



# APS RPAC Meeting

6/7/2022



# MEETING AGENDA



Welcome & Meeting Agenda  
Matt Lind  
1898 & Co.



Industry Supply Chain Perspectives  
Lakshmi Alagappan / E3  
RPAC Members



APS Updates  
Justin Joiner / VP, Resource Mgmt  
Todd Komaromy / Director,  
Resource Planning



Summer Readiness /  
Regional Reliability  
Kent Walter  
Manager, Analysis and Engagement



2020 ASRFP Update  
Jill Freret  
Director, Resource Acquisition



Next Steps & Discussion



2022 ASRFP Update  
Matt Lind  
1898 & Co.



## April RPAC Meeting

- APS completed the development of an All-Source RFP targeting resource needs between 2025 and 2027. The RFP was released on May 16<sup>th</sup>
- APS discussed the changes of the 2022 RFP document relative to the 2020 process with additional focus on RPAC members feedback items.
- Conducted an open forum that allowed RPAC members to provide feedback on the RFP process and level of stakeholder engagement.



# Following Up

- Action Items from previous meetings:
  - ☐ Share RFP release
  - ☐ Finalize hybrid meeting logistics
- Ongoing Commitments:
  - ☐ Distribute meeting materials in a timely advance fashion (3 bd prior)
  - ☐ Transparency and dialogue







# Meeting Guidelines

- 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.
- We will keep a parking lot for items to be addressed at later meetings.
- 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.
- Consistent member attendance encouraged; identify proxy attendee for scheduling conflicts.
- Meetings and content are preliminary in nature, and prepared for RPAC discussion purposes. Litigating attorneys are not expected to participate.



# Icebreaker / Introductions

- Name
- Organization you are representing
- Choose one to answer (or tell us a fun fact):
  - ☐ If you're stranded on an island and have the option of bringing two items with you, what two items would they be?
  - ☐ What is one of your favorite books, and why?
  - ☐ You have to sing karaoke. What song do you pick?
  - ☐ What did you eat for dinner last night?





# APS Updates



# 2020 ASRFP Update





# 2020 RFPs

- Three RFPs issued in 2020:
  - ☐ All Source
  - ☐ Battery Energy Storage (to retrofit final two AZ Sun solar sites)
  - ☐ Demand Response
- Total MWs under contract today:
 

<input type="checkbox"/> Solar:	150MW
<input type="checkbox"/> Wind:	238MW
<input type="checkbox"/> PVS:	275MW
<input type="checkbox"/> Storage:	360MW
<input type="checkbox"/> DR:	75MW
<input type="checkbox"/> Gas:	565MW
<b>TOTAL:</b>	<b>1,663MW</b>
<b>CLEAN:</b>	<b>1,098MW</b>





# 2020 Procurement Updates

- Transactions represent a balanced portfolio of third-party PPA and APS ownership with focus on clean, reliable, affordable resources to serve our customers
- Contracts blend mature and emerging technologies and have been executed with large, experienced developers
- Commercial headwinds are significant (supply chain constraints, rising prices, regulatory and legislative uncertainty)
- APS has already received force majeure notices for some clean projects in its portfolio and is working closely with developers to minimize schedule and cost impacts

- 
- Additional transaction still in negotiation
    - ❑ Solar + storage totaling 168MW/672MWh
  - Transaction is tied to APS's Green Power Partners (GPP) program, which enables large customers to meet their sustainability goals; benefits APS and all customers by advancing clean energy projects through premium payments made by participating large customers
  - Expect to finalize by July 2022





## Discussion & Questions



# 2022 ASRFP Update



# Overview & Schedule

- RFP publicly available at [aps.com/rfp](https://aps.com/rfp)
- Added a Bidder's Conference (June 8<sup>th</sup>)

Event	Important Date
RFP Release	(Mon.) May 16, 2022
Confidentiality agreement DUE	<del>(Mon.) May 30</del> (Tues.) May 31, 2022
Bidder's Conference	(Wed.) June 8, 2022
Proposal(s) DUE	(Fri.) July 8, 2022
Proposal Fee(s) DUE	
Shortlist Respondents notified	August 2022
Final selections	September 2022
Anticipated contract execution	September – December 2022

# Early Look at Participation

- ~130 entities registered for PowerAdvocate access
- 78 Signed Confidentiality Agreements

Respondent Type	Approximate #
Renewable Energy Resource (Includes Storage)	95
Demand Response	10
Energy Efficiency	10
Thermal Resource	15
Other... (News Outlet, a non-bidder)	Less than 5



Break



# Industry Supply Chain Perspectives







# Procurement of new resources has become more difficult due to headwinds in new resource development

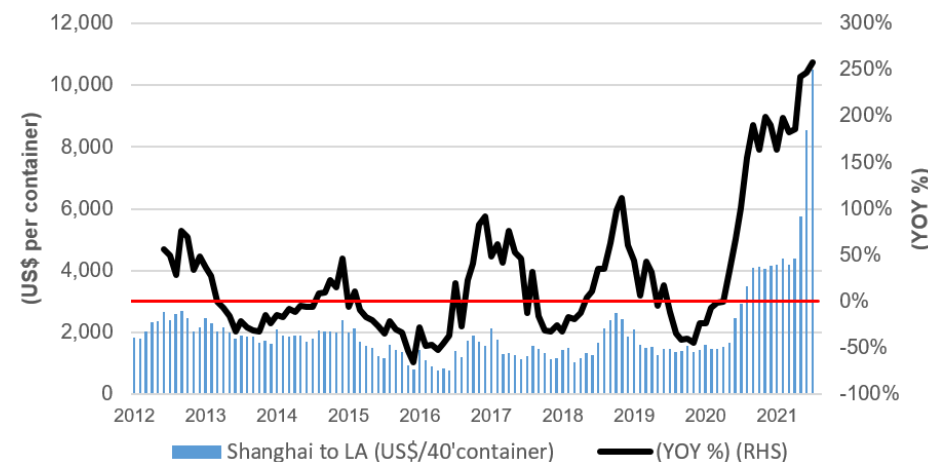
- + Record demand for new resource development is being met with a disrupted supply that is impacting new resource procurements across the U.S.
- + Headwinds faced by developers of new resources include:
  1. Equipment shipping costs
  2. Manufacturing facility lockdowns
  3. Department of Commerce AD/CVD investigation
  4. Commodity price volatility
  5. Interconnection and permitting delays



# Shipping costs are expected to stay high in the near-term, putting pressure on new development

- + **Shipping costs across most ports / cities have been increasing since mid-2020**
  - Shipping cost for one container from Shanghai to LA broke \$10K in the latter half of 2021, more than 5x the historical average
- + **The main driver for the increase in 2020-2021 was shipping back-logs due to COVID-related supply chain issues**
- + **In 2022, shipping costs have remained at record levels after oil prices spiked due to the Russian invasion of Ukraine**
  - Some supply chain strains have started to ease but this has not translated into lower shipping costs yet

2021 Shipping Cost Increase (US-China)



2022 Oil Price Increase



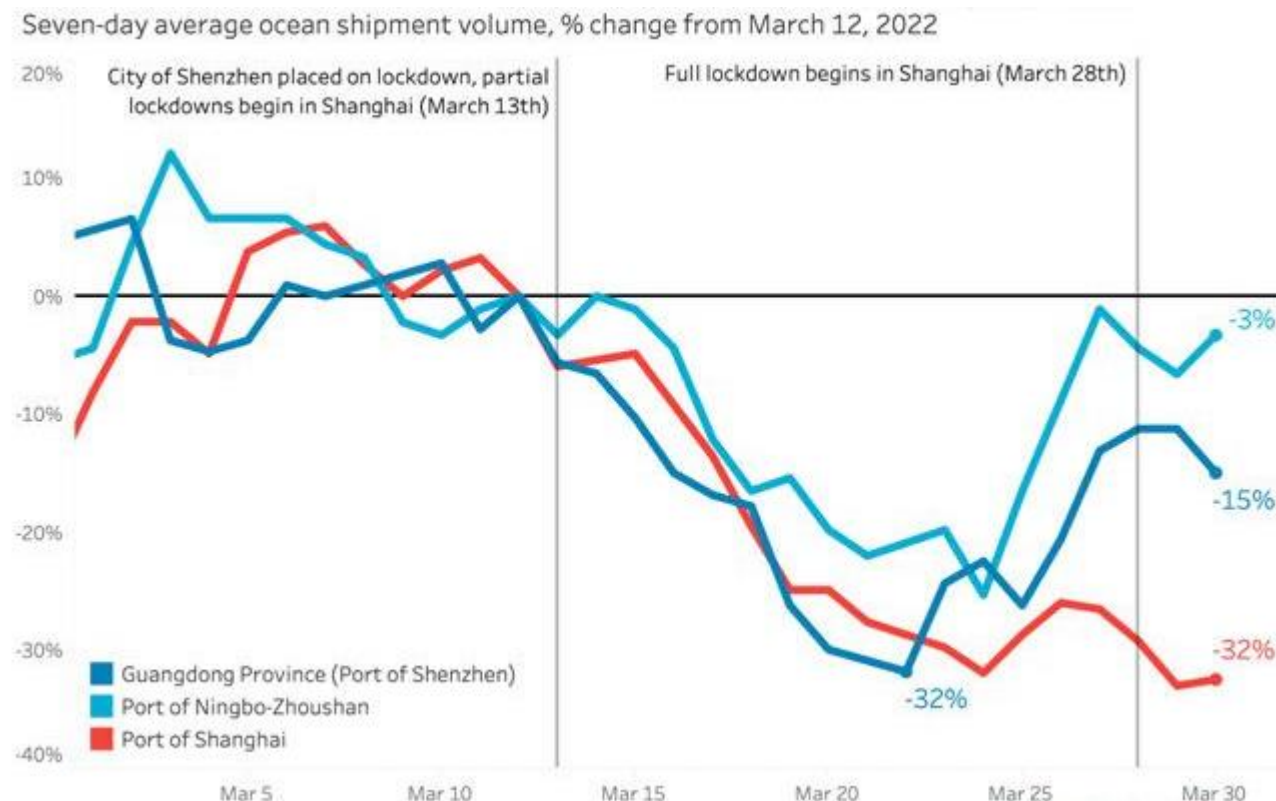
Source: International Monetary Fund; Bloomberg



# Manufacturing facilities lockdowns due to COVID continue to pose a supply chain risk

- + COVID lockdowns of manufacturing facilities were the main cause of supply chain disruptions in 2020
- + However, China and other countries utilizing the “zero-COVID” approach are still mandating COVID lockdowns in 2022
  - This leads to a continued disruption of the world’s supply chain in 2022
- + China’s three main exporting cities have experienced 25-35% decrease in outbound shipments in March-2022 due to these lockdowns
- + However, most U.S. developers do not expect these lockdowns to cause project cancellations
  - Potentially only minor delays

## Impact of China COVID Lockdowns on Shipment Volumes



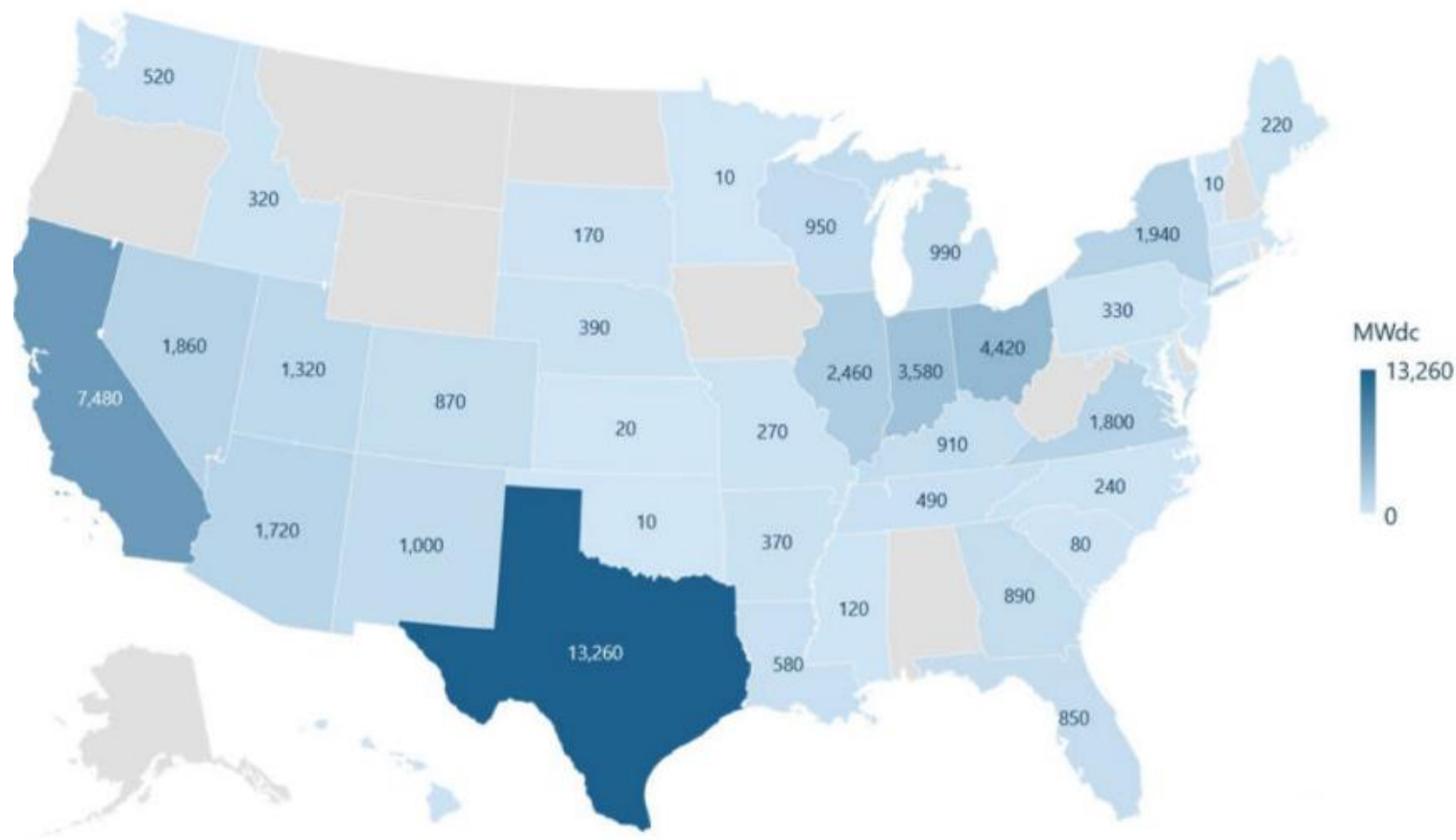
Source: FourKites Tracking Data (2022)



# New AD/CVD investigation has already impacted 318 utility-scale solar projects nationally

- + Earlier this year, Department of Commerce started investigating a circumvention case that would increase tariffs on solar cell imports
  - Investigation has already started impacting solar projects
- + Through Apr-2022, utility-scale solar developers have reported 318 project delays or cancellations nationally, adding up to:
  - **50.8 GW** of solar
  - **5.8 GWh** of co-located battery storage

## Solar Capacity Delayed or Cancelled by AD/CVD Investigation



Source: Solar Energy Industries Association, data as of 4/28/2022



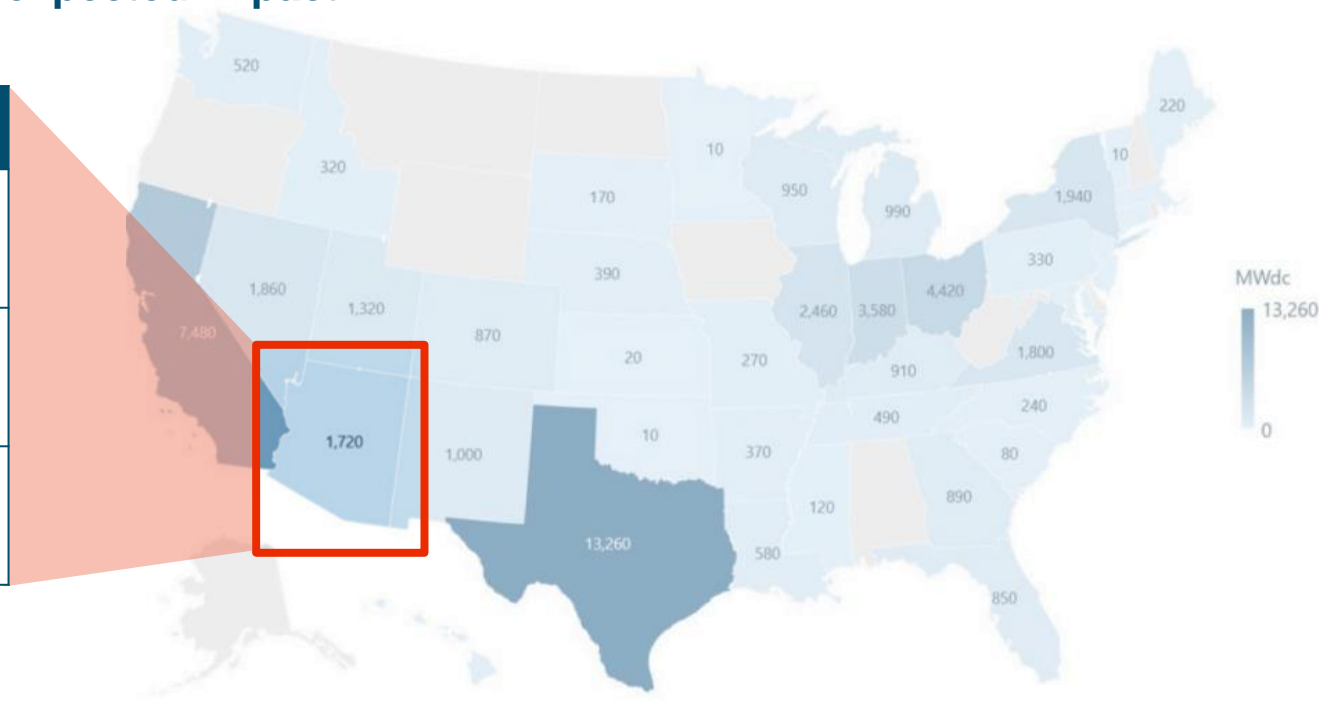


# Arizona is one of the top 10 states most impacted by the investigation, with 1.7+ GW of impacted solar additions

+ Based on company reports compiled by the Solar Energy Industries Association (SEIA) through April 2022, Arizona is one of the top 10 states most impacted by the investigation:

- **1.7+ GW** of solar resources in development in Arizona impacted by the investigation
- Current reports represent a fraction of total expected impact

Impacts to Arizona	
Utility-Scale Solar Project Capacity Impacted	1.7 GW
Utility-Scale Solar Project Investment Impacted	\$1.8B
Fraction of Companies with Impacted Module Supply	63%



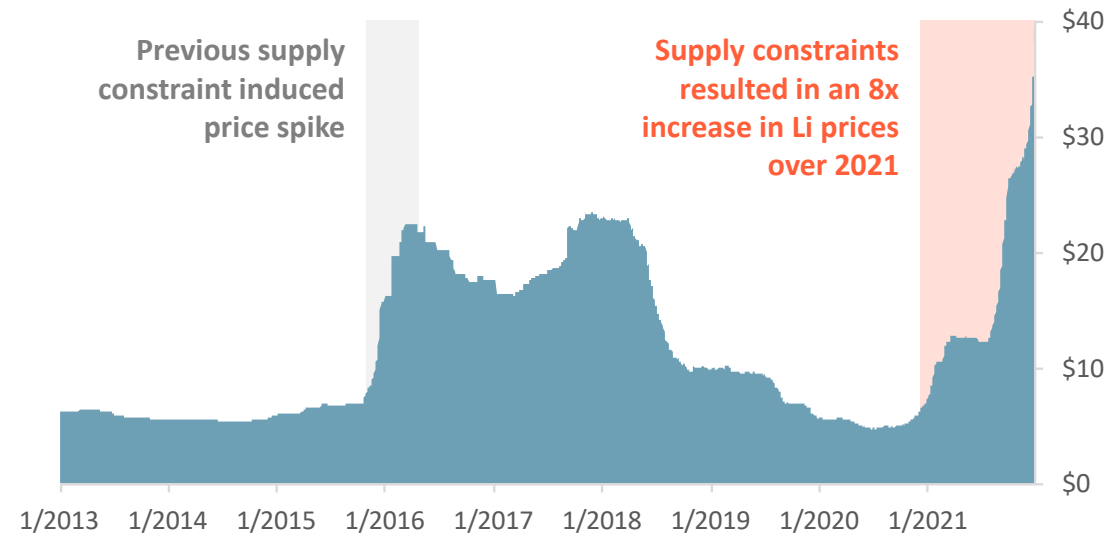
Source: Solar Energy Industries Association, data as of 4/28/2022



# Recent lithium and cobalt price increases and supply chain issues are creating greater risk of project delays

- + As global demand for lithium ion batteries has surged, upstream extraction and refining industries have become constraints
  - Recent commodity prices for key raw materials increased significantly in 2021
  - Industry analysts expect lithium, nickel, and cobalt commodity markets to be short on supply in or before 2025
- + COVID-19 impacts on global trade have further disrupted the market
- + Impacts could include increased costs and greater risk of project delays
  - Raw materials currently make up roughly 70% of total cell costs

Lithium Carbonate Price  
(\$/kg)



*“...new-build resources require at least 4-6 years of lead time, and there are a number of macroeconomic factors that must be taken into account that are beyond the control of sellers and buyers, such as the COVID-19 pandemic, the global semiconductor shortage, and tight battery supplies.”*

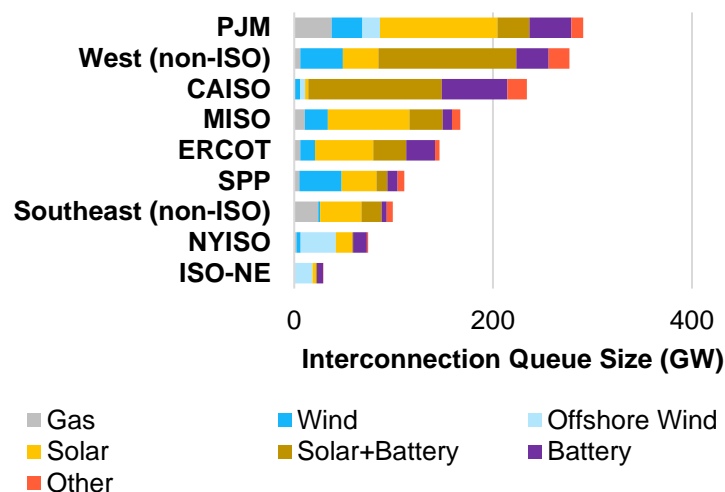
*California Energy Storage Alliance, Comments to CPUC*



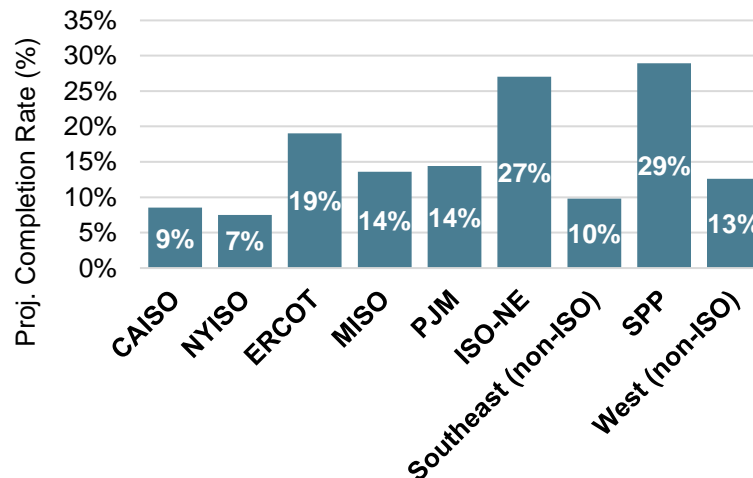
# Interconnection queues have been growing and now total more than ~1.5 TW of planned capacity nationally

- + As of April 2022, there are 8,000+ active projects (~1.5 TW) across all U.S. interconnection queues
- + Historically, interconnection queues lasted an average of 2 – 4 years with 15% – 25% completion rate
- + Recently, there has been an increase in the number of delays and cancellations, led by CAISO and NYISO
- + PJM also proposed a two-year pause on new interconnection requests to deal with 1,200-project backlog
- + Wind and gas are the technologies with the longest interconnection timelines; solar and batteries have the lowest completion rate, ~7% and ~3% respectively

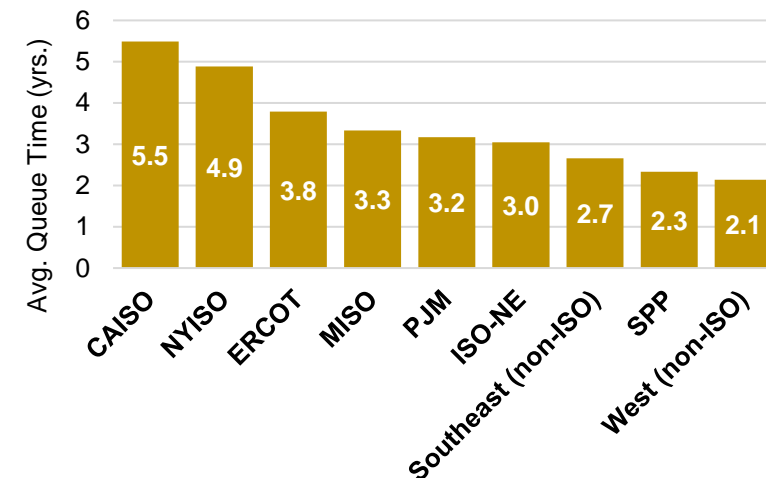
## Interconnection Queue Capacity by Region



## Avg. Project Completion Rate by Region



## Avg. Queue Timeline by Region





# Several utilities have delayed coal plant retirements due to risks associated with new resource development

- + As reserve margins shrink around the country, headwinds facing new resource development are forcing utilities to reconsider their resource plans in the near- to medium-term
- + PNM & NIPSCO have announced delays in the retirement of coal plants to ensure near-term reliability in light of delays for proposed replacement resources
- + These announcements have not yet impacted decarbonization goals and plans, but further delays could impede progress towards carbon reductions and jeopardize other utilities' plans for resource retirements



Coal Plant Name	Owner	Capacity (MW)	Location	Original Retirement Date	Updated Retirement Date
San Juan	PNM	507	San Juan, NM	Mar-2022	Sep-2022
R.M. Schahfer	NIPSCO	722	Jasper, IN	Dec-2023	Dec-2025





# Discussion Questions

- + What are your reactions to hearing about the resource development headwinds across the industry?**
- + How do you see these resource development headwinds impacting each of the following goals?**
  - Affordability
  - Reliability
  - Sustainability
- + If you were making resource procurement decisions in this market, what steps would you take to mitigate risks and their impacts?**



# Summer Preparedness & Regional Reliability

# Summer Preparedness Summary

APS is serving its customers with sufficient generation resources, fuel supplies and transmission capacity to meet their needs reliably through the summer.

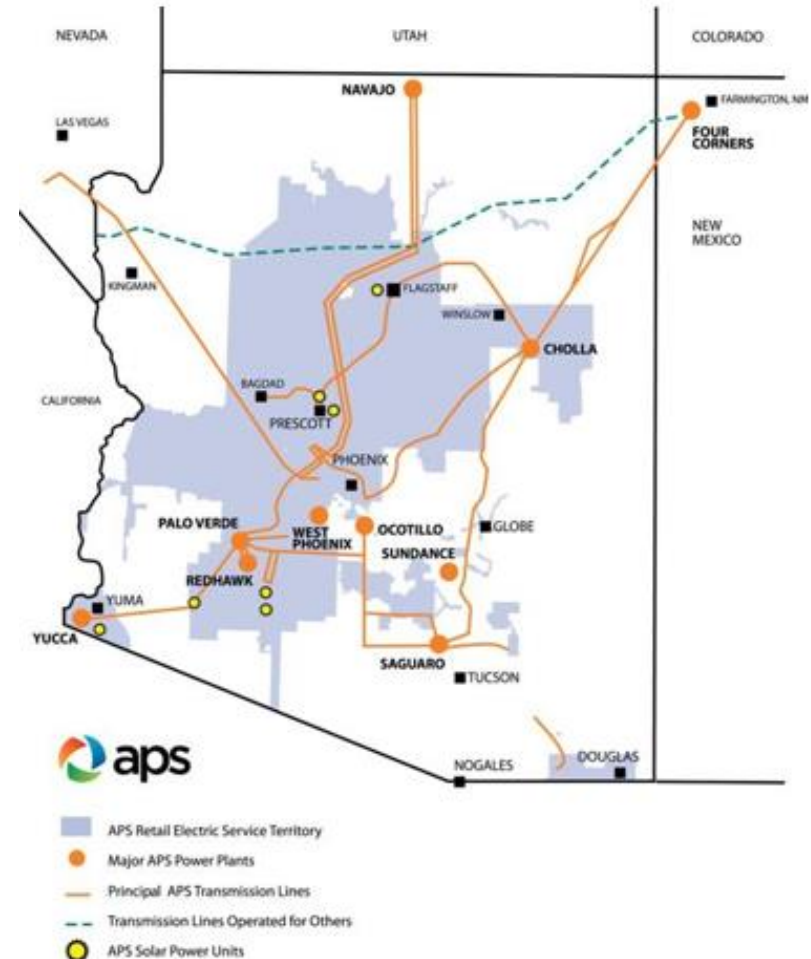


# **How are cascading reliability challenges prevented across the West?**



# APS cannot island all its customers apart from the Western grid

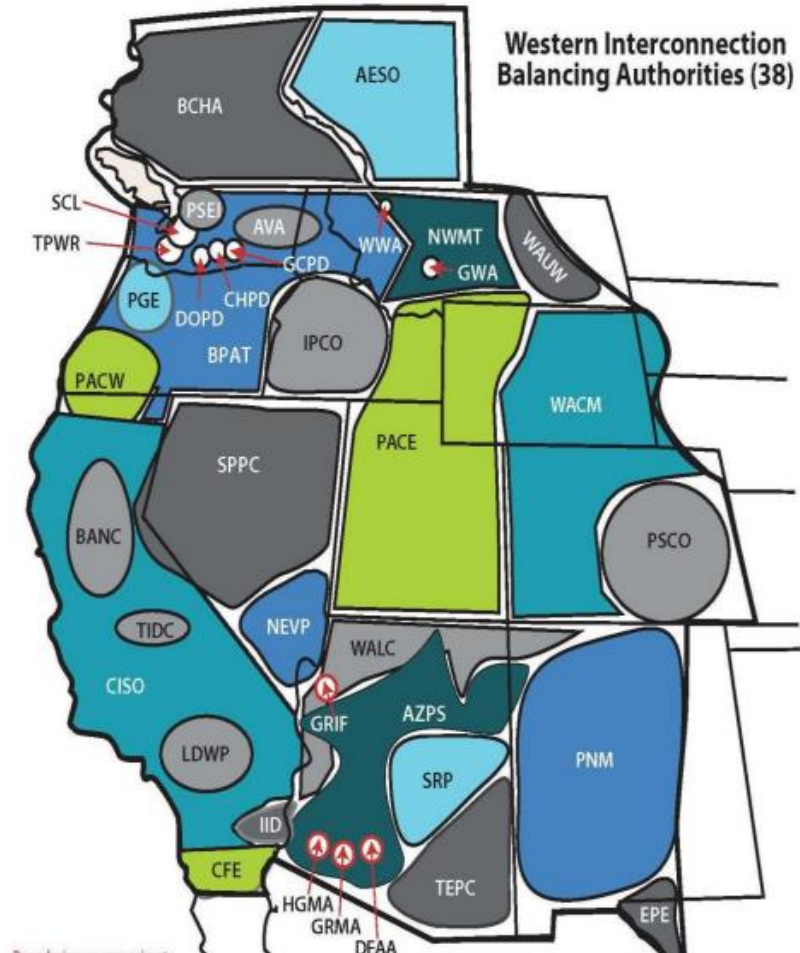
- Jointly owned transmission
- Jointly owned generation
- Broad non-congruent service territory
- Benefits of interconnection
  - ☐ Reserve sharing
  - ☐ Physical inertia
  - ☐ Economic opportunities





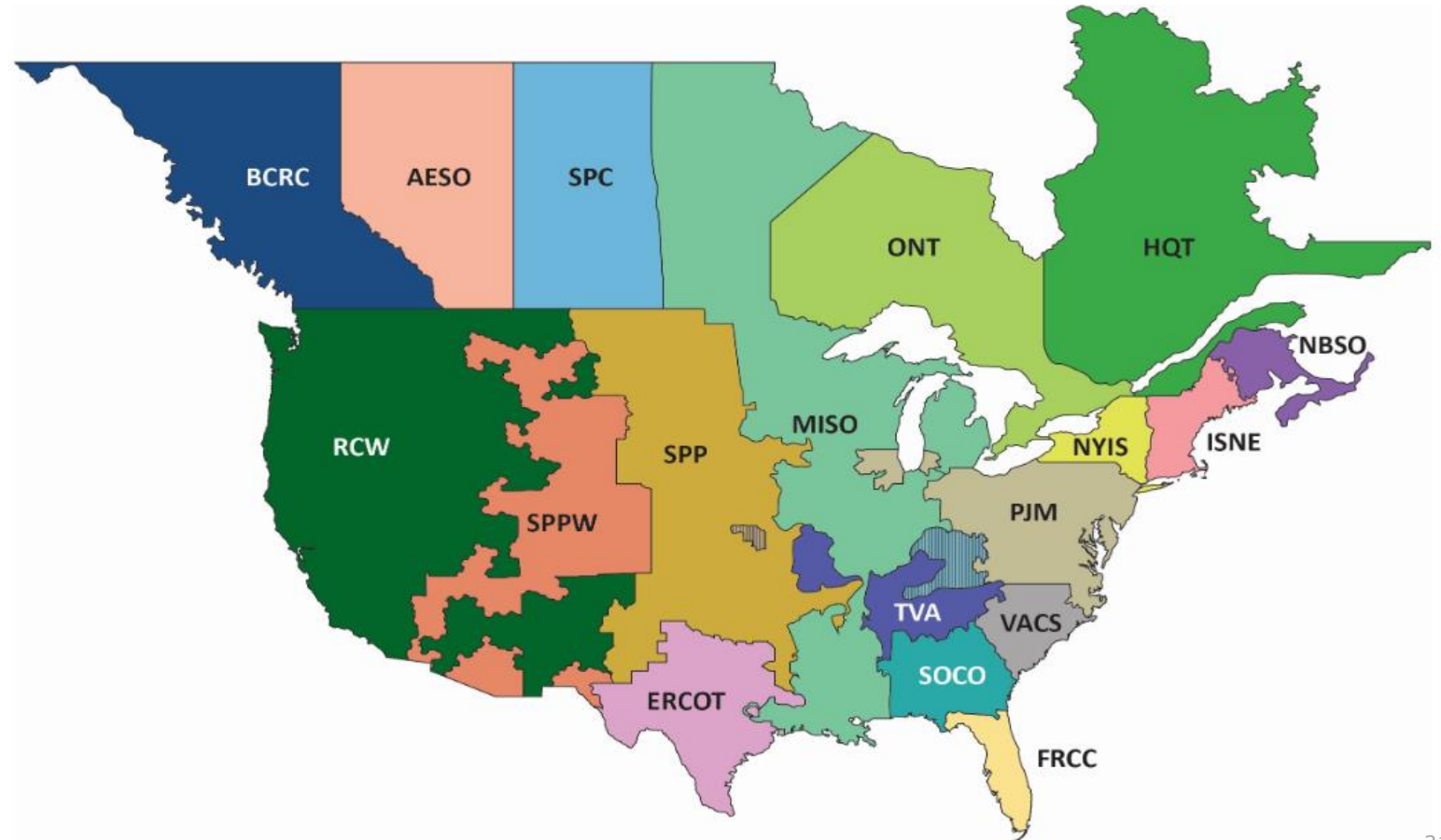
# Western grid operated by 38 independent Balancing Authorities

- Each BA is responsible for reliability within their area
  - Moment-to-moment matching of resource to demand (Area Control Error (ACE) and Frequency)
- NERC/WECC reliability standards



# Reliability Coordinator (RC) provides oversight to reliable BA operations

- Determine severity of emergency events
- Determine remediation to prevent cascading effects
- Two Western US Reliability Coordinators
  - ❑ Reliability Coordinator West (RC West)
  - ❑ SPP West



# So what happens in a resource shortage?\*

- BA maintains communication with RC
- RC declares emergency condition
- BA seeks to mitigate (purchases, reserves, public conservation appeal, cut firm sales, etc.)
- BA not able to maintain ACE or must restore reserves
- RC orders amount of load shed to maintain ACE/Frequency and reserves

\*Simplified example to illustrate RC actions to contain reliability impacts to offending BA





# Some impacts that spill over

- Pricing impacts
- Firm purchases cut
- Transmission priority may override resources
- Requests for assistance





## Discussion & Questions





## Next Steps



## What's Next?

- Pause monthly cadence
- Next meeting anticipated August/September
- Revisit RPAC Mission and membership
- Upcoming discussion
  - ASRFP participation and evaluations update
  - 2023 Integrated Resource Plan

