GWP 2024 Integrated Resource Plan

Stakeholder Technical Advisory Group meeting 3

August 2, 2023

Agenda

- Readout on results of last STAG meeting and second townhall (20 min)
  - Presentation from Strategen (10 min)
  - Q&A (10 min)
- Setting the scene for scenario discussion (35 min)
  - Presentation from Strategen (20 min)
  - Q&A (15 min)
- Break (5 min)
- Full-group discussion on community-preferred scenarios (95 min)
- Wrap up and next steps (5 min)

Objectives for this meeting

- Brief STAG members on outcomes of second IRP townhall
- Discuss options for community-preferred scenarios
- Where we want to land by end of meeting:
  - Narrow down the key elements of STAG's preferred scenarios to explore deeper next time.
  - Finalize scenarios by the end of next meeting.

IRP community engagement process – what have we learned?

- STAG members might feel they need more information to be able to make informed decisions on scenarios (e.g., cost, local resource potential). Members seem to have a strong desire to ground scenarios in what is technically possible.
- It might not be clear to STAG members exactly what decisions need to be made at each meeting. Better clarifying decision points can make this easier.
- More time for Q&A and discussion in both STAG meetings and townhalls is always welcome.
- Some STAG members have strong interest in preparing for STAG meetings, sending resources, and engaging in discussion via email.
  - This type of engagement is encouraged, but the Strategen team also wants to be sensitive that not everyone may have the capacity for that level of activity.
- STAG members would like to have more clarity on what we'll be covering at each meeting further in advance.

Takeaways from second STAG meeting – clean energy timeline

Timeline	Members in favor	Comments
2035	6	
2040	1	
2042	2	
2043	1	100% renewable, not clean. Also suggested interim schedule before 2043 target.
Other	1	Comment suggested following mandated timeline, but unclear if this referred to CA mandate or Glendale goal.

STAG member preferred resources

Preferred resource	Members in favor	Comments
Solar	6	Two comments specifically mentioned rooftop solar. One of those mentioned the 10% rooftop solar goal.
Energy storage/batteries	4	
Wind	2	
Green/clean hydrogen	2	
Energy efficiency	2	One comment mentioned more incentives for efficiency.
Nuclear	2	One comment mentioned small nuclear. One comment mentioned being okay with nuclear if outside state.
DERs	2	No further description of which DER types.
Natural gas	1	Member was okay with NG due to transmission issues.
Low-carbon local generation	1	No further description.
Demand response	1	One comment mentioned time-of-use rates.

STAG member non-preferred resources

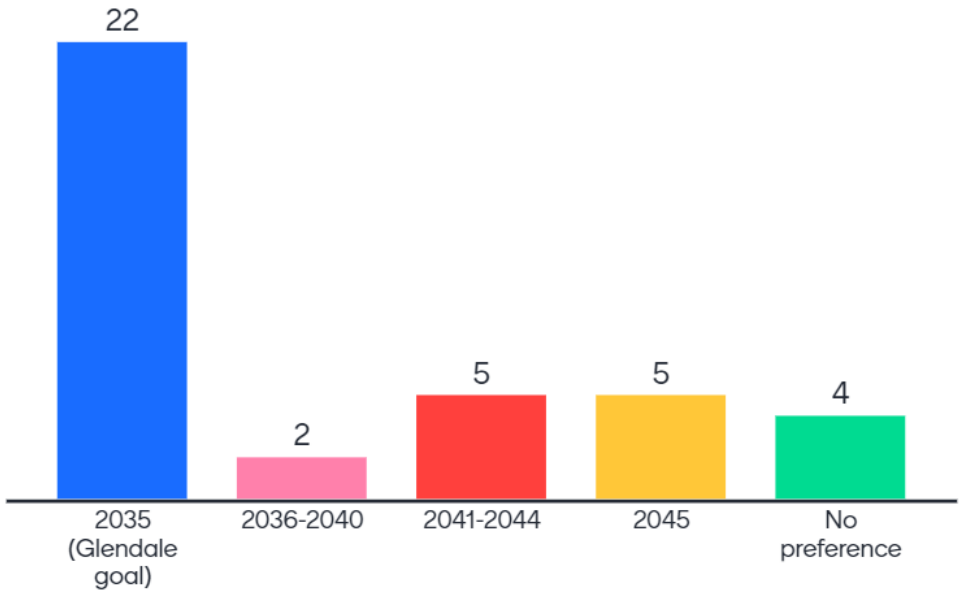
Non-preferred resource	Members against	Comments
Natural gas	3	One comment specified no new natural gas.
Coal	2	One comment specified no new coal.
Geothermal	2	
Nuclear	2	
Fossil fuels	1	
Any carbon-emitting resources	1	

Takeaways from second townhall (7/24)

- Distributed energy resources continue to be of interest to the community, but significant concern arose around how to engage renters and people living in multi-family buildings on this strategy.
  - Some attendees also expressed that they'd experienced challenges installing rooftop solar, even though they had the ability to opt-in to it, in theory.
- Some attendees pushed back on the assumption that achieving 100% clean energy on a quicker timeline could raise system costs and expressed that it's unfair to ask community members (particularly low-income residents) to choose between these two priorities.
- Questions arose on the difference between clean, zero-carbon, and renewable energy. Some attendees raised that what counts as "renewable" might not really be clean, or vice versa.
- Concern arose about the potential use of renewable energy credits (RECs) to meet clean energy mandates and whether GWP might use RECs to claim its energy as "renewable" without actually supplying renewable electricity to the community.
- Some attendees wanted more data on how distributed energy resources are being accounted for in Ascend's modeling and in projections of future energy demand.

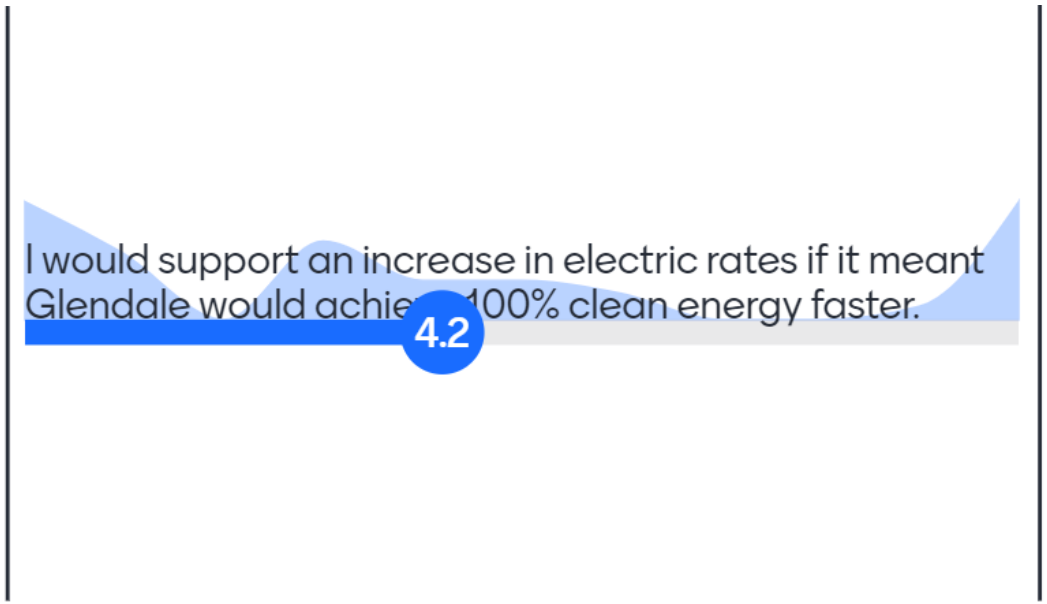
Townhall preference activity results (1)

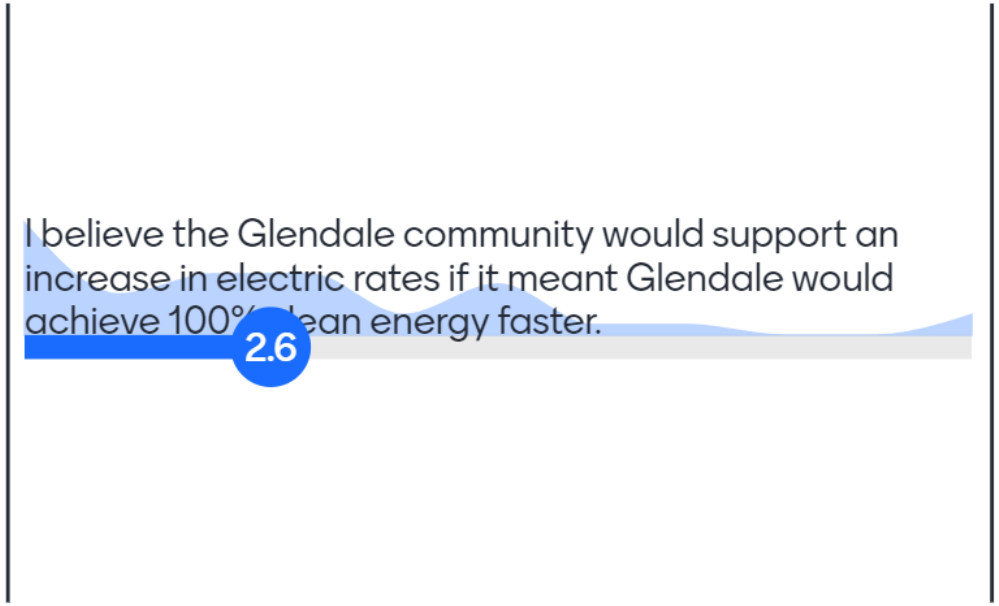
I want Glendale to achieve 100% clean energy by



Townhall preference activity results (2)

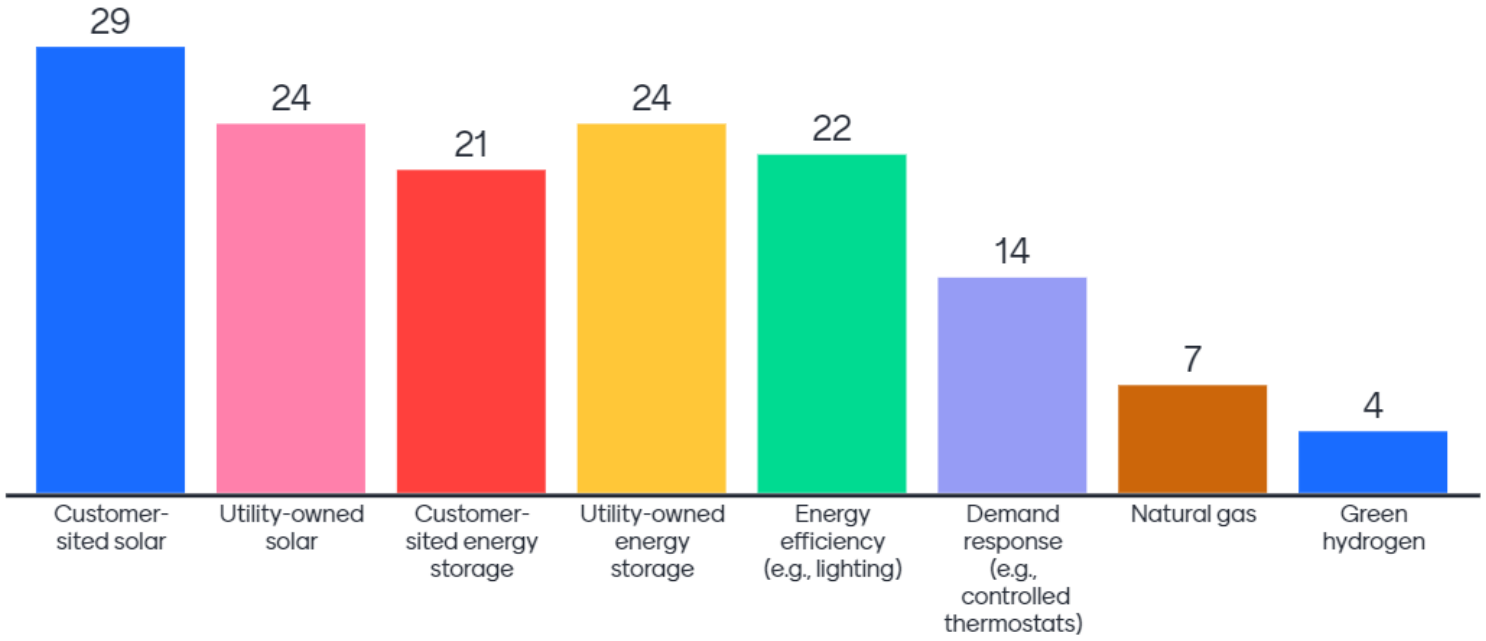
Balancing costs and clean energy





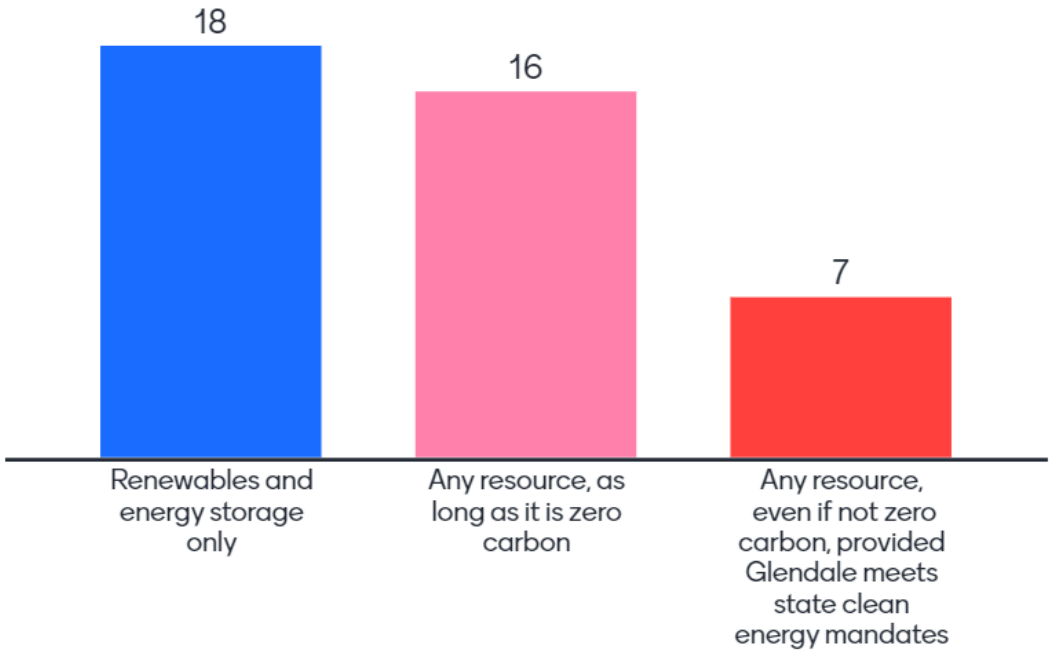
Townhall preference activity results (3)

I would support developing the following resources inside Glendale, in addition to what's already present:



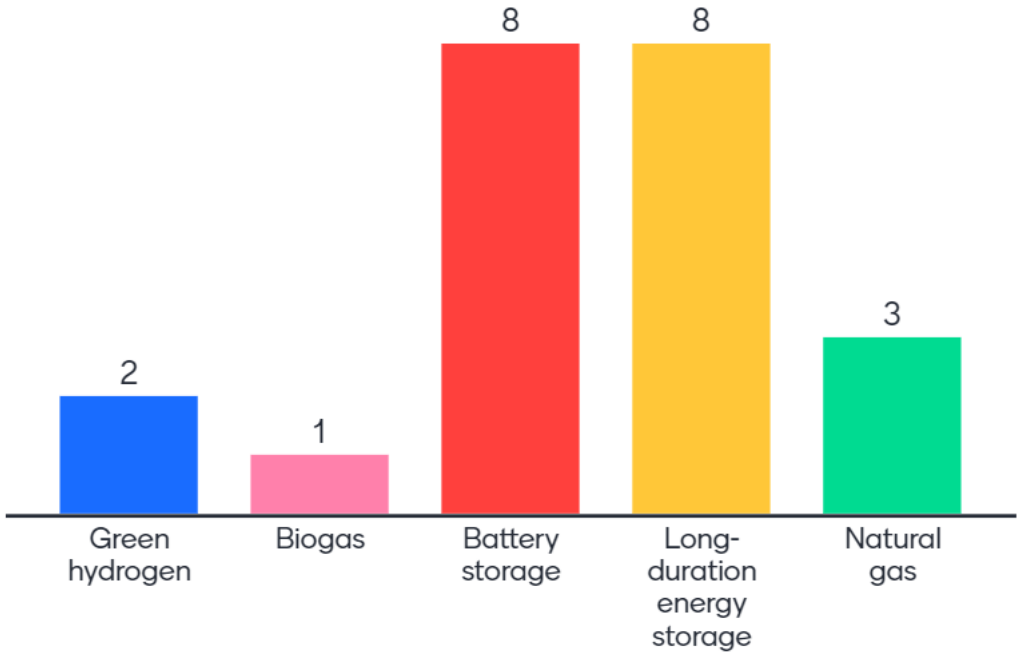
Townhall preference activity results (4)

I would support procuring the following resource types outside Glendale:



Townhall preference activity results (5)

How should Glendale provide energy flexibility with increasing amounts of renewable energy?



Remaining questions and topics from townhall

Incentives for multi-family units

I want details of the model as it develops (e.g., shared through STAG meeting minutes)

Give the community an opportunity to weigh in on scenarios and assumptions being used in modeling

Why is solar thermal not a higher priority?

Is there a better way to inform us about new, safer, and more efficient technology?

Please explain how the analysis will value different energy resources, including whether and how it will incorporate indirect and noneconomic costs.

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Q&A (10 min)

GWP's modeling scenarios – what's being planned?

California clean energy mandate

- Will follow requirements of California's SB 100 and SB 1020:
  - 60% renewable by 2030
  - 90% zero-carbon by 2035
  - 95% zero-carbon by 2040
  - 100% zero-carbon by 2045
- Will result in all energy brought to Glendale being 100% zero carbon by 2045.

Accelerated clean energy pathway (Glendale goal)

- Will meet Glendale's 100% clean energy by 2035 goal.
- Will result in all energy brought into Glendale being 100% clean by 2035.

Affordability first

- Will meet mandates of SB 100 and SB 1020 at the lowest possible cost, without necessarily meaning all energy brought into Glendale is 100% zero carbon.
  - Could mean greater use of renewable energy credits (RECs).
- Meant as reference to scenario 1 for lowest possible cost of compliance.

What makes a scenario?

- **An overall goal:** Think of each scenario as being defined by the high-level goal or 'vision of the future' it will aim to test.
- **A timeline:** Choosing a timeline for 100% clean energy will impact the resources the model selects and the price of the resulting portfolio.
- **Assumptions:** A scenario can choose to test 'worldview' assumptions about the future that are different than other scenarios being run. This could include different assumptions about what technologies might be available, how much of Glendale's energy demand certain resources could meet, and what Glendale's future electricity demand might be.
- **Resource details:** A scenario can include details on specific resources that will be prioritized in the resource portfolio, but it doesn't have to. Without these details, the model will pull together multiple potential resource portfolios that could meet the confines of the scenarios, at the lowest possible cost.
- **Any exclusions:** Scenarios could explicitly exclude certain types of resources entirely, or after a certain date. All scenarios will automatically exclude new biogas development, per City Council policy.
  - Retiring certain resources at a given date (e.g., early closure of natural gas facilities) would qualify as an exclusion.

Delving into community-preferred scenarios

- Strategen has developed 4 example scenarios, based on what we've heard from STAG and townhall meetings. These are meant to be starting points for discussion, *not* an attempt to create your scenarios for you!
- Things we tried to reflect in these scenarios:
  - Preference for 2035 clean energy timeline, but not unanimously
  - Preference for internal-to-Glendale resources
  - High interest in customer-sited resources, with need for new models
  - Concern about hydrogen, natural gas, nuclear, and geothermal, but not unanimously
  - Some curiosity about newer technologies, like long-duration energy storage, vehicle-to-grid, or small modular reactors
- We'll explore what you like and don't like about these ideas and use them to develop **2 high-level scenarios** by the end of this meeting.
- We'd love for all STAG members to support both community-preferred scenarios, but we understand that might not be possible. At the very least, we hope every STAG member has **at least one scenario** they feel good about.

Resource summaries – what's technically possible?

Local resource options (inside Glendale)	Excluded local resources	Remote resource options (outside Glendale)	Excluded remote resources
+ Utility-owned energy storage (under 8 hours) + Utility-owned long-duration energy storage (8+ hours) + Customer-sited batteries + Customer-sited solar + Utility-owned solar + Hydrogen combustion + Hydrogen fuel cells + Natural gas + Customer energy efficiency + Customer demand response + Existing biogas	+ New biogas + Nuclear (incl. small modular reactors) + Utility-scale wind + Geothermal + Carbon capture for Grayson, Magnolia	+ Utility-scale solar + Utility-scale wind + Utility-scale energy storage (under 8 hours) + Utility-scale long-duration energy storage (8+ hours) + Offshore wind + Hydrogen combustion + Hydrogen fuel cells + Natural gas + Nuclear (incl. small modular reactors) + Geothermal + Existing hydropower	+ Coal + New hydropower

Baseline assumptions informing scenarios

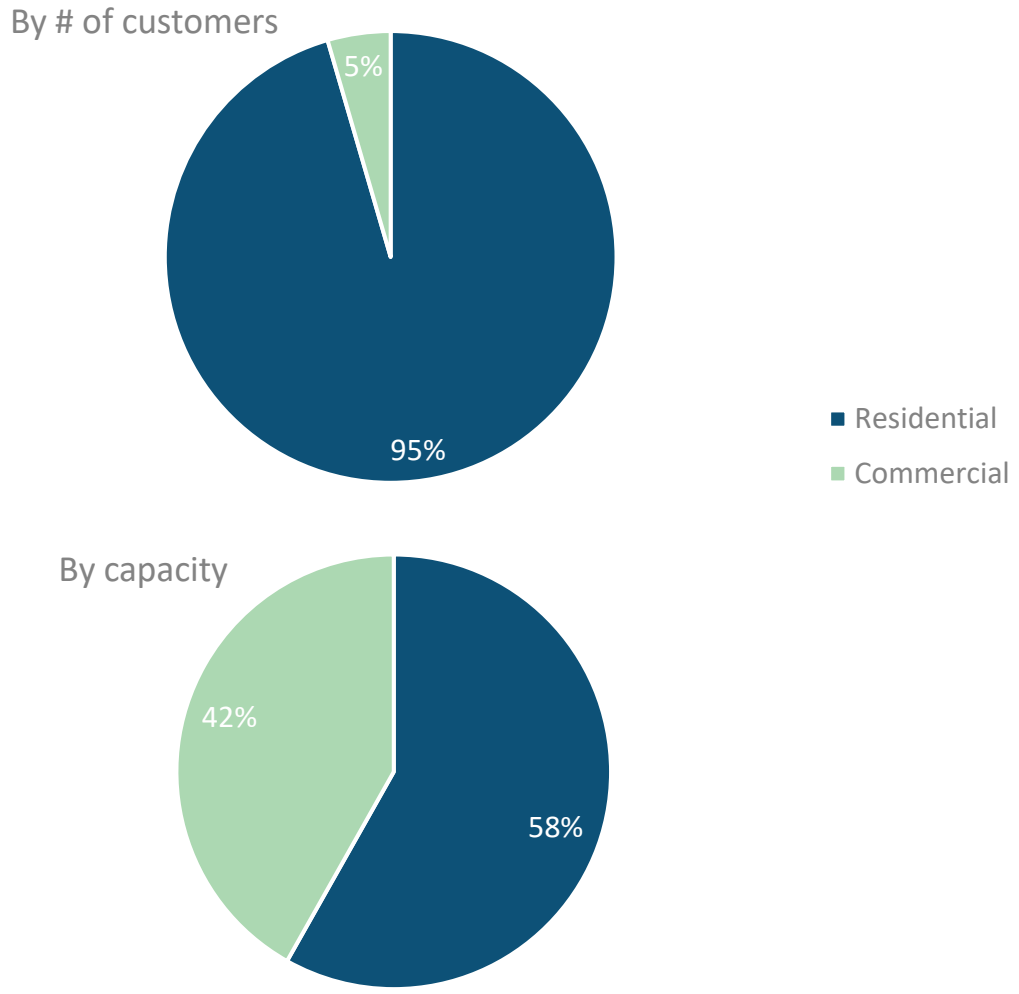
- The modeling team has a sense of some assumptions that will inform GWP's scenarios, but others are still in the works.
  - Load forecasting is currently in the works, considering historical trends, new customer growth, electrification growth, and energy efficiency participation (this will build on CEC CA load forecasts).
  - Ascend has updated price projections for individual resources. Market price projections are underway.
  - Assumptions related to the maximum potential of customer-sited resources (customer solar, customer storage, energy efficiency, demand response) are ongoing.
- All scenarios will be modeled with a cost applied to carbon emissions, per California cap-and-trade values.
  - We're currently reviewing additional social cost of carbon analyses for the scenarios.
- For today, we want to align on high-level goals that are of interest in STAG's two scenarios so we can focus more on assumptions and other specific details next meeting.
  - That means agreeing on things like "test higher adoption of customer solar than we'd otherwise think possible."
  - We want to **save conversation on exact numbers until after we've aligned on the direction** we're taking and after the modeling team has draft assumptions.

Example scenario 1: Maximizing customer contributions to clean energy

- **Overall goal of scenario:** To test the maximum contributions that customer-facing programs (customer solar and storage, energy efficiency, demand response) could contribute to GWP's system.
- **Timing:** 100% clean energy by 2035.
- **Assumptions:**
  - High estimates for customer solar and storage adoption.
  - High estimates for customer energy efficiency and demand response participation.
  - Availability of new customer programs to provide options for renters and multi-family units.
  - High estimates for utility-owned solar and battery potential in Glendale.
- **Resource details:**
  - Glendale achieves goal of 10% of customers having solar power.
  - Glendale strongly incentivizes coupling rooftop solar with storage.
  - Glendale launches community solar options for renters and multi-family units.
  - Glendale invests heavily in energy efficiency and demand response programs, resulting in lower peak demand.
  - Gaps in energy supply are filled in first with maxed-out local utility-owned solar and batteries, then supplemented with external resources.
- **Excluded resources:**
  - Additional natural gas in Glendale
  - Hydrogen in Glendale

Customer-sited solar in Glendale – what's the current state of play?

- 2,639 installations as of July 2023
  - **2,520** of these are residential.
  - **119** are commercial.
- 26.3 MW capacity total
  - **15.3 MW** comes from residential projects.
  - **11 MW** comes from commercial projects.
- Average capacity of installations:
  - Average residential project capacity is **6 kW**.
  - Average commercial project capacity is **92 kW**.
- **3%** of Glendale customers have rooftop solar, accounting for **7%** of GWP's peak demand.



Example scenario 2: Early fossil retirement

- **Overall goal of scenario:** To test the impacts of early retirement of Glendale-sited fossil resources and replacement options for their reliability contributions.
- **Timing:** 100% clean energy by 2042.
- **Assumptions:**
  - Grayson and Magnolia power plants retire in 2036, instead of continuing to run at low capacity to provide emergency reliability services.
  - High estimates for utility-owned solar and battery potential in Glendale.
- **Resource details:**
  - Glendale prioritizes local renewable and storage resources to replace fossil units.
  - Replacing plants with hydrogen combustion could be an option to provide flexibility.
- **Excluded resources:**
  - Natural gas power plants (Grayson, Magnolia) retire in 2036.

Example scenario 3: Betting on emerging technologies

- **Overall goal of scenario:** To test how emerging technologies could contribute to Glendale's portfolio if they were commercially available sooner, and at lower cost, than in other scenarios.
- **Timing:** 100% clean energy by 2035.
- **Assumptions:**
  - Long-duration energy storage (12+ hours) is available 5 years sooner than in other scenarios (currently 2030) and is 5% cheaper than anticipated.
  - Small modular nuclear reactors are available (outside Glendale) 3 years sooner than in other scenarios (currently 2035) and are 5% cheaper than anticipated.
- **Resource details:**
  - No innate resource preferences are built in. Allows model to choose emerging technologies where cost effective.
- **Excluded resources:**
  - No exclusions.

Example scenario 4: Accelerated electrification

- **Overall goal of scenario:** To test how Glendale's energy demand (and according resource portfolio) might change if customers electrify at higher rates, and sooner, than other scenarios suggest.
- **Timing:** 90% clean energy by 2035, 100% by 2040.
- **Assumptions:**
  - Glendale meets the reach code of all new construction being electric only and having installed solar.
  - Half of all light-duty vehicles in Glendale are EVs by 2035.
  - Glendale provides incentives to electrify existing homes and multi-family units.
- **Resource details:**
  - EV batteries are modeled as added energy storage capacity on the grid.
  - Accelerated implementation of heat pumps and electric appliances.
  - Shift of industrial energy use to electricity.
  - GWP invests heavily in demand response programs to better manage peak demand from EVs and other electrified loads.
- **Excluded resources:**
  - No exclusions.

Summary of scenarios (including examples)

Scenario	100% clean energy date	Meets CA mandate	Meets Glendale goal	Baseline assumption changes	Excluded resources
CA mandate	2045	X		None.	No difference from baseline.
CA mandate – lowest cost	2045	X		Not all power supplied to Glendale has to be 100% clean.	No difference from baseline.
Glendale goal	2035	X	X	None.	No difference from baseline.
Customer contributions	2035	X	X	Higher customer solar, customer storage, energy efficiency, and demand response adoption. Higher utility solar and storage.	New NG in Glendale. H2 combustion in Glendale.
Fossil retirement	2042	X		Higher utility solar and storage.	No natural gas in Glendale after 2036.
Emerging tech	2035	X	X	Accelerated tech availability and cost reductions.	No difference from baseline.
Accelerated electrification	2040	X		Higher electricity demand.	No difference from baseline.

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Q&A (15 min)

Discussion questions

- Do these scenarios explore a wide enough array of potential futures for Glendale?
  - If not, what do you think is missing?
- Do the scenarios explore potential futures in a way that aligns with preferences from townhalls and STAG?
  - What preferences do you think are missing, or are being contradicted?
- Are there elements of the scenarios you think are superfluous or not a high priority to test?