CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

Last modified: 2024/6/20
Revision: 1.0

2022 CODE CYCLE:

Custom Cost Effectiveness Analysis:

City of Glendale - Multifamily New Construction

Prepared by:
Frontier Energy, Inc
Misti Bruceri & Associates, LLC

Prepared for:
Kelly Cunningham, Codes and Standards Program, Pacific Gas and Electric

Pacific Gas and Electric Company
SOUTHERN CALIFORNIA EDISON Energy for What's Ahead
SDGE

Legal Notice

Acronym List

B/C – Benefit-to-Cost Ratio

CBECC - California Building Energy Code Compliance

CBSC - California Building Standards Commission

CEC - California Energy Commission

CZ – Climate Zone

GHG - Greenhouse Gas

IOU – Investor-Owned Utility

POU – Publicly Owned Utility

PG&E – Pacific Gas & Electric (utility)

SCE – Southern California Edison (utility)

SCG – Southern California Gas (utility)

SDG&E – San Diego Gas & Electric (utility)

CPAU – City of Palo Alto Utilities

LADWP – Los Angeles Department of Water and Power

kWh – Kilowatt Hour

NPV – Net Present Value

PV - Solar Photovoltaic

TDV - Time Dependent Valuation

Title 24 – California Code of Regulations Title 24, Part 6

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 Introduction

The California Codes and Standards (C&S) Reach Codes program provides technical support to local governments considering adopting a local ordinance (reach code) intended to support meeting local and/or statewide energy efficiency and greenhouse gas reduction goals. The program facilitates adoption and implementation of the code when requested by local jurisdictions by providing resources such as cost-effectiveness studies, model language, sample findings, and other supporting documentation.

The California Building Energy Efficiency Standards Title 24, Part 6 (Title 24) (CEC, 2022) is maintained and updated every three years by two state agencies: the California Energy Commission (the Energy Commission) and the Building Standards Commission (BSC). In addition to enforcing the code, local jurisdictions have the authority to adopt local energy efficiency ordinances—or reach codes—that exceed the minimum standards defined by Title 24 (as established by Public Resources Code Section 25402.1(h)2 and Section 10-106 of the Building Energy Efficiency Standards). Local jurisdictions must demonstrate that the requirements of the proposed ordinance are cost-effective and do not result in buildings consuming more energy than is permitted by Title 24. In addition, the jurisdiction must obtain approval from the Energy Commission and file the ordinance with the BSC for the ordinance to be legally enforceable.

This report is an addendum to the 2022 Multifamily New Construction Cost-effectiveness Study (Statewide Reach Codes Team, 2023) modified to accurately represent the City of Glendale, California. The study analyzes cost-effectiveness of measures and measure packages that exceed the minimum state requirements, the 2022 Building Energy Efficiency Standards, effective January 1, 2023, in newly constructed buildings. This report was developed in coordination with the California Statewide Investor-Owned Utilities (IOUs) Codes and Standards Program, key consultants, and engaged cities - collectively known as the Reach Codes Team.

Two multifamily prototypes were evaluated in this study. A 3-story loaded corridor and a 5-story mixed use prototype, which combined are estimated to represent 91 percent of new multifamily construction in California. The methodology, prototype characteristics, and measure packages are retained from the main studies referenced above except for the energy costs are calculated using local Glendale Water and Power (GWP) utility rates. Measure packages include combinations of energy efficiency, electrification, solar photovoltaics (PV), and battery storage with results evaluated for California Climate Zone 9.

This report presents measures or measure packages that local jurisdictions may consider adopting to achieve energy savings and emissions reductions beyond what will be accomplished by enforcing minimum state requirements, the 2022 Building Energy Efficiency Standards (Title 24, Part 6), effective January 1, 2023.

Local jurisdictions may also adopt ordinances that amend different Parts of the California Building Standards Code or may elect to amend other state or municipal codes. The decision regarding which code to amend will determine the specific requirements that must be followed for an ordinance to be legally enforceable. Although a cost-effectiveness study is only required to amend Part 6 of the CA Building Code, it is important to understand the economic impacts of any policy decision. This study documents the estimated costs, benefits, energy impacts and greenhouse gas emission reductions that may result from implementing an ordinance based on the results to help residents, local leadership, and other stakeholders make informed policy decisions.

Model ordinance language and other resources are posted on the C&S Reach Codes Program website at LocalEnergyCodes.com. Local jurisdictions that are considering adopting an ordinance may contact the program for further technical support at info@localenergycodes.com.

Summary of Revisions

Date	Description	Reference (page or section)
6/20/2024	Original Release	-

2 Methodology and Assumptions

The Reach Codes Team analyzed the 3-story and 5-story prototypes to represent a variety of common building types using the cost-effectiveness methodology detailed in this section below. The general methodology is consistent with the statewide study, any differences are described below.

1. Utility costs were calculated using local GWP electricity rates. SoCalGas gas rates were updated to reflect rates through April 2024.
2. Energy models were updated to a recent version of California's Building Energy Code Compliance (CBECC) software, CBECC 2022.3.1.
3. The PV capacities were resized to offset annual building electricity use and avoid oversizing which would violate net energy metering (NEM) rules.
4. A new package was evaluated that included larger battery capacity building on the 5-story mixed fuel efficiency + PV package.
5. A new package was evaluated where the solar fraction was increased for the gas boiler system with solar thermal building on the 5-story mixed fuel + efficiency package.

2.1 Reach Codes

This section describes the approach to calculate cost-effectiveness including benefits, costs, metrics, and utility rate selection.

2.1.1 Benefits

This analysis used both on-bill and time dependent valuation (TDV) of energy-based approaches to evaluate cost-effectiveness. Both on-bill and TDV require estimating and quantifying the energy savings and costs associated with energy measures. The primary difference between on-bill and TDV is how energy is valued:

- On-Bill: Customer-based lifecycle cost approach that values energy based upon estimated site energy usage and customer on-bill savings using electricity and natural gas utility rate schedules over a 30-year duration for residential and 15 years for nonresidential designs, accounting for a three percent discount rate and energy cost inflation per Appendix 7.2.3.
- TDV: TDV was developed by the Energy Commission to reflect the time dependent value of energy including long-term projected costs of energy such as the cost of providing energy during peak periods of demand and other societal costs including projected costs for carbon emissions and grid transmission impacts. This metric values energy use differently depending on the fuel source (gas, electricity, and propane), time of day, and season. Electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods.

The Reach Codes Team performed energy simulations using California's Building Energy Code Compliance Software (CBECC 2022.3.1) for 2022 Title 24 code compliance analysis.

2.1.2 Costs

The Reach Codes Team assessed the incremental costs and savings of the energy packages over the lifecycle of 30 years for the multifamily buildings. Incremental costs represent the equipment, installation, replacement, and maintenance costs of the proposed measure relative to the 2022 Title 24 Standards minimum requirements or standard industry practices. The Reach Codes Team obtained measure costs from manufacturer distributors, contractors, literature review, and online sources such as Home Depot and RS Means. Taxes and contractor markups were added as appropriate. Maintenance and replacement costs are included where appropriate.

The new mixed fuel package with a larger solar thermal water heating system required developing incremental costs for a 35% solar fraction collector relative to a 20% solar thermal fraction collector. Table 1 reports these costs for the

5-story prototype. Costs include equipment and labor. Replacement costs are based on an effective useful life of 20 years for the solar thermal collectors. For the solar thermal systems, it's also assumed that the glycol is replaced at years 9, 18 and 27. Please see the main 2022 Multifamily New Construction Cost-effectiveness Study (Statewide Reach Codes Team, 2023) and the 2022 Multifamily All-Electric Codes and Standards Enhancement (CASE) report (Statewide CASE Team, 2020c) for further details on cost assumptions.

Table 1. Incremental Costs for Larger Solar Thermal System (Present Value (2023$))

Item	5-Story 35% vs 20% solar thermal fraction	Source & Notes
First Cost	$21,720	Costs based on component costs from the 2022 Multifamily All-Electric CASE Report.
Replacement Cost	$9,431	
Total Incremental Cost	$31,151	
Incremental Cost per Dwelling Unit	$354	

2.1.3 Metrics

Cost-effectiveness is presented using net present value (NPV) and benefit-to-cost (B/C) ratio metrics.

- NPV: The Reach Codes Team uses net savings (NPV benefits minus NPV costs) as the cost-effectiveness metric. If the net savings of a measure or package is positive, it is considered cost effective. Negative net savings represent net costs to the consumer. A measure that has negative energy cost benefits (energy cost increase) can still be cost effective if the costs to implement the measure are even more negative (i.e., construction and maintenance cost savings).
- B/C Ratio: Ratio of the present value of all benefits to the present value of all costs over 15 years (NPV benefits divided by NPV costs). The criterion for cost-effectiveness is a B/C greater than 1.0. A value of one indicates the savings over the life of the measure are equivalent to the incremental cost of that measure. A value greater than one represents a positive return on investment.

Improving the energy performance of a building often requires an initial investment. In most cases the benefit is represented by annual on-bill utility or TDV savings, and the cost by incremental first cost and replacement costs. However, some packages result in initial construction cost savings (negative incremental cost), and either energy cost savings (positive benefits), or increased energy costs (negative benefits). In cases where both construction costs and energy-related savings are negative, the construction cost savings are treated as the benefit while the increased energy costs are the cost. In cases where a measure or package is cost-effective immediately (i.e., upfront construction cost savings and lifetime energy cost savings), B/C ratio cost-effectiveness is represented by ">1". Because of these situations, NPV savings are also reported, which, in these cases, are positive values.

2.1.4 Utility Rates

In coordination with the City of Glendale, the Reach Codes Team determined appropriate tariffs for each package, summarized in Table 2, based on the annual load profile of the prototype and the corresponding package, and the most prevalent rate for each building type.

The analysis applies GWP residential electricity rates forecasted for Phase 2 July 2024 and current Southern California Gas (SCG) natural gas rates as of April 2024. For a more detailed breakdown of the rates selected refer to Appendix 7.2 Utility Rate Schedules.

Electricity use for central water heating was evaluated using the residential L-1-A rate. The water heating utility bill was calculated separately from the in-unit electricity bill. Photovoltaic (PV) and battery energy storage benefits were applied assuming virtual net energy metering (VNEM) program is in place. PV was first assigned to the central water heating meter to offset 100 percent of the electricity use. The remaining PV and all of the battery impacts were then split evenly across the apartment meters.

The multifamily prototypes used in this analysis include common area spaces that serve the residents (lobby, leasing office, corridors, etc.). Most of the energy use for these spaces could not be separated from that for the dwelling units within the CBECC model. As a result, average per dwelling unit hourly energy use was calculated to include both the dwelling unit and common space energy use.

Table 2. Utility Tariffs in City of Glendale

Electric / Gas Utility	Electricity	Natural Gas
GWP / SoCalGas	L-1-A (Phase 2)	GM

Utility rates are assumed to escalate over time, using assumptions detailed in Appendix 9.2 of the main report. Please see the main 2022 Multifamily New Construction Cost-effectiveness Study (Statewide Reach Codes Team, 2023) for further details on methodology.

2.2 Greenhouse Gas Emissions

The analysis uses the greenhouse gas (GHG) emissions estimates built-in to CBECC software. There are 8,760 hourly multipliers accounting for time dependent energy use and carbon emissions based on source emissions, including RPS projections. There are 32 strings of multipliers, with a different string for each California CZ and each fuel type (metric tons of CO_2 per kWh for electricity and metric tons of CO_2 per therm for natural gas).

3 Prototype Designs and Measure Packages

3.1 Multifamily Prototype Buildings

The Energy Commission defines building prototypes which it uses to evaluate the cost-effectiveness of proposed changes to Title 24 requirements. There are 4 multifamily prototypes used in code development: a 2-story garden style, a 3-story loaded corridor, a 5-story mixed use and a 10-story mixed use. Based on work completed for the 2022 Title 24 code development, the 3-story and the 5-story represent 33 percent and 58 percent, respectively, of new multifamily construction in California. As a result, these two prototypes are used in this analysis. Additional details on all four prototypes can be found in the Multifamily Prototypes Report (TRC, 2019).

Table 2 describes the basic characteristics of each prototype.

Table 3: Residential Prototype Characteristics

Characteristic	3-Story Loaded Corridor	5-Story Mixed Use
Conditioned Floor Area	39,372 ft^2	113,100 ft^2 total: 33,660 ft^2 nonresidential 79,440 ft^2 residential
Num. of Stories	3	6 Stories total: 1 story parking garage (below grade) 1 story of nonresidential space 4 stories of residential space
Num. of Bedrooms	(6) Studio (12) 1-bed (12) 2-bed (6) 3-bed	(8) studios (40) 1-bed units (32) 2-bed units (8) 3-bed units
Window-to-Wall Area Ratio	25%	25%
Wall Type	Wood framed	Wood frame over a first-floor concrete podium
Roof Type	Flat roof	Flat roof
Foundation	Slab-on-grade	Concrete podium with underground parking

3.2 Measure Packages

The Reach Codes Team evaluated the following packages for mixed fuel and all-electric homes for each prototype, as described below.

1. All-Electric Prescriptive Code: This package meets all the prescriptive requirements of the 2022 Energy Code.
2. All-Electric Prescriptive Code + PV: Using the code minimum package as a starting point, PV capacity of 108 kW and 285.5 kW for the 3-story and 5-story, respectively, was added to offset 100 percent of the estimated annual electricity use.
3. Mixed Fuel Efficiency Only: This package uses only efficiency measures that do not trigger federal preemption including envelope and duct distribution efficiency measures.
4. Mixed Fuel Efficiency Only + 35SF: Using the mixed fuel efficiency only as a starting point, the size of the solar thermal system supporting the gas boiler water heating system was increased from the prescriptive requirement of 20% to 35% solar fraction. This only applies to the 5-story prototype.
5. Mixed Fuel Efficiency + PV: Using the Efficiency Package as a starting point, PV capacity of 238.3 kW was added to offset 100 percent of the estimated annual electricity use. This package only applies to the 5-story prototype.
6. Mixed Fuel Efficiency + PV + Battery: Using the Efficiency Package as a starting point, PV capacity of 93 kW and 238.3 kW for the 3-story and 5-story, respectively, was added to offset 100 percent of the estimated annual electricity use. A battery system was also added for the 3-story prototype. The 5-story prototype includes a battery system in the baseline per the 2022 prescriptive requirements and the battery size was increased from 256 kWh to 400 kWh.

4 Results

Cost-effectiveness results are presented per prototype and measure packages described in Section 3.2. The TDV and On-Bill based cost-effectiveness results are presented in terms of B/C ratio and NPV. Energy savings, compliance margin, utility bill savings, and incremental costs are also shown.

In the following figures, green highlighting indicates that the case is cost-effective with a B/C ratio greater than or equal to 1 and a NPV greater than or equal to 0. Red highlighting indicates the case is not cost-effective.

Compliance margins are presented as percentages both for the efficiency TDV and the source energy metrics. A compliance margin that is equal to or greater than 0 indicates the case is code compliant.

Table 3 and Table 4 show results for the 3-story multifamily prototype and 5-story multifamily prototype, respectively.

Table 4: Climate Zone 9 3-Story Multifamily Cost-Effectiveness Results per Dwelling Unit

Case	Efficiency TDV Comp Margin	Source Comp Margin	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Utility Cost Savings		Incremental Cost		On-Bill		TDV	
					First Year	Lifecycle (2022$)	First Year	Lifecycle (2022$)	B/C Ratio	NPV	B/C Ratio	NPV
All-Electric												
Code Minimum	13%	6%	-707	98	($117)	($2,179)	$697	$1,029	0.0	($3,208)	8.1	$2,389
Code + PV	13%	15%	1,131	98	$356	$8,781	$2,282	$3,091	2.8	$5,690	3.9	$7,000
Mixed Fuel												
Efficiency Only	1%	0%	26	0	$7	$163	$146	$156	1.0	$7	1.4	$68
Efficiency + PV + Battery	1%	16%	1,071	0	$276	$6,397	$3,063	$4,932	1.3	$1,465	1.3	$1,593

Table 5: Climate Zone 9 5-Story Multifamily Cost-Effectiveness Results per Dwelling Unit

Case	Efficiency TDV Comp Margin	Source Comp Margin	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Utility Cost Savings		Incremental Cost		On-Bill		TDV	
					First Year	Lifecycle (2022$)	First Year	Lifecycle (2022$)	B/C Ratio	NPV	B/C Ratio	NPV
All-Electric												
Code Minimum	7%	3%	-762	92	($144)	($2,880)	$608	$1,185	0.0	($4,065)	1.9	$985
Code + PV	7%	11%	268	92	$135	$3,587	$1,432	$2,256	1.6	$1,331	2.9	$4,242
Mixed Fuel												
Efficiency Only	1%	0%	29	0	$8	$182	$142	$149	1.2	$33	1.7	$97
Efficiency Only + 35SF	4%	5%	25	14	$27	$784	$389	$503	1.6	$282	2.2	$598
Efficiency + PV	1%	0.5%	69	0	$18	$422	$178	$195	2.2	$227	2.1	$218
Efficiency + PV + Battery	1%	2%	57	0	$15	$350	$1,323	$2,264	0.2	($1,914)	0.3	($1,695)

5 Summary

The Reach Codes Team developed packages of energy efficiency measures as well as packages combining energy efficiency with solar PV generation, simulated them in building modeling software, and gathered costs to determine the cost-effectiveness of multiple scenarios. The Reach Codes Team coordinated with multiple utilities, cities, and building community experts to develop a set of assumptions considered reasonable in the current market. Changing assumptions, such as the period of analysis, measure selection, cost assumptions, energy escalation rates, or utility tariffs are likely to change results.

Table 5 and Table 6 summarize results for each prototype and depict the source energy compliance margins achieved for each package. Because local reach codes must both exceed the Energy Commission performance budget (i.e., have a positive compliance margin) and be cost-effective, the Reach Codes Team highlighted cells meeting these two requirements to help clarify the upper boundary for potential reach code policies. All results presented in this study have a positive compliance margin.

- Cells highlighted in **green** depict a positive compliance margin and cost-effective results using both On-Bill and TDV approaches.
- Cells highlighted in **yellow** depict a positive compliance and cost-effective results using either the On-Bill or TDV approach.
- Cells **not highlighted** depict a package that was not cost effective using either the On-Bill or TDV approach.

The Reach Codes Team concluded the following from the results of this study.

- All-electric packages for 3-story and for 5-story multifamily new construction was found to be cost-effective based on TDV.
- Source energy compliance margins for the all-electric packages are higher than mixed fuel construction with the exception of the mixed fuel efficiency + PV + battery package and the mixed fuel + efficiency + 35SF package for the 3-story and 5-story, respectively.
- For a reach code that allows for mixed fuel buildings, the mixed fuel efficiency + PV + battery package was found to be cost effective for the 3-story prototype based On-bill and TDV, but not cost effective based On-bill or TDV for the 5-story prototype. The mixed fuel efficiency + PV package was found to be cost effective based On-bill and TDV for the 5-story prototype

Table 6: Summary of Source Compliance Margins and Cost-Effectiveness for the 3-Story Prototype

Climate Zone	Electric/Gas Utility	All-Electric Prescriptive Code	All-Electric + PV	Mixed Fuel Efficiency	Mixed Fuel Efficiency + PV + Battery
CZ09	GWP/SCG	6%	15%	0%	16%

Table 7: Summary of Compliance Margins and Cost-Effectiveness for the 5-Story Prototype

Climate Zone	Electric/Gas Utility	All-Electric Prescriptive Code	All-Electric + PV	Mixed Fuel Efficiency	Mixed Fuel Efficiency + 35SF	Mixed Fuel Efficiency + PV	Mixed Fuel Efficiency + PV + Battery
CZ09	GWP/SCG	3%	11%	0%	5%	0.5%	2%

6 References

California Public Utilities Commission. (2021a). *Utility Costs and Affordability of the Grid of the Future: An Evaluation of Electric Costs, Rates, and Equity Issues Pursuant to P.U. Code Section 913.1.* Retrieved from https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2021/senate-bill-695-report-2021-and-en-banc-whitepaper_final_04302021.pdf

E3. (2021). Retrieved from https://efiling.energy.ca.gov/GetDocument.aspx?tn=233260&DocumentContentId=65748

NORESCO. (2020). *Time Dependent Valuation of Energy for Developing Building Efficiency Standards.* Retrieved from https://efiling.energy.ca.gov/GetDocument.aspx?tn=233257&DocumentContentId=65743

Statewide CASE Team. (2020c). *Multifamily All-Electric Codes and Standards Enhancement (CASE) Initiative 2022 California Energy Code.* Prepared by TRC.

Statewide Reach Codes Team. (2023). *2022 Cost-Effectiveness Study: Multifamily New Construction.* Prepared for Pacific Gas and Electric Company. Prepared by Frontier Energy. Retrieved from https://localenergycodes.com/download/1552/file_path/fieldList/2022%20Multifamily%20NewCon%20Cost-Eff%20Report.pdf

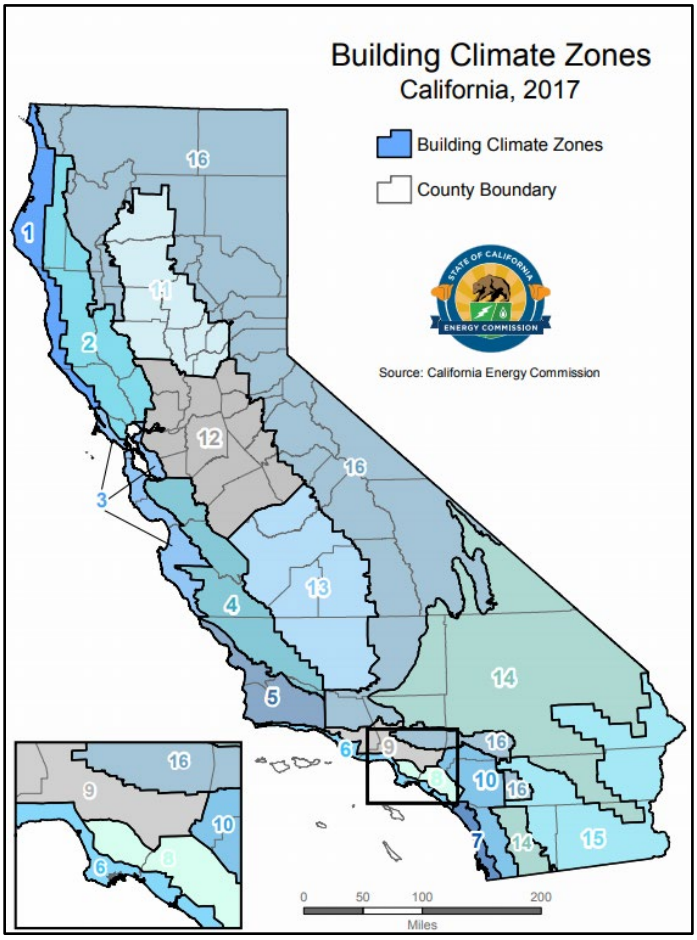
TRC. (2019). *Multifamily Prototypes.* Prepared for Southern California Edison. Retrieved from https://title24stakeholders.com/wp-content/uploads/2019/06/SCE-MFModeling_MultifamilyPrototypesReport_2019-06-07_clean.pdf

7 Appendices

7.1 Map of California Climate Zones

Climate zone geographical boundaries are depicted in Figure 1. The map in Figure 1 along with a zip-code search directory is available at: https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

Figure 1. Map of California climate zones.



7.2 Utility Rate Schedules

The Reach Codes Team used the City of Glendale tariffs detailed below to determine the On-Bill savings for each package.

7.2.1 Glendale Water and Power

7.2.1.1 Residential

The following shows the City of Glendale electricity tariffs applied in this study. The L-1-A Phase 2 rate was applied to all packages.

Current and Proposed Electric Rates:
Residential Service L-1-A

Item	Unit	Current Rate	Proposed Rates				
			Phase 1 Dec 1, 2023	Phase 2 Jul 1, 2024	Phase 3 Jul 1, 2025	Phase 4 Jul 1, 2026	Phase 5 Jul 1, 2027
Customer	Meter/Day	$0.64	$0.70	$0.75	$0.75	$0.75	$0.75
Energy	kWh						
High Season - First 10 kWh/day		$0.1661	$0.2481	$0.2863	$0.3335	$0.3335	$0.3335
High Season - Next 10 kWh/day		$0.2059	$0.3075	$0.3549	$0.4134	$0.4134	$0.4134
High Season - Remaining kWh		$0.2459	$0.3673	$0.4238	$0.4937	$0.4937	$0.4937
Low Season - First 10 kWh/day		$0.1393	$0.2081	$0.2401	$0.2797	$0.2797	$0.2797
Low Season - Next 10 kWh/day		$0.1725	$0.2577	$0.2973	$0.3464	$0.3464	$0.3464
Low Season - Remaining kWh		$0.2128	$0.3179	$0.3668	$0.4273	$0.4273	$0.4273
ECAC	kWh	$0.0001	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000
RAC	kWh	$0.0250	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000
RDC	kWh	$0.0159	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000

Note: These rates also apply to Residential Solar (L-1-D).
High Season are months July, August, September, October
Low Season are months November through June

The following reflects the details for the net energy metering (NEM) arrangement applied in this analysis per Net Energy Metering (NEM) Program | City of Glendale, CA (glendaleca.gov). A NEM compensation rate of $ 0.0817/kWh was applied based on information provided by City of Glendale staff.

Although incentives are no longer offered, GWP continues to make NEM available to customers who are interested in installing solar photovoltaic systems in their home or business. With NEM, solar customers are eligible to receive a bill credit for any excess generation produced by their solar system and have the credit automatically applied to their account when it is needed.

IMPORTANT CHANGES EFFECTIVE 11/01/2023

1. All residential and commercial PC systems sized up to 10kW CEC-AC will be exempt from the 110% historical usage cap. Self-certification of system size need will be required within the PC Interconnection Application on PowerClerk. Customers who meet these criteria may also install up to 30 kWh of PV paired energy storage.
2. Energy storage meter will no longer be required for any residential or commercial energy storage systems. For the most recent versions of the Distributed Energy Resources Diagrams please refer to the Distributed Energy Resources section of the Electrical Service Requirements.
3. Inverters with PCS (Power Control Systems) capabilities will now be allowed in the City of Glendale. Customer-Generator and Solar Contractor will be required to complete a Power Control System Agreement and submit as an additional document.

Please review the **Guide for Applying for PV Interconnection and NEM (for under 15 kW CEC-AC residential systems)** if installing an under 15 kW CEC-AC residential system.

All installations of commercial PV systems and installations of 15+ kW CEC-AC residential PV systems need to follow the **Guide for Applying for PV Interconnection and NEM (for commercial and 15+ kW CEC-AC residential systems).**

In case of questions please contact the GWP Solar Team by sending an email to GWPSolarSolutions@glendaleca.gov or by calling 818-548-2750.

7.2.2 SCG

Following are the SoCalGas natural gas tariffs applied in this study. For Climate Zone 9 the baseline territory of 1 was assumed.

The SoCalGas monthly gas rate in $/therm was applied on a monthly basis according to the rates shown in Table 7. These rates are based on applying a normalization curve to the April 2024 tariff based on ten years of historical gas data. Long-term historical natural gas rate data was only available for SoCalGas' procurement charges.[1] The baseline and excess transmission charges were found to be consistent over the course of a year and applied for the entire year based on 2024 rates. CARE rates reflect the 20 percent discount per the GR tariff.

Table 8: SoCalGas Monthly Gas Rate ($/therm)

Month	Procurement Charge	Transportation Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
January	$0.52	$0.93	$1.35	$1.44	$1.87
February	$0.35	$0.93	$1.35	$1.27	$1.70
March	$0.30	$0.93	$1.35	$1.23	$1.66
April	$0.26	$0.93	$1.35	$1.19	$1.61
May	$0.28	$0.93	$1.35	$1.20	$1.63
June	$0.30	$0.93	$1.35	$1.23	$1.66
July	$0.32	$0.93	$1.35	$1.24	$1.67
August	$0.35	$0.93	$1.35	$1.28	$1.71
September	$0.32	$0.93	$1.35	$1.25	$1.67
October	$0.30	$0.93	$1.35	$1.23	$1.65
November	$0.33	$0.93	$1.35	$1.26	$1.69
December	$0.39	$0.93	$1.35	$1.31	$1.74

Southern California Gas Company
Residential Rates
24-Apr

Customer Type / Rate Schedule	Commodity Charge	Rate Type	Procurement Charge ¢/therm	Transportation Charge ¢/therm	New Rate Effective 4/1/2024	New Rate Effective 3/1/2024	New Rate Effective 2/1/2024	New Rate Effective 1/1/2024	Absolute Rate Change	% Change
Residential Individually Metered										
Schedule No. GR	GR	Baseline	25.874	92.671	118.545	137.281	146.941	141.97	-18.736	-13.60%
Res. Service	GR	Non Baseline	25.874	135.332	161.206	179.942	189.602	184.631	-18.736	-10.40%
	GT-R	Baseline	0	92.671	92.671	92.671	92.671	92.671	0	0.00%
	GT-R	Non Baseline	0	135.332	135.332	135.332	135.332	135.332	0	0.00%
Residential Submetered Customer										
Schedule No. GS	GS	Baseline	25.874	92.671	118.545	137.281	146.941	141.97	-18.736	-13.60%
Multi-Family Service	GS	Non Baseline	25.874	135.332	161.206	179.942	189.602	184.631	-18.736	-10.40%
Submetered	GT-S	Baseline	0	92.671	92.671	92.671	92.671	92.671	0	0.00%
	GT-S	Non Baseline	0	135.332	135.332	135.332	135.332	135.332	0	0.00%
Residential Small Master Metered										
Schedule No. GM-E	GM-E	Baseline	25.874	92.671	118.545	137.281	146.941	141.97	-18.736	-13.60%
Baseline Allowance	GM-E	Non Baseline	25.874	135.332	161.206	179.942	189.602	184.631	-18.736	-10.40%
	GT-ME	Baseline	0	92.671	92.671	92.671	92.671	92.671	0	0.00%
	GT-ME	Non Baseline	0	135.332	135.332	135.332	135.332	135.332	0	0.00%
Schedule No. GM-C	GM-C	All Usage	25.874	135.332	161.206	179.942	189.602	184.631	-18.736	-10.40%
No BL Allowance	GT-MC	All Usage	0	135.332	135.332	135.332	135.332	135.332	0	0.00%

[1] The SoCalGas procurement and transmission charges were obtained from the following site: https://www.socalgas.com/for-your-business/energy-market-services/gas-prices RES2023.xlsx (live.com)

7.2.3 Fuel Escalation Rates

7.2.3.1 Residential Occupancies

The average annual escalation rates in Table 8 were used in this study. These are based on assumptions from the CPUC 2021 En Banc hearings on utility costs through 2030 (California Public Utilities Commission, 2021a). Escalation rates through the remainder of the 30-year evaluation period are based on the escalation rate assumptions within the 2022 TDV factors. Rates were applied for the same 30-year period and are based on the escalation rate assumptions within the 2025 LSC factors from 2027 through 2053[2]. These rates were developed for electricity use statewide (not utility-specific) and assume steep increases in gas rates in the latter half of the analysis period. Data was not available for years 2024, 2025, and 2026 and so the CPUC En Banc assumptions were applied for those years using the average rate across the three IOUs for statewide electricity escalation. No data was available to estimate electricity escalation rates for the utilities that serve Glendale, therefore electricity escalation rates for SCE and statewide natural gas escalation rates were applied.

Table 9: Real Utility Rate Escalation Rate Assumptions

Year	Statewide Natural Gas Average Rate (%/year, real)	SCE Electric Average Rate (%/year, real)
2024	4.6%	1.6%
2025	4.6%	1.6%
2026	4.6%	1.6%
2027	4.6%	1.6%
2028	4.6%	1.6%
2029	4.6%	1.6%
2030	4.6%	1.6%
2031	2.0%	0.6%
2032	2.4%	0.6%
2033	2.1%	0.6%
2034	1.9%	0.6%
2035	1.9%	0.6%
2036	1.8%	0.6%
2037	1.7%	0.6%
2038	1.6%	0.6%
2039	2.1%	0.6%
2040	1.6%	0.6%
2041	2.2%	0.6%
2042	2.2%	0.6%
2043	2.3%	0.6%
2044	2.4%	0.6%
2045	2.5%	0.6%
2046	1.5%	0.6%
2047	1.3%	0.6%
2048	1.6%	0.6%
2049	1.3%	0.6%
2050	1.5%	0.6%
2051	1.8%	0.6%
2052	1.8%	0.6%
2053	1.8%	0.6%

[2] https://www.energy.ca.gov/files/2025-energy-code-hourly-factors. Actual escalation factors were provided by consultants E3.

Get In Touch

The adoption of reach codes can differentiate jurisdictions as efficiency leaders and help accelerate the adoption of new equipment, technologies, code compliance, and energy savings strategies.

As part of the Statewide Codes & Standards Program, the Reach Codes Subprogram is a resource available to any local jurisdiction located throughout the state of California.

Our experts develop robust toolkits as well as provide specific technical assistance to local jurisdictions (cities and counties) considering adopting energy reach codes. These include cost-effectiveness research and analysis, model ordinance language and other code development and implementation tools, and specific technical assistance throughout the code adoption process.

If you are interested in finding out more about local energy reach codes, the Reach Codes Team stands ready to assist jurisdictions at any stage of a reach code project.

Visit LocalEnergyCodes.com to access our resources and sign up for newsletters.

Contact info@localenergycodes.com for no-charge assistance from expert Reach Code advisors.

Follow us on LinkedIn