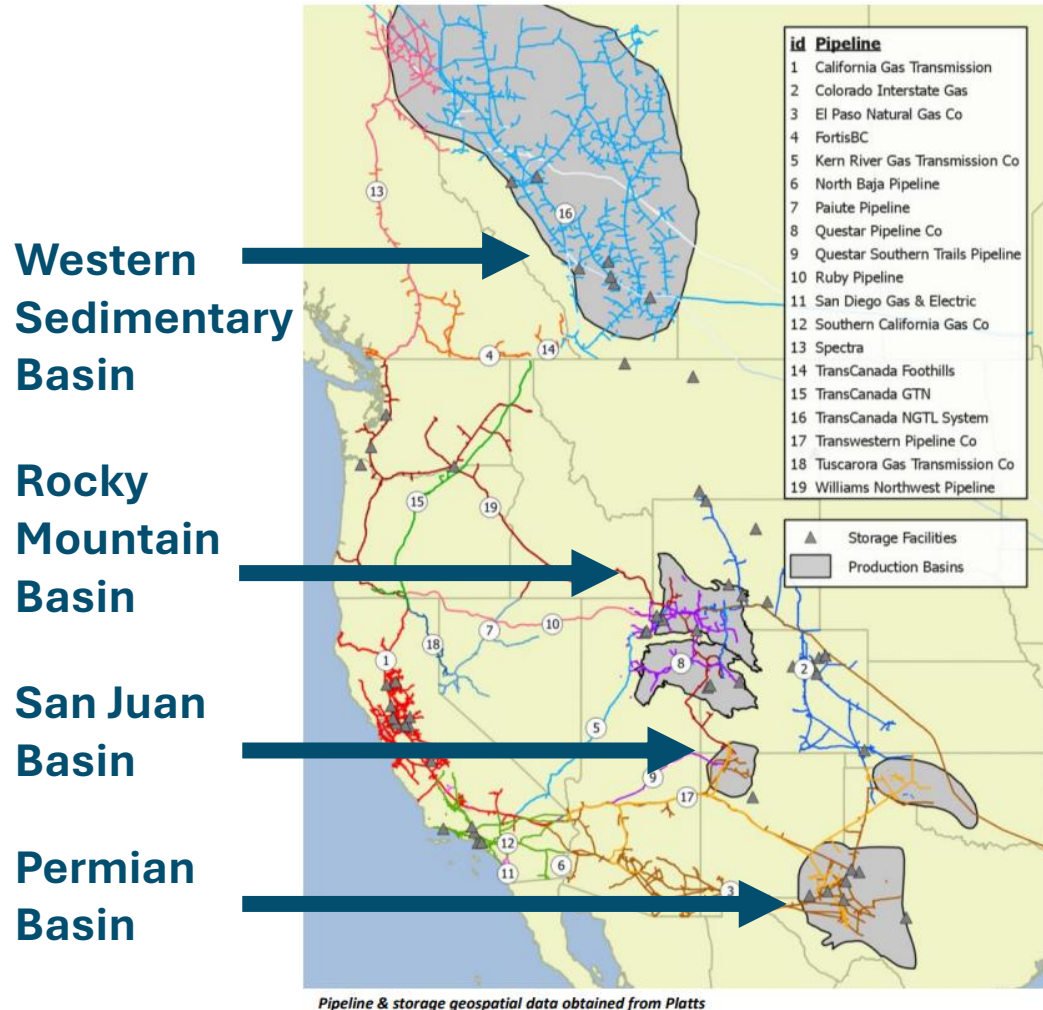
- + Natural gas generation represents the largest source of capacity across the Western Interconnection, playing a crucial role in supporting system reliability
- + Viability of natural gas as a fuel for power production relies on “just-in-time” delivery from pipelines and storage
- + The dynamics of the gas-electric interface in the West have received considerable scrutiny over time:
  - [Report on Outages and Curtailments during the Southwest Cold Weather Event on February 1-5, 2011](#), joint report released by NERC and FERC
  - [Natural Gas Infrastructure Adequacy in the Western Interconnection: An Electric System Perspective](#), commissioned by WIEB following high-profile events in Eastern Interconnection and Permian freeze-off of 2012
  - [Western Interconnection Gas – Electric Interface Study](#), commissioned by WECC during a period of heightened risk with Aliso Canyon future uncertain
- + Increasing evidence of growing constraints on pipeline systems is driving a renewed interest in this topic

*Evaluating the role of natural gas in long-term resource plans requires consideration of upstream production and transport infrastructure – and its costs, constraints, and associated risk factors*

Installed Capacity by Technology in the Western Interconnection, 2023



# Western Natural Gas System Distributes Gas from Four Production Basins Across Western States

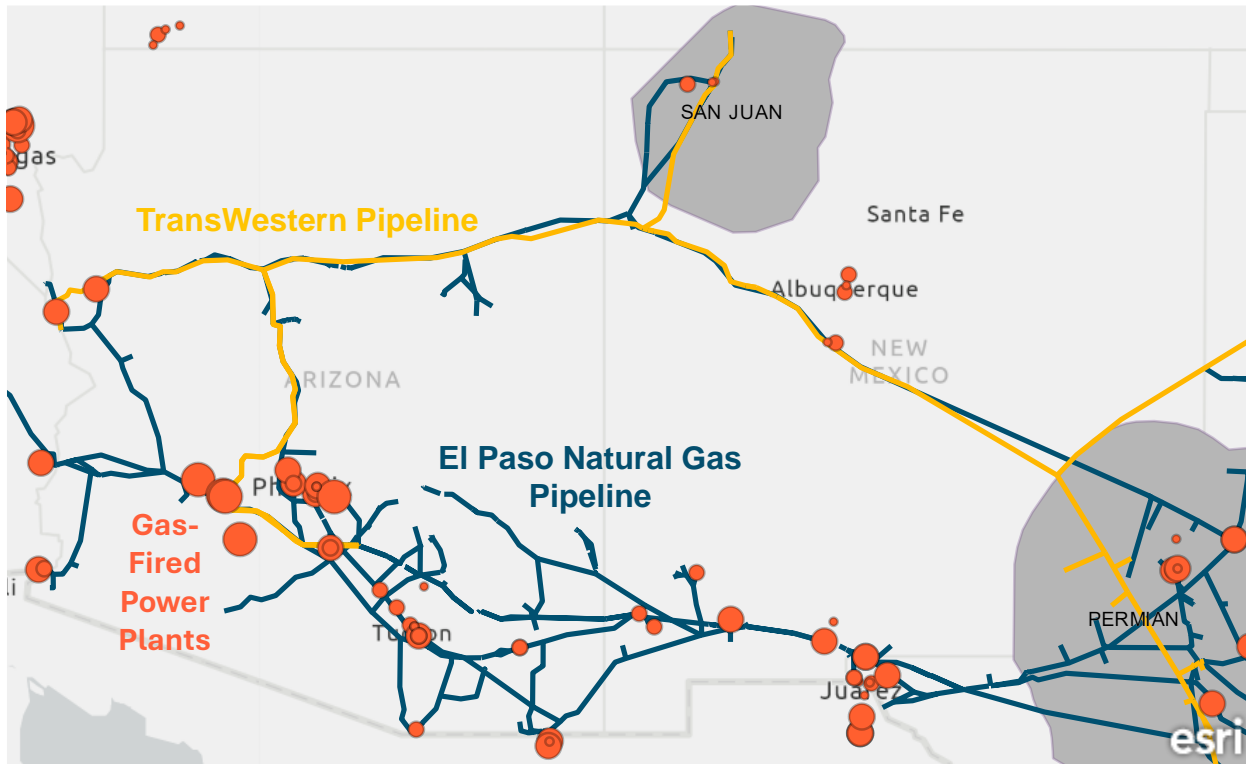


Across all sectors, demand for natural gas in the Western US is roughly 5 trillion cubic feet per year; nearly 40% of this total is used to produce electricity

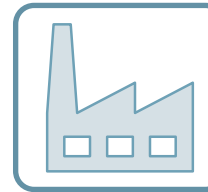
Three components of upstream infrastructure necessary to deliver natural gas to end users:

1. **Production:** four major production basins in Western US and Canada
2. **Transportation:** nineteen major interstate/ intrastate pipeline systems in the West
3. **Storage:** largest storage facilities in the West located in California and the Northwest
  - Injection & withdrawals from underground storage provides both peaking capability and balancing flexibility

# Profile of Natural Gas Infrastructure in Arizona



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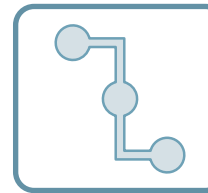
Third largest demand for natural gas among western states

- Behind California (1) and Colorado (2)
- Electricity generation accounts for ~80% of demand



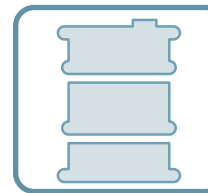
Natural gas supplied from Permian & San Juan basins

- No in-state production or reserves



Two interstate pipelines serving Arizona and downstream demands in California

- Pipelines most constrained in **winter**
- Arizona gas demand highest in **summer**

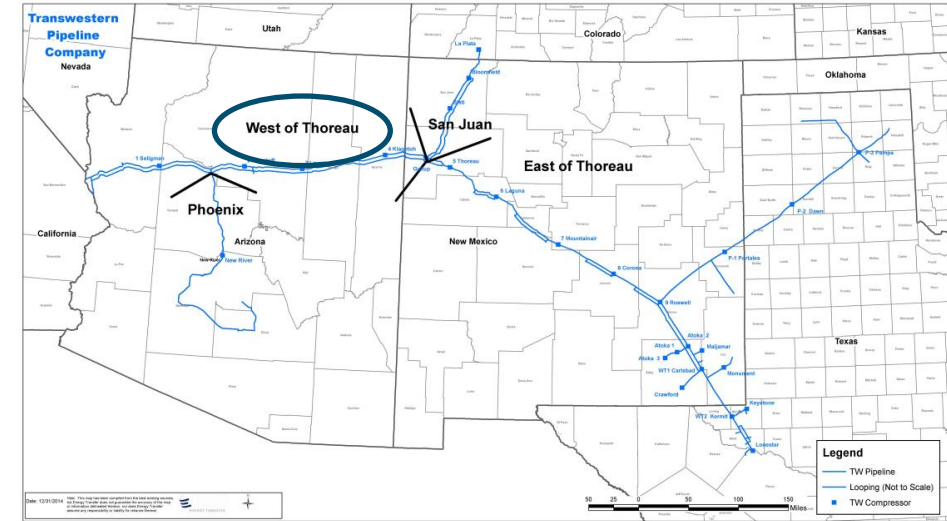


No existing underground storage capacity

- Potential for development of storage in natural salt caverns – but highly site-specific

# Pipelines Delivering Natural Gas to Arizona and California are Largely Fully Subscribed

- + Transportation services for natural gas generally fall into two categories:
  1. **Firm:** capacity reserved on the pipeline for exclusive use over time spans of months to years, ensuring transportation except in even of force majeure (typically at a higher cost)
  2. **Interruptible:** capacity purchased on a day-ahead basis subject to availability on the pipeline (typically at a lower cost)
  
- + Across most of the Western Interconnection, utilities that rely on gas generation for reliability typically meet a large portion of needs with firm service to ensure delivery when needed
  
- + Pipelines post available capacity publicly on “electronic bulletin boards” – a useful resource to understand how much capacity is available for firm service



Loc Name	Zone Name	Loc Purp Desc	Loc/QTI	Unsub Cap[09/2028]	Unsub Cap[10/2028]	Unsub Cap[11/2028]	Unsub Cap[12/2028]	Unsub Cap[01/2029]
WEST TEXAS WEST THROUGH WT-1		M2	RPQ	0	0	0	0	860
WT-2 C/S WEST TO WT-1 C/S		M2						00
WEST TEXAS TO STATION 9		M2						00
SOUTH THRU BLOOMFIELD COMPRESSOR		M2						05
SJ LAT SOUTH TO THOREAU		M2	RPQ	606,275	640,015	526,965	347,925	331,105
THOREAU WEST		MQ	DPQ	0	0	0	0	0

**TransWestern’s Electronic Bulletin Board reports no capacity available West of Thoreau through 2028, indicating pipeline is fully subscribed**

# Despite Ambitious Climate Policies, California's Demand for Natural Gas is Declining Slowly

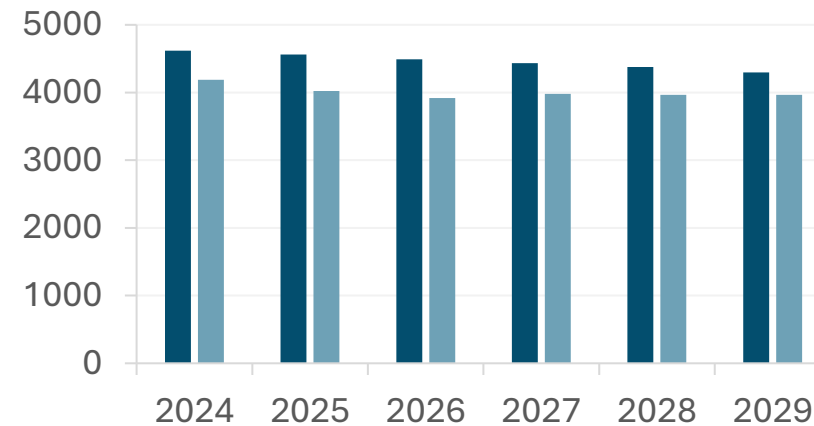
## + California has enacted a suite of targets and policies to reduce greenhouse gas emissions:

- Greenhouse gas emissions reductions of 80% by 2050
- Carbon neutrality by 2045
- Renewables portfolio standard of 60% by 2030
- Clean electricity standard of 100% by 2045
- Building codes & appliance standards promoting electrification

## + Demand for natural gas has nonetheless remained relatively stable, declining at a rate of ~1% per year – a trend that is expected to continue

## + Most impactful measures to reduce natural gas consumption (e.g. building electrification) have limited near-term impact – but will drive down consumption over decades

Winter Peak Day Demand (1-in-10 Peak)  
(MMcf/d)



Average rate of decline, 2024-'29

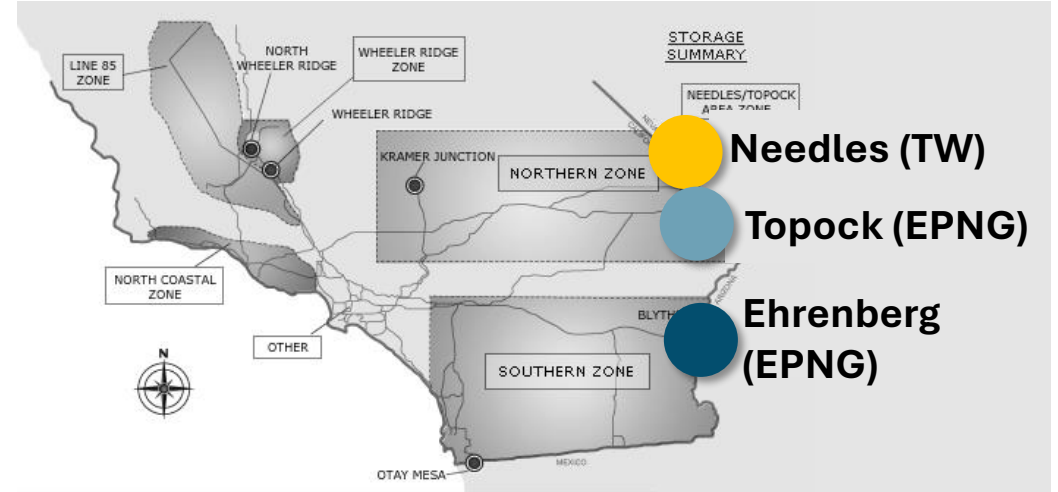
SoCal Gas:  
**1.5% per yr**

PG&E:  
**1% per yr**

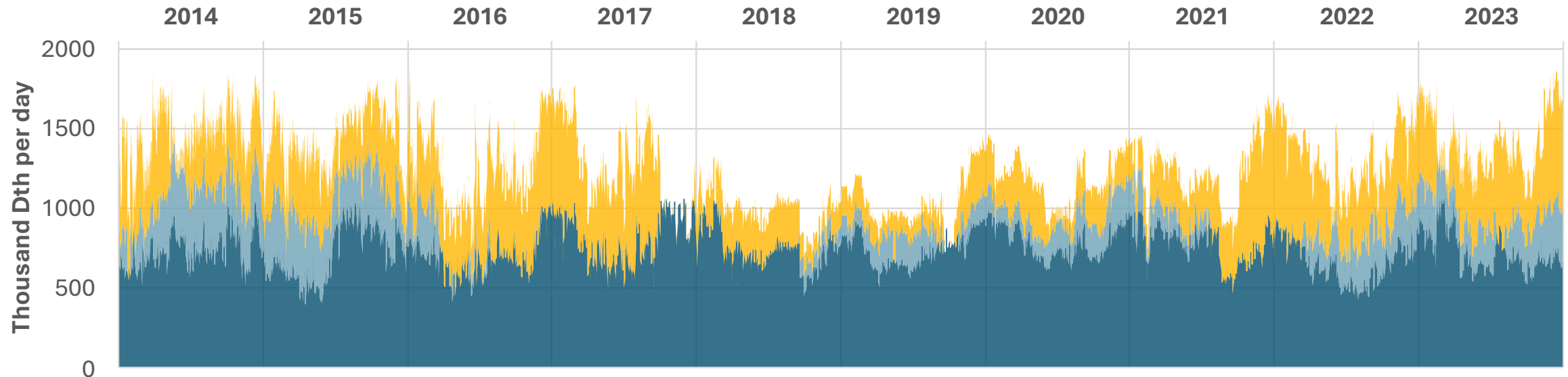
*Natural gas pipelines are most constrained in winter months due to high demands in residential and commercial sectors*

# Westbound Flows Through Arizona to California Have Increased Since 2020

- + Approximately one third of natural gas consumed in California is transported over the TransWestern and El Paso Natural Gas pipelines to the SoCal Border
- + Daily deliveries have increased modestly over the past several years – an indication of the pipelines’ continued utilization to supply California gas needs



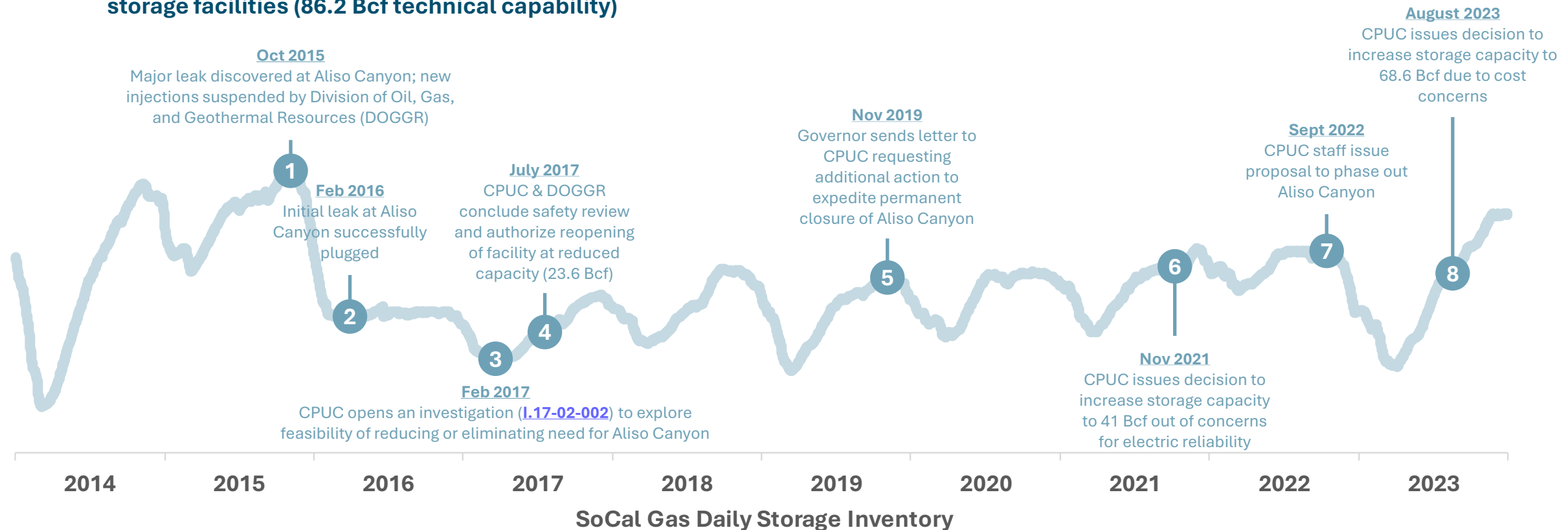
Daily Deliveries to Southern California Border



# Future of Natural Gas Storage in California is Uncertain

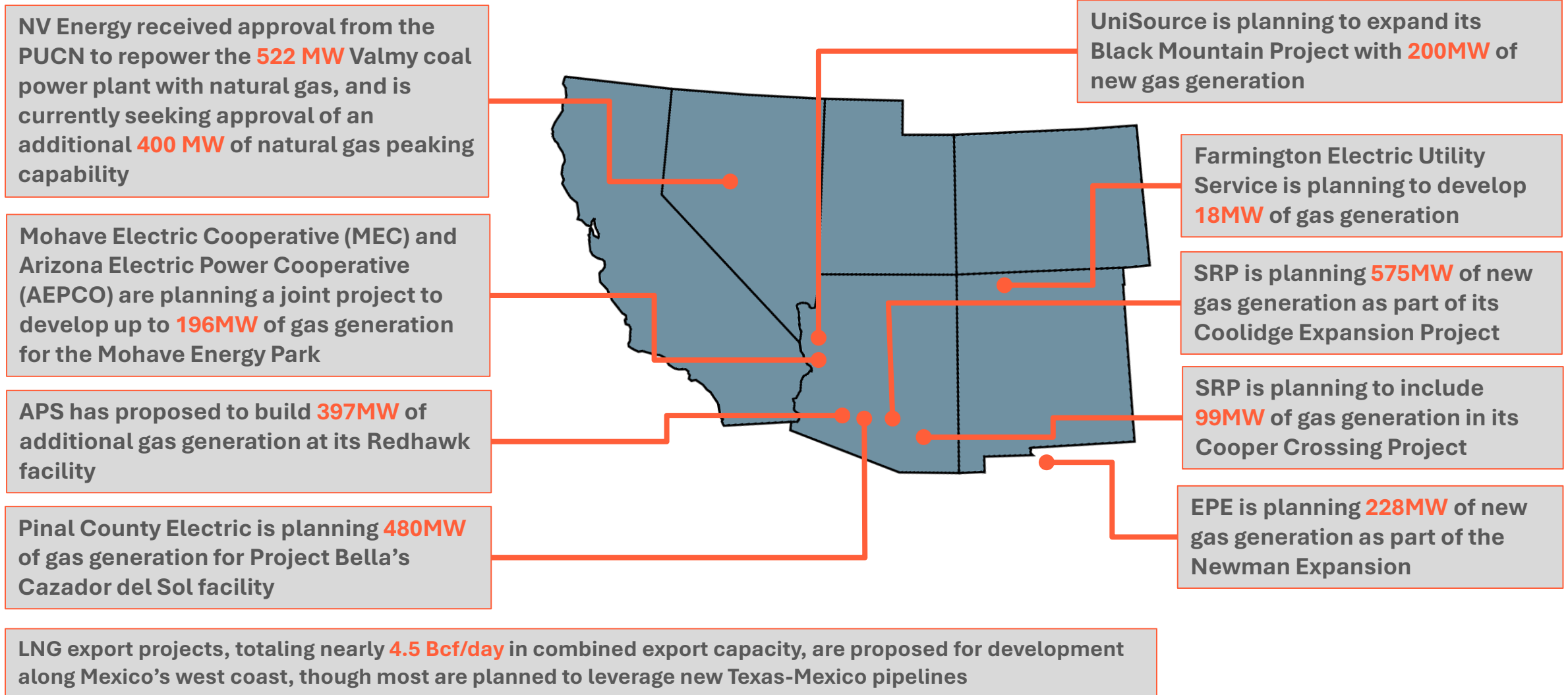
Natural gas storage facilities in California have historically played an important role in (a) providing reliable supplies of natural gas to end users and (b) providing balancing services to enable pipeline operations; Aliso Canyon is the largest of these storage facilities (86.2 Bcf technical capability)

Since discovery of leaks in 2015, tensions between importance of reliable natural gas supplies (and by extension electric reliability) and public safety concerns have left future of Aliso Canyon uncertain





# Utility Plans to Add New Natural Gas Capacity Will Increase Demand on Existing System



# Summary and Implications

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- + Constraints on existing gas infrastructure are becoming increasingly apparent, with limited signs of relief:**
  - Major interstate pipelines fully subscribed for firm capacity
  - Limited near-term reductions in California natural gas demand
  - Lingering uncertainties regarding the future role of existing natural gas storage in California
  - Increases in regional demand in power sector to meet rapid increases in electric demand
  - Potential for additional demand for LNG exports
- + In this environment, planning for fuel transportation is an increasingly crucial aspect of resource planning**





# Microgrid RFP

Sarah Noll, APS



# Microgrid RFP | Introduction

## **Microgrid:**

Is a dispatchable resource with defined loads and electrical boundaries; these are interconnected with the grid but also capable of operating independently.

## **APS Goals:**

APS's 2023 Integrated Resource Plan (IRP) identified approximately 600 MW of dispatchable microgrid (MG) capacity in APS's service territory by 2031. APS plans to partner with customers, where it is cost-effective, on such MG facilities.

## **Objectives:**

- Identify MG developers that can meet the APS MG requirements in support of advancing customer-sited microgrids
- Establish various Microgrid resources cost profiles

## **Microgrid Project Structure:**

- Projects going forward will be **customer-sited and not owned by APS**
- Projects will use capacity purchase agreements with the generator owner

**RFP Status:** RFP was issued Sept 3, 2024



# Microgrid RFP | Overview of Customer-Sited Microgrids



APS's **C&I customers** with on-site generation requirements include:

- Data Centers
- Advanced Manufacturing
- Health Sciences (hospitals)
- Critical Infrastructure

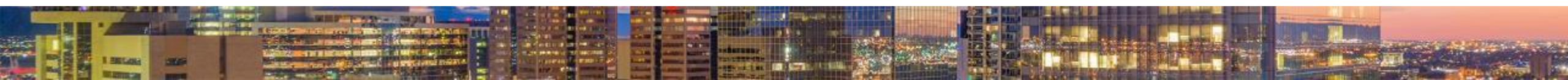
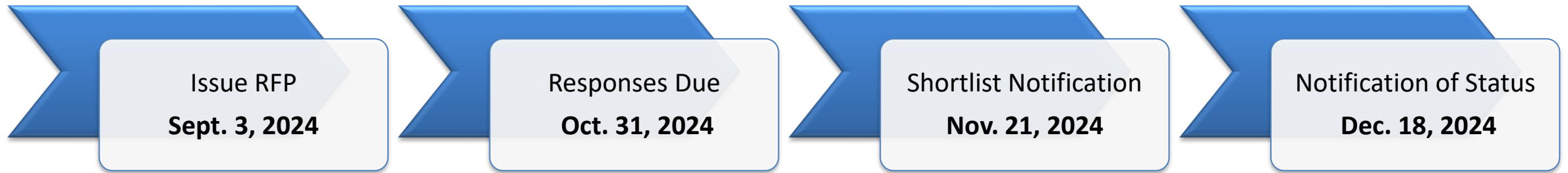


Potential **MG Technologies** include:

- Solar PV (or CSG) +Storage (electrochemical, thermal..)
- Long duration energy storage
- Hydrogen fuel cells
- Reversible hydrogen electrolyzers & generation
- Tier 4-final certified Diesel reciprocating generation
- Small modular reactors
- Compressed air energy storage
- Linear generators (multifuel)



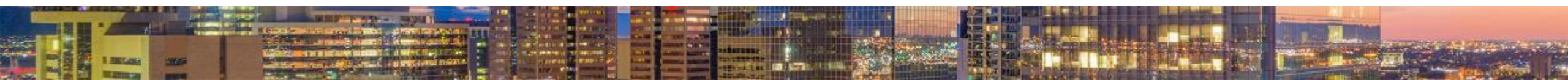
# Microgrid RFP | Timeline



## Microgrid RFP Results | Success

Identify qualified vendors in the APS market to allow APS to support customer microgrid needs

- A robust list of microgrid developers to meet individual customer needs
- Multiple technologies are identified and supported by developers
- Cost- effective solutions for customers



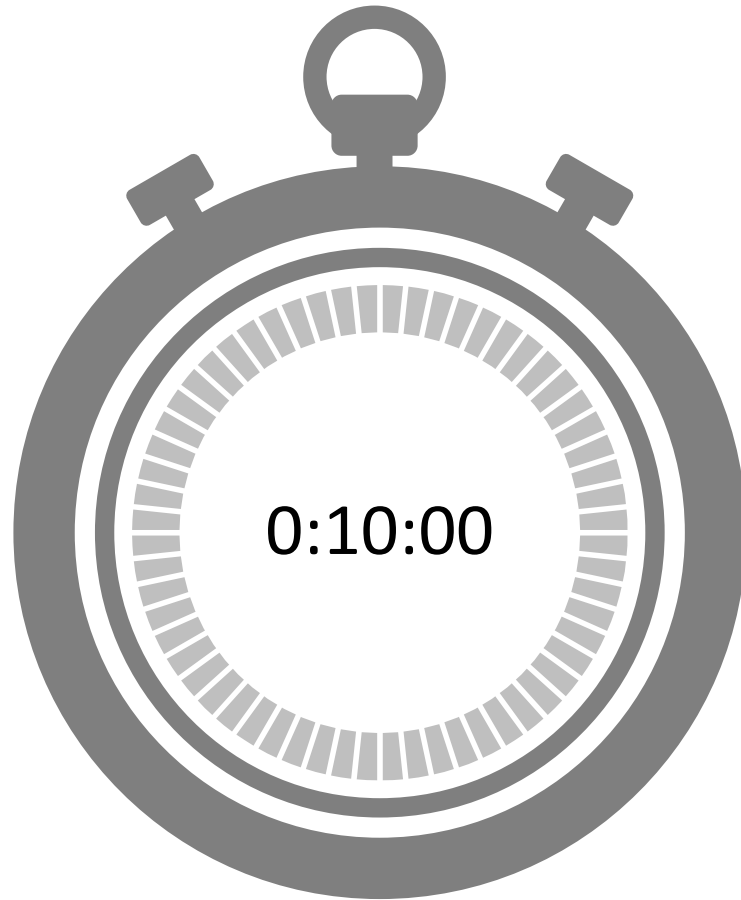


Break





# Time for a Break



Break Duration 10 min.

Meeting will resume at



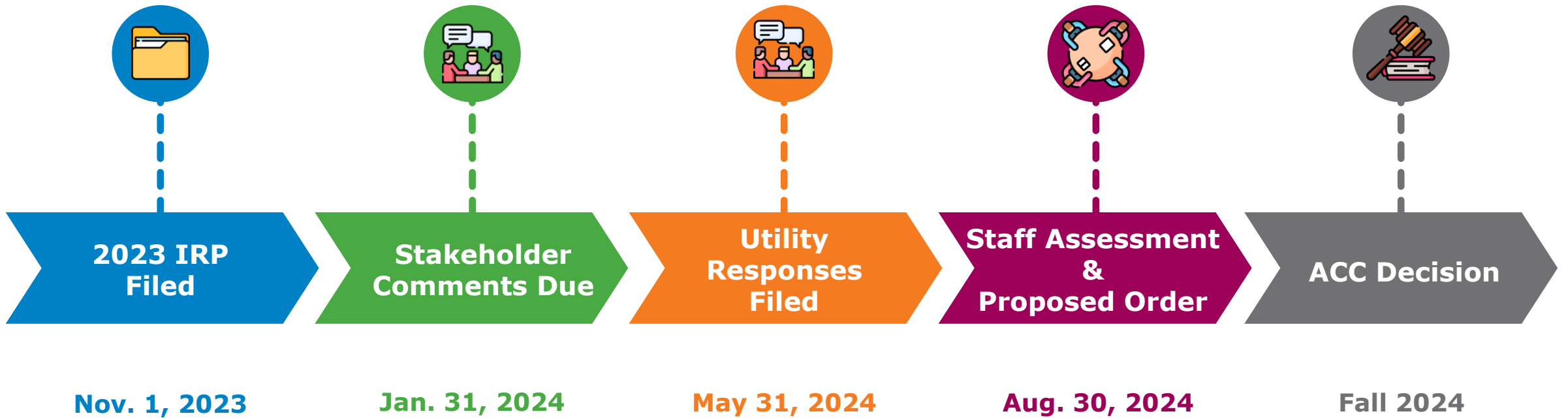


# ACC Staff Proposed Order - 2023 IRP

Mike Eugenis, APS



# 2023 IRP Timeline



# Staff IRP Proposed Order

- Recommendations are based on Staff's review of the 2023 IRPs, Commissioner comments, stakeholder comments and recommendations, and other relevant filings made in Docket No. E-99999A-22-0046
- Recommends that the Commission acknowledge the 2023 IRPs for APS, TEP, and UNSE
- Recommends Staff be required to file a development timeline for next IRP process within 90 days of the Commission's decision





# Western Market Update

Tyler Moore, APS

# Western Market Update

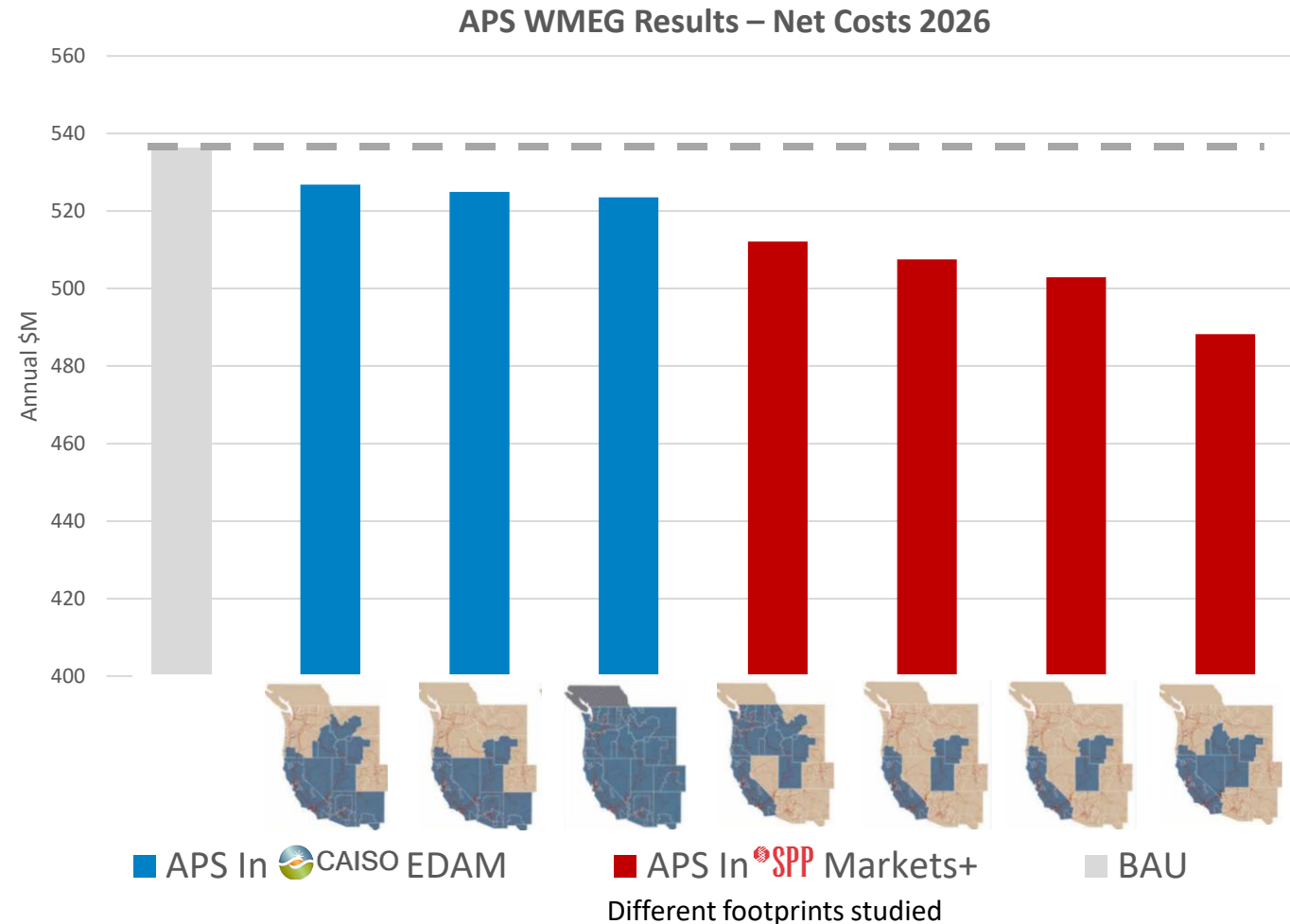
- APS shared preference for Markets+ in April 2024
  - Greater customer savings
  - More typical market structure with greater benefits
- APS co-authoring Issue Alerts highlighting differences in market design:
  - Seven-part series posted every few weeks
  - Co-authored with several other Western entities

- **Issue Alerts comparing market design:**
  - [Governance](#), 7/31/2024
  - [Reliability](#), 8/14/2024
  - [Fair and Accurate Market Pricing](#), 8/28/2024
  - [Seams Issues](#), 9/18/2024
  - Support for Clean Resources
  - Market Operator Actions and Modeling
  - Durable Customer Benefits



# Continuing to Develop Recommendation

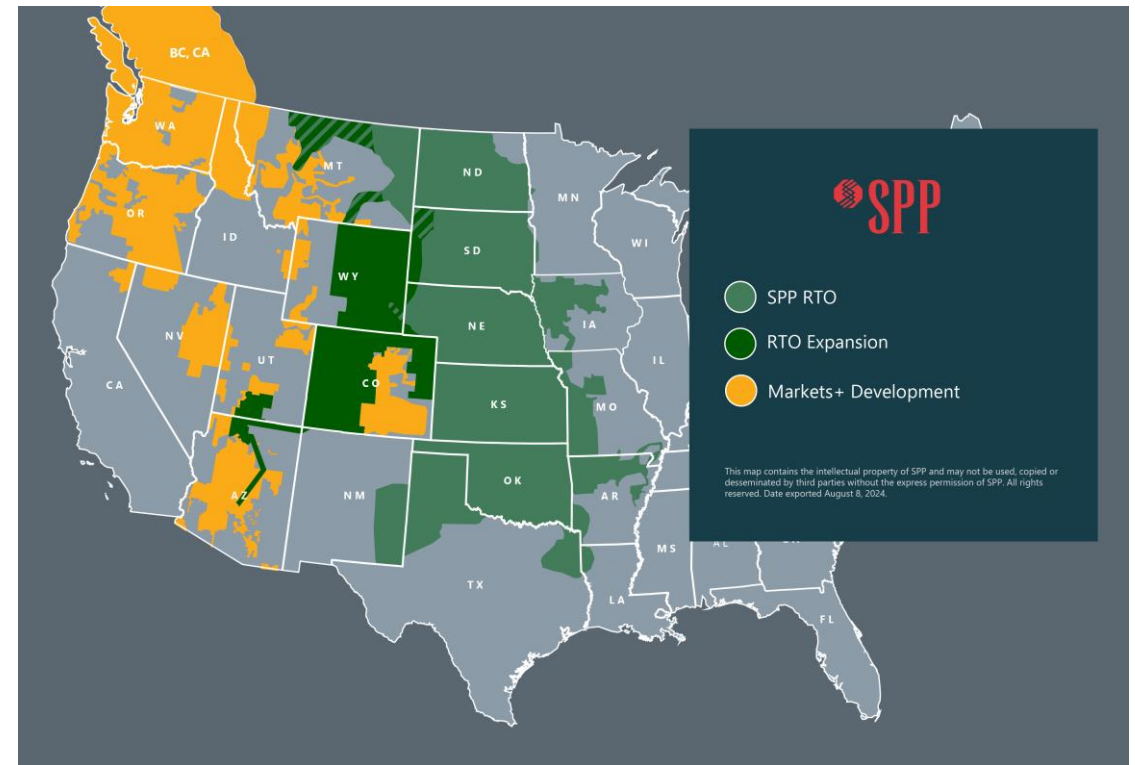
- Updating production cost analysis
- Completing assessment of market stand-up costs / integration and steady state
- Review of generation capacity implications of market decisions



# Western Market Update

- Continued monitoring as both EDAM and Markets+ develop:
  - Markets+ tariff update
  - Pathways initiative (CAISO market)
  - Market commitments
- Updating Production Cost Models with market leanings
- Tracking towards Q4 2024 market decision and November RPAC update

## Map of SPP Market Leaning



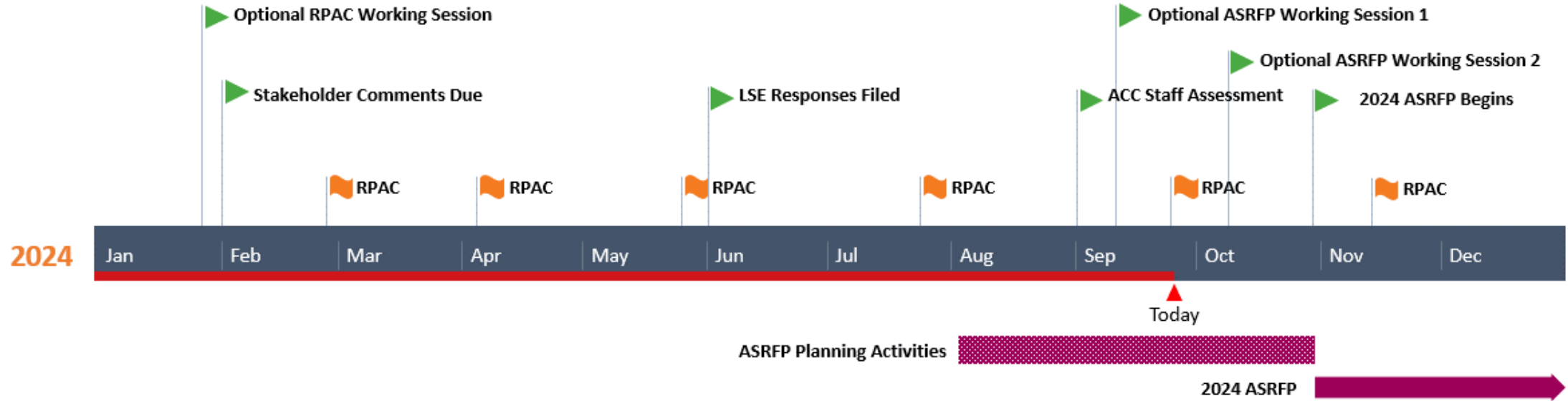




# Next Steps & Closing Remarks

Matt Lind, 1898 & Co.

# Forward Plans and Meetings



## Key Milestones

November RPAC Meeting: 11/15/2024  
Time: 9:00am

2024 ASRFP Breakout Session #2: 10/10/24  
2024 ASRFP Release: 10/30/24  
ACC IRP Decision: Fall 2024





# Appendix

## Appendix - Critical Market Characteristics

Issue	Outcome Sought	Issue	Outcome Sought
<b>ECONOMIC PROTECTIONS</b>  <b>Allow for WRAP PRM Benefits</b> Market design that positions APS customers to capture lower reserve margins through participation in WRAP  <b>Congestion Revenue as a Market Hedge</b> Congestion revenues are structured to hedge customer risks of congestion costs  <b>GHG Construct</b> Enable state policy choices for GHG without imposing costs on other states		<b>RELIABILITY</b>  <b>Participant Leaning of Resource Adequacy</b> The market design must either assure that each BA has sufficient RA, or ensure that there is no "leaning" by short BAs  <b>Market Sufficiency</b> Market is structured to limit shortfall risks allow participation without risk of reliability  <b>Deliverability of RA Resources</b> Requirement that external RA resources have firm transmission	
Issue	Outcome Sought	Issue	Outcome Sought
<b>LONG-TERM OUTLOOK</b>  <b>Independent Governance</b> Independence in decision making and operations  <b>Representative Stakeholder Process</b> Stakeholder process captures perspective of stakeholders  <b>Transmission Development</b> Market design compensates entities' transmission for congestion relief		<b>ECONOMIC OPPORTUNITIES</b>  <b>Efficient Balancing Authority Seams</b> Flow based resource dispatch within the market footprint including between BA seams  <b>Reduced Production Costs</b> Efficient unit commitment and dispatch due to larger pool of resources	

