

# Arizona Public Service - August RPAC Meeting Minutes

Date	Location	Start	Stop
08/04/2023	Virtual	9:00 a.m.	11:00 a.m.

## MEETING OBJECTIVES

- Recap the July RPAC meeting and provide the status of previous action items.
- Review the latest regulatory changes and updates.
- Explain APS's Clean Energy Accounting process.
- Discuss the next steps and future RPAC engagement opportunities.

Attendees	Organization	Title/Role
Tara Beske	APS	Business Advisor, Resource Management
Yessica Del Rincon	APS	Communications Consultant
Michael Eugenis	APS	Manager, Resource Planning & Analysis
Jill Freret	APS	Director, Resource Integration & Fuels
Brent Goodrich	APS	Federal/State Regulatory Advisor
Todd Komaromy	APS	Director, Resource Planning
Elizabeth Lawrence	APS	Manager, Product Development & Strategy
Akhil Mandadi	APS	Sr. Engineer, Resource Planning
David Peterson	APS	Corporate Strategy Advisor
Nicole Rodriguez	APS	Consultant, Strategic Communications
Adam Constable	APS	Federal/State Regulatory Consultant
Timothy Rusert	APS	Director, Power Supply Service
Nonie Black Elk	APS	Energy Innovation Analyst
Rachael Leonard	APS	Manager, Regulatory Compliance
Evan Lipsitz	1898 & Co.	Consultant
Matthew Lind	1898 & Co.	Director of Resource Planning
Chase Kilty	1898 & Co.	Consultant
Madeline Suellentrop	1898 & Co.	Lead Power & Utilities Analyst
Steve Jennings	AARP	Associate State Director
Phil Jones	Alliance for transportation Electrification (ATE)	Executive Director
Gregory Blackie	Arizona Free Enterprise Club	Deputy Director of Policy
Jackie Solares	CalMich Produce	Director, Sales and Business Development
Chris Camacho	Greater Phoenix Economic Council	President & CEO
Lisa Hickey	Interwest Energy Alliance	Senior Regulatory Counsel

Sam Johnston	Interwest Energy Alliance	Policy Manager
Amanda Ormond	Ormond Group LLC	Principal
Sandy Bahr	Sierra Club	Director, Grand Canyon Chapter
Alondra Regalado	Strategen	Policy Analyst
Sergio Dueñas	Strategen	Project Manager
Caryn Potter	SWEEP	Arizona Representative
Devi Glick	Synapse Energy Economics	Senior Principal
Autumn Johnson	Tierra Strategy	CEO
Kate Bowman	Vote Solar	Regulatory Director
Alex Routhier	Western Resource Advocates	Senior Clean Energy Policy Analyst
Murphy Bannerman	Western Resource Advocates	AZ Government Affairs Manager
Claire Michael	Wildfire	Director of Climate Equity

## Matt Lind | 1898 & Co./Director of Resource Planning | July RPAC Recap

### Slide 4 - July Meeting Recap

- APS detailed the latest regulatory changes and updates. The 2023 IRP filing date has been moved to November 1, 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 (PRM) and Effective Load Carrying Capability (ELCC).

## Todd Komaromy | APS/Director of Resource Planning | Regulatory Update

### Slide 7 - Regulatory Update

- The Staff filed a proposed timeline for processing and reviewing the submitted Integrated Resource Plans (IRP's). The filing date is November 1, 2023.
  - Stakeholder comments are due on January 31, 2024.
  - Load Serving Entities (LSEs) responses will be filed by May 31, 2024.
- ACC Staff Assessment and Proposed Order to be filed by August 30, 2024.

## Matt Lind | 1898 & Co./Director of Resource Planning | RFP Schedule

### Slide 8 - RFP Schedule

- On August 1, 2023, there were site visits hosted at Ironwood and Agave locations.
- Proposal submissions and fees are due on September 1, 2023.
  - This date might be pushed back to accommodate for the Labor Day holiday. Once decided, communication will be sent through PowerAdvocate.
- The Short-listed Respondents will receive notifications between October 2023 and November 2023.
- The anticipated contract executions are expected to occur between November 2023 and March 2024.

Slide 11 - APS's Clean Energy Commitment

- When describing the Company's Clean Energy Commitment (CEC), APS identifies both clean and renewable energy goals using the following terms:
  1. Renewable Energy Percentage
  2. Clean Energy Percentage
- 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 Standard (RES) are used, under which each utility's share of renewable energy is expressed as a percentage of its retail sales relative to total sales to customers.
- What are APS's Clean Energy Commitments goals?
  - 100% clean, carbon-free electricity by 2050.
  - 65% clean energy by 2030 with 45% renewable energy.
  - Eliminate coal by the end of 2031.

Slide 12 - Renewable Energy Percentage

- This metric is based on 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 this metric.
- Self-consumed DG is included in the denominator to prevent overcounting of DG.
- Is not a Renewable Energy Certificate (REC) based standard - differing from the Arizona Corporation Commission (ACC) RES requirement.

$$\text{Renewable Energy \%} = \frac{R + DG_{load} + DG_{YTD}}{RS + DG_{SelfConsumed}}$$

Slide 13 - Clean Energy Percentage

- One of the key differences that the Clean Energy Percentage calculation has from the Renewable Energy Percentage calculation is the inclusion of the load impacts of Demand-Side Management (DSM) and Energy Efficiency (EE).
- The Clean Energy Percentage differs from the Renewable Energy Percentage in a few respects:
  1. The calculation considers generation losses (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 negative prices

$$\text{Clean Energy \%} = \frac{\text{Nuclear} + \text{Renewable (including DG)} + \text{DSM} + \text{Clean Purchases}}{\text{Energy Requirement including DSM \& DG}}$$

- The Clean Energy Percentage is typically discussed in terms of an energy mix because this is not based on resource sales or the historical DSM.
- This is measured at the busbars; it is looking at the production that is coming directly from the facility and does not net out any losses that occur on the transmission system which differs from the Renewable Energy Percentage calculation.
- Question - RPAC Member: If clean purchases are only 'likely renewable' then they are only likely to be carbon free, correct?
- Response - Mike Eugenis: Determining whether clean purchases are 'likely renewable' is a judgment call that is made by APS and clean purchases make up a small portion of the total energy in the Clean Energy Percentage.

- Comment - RPAC Member: While I appreciate the consideration given to negative pricing and solar presence, I would like to highlight the uncertainty surrounding whether these electrons are truly renewable. Placing them in the clean category can be ambiguous, particularly when we lack clarity on their origin. It is important to differentiate unless this type of purchase becomes predominant. Unanswered questions and the variability in sources make labeling them 'clean' dubious. Could you clarify your definition of 'clean' and whether it implies carbon-free?
- Response - Mike Eugenis: You are right that there is uncertainty. We account for this by categorizing these in a certain way. While renewables dominate our clean attributes, there is a small portion attributed to such cases. Palo Verde, for example, contributes significantly as a clean resource. We will keep track and ensure the report is clear.
- Question - RPAC Member: Could you provide further insight into DSM's contribution to the Clean Energy Percentage? How do you differentiate DSM from the energy efficiency standard? Are external DSM efforts considered, even if not directly through APS? Where is the line drawn on the efficiency contribution?
- Response - Mike Eugenis: Our load forecasting group divides DSM into historical and future categories. It encompasses both APS's direct investments in DSM-specific technology and broader DSM aspects like codes and standards. We primarily focus on EE within this metric. Demand response plays a minor role, because it is typically utilized as a capacity resource during peak load periods.
- Question - RPAC Member: What percentage of your sales are retail sales? Is 100% retail sales accurate? Do you track carbon reduction over time? If so, what is your baseline? Do you measure carbon reduction on a mass basis?
- Response - Mike Eugenis: APS has various types of energy sales. Resource Planning's primary focus is on sales to the customer. We do not include any market sales in this calculation. We will provide a follow-up on the specific percentage of retail sales. We do track carbon reduction, and the baseline is 2005 and can be seen in the 2020 IRP. Along with graphs that talk about carbon reduction going forward there are some sustainability documents that talk about the carbon reduction profile. The unit used to measure carbon reduction is tons of CO<sub>2</sub>.
- Question - RPAC Member: Could you elaborate on how DSM is handled in the calculations? How do you ensure fairness in calculating clean energy?
- Response - Mike Eugenis: It is an ongoing effort. APS acknowledges DSM and EE within historical load forecasts, so it has to be addressed to calculate renewable and clean energy goals. The goal is to maintain consistency and avoid confusion in peak forecasts. As for the clean energy metric, it reflects renewables' influence and enhances comparability to RES standards.
- Question - RPAC Member: How do these metrics serve APS? Externally or internally? Why are they treated separately?
- Response - Mike Eugenis: They serve two purposes. We employ them in our Clean Energy Commitment modeling, guiding our path to zero carbon by 2050. APS uses these metrics as benchmarks to achieve its goals while ensuring transparency and customer alignment. The percentages were chosen for comparability with other utilities. The metrics also provide a level of flexibility around rapidly evolving technology and changing market dynamics.
- Question - RPAC Member: Does APS internally track clean energy changes over time and throughout the year?
- Response - Michael Eugenis: Resource Planning focuses on annual data when going through the IRP process; Operations performs monthly tracking.
- Response - Tim Rusert: The Operations team does monthly updates. These materials are not currently distributed. This is where all the sustainability reporting information comes from.
- Comment - RPAC Member: I think the information from the Operations team would be valuable to track the renewable adoption and changes in the renewable and clean energy calculations over time.
- Question - RPAC Member: Could you explain the difference between retail and wholesale sales? I know that the ACC annual report breaks down the total retail sales versus total wholesale sales. From the TEP rate case, I was surprised that the clean energy commitment was based on retail sales, and it looked like only half their sales were retail sales.

- Response - Tim Rusert: Historically, utilities did a lot more long-term wholesale sales and more committed wholesale sales to third parties. APS has essentially left that business behind and is focused on retail sales. For the most part, there is no excess energy to offer long-term sales. All the wholesale sales are very volatile and hard to predict. APS's commitment and direction is on serving retail sales which is why all the clean and renewable metrics are focused on retail sales.

### Akhil Mandadi | APS/ Sr. Engineer, Resource Planning | IRP Reference Case

Slide 16 - IRP Reference case identifies an optimal portfolio under various constraints and a base set of assumptions for 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:
    - Load Growth
    - Capital Costs
    - Natural Gas Prices
    - Market Prices
  - APS-Specific Assumptions:
    - Financial
    - EE and DSM
    - Four Corners Exit
    - Carbon Price
    - Clean Energy Commitment

### Slide 17 - IRP Reference Case: "Need" Identification

- APS wants to identify the needs associated with the IRP reference case. Adding APS's existing resources and planned resources represents the current resource capacity. The load plus the planning reserve margin helps display future information for APS. Taking the difference between the load plus PRM, and APS's resource capacity, identifies the need that APS is looking for in the Reference Case.

### Slide 18 - New Resource Alternatives: LTCE Runs

- There are many resource alternatives that APS is allowing the model to select in the capacity expansion model. Some of the resource categories are listed below:
  - SMR
  - Combustion Turbine
  - Solar
  - Geothermal
  - Biomass
  - Battery Energy Storage System (BESS)
  - Wind
  - Microgrid
  - Pumped Storage
  - Combined Cycle
  - Energy Efficiency

### Slide 19 - LTCE Run Details

- Updates to the model version 1 shared on June 26, 2023, with the RPAC Modeling Committee (RMC) include:
  - Model data revisions.
  - Introduced transmission wheeling charges 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 during the July RPAC meeting.
  - Introduced monthly natural gas transport limits as constraints.
- New Modeling data to be shared with RMC:

- Long Term Capacity Expansion (LTCE) model picking the reference case.
- Production Cost Model (PCM) model with the reference case resources included.
- Question - RPAC Member: When you talk about wheeling energy, are you talking about energy from another balancing authority (BA) to you or is that energy being wheeled through your system?
- Response - Akhil Mandadi: I am talking about energy that comes from another balancing authority or procuring a resource that is not in our balancing authority. Once we have exhausted existing transmission, then we are looking to see if we can wheel through another system, or do we need to build a new transmission line in the APS BA?
- Question - RPAC Member: How is that different than maximizing the use of APS's transmission system?
- Response - Akhil Mandadi: Once we have exhausted the number of resources we are putting in, we do not have any more availability on our existing transmission system. We then must determine if it is cheaper to wheel through another system or to build a new line that APS owns that is able to accommodate the new resources.
- Question - RPAC Member: When you say wheel through, you are looking at the charges for wheeling through? Then presumably when APS joins a market, this will not be an issue.
- Response - Akhil Mandadi: Yes, we are looking at the wheeling charges. If APS enters an integrated market, then yes, this would not be an issue.

#### Slide 20 - Key Model Considerations

- Liquidated damages modeling for coal plant operations
- Co-optimization of transmission expansion along with resource expansion
- Updated resource contribution to reliability to navigate the loop between capacity expansion results and resource adequacy contributions after portfolio of resources are selected.
- Monthly gas transport limitations modeling.

#### Slide 21 - Loads and Resources: New Reliable Capacity Built

- The y-axis represents the capacity needs that APS has identified. The stacked bars illustrate the perfect capacity contribution of each resource addition to all resources already planned to come online in the future or being purchased through a PPA.
- Question - RPAC Member: What is the data source for the monthly transportation limitations for gas? Are you contracting for space on the pipeline to get gas and if there are additional limitations for the winter then those are factored into the model?
- Response - Akhil Mandadi: The source is from our gas team. They are total entitlements on the gas pipelines. There are monthly limits that have been introduced that fluctuate seasonally.

#### Slide 22 - New Reliable Capacity Built: Short-Term Focus

- This chart represents the same information from slide 21 but on a narrower time horizon. This graph shows five years into the future.

#### Slide 23 - Loads and Resources: New Nameplate Capacity Built

- The chart shows the nameplate capacity of resources built in the study period. The amount of nameplate capacity that would be needed to meet the load is significantly larger with this accounting method as compared to the perfect capacity method.

#### Slide 24 - Loads and Resources: Reliable vs Nameplate Capacity

- This chart shows the two different accounting methods. The bar on the right represents the nameplate capacity and the left bar represents how much you can rely on from a resource adequacy perspective.
- This gives a rough sense of what the portfolio ELCC is. Looking further out, APS is depending more on the traditional ELCC resources and reducing the dependence on the traditional installed capacity resources.
- Question - RPAC Member: What is driving the significant amount of gas?

- Question - RPAC Member: When you look at the gas, it looks like the nameplate and the capacity bars are almost identical. Natural gas is a capacity resource, but is there any other detail you want to provide? We want to minimize gas use at all costs. I am curious about why they are so similar.
- Response - Akhil Mandadi: Gas and microgrid have similar treatment between nameplate and reliability. Not obvious is derating, which is done by one minus the forced outage rate. What you are seeing is an attempt to get the ELCC of gas. The value illustrates our expectation of its capacity contribution to reliability, and it has higher capacity value than other intermittent and variable energy resources.
- Question - RPAC Member: You added forced outage rates, which is good. Do you treat these as must-run in modeling? Are these new additions or extensions of existing gas?
- Response - Akhil Mandadi: These are entirely new additions shown in the graph and they are not modeled as must-run resources. Extensions of tolls are in the planned category and not included in this graph.
- Comment - RPAC Member: It looks like a quarter to a third of your resources, from a nameplate perspective, are going to be gas going out through 2038.
- Response - Akhil Mandadi: Due to constraints such as transmission and other in the model, these are what the model is selecting to meet peak load plus PRM.
- Question - RPAC Member: Have you shared the ELCC values that were used to derive the graphs?
- Response - Akhil Mandadi: Not specifically for this graph, but during the last meeting we gave a sense of what the ELCCs look like for future resources at different penetration levels. We have received elaborate ELCC matrices from the study work with Astrapé. We established the ELCC based on the function of all of them and it is based on the adjustments that we feed the capacity expansion model.
- Question - RPAC Member: It seems like the model consistently sees a significant difference in either cost or capacity contribution between storage and new gas build. I am unclear if what has been done is a forced outage derate for gas and an ELCC for the remaining portfolio or if you have done any ELCC analysis for the whole portfolio, inclusive of gas, which also contains thermal derates and potentially other sources of reliability concerns.
- Response - Akhil Mandadi: There is a capacity reduction on gas between derated UCAP and ELCC. It is approximately 5-6% of additional derate. Existing resources use true ELCC value. New resources use incremental ELCC based on calculations.
- Comment - RPAC Member: I would argue that the interaction with the rest of the portfolio is less significant with an asset like new gas where it is not bound on its energy by the rest of the portfolio, like storage would be, and it is also dispatchable. Storage is the only purely dispatchable resource where the ELCC is bound to your energy availability in the electric sector, but new gas build is bound by energy availability in the gas sector, such as the delivery of gas. Planning only on forced outage derate in the future might be an overstatement given that you are not assuming new changes on the gas side.
- Response - Akhil Mandadi: I agree, but that presents a case for using UCAP. The ELCC is lower than UCAP because of those interactions. To your point, without the interactions for the incremental gas, doing it at the existing ELCC level is undermining its true ability.
- Question - RPAC Member: Do you use UCAP for storage?
- Response - Akhil Mandadi: No, it is based on incremental ELCC. The way we understand it is all existing conventional resources are at their ELCC value, which is on average about 5% less than their UCAP equivalent. However, for all future resources it would not be fair to use existing ELCC equivalents. They would have to be accredited on what they would bring to the system.
- Comment - RPAC Member: That could be marginal ELCC, it does not need to be UCAP for fossil resources. You could still use the data that is being derived from loss of load expectation modeling to find what would be the marginal ELCC of a resource with those characteristics, which will be lower than UCAP.
- Response - Akhil Mandadi: We use incremental, we are not penalizing it for being purely marginal. We are giving it more for all resources by using incremental.
- Question - RPAC Member: Can you describe any constraints that were put on DSM through the reference case scenario and what that looks like?

- Response - Akhil Mandadi: The model was given the option to go down two paths. It can pick “DSM 1” or “DSM 2” in the model. DSM 1 has set parameters attached to it. DSM 2 has higher savings and higher costs based on assumptions. It must pick one or the other, but it has the option to pick either. It starts in 2025 because that is the first year of our Capacity Expansion runs.
- Comment - RPAC Member: It sounds like there are no hard-coded inputs to reflect a minimum amount of energy efficiency for example and annual average energy savings that the reference case would indicate for energy efficiency.
- Response - Akhil Mandadi: Correct, except by saying it must pick one program or the other which essentially sets a minimum.
- Question - RPAC Member: Is there a consideration for historical energy efficiency savings or existing equipment in the reference case?
- Comment - RPAC Member: I want to better understand how the reference case is considering historical energy efficiency savings. It does not seem like that is being considered in the graphs and figures that you are showing today. I would like to better understand those variables and how things can be properly updated to consider the true impact of DSM on the system.
- Response - Akhil Mandadi: Our load forecast accounts for all embedded DSM, rendering the issue of historical energy efficiency savings covered. However, this topic warrants more in-depth discussion.
- Response - Todd Komaromy: APS team will follow up with more information outside of the meeting in the interest of time.
- Question - RPAC Member: The graph indicates an annual addition of nearly 2,000 MW of gas starting in the 2030s. Is this the reference case, and does it differ from the least-cost portfolio you are mandated to assess?
- Response - Akhil Mandadi: The graph shows the cumulative addition of resources added over the course of the study. Yes, this is the reference case, and this does differ from the least-cost portfolio.
- Comment - RPAC Member: The substantial annual gas additions after 2030 raise concerns about our commitment to addressing climate change effectively.

#### Slide 25 - Loads and Resources: Short-Term Focus

- This chart represents the same information from the previous slide but on a narrower time horizon. This graph shows five years into the future.

#### Slide 26 - Reference Case Portfolio: Peak Capacity

- This chart shows the peak capacity for the mix of resources in the reference case. One key item to note is the retirement of coal in the year 2030.

#### Slide 27 - Reference Case Portfolio: Energy

- This chart shows the energy stack of resources. This shows the energy production in GWh across the study years (2025 through 2038).

#### Slide 28 - Other Portfolio Characteristics

- The chart on the left shows the carbon emissions and the chart on the right shows the water usage of the entire portfolio.
- Question - RPAC Member: How is the reference case utilized in the IRP? Is it a benchmark for comparing scenarios?
- Response - Akhil Mandadi: The reference case sets the initial parameters, assumptions, and modeling expectations. It acts as a starting point against which we assess other cases.
- Response - Todd Komaromy: The reference case provides a quantitative output that contributes to the IRP's narrative, combining qualitative and quantitative aspects to derive a preferred view.
- Comment - RPAC Member: I am concerned policymakers might fixate on the reference case and how it is discussed in the filing matters.
- Comment - RPAC Member: When creating portfolios, do you maximize for specific constraints like carbon reduction or renewables?



- Response - Todd Komaromy: Yes, our goal is to explore different levers to depict various future scenarios, comparing them against the reference case.
- Question - RPAC Member: Is the reference case cost or reliability focused?
- Response - Akhil Mandadi: It is both. We incorporate various constraints, including resource and fuel costs, aiming for an optimal and reliable baseline.
- Question - RPAC Member: The model's choice is the reference case, and then you enhance portfolios from there?
- Response - Akhil Mandadi: Yes, we will weigh different characteristics, some ordered by the Commission, and evaluate the cases to identify a preferred portfolio.
- Question - RPAC Member: I thought it was said before that this was not looking at cost, but then it sounded like it is including cost in response to the following question?
- Response - Akhil Mandadi: It is looking at costs, but I meant to say that costs have not been offered up because those are the results of the revenue requirements. It is inclusive of costs and that is the optimization basis, but I have not presented costs today.
- Question - RPAC Member: Will the assumptions and constraints presented today be apparent to stakeholders using Aurora licenses?
- Response - Akhil Mandadi: Yes, they will be very apparent and if otherwise, APS can provide further support.

## Matt Lind | 1898 & Co./Director of Resource Planning | Next Steps & Open Discussion

### Slide 31 - IRP Timeline

- September RPAC Meeting: September 22, 2023
- Public Stakeholder Meeting #2: September 27, 2023
- Question - RPAC Member: When will participants and stakeholders reveal their modeling results? September RPAC or upcoming public stakeholder meeting?
- Response - Todd Komaromy: We could do the September or October meeting. What do you have in mind?
- Response - RPAC Member: For something like this, it would be a good opportunity for other RPAC members that are interested and curious for the modeling work that some of the other stakeholders are conducting, that those groups would be able to showcase some of the differences in the analysis and what their results demonstrated for the rest of the group.
- Question - Todd Komaromy: Do you think you can meet the September 22<sup>nd</sup> date?
- Response - RPAC Member: I will discuss this with our team, and others might have similar considerations.
- Question - RPAC Member: Are other portfolio outputs coming before the September 22<sup>nd</sup> meeting?
- Question - Todd Komaromy: No scheduled meetings, but we are planning on going over some of those results. We don't have any additional information to share at this time. What do you suggest?
- Response - RPAC Member: TEP used dashboards and held a meeting to discuss them, allowing thorough comparisons. Given tight timing, sharing results as they come or before the meeting would be beneficial.
- Response - Todd Komaromy: Our goal is to share anything that we are planning to share in the Public Stakeholder meeting with this RPAC prior to that meeting.