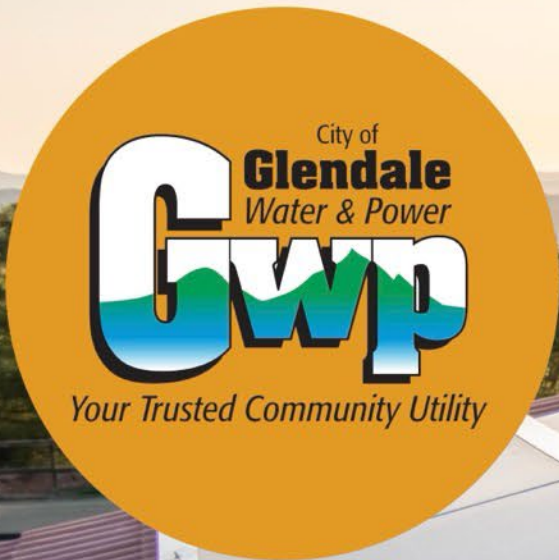




Energy+Environmental Economics

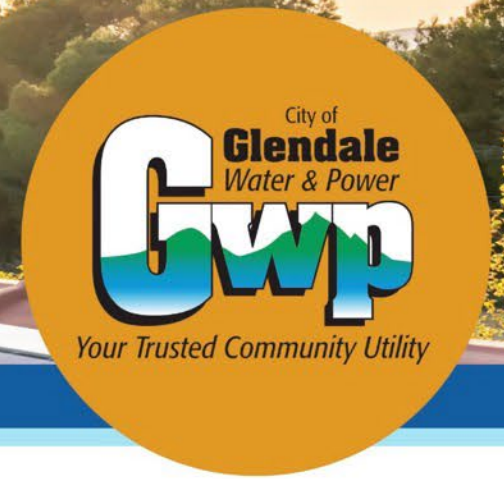


Community Meeting

Glendale Water and Power's Plan to Increase Solar Adoption and Develop Additional Distributed Energy Resources



May 15th, 2024

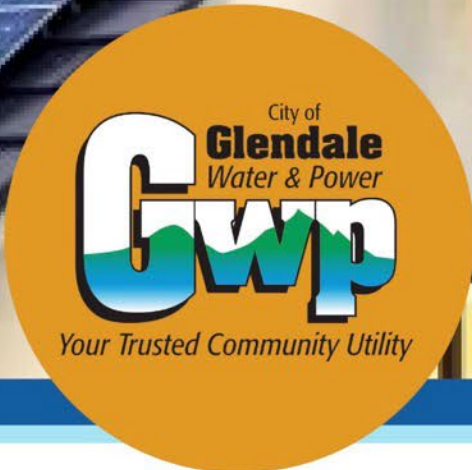


Welcome and Introduction

- **Introduction of meeting presenters and facilitators**
- **Welcome remarks**
- **Meeting objectives**
 - Provide residents and business owners with information and progress about the plan
 - Gather feedback from residents and business owners and understand other areas of concern

We distributed an online survey to over 40,000 customers in the GWP utility service area. We also received direct community feedback on what they want to see as part of the plan, implementation, and the approach and assumptions for quantitative analysis via comment cards, emails, and note taking during Community Meetings 1, 2 and 3.

After considering all the input and feedback received to date, we're here to present quantitative research analysis where possible, share our progress on the preliminary plan, and listen to your input and feedback once again



Team Members



Jun Zhang
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Primary Presenter



Rosie Kang
Vice President - Willdan
rkang@willdan.com
Presenter

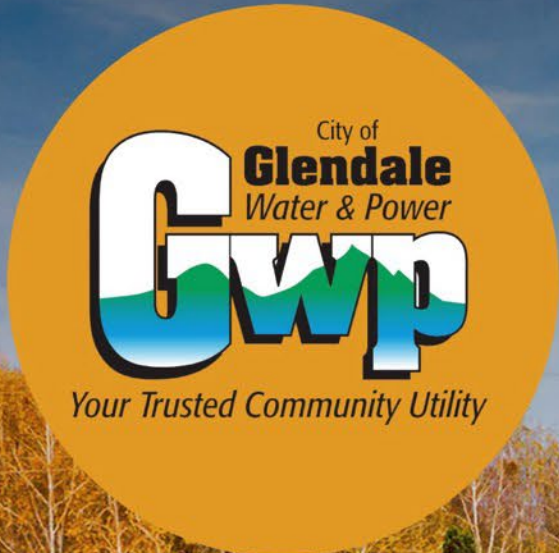
Community Outreach and Event Support



Rick Taylor
Partner - Dakota Communications
rick@dakcomm.com
Facilitator

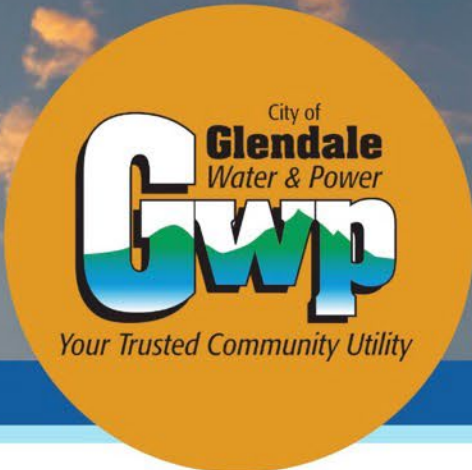


Jad Hagekhalil
Account Manager - Dakota Communications
jad@dakcomm.com
Event Support



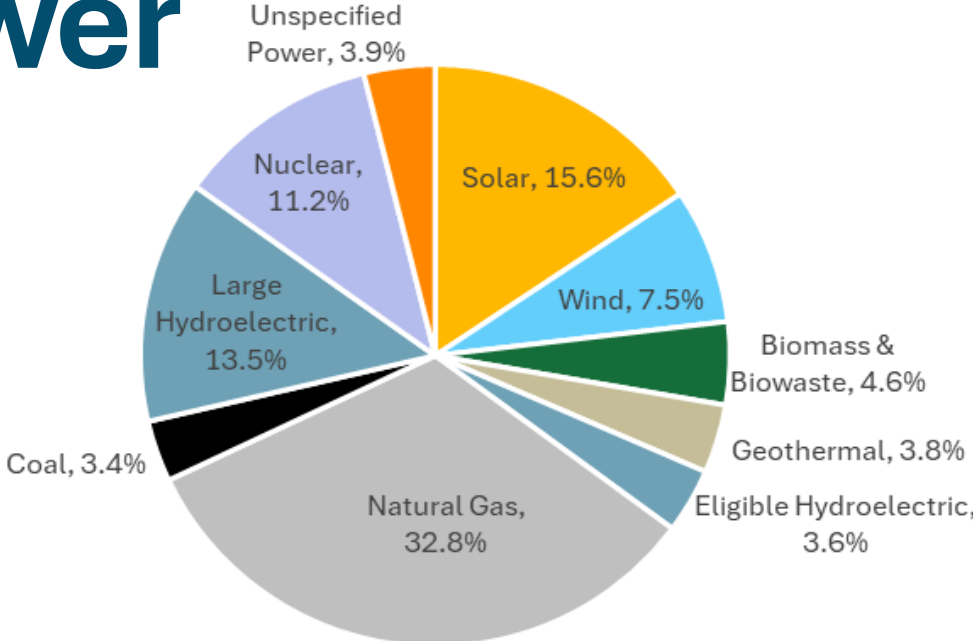
Welcome Remarks





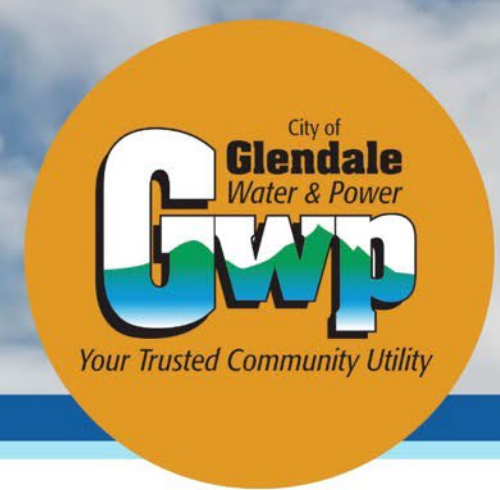
Glendale Water and Power

- Glendale Water and Power (GWP) is a municipal utility that serves the community of Glendale, California, including over 34,000 water and 90,000 electric customers
- GWP’s vision is to deliver reliable, high quality, environmentally sensitive, and sustainable water and power services to customers in a caring and cost-competitive manner
- GWP helps residents and businesses manage energy costs at home and at work through different Customer Programs, Residential Water and Energy Efficiency Programs, and Business Programs
- In Fiscal Year 2022/2023, 35.2% of Glendale’s power supply came from eligible renewable resources*, and almost 60% from clean energy resources when including nuclear and large hydroelectric
- GWP continues pursuing the goal of integrating the maximum amount of renewable, zero-carbon, and/or low-carbon energy and minimizing the amount of fossil fuel generation in GWP’s portfolio



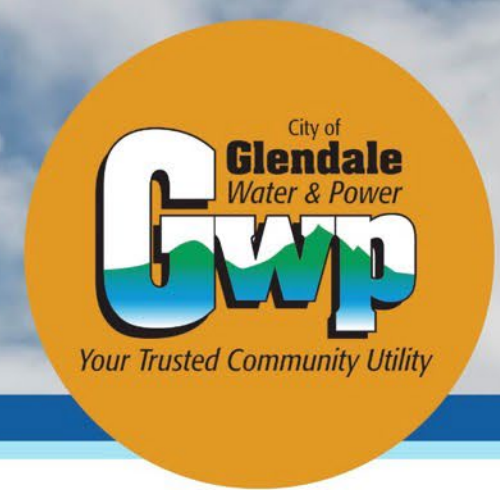
Source: GWP Power Content Label, <https://www.glendaleca.gov/government/departments/glendale-water-and-power/about-us/power-content-label>

*Eligible renewable resources include solar, wind, biomass and biowaste, geothermal, and eligible hydroelectric.



Meeting Agenda

Section	Agenda	Minutes
Opening	Welcome and Introduction	5
	Project Overview	10
	Summarize and Address Community Inputs	10
	E3's Analytical Approach Overview	5
	Technical Potential and Market Segmentation	10
	Q&A	15
	Adoption Scenario Analysis	30
Closing	Q&A	20
	Closing Remarks and Future Engagement	5



Important Notes

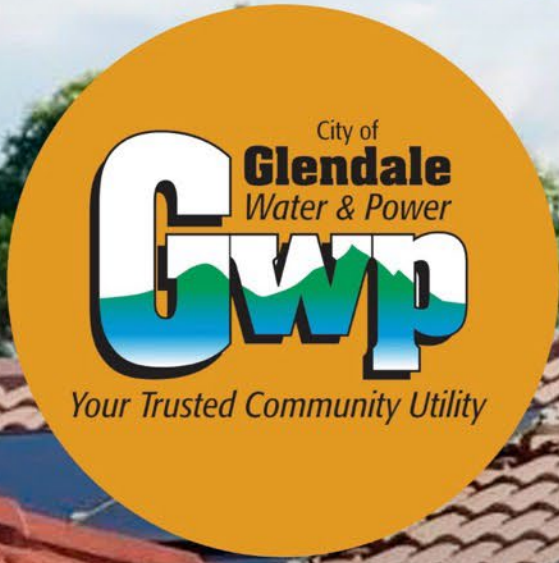
- 1. It's now in the middle of the plan design phase, we're here to share our progress on the preliminary plan and analysis, and listen to your input and feedback once again.**
- 2. Quantitative research and analysis presented today are preliminary and subject to change and further refinement.**

What we will cover today

1. Solar and storage
2. Preliminary quantitative research and analysis results

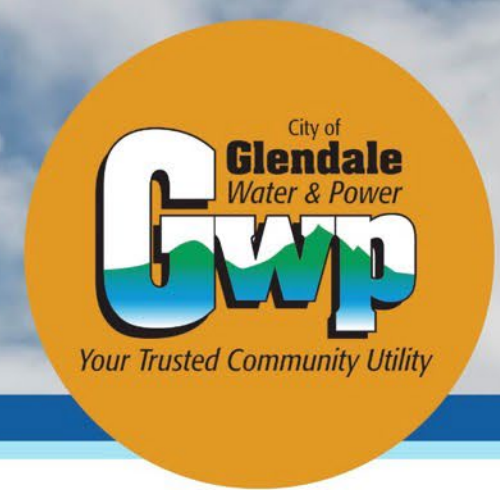
What we will not cover today

1. Other DERs (EV, EE, DR, etc.)
2. Improved avoided costs
3. Deep dive of program design proposals



Project Context and Status

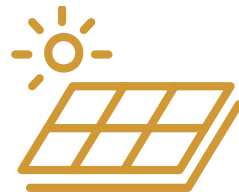




Types of DERs (Distributed Energy Resources)



Energy Efficiency



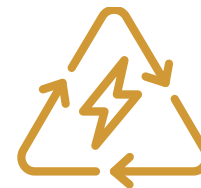
Customer-Sited Solar



Energy Storage



Electric Vehicles



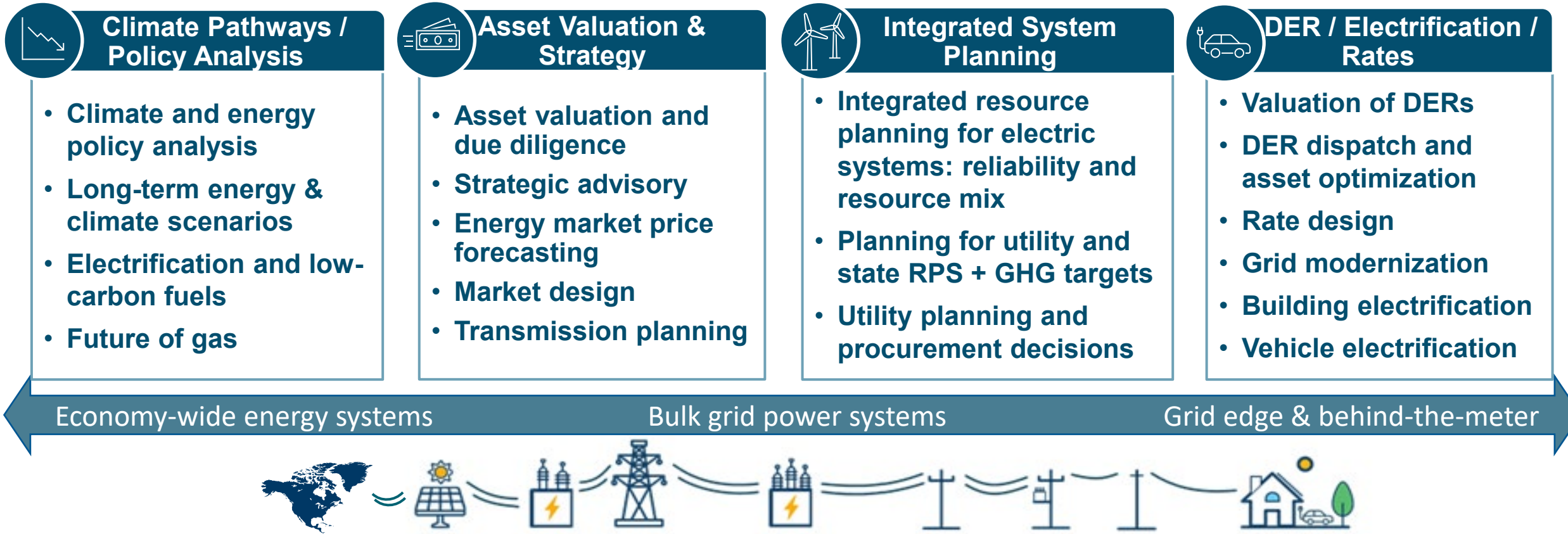
Flexible Loads

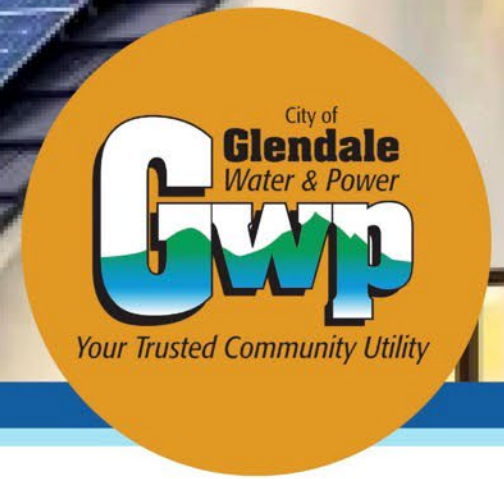


Demand Response

Who is E3?

- + E3 is the **largest consulting group** focused on the clean energy transition in North America
- + E3 is a recognized **thought leader** on decarbonization and clean energy transition topics
- + E3 has **four major practice areas** covering energy systems from bulk grid to behind the meter





Plan Context and Goals

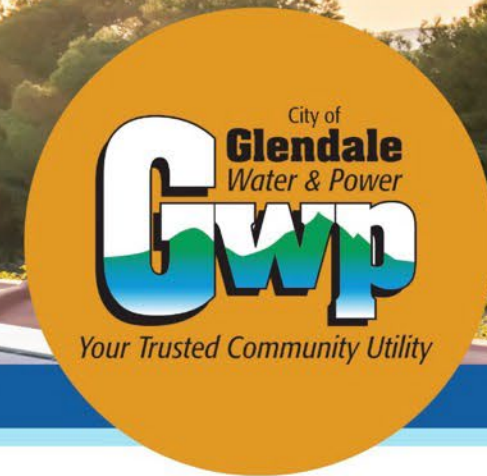
- In August 2022, the Glendale City Council passed a resolution expressing their intent to adopt policies and practices aimed at achieving the goal of having at least 10% of GWP customers adopt solar and energy storage systems by 2027, and to develop additional demand management measures, with a minimum total peak dispatchable and peak-load-reducing capacity of 100 MW
- GWP has partnered with Energy and Environmental Economics (E3) to create an equitable solar and energy storage adoption plan, with input from the community

*DER: Distributed Energy Resources



Goals of the Plan

- Maximize the use of renewable energy to serve the current and future energy needs of Glendale residents
- Maximize local solar and energy storage with the goal of a minimum penetration rate of 10% by December 2027
- Maximize the use of distributed energy resources (DERs) with a minimum total peak dispatchable and peak-load-reducing capacity of 100 MW
- Minimize the impact of cost shifts to low-income customers
- Maintain overall system reliability



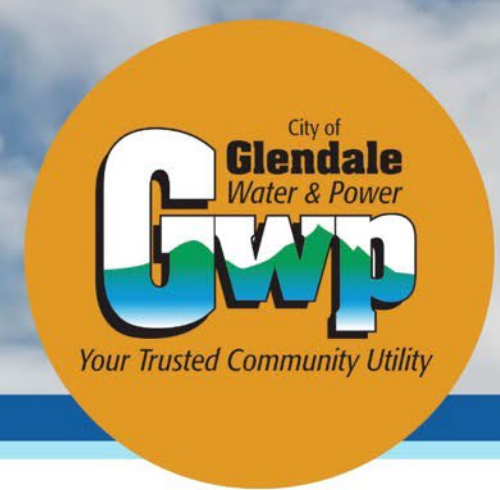
Plan Scope and Expected Outcomes

The solar and energy storage plan will include:

- An evaluation of the solar and energy storage adoption potential, including the feasibility of achieving the City Council’s goals
- If the evaluation finds that the goals are not achievable, an estimate of when the goals can be achieved
- Policies and incentives to achieve the adoption and capacity goals
- Policies and incentives aimed at low-income customers, customers in heavily pollution-burdened areas, multifamily properties, and rental properties
- An analysis of the benefits and costs including direct and indirect economic, environmental, societal, and other noneconomic benefits and costs
- Direct and indirect impacts to low- and moderate-income households

Policies and Incentives Considered

- **Upfront Rebates**
- **Performance-Based Incentives**
- **Feed-In-Tariff (FIT) Program**
- **Net Energy Metering (NEM)**
- **Equity Strategies & Policies**
- **Community Solar Projects**
- **Energy Efficiency**
- **Demand Reduction**

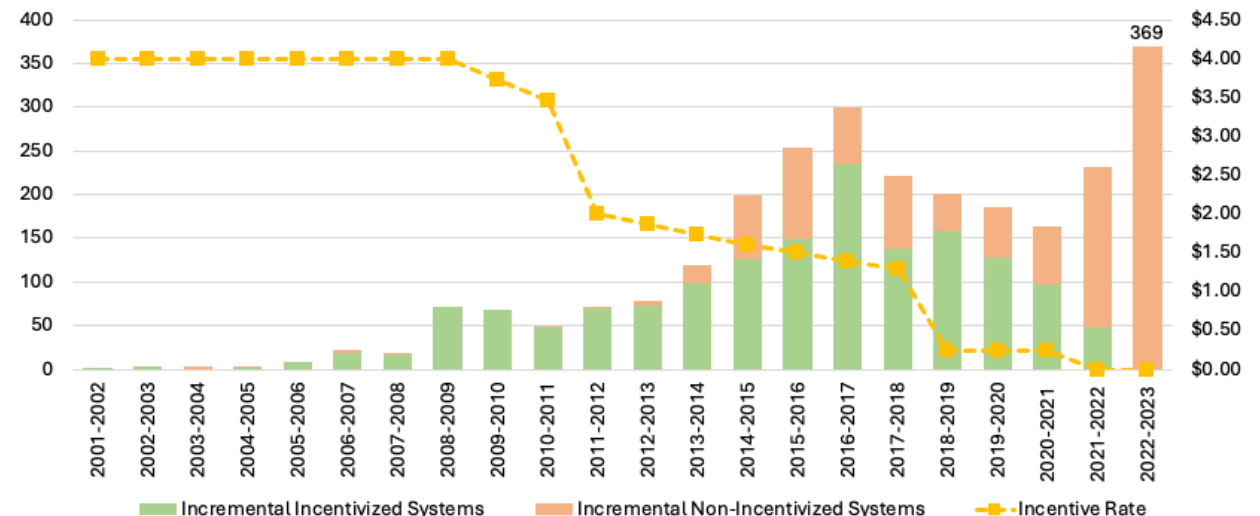


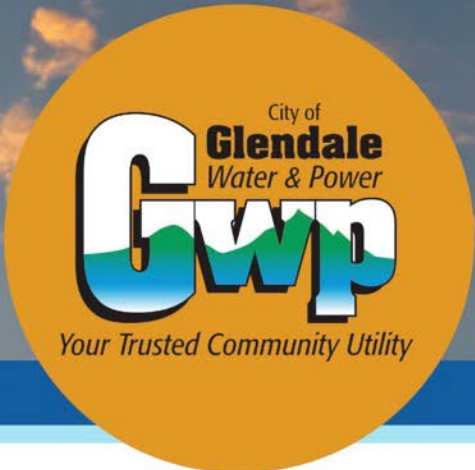
Where We Stand Today

- 2,921 PV/Solar Systems Installed since 2001 for a total of 28 MW
- 2,800 Residential PV/Solar Systems Installed since 2001 for a total of 17 MW
- 121 Commercial PV/Solar Systems Installed since 2001 for a total of 11 MW
- Solar penetration is currently at 3.25%
- Solar system installations in Glendale have been increasing every year, despite the end of the solar incentive program in 2022 (see graph)

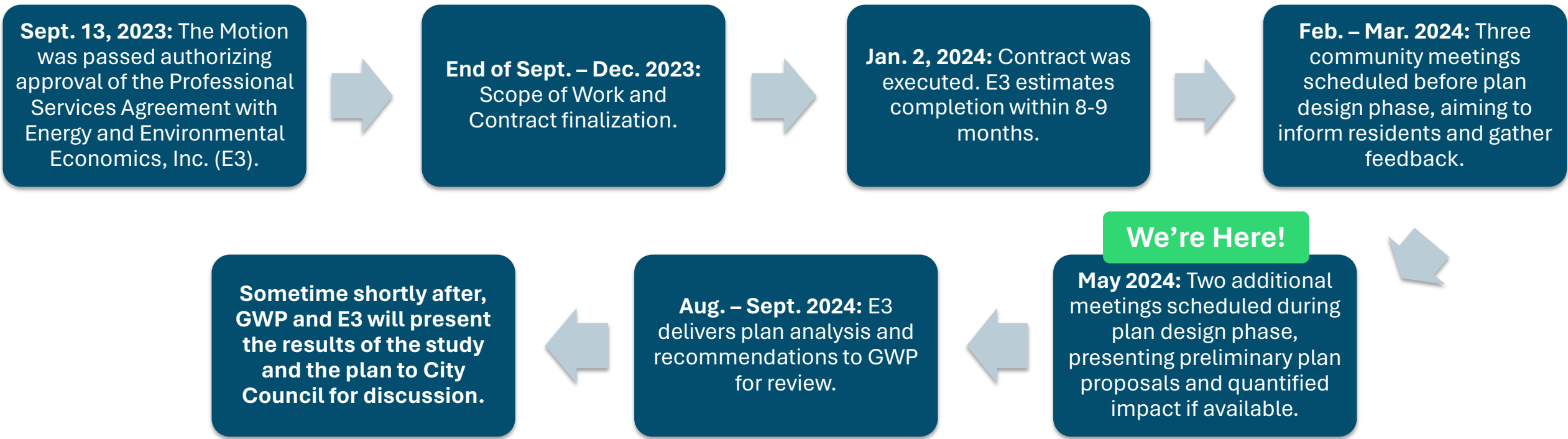
Annual Customer Sited Solar Installations in Glendale

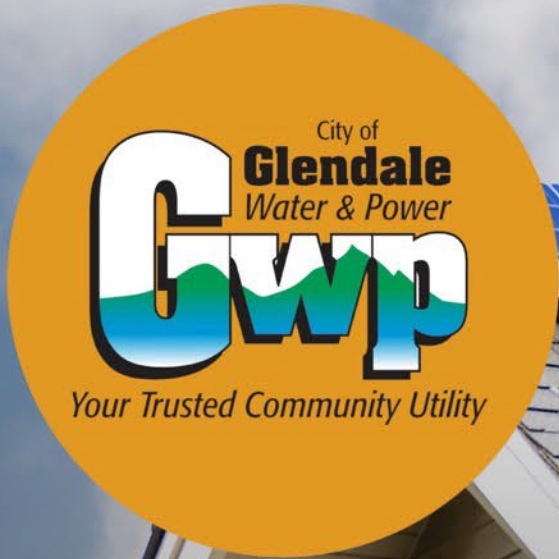
Solar systems installed in each year, number of systems
Upfront rebates for installing solar, \$/kW



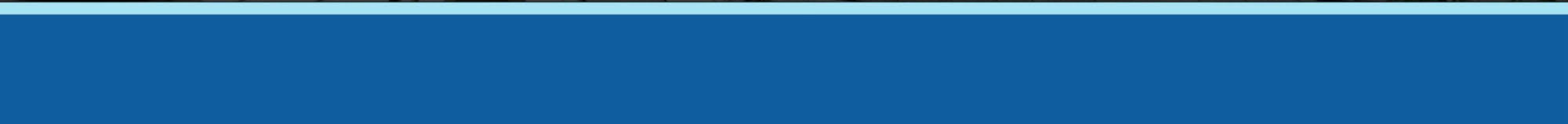


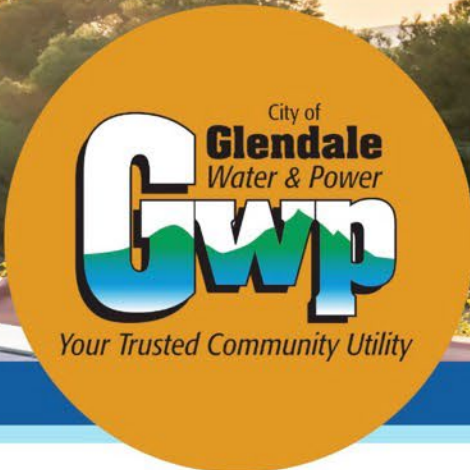
Plan Timeline





Community Inputs





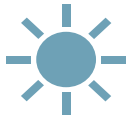
GWP engaged stakeholders through three community meetings before the plan design stage to collect community inputs



Stakeholder Participation Following a resolution by The Glendale City Council, Glendale Water and Power (GWP) established new goals for solar and energy storage installations, aligning with clean energy targets. In response, GWP engaged stakeholders through three community meetings, two in person and one virtual, where attendees received an overview of Glendale's solar and energy landscape and provided feedback directly to project managers.

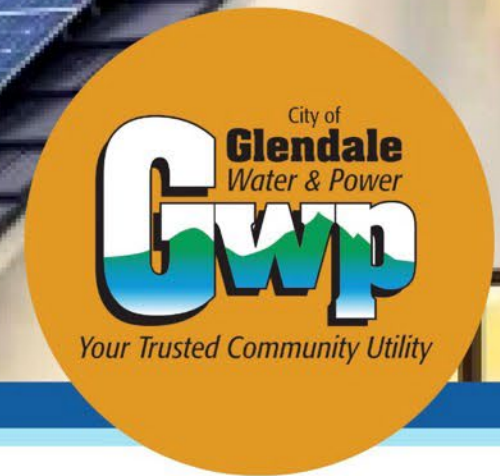


Stakeholder Outreach GWP made extensive efforts to inform residents and businesses about the meetings, including bill inserts, direct mail, a dedicated web page, press releases, social media posts, email blasts, and a text message blast. Additionally, an online survey with over 20 questions was distributed to gather input from those unable to attend meetings.



Community Meeting Participation GWP and its consultants held three meetings to inform attendees about solar and energy storage in Glendale, discuss the resolution's benefits and challenges, and gather feedback. Each meeting included a presentation, followed by discussions at four stations covering key topics. The meetings concluded with a Q&A session and an invitation for attendees to submit comment cards. The third meeting was conducted virtually via Zoom Webinar to facilitate broader participation. The meetings collectively attracted over 160 attendees, with the virtual session being the most attended. Additionally, an online survey received over 100 responses from GWP customers.

Press coverage of the third community meeting:
<https://glendalenewspress.outlooknewspapers.com/2024/03/18/glendale-water-and-power-talks-highlight-solar-panel-costs-permits>



Community Meeting Timeline

- **Meeting 1-3:** These meetings took place before the plan design phase of the project, with the goal of informing residents on the project, and gathering feedback to incorporate into the plan design phase.
- **Meeting 4-5:** These two meetings will take place during the plan design phase of the project, with the goal of presenting final proposals to the public, along with the quantified impact if available.

Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Wednesday, February 28 th	Saturday, March 2 nd	Monday, March 11 th	Wednesday, May 15 th	Thursday, May 30 th
Adult Recreation Center 201 E Colorado St, Glendale, CA 91205	Sparr Heights Community Center 1613 Glencoe Way, Glendale, CA 91208	Zoom/Webinar	Adult Recreation Center 201 E Colorado St, Glendale, CA 91205	Sparr Heights Community Center 1613 Glencoe Way, Glendale, CA 91208
6:00 – 8:00 PM	10:00 AM – 12:00 PM	6:00 – 8:00 PM	6:00 – 8:00 PM	6:00 – 8:00 PM
In-Person	In-Person	Zoom/Webinar	In-Person	In-Person

Better community inputs collections via discussion stations and interactive discussions

Infographics developed to better inform residents and collect their inputs.



Understanding Barriers to DER Adoption: Empowering Progress and Growth

FINANCING & FUNDING

- Prohibitive Upfront Costs**
- Significant upfront costs of solar, storage, and other DER technologies may be prohibitive for residents and business owners
- Tax Credit Challenges**
- Some households do not have enough tax appetite to fully benefit from the federal investment tax credits, or are not eligible for specific tax credits

Additional Challenges for Renters and Multifamily Residents

- Renters may not be able or willing to install DERs since they do not own the property
- Multifamily residents (both renters and unit owners) face challenges in getting approvals from property owners for adopting DERs
- Additional barriers include split incentives among property owner and tenants, and challenges associated with tenants lacking the authority or bill crediting mechanism to take advantage of on-site solar and other DER technologies

SITE SUITABILITY

- Rooftop suitability is a common challenge for solar. Roofs best suited for solar have strong infrastructure, no leaks, and must not require significant maintenance at the time of installation.
- The installation of DERs may require upgrades to homes and businesses such as new electrical panels
- Adoption of air conditioning, heating, or water heating equipment typically occurs when existing equipment breaks

POLICY & REGULATORY

- Flat retail rates or minimally differentiated time-of-use structure
- Reductions in utility revenues can result in cost shifts to non-participants
- Absence of enabling legislation or policies
- "Soft costs" such as permitting and interconnection delays

COMMUNITY ENGAGEMENT

- Lack of access to information on DER technologies, policies, programs, and incentives
- Lack of interest in engagement and education
- Limited trust in DER technologies and developers, compounded by complex contracts and bill crediting confusion



Further Questions?
Reach us at:
solar-der@glendaleca.gov



INPUT MATTERS: WE VALUE YOUR INPUT ON DER ADOPTION BARRIERS TO INCORPORATE INTO THE PLAN.



Environmental Justice and Equity

CITY COUNCIL EQUITY AND JUSTICE PRIORITIES FOR THE SOLAR & ENERGY STORAGE PLAN

- Expand access to **on-site or community** solar for customers who have been historically excluded, including **low- and middle-income** customers, customers in **multifamily** buildings, and **renters**
- Focus on programs and incentives that provide benefits in heavily **pollution-burdened areas**
- Improve **energy affordability** for customers with high energy burdens
- Include **community ideas and concerns** about existing and potential DER programs

INCLUDING EQUITY AND JUSTICE IN THE SOLAR & ENERGY STORAGE PLAN

Example Equity and Justice Metrics:

- Electricity Bills:** How do participating and non-participating customers' bills change as solar and other DERs are added in Glendale?
- Energy Burden by Income Bracket:** What share of a customer's monthly income is spent on electricity?
- Adoption and Incentive Distribution:** Is access to DERs and city-provided incentives overrepresented or underrepresented in certain customer groups?

Guiding Questions:

- What incentives or support is needed to achieve equitable access to DERs?
- Which customers groups currently see the highest energy and environmental burdens in Glendale?
- What benefits might come from increased adoption of DERs?
- What harms might come from increased adoption of DERs?
- What other ways can we measure energy equity outcomes in this plan?

ENVIRONMENTAL JUSTICE FRAMEWORK



Further Questions?
Reach us at: solar-der@glendaleca.gov



Better community inputs collections via discussion stations and interactive discussions

Infographics developed to better inform residents and collect their inputs.



AFFORDABILITY AND COST SHIFTS

PLAN COMPONENTS

- Consideration of incentives and rebates to improve affordability of adopting DERs
- Policies aimed at low- and moderate-income customers
- The plan aims to minimize the impact on cost shifts to low-income customers

The plan considers multiple objectives:



AFFORDABILITY AND DER COSTS

Metrics: Energy affordability can be measured by **energy burden**, the percentage of household income spent on energy bills

Barriers: While DERs can reduce energy bills for participants, they can also be associated with high upfront costs that present a barrier to adoption

What are your concerns about energy affordability and other costs as solar and other DERs are adopted?

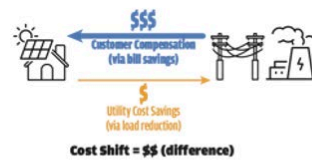
OPPORTUNITIES

- DERs can reduce energy bills for residents and business owners
- Utility incentives can further reduce a customer's energy bill via bill credits
- Federal, state, and utility incentives can reduce the upfront costs associated with installing DERs
- Financing and leasing options can help improve the economics for some customers
- Community solar could have the potential to provide affordable options for low-to-moderate income customers, assuming available space

What other programs and incentives could improve affordability and increase DER adoption?

COST SHIFTS

- DERs can reduce loads which provides electricity system cost savings for the utility, otherwise known as "utility avoided costs"
- DERs may result in reductions in utility revenues due to reduced bill payments resulting from customer compensation (net energy metering or other incentives)
- If customer compensation is greater than utility system cost savings, rates need to increase to recover utility costs, resulting in a cost shift from participants to non-participants



Further Questions? Reach us at: solar-der@glendaleca.gov



COMMERCIAL AND INDUSTRIAL DER ADOPTION PLAYS A VITAL ROLE

ENERGY EFFICIENCY



Energy Efficiency is the FIRST FUEL in California - make it work for you!

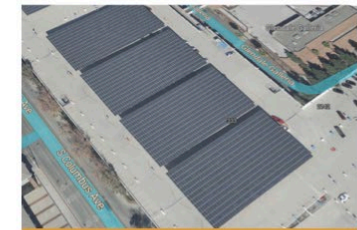
- Glendale Water and Power's Business Energy Upgrade program serves customers with the direct installation of energy efficiency measures:
- Lighting
 - Refrigeration
 - Heat Pump Water Heaters
 - Custom Measures

What measures could we add that would help your business?
An Energy Services Representative (ESR) can show you how to participate!

Further Questions? Reach us at: solar-der@glendaleca.gov

SOLAR AND STORAGE

- Coupling batteries with solar ensures energy is available after the sun sets
- Federal tax credits are available for both solar and storage, with a bonus credits for energy communities or projects in low-to-moderate income communities
- There are federal and GWP electric vehicle (EV) incentives available for installing workplace chargers, enabling EVs to charge during the workday when solar energy is abundant
- Larger solar and storage systems are more cost effective

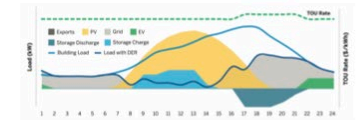


Workplace charging under solar shade canopies makes good use of parking lots and upper decks of parking garages

Further Questions? Reach us at: solar-der@glendaleca.gov

DEMAND MANAGEMENT

- When you use energy is as important as how much you use
- Managing demand reduces demand charges and creates capacity for other electrical end uses
- Using energy during off peak periods reduces energy costs with time of use (TOU) rates

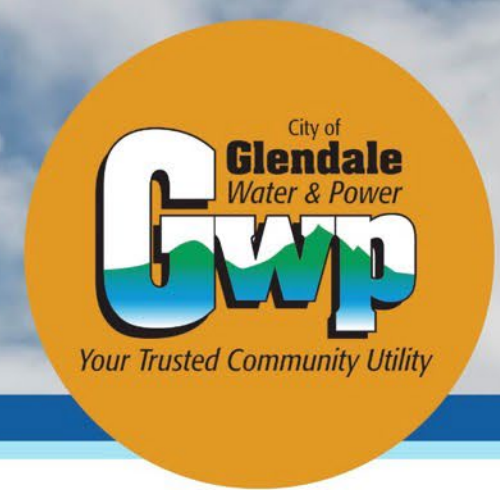


The figure shows demand management and load shift of a customer with solar, storage, and an electric vehicle (EV). The storage is charged from solar to avoid exports and maintain bill savings under net energy metering. Storage is discharged at the beginning of the on-peak TOU period, and the EV begins charging at the start of the off-peak TOU period. The customer load with DERs is significantly reduced throughout the on-peak TOU period.

Figure references: Glavin et al. 2013, "New Design for the Energy Transition: Getting the Most out of Flexible Loads in a Changing Grid," a White Paper from the Smart Grid Consortium. Smart Grid Consortium, "Energy Systems Integration Group." <http://www.esig.org/using-costly-price-with-grid-loads>

Further Questions? Reach us at: solar-der@glendaleca.gov

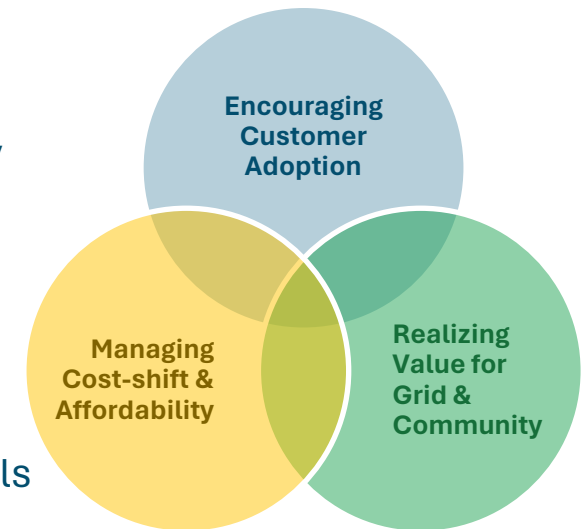


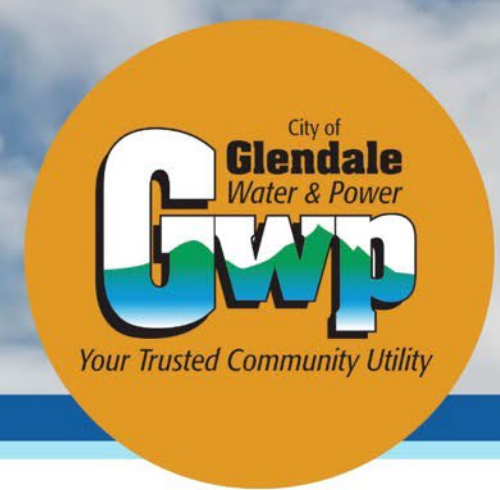


Collecting and Addressing Community Inputs

- We distributed an online survey to over 40,000 customers in the GWP utility service area and received over 100 unique responses
- **Our takeaways:**
 - Survey respondents see affordability and reliability as most important regarding their energy needs
 - Survey respondents want rebates, net metering, and bill transparency
 - Survey respondents want community solar projects to assist renters and low-income households
 - Survey respondents want more education and outreach, in the form of workshops and panels
 - Survey respondents want regulatory and approval process clarity

Balancing Multiple Objectives

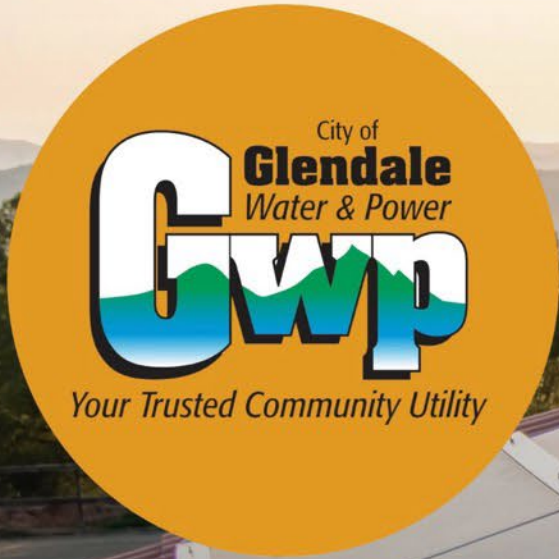




Collecting and Addressing Community Inputs

- We also received direct community feedback on what they want to see as part of the plan, implementation, and the approach and assumptions for quantitative analysis via comment cards, emails, and note taking during Community Meetings 1, 2 and 3.
- While we greatly value your input, there are many considerations taken into account, meaning not all input can be incorporated into the plan.
- **Takeaways:**
 - Customers want upfront rebates to assist in the initial cost hurdle
 - Customers want Net Metering
 - Customers want an expedited and more streamlined process for approvals
 - Customers want more guidance on securing and utilizing federal and state resources
 - Customers want GWP to act as a guide/aid in the Solar and DER adoption process

We heard you! Link available on GWP website, and posted PDF of all presentations.

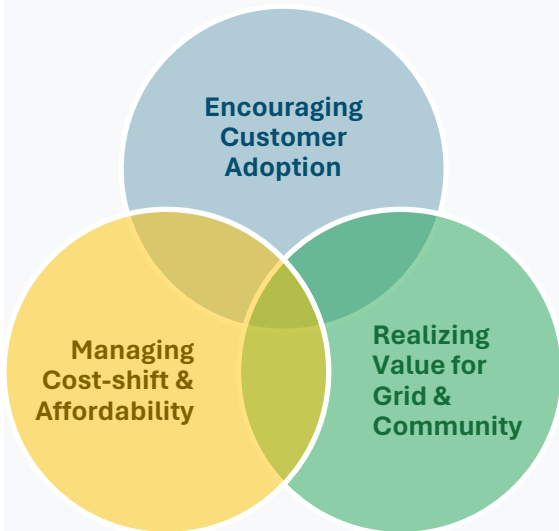


E3's Analytical Approach

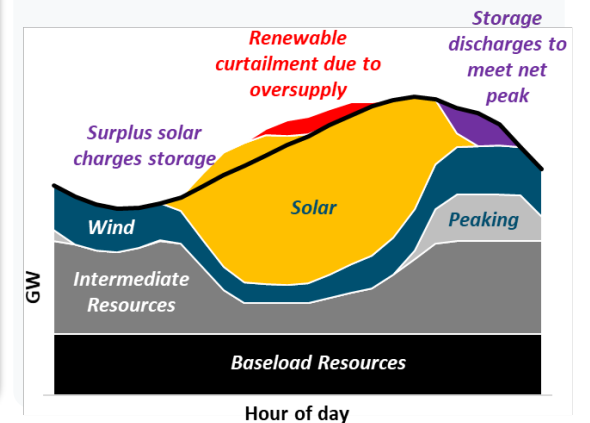
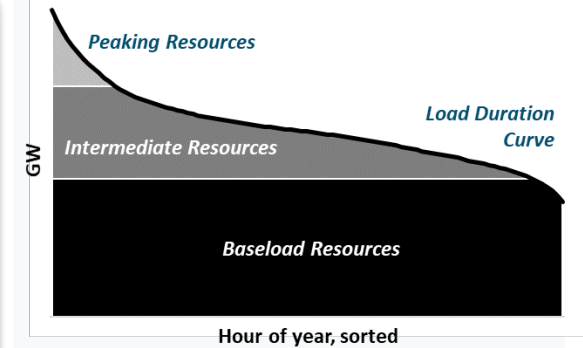
E3's analytical support focused on the following research questions

How can local solar and distributed energy resources be effective, economic and equitable part of GWP's reliable, low-carbon resource portfolio?

Balancing Multiple Objectives



1. What is the potential for solar, energy storage, and other DER adoption in meeting the City Council's goals?
2. If the goals are not currently achievable, when can they realistically be met?
3. What policies and incentives are necessary to achieve the adoption and capacity goals?
4. How can policies and incentives be tailored to address the needs of low-income customers, residents in heavily pollution-burdened areas, multifamily properties, and rental properties?
5. What are the direct and indirect economic, environmental, societal, and other non-economic benefits and costs associated with solar, energy storage, and other DER adoption?
6. What are the direct and indirect impacts on low- and moderate-income households resulting from these policies and incentives?



E3 designed the following scope of work to support the adoption plan development



Estimation of DER potential from all market segments



Enhancement of avoided costs to reflect GWP system plans and characteristics



Analysis of adoption scenarios to identify feasibility of city council targets and short-list the most promising and effective policy and program options



Benefit cost analysis considering direct/indirect economic and non-energy benefits



Deep dive into the most promising and effective program options to provide next-level program design recommendations

Turning potential into adoption necessitates a multifaceted approach to ensure equitable solar and DER adoption in Glendale

Community Outreach

Permitting,
Interconnection, and
Approval Rules & Process

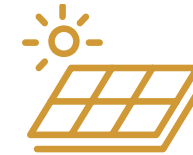
Program & Incentive
Design

Equity Strategies

Additional DR, EV, and
EE Strategies

Incorporated community inputs and E3/Willdan project experience & expertise, these are the prerequisites for encouraging more adoption.

Utilize modeling and scenario analysis to evaluate and identify effective, least-cost, and equitable strategies, along with improved and customized avoided cost valuation and cost-benefit analysis for Glendale.



Customer-Sited Solar



Energy Storage



Flexible Loads



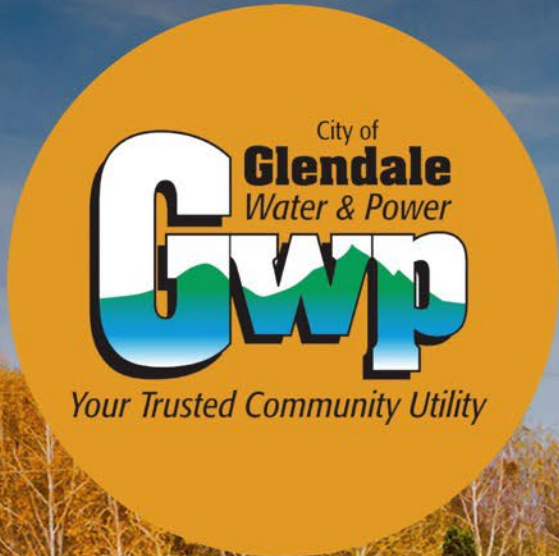
Demand Response



Electric Vehicles



Energy Efficiency



Technical Potential & Market Segmentation

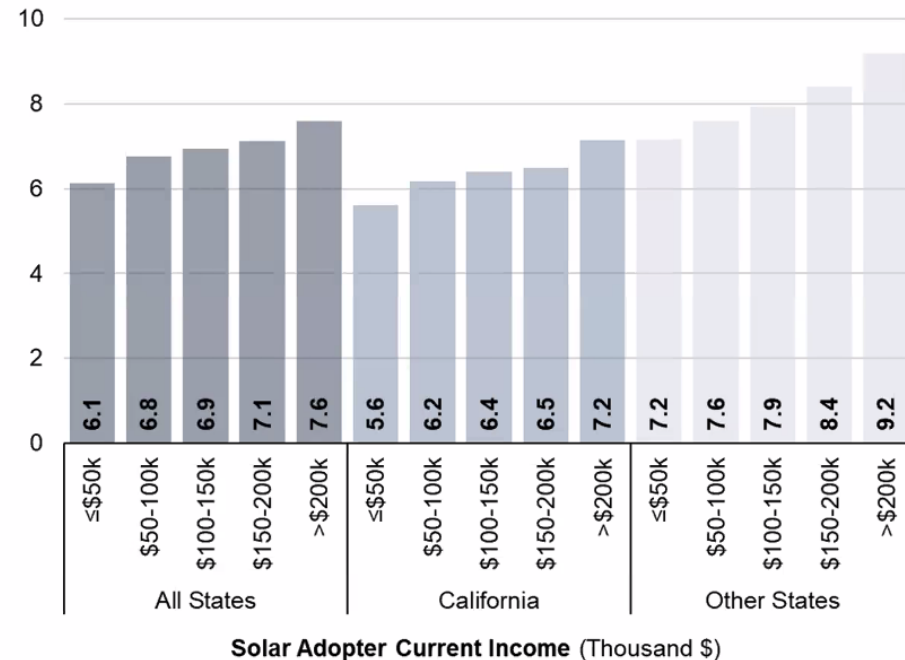


Understanding the demographics of residential adopters in California provides crucial context for shaping GWP's future in customer solar and storage

+ Higher income customers tend to adopt larger systems.

- CA residents tend to install smaller systems than other states, with median sizes ranging from 5.6-7.2 kWdc across income levels

Median System Size (kW_{DC}) for Systems Installed in 2022

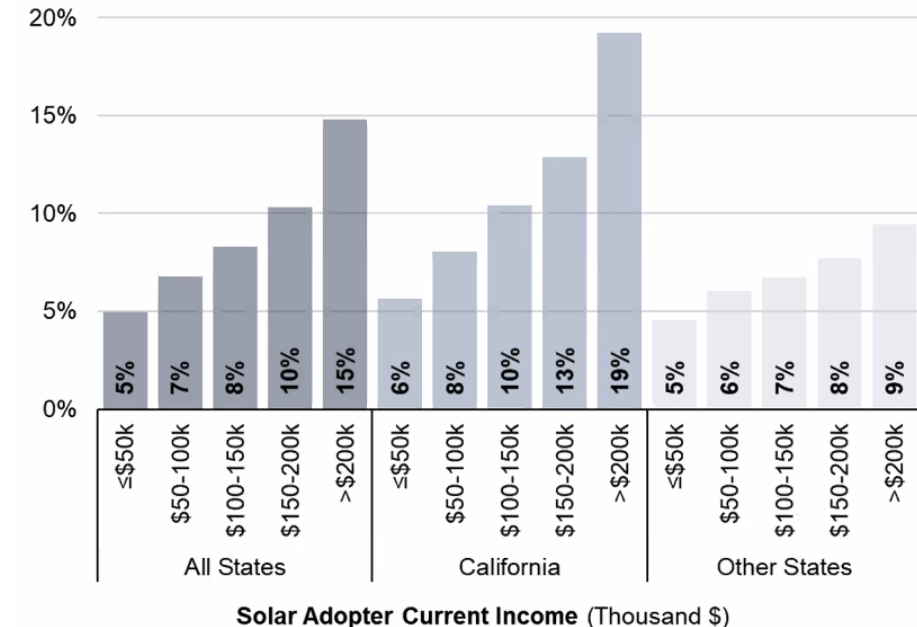


+ Higher income customers are more likely to adopt paired batteries.

- CA residents tend to adopt paired batteries at a higher rate than other states, with attachment rates ranging from 6%-19% across income levels

Battery Storage Attachment Rates for Systems Installed in 2022

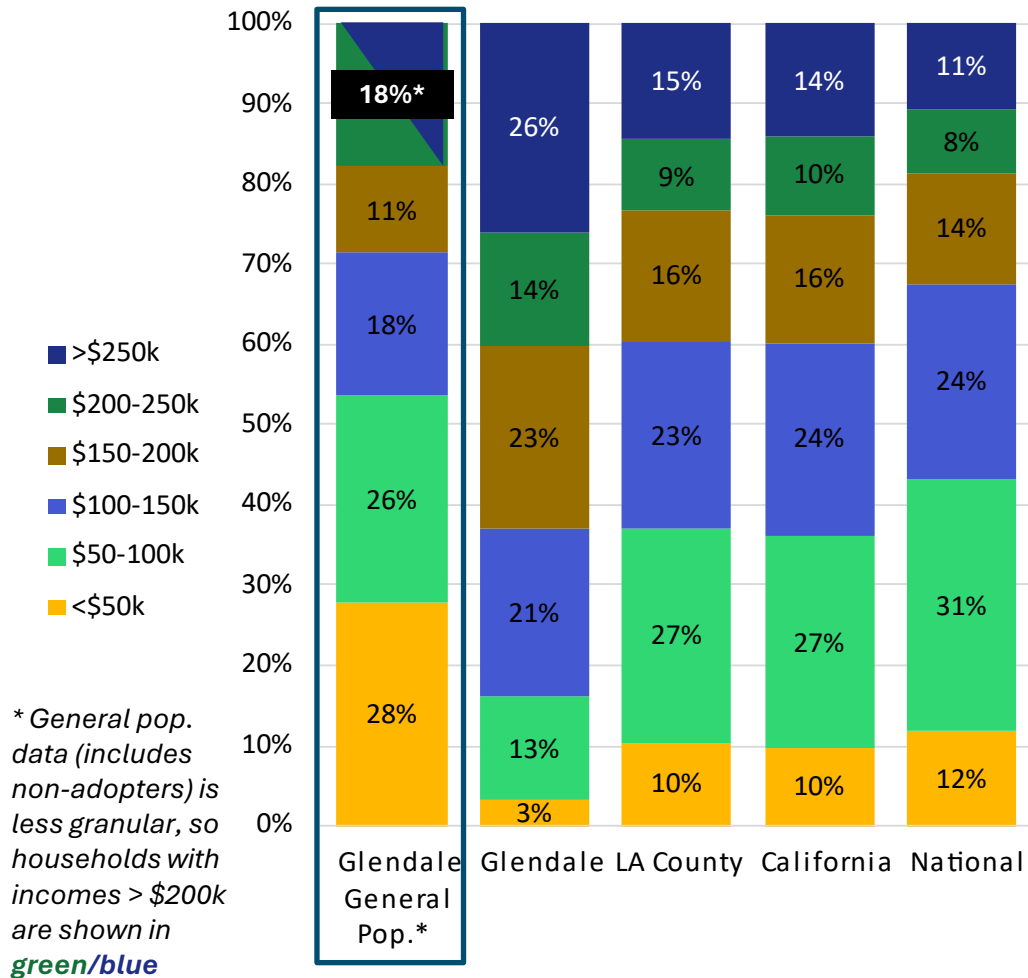
Percent of PV systems co-installed with storage



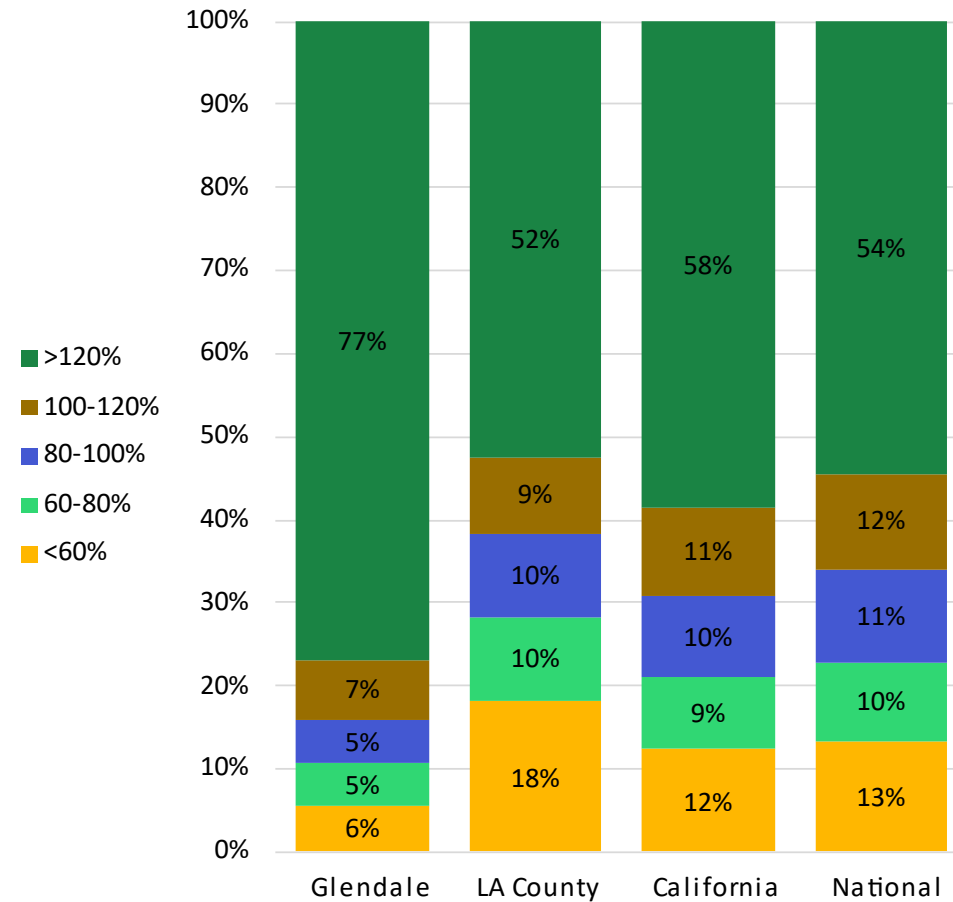
Glendale's solar adopters skew higher income than the county, state, and national averages

LBNL Income Demographics of GWP Solar Adopters: Raw Income, Area Median Income

Share of 2016-2022 Solar Adopters by Income

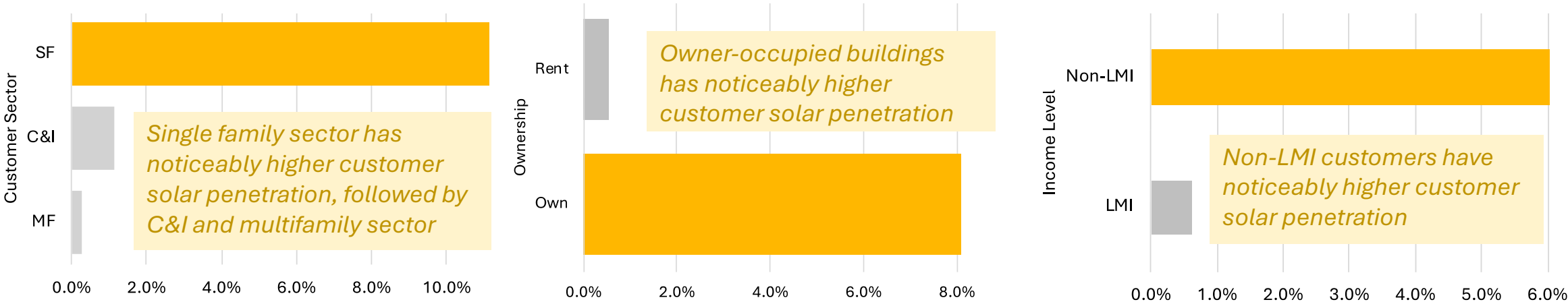


Share of 2016-2022 Solar Adopters by County AMI



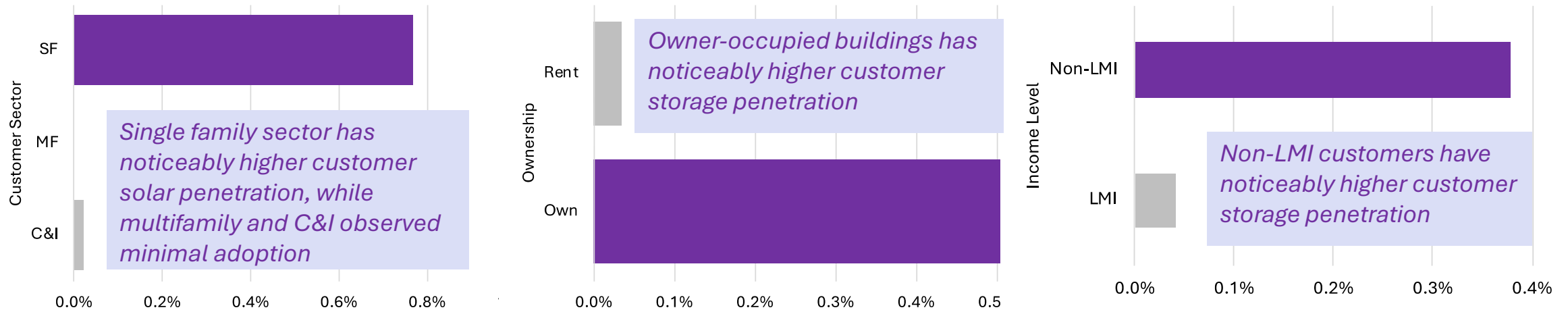
Glendale's current solar and storage penetration pattern skews towards single-family, owner-occupied, and non-LMI households

+ Glendale has 2,900 customer-sited solar systems totaling 28 MW, most of them are from owner-occupied single-family non-LMI households. Solar penetration is currently at 3.25% and solar system installations in Glendale have been increasing every year, despite the end of the solar incentive program in 2022.



Glendale's current solar and storage penetration pattern skews towards single-family, owner-occupied, and non-LMI households

+ Glendale has less than 200 customer-sited storage systems totaling 3 MWh, most of them owner-occupied single-family non-LMI households with just one large system from commercial customer and none from multifamily multifamily residences reflecting split-incentive and other adoption barriers.



Rooftop solar resource potential for planning purpose should further consider system size limits beyond suitability and developable roof areas

Rooftop solar resource potential refers to the **theoretical maximum** generation capacity that can be sited on developable rooftops in a region assuming economics and grid integration are not a constraint. Variations in the definition of technical potential may impact results substantially.

Project Sunroof **Project Sunroof**

466 MWdc solar installation potential from **all** sectors, with **80%** buildings suitable for solar

- Potential estimate includes existing systems.
- Technical potential is estimated using machine learning algorithm based on Google's overhead imagery and weather data.
- Solar-suitable buildings are identified based on irradiance, orientation, and shading (79.25%).
- System size (2 - 1000 kW) is a function of developable roof area, which takes obstacles into account.
- Does not consider parking lots or fields as eligible sites.
- Does not limit system size based on applicable program limits (e.g., NEM).



NREL REPLICA

330 MWdc solar installation potential from **residential** sector

- Potential estimate includes existing systems.
- Technical potential is estimated using a statistical model that leverages LiDAR data to determine rooftop suitability.
- Solar-suitable buildings are identified based on irradiance, orientation, and shading.
- System size (> 1.5 kW) is a function of developable roof area, which takes obstacles into account.
- Does not consider parking lots or fields as eligible sites.
- Does not limit system size based on applicable program limits (e.g., NEM).



E3

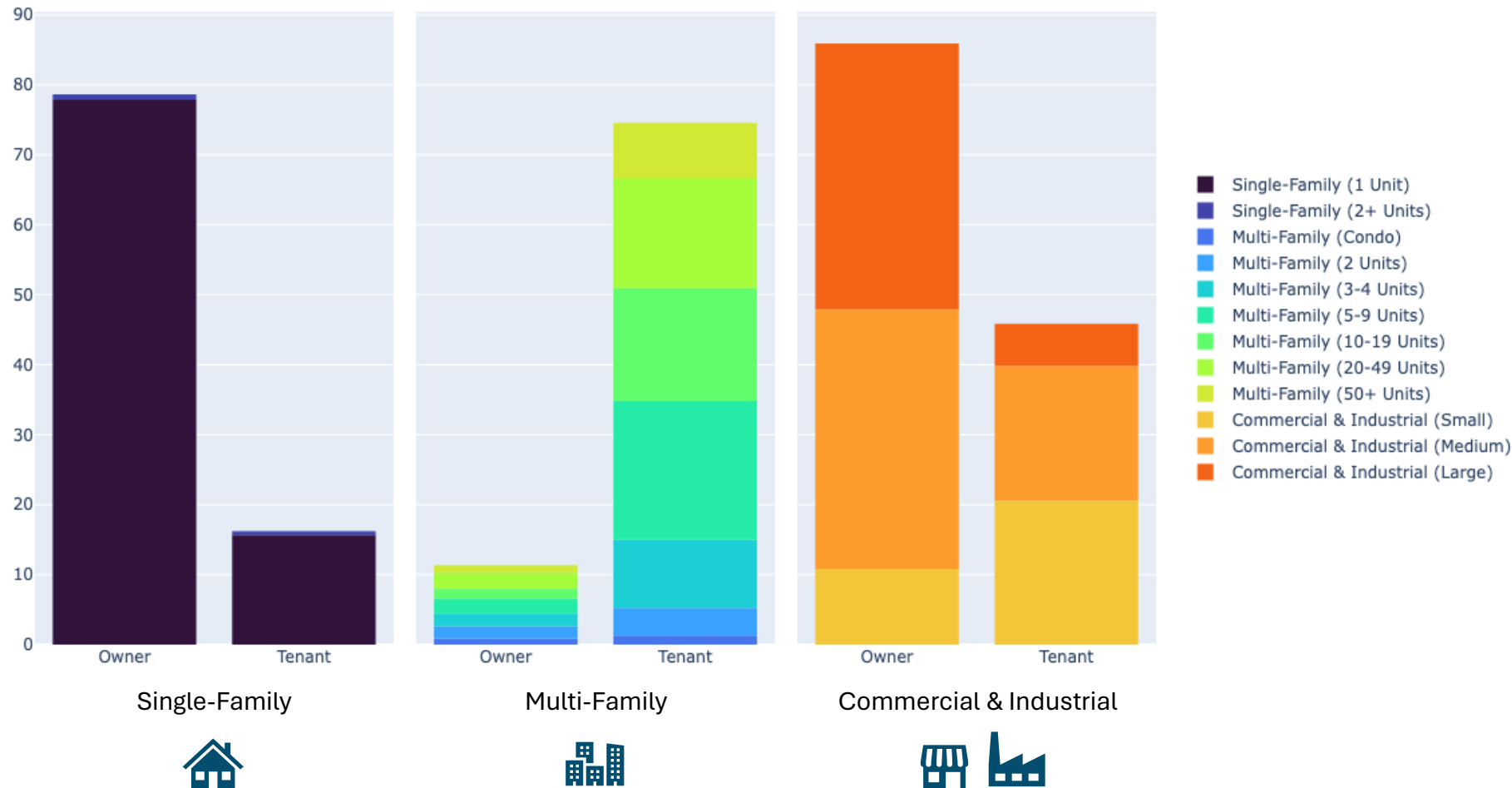
370+ MWdc solar installation potential from **all** sectors

- Potential estimate includes existing systems.
- Technical potential is estimated using anonymous GWP customer and building data and LA County Assessor parcel data.
- Developable roof area derived from building footprint with derating factor to account for setback requirements, obstacles, etc.
- Glendale solar suitability adjustment of 79.25% (Project Sunroof) to account for structural stability, electrical code compliance, etc.
- Any building with enough developable roof area to site a 1 kW system (based on historical installations) is considered solar-suitable.
- Does not consider parking lots or fields as eligible sites.
- **Constrains system size based on applicable program limits (e.g., NEM).**
- **Run sensitivities for different rooftop area availability and program limits.**

E3 “Core Case” estimates identify 370+ MW rooftop solar resource potential from all market segments

Solar Potential by Sector, Ownership Status, and Building Type

For Mid-Case, in MW



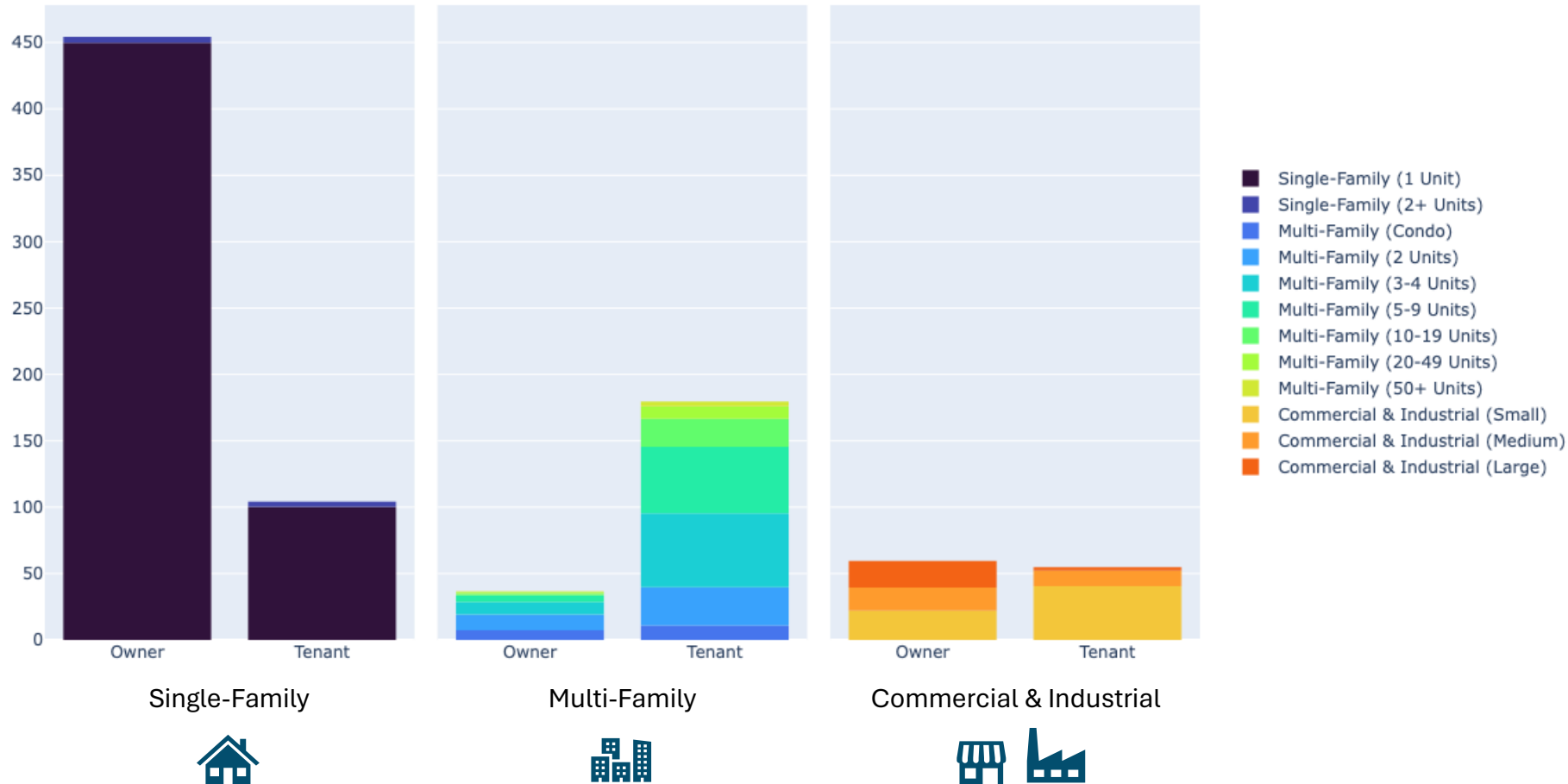
Key Observations

- **Single-family: Owner-occupied single-family residences show the greatest potential for adoption.**
- **Multi-family: Multifamily rental properties follow closely behind but face historical challenges due to ownership dynamics and split incentives. Addressing these issues could unlock significant potential.**
- **Commercial & Industrial: while comprising fewer customers, they have larger average installation sizes, making it a significant contributor to achieving the 100 MW DER capacity target.**

E3 “Core Case” estimates identify 900 MWh customer storage resource potential from all market segments

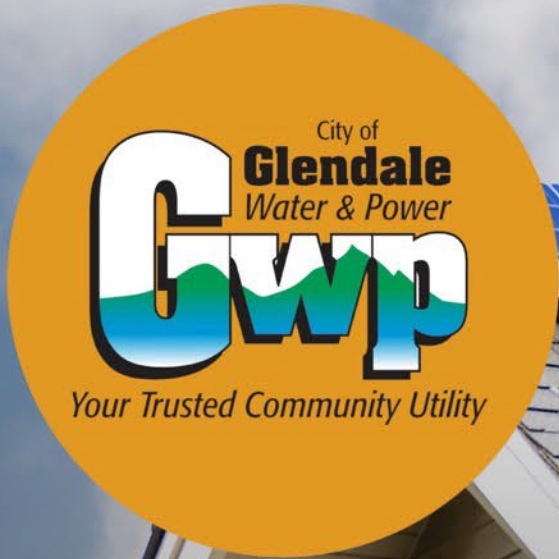
Storage Potential by Sector, Ownership Status, and Building Type

For Mid-Case, in MWh

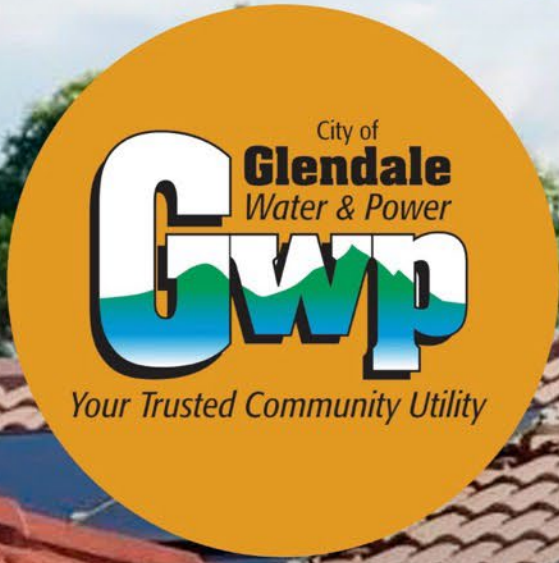


Key Observations

- **Single-family: Owner-occupied single-family residences show the greatest potential for adoption. Customers with less than 10 kW solar system can install up to 30 kWh battery storage systems.**
- **Multi-family: Multifamily rental properties follow closely behind but face historical challenges due to ownership dynamics and split incentives. Addressing these issues could unlock significant potential.**
- **Commercial & Industrial: For large solar systems (>10 kW), maximum storage potential is up to 110% historical average daily usage, which constrains the potential from C&I sector.**



Q&A (15 minutes)



Adoption Scenario Analysis



Qualitative screening analysis helps prioritize program and policy options that are more important to achieve city council's target

+ Program proposals ranked by overall qualitative performance

+ Note that reasonable DER compensation levels that mitigate cost shifts are preferred

Program Ideas	Involved Technologies	Overall Priority	Low Administrative Cost	Correctly Values DER Compensation	Program Maturity	Promote Adoption (Solar/Storage Penetration)	Promote Adoption (DER Capacity)	Ease of Implementation
Outreach, Education, & Support	All	High	High	None	High	High	High	High
Net Metering	Solar, Storage	High	High	Low	High	High	High	Mid
Base Rebate	Solar, Storage	High	Mid	Low	High	High	High	High
Net Billing	Solar, Storage	High	High	High	Mid	Mid	Mid	Mid
Community Solar	Solar, Storage	High	Mid	High	Mid	High	Mid	Mid
Streamline Permitting Process	Solar, Storage	High	Mid	None	Mid	High	High	Mid
Feed-in Tariff	Solar	High	Mid	High	High	Low	High	Mid
VNEM	Solar, Storage	High	Mid	Low	Mid	High	Mid	Mid
Performance-based Incentive	Storage	Mid	Low	High	Mid	Mid	Mid	Mid
Load Shedding DR	All	Mid	Mid	High	High	Low	Low	Mid
TOU	All	Mid	Low	None	High	Mid	High	Low
Buy-all, Sell-all	Solar, Storage	Low	High	High	Low	Low	Low	Mid
VPP	All	Low	Low	High	Low	Low	Mid	Low
Load Shifting DR	All flexible loads	Low	Low	High	Low	Low	Mid	Low
VGI	EVs	Low	Low	High	Low	None	Low	Low

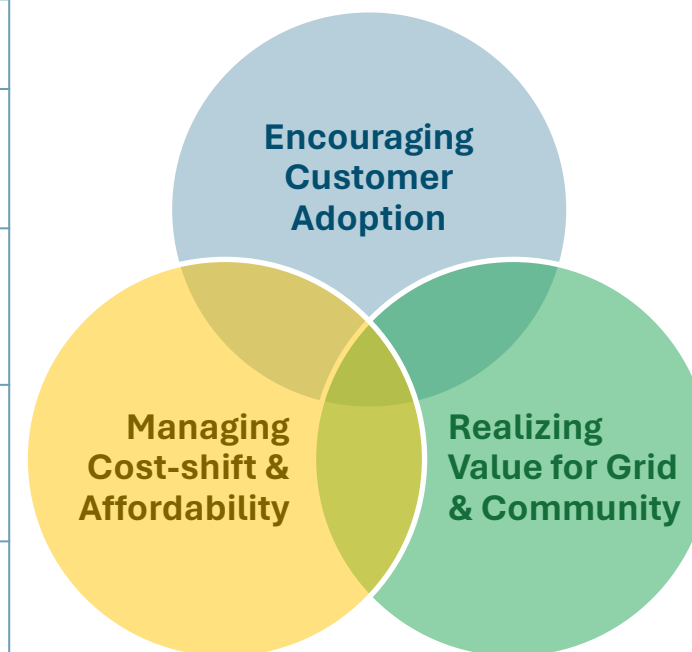
Priority Level

Various adoption scenarios capture multifaceted programs targeting various property types and communities







- + Each scenario will feature a portfolio of programs, including some combination of customer solar policies, shared solar and off-site solar solutions, upfront incentives, performance-based incentives, etc.
- + Scenarios will be guided by values from stakeholders, policy, and GWP. For each scenario and customer class, the proposed program portfolio will be evaluated on how well it captures each value.

No.	Scenarios	Narrative & Philosophy
1	No New Program	Reflects current GWP policies without new incentive programs, but with improved outreach, support, and improved permitting process.
2	Targeted MF LMI Adoption	Aims to reach as much adoption as possible while maintaining high standards for equitable implementation. Focus on minimal cost shifting and promote LMI/DAC adoption via direct install programs.
3	Balanced	Aims to reach balance between S2 and S4, with focus on increasing customer adoption while reducing cost shifting potential, supplemented with MF LMI/DAC upfront incentives as needed.
4	Widespread Adoption	Aims to reach adoption goal with an emphasis on customer-sited solar and storage. Focus on maximizing adoption with supplemental upfront incentives as needed.
5	Direct Install	Serves as a high-cost bookend under which GWP direct installs up to 10% of customer with solar. Emphasis on MF properties (lower cost per customer) and adoption in LMI/DACs.

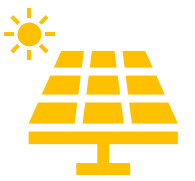
Balancing Multiple Objectives



Best-case pathways to achieve Glendale's DER adoption target

	Export Compensation	Upfront Incentives	Split Incentive	Other Utility Support	Best-case 2027 Adoption 	Best-case Lifetime Net Program Cost 		
S1 No New Program	Net energy metering at retail rates	Federal and state	Persist	Best-case Scenario: Optimistic outlook on enhanced community outreach and support, along with improved permitting processes starting early 2025	 9.6 % 60 MW	\$332M		
S2 Targeted LMI MF Adoption	Net energy billing at avoided costs	Federal and state, utility direct install* for LMI/DAC MF customers	Best-case Scenario: Optimistic outlook on split incentive being resolved or mitigated by off-site solar or other financing solutions starting early 2025		 11.9 % 59 MW		\$249M	
S3 Balanced	Net energy billing above avoided costs but below retail rates	Federal and state, utility incentive* for LMI/DAC MF buildings			 11.8 % 60 MW			\$222M
S4 Widespread Adoption	Net energy metering at retail rates	Federal and state, utility incentive* for all multifamily customers			 15.9 % 70 MW			
S5 Direct Install (In Progress)	Net energy billing at avoided costs	Direct install for all residential customers	N/A		N/A		*For compensating solar and storage adopters in 2024-2030	

How feasible it is to achieve the 10% customer solar and storage adoption target by 2027?



Achieving 10% Adoption by 2027:

- + Is technically feasible only with significant utility investment
- + Would impose a net cost of \$200-500 million for incentivizing solar and storage adopters in 2025-2030
 - Exact rate impacts require further analysis
- + Prerequisites needed by early 2025:
 1. Robust community outreach & support
 2. Improved permitting processes
 3. Offer solutions to address split incentives
 4. Multifaceted incentive programs targeting various property types and communities

Options

1. Rooftop solar owned, financed, or leased by single-family customers (1 system for 1 electric customer)
2. Rooftop solar owned, financed, or leased by multi-family property owners/managers under virtual net metering programs and shared among tenants and unit owners (1 system for multiple electric customers)
3. Subscribers of off-site solar solutions like community solar, solar share, and green rate options (1 project for numerous electric customers)

All options must be carefully evaluated for cost-effectiveness against other solar solutions, particularly lower-cost utility-scale city-owned options

- Achieving the goal by 2027 is feasible but challenging given the cost implications and the uncertainty on how much progress can be made for these prerequisites.
- A more feasible timeline for reaching the 10% goal would be by 2030, leveraging additional adoption growth between 2027 and 2030

How feasible it is to achieve the 10% customer solar and storage adoption target by 2027?



Achieving 10% Adoption by 2027:

- + **Not technically feasible, even by 2030, without significant utility investment through full direct install programs (approximately \$80-120 million upfront battery storage cost incentive alone*)**
 - GWP can afford to pay higher incentives to storage because storage can provide grid values, but the impact of incentive on promoting storage adoption is limited since historically, battery storage adoption has primarily been driven by resiliency considerations rather than economic factors.
 - Also, substantial upfront costs and comparatively diminished benefits including lack of energy arbitrage benefits (low TOU participation, symmetric NEM rate schedule, etc.) and less monetizable resiliency benefits
 - On average and varied by income level, only 6%-19% customer solar systems in California are attached with battery storage, achieving higher attachment rates require significant utility interventions

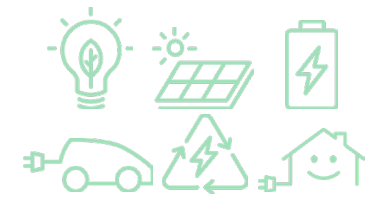
Options

1. Customer storage owned, financed, or leased by single-family and multi-family property owners/managers and commercial & industrial customers
2. Subscribers of off-site solar and storage solutions like community solar/storage, solar/storage share, and green rate options
3. To fill in the gap, options like distribution grid storage, customer storage at city-controlled sites, or GWP-installed storage hosted on customer sites could be explored.

All options must be carefully evaluated for cost-effectiveness against other storage solutions, particularly lower-cost utility-scale city-owned options

A more realistic target is achieving 8% adoption of **customer solar-only** and 2% **customer solar + storage** systems by 2030 considering the realistic level of storage attachment rate in California

How feasible it is to achieve 100 MW DER additional capacity target by 2027?



Achieving 100 MW extra DER by 2027:

- + **Additional study is required to fully answer this question in the next step of the project work plan.**
- + **Effective Capacity:** attaining 100 MW of additional DER effective capacity (ELCC-adjusted) by 2027 requires approx. 200-300 MW customer solar and 40-60 MW customer storage, plus other DERs
- + **Nameplate Capacity:** achieving 100 MW of additional DER nameplate capacity by 2027 is technically feasible with significant utility investment, with a more reasonable timeframe between 2030 and 2035

DER Contributions

DER	Nameplate Capacity by 2027	ELCC Range
Customer Solar	60-70 MW	approx. 10-20%
Customer Storage	5-10 MW	approx. 60-90%
EV Managed Charging	Under Development	
EV Vehicle-to-Grid (V2G)		
Residential DR		
C&I DR		
Energy Efficiency		
Total Nameplate MW		

Achieving 100 MW additional effective capacity considering DER's ability to reduce GWP system peak demand requires significant amount of DER nameplate capacity coming online in near-term, a more realistic target is achieving 100 MW additional DER nameplate capacity between 2030 and 2035

Key Takeaways – Target Feasibility

+ Achieving 10% customer adoption by 2027 are technically feasible but requires significant utility investment at a net cost of \$200-500 million for incentivizing solar and storage adopters in 2025-2030

- Key prerequisites by early 2025 include: 1) robust community outreach and support, 2) improved permitting processes, 2) solutions addressing split incentives.



+ Further clarifications and interpretations of the City Council's target are necessary to distinguish between:

- 10% adoption target for solar + storage systems vs. 10% for either solar or solar + storage systems.
- 100 MW of additional DER nameplate capacity vs. effective capacity based on their contributions to reducing GWP system peak.



+ Extending the 10% adoption target to 2030 is more feasible and could have a smaller rate impact to all GWP ratepayers with more volumetric adoption coming online between 2027 and 2030.

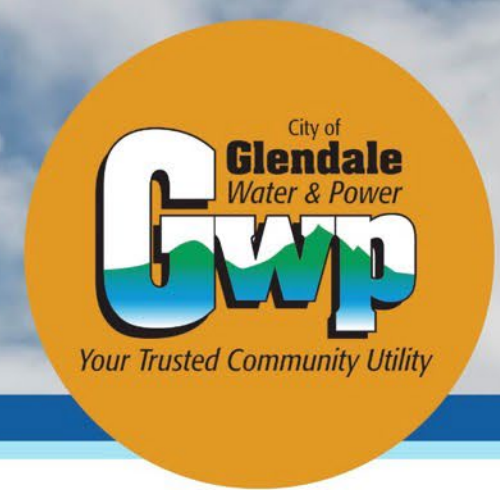
- Additional quantitative analysis will be considered in next steps.



Key Takeaways – Adoption Strategies

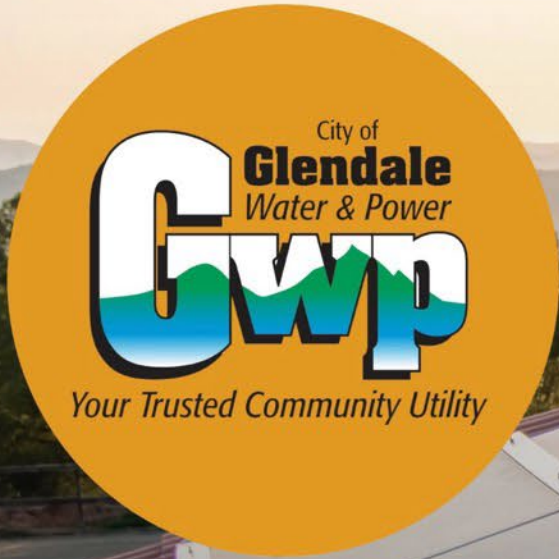
- + **Offer solutions to split incentives and off-site solar options for multifamily, tenant, and low-and-moderate-income/disadvantaged communities, potentially coupled with additional financial incentives.**
 - Real-world solutions to explore later may include on-bill financing options, green leases, shared-solar, and off-site solar solutions like community solar, solar share, and green rate, and virtual net metering, all of which are pivotal for cost reduction and broadening access to multifamily, low-income, or tenant households.
- + **Ensuring effective building code compliance for solar and storage mandates in new constructions is imperative.**
 - By the end of 2027, the adoption of building code-compliant customer solar and storage systems could account for 15% to 20% of the total customer adoption required to meet the 2027 target
- + **Balance between affordability and adoption impact must be carefully considered when selecting program portfolios to ensure equitable growth.**
 - Continuation of the current policy primarily benefits SF homeowners.
 - Increased participation from renters and LMI/DAC households can be achieved through MF incentives, such as upfront incentives or LMI/DAC-targeted direct install programs, along with solutions addressing split incentives (e.g., financing, off-solar, or shared-solar arrangements mentioned above).
 - Lower costs can be attained through the adoption of the new energy billing (NEB) system, which is more equitable than Glendale's current NEM program.



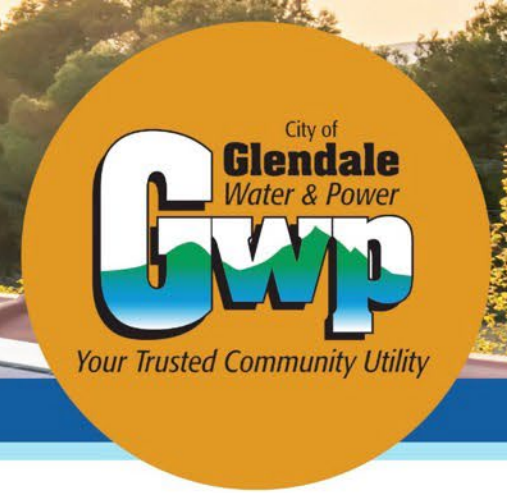


Next Steps

- 1. It's now in the middle of the plan design phase, we're here to share our progress on the preliminary plan and analysis, and listen to your input and feedback once again.**
- 2. Next steps**
 1. Continue the enhancement of avoided costs to reflect GWP system plans and characteristics
 2. Complete adoption and cost-benefit analysis to cover other DERs, and look into sensitivities if needed
 3. Look into EV, EE, and DRs for their potential contributions to 100 MW DER goals with program support
 4. Deep dive into the most promising and effective program options to provide next-level program design recommendations



Q&A (20 minutes)



Closing Remarks and Future Engagement



Thank you for attending today's community meeting! We appreciate your participation and feedback to incorporate into the plan design phase.



Please consider attending a future community meeting where we will present the plan's proposals and provide residents with the opportunity to ask questions and provide comments before the plan is finalized.

- Wednesday, May 15th, 6-8pm at the Adult Recreation Center
- Thursday, May 30th, 6-8pm at Sparr Heights Community Center



To view the most up-to-date meeting times and locations, or to learn more about the plan, visit the Glendale Water and Power website: GlendaleCA.gov/Solar-DER-Plan



Didn't get a chance to ask your question or give your thoughts during Q&A?

Email GWP at solar-der@glendaleca.gov