Plan to Increase Solar Adoption and Develop Additional Distributed Energy Resources

October 7, 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

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

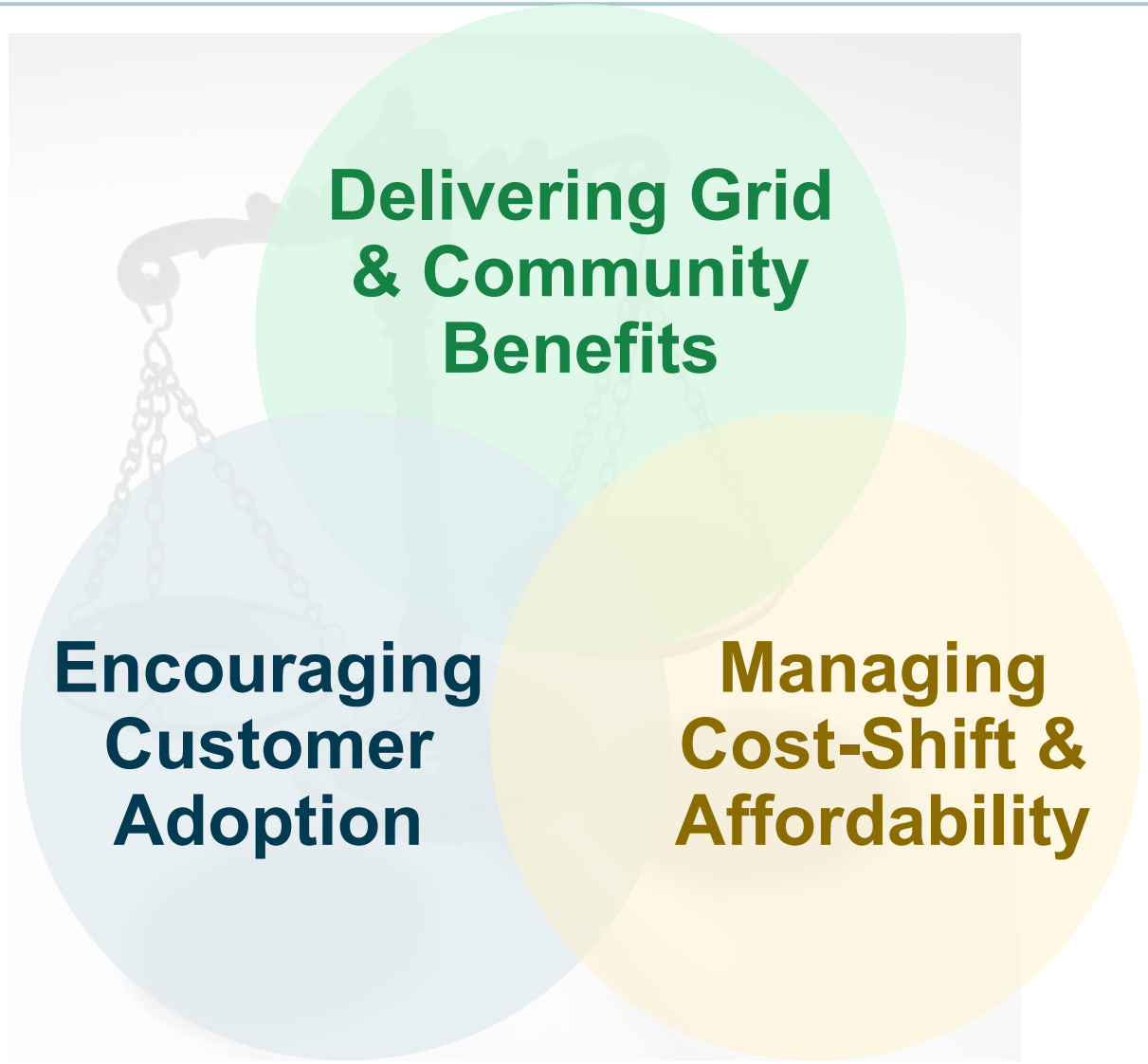
Category 2

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

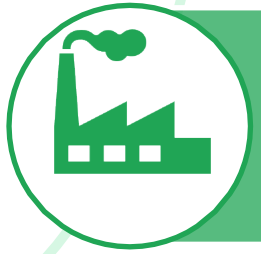
IRP Planning Challenges

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

Opportunities

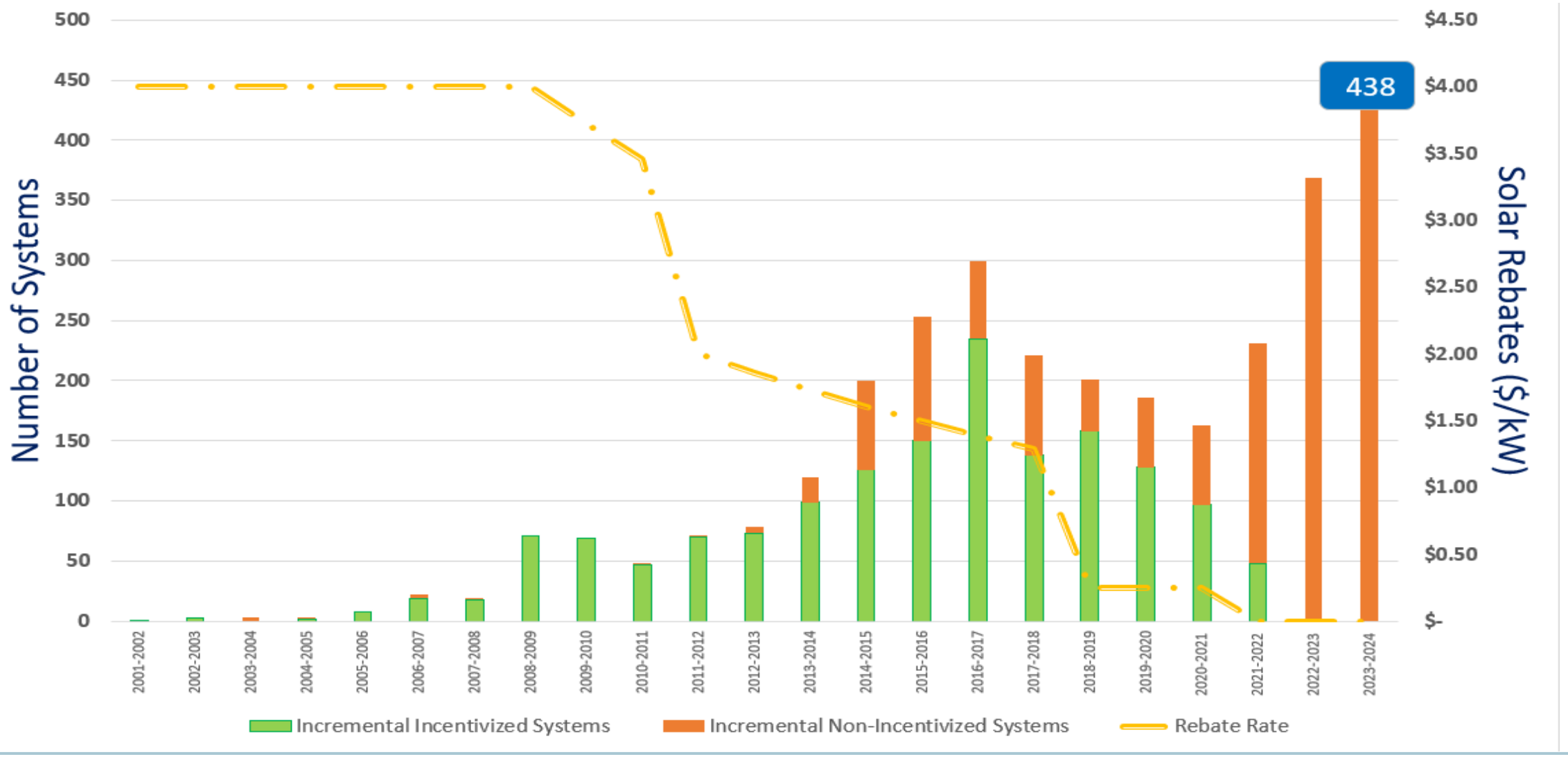
Maintaining leadership in clean and renewable energy

Unlocking more local generation

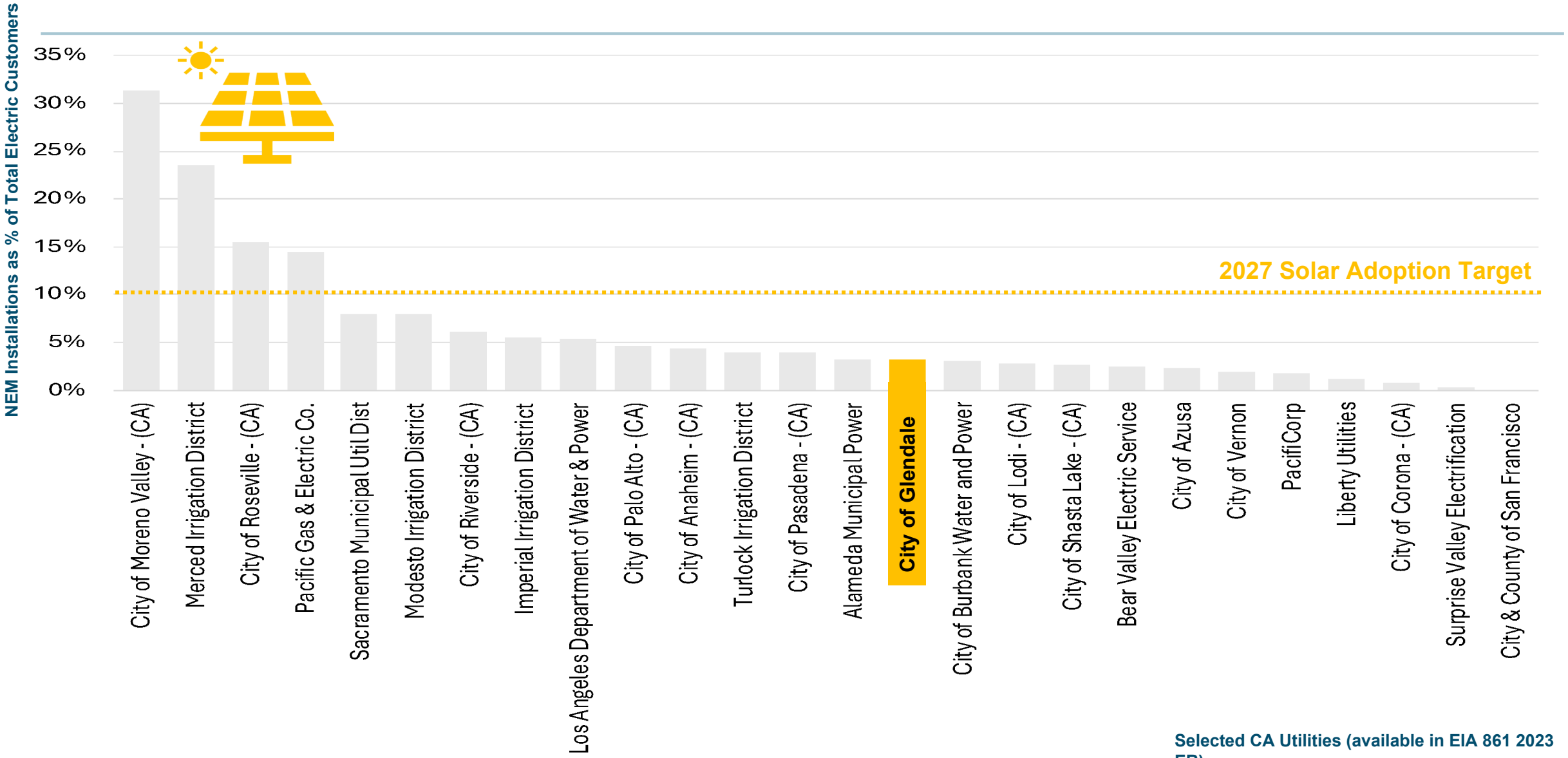


Reducing fossil generation (Grayson Repower, etc.)

Solar Adoption and Rebate Trends: 2001 - 2024



Solar Installations of California Utilities



Selected CA Utilities (available in EIA 861 2023 ER)

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/

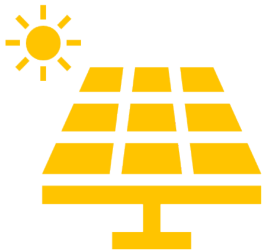
Energy Storage Installations of California Utilities

Selected CA Utilities (available in EIA 861 2023 ER)

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

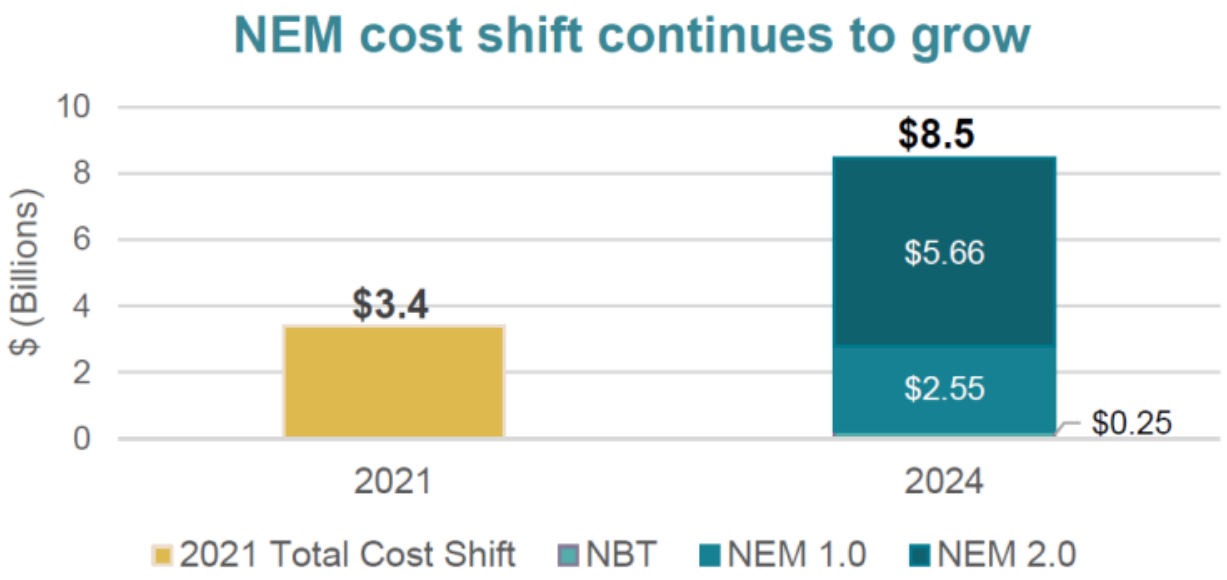
Utility Costs Not Avoided by Solar

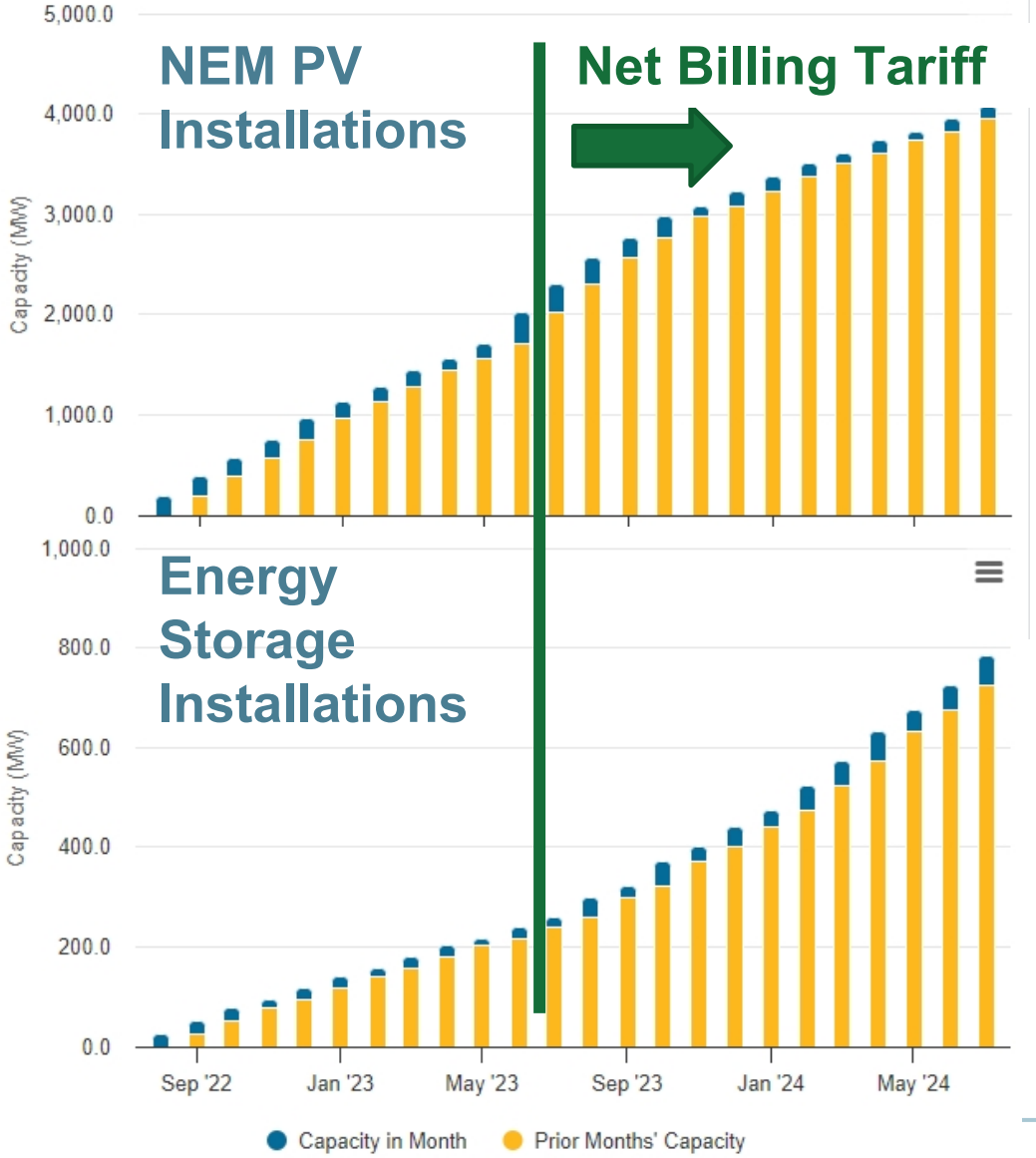
Utility Costs Avoided by Solar

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

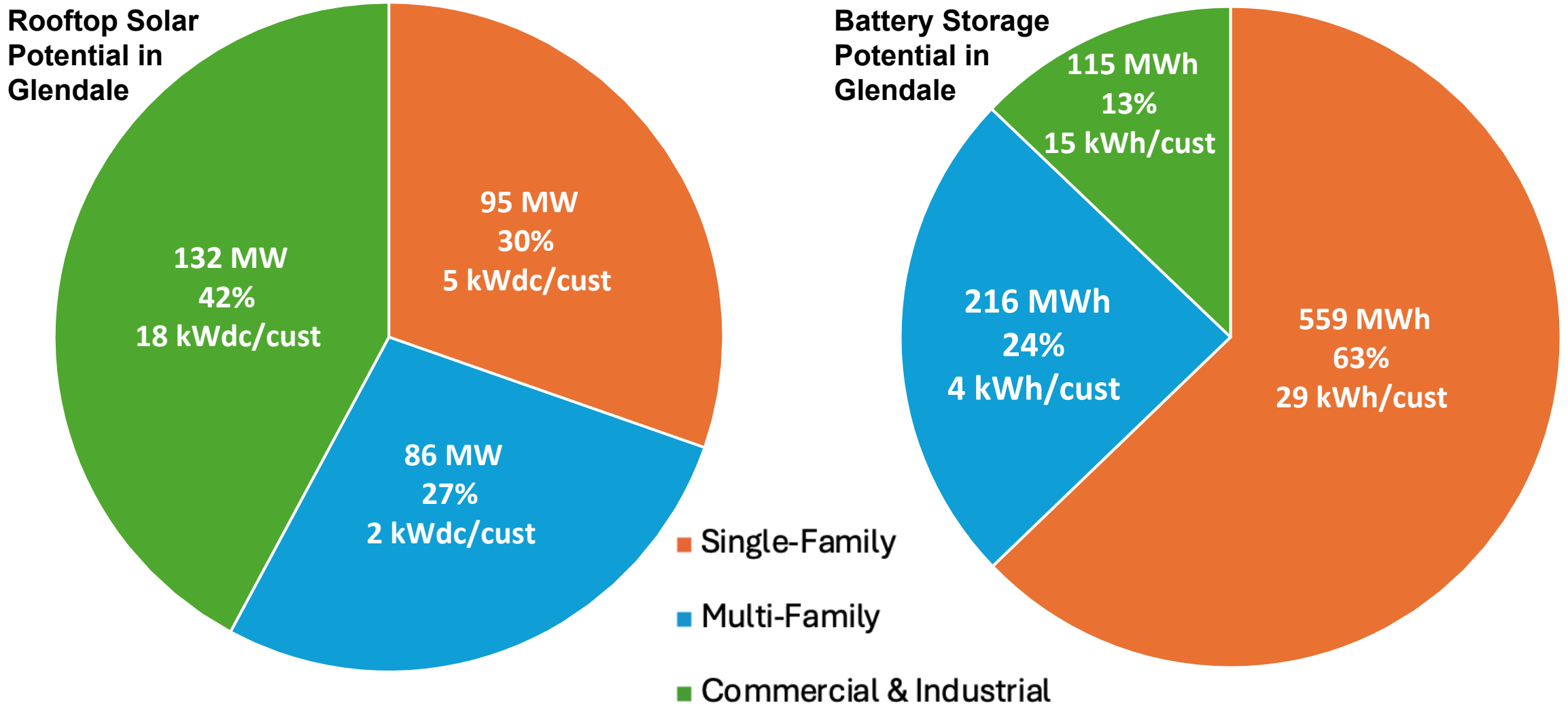
	Total # of Units	# of Solar-Suitable Units	Total PV Capacity (MW)	Total Battery Storage Capacity (MWh)	Total Battery Dispatch Capacity (MW)
Single-Family	23,843	19,046	95	559	279
Multi-Family	61,201	49,130	86	216	108
Commercial & Industrial	9,474	7,491	132	115	57

	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 25 mild case. Omits sites that could not be categorized.

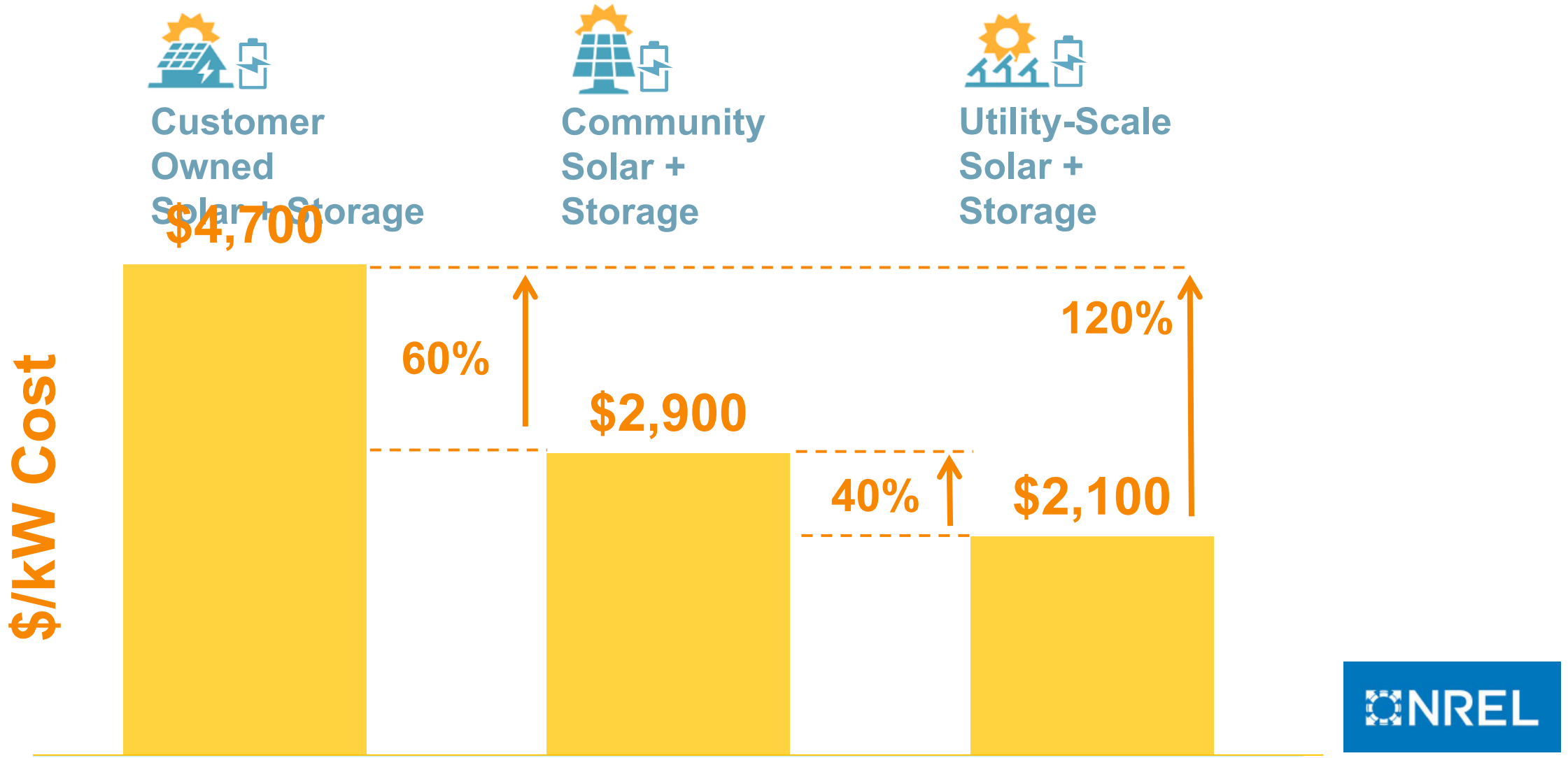
Solar and Storage Technical Potential by Customer Sector

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*

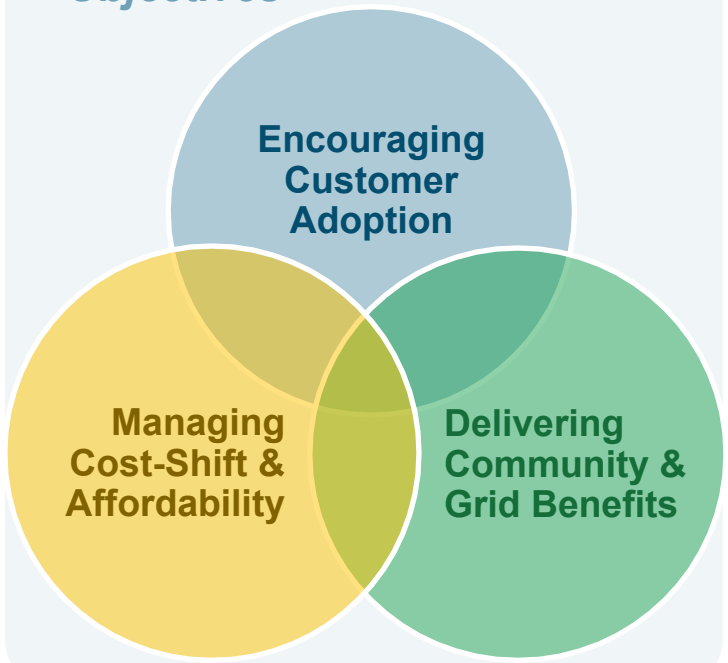
Scenario Evaluation Approach

- **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 LMI: 5% / Renter: 12% / 11% 0% / 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 LMI: 10% / Renter: 10% / 16% 13% / 22% / 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 LMI: 44% / Renter: 46% / 42% 56% / 58% / 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 LMI: 41% / Renter: 43% / 37% 55% / 59% / 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 LMI: 51% / Renter: 52% / 40% 72% / 67% / 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 LMI: 51% / Renter: 54% / 53% 92% / 93% / 93%

1) *Theoretical modeled economic adoption*

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

Economic Analysis: Cost Tests

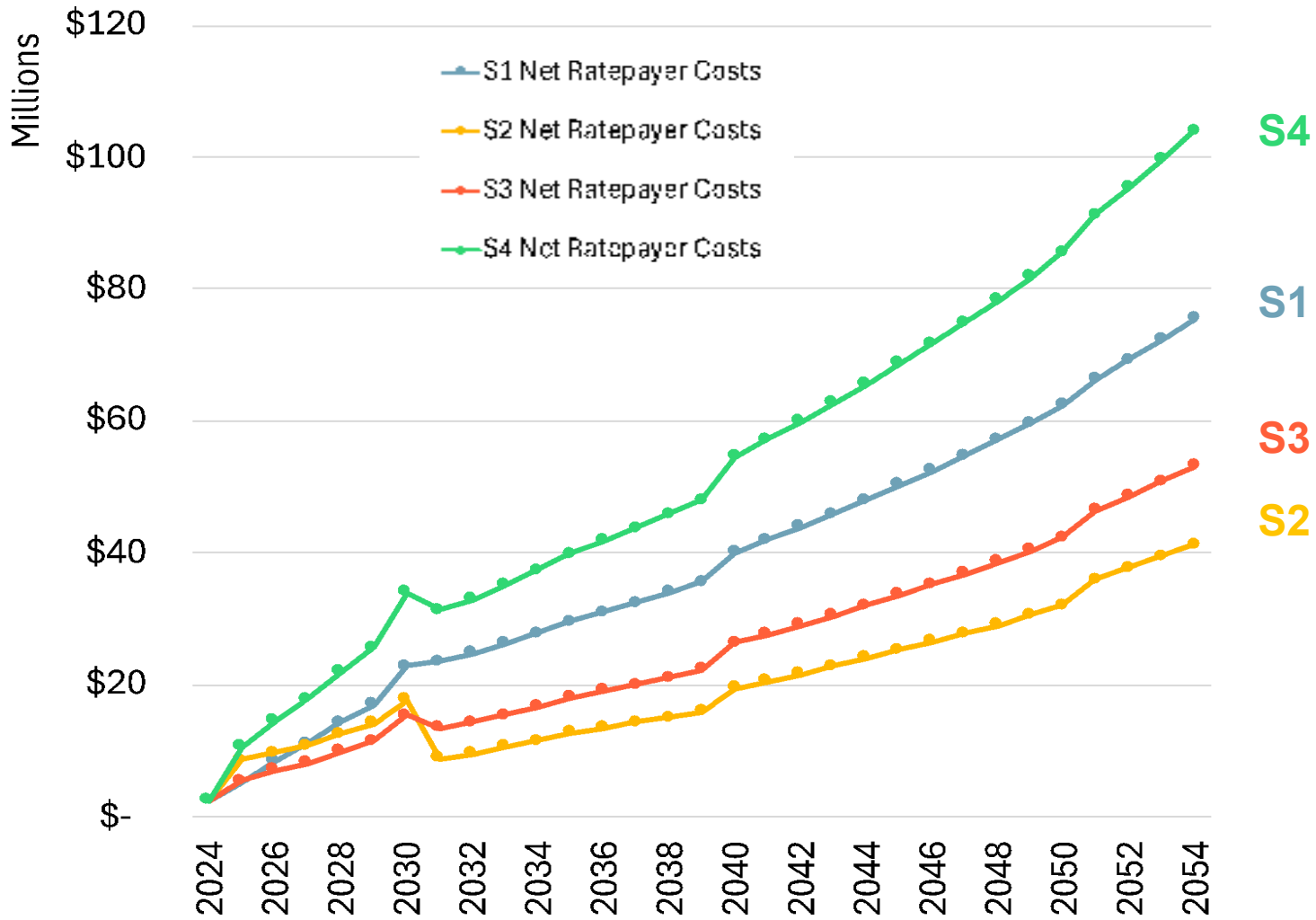
Societal Cost Test (SCT)	Society as a whole
Total Resource Cost (TRC)	City of Glendale
Participant Cost Test (PCT)	Net benefits for customer installing PV?
Utility Cost Test (UCT)	Will utility costs increase or decrease?
Ratepayer Impact Measure (RIM)	Will utility rates increase or decrease?

Economic Analysis of Scenarios: Cost Test Scores

	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 High 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**



Can the City Council's Goals Be Met By 2027?

Can we reach 10% customer solar adoption by 2027?

- Theoretically possible but at a cost to GWP ratepayers between $23-$45 million from 2024 to 2027. This estimate accounts only for bill savings, utility incentives, and avoided costs.
- Electric rates would increase 4%-8% by 2027, in addition to other expected increases.
- The adoption level results will be further limited by implementation barriers, customer adoption behavior, and other financial and non-economic barriers that customers face. As a result, we expect utility program costs to be higher to account for those factors.

Can we reach 10% customer storage adoption by 2027?

- Not feasible considering current upfront costs and storage attachment rates in California.

Can we reach 100 MW dispatchable and peak load reduction capacity by 2027?

- Adoption of 200-300 MW nameplate capacity to achieve an effective capacity of 100 MW is not feasible.

Study Findings

- **All scenarios evaluated involve a significant increase in average electric rates**
  - Total present value costs to GWP ratepayers of the four scenarios evaluated range from $200-$500 million for systems adopted between 2024-2030
  - Expected annual cost shifts in 2030 are projected to be $15-$35 million, resulting in a rate increase of 6-11% and an increase of $4-$6/month in low- and moderate-income customer bills
  - Incentives are subject to PBC funds and Proposition 26 cost of service rules
- **Additional research is necessary to assess realistically achievable potential for the City and what program elements can increase that potential in Glendale. Industry studies suggest that achievable potential is 20-40% of the technical potential.**
  - Real-world barriers that limit achievable potential include customer awareness, uncertainty and risk aversion, split-incentives, policy constraints, access to financing and permitting, and interconnection and installation timelines.

Recommendations and Next Steps

Glendale Water & Power Commission

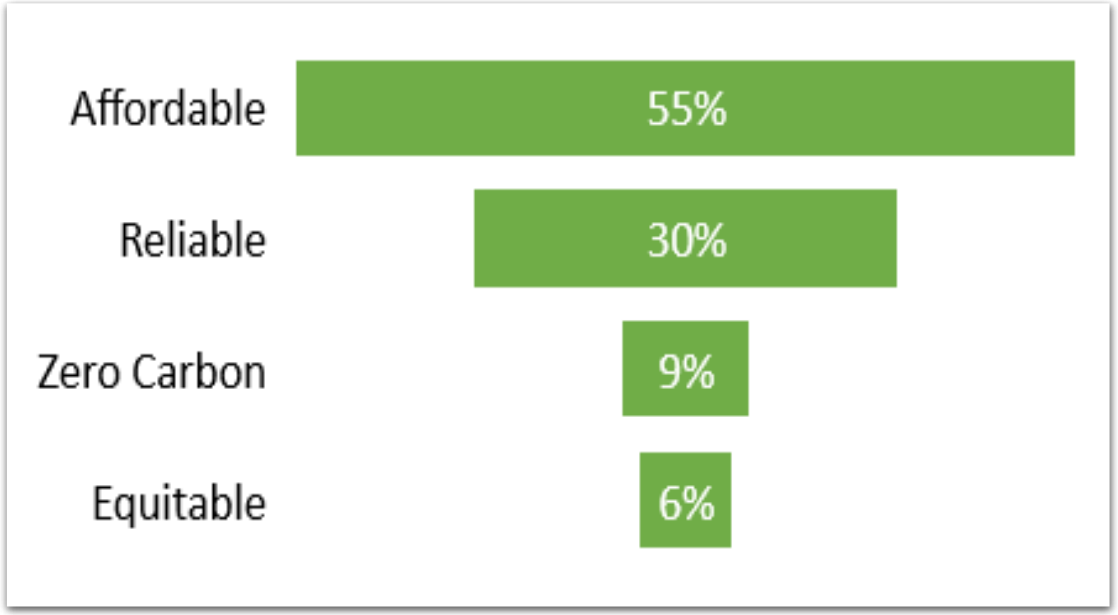
October 7, 2024

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

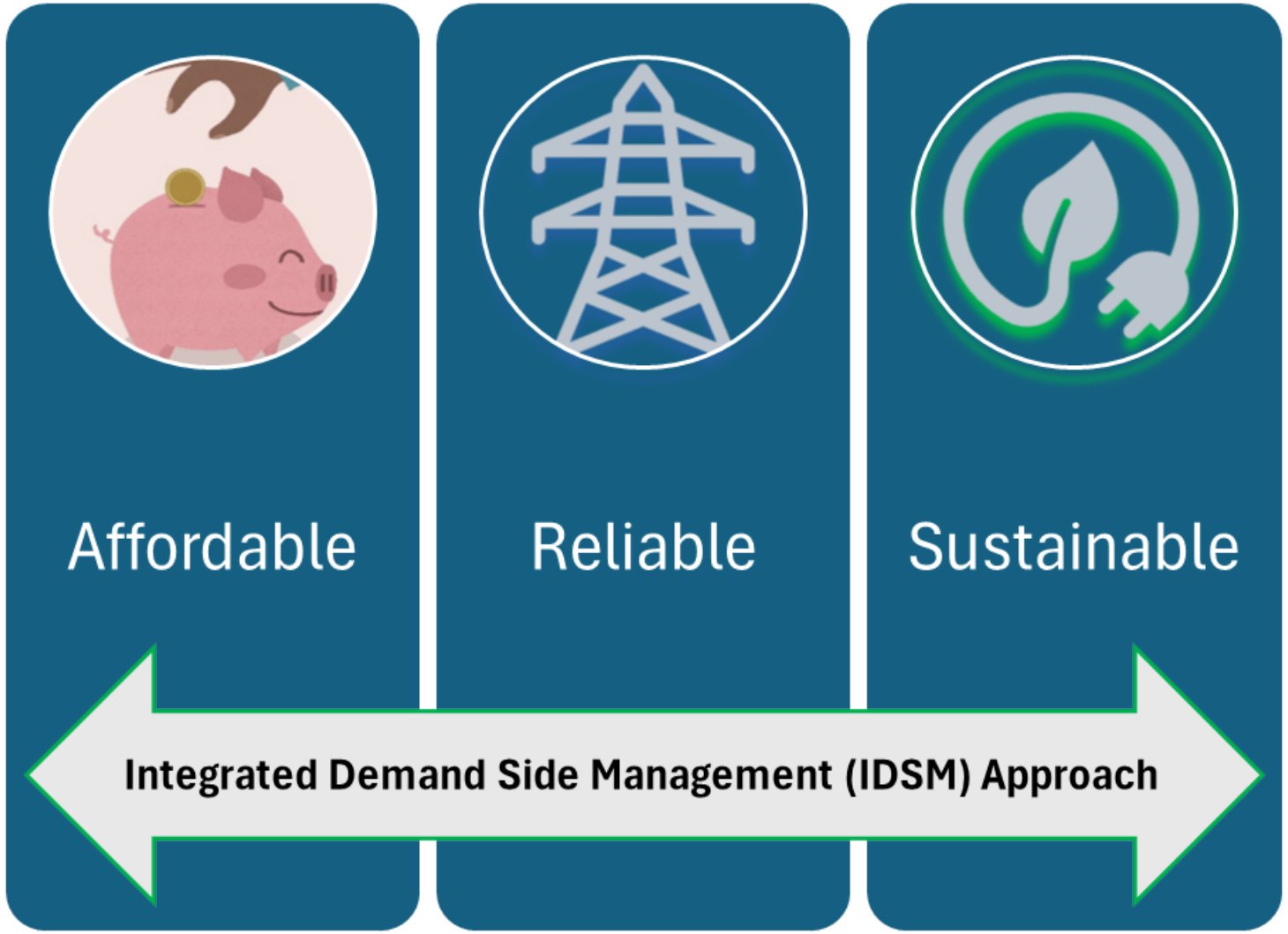
"My concern is reliable, affordable and locally generated electricity so my bills stop going up and in case of a natural disaster our power is not interrupted."

"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?."

GWP's Priorities

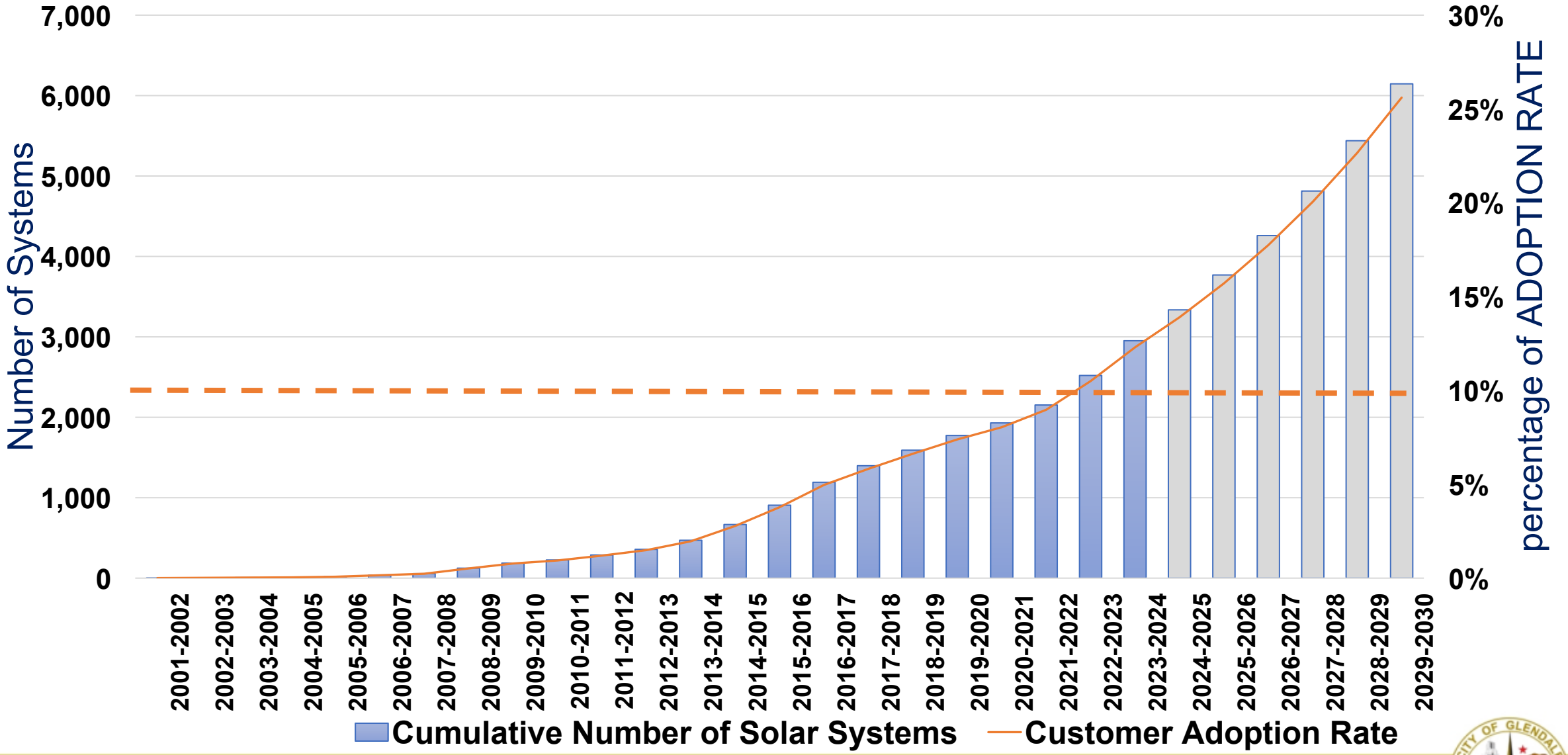


Current Solar Adoption Overview Within Glendale

Customer Class	Number of Connections	Solar Systems Installed	Adoption Rate	Generation Capacity (MW)
Single Family	24,234	2,952	12.2%	18.1
Multi-Family	53,178	0	0.0%	0.0
Non-Residential	9,869	125	1.3%	11.2
Total Customer Owned Solar	**87,281**	**3,077**	**3.5%**	**29.3**
Utility Owned Solar (Existing & Phase 1)	-	-	-	*5.1**
Power Purchase Agreements	-	-	-	*1.3**
Total Solar Capacity	-	-	-	**35.7 (~10%)**

* In Progress

Residential Single-Family Solar Installations and Projections



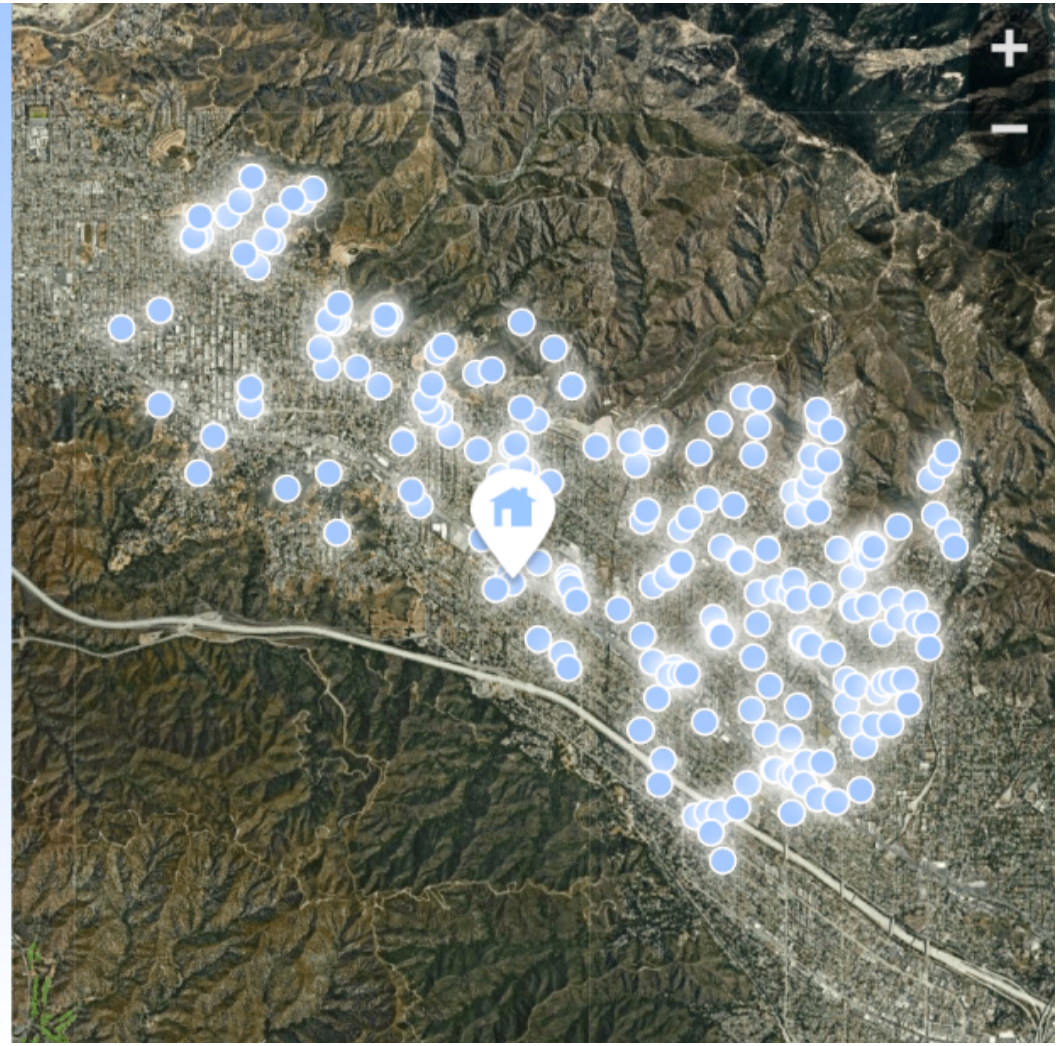
Customer Experience
(GWP does not endorse any companies mentioned)

Sunrun Neighbors

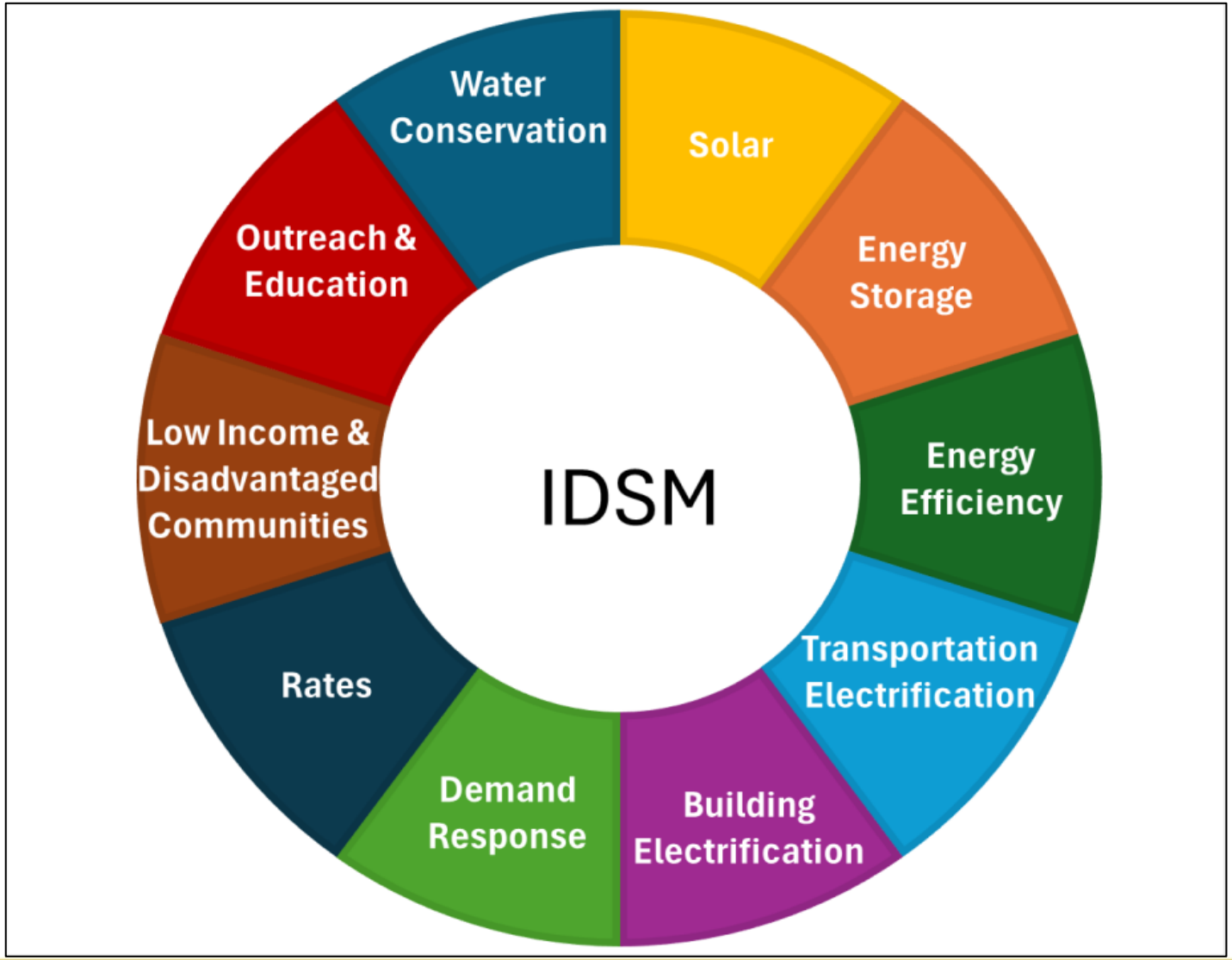
24,180
Neighbors
near Glendale

Showing homes within a 25 mile radius of your address that have gone solar with Sunrun.

** Showing pins for the first 200 nearby customers.*



GWP's Integrated Demand Side Management Approach



GWP's Integrated Demand Side Management Approach

Outreach and Education

Build a relationship with our customers through trust and competency

Educate customers on our programs and initiatives to help transition to cleaner technologies

Learn more about our customers to provide services that better meet their needs

Additional outreach on federal and state support (IRA, SGIP, etc.) and external funds for the community

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GWP's Integrated Demand Side Management Approach

Water Conservation

In-System Power Purchase Agreement (PPA)

- Guaranteed price
- Maximize site's solar potential

Benefits:

- Increased investment in renewables
- Long-term contract/ guarantee supply
- Development of underutilized surfaces

Possible Concerns:

- Locked in price

Program Improvements

Program Sizing Constraints

Remove 4.2 MW program cap

Remove 1.4 MW system cap

Long-Term Rate Guarantees

Current rate changes quarterly

Location-Specific Incentives

for using underutilized space

In-System PPA Program Timeline and Phases

PROJECT PHASE / APPROXIMATE DURATION	Dec 24	Jan 25	Feb 25	Mar 25	Apr 25	May 25	Jun 25	Jul 25	Aug 25	Sep 25	Oct 25	Nov 25	Dec 25	Jan 26	Feb 26
1. Pilot Project Approval & Completion															
2. Approval of Expanded Program															
3. Drafting and Issuance of RFP															
4. Selection of Project(s)															
5. Contract(s) Execution															

Comprehensive Residential Rebate Program

Energy Efficiency

- Offering more rebated energy efficiency measures can significantly support the adoption of distributed energy resources.
- Lower upfront costs could help customers adopt above-code technology.

Benefits:

- Reduced overall energy demand
- Improved grid resiliency and management
- Increased affordability and accessibility

Possible Concerns:

- Budget and funding
- Resources to process more program applications

Comprehensive Residential Rebate Program Timeline & Phases

PROJECT PHASE / APPROXIMATE DURATION	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25
1. Research, Analysis, & Measures List									
2. Benefit Cost Analysis to Determine Incentive Levels									
3. Program Application, Guidelines, T&C, & FAQs									
4. Obtain Expanded Program Approvals									
5. Marketing Materials, Website, & Collateral									
6. Program Launch & Implementation									

Comprehensive Energy & Water Assessments, Installations & Concierge Services

Energy Efficiency

More comprehensive energy & water assessments as well as direct installations

Benefits:

- Reduced overall energy demand
- Improved grid resiliency and management
- Increased affordability and accessibility

Possible Concerns:

- Budget and funding

Comprehensive Energy-Water Assessments, Installations & Concierge Services - Timeline & Phases

PROJECT PHASE / APPROXIMATE DURATION	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25	Jan-26
1. Research, Analysis, & Measures List														
2. Benefit Cost Analysis														
3. Program Application, T&C, & FAQs														
4. Obtain Expanded Program Approvals														
5. Issue an RFP and Select a Contractor														
6. Marketing Materials, Website, & Collateral														
7. Program Launch & Implementation														

Recommendations

1. **Accept the E3 Study Findings:** Staff recommends that the GWP Commission endorse the E3 study findings for Council approval, as they reveal significant ratepayer impacts that deem the analyzed initiatives not feasible.

2. **Path Forward for New Program Development:** Staff recommends that the GWP Commission endorse the following three proposed programs for Council approval, aimed at enhancing energy demand management and supporting our clean energy future:
    I. In-System Power Purchase Agreement
    II. Additional Rebates and Marketing for Energy Efficient Measures
    III. Customer “Concierge Service” Assessing Energy & Water Savings Opportunities and Available Incentives

Questions?

City of Glendale Water & Power

Your Trusted Community Utility