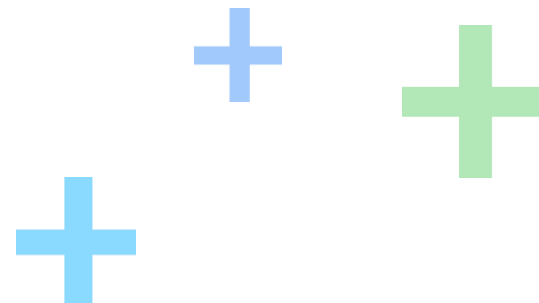


GWP 2024 Integrated Resource Plan

Stakeholder Technical Advisory Group kickoff

July 12, 2023



Agenda

- + STAG member and team introductions (30 min)
- + Introduction to GWP's system, requirements, and challenges for this IRP (15 min)
 - + Scott Mellon, GWP
- + Overview of modeling and initial study results (10 min)
 - + Zachary Brode, Ascend Analytics
- + Overview of STAG's role, responsibilities, and expectations (10 min)
 - + Dhruv Bhatnagar, Strategen Consulting
- + Mapping community-preferred scenarios (50 min)
 - + Debrief on community preferences from first townhall
 - + Building out scenario preferences

Objectives for this meeting

- + Introduce STAG members to each other and key GWP, Ascend and Strategen staff
- + Gain understanding of GWP's system, requirements, and challenges for this IRP
- + Define STAG's role in the IRP modeling process
- + Agree on initial direction of priority community modeling scenarios

What's the goal of the STAG?

- + Desire to increase community engagement from the 2019 IRP.
- + Wanting to provide a way for community members to provide both high-level and more technical input on the 2024 IRP.
- + STAG is meant to be the bridge between the community and the IRP team and ensure community voices are integrated throughout the IRP process.

Chatham House Rule

What does it mean!

- + This is meant to let folks speak openly and freely.
- + STAG meetings are closed-door and unattributed.
 - + No sharing slides, agendas, or other materials without permission.
- + In most cases, you can use the information you hear at STAG meetings, but don't attribute it to the speaker.
- + There may be some sensitive information that we ask members not to share.
- + This isn't meant to prohibit folks from talking about STAG! We want you to be able to spread the word and raise awareness in your communities.

Chatham House Rule

Examples

+ Do:

- + “At the STAG meeting, some folks were talking about...”
- + “We discussed scenarios and resources at the STAG meeting and it sounds like the group is really interested in utility-scale batteries.”

+ Don't:

- + “At the STAG meeting, Christina said...”
- + “At the STAG meeting, Strategen Consulting said...”
- + “At the STAG meeting, John, the owner of the coffee shop, was advocating for...”



Introductions!

- + Name, affiliation, customer type, location
- + What's one thing that's important for you to contribute or get out of this STAG process?



Introduction to GWP's system and considerations for this IRP

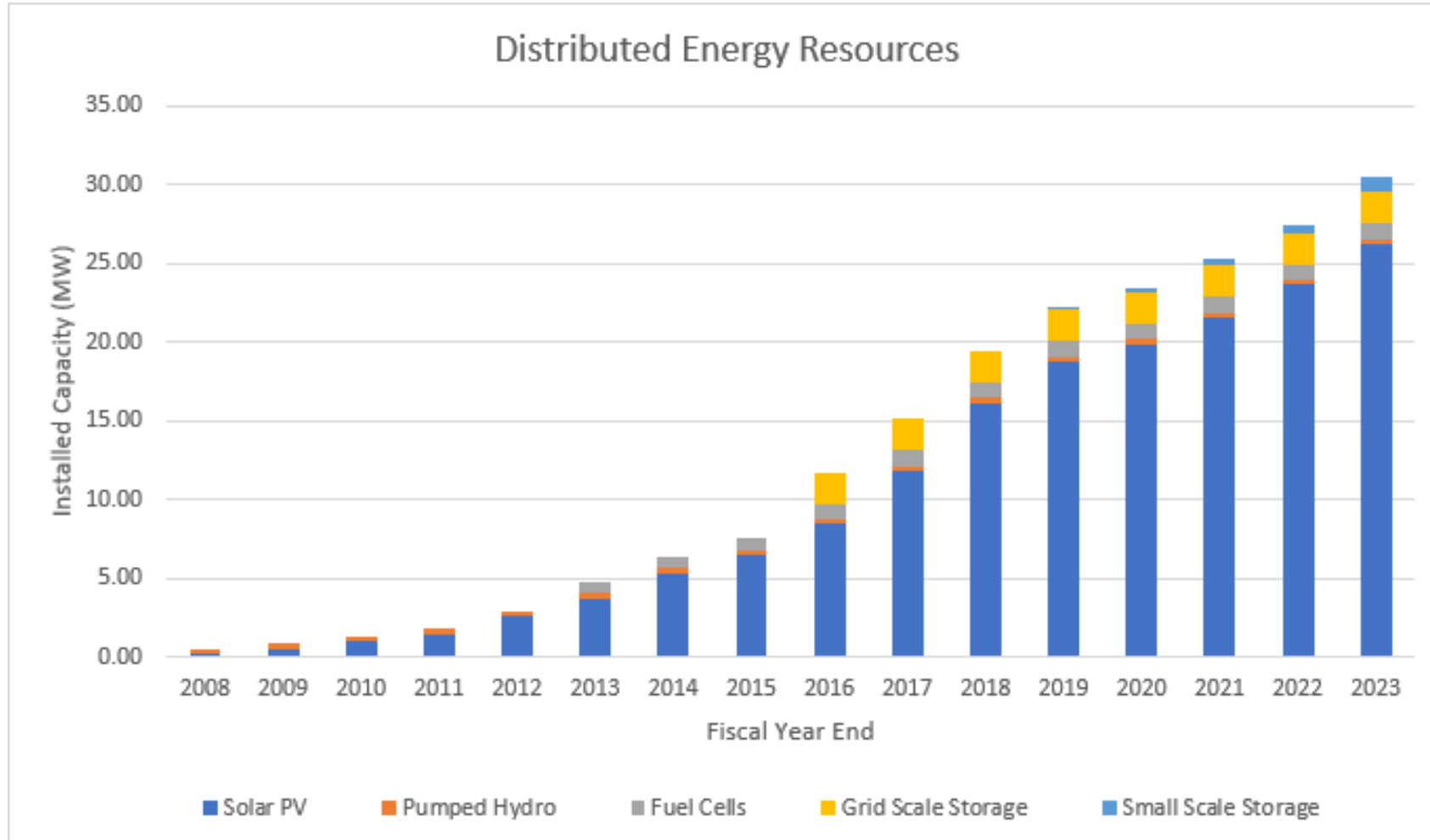
Scott Mellon, GWP



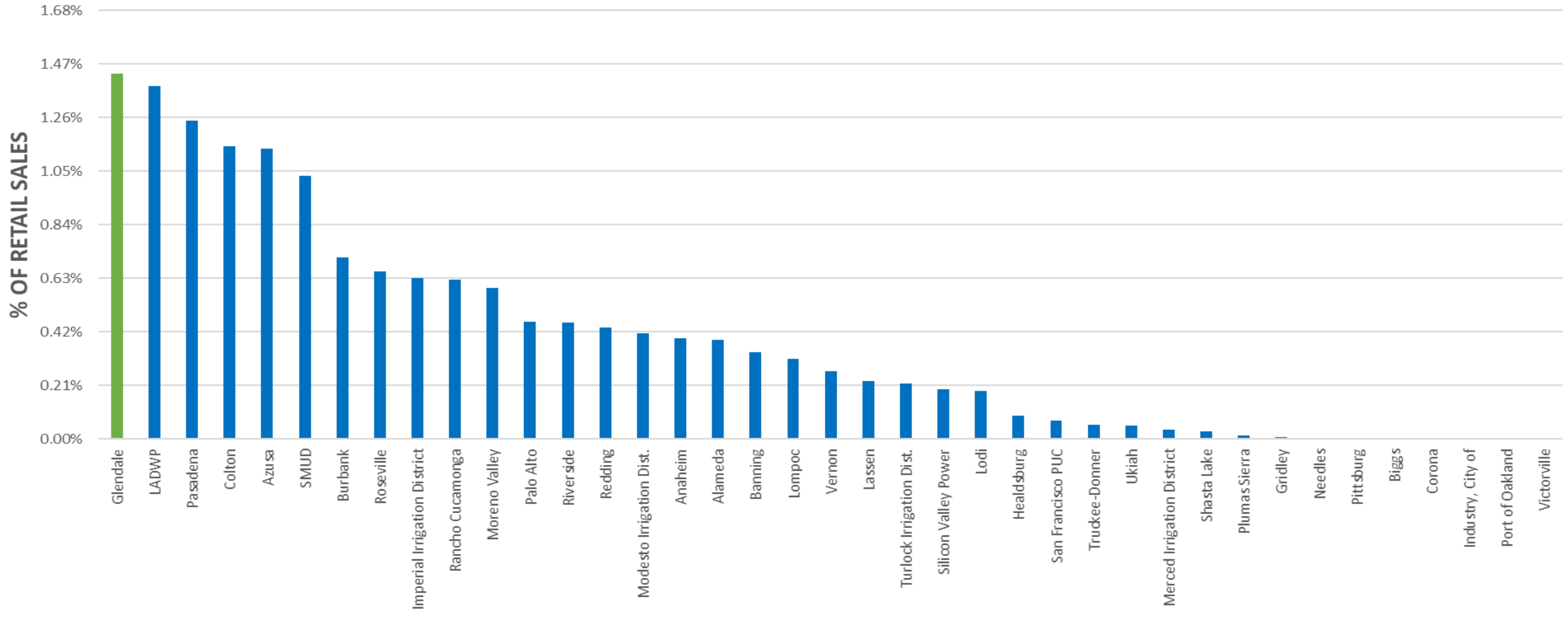
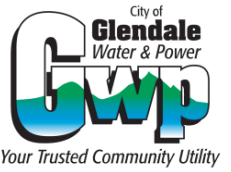
Introduction to Glendale Water and Power

- + Glendale Water & Power is a municipally owned utility serving approximately 90,000 customers.
 - + 85% residential
 - + 15% commercial
 - + Less than 1% industrial
- + By energy usage...
 - + 40% residential
 - + 32% commercial
 - + 28% industrial
- + Our peak energy demand is in the summer (normally between 4-5 p.m.), driven by AC demand.
- + Local codes and state and federal policies are all driving GWP toward increased electrification and decarbonization.

GWP is seeing an upward trend in distributed energy resource growth



In 2021, GWP led California publicly-owned utilities in energy efficiency performance and targets.



These trends and goals mean we need to the plan for the future of our system. We do so with Integrated Resource Planning.

- + IRPs are planning documents required to be developed by California law every 5 years.
- + They study how much energy GWP will need in the future and develop potential strategies to supply that energy over the next 20 years.
- + The IRP will answer important questions about Glendale’s future energy system:
 - + Where will Glendale get its power?
 - + How much of that power will be renewable or clean?
 - + How much will that power cost?
- + IRPs are a snapshot in time. They represent our best understanding of our system’s needs – and options to meet it – at this moment.
 - + Things change quickly, which is why it’s important to update this plan regularly.

What do IRPs do?

- + IRPs help GWP prepare for the future by developing multiple potential strategies (called “scenarios”) to meet Glendale’s future energy needs.
 - + **The scenarios can test:**
 - + Different mixes of energy resources (rooftop solar, wind, energy efficiency, etc.)
 - + Different timelines for achieving clean energy goals
 - + Different cost preferences
 - + Other variables
- + The scenarios are then explored to see how they’d perform in the future in terms of reliability, environmental responsibility, and cost.
- + Based on the results, GWP will choose the scenario that best meets its need for reliable power, while minimizing costs and maximizing environmental performance.

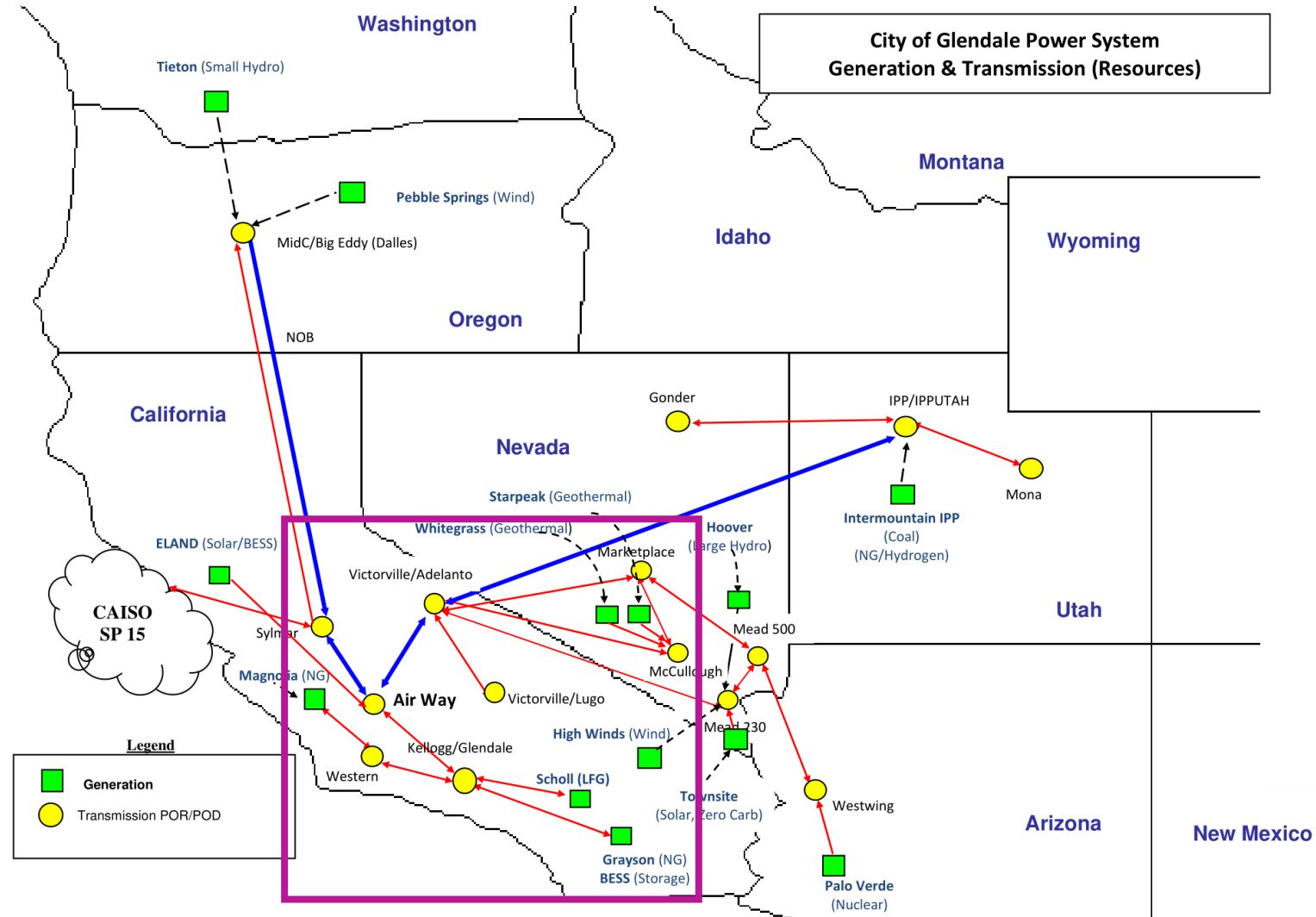
How will the IRP be developed?

1. GWP, STAG, and the Glendale community will develop multiple future energy scenarios to test in the IRP modeling process.
2. Ascend Analytics will test these strategies in their model to see how they compare on reliability, costs, and environmental responsibility.
3. GWP will present and discuss the results with the STAG and the community to provide an opportunity for feedback.
4. Based on the results, GWP will choose a “preferred portfolio” of resources it will develop to meet Glendale’s energy needs over the next 20 years.

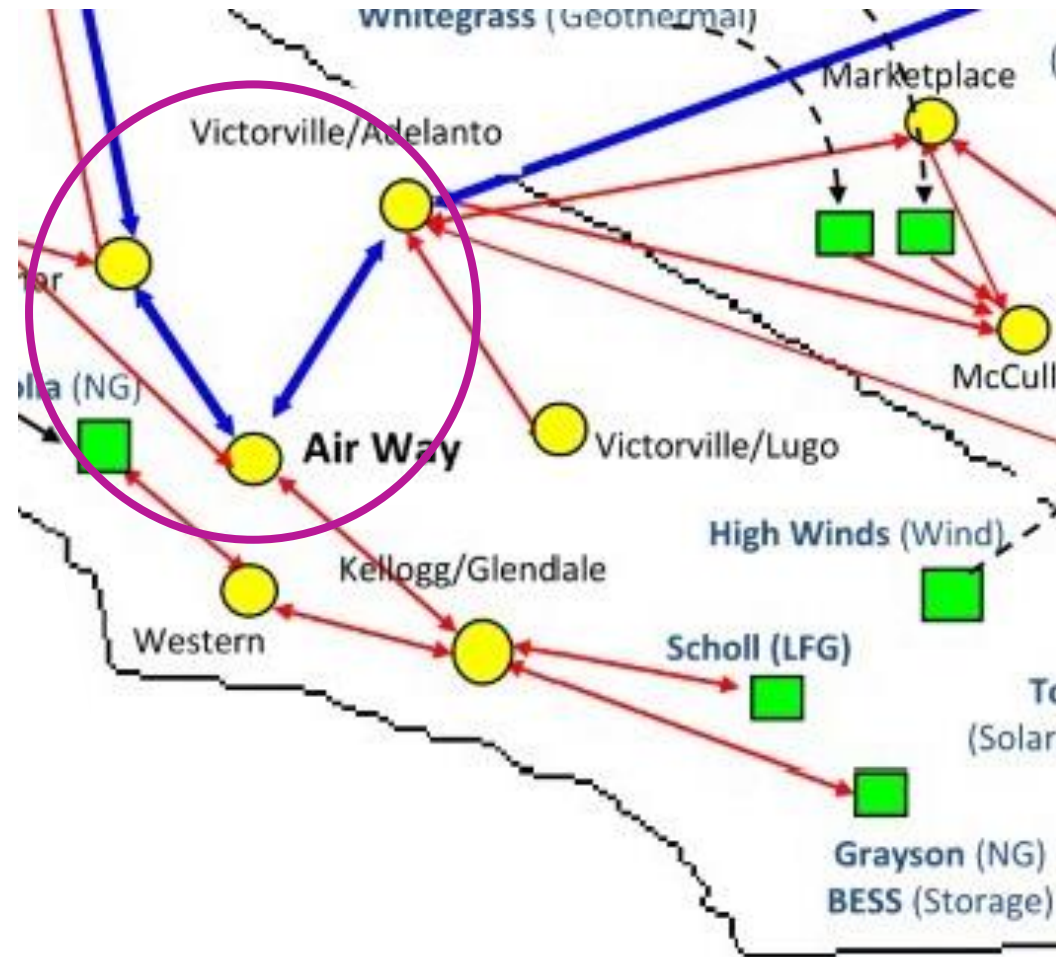
Central planning considerations in this IRP

- + **Reliability:** GWP must meet or exceed certain reliability standards in planning and operations.
 - + Federal planning standards: cannot exceed one day of outage in ten years
 - + Operating standards:
 - + Must have sufficient unused resources in reserve (reserve margin) to cover a portion of our peak demand
 - + Must be able to operate if largest transmission or generation resources fail (N-1 and N-1-1 contingencies)
- + **Sustainability:** GWP must meet or exceed California Renewable Portfolio Standard (RPS) requirements.
 - + **SB100:**
 - + 60% renewable energy by 2030
 - + 100% zero-carbon by 2045
 - + Glendale goal: 100% clean energy by 2035
- + **Affordability:** GWP must accomplish these first two while maintaining lowest possible costs. Costs are a direct result of how reliable and sustainable GWP's portfolio is.

Meeting reliability and clean energy requirements depends heavily on our ability to get power from the Western U.S. into Glendale.



Glendale's system is constrained by only two transmission lines.



What are we studying in this IRP, and how?

Zachary Brode, Ascend Analytics



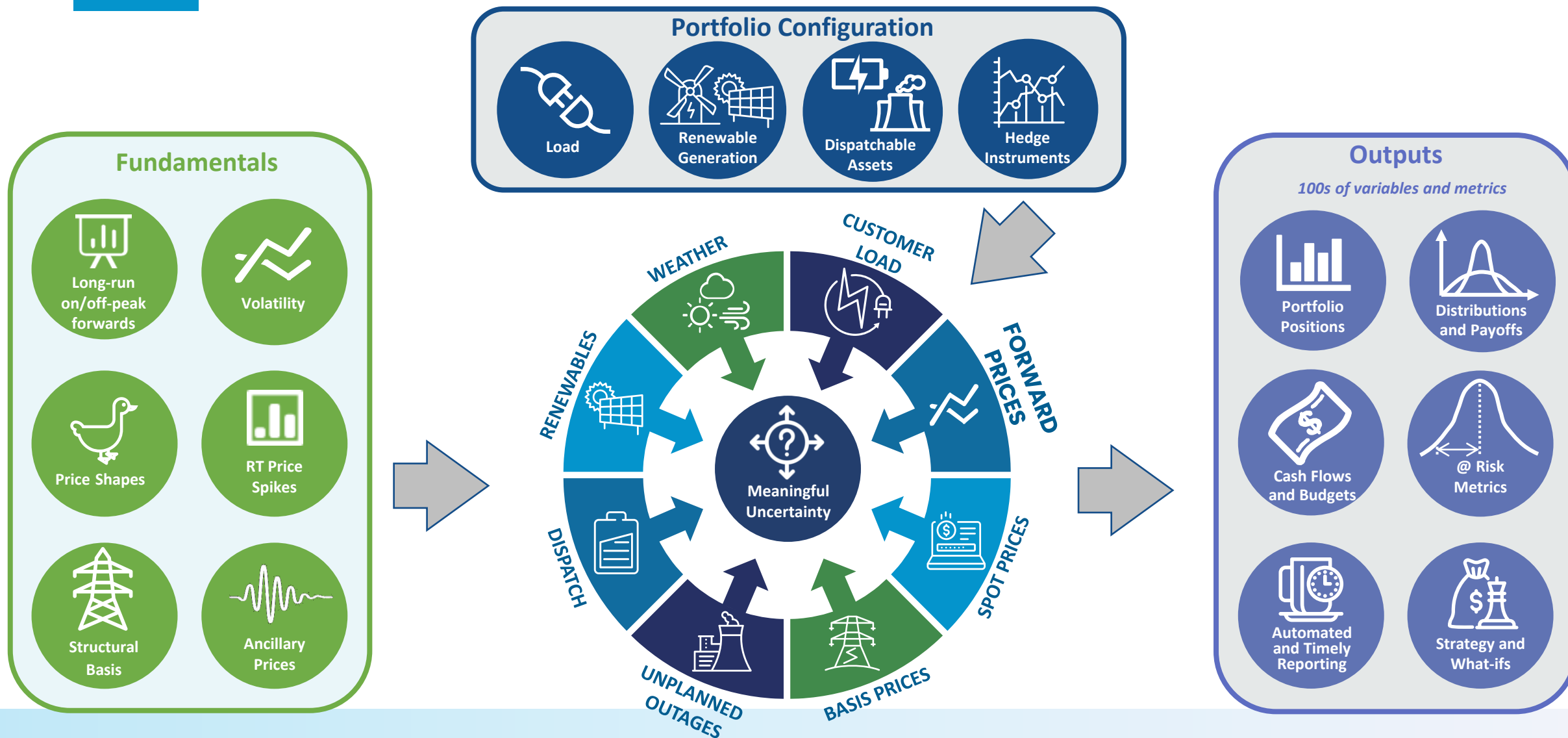
Introduction to Ascend Analytics

- + Software and advisory services firm based in Boulder, CO.
- + Provides analytical solutions and consulting support for resource planning, power system operations, and portfolio risk management.
- + We work with utilities across the United States and have completed multiple IRPs for California utilities.
 - + Glendale and Ascend have worked together since 2018.
- + PowerSIMM modeling software provides a full suite of tools to support Glendale's resource plan.
- + Ascend and GWP model the full GWP system to understand the impact of an evolving energy supply.

IRPs use modeling to evaluate multiple future energy paths for GWP.

- + The future is uncertain, and testing different versions of the future allows us to plan for that uncertainty.
 - + Modeling is a way to simulate the future so we can study it.
- + IRP models simulate GWP's energy demand and supply to project how resources operate under future conditions.
- + Power system models provide estimates of future system costs, GHG emissions, renewable generation, and many more outputs.
- + To create a model, we need to determine assumptions (model inputs) about the future.
 - + What technologies will be available and what are their characteristics?
 - + What is the risk of certain events (like wildfires) impacting GWP's system?
 - + What does future electricity demand look like?
 - + What are Glendale's clean energy policies/targets?
 - + What will future energy and fuel prices be? Can we project or estimate them?

Ascend PowerSIMM model – what goes in, what comes out?



Types of modeling used in IRPs

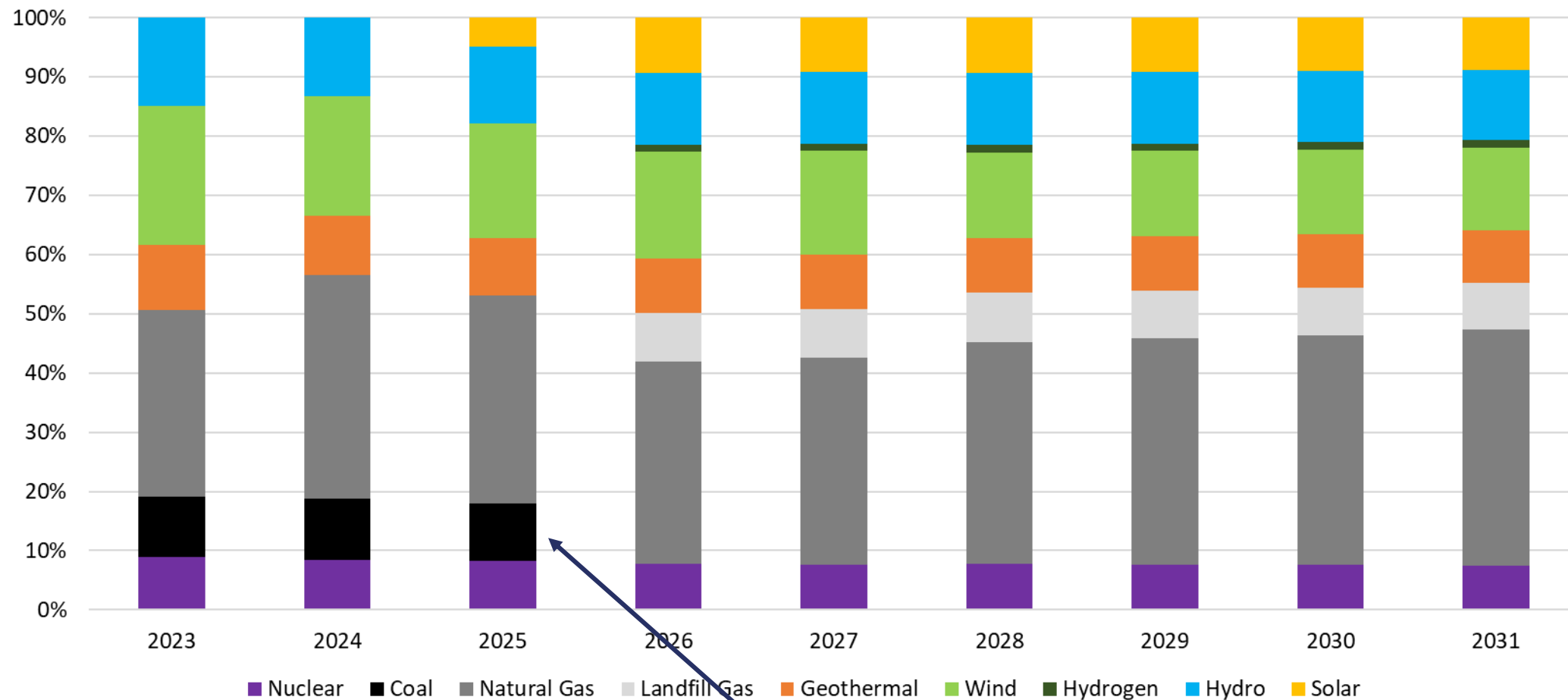
- + The future GWP system must be *reliable, sustainable, and affordable*. We use **three different types of models** to ensure GWP's portfolio meets these needs.
- + Resource adequacy models
 - + Will a portfolio ensure the lights stay on, especially during very hot or cold days?
- + Capacity expansion models
 - + What resources will be in the portfolio to meet Glendale's energy needs, and how much of it will be renewable?
- + Production cost models
 - + How much will the portfolio cost?

What changes are already expected to GWP's system?

- + GWP is making changes to its portfolio to increase clean energy and reduce greenhouse gas emissions.
- + Expected changes in the next decade include:
 - + Intermountain Power Plant converting fully to hydrogen
 - + Addition of Eland solar and storage project
 - + Addition of Scholl biogas (landfill gas)
 - + Grayson repowering and battery storage
- + This IRP will focus on how to close the gaps to meet CA and Glendale clean energy goals.

POWER CONTENT LABEL						
City of Glendale						
Greenhouse Gas Emissions Intensity (lbs CO ₂ e/MWh)			Energy Resources	2021	2025	2030
2021	2025	2030	Eligible Renewable ²	35.3%	47.8%	47.0%
489	274	265	Biomass & Biowaste	14.1%	4.6%	9.0%
			Geothermal	3.6%	10.2%	9.9%
			Eligible Hydroelectric	8.3%	2.3%	2.2%
			Solar	0.0%	26.8%	25.9%
			Wind	9.2%	4.0%	0.0%
			Coal	3.5%	3.0%	0.0%
			Large Hydroelectric	21.4%	11.3%	11.0%
			Natural Gas	31.3%	15.0%	11.0%
			Nuclear	8.4%	8.4%	6.8%
			Other	0.0%	7.0%	7.0%
			Unspecified Power	0.0%	7.5%	17.2%
			TOTAL	100.0%	100.0%	100.0%
Percentage of Total Clean Energy (RPS + ZeroCarb) Supplied to Load ¹				65%	75%	72%
¹ Percentages are calculated as the ratio of resource generation to mean system load. ² The eligible renewable percentage above does not reflect RPS compliance, which is determined using a different methodology.						
For specific information about this electricity portfolio forecast and any additional questions, contact: GWP-IRP@glendaleca.gov						

How is Glendale's energy mix evolving into the future?



IPP Coal Generation Retires

Q&A (15 minutes)



What is the STAG's role in this IRP?

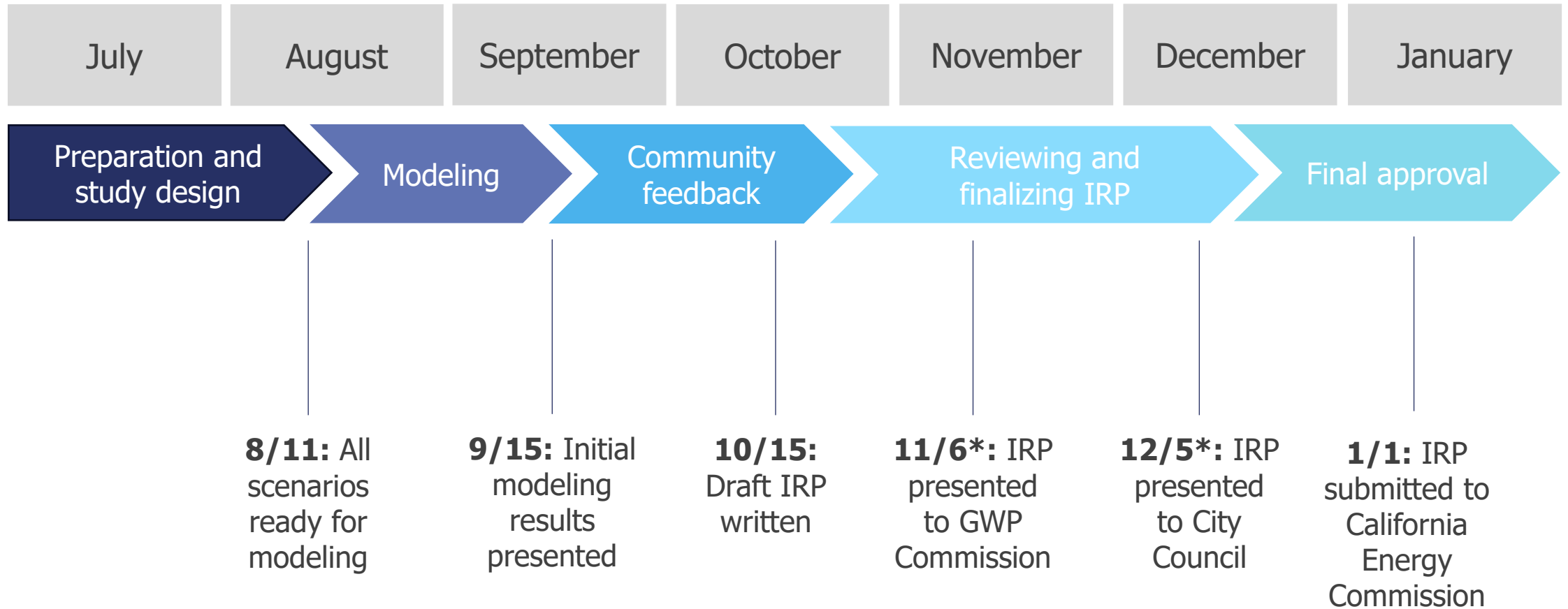
Dhruv Bhatnagar, Strategen Consulting



STAG's role in IRP process

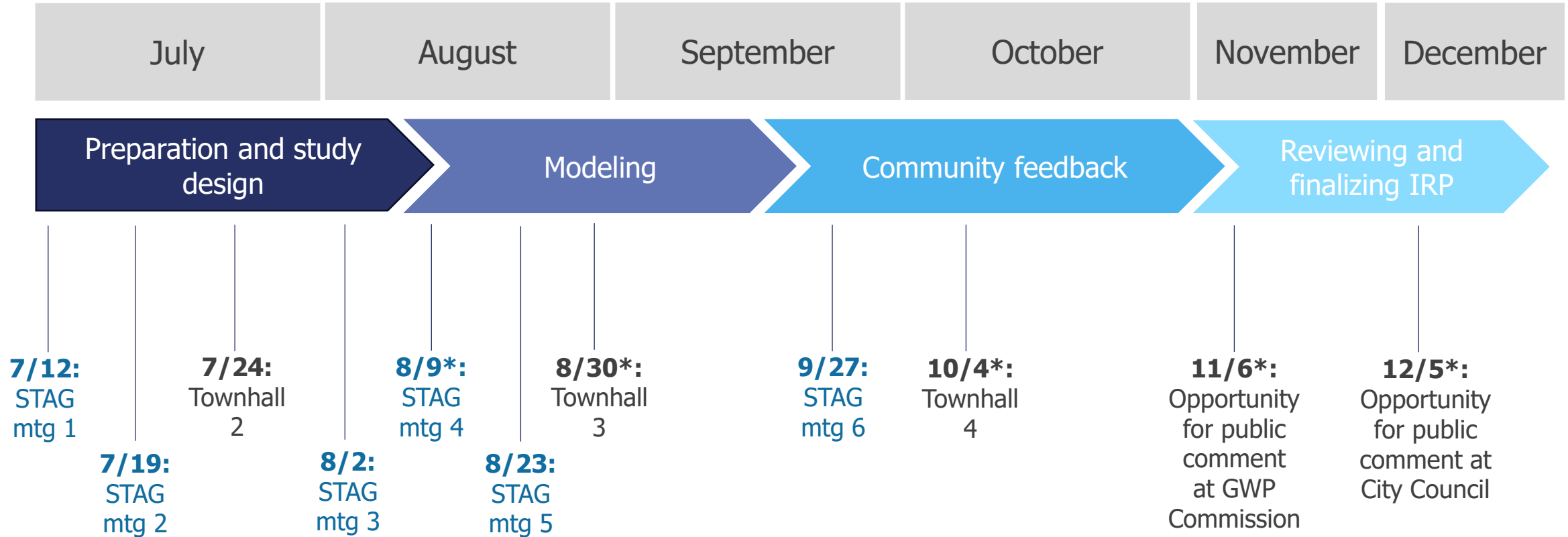
- + The STAG is the bridge between the broader Glendale community and the IRP modeling team.
 - + Translating the direction we get from Glendale community into workable community-informed scenarios for modeling.
 - + Updating their communities on the IRP process and sharing community feedback with the IRP team.
 - + Providing other input on the IRP process and results to the GWP, Strategen, and Ascend teams.
- + STAG will be informing two community-preferred scenarios to test in modeling this IRP, answering key questions like:
 - + Preferences on energy resources to include in portfolios
 - + Timeframes for deploying certain resources
 - + The timeline for GWP to achieve clean energy goals

Key IRP deadlines



*Dates pending.

Community and STAG engagement in IRP process



*Dates pending.

Member responsibilities and expectations

- + Committing to attendance
- + Chatham House Rule and information confidentiality
- + Engaging with and representing the community
- + Acting with respect and striving for common understanding with others
- + Transparency of STAG member list
- + Being involved in the broader IRP process, where possible
- + Speaking for yourself, not STAG, unless otherwise permitted

Discussion:

Delving into scenarios!



Debrief on first community townhall – major learnings

- + There was a strong desire for transparency and community input in the IRP process.
- + Clean energy seemed to be attendees' top priority.
- + The community sees customer solar and energy efficiency as key resources.
 - + Community members expressed that energy efficiency should play a large role and customer training should be a critical part of making it effective.
- + For other resources, concerns were expressed for large resources being developed in Glendale vs. outside Glendale.

Results of community resource preference activity

Resource	Green stickers	Red stickers
Utility scale solar	9	
Utility scale wind	5	4
Green hydrogen	1	7
Natural gas	5	22
Grid-scale energy storage	10	
Small modular nuclear reactors		17
Geothermal	4	1
Customer-sited storage	5	8
Customer-sited solar	16	
Energy efficiency and demand response	14	

Discussion questions

- + What are members' views on the balance of reliability, affordability, and environmental goals?
- + What types of potential futures for Glendale would STAG members like to see explored in this IRP?
 - + What resources would we like to evaluate?
 - + Renewable resources: solar, wind etc.
 - + Firm and flexible resources: energy storage, green hydrogen, renewable natural gas, etc.
 - + What would our timeline be for achieving clean energy goals?
- + What information would be helpful for STAG members in building out scenarios?
 - + Ex. Background on Glendale's system, resource costs, state/federal policy drivers, key challenges in decarbonization

Discussion – Scenarios

- + Scenarios GWP is currently considering:
 1. Glendale goal: 100% clean energy by 2035
 2. California mandate in SB 100 and SB 1020:
 - + 60% renewable energy by 2030
 - + 100% zero-carbon by 2045
 3. Lowest cost portfolio for California mandate compliance

- + Other examples:
 - + High distributed energy resource adoption
 - + Use of emerging technologies, even at higher cost
 - + Large buildout of energy storage resources
 - + Caps on year-over-year rate increases

Discussion questions

- + What other items would you like to see addressed in the IRP process that we have not covered?
- + What would make this STAG process/the stakeholder process a success?

Thank you and next steps!

- + **7/19:** STAG meeting 2
 - + This meeting will be a deep dive into potential scenarios to present to the community at the second townhall.
- + **7/24:** Townhall 2
 - + Sparr Heights Community Center, 6:30-8:30 p.m.
 - + This townhall will be a deep dive into the community-informed scenarios to be explored in modeling.

