Item 8.b

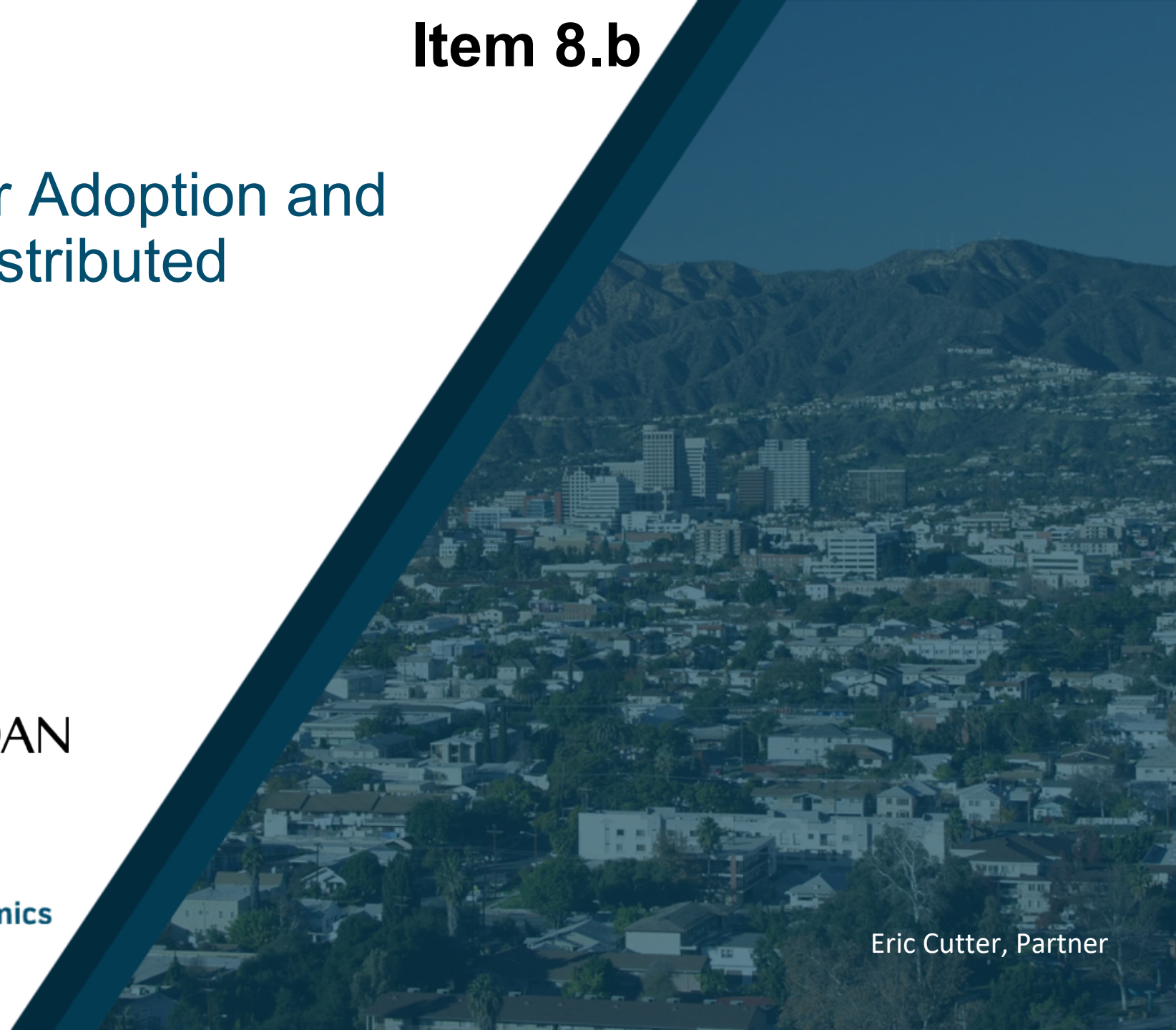
Plan to Increase Solar Adoption and Develop Additional Distributed Energy Resources

November 19, 2024

City of Glendale Water & Power
Your Trusted Community Utility

WILLDAN

Energy+Environmental Economics



Eric Cutter, Partner

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Introduction and Objectives

City Council Resolution of August 2022

10% of GWP customer solar and energy storage adoption by 2027

Additional dispatchable and peak load reduction capacity of 100 MW

Category 1

Develop Plan to Increase Solar and Energy Storage Penetration and Develop Additional Distributed Energy Resources (DERs)

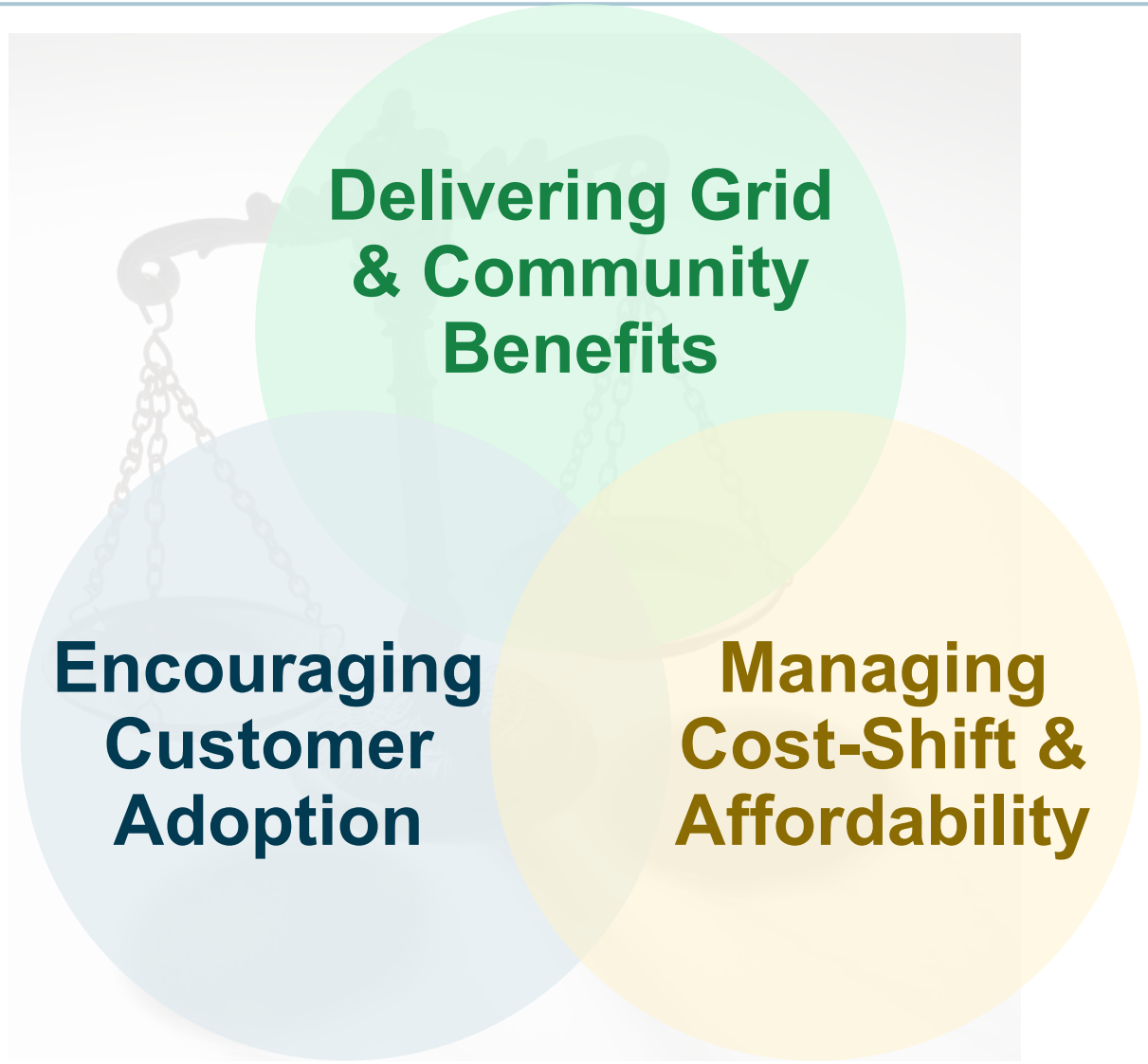
Category 2

Dispatchable Capacity and Demand Reduction Calculation

Category 3

Cost-Benefit Analysis

Balancing Multiple Objectives



Challenges and Opportunities

Challenges

Clean Energy Vision

- 60% RPS by 2030 (CA regulatory requirement)

Transmission & Land Constraints

- Procuring new renewables outside of the City

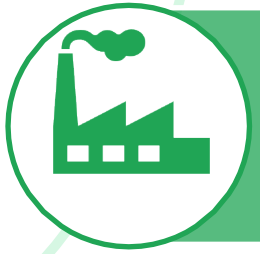
IRP Planning Challenges

- Integrating renewables, retiring coal, converting to hydrogen CT
- Maintaining system reliability

Opportunities

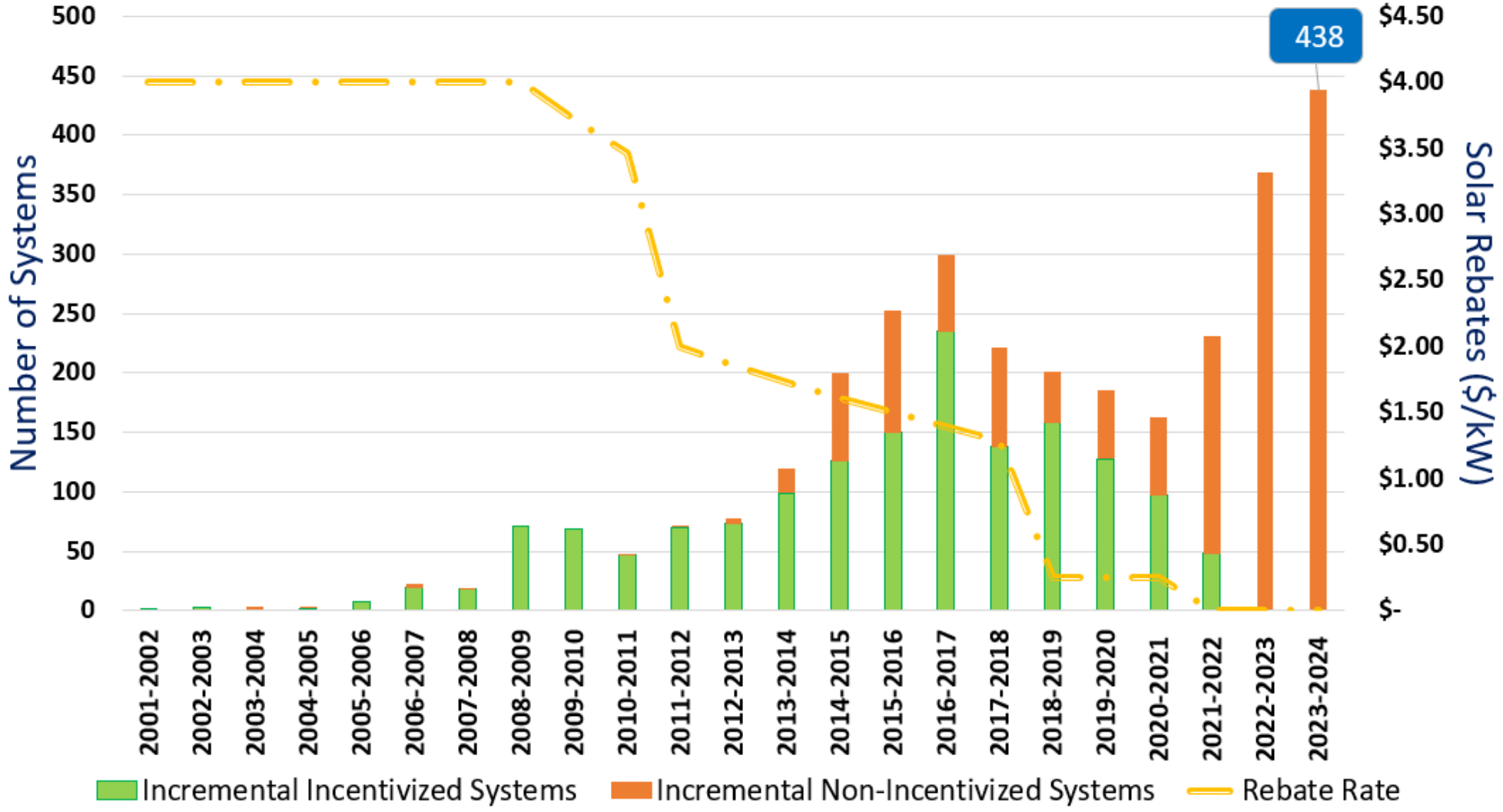
Maintaining leadership in clean and renewable energy

Unlocking more local generation

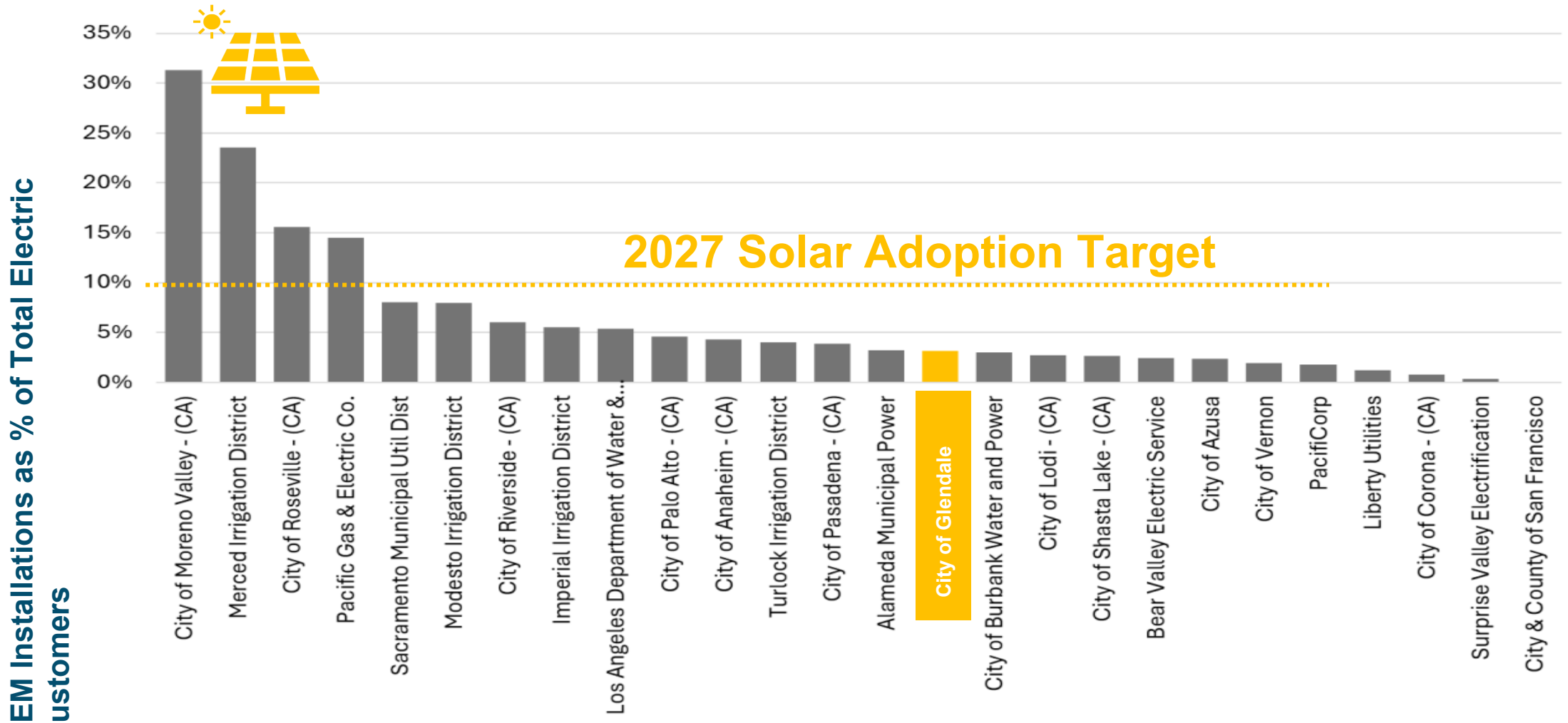


Reducing fossil generation (Grayson Repower, etc.)

Solar Adoption and Rebate Trends: 2001 - 2024



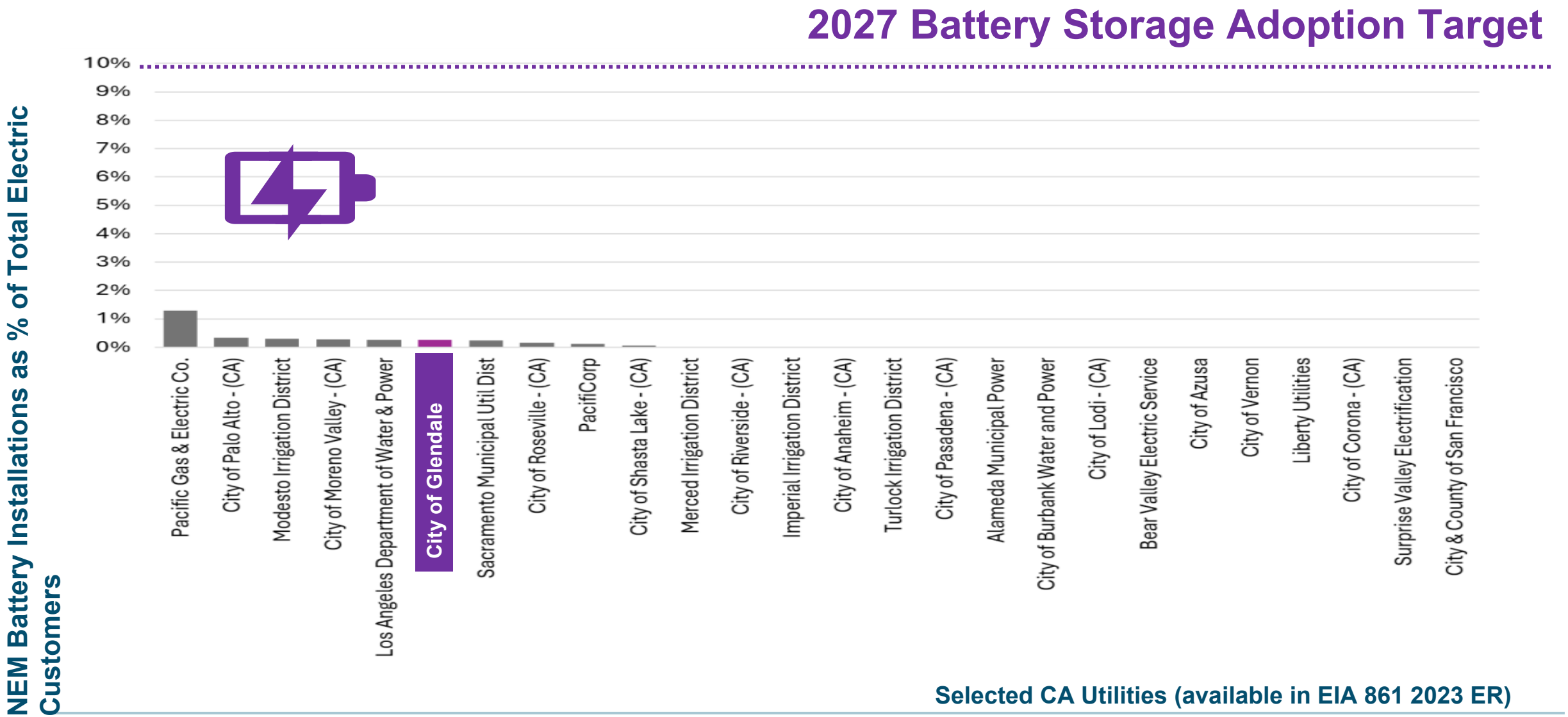
Solar Installations of California Utilities



Selected CA Utilities (available in EIA 861 2023ER)

Utility-level net metering solar and storage installation and customer count data collected and derived from EIA Form 861 2023 early release version: https://www.eia.gov/electricity/data/eia861/

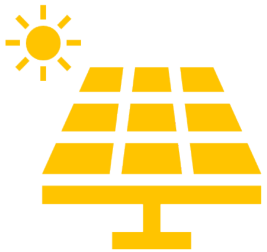
Energy Storage Installations of California Utilities



Utility-level net metering solar and storage installation and customer count data collected and derived from EIA Form 861 2023 early release version: https://www.eia.gov/electricity/data/eia861/

Net Energy Metering (NEM) and Net Billing Tariff (NBT) – Impacts on Equity

Solar Benefits



Not Utility Costs

Environmental & Societal

Avoided by Customer Solar

Some Transmission & Distribution

Avoided by Utility Scale Solar

Energy, GHG, *Some* Capacity

NEM 1.0 Bill Savings

Utility Costs Not Avoided by Solar

Utility Costs Avoided by Solar

NEM 1.0 Cost Shift

Rate Increase

NBT Bill Savings

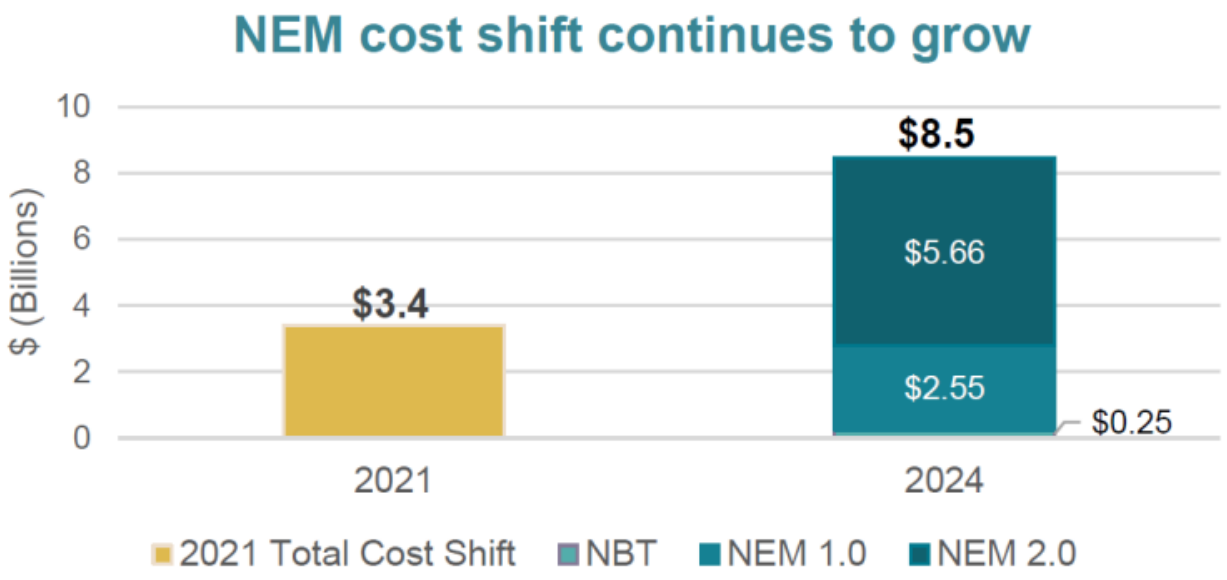
Utility Costs Not Avoided by Solar

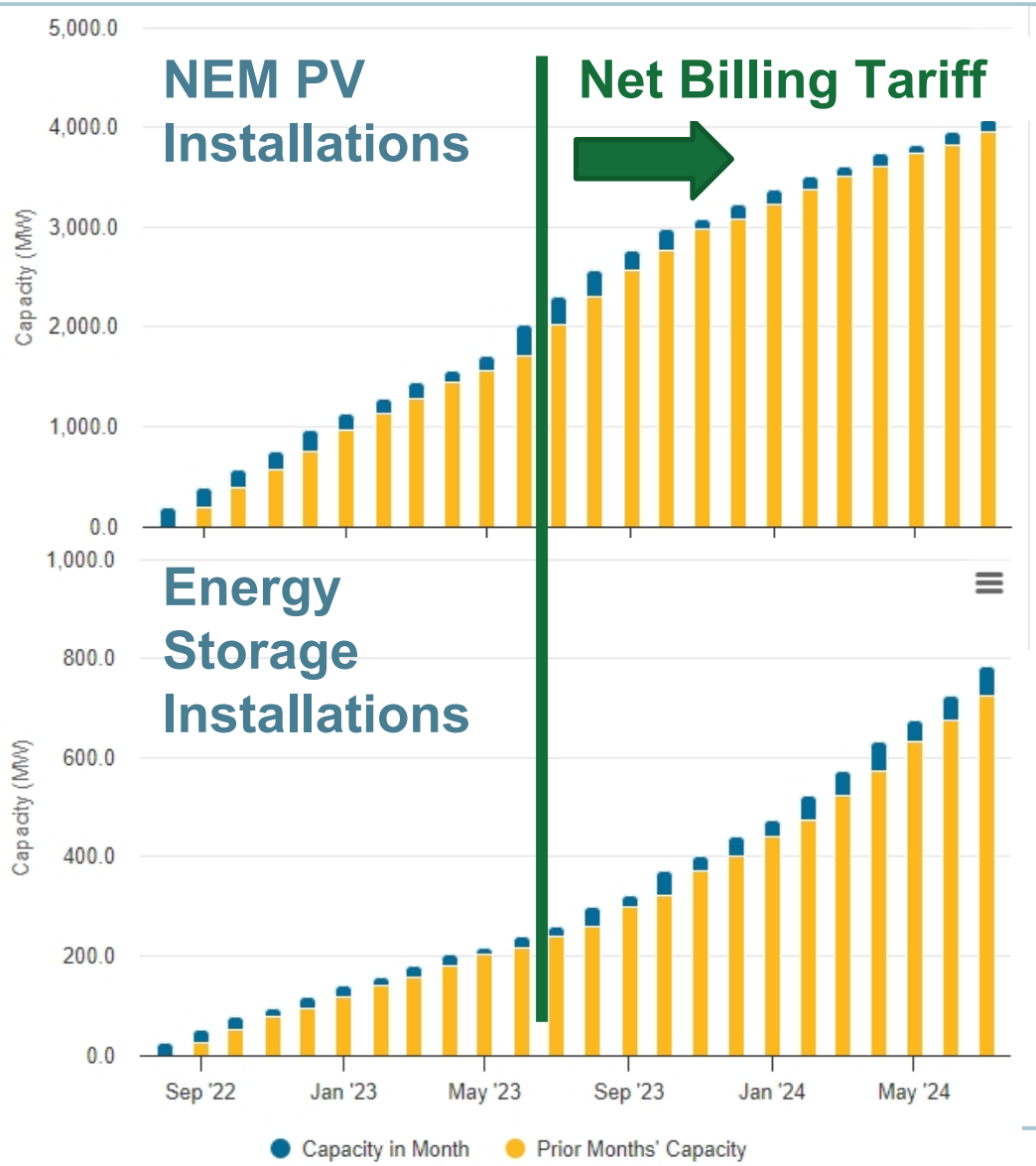
Utility Costs Avoided by Solar

NBT Cost Shift

Rate Increase

California's NEM Cost Shift and Solar Adoption Post NBT





Source: https://www.californiadgstats.ca.gov/charts/

Technical Potential Analysis

Not Technically Feasible	**Technical Potential** Theoretical maximum generation or capacity available		
Not Technically Feasible	**Not Cost-Effective**	**Economic Potential** Economically cost-effective according to specific criteria	
Not Technically Feasible	**Not Cost-Effective**	**Not Achievable**	**Achievable Potential** Practical estimate considering real-world, policy levers, and likelihood of adoption

Solar and Storage Technical Potential Capacity by Customer Sector

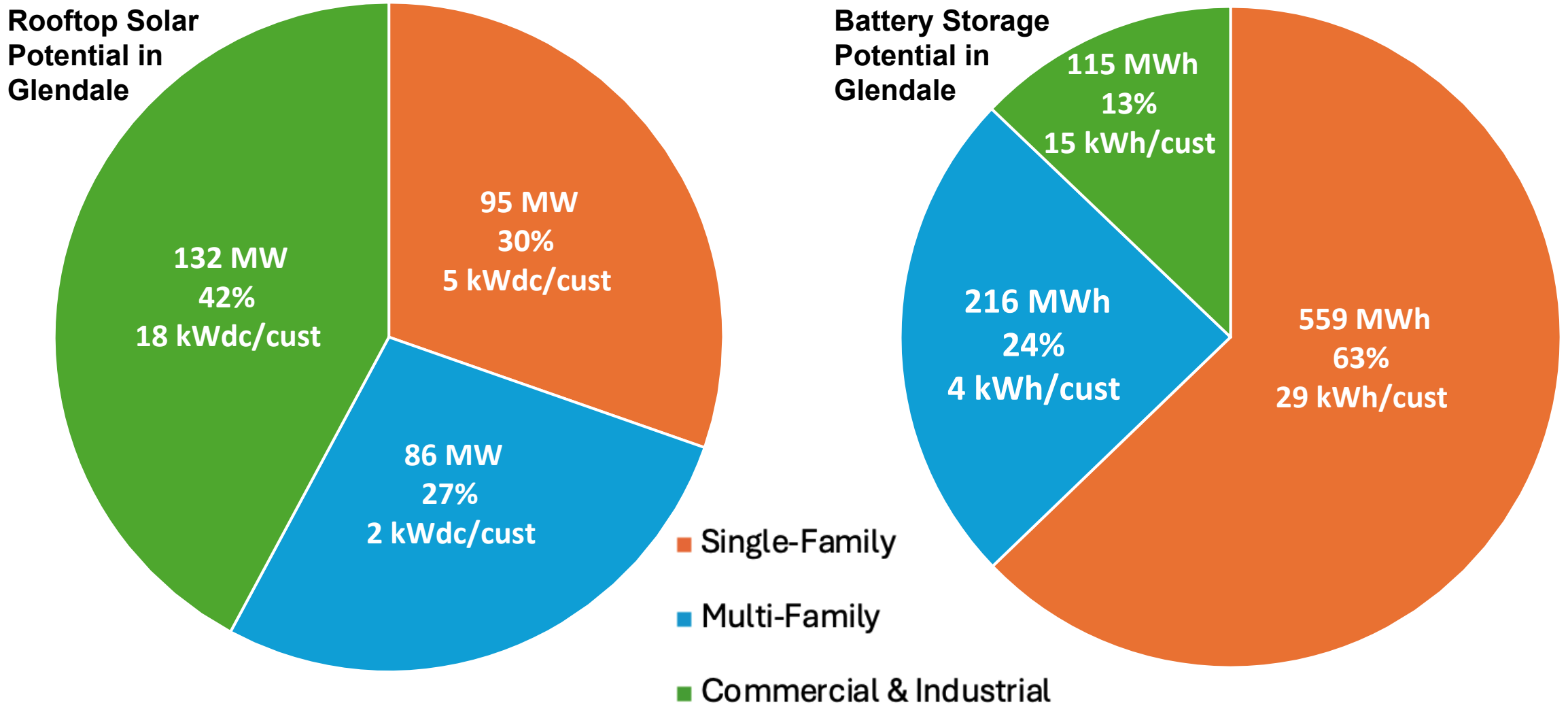
	Total # of Units	# of Solar-Suitable Units	Total PV Capacity (MW)	Total Battery Storage Capacity (MWh)	Total Battery Dispatch Capacity (MW)
Single-Family	23,843	19,046	95	**559**	**279**
Multi-Family	61,201	49,130	86	216	108
Commercial & Industrial	9,474	7,491	**132**	115	57

	Total # of Units	# of Solar-Suitable Units	Total PV Capacity (MW)	Total Battery Storage Capacity (MWh)	Total Battery Dispatch Capacity (MW)
Owner	31,904	25,355	176	550	275
Tenant	62,588	50,299	137	339	169
Manager	26	14	0.05	0.39	0.20

** Statistics for solar-suitable buildings under E3 "mid-case." Omits sites that could not be categorized.*

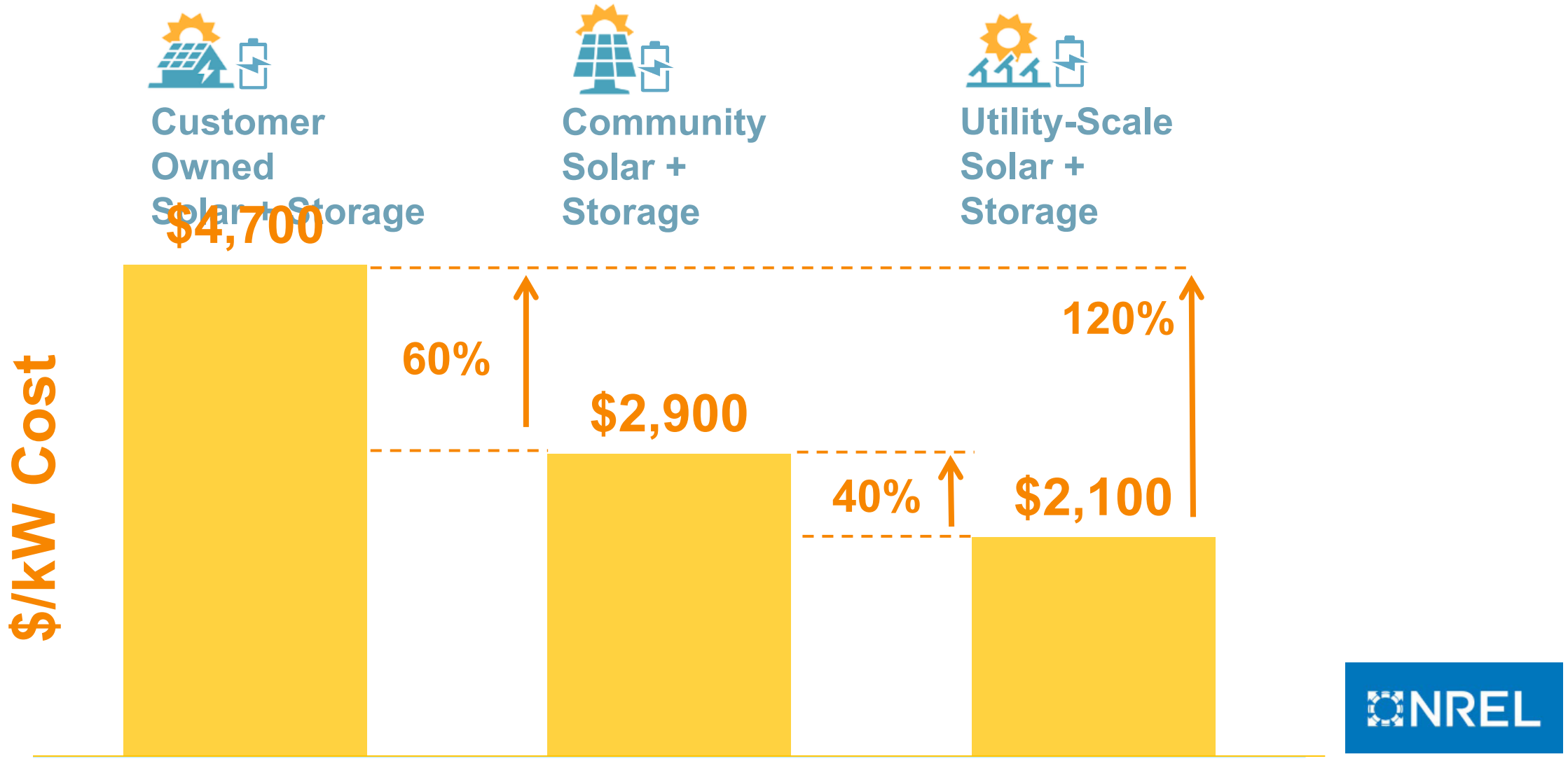
Solar and Storage Technical Potential by Customer Sector

Based on developable roof area, system size limits, site suitability, and other constraints



Note: These figures represent the theoretical maximum of solar and storage capacity under applicable policies and other constraints. In our adoption analysis, systems are sized based on customer needs.

Costs of Different Types of Solar and Storage Systems



• *Modeled Market Price (MMP) Benchmarks from NREL Q1 2023*

Target Scenarios: Trade-offs of Adoption, Equity, & Costs

Scenario 1: Continue NEM

Scenario 2: Targeted LMI/DACs & MF Adoption

Scenario 3: Balanced

Scenario 4: High Adoption

Program & Incentive Design

- **NEM Compensation**
- **Additional Incentives**

Address Additional Barriers

- **Resolve Split Incentives**
- **Provide More Utility Support**

- *Low and Moderate Income (LMI)*
- *Disadvantaged Communities (DACs)*
- *Multi-family (MF)*

Pathways to Glendale's DER Adoption Target

Best-case scenarios for evaluating the theoretical feasibility of achieving adoption targets

		NEM Compensation	Additional Incentives*	Split Incentive	Other Utility Support
Reference	**S0** Business as Usual	NEM at retail rates	Federal and state	Persist	At the Current Level
Evaluate Adoption Strategies	**S1** Continue Current NEM	NEM at retail rates	Federal and state	Persist	Optimistic outlook on enhanced community outreach and support, along with improved permitting processes starting early 2025
	S2 Targeted LMI & MF Adoption	NBT at avoided costs	Federal and state, utility direct install for LMI/DAC MF customers	Optimistic outlook on split incentive being resolved or mitigated by off-site solar or other financing solutions starting early 2025	
	S3 Balanced	NBT above avoided costs but below retail rates	Federal and state, 7-yr payback utility incentive for LMI/DAC MF buildings		
	S4 High Adoption	NEM at retail rates	Federal and state, 5-yr payback utility incentive for all MF customers		
Hypothetical Feasibility	**S5** Direct Install	NEM at retail rates	Federal and state, and direct install for MF renter LMI/DAC customers	Persist	At the Current Level

**Additional incentives is a general representation of all types of incentives including potential upfront incentives and performance-based incentives offered by GWP. Assuming receipt of GWP incentives requires customers dispatch battery storage against utility signals to maximize community benefits*

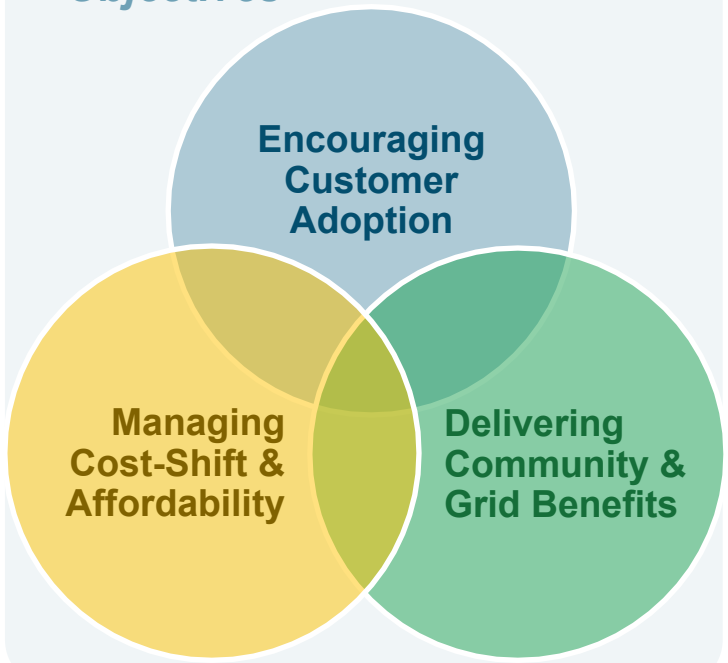
Scenario Evaluation Approach

- **Scenarios are shaped by stakeholder inputs, policy directions, and the balancing of multiple GWP objectives.**
- **Each proposed program portfolio should be evaluated based on its effectiveness in addressing these values from various perspectives.**

Key Scenario Performance Metrics

- **Adoption**
- **Ratepayer Impact**
- **Rate & Bill Impact**
- **Distributional Equity Impact**
- **Others**

Balancing Multiple Objectives



Key Results: Bill Savings and Utility Incentive Levels by Scenario

Variations in customer segments may lead to a range of outcomes

		NEM Compensation ($/kWh)	2025 Level	Additional Incentives*	2025 Level ($/W)
Reference	**S0** Business as Usual	NEM at retail rates	0.13-0.28 0.00	Federal and state	0.00 0.00
Evaluate Adoption Strategies	**S1** Continue Current NEM	NEM at retail rates	0.13-0.28 0.00	Federal and state	0.00 0.00
	S2 Targeted LMI & MF Adoption	NBT at avoided costs	0.09-0.19 0.08-0.28	Federal and state, utility direct install for LMI/DAC MF customers	2.6 1.65
	S3 Balanced	NBT above avoided costs but below retail rates	0.11-0.22 0.06-0.25	Federal and state, 7-yr payback utility incentive for LMI/DAC MF buildings	1.3-1.5 1.4-1.5
	S4 High Adoption	NEM at retail rates	0.13-0.28 0.00	Federal and state, 5-yr payback utility incentive for all MF customers	1.0-1.2 1.7-1.8
Hypothetical Feasibility	**S5** Direct Install	NEM at retail rates	N/A N/A	Federal and state, utility direct install for all MF renter LMI/DAC customers	N/A N/A

Key Results: Adoption Level, Equity, and Access by Scenario

Adoption scenarios represent an upper bound of how much adoption we can expect

		NEM Compensation	2027 Customer Adoption[1]	Additional Incentives	2027 Equity & Access[2]
Reference	**S0** Business as Usual	NEM at retail rates	5.2 % 39 MW 0.8 % 3 MW	Federal and state	MF 5% LMI 0% Renter 12% 11% 11%
Evaluate Adoption Strategies	**S1** Continue Current NEM	NEM at retail rates	9.6 % 60 MW 1.5 % 5 MW	Federal and state	MF 10% LMI 13% Renter 10% 22% 16% 18%
	S2 Targeted LMI & MF Adoption	NBT at avoided costs	11.6 % 58 MW 2.7 % 7 MW	Federal and state, utility direct install for LMI/DAC MF customers	MF 44% LMI 56% Renter 46% 58% 42% 54%
	S3 Balanced	NBT above avoided costs but below retail rates	11.8 % 59 MW 2.1 % 6 MW	Federal and state, 7-yr payback utility incentive for LMI/DAC MF buildings	MF 41% LMI 55% Renter 43% 59% 37% 54%
	S4 High Adoption	NEM at retail rates	15.8 % 70 MW 2.0 % 6 MW	Federal and state, 5-yr payback utility incentive for all MF customers	MF 51% LMI 72% Renter 52% 67% 40% 47%
Hypothetical Feasibility	**S5** Direct Install	NEM at retail rates	10.0 % 48 MW 10.0 % 10 MW	Federal and state, utility direct install for all MF renter LMI/DAC customers	MF 51% LMI 92% Renter 54% 93% 53% 93%

1) *Theoretical modeled economic adoption*

2) *Percent of total adoption that occurs in each customer group*

Economic Analysis: Cost Tests

Societal Cost Test (SCT)	Society as a whole
Total Resource Cost (TRC)	City of Glendale
Participant Cost Test (PCT)	Net benefits for customer installing PV?
Utility Cost Test (UCT)	Will utility costs increase or decrease?
Ratepayer Impact Measure (RIM)	Will utility rates increase or decrease?

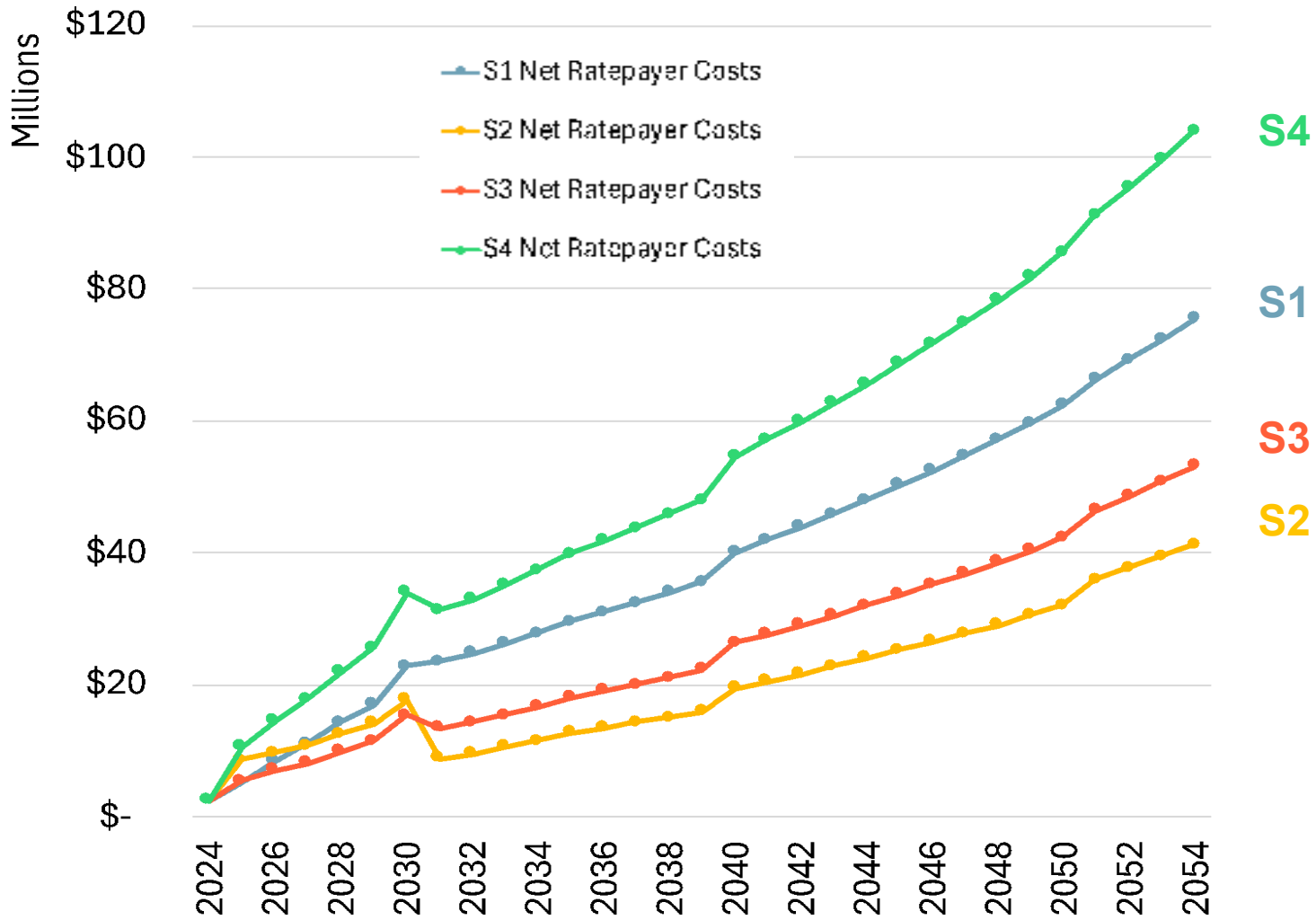
Economic Analysis of Scenarios: Cost Test Scores

$$\frac{\text{Benefits}}{\text{Costs}} \geq 1.0$$

	Participant Cost Test	Societal Cost Test	Ratepayer Impact Measure
S1 Continue Current NEM	3.04	1.87	0.28
S2 Targeted LMI/MF Adoption	2.16	2.09	0.45
S3 Balanced	2.25	2.11	0.39
S4 Widespread Adoption	3.04	2.17	0.29

Annual Net Ratepayer Costs

- **All scenarios have annual net ratepayer costs that increase GWP rates due to accelerating DER adoption**



Nameplate vs. Effective Peak Dispatchable & Peak Load-Reducing Capacity

DER Nameplate Capacity

- **100-152 MW**
- **Cumulative by 2027**
- **Best-case adoption forecast across all scenarios that will be further limited by real-world barriers**

×

DER Effective Load Carrying Capacity

Peak Dispatchabl	Peak Load Reducing
Customer Storage	Customer Solar
LDEV VGI*	LDEV Managed Charging
	Res & Com Demand Response
	Energy Efficiency*

=

DER Effective Capacity

- **20-44 MW**
- **Cumulative by 2027**
- **Best-case adoption forecast across all scenarios that will be further limited by real-world barriers**

Achieving 100 MW additional effective capacity, considering DER's ability to reduce GWP system peak demand, will require approximately 200-300 MW DER nameplate capacity coming online by 2027

- ***LDEV VGI**: Light-Duty Electric Vehicle Vehicle-Grid Integration - excluded due to its relatively low deployment level projection in the near term*
- ***Energy Efficiency**: peak saving forecasts are available from the GWP IRP, which are assumed to already account for capacity*

Community Outreach and Engagement

Stakeholder Participation		
Meeting 1	Wednesday, February 28th	In-Person
Meeting 2	Saturday, March 2nd	In-Person
Meeting 3	Monday, March 11th	Zoom Webinar
Meeting 4	Wednesday, May 15th	In-Person
Meeting 5	Thursday, May30th	In-Person

Community Outreach
✓ Two bill inserts & direct mail reminders
✓ Dedicated webpage
✓ Press releases
✓ Social media posts
✓ Email and text message blasts

Community Outreach and Engagement

Understanding Barriers to DER Adoption

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

Energy+Environmental Economics

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

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

Environmental Justices & Equity

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?

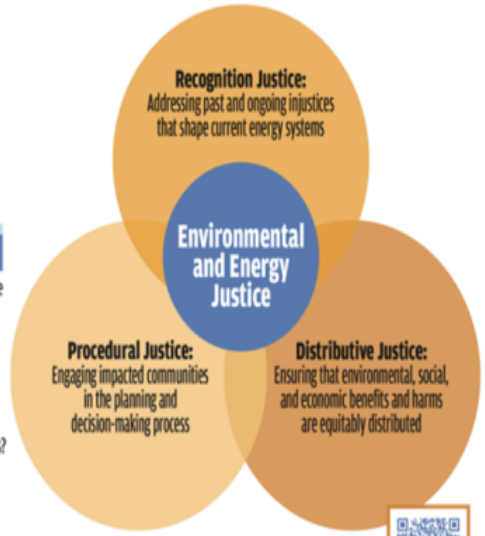
Energy Burden by Income Bracket: What share of a customer's monthly income is spent on electricity?

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



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

Community Outreach and Engagement

Glendale Local Press Coverage

Glendale News-Press

NEWS ▾ BUSINESS ▾ CHARITIES & FUNDRAISERS EVENTS ▾ SCHOOLS & YOUTH

Home › City News › Glendale Water and Power Talks Highlight Solar Panel Costs, Permits

Glendale Water and Power Talks Highlight Solar Panel Costs, Permits

By **Kennedy Zak** March 18, 2024 0

Facebook Twitter WhatsApp

Glendale Water and Power's first community meeting on solar adoption was held on Feb. 28 at the city's Adult Recreation Center, where residents shared their thoughts with city staff and consultants. - Photo courtesy Glendale Water and Power

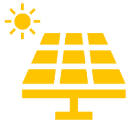
Community Meeting #1

Presenter: Jun Zhang

Community Meeting #5

Presenter: Eric Cutter

Findings: Achieving the adoption goals by 2027 is not feasible



Achieving a goal of 10% customer solar adoption by 2027 is not feasible. The goal is theoretically feasible by 2030 with a significant increase in utility costs and effort, but real-world barriers remain.

Achieving a goal of 10% customer storage adoption in the near future is not feasible.

Achieving a goal of 100 MW of reliable peak load reduction with DERs is not feasible.

Industry studies suggest that achievable potential is 20%-40% of the technical potential.

Recommendations

- Set an adoption goal in terms of MW of installed capacity rather than a percentage of customers.
- Perform additional analyses of realistically achievable potentials for customer-owned, community, and utility-scale solar and storage.
- Develop an integrated resource plan with the potential and MW targets for each resource type.

Findings: Adoption of customer-owned solar and storage increases GWP rates

The scenarios achieving 10% solar adoption would result in a projected net cost of $23-$45 million to GWP ratepayers from 2024 to 2027.

The resulting rate increase would be 6-11% by 2030, with a low- and moderate-income (LMI) customer monthly bill increase of $4-$6.

Recommendations

- Implement a Net Billing Tariff to reduce the cost shift.
- Develop and implement non-bypassable charges and fixed customer charges to reduce the cost shift.
- Evaluate the cost and feasibility of changes to GWP's billing and metering systems needed to implement a Net Billing Tariff.

Recommendations and Next Steps

City of Glendale City Council

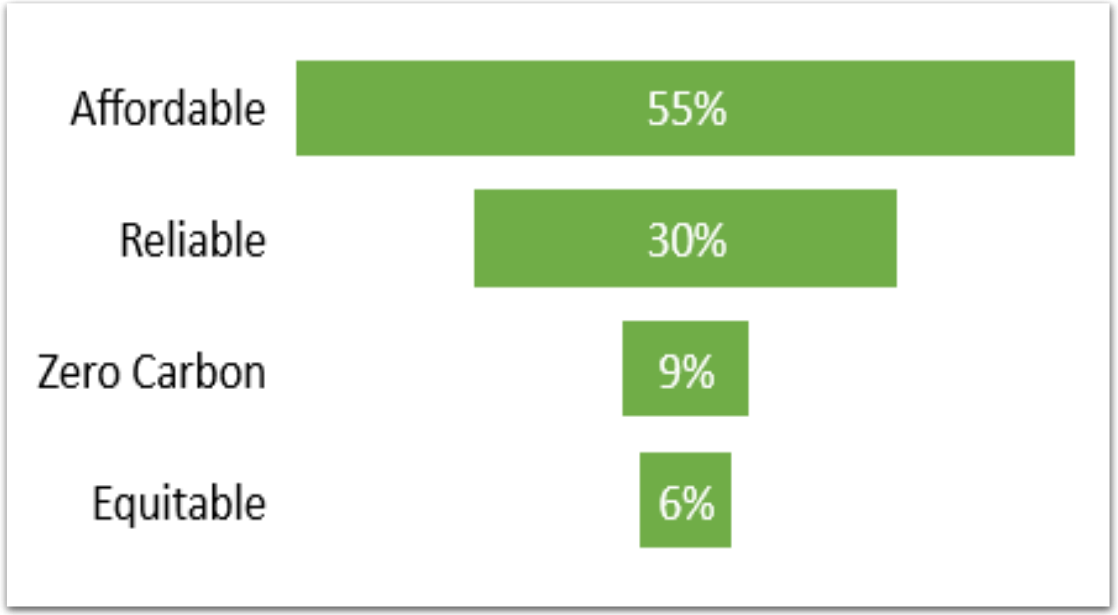
November 19, 2024

Ruzan Soloyan – Clean Energy Officer
City of Glendale Water & Power

City of Glendale Water & Power
Your Trusted Community Utility

GWP Customer Survey (Over 2,000 Customer Responses)

Top Priorities of GWP Customers



Customer Quotes

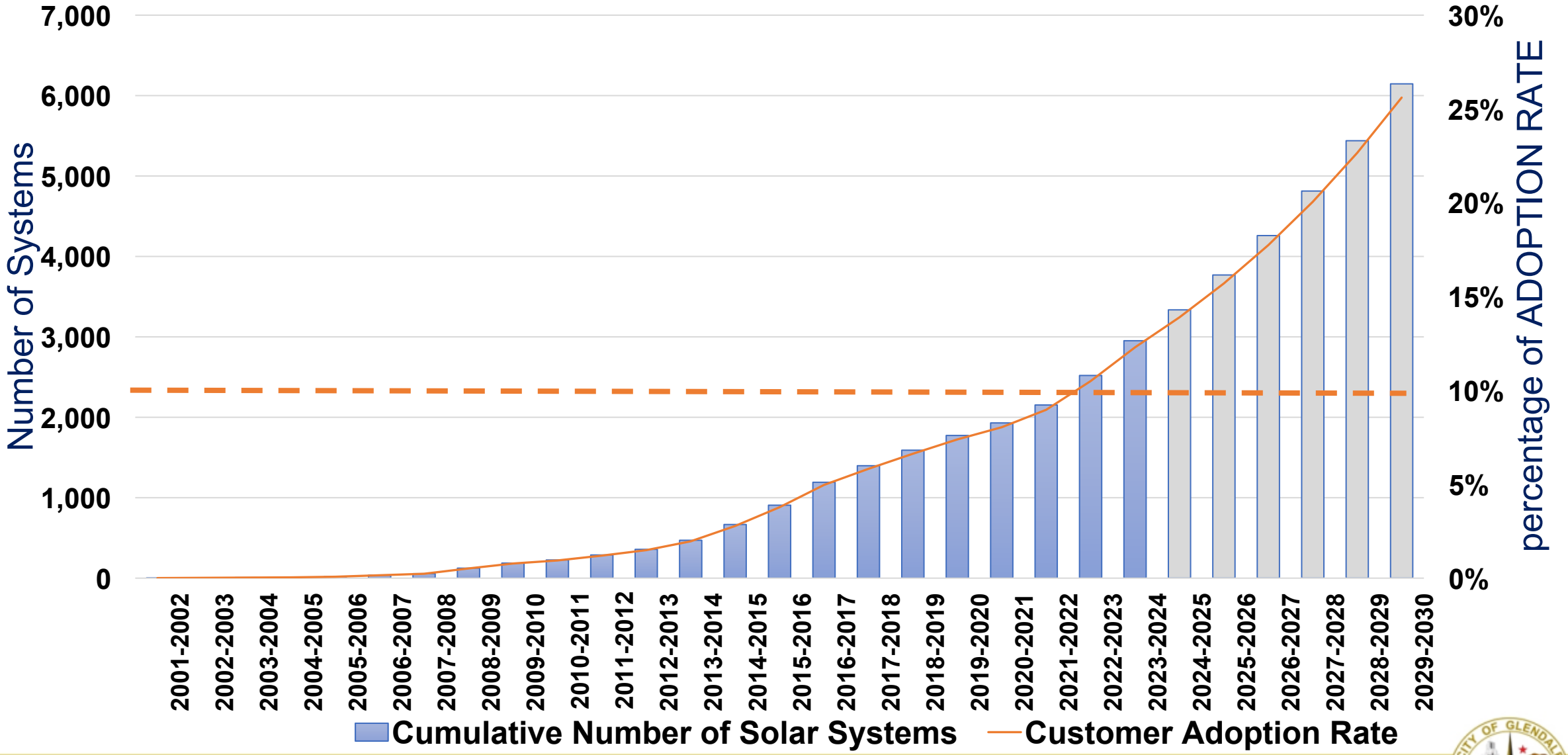
"My concern is reliable, affordable and locally generated electricity so my bills stop going up and in case of a natural disaster our power is not interrupted."

"Utility rates should not increase to achieve these goals."

"This should not by any means raise rates for tenants who can't have access to this or forced to pay more in electricity when landlords keep raising rates like we are all making money when the truth is a lot are scraping by."

"How much will the bills of those of us who decline to install solar go up in order to implement these plans? Assuming that they, like the trash collection fees, will go up, how much of those funds will actually be spent on "green" technology vs. to pay consultants and private contractors?."

Residential Single-Family Solar Installations and Projections



Solar Adoption Projections in Glendale by 2030

Customer Class	Number of Connections	Current Generation Capacity (MW)	Projected Generation Capacity (MW) by 2030
Residential Single Family	24,234	18.1	35
Non-Residential	9,869	11.2	15
Total Customer Owned Solar	**87,281**	**29.3**	**50**
Utility Owned Solar (Phase 1 & 2)	-	0	*8**
Power Purchase Agreements	-	0	*2**
Total Solar Capacity	-	**29.3**	**~ 60****
Additional Achievable Energy Efficiency Savings on Peak (Proposed Programs)	-	-	Additional analysis pending for proposed EE programs

* In Progress

** 15% of Forecasted (380 MW) Total Peak Demand

Proposed Programs

1. In-System Solar Power Purchase Agreement (PPA) Program
   - *Proposed launch in November 2025*
   - Guarantee long-term rate and better understanding of ROI
   - Looking at providing location-specific incentives for using underutilized space

2. Comprehensive Residential Energy Efficiency Rebate Program
   - *Proposed launch in August 2025*
   - Offer more rebates for energy efficiency measures to support the adoption of distributed energy resources.
   - Lower upfront costs could help customers adopt above-code technology.

3. Comprehensive Energy & Water Assessments, Installations & Concierge Services
   - *Proposed launch in January 2026*
   - Offer comprehensive energy & water assessments & direct installations
   - Provide concierge services to identify additional incentives and tax credits

Recommendations

1. Accept the findings of the E3 study to inform GWP's strategic direction.

2. Amend Resolution No. 22-125 as follows to support affordability and reliability of energy services:
    - Implement a target of 60 MW of solar generating capacity by 2030 in lieu of 100 MW peak dispatchable capacity, which was determined to be infeasible by the E3 study
    - Approve the development of the following programs to enhance energy efficiency and reduce peak demand:
        - In-System Solar Power Purchase Agreement (PPA) Program
        - Comprehensive Residential Energy Efficiency Rebate Program
        - Comprehensive Energy and Water Assessments, Installations, and Concierge Services

3. Approve the amendment to the existing PSA with E3 to increase the total amount by $52,330, to a new total not to exceed amount of $388,205.

Questions?

City of Glendale Water & Power

Your Trusted Community Utility