CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

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2022 CODE CYCLE:

Single Family and ADU Custom Cost Effectiveness Analysis: South Lake Tahoe

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Acronym List

B/C – Benefit-to-Cost Ratio

CBECC - California Building Energy Code Compliance

CBSC - California Building Standards Commission

CEC - California Energy Commission

CPAU – City of Palo Alto Utilities

CZ – Climate Zone

GHG - Greenhouse Gas

IOU – Investor-Owned Utility

kWh – Kilowatt Hour

LADWP – Los Angeles Department of Water and Power

Liberty – Liberty Utilities

NPV – Net Present Value

PG&E – Pacific Gas & Electric (utility)

POU – Publicly Owned Utility

PV - Solar Photovoltaic

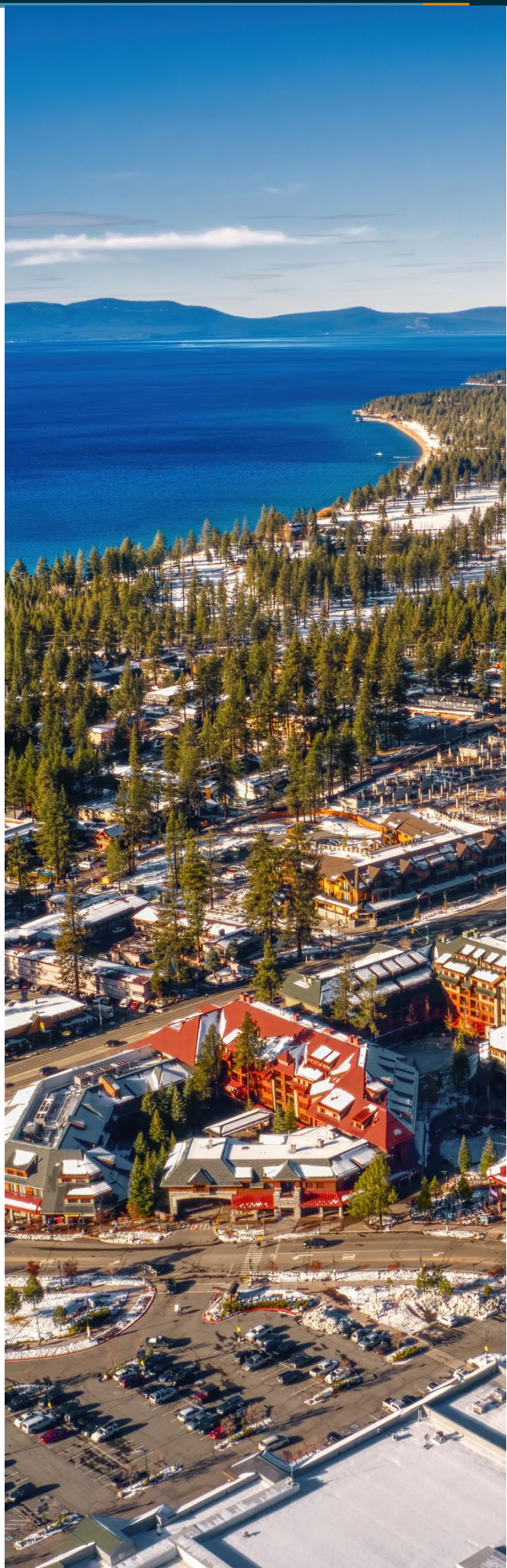
SCE – Southern California Edison (utility)

SCG – Southern California Gas (utility)

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

TDV - Time Dependent Valuation

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



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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 Single Family New Construction Cost-effectiveness Study* modified to accurately represent the City of South Lake Tahoe, 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.

The prototype building designs analyzed in this study are newly constructed:

- Single Family Home
- Detached Accessory Dwelling Unit (ADU)

The methodology, prototype characteristics, and measure packages are retained from the main studies referenced above except for the energy costs are calculated using local South Lake Tahoe utility rates. Measure packages include combinations of energy efficiency, electrification, solar photovoltaics (PV), and battery storage with results evaluated for California Climate Zone 16.

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.

2 Methodology and Assumptions

The Reach Codes Team analyzed two residential prototype designs to represent a variety of common building types using the cost-effectiveness methodology detailed in this section below. The general methodology is consistent with analyses of other prototypes, whereas some specifics such as utility rate selection are customized for the City of South Lake Tahoe rates.

2.1 Reach Codes

This section describes the approach to calculating 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 the most recent software available for 2022 Title 24 code compliance analysis, CBECC-Res v1.0.

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 single family and ADU buildings. Incremental costs represent the equipment, installation, replacements, and maintenance costs of the proposed measure relative to the 2019 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.

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 30 years (NPV benefits divided by NPV costs). The criteria 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 South Lake Tahoe, the Reach Codes Team determined appropriate tariffs for each package, summarized in Table 1, based on the annual load profile of the prototype and the corresponding package, and the most prevalent rate for each building type in addition to the impacts for permanent versus nonpermanent residents.

For a more detailed breakdown of the rates selected refer to Appendix 7.2 Utility Rate Schedules.

Table 1: Utility Tariffs in South Lake Tahoe

Electric / Gas Utility		Electricity	Natural Gas
Residential (Single Family and Detached ADU)			
Liberty / Southwest Gas	Permanent Resident	D-1	GN 10
	Nonpermanent Resident	D-1 (without baseline quantities	GN 15

Utility rates are assumed to escalate over time, using assumptions detailed in Appendix 7.2. Please see the main *2022 Single Family New Construction Reach Code Cost Effectiveness Studies* for further details on methodology.

2.2 Greenhouse Gas Emissions

The analysis uses the greenhouse gas (GHG) emissions estimates built-in to CBECC-Res. There are 8,760 hourly multipliers accounting for time dependent energy use and carbon emissions based on source emissions, including renewable portfolio standard projections. Natural gas fugitive emissions, which are shown to be substantial, are not included. There are two strings of multipliers—one for Northern California climate zones, and another for Southern California climate zones.[1].

[1] CBECC-Res multipliers are the same for CZs 1-5 and 11-13 (presumed to be Northern California), while there is another set of multipliers for CZs 6-10 and 14-16 (assumed to be Southern California).

3 Prototype Designs and Measure Packages

3.1 Residential Occupancies

Table 2 describes the basic characteristics of each residential prototype design. The prototypes have equal geometry on all walls, windows and roof to be orientation neutral.

Table 2: Residential Prototype Characteristics

Characteristic	Single Family One-Story	Single Family Two-Story	ADU
Conditioned Floor Area	2,100 ft^2	2,700 ft^2	625 ft^2
Num. of Stories	1	2	1
Num. of Bedrooms	3	3	1
Window-to-Floor Area Ratio	20%	20%	20%

The Reach Codes Team evaluated three packages for mixed fuel homes and five packages for all-electric homes for each prototype and climate zone, as described below.

1. All-Electric Code Minimum: This package meets all the prescriptive requirements of the 2022 Title 24 Code.
2. Efficiency Only: This package uses only efficiency measures that don't trigger federal preemption issues including envelope and water heating or duct distribution efficiency measures.
3. Efficiency + NEEA (Preempted): This package was evaluated for the all-electric homes only and shows an alternative design that applies water heating equipment that is more efficient than federal standards meeting the NEEA Tier 3 rating. The Reach Codes Team considers this more reflective of how builders meet above code requirements in practice.
4. Efficiency + PV: Using the Efficiency Package as a starting point, PV capacity was added to offset most of the estimated electricity use.
5. Efficiency + PV + Battery: Using the Efficiency & PV Package as a starting point, a battery system was added. For mixed-fuel homes the package of efficiency measures differed from the Efficiency Package in some climate zones to arrive at a cost effective solution.

4 Results

Results are presented as per the prototype-specific Measure Packages described in Section 4. Overarching factors impacting the results include:

- Designation of a **'benefit'** or a **'cost'** varies with the scenarios because both energy savings, and incremental construction costs may be negative depending on the package. Typically, utility bill savings are categorized as a 'benefit' while incremental construction costs are treated as 'costs.' In cases where both construction costs are negative and utility bill savings are negative, the construction cost savings are treated as the 'benefit' while the utility bill negative savings are the 'cost.'
- All-electric packages will have lower **GHG emissions** than equivalent mixed-fuel packages in all cases, due to the clean power sources currently available from California's power providers.
- The Reach Codes Team coordinated with the City of South Lake Tahoe to select the most prevalent tariffs for each prototype given the annual energy demand profile. The Reach Codes Team **did not compare a variety of tariffs** to determine their impact on cost-effectiveness although utility rate changes or updates can affect on-bill cost-effectiveness results.

4.1 Residential Occupancies

Table 33 and Table 44 show results for the single family and ADU prototypes, respectively, for permanent residents using Liberty/Southwest Gas rates. Table 55 and Table 6 show results for the single family and ADU prototypes, respectively, for nonpermanent residents using Liberty /Southwest Gas rates. Results are shown for all the evaluated packages. All packages are cost-effective based on TDV. All of the single family packages are On-Bill cost-effective with the exception of the mixed fuel Efficiency + PV + Battery case. All of the ADU packages are On-Bill cost-effective with the exception of the mixed fuel Efficiency + PV + Battery case and the all-electric Efficiency + PV + Battery case under permanent resident rates.

Table 3: South Lake Tahoe Permanent Resident Single Family Cost-Effectiveness Summary

Case	Efficiency EDR2 Margin	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Average Annual GHG Reductions (metric tons)	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	6.0	-4,314	404	1.5	$79	$7,647	($3,257)	($2,954)	>1	$10,602	>1	$3,139
Efficiency Only	9.7	-4,027	404	1.6	$124	$8,705	($1,943)	($1,479)	>1	$10,184	>1	$3,675
Efficiency + NEEA	10.9	-3,825	404	1.6	$154	$9,429	($1,943)	($1,479)	>1	$10,908	>1	$4,277
Efficiency + PV	9.7	1,331	404	1.8	$921	$27,576	$7,051	$10,549	2.6	$17,026	1.9	$8,576
Efficiency + PV + Battery	18.1	1,183	404	2.3	$899	$27,055	$12,497	$22,036	1.2	$5,019	1.6	$11,922
Mixed Fuel												
Efficiency Only	14.9	-106	119	0.7	$191	$6,159	$3,344	$3,755	1.64	$2,404	2.2	$4,123
Efficiency + PV	14.9	1,331	119	0.8	$403	$11,201	$5,756	$6,981	1.6	$4,220	1.9	$5,419
Efficiency + PV + Battery	22.6	1,235	115	1.2	$382	$10,636	$10,780	$18,007	0.6	($7,371)	1.5	$8,024

Table 4: South Lake Tahoe Permanent Resident ADU Cost-Effectiveness Summary

Case	Efficiency EDR2 Margin	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Average Annual GHG Reductions (metric tons)	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	0.1	-1,807	122	0.4	($37)	$1,010	($2,640)	($2,261)	>1	$3,272	1.0	$22
Efficiency Only	8.8	-1,508	122	0.5	$12	$2,159	($2,749)	($1,170)	>1	$3,329	9.9	$748
Efficiency + NEEA	12.8	-1,400	122	0.5	$28	$2,539	($2,749)	($1,170)	>1	$3,709	>1	$1,580
Efficiency + PV	8.8	3,669	122	0.7	$779	$20,326	$5,941	$10,452	1.9	$9,874	1.7	$6,200
Efficiency + PV + Battery	16.4	3,629	122	1.0	$773	$20,183	$11,453	$22,027	0.9	($1,845)	1.4	$7,321
Mixed Fuel												
Efficiency Only	8.7	-628	87	0.4	$57	$2,553	$510	$1,787	1.43	$766	1.0	$52
Efficiency + PV	8.7	3,669	87	0.5	$694	$17,631	$7,723	$11,433	1.5	$6,199	1.4	$4,505
Efficiency + PV + Battery	16.2	3,652	87	0.8	$691	$17,568	$13,234	$23,007	0.8	($5,438)	1.2	$4,937

Table 5: South Lake Tahoe Nonpermanent Resident Single Family Cost-Effectiveness Summary

Case	Efficiency EDR2 Margin	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Average Annual GHG Reductions (metric tons)	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	6.0	-4,314	404	1.5	$57	$7,726	($3,257)	($2,954)	>1	$10,681	>1	$3,139
Efficiency Only	9.7	-4,027	404	1.6	$107	$8,895	($1,943)	($1,479)	>1	$10,374	>1	$3,675
Efficiency + NEEA	10.9	-3,825	404	1.6	$141	$9,717	($1,943)	($1,479)	>1	$11,196	>1	$4,277
Efficiency + PV	9.7	1,331	404	1.8	$1,028	$30,719	$7,051	$10,549	2.9	$20,169	1.9	$8,576
Efficiency + PV + Battery	18.1	1,183	404	2.3	$1,002	$30,114	$12,497	$22,036	1.4	$8,078	1.6	$11,922
Mixed Fuel												
Efficiency Only	14.9	-106	119	0.7	$209	$6,775	$3,344	$3,755	1.8	$3,019	2.2	$4,123
Efficiency + PV	14.9	1,331	119	0.8	$456	$12,627	$5,756	$6,981	1.8	$5,646	1.9	$5,419
Efficiency + PV + Battery	22.6	1,235	115	1.2	$432	$11,984	$10,780	$18,007	0.7	($6,023)	1.5	$8,024

Table 6: South Lake Tahoe Nonpermanent Resident ADU Cost-Effectiveness Summary

Case	Efficiency EDR2 Margin	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Average Annual GHG Reductions (metric tons)	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	0.1	-1,807	122	0.4	($55)	$769	($2,640)	($2,261)	>1	$3,030	1.0	$22
Efficiency Only	8.8	-1,508	122	0.5	$1	$2,102	($2,749)	($1,170)	>1	$3,272	9.9	$748
Efficiency + NEEA	12.8	-1,400	122	0.5	$20	$2,543	($2,749)	($1,170)	>1	$3,713	>1	$1,580
Efficiency + PV	8.8	3,669	122	0.7	$891	$23,188	$5,941	$10,452	2.2	$12,736	1.7	$6,200
Efficiency + PV + Battery	16.4	3,629	122	1.0	$884	$23,022	$11,453	$22,027	1.0	$995	1.4	$7,321
Mixed Fuel												
Efficiency Only	8.7	-628	87	0.4	$58	$2,692	$510	$1,787	1.5	$906	1.0	$52
Efficiency + PV	8.7	3,669	87	0.5	$797	$20,193	$7,723	$11,433	1.8	$8,761	1.4	$4,505
Efficiency + PV + Battery	16.2	3,652	87	0.8	$794	$20,121	$13,234	$23,007	0.9	($2,886)	1.2	$4,937

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 7: (all-electric) and

Table 8 (mixed fuel) summarize results for each prototype and depict the efficiency EDR2 compliance margins achieved for each package in Climate Zone 16. There were minor differences in the cost-effective outcome between permanent and nonpermanent resident rates. 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 found all-electric code compliant new construction to be feasible and cost effective based on TDV and Liberty electricity rates for both the single family and ADU prototypes. The code-compliant all-electric building resulted in lower first year utility cost for the single family home, but slightly higher first cost for the ADU. Combining higher capacity PV systems and all-electric construction further reduces utility costs.

For a reach code that allows for mixed fuel buildings the mixed fuel efficiency, PV, and battery package was found to be cost effective based on TDV for both prototypes with EDR2 margins equal to 16.2.

Table 7: Summary of All-Electric Efficiency EDR2 Margins and Cost-Effectiveness

	Single Family				ADU			
Residency	**Code Min**	**EE**	**EE+PV**	**EE+PV /Batt**	**Code Min**	**EE**	**EE+PV**	**EE+PV /Batt**
Permanent	6.0	9.7	9.7	18.1	0.1	8.8	8.8	16.4
Nonpermanent	6.0	9.7	9.7	18.1	0.1	8.8	8.8	16.4

Table 8: Summary of Mixed Fuel Efficiency EDR2 Margins and Cost-Effectiveness

	Single Family			ADU		
Residency	**EE**	**EE+PV**	**EE+PV/ Batt**	**EE**	**EE+PV**	**EE+PV/ Batt**
Permanent	14.9	14.9	22.6	8.7	8.7	16.2
Nonpermanent	14.9	14.9	22.6	8.7	8.7	16.2

6 References

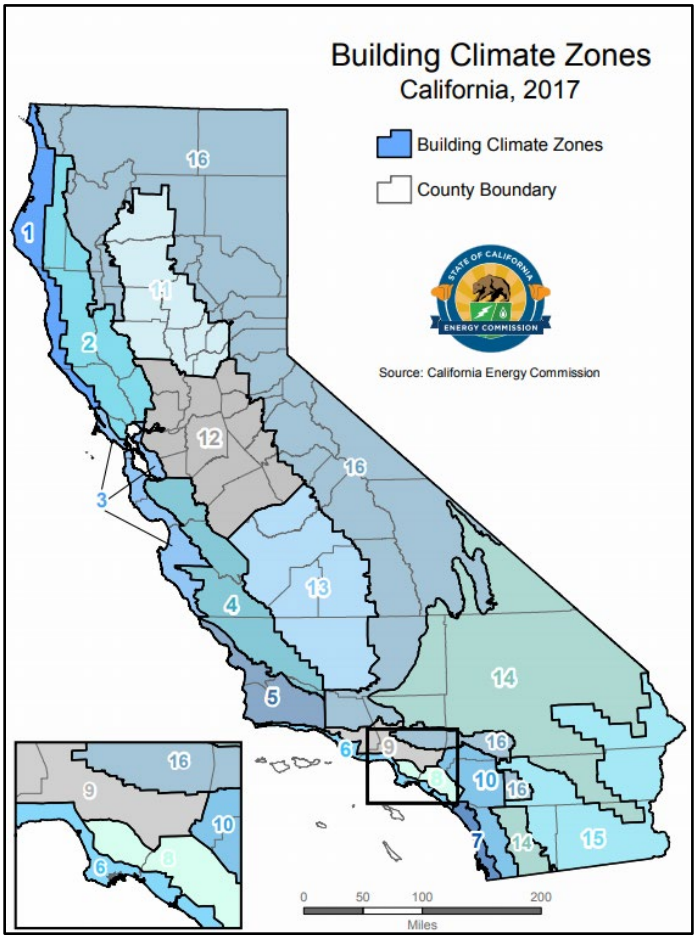
California Public Utilities Commission. (2021a). *Utility Costs and Affordability of the Grid of the Future: An Evaluation of Electric Costs, Rates, and Equity Issues Pursuant to P.U. Code Section 913.1.* Retrieved from https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2021/senate-bill-695-report-2021-and-en-b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

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 Liberty and Southwest Gas tariffs detailed below to determine the On-Bill savings for each package.

7.2.1 Liberty Utilities

Following are details on the Liberty Utility electricity tariff, D-1[2], applied in this study. For nonpermanent residents the rate for quantities in excess of baseline was applied to all energy use. A net energy metering arrangement was evaluated that credits any net generation monthly based on the appropriate rate per the tariff. Any generation credits do not offset the monthly minimum charge.[3] The CPUC Reimbursement Surcharge is applied monthly only when net kWh is positive.

[2] https://california.libertyutilities.com/uploads/CalPeco%20Tariffs/Schedule%20No%20D-1.pdf
[3] https://california.libertyutilities.com/uploads/NEM_NEMA%20PDF%207-13-17.pdf

SCHEDULE NO. D-1
DOMESTIC SERVICE

APPLICABILITY

This rate schedule is applicable to all domestic power service to separately metered single family dwellings and individual living units of multi-unit complexes, where such units are metered by the Utility.

TERRITORY

Entire California Service Area.

RATES

Customer Charge
Per meter, per month $9.67

Energy Charges (Per kWh)

A. For Quantities up to and Including Baseline Quantities (See Special Condition 2):

Distribution	Generation [1]	Vegetation [2]	SIP [4]	PPP [5]		BRRBA [7]	Total	
$0.08197	$0.04371	$0.00563	$0.00072	$0.00270	(R)	$0.01178	$0.14651	(R)

B. For Quantities in Excess of Baseline Quantities (See Special Condition 2):

$0.08197	$0.06751	$0.00563	$0.00072	$0.00270	(R)	$0.01178	$0.17031	(R)

Other Energy Charges (Per kWh)
Surcharges[8] $0.00160

Late Charge
1% on any amount 45 days in arrears from previous billings

Minimum Charge
The per meter, per month Customer Charge

1. Generation – Charge includes the Energy Cost Adjustment Clause Billing Factor as described in the Preliminary Statement, Number 6.
2. Vegetation – Charge to recover amounts in the Vegetation Management Balancing Account, as described in the Preliminary Statement, Number 18.
3. CEMA – Charge to recover amounts in the Catastrophic Event Memorandum Account as approved in D.16-12-024 and as described in the Preliminary Statement, Number 13.A.
4. SIP – Charge to recover the costs of the Solar Initiative Program as described in the Preliminary Statement, Number 21.
5. PPP – Charge to recover Public Purpose Programs funding energy efficiency and low-income assistance programs described in Preliminary Statement, Numbers 10, 17 and 19.
6. GRCMA – Charge to recover amounts in the General Rate Case Memorandum Account as described in the Preliminary Statement, Number 13.I.
7. BRRBA – Charge to recover amounts in the Base Revenue Requirement Balancing Account as described in the Preliminary Statement Number 8.
8. Surcharges – Charge to recover the Public Utilities Commission Reimbursement Surcharge as described in Rate Schedule RF and the Energy Commission Surcharge that is established by the California Energy Commission.

(Continued)

Advice Letter No.	180-E-A	Issued by Christopher G. Alario Name	Date Filed	November 1, 2021
Decision No.	D.21-10-023	President Title	Effective	January 1, 2022

7.2.2 Southwest Gas

The Southwest Gas monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending August 2022 according to the rates shown in Table 3.[4] The monthly basic service charge was based on the most current tariff statements. A Franchise Fee of 2.5% was applied to the total monthly bill. Lastly, the annual California Climate Credit of $49.44 for 2022 was applied.[5]

Table 3: Southwest Gas Monthly Gas Rate ($/therm)

Month	GN-10		GN-15	
	Baseline	Excess	Baseline	Excess
Jan 2022	$1.73806	$1.86329	$1.9138	$1.9138
Feb 2022	$1.71260	$1.83783	$1.88924	$1.88924
Mar 2022	$1.62528	$1.75051	$1.80192	$1.80192
Apr 2022	$1.65098	$1.77621	$1.82762	$1.82762
May 2022	$1.88741	$2.01264	$2.06405	$2.06405
June 2022	$1.99564	$2.12087	$2.17228	$2.17228
July 2022	$1.85374	$1.97897	$2.03038	$2.03038
Aug 2022	$1.85405	$1.97928	$2.03069	$2.03069
Sept 2021	$1.54984	$1.67507	$1.7218	$1.7218
Oct 2021	$1.71208	$1.83731	$1.88404	$1.88404
Nov 2021	$1.65364	$1.77887	$1.8256	$1.8256
Dec 2021	$1.67571	$1.80094	$1.84767	$1.84767

Schedule No. and Type of Charge	Margin	Charges [3] and Adjustments	Subtotal Gas Usage Rate	Other Surcharges CPUC	Other Surcharges PPP	Gas Cost	Effective Sales Rate
GN-10-Residential Gas Service							
Basic Service Charge	$5.75						$5.75
Cost per Therm							
Baseline Quantities	$ .73615	$ .34479	$1.08094	$ .00577	$ .05245	$ .91213	$2.05129
Tier II	.86138	.34479	1.20617	.00577	.05245	.91213	2.17652
GN-12-CARE Residential Gas Service							
Basic Service Charge	$4.00						$4.00
Cost per Therm							
Baseline Quantities	$ .33754	$ .34479	$ .68233	$ .00577	$ .03595	$ .91213	$1.63618
Tier II	.43772	.34479	.78251	.00577	.03595	.91213	1.73636
GN-15-Secondary Residential Gas Service							
Basic Service Charge	$6.00						$6.00
Cost per Therm	$ .91279	$ .34479	$1.25758	$ .00577	$ .05245	$ .91213	$2.22793

The baseline daily quantity in therms for all individually-metered residential uses are:

Climate Zone	Summer Season (May - Oct.)	Winter Off-Peak (Spring/Fall) (Mar., Apr. & Nov.)	Winter Peak (Dec.-Feb)
Barstow	0.39	1.12	2.11
Needles	0.23	0.53	0.92
Victorville	0.39	1.25	2.04
	Summer Season (June - Oct.)	Winter Off-Peak (Spring/Fall) (Apr., May & Nov.)	Winter Peak (Dec.-March)
Big Bear	0.46	1.45	2.83
No. Lake Tahoe	0.66	2.11	3.09
So. Lake Tahoe	0.72	2.04	3.09
Truckee	0.72	2.17	3.55

[4] https://www.swgas.com/en/california-rates-and-regulation
[5] https://www.cpuc.ca.gov/climatecredit/

7.2.3 Fuel Escalation Rates

7.2.3.1 Residential Occupancies

The average annual escalation rates in Table 10 were used in this study. The electricity and natural gas rates 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. No data was available to estimate electricity escalation rates for South Lake Tahoe, therefore electricity escalation rates for PG&E and statewide natural gas escalation rates were applied.

Table 4: Real Utility Rate Escalation Rate Assumptions

Year	Statewide Natural Gas Average Rate (%/year, real)	PG&E Electric Average Rate (%/year, real)
2023	4.6%	1.8%
2024	4.6%	1.8%
2025	4.6%	1.8%
2026	4.6%	1.8%
2027	4.6%	1.8%
2028	4.6%	1.8%
2029	4.6%	1.8%
2030	4.6%	1.8%
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%

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.

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A STATEWIDE UTILITY PROGRAM

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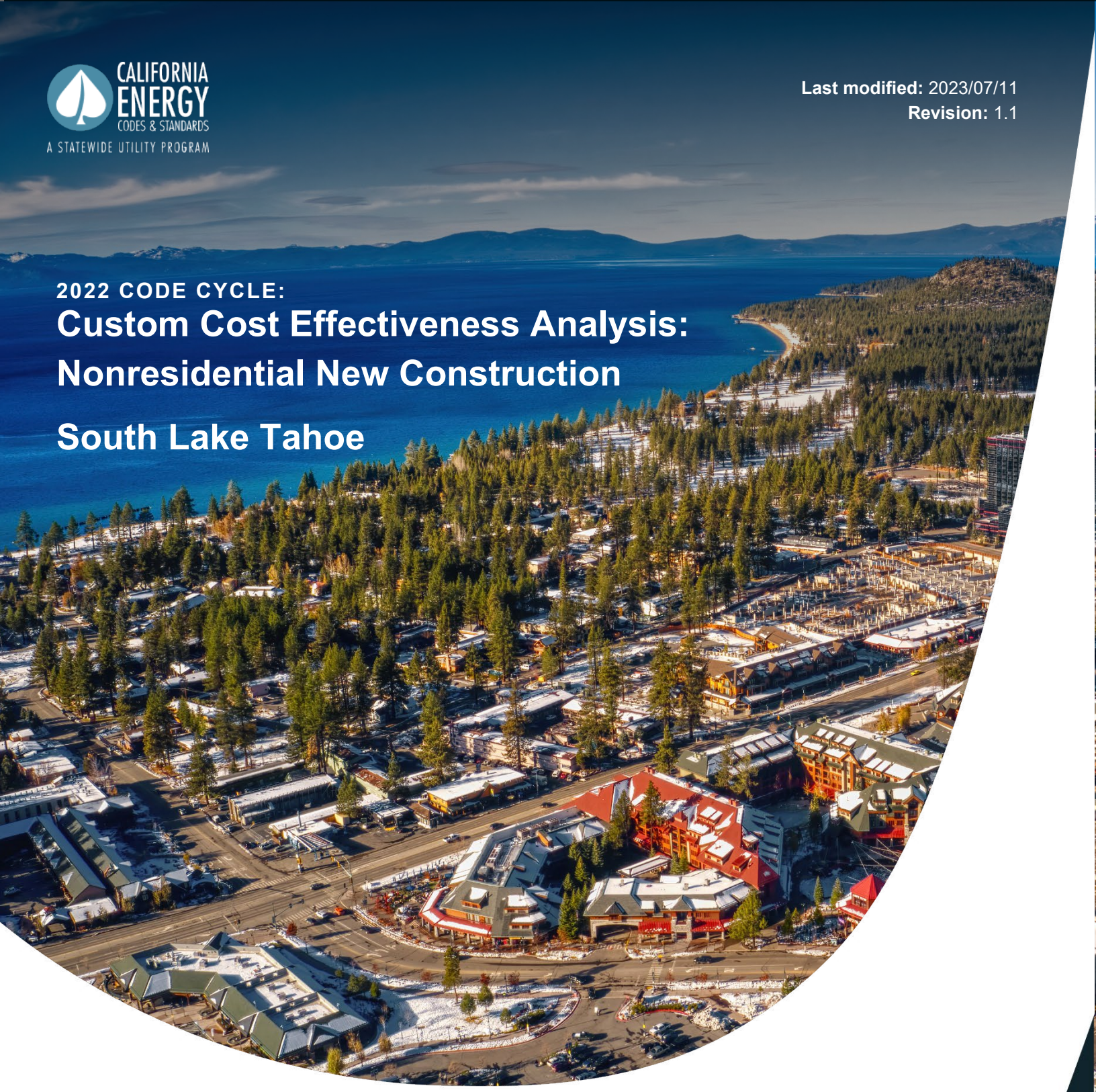

2022 CODE CYCLE:

Custom Cost Effectiveness Analysis: Nonresidential New Construction

South Lake Tahoe

Prepared by:
TRC Companies, Inc

Prepared for:
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SDGE™ SOUTHERN CALIFORNIA EDISON® Energy for What's Ahead® PG&E Pacific Gas and Electric Company®

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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

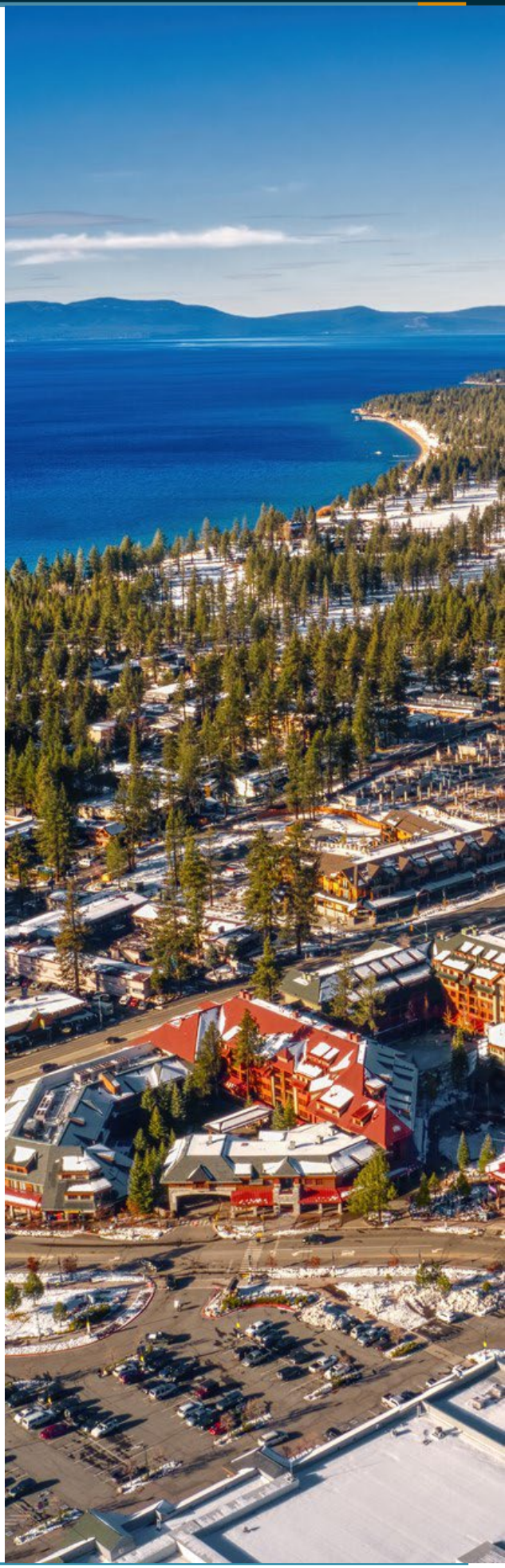
kWh – Kilowatt Hour

NPV – Net Present Value

PV - Solar Photovoltaic

TDV - Time Dependent Valuation

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



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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 Nonresidential New Construction Reach Code Cost Effectiveness Study** modified to accurately represent the South Lake Tahoe, 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 Code Team (or “the Team” in short).

The prototype building designs analyzed in this study are newly constructed:

- Medium Office
- Medium Retail
- Quick-Service Restaurant
- Small Hotel

The Reach Code Team performed cost-effectiveness analysis based on the prescriptive 2022 Title 24 code requirements:

- For the retail building type, the prescriptive code minimum is all-electric. Fuel substitution packages revert to mixed-fuel appliances.
- For all other building types, the prescriptive code minimum is mixed-fuel. Fuel substitution packages switch to all-electric appliances.

The methodology, prototype characteristics, and measure packages are retained from the main studies referenced above except for the energy costs are calculated using local South Lake Tahoe utility rates. Measure packages include combinations of energy efficiency, electrification, solar photovoltaics (PV) with results evaluated for California Climate Zone 2.

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.

2 Methodology and Assumptions

The Reach Codes Team analyzed four nonresidential 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 analyses of other prototypes, whereas some specifics such as utility rate selection are customized for the South Lake Tahoe rates.

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 15-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. This refers to the "Total TDV" that includes all the energy end uses such as space-conditioning, mechanical ventilation, service water heating indoor lighting, photovoltaic (PV) and battery storage systems, and covered process loads.

The Reach Codes Team performed energy simulations using the most recent software available (June 8, 2022) for 2022 Title 24 code compliance analysis, California's Building Energy Code Compliance Software CBECC 2022.1.0 (1250).

2.1.2 Costs

The Reach Codes Team assessed the incremental costs and savings of the energy packages over the lifecycle of 15 years for the nonresidential buildings. Incremental costs represent the equipment, installation, replacements, and maintenance costs of the proposed measure relative to the 2022 Title 24 Standards minimum requirements or standard industry practices. The Reach Code Team obtained baseline and measure costs from manufacturer distributors, contractors, literature review, and online sources such as RS Means.

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 South Lake Tahoe and the utilities, Liberty (LIB) and Southwest Gas (SWG), the Reach Codes Team determined appropriate tariffs for each package, summarized in Table 1, based on the annual load profile of the prototype and the corresponding package, and the most prevalent rate for each building type.

South Lake Tahoe has separate distribution service rates from Truckee and other territories serviced by SouthWest Gas. However, the Liberty electricity rate applies commonly across all territories.

For a more detailed breakdown of the rates selected refer to Appendix 7.2 Utility Rate Schedules.

Table 1. Utility Tariffs in South Lake Tahoe

Electric / Gas Utility	Electricity	Natural Gas
Nonresidential Buildings		
LIB / SWG	A-1/A-2/A-3	SWG (SLT territory)

Utility rates are assumed to escalate over time, using assumptions detailed in Appendix 9.2 of the main report. Please see the main *2022 Nonresidential New Construction Reach Code Cost Effectiveness Study* 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 CO2 per kWh for electricity and metric tons of CO2 per therm for natural gas).

2.3 Nonresidential Occupancies

Table 2 describes the basic characteristics of each nonresidential prototype design.

Table 2: Nonresidential Prototype Characteristics

	Medium Office	Medium Retail	Quick-Service Restaurant	Small Hotel
Conditioned floor area (ft²)	53,628	24,563	2,501	42,554 (77 guest rooms)
Number of stories	3	1	1	4
Window-to-Wall Area ratio	0.33	0.07	0.11	0.14
Window U-factor/SHGC	U-factor: CZ 1-8, 10, 16 – 0.36 CZ 9, 11-15 – 0.34 SHGC: CZ 1-8, 10, 16 – 0.25 CZ 9, 11-15 – 0.22	U-factor: CZ 1-8, 10, 16 – 0.36 CZ 9, 11-15 – 0.34 SHGC: CZ 1-8, 10, 16 – 0.25 CZ 9, 11-15 – 0.22	U-factor: CZ 1-8, 10, 16 – 0.36 CZ 9, 11-15 – 0.34 SHGC: CZ 1-8, 10, 16 – 0.25 CZ 9, 11-15 – 0.22	Nonresidential: U-factor: CZ 1-8,10,16 – 0.36 CZ 9, 11-15 –0.34 SHGC: CZ 1-8,10,16 – 0.25 CZ 9, 11-15 – 0.22 Guest Rooms: U-factor: 0.36 SHGC: 0.25
Solar PV size	123 kW – 204 kW Depending on CZ	64 kW – 87 kW Depending on CZ	None	17 kW – 25 kW Depending on CZ
Battery Storage	217 kWh – 360 kWh Depending on CZ	70 kWh – 94 kWh Depending on CZ	None	16 kWh – 24 kWh Depending on CZ
HVAC System	VAV reheat system with packaged rooftop units, gas boilers, VAV terminal units with hot water reheat	CZ 1 Heat recovery for Core Retail space only CZ 1, 16 < 65 kBtu/h: SZAC with gas furnace > 65 kBtu/h and < 240 kBtu/h: SZHP and gas furnace (i.e., dual fuel heat pump). VAV. > 240 kBtu/h: SZAC VAV with gas furnace CZ 2-15 < 65 kBtu/h: SZAC with gas furnace > 65 kBtu/h and < 240 kBtu/h: SZHP VAV > 240 kBtu/h: SZAC VAV with gas furnace	< 65 kBtu/h: SZAC + gas furnace > 65 kBtu/h: SZAC VAV	Nonresidential and Laundry: VAV reheat system with packaged rooftop units, gas boilers, VAV terminal units with hot water reheat Guest Rooms: SZAC with gas furnaces
SHW System	5-gallon electric resistance water heater	5-gallon electric resistance water heater	100-gallon gas water heater	Nonresidential: 30-gallon electric resistance water heater Laundry Room: 120-gal gas storage water heater Guest rooms: Central gas water heater, 250 gallons storage, recirculation loop

The Reach Codes Team evaluated mixed fuel efficiency and all-electric packages for each prototype and climate zone, as described below.

- **Mixed Fuel + Efficiency Measures**: Mixed-fuel prescriptive building per 2022 Title 24 requirements, including additional efficiency measures.
- **All-Electric Code Minimum Efficiency:** All-Electric building to minimum Title 24 prescriptive standards and federal minimum efficiency standards. This package has the same PV size as mixed-fuel prescriptive baseline.
- **All-Electric Energy Efficiency:** All-Electric building with added energy efficiency measures related to HVAC, SHW, lighting or envelope.
- **All-Electric Energy Efficiency + Load Flexibility:** All-Electric building with added energy efficiency and load flexibility measures.
- **All-Electric Energy Efficiency + Solar PV:** All-Electric building with added energy efficiency and additional Solar PV. The added PV size is larger than prescriptive 2022 Title 24 code requirements and accounts for roof space availability.

For Quick Service Restaurant (QSR), the Reach Code Team has analyzed two scenarios for All-Electric packages, one with electric cooking and the one with gas cooking (the latter of which is referred to as the "HS" package to reflect all-electric HVAC and SHW).

For Small Hotel, the Reach Code Team also analyzed an alternative scenario with PTHP instead of SZHP in All-Electric scenario. It is denoted by the "PTHP" in parenthesis in package name.

3 Results

Results are presented as per the prototype-specific Measure Packages described in Section 4. Overarching factors impacting the results include:

- Designation of a **'benefit'** or a **'cost'** varies with the scenarios because both energy savings, and incremental construction costs may be negative depending on the package. Typically, utility bill savings are categorized as a 'benefit' while incremental construction costs are treated as 'costs.' In cases where both construction costs are negative and utility bill savings are negative, the construction cost savings are treated as the 'benefit' while the utility bill negative savings are the 'cost.'
- Most all-electric packages will have lower **GHG emissions** than equivalent mixed-fuel packages in all cases, due to the clean power sources currently available from California's power providers.
- The Reach Codes Team coordinated with the South Lake Tahoe to select the most prevalent tariffs for each prototype given the annual energy demand profile. The Reach Codes Team **did not compare a variety of tariffs** to determine their impact on cost-effectiveness although utility rate changes or updates can affect on-bill cost-effectiveness results.

3.1 Nonresidential Occupancies

Table 3 through Table 6 shows the results for the four nonresidential prototypes for all the evaluated packages for climate zone 16 using South Lake Tahoe rates. In climate zone 16, the A-2 Liberty Electric rate applies to all packages and all prototypes.

- The Reach Code Team identified cost-effective package of energy efficiency measures when added to the mixed-fuel baseline prototype in all prototypes except for Medium Retail, which has an all-electric baseline.
- For Medium Office, The Team identified On-Bill cost-effective packages for all-electric package with added efficiency and load flexibility.
- For Medium Retail, The Team identified all-electric package with added energy efficiency measures to be On-Bill cost-effective.
- For Quick Service Restaurant, The Team identified On-Bill cost-effective packages for all-electric packages without cooking appliance electrification but with added efficiency and/or load flexibility and/or solar PV measures.
- For Small Hotel, all all-electric packages are On-Bill cost-effective with added efficiency and/or load flexibility and/or solar PV measures or with PTHP instead of SZHP system type, but not cost-effective alone as All Electric Code Minimum Efficiency package.

Please note that for the Medium Office, the total complilance margin is highly negative. It is because that the total compliance margin of the baseline building is much lower total TDV energy consumption (9 TDV kBtu/ft^2-yr) due to the applied PV compared to that of the proposed packages. This smaller number is in the denominator of the package Total Compliance Margin calculations, resulting in large magnitude results. In these situations, the sign of the result is the best indicator of the compliance of a given package. Specifically, the Mixed Fuel + Efficiency Measures complied for Medium Office.

Table 3. Medium Office Cost-Effectiveness Summary

Package	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG savings (tons)	Eff TDV Margin	Total Compliance Margin	Source kBtu Margin	Upfront Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle $-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed-Fuel + Efficiency Measures	9,204	(125)	0.4	4%	39%	1%	$0	$17,085	$16,744	>1	>1	$17,085	$16,744
All Electric Code Minimum Efficiency	(130,271)	5,799	0.8	-71%	-699%	3%	($52,070)	($74,676)	($303,371)	0.7	0.2	($22,606)	($251,301)
All Electric Energy Efficiency	(123,647)	5,799	1.4	-68%	-668%	5%	($52,070)	($60,022)	($290,084)	0.9	0.2	($7,952)	($238,013)
All-Electric Energy Efficiency and Load Flexibility	(111,041)	5,799	5.0	-58%	-567%	14%	($52,070)	($33,144)	($246,130)	1.6	0.2	$18,927	($194,059)

Table 4. Medium Retail Cost-Effectiveness Summary

Package	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG savings (tons)	Eff TDV Margin	Total Compliance Margin	Source kBtu Margin	Upfront Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle $-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel Code Minimum	44,088	(3,537)	(11.4)	12%	18%	-49%	$67,904	($11,834)	$57,931	-0.2	0.9	($79,738)	($9,974)
Mixed-Fuel + Efficiency Measures	48,319	(3,624)	(11.2)	14%	21%	-48%	$67,904	($4,563)	$66,411	-0.1	1.0	($72,467)	($1,493)
All Electric Energy Efficiency	3,504	0	0.6	2%	3%	2%	$0	$6,818	$8,547	>1	>1	$6,818	$8,547

Table 5. Quick-Service Restaurant Cost-Effectiveness Summary

Package	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG savings (tons)	Eff TDV Margin	Total Compliance Margin	Source kBtu Margin	Upfront Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle $-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed-Fuel + Efficiency Measures	10,088	936	7.0	21%	21%	-55%	$22,540	$60,068	$46,308	2.7	2.1	$37,528	$23,768
All Electric HS Energy Code Minimum Efficiency	(57,545)	4,788	14.7	-32%	-32%	-10%	$23,206	$13,483	($70,150)	0.6	-3.0	($9,722)	($93,356)
All-Electric HS Energy Efficiency	(36,879)	4,788	18.6	-6%	-6%	13%	$45,745	$69,129	($12,601)	1.5	-0.3	$23,383	($58,346)
All-Electric HS Energy Efficiency + Load Flexibility	(36,807)	4,788	20.0	3%	3%	21%	$51,155	$69,323	$6,395	1.4	0.1	$18,168	($44,760)
All-Electric HS Energy Efficiency + Solar PV	(6,302)	4,788	20.1	-6%	18%	21%	$96,153	$151,457	$39,572	1.6	0.4	$55,304	($56,581)
All Electric Code Minimum Efficiency	(160,672)	12,242	36.0	-40%	-40%	-17%	$143,959	$78,431	($222,219)	0.5	-1.5	($65,528)	($366,177)

All Electric Energy Efficiency	(138,982)	12,242	40.1	-13%	-13%	7%	$166,498	$123,313	($161,663)	0.7	-1.0	($43,186)	($328,161)
All-Electric Energy Efficiency + Load Flexibility	(139,097)	12,242	41.7	-3%	-3%	16%	$171,908	$127,551	($140,052)	0.7	-0.8	($44,357)	($311,960)

Table 6. Small Hotel Cost-Effectiveness Summary

Package	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG savings (tons)	Eff TDV Margin	Total Compliance Margin	Source kBtu Margin	Upfront Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle $-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + Efficiency Measures	8,939	2,952	18.4	15.7%	18%	18%	$21,214	$123,752	$116,017	5.8	5.5	$102,538	$94,804
All Electric Code Minimum Efficiency	(313,257)	17,363	61.4	-29.0%	-33%	48%	($179,779)	($281,028)	($248,882)	0.6	0.7	($101,249)	($69,103)
All Electric Energy Efficiency	(271,171)	17,363	65.0	-18.2%	-21%	52%	($158,565)	($76,510)	($167,773)	2.1	0.9	$82,055	($9,207)
All-Electric Energy Efficiency + Load Flexibility	(270,193)	17,363	65.0	-18.0%	-21%	52%	($158,565)	($157,953)	($168,004)	1.0	0.9	$612	($9,438)
All Electric Energy Efficiency + Solar PV	(194,632)	17,363	67.9	-18.2%	0%	55%	($3,588)	$83,387	($35,212)	>1	0.1	$86,975	($31,623)
All Electric Code Minimum Efficiency (PTHP)	(299,522)	17,363	64.5	-19.7%	-22%	52%	($652,012)	($242,077)	($180,549)	2.7	3.6	$409,935	$471,464

4 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.

The combined result of cost effectiveness and code compliance across all packages are detailed in Table 7 through Table 10 below. The tables are formatted to show:

- "Both" with **green** highlight – for scenarios that are cost effective on both metrics and have positive compliance margin across all three compliance metrics.
- "TDV/On-Bill" with **yellow** highlight – for scenarios that are cost effective on either one of the metrics and has positive compliance margin across all three compliance metrics.
- "Comp" with **gray** highlight – for scenarios that are not cost effective on either metric but have positive compliance margin across all three compliance metrics.
- "-" with no color highlight – for scenarios that do not comply across any one code compliance metric and may or may not be cost effective.

The package names in table results columns are as follows:

- Mixed fuel – EE: Mixed Fuel + Efficiency Measures
- All-Electric – Code Min: All-Electric Code Minimum Efficiency
- All-Electric – EE: All-Electric Energy Efficiency
- All-Electric – EE+ LF: All-Electric Energy Efficiency and Load Flexibility
- All-Electric – EE + PV: All-Electric Energy Efficiency and Solar PV
- All-Electric – Code Min with PTHP: All-Electric Code Minimum Efficiency with PTHP

The QSR has two electrification scenarios, with and without cooking appliance electrification, which is denoted by "HS" prefix.
The Small Hotel has an extra package that evaluates a different HVAC type in the All-Electric Code Minimum Efficiency package, a Packaged Terminal Heat Pump (PTHP) instead of a Single Zone Heat Pump.

Table 7. Summary of Medium Office Packages

CZ	Utility	Mixed Fuel	All-Electric		
		EE	Code Min	EE	EE + LF
CZ16	South Lake Tahoe	Both	-	-	-

Table 8. Summary of Medium Retail Packages

CZ	Utility	Mixed Fuel		All-electric
		Code Min	EE	EE
CZ16	South Lake Tahoe	-	-	Both

Table 9. Summary of Quick Service Restaurant Packages

CZ	Utility	Mixed Fuel	All-electric			All-electric "HS" (HVAC+SHW)			
		EE	Code Min	EE	EE + LF	Code Min	EE	EE + LF	EE + PV
CZ16	South Lake Tahoe	-	-	-	-	-	-	On-bill/TDV	-

Table 10. Summary of Small Hotel Packages

CZ	Utility	Mixed Fuel	All-Electric				All-Electric
		EE	Code Min	EE	EE + LF	EE + PV	Code Min (PTHP)
CZ16	South Lake Tahoe	Both	-	-	-	-	-

LEGEND KEY

Both	Compliant & c/e on both metrics
On-bill/TDV	Compliant & c/e on one metric
Comp	Compliant not c/e
-	Not compliant

Please refer to the limitations of this study, described in *2022 Nonresidential New Construction Reach Code Cost Effectiveness Study* Section 3.5, while using these results to inform reach code policies.

Results support reach code adoption for energy efficiency measures over mixed fuel nonresidential building types for all four prototypes except Medium Retail in climate zone 16. For Medium Retail, the mixed-fuel code-minimum package is neither cost-effective nor code compliant since the baseline is all-electric.

The All-Electric packages indicate the capability of achieving the greatest greenhouse savings as compared to mixed-fuel buildings. The Reach Codes Team found all-electric code compliant new construction to be feasible and cost effective based on TDV and Liberty electricity rates for all four nonresidential prototypes with added measures. Here is a summary of the results:

- For Medium Office, all-electric package with added efficiency and load flexibility is cost-effective but is not code compliant due to the use of electric resistance VAV reheat systems. The most likely all-electric replacement for a central gas boiler serving a variable air volume reheat system would be a central heat pump boiler; however, this system cannot be modeled in CBECC at the time of the writing of this report. As such, the Reach Code Team is treating this analysis as temporary until a compliance pathway is established for a central heat pump boiler in the Energy Code and results can be updated accordingly. This modeling capability is anticipated in early 2023 according to discussions with the CBECC software development team, and the cost-effectiveness analysis should become available in the first half of 2023. Heat pump systems are multiple times more efficient, but may also be multiple times more costly than the electric resistance reheat systems currently analyzed.
- The Reach Codes Team found All-Electric Medium Retail with added efficiency to be code complaint and cost effective based on South Lake Tahoe rate in climate zone 16.

- For Quick-Service Restaurant, The Team identified On-Bill cost-effective packages for all-electric packages without cooking appliance electrification but with added efficiency and/or load flexibility and/or solar PV measures. However, there is only one “code-compliant” all-electric package is without cooking appliance electrification, added efficiency and load flexibility, hence can be pursued for reach code adoption with an exemption for the commercial cooking appliance.
- For Small Hotel, all all-electric packages are On-Bill cost-effective except for All Electric Code Minimum Efficiency package. However, none of them achieves compliance because of high heating loads being met by electric resistance VAV system instead of efficient heat pumps in nonresidential areas. This is a similar limitation as Medium Office and will be re-evaluated in 2023.

5 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

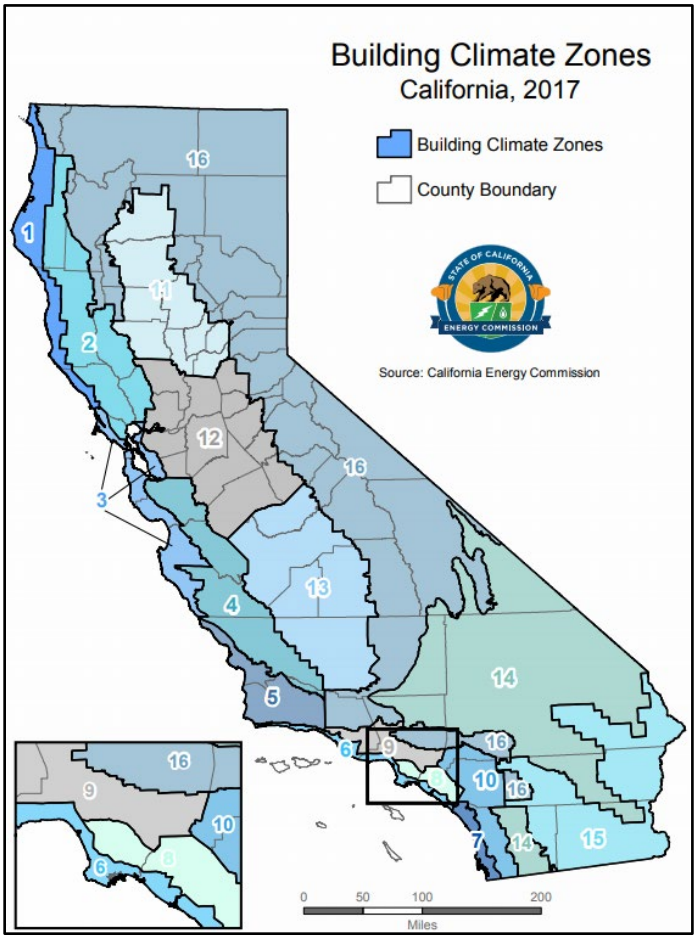
NORESCO. (2020). *Time Dependent Valuation of Energy for Developing Building Efficiency Standards.* Retrieved from https://efiling.energy.ca.gov/GetDocument.aspx?tn=233257&DocumentContentId=65743

6 Appendices

6.1 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.



6.2 Utility Rate Schedules

The Reach Codes Team used the South Lake Tahoe tariffs detailed below to determine the On-Bill impacts.

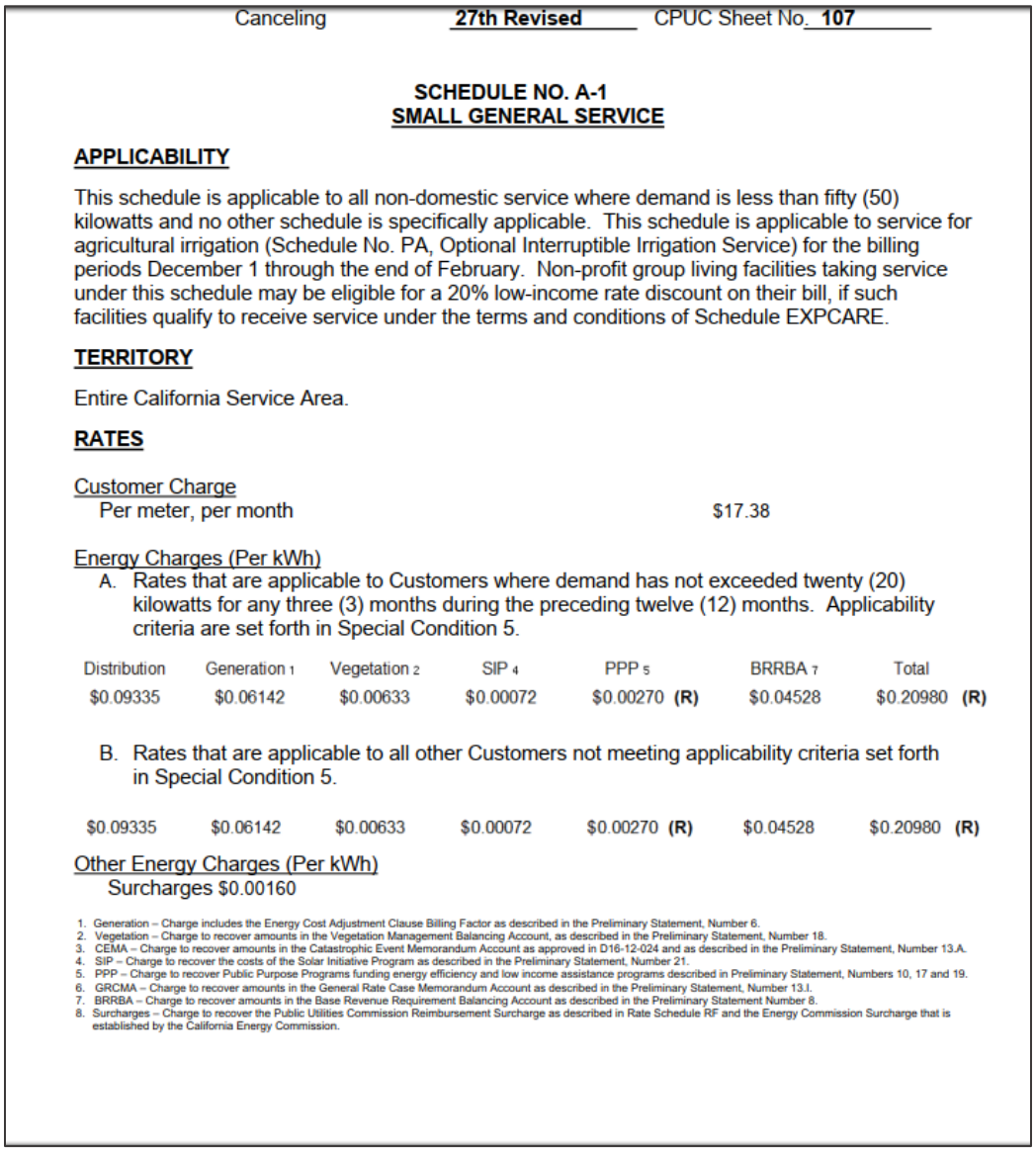
6.2.1 Liberty

6.2.1.1 Nonresidential

Following are the Liberty electricity tariffs applied in this study.

6.2.1.1.1 Liberty

Following are the Liberty electricity tariffs applied in this study.[1] A-1/A-2/A-3 is applied based on the peak demand.



Canceling **27th Revised** CPUC Sheet No. **107**

SCHEDULE NO. A-1
SMALL GENERAL SERVICE

APPLICABILITY

This schedule is applicable to all non-domestic service where demand is less than fifty (50) kilowatts and no other schedule is specifically applicable. This schedule is applicable to service for agricultural irrigation (Schedule No. PA, Optional Interruptible Irrigation Service) for the billing periods December 1 through the end of February. Non-profit group living facilities taking service under this schedule may be eligible for a 20% low-income rate discount on their bill, if such facilities qualify to receive service under the terms and conditions of Schedule EXPCARE.

TERRITORY

Entire California Service Area.

RATES

Customer Charge
Per meter, per month $17.38

Energy Charges (Per kWh)

A. Rates that are applicable to Customers where demand has not exceeded twenty (20) kilowatts for any three (3) months during the preceding twelve (12) months. Applicability criteria are set forth in Special Condition 5.

Distribution	Generation 1	Vegetation 2	SIP 4	PPP 5	BRRBA 7	Total
$0.09335	$0.06142	$0.00633	$0.00072	$0.00270 (R)	$0.04528	$0.20980 (R)

B. Rates that are applicable to all other Customers not meeting applicability criteria set forth in Special Condition 5.

$0.09335	$0.06142	$0.00633	$0.00072	$0.00270 (R)	$0.04528	$0.20980 (R)

Other Energy Charges (Per kWh)
Surcharges $0.00160

1. Generation – Charge includes the Energy Cost Adjustment Clause Billing Factor as described in the Preliminary Statement, Number 6.
2. Vegetation – Charge to recover amounts in the Vegetation Management Balancing Account, as described in the Preliminary Statement, Number 18.
3. CEMA – Charge to recover amounts in the Catastrophic Event Memorandum Account as approved in D16-12-024 and as described in the Preliminary Statement, Number 13.A.
4. SIP – Charge to recover the costs of the Solar Initiative Program as described in the Preliminary Statement, Number 21.
5. PPP – Charge to recover Public Purpose Programs funding energy efficiency and low income assistance programs described in Preliminary Statement, Numbers 10, 17 and 19.
6. GRCMA – Charge to recover amounts in the General Rate Case Memorandum Account as described in the Preliminary Statement, Number 13.I.
7. BRRBA – Charge to recover amounts in the Base Revenue Requirement Balancing Account as described in the Preliminary Statement Number 8.
8. Surcharges – Charge to recover the Public Utilities Commission Reimbursement Surcharge as described in Rate Schedule RF and the Energy Commission Surcharge that is established by the California Energy Commission.

[1] Liberty Tariffs & Rates Page

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC
SOUTH LAKE TAHOE, CALIFORNIA 28th Revised CPUC Sheet No. 113
Canceling 27th Revised CPUC Sheet No. 113

SCHEDULE NO. A-2
MEDIUM GENERAL SERVICE

APPLICABILITY

This schedule is applicable to all service where maximum demand is between fifty (50) kilowatts and two hundred (200) kilowatts for any three months during the preceding twelve months and where another schedule is not specifically applicable. Non-profit group living facilities taking service under this schedule may be eligible for a 20% low-income rate discount on their bill, if such facilities qualify to receive service under the terms and conditions of Schedule EXPCARE.

TERRITORY

Entire California Service Area.

RATES

Customer Charge
Per meter, per month $43.78

Demand Charge
Per kW of Maximum Demand per month

	Distribution	Generation	Total
Winter	$12.97	$0.00	$12.97
Summer	$ 0.00	$8.43	$ 8.43

Energy Charges (Per kWh)

	Distribution	Generation [1]	Vegetation [2]	SIP [4]	PPP [5]		BRRBA [7]	Total	
Winter	$0.05022	$0.02913	$0.00449	$0.00072	$0.00270	(R)	$0.04528	$0.13254	(R)
Summer	$0.00000	$0.10255	$0.00449	$0.00072	$0.00270	(R)	$0.04528	$0.15574	(R)

Other Energy Charges (Per kWh)
Surcharges[8] $0.00160

1. Generation – Charge includes the Energy Cost Adjustment Clause Billing Factor as described in the Preliminary Statement, Number 6.
2. Vegetation – Charge to recover amounts in the Vegetation Management Balancing Account, as described in the Preliminary Statement, Number 18.
3. CEMA – Charge to recover amounts in the Catastrophic Event Memorandum Account as approved in D16-12-024 and as described in the Preliminary Statement, Number 13.A.
4. SIP – Charge to recover the costs of the Solar Initiative Program as described in the Preliminary Statement, Number 21.
5. PPP – Charge to recover Public Purpose Programs funding energy efficiency and low income assistance programs described in Preliminary Statement, Numbers 10, 17 and 19.
6. GRCMA – Charge to recover amounts in the General Rate Case Memorandum Account as described in the Preliminary Statement, Number 13.I.
7. BRRBA – Charge to recover amounts in the Base Revenue Requirement Balancing Account as described in the Preliminary Statement Number 8.
8. Surcharges – Charge to recover the Public Utilities Commission Reimbursement Surcharge as described in Rate Schedule RF and the Energy Commission Surcharge that is established by the California Energy Commission.

(Continued)

Advice Letter No. 180-E-A
Decision No. D.21-10-023

Issued by
Christopher G. Alario
Name
President
Title

Date Filed November 1, 2021
Effective January 1, 2022
Resolution No. _____

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC
SOUTH LAKE TAHOE, CALIFORNIA — 28th Revised CPUC Sheet No. 120
Canceling — 27th Revised CPUC Sheet No. 120

SCHEDULE NO. A-3
LARGE GENERAL SERVICE

APPLICABILITY

This schedule is applicable to three-phase general service, including light and power. This schedule is mandatory for all customers whose monthly maximum demand exceeds two hundred (200) kilowatts for any three months during the preceding twelve months. Customer shall contract for service hereunder for a minimum term of not less than one (1) year. For a customer who installs electric bus charging stations, the period of time in which the demand charge is calculated for those charging stations will be increased from 15 minutes to 30 minutes. The customer who installs these stations must deploy a minimum of 2 buses that utilize these stations. Non-profit group living facilities taking service under this schedule may be eligible for a 20% low-income rate discount on their bill, if such facilities qualify to receive service under the terms and conditions of Schedule EXPCARE.

TERRITORY

Entire California Service Area.

RATES

Customer Charge
Per meter, per month $517.94

Facilities Charge
Per kW of Maximum Demand, per month $5.82

Demand Charges
Per kW of Billing Demand for relevant time-of-use period, per month (See Special Condition 6)

	Distribution	Generation	Total
Winter			
On-Peak	$7.17	$ 1.86	$ 9.03
Mid-Peak	$2.12	$ 1.28	$ 3.40
Summer			
On-Peak	$3.00	$11.92	$14.92

Energy Charges (Per kWh)

	Distribution	Generation [1]	Vegetation [2]	SIP [4]	PPP [5]		BRRBA [7]	Total	
Winter									
On-Peak	$0.03231	$0.04556	$0.00000	$0.00072	$0.00270	(R)	$0.04528	0.12657	(R)
Mid-Peak	$0.02760	$0.04637	$0.00000	$0.00072	$0.00270	(R)	$0.04528	0.12267	(R)
Off-Peak	$0.01456	$0.03870	$0.00000	$0.00072	$0.00270	(R)	$0.04528	0.10196	(R)
Summer									
On-Peak	$0.04279	$0.04547	$0.00000	$0.00072	$0.00270	(R)	$0.04528	0.13696	(R)
Off-Peak	$0.02312	$0.03640	$0.00000	$0.00072	$0.00270	(R)	$0.04528	0.10822	(R)

Other Energy Charges (Per kWh)
Surcharges [8] $0.00160

(Continued)

Issued by
Advice Letter No. 180-E-A — Christopher G. Alario (Name) — Date Filed November 1, 2021
Decision No. D.21-10-023 — President (Title) — Effective January 1, 2022
Resolution No.

6.2.2 Southwest Gas

Following are the GN-40 Southwest Gas tariffs applied in this study for South Lake Tahoe. The Transportation Service Charge doesn't apply here since the nonresidential prototype buildings in South Lake Tahoe are not "transportation customers". The transportation customer refers to a nonresidential customer who purchases their natural gas independently of Southwest Gas on the natural gas market, and then pays Southwest Gas a monthly transportation fee to transport their purchased gas to their facility.

SOUTHWEST GAS CORPORATION
P.O. Box 98510
Las Vegas, Nevada 89193-8510
California Gas Tariff — Canceling Original — Cal. P.U.C. Sheet No. 10 — Cal. P.U.C. Sheet No. _____

PRELIMINARY STATEMENT

1. SERVICE TERRITORY

Southwest Gas Corporation (the Company) provides natural gas service within the following counties: San Bernardino, Placer, El Dorado and Nevada. Service is provided in the geographical areas definitively set forth by cross-hatching on the maps of the Company's service areas contained in this California Gas Tariff.

1A. The following communities are included in the Company's Southern California service area:

Adelanto	Fawnskin	Moonridge
Apple Valley	Helendale	Needles
Barstow	Hesperia	North Barstow
Big Bear City	Hinkley	Oro Grande
Big Bear Lake	Lenwood	Sugarloaf
Bryman	Lockhart	Summit
Calico	Lucerne Valley	Victorville
Daggett	Marianas Ranchos	Yermo

1B. The following communities are included in the Company's Northern California and South Lake Tahoe service areas:

Agate Bay	Homewood	Sunnyside
Brockway	Kings Beach	Tahoe City
Carnelian Bay	McKinney Bay	Tahoe Donner
Cedar Flat	Meeks Bay	Tahoe Pines
Chambers Lodge	Northstar	Tahoe Vista
Dollar Point	Rubicon Point	Tahoma
Donner Lake	South Lake Tahoe	Talmont
Glenshire	Sugar Pine Point	Truckee

The Company maintains separate distribution service rates for South Lake Tahoe and the remainder of its Northern California service area as reflected on the Northern California Division and South Lake Tahoe Statement of Rates.

2. DESCRIPTION OF SERVICE

The Company is principally engaged in the business of purchasing, distributing and transporting natural gas to residential, commercial and industrial customers in the southwestern United States.

Advice Letter No. 864 — Issued by John P. Hester Senior Vice President — Date Filed March 23, 2011 — Effective April 24 2011
Decision No. _____ — Resolution No. _____

SOUTHWEST GAS CORPORATION
P.O. Box 98510
Las Vegas, Nevada 89193-8510
California Gas Tariff — Canceling 111th Revised Cal. P.U.C. Sheet No. 72 / 110th Revised Cal. P.U.C. Sheet No. 72

STATEMENT OF RATES

RATES APPLICABLE TO SOUTH LAKE TAHOE SERVICE AREA [1]

Schedule No. and Type of Charge	Margin	Charges [2] and Adjustments	Subtotal Gas Usage Rate	Other Surcharges CPUC	Other Surcharges PPP	Gas Cost	Effective Sales Rate
SLT-40-Core General Gas Service (Covered Entities)							
Basic Service Charge	$11.00						$11.00
Transportation Service Charge	$780.00						$780.00
Cost per Therm							
First 100	$ .58322	$ .40054	$ .98376	$ .00577	$ .05245	$ .71489	$ 1.75687
Next 500	.49833	.40054	.89887	.00577	.05245	.71489	1.67198
Next 2,400	.41345	.40054	.81399	.00577	.05245	.71489	1.58710
Over 3,000	.26742	.40054	.66796	.00577	.05245	.71489	1.44107

6.2.3 Fuel Escalation Rates

6.2.3.1 Nonresidential Occupancies

Table 12 below demonstrate the escalation rates used for nonresidential buildings.

Table 11: Real Utility Rate Escalation Rate Assumptions

	Source	Statewide Electric Nonresidential Average Rate (%/year, real)	Statewide Natural Gas Nonresidential Core Rate (%/year, real)
2023	E3 2019	2.0%	4.0%
2024	2022 TDV	0.7%	7.7%
2025	2022 TDV	0.5%	5.5%
2026	2022 TDV	0.7%	5.6%
2027	2022 TDV	0.2%	5.6%
2028	2022 TDV	0.6%	5.7%
2029	2022 TDV	0.7%	5.7%
2030	2022 TDV	0.6%	5.8%
2031	2022 TDV	0.6%	3.3%
2032	2022 TDV	0.6%	3.6%
2033	2022 TDV	0.6%	3.4%
2034	2022 TDV	0.6%	3.4%
2035	2022 TDV	0.6%	3.2%
2036	2022 TDV	0.6%	3.2%
2037	2022 TDV	0.6%	3.1%

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 Twitter