



# CITY COUNCIL MEETING - AMENDED 4/7/23 AGENDA

7:00 PM - Tuesday, April 11, 2023  
*via Videoconference and In Person*

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**Please Note: The City Council will meet in person as well as via Telephone/Video Conference**

**Telephone: 1-669-444-9171 / Webinar ID:879 6426 1073**

**<https://losaltosca.gov.zoom.us/j/87964261073?pwd=b1ltQlQ5Y3ZnSCs5OEowZU9zejlRUT09>**

**Passcode: 118396**

**PLEASE NOTE:** Councilmember Fligor will participate in the meeting via videoconference from the site listed below. The meeting agenda will be posted on the videoconference site, which is accessible to the public. Anyone wishing to address the Council from the videoconference site will be provided with an opportunity to do so.

### **Location:**

**3001 Northstar Drive, Room #105  
Truckee, California 96161**

**TO PARTICIPATE IN-PERSON:** Members of the public may also participate in person by being present at the Los Altos Council Chamber at Los Altos City Hall located at 1 N. San Antonio Rd, Los Altos, CA.

**TO PARTICIPATE VIA VIDEO:** Follow the link above. Members of the public will need to have a working microphone on their device and **must have the latest version of ZOOM installed** (available at <https://zoom.us/download>). To request to speak, please use the “Raise hand” feature located at the bottom of the screen.

**TO PARTICPATE VIA TELEPHONE:** Members of the public may also participate via telephone by calling the number listed above. To request to speak, press \*9 on your telephone.

**TO SUBMIT WRITTEN COMMENTS:** Prior to the meeting, comments on matters listed on the agenda may be emailed to [PublicComment@losaltosca.gov](mailto:PublicComment@losaltosca.gov). Emails sent to this email address are sent to/received immediately by the City Council. Please include a subject line in the following format:

**PUBLIC COMMENT AGENDA ITEM ## - MEETING DATE**

Correspondence submitted in hard copy/paper must be received by 2:00 PM on the day of the meeting to ensure distribution prior to the meeting. Correspondence received prior to the meeting will be included in the public record. .

***Public testimony will be taken at the direction of the Mayor, and members of the public may only comment during times allotted for public comments.***

## AGENDA

### CALL MEETING TO ORDER

### ESTABLISH QUORUM

### PLEDGE ALLEGIANCE TO THE FLAG

### REPORT ON CLOSED SESSION

### CHANGES TO THE ORDER OF THE AGENDA

### PUBLIC COMMENTS ON ITEMS NOT ON THE AGENDA

Members of the audience may bring to the Council's attention any item that is not on the agenda. Speakers are generally given two or three minutes, at the discretion of the Mayor. Please be advised that, by law, the City Council is unable to discuss or take action on issues presented during the Public Comment Period. According to State Law (also known as "The Brown Act") items must first be noted on the agenda before any discussion or action.

### SPECIAL ITEM

- [A.](#) Holocaust Remembrance Day
- B. Introduction and welcome of the new City Clerk, Melissa Thurman

### CONSENT CALENDAR

These items will be considered by one motion unless any member of the Council or audience wishes to remove an item for discussion. Any item removed from the Consent Calendar for discussion will be handled at the discretion of the Mayor.

- [1.](#) **Minutes:** Approve Minutes of the City Council Regular meeting of March 28, 2023. (A. Rodriguez)
- [2.](#) **Santa Clara Valley Runoff Pollution Prevention Program:** Approve Contract Amendment No. 4 with Santa Clara Valley Runoff Pollution Prevention Program (SCVURPPP); find that the approval of the amendment is exempt from review under the California Environmental Quality Act ("CEQA") pursuant to CEQA Guidelines Sections 15061(b)(3) and 15308 (E. McDannold)
- [3.](#) **Military Equipment Policy:** Adopt Ordinance No. 2023-489 approving Los Altos Police Policy 709 pertaining to the funding, acquisition, and use of military equipment as mandated by Assembly Bill 481 (K. Krauss)

### PUBLIC HEARINGS

- [4.](#) **Single-use Foodware Accessories and Condiments Ordinance in Compliance with AB 1276:** Adopt the Single-use Foodware Accessories and Condiments Ordinance, in compliance with AB 1276, adding Chapter 6.45 (Single-use Foodware Accessories and Condiments) to Title 6 (Health and Safety) of the Los Altos Municipal Code by adopting by reference Chapter 5.2 (commencing

with section 42270) of Part 3 of Division 30 of the Public Resources Code prohibiting a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer and authorizing City and County enforcement and penalties (T. Katbi)

## DISCUSSION ITEMS

- 5. Prohibition on possession of firearms in sensitive places:** Introduce and waive further reading of Ordinance No. 2023-xxx prohibiting the possession of firearms in sensitive places (J. Maginot)
- 6. Outdoor Dining Program:** Extend the current COVID parklet program, adopt the City of Los Altos Resolution No. 2023-XX to amend the Los Altos Parklet Program, adopt the City of Los Altos Resolution No. 2023-XX to establish the Los Altos Sidewalk Dining Program, and adopt the City of Los Altos Resolution No. 2023-XX to amend the Los Altos Outdoor Display Program. (A. Carnesecca)
- 7. Los Altos Reach Codes Update:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code” (T. Katbi)
- 8. City Council and Commissions Teleconference Policy:** Add Section 11.13 Teleconferencing to the Council Norms & Procedures, which will allow Council members to teleconference under certain circumstances in accordance with state law, amend the Commission Handbook section “Teleconferencing” to allow Commission members to teleconference under certain circumstances in accordance with state law, and direct staff to come back with an update on this policy in six months. (A. Carnesecca)

## INFORMATIONAL ITEMS ONLY

- 9.** Tentative Council Calendar

## COUNCIL/STAFF REPORTS AND DIRECTIONS ON FUTURE AGENDA ITEMS

## ADJOURNMENT

**(Council Norms: It will be the custom to have a recess at approximately 9:00 p.m. Prior to the recess, the Mayor shall announce whether any items will be carried over to the next meeting. The established hour after which no new items will be started is 11:00 p.m. Remaining items, however, may be considered by consensus of the Council.)**

## SPECIAL NOTICES TO THE PUBLIC

In compliance with the Americans with Disabilities Act, the City of Los Altos will make reasonable arrangements to ensure accessibility to this meeting. If you need special assistance to participate in this meeting, please contact the City Clerk 72 hours prior to the meeting at (650) 947-2610.

Agendas Staff Reports and some associated documents for City Council items may be viewed on the Internet at <http://www.losaltosca.gov/citycouncil/online/index.html>.

All public records relating to an open session item on this agenda, which are not exempt from disclosure pursuant to the California Public Records Act, and that are distributed to a majority of the legislative body, will be available for public inspection at the Office of the City Clerk's Office, City of Los Altos, located at One North San Antonio Road, Los Altos, California at the same time that the public records are distributed or made available to the legislative body.

If you wish to provide written materials, please provide the City Clerk with 10 copies of any document that you would like to submit to the City Council for the public record.





# *Proclamation*

## *Of the Mayor*

### *Of the City of Los Altos, California*

**WHEREAS**, On April 18, 2023 we commemorate Yom HaShoah, Holocaust Remembrance Day; and

**WHEREAS**, We reflect on the horrors of the Holocaust when the Nazi regime systematically murdered six million Jews and five million others, including Roma, Sinti, Slavs, persons with disabilities, LGBTQI+ individuals, and political dissidents; and

**WHEREAS**, Antisemitism continues to escalate, with increasing attacks and violence against Jewish communities around the globe, while online and offline, hate speech is intensifying; and

**WHEREAS**, Antisemitism is a threat not only to those who subscribe to the Jewish faith, but all people no matter creed or background, it is a challenge to the core values that bind Americans together; and

**WHEREAS**, We honor the memories of Holocaust victims, we embrace the survivors, and we commit to keeping alive the promise of “never again”; and

**WHEREAS**, Today and every day, we stand against antisemitism and all other types of hate and continue to ensure that everyone can live in a world that safeguards the fundamental human dignity of all people;

**NOW THEREFORE**, I, Sally Meadows, Mayor of the City of Los Altos, and on behalf of the Los Altos City Council, do hereby proclaim April 18, 2023, to be

## **Yom HaShoah, Holocaust Remembrance Day**

and pledge that in Los Altos we stand together against antisemitism and hatred in all its forms.

**IN WITNESS WHEREOF**, I have hereunto set my hand and affixed the seal of the City of Los Altos this 11th day of April 2023.



  
Sally Meadows, MAYOR



**CITY COUNCIL MEETING  
MINUTES  
7:00 PM - Tuesday, March 28, 2023  
via Videoconference and In Person**

**CALL MEETING TO ORDER**

At 7:06 p.m. Mayor Meadows called the meeting to order.

**ESTABLISH QUORUM**

**PRESENT:** Councilmembers Fligor, Lee Eng (via Zoom), Dailey, Vice Mayor Weinberg, Mayor Meadows

**ABSENT:** None

Pursuant to California Government Code Section 54953, Council Member Lee Eng participated in the meeting via videoconference. The videoconference location was identified in the notice for this meeting. Councilmember Lee Eng confirmed that she could hear the proceedings, attested to have posted the agenda properly at her location, and that the location was publicly accessible.

**PLEDGE ALLEGIANCE TO THE FLAG**

Arya Tatavarty, with Troop 60430 led the pledge.

**REPORT ON CLOSED SESSION**

There was no Closed Session.

**CHANGES TO THE ORDER OF THE AGENDA**

Staff removed Item 7 from the Consent Calendar and informed the Council that it would return at the next meeting.

Vice Mayor Weinberg requested to move Item 16 to the Consent Calendar. City Attorney Houston responded and it was not moved.

**PUBLIC COMMENTS ON ITEMS NOT ON THE AGENDA**

The following members of the public spoke: Jon Baer, Joe Beninato, and Roberta Phillips.

**SPECIAL ITEM**

- A. Women's History Month Proclamation

Mayor Meadows presented the proclamation to the Council.

**CONSENT CALENDAR**

1. **Minutes:** Approve Minutes of the City Council Regular Meeting of February 28, 2023. (A. Rodriguez)
2. **Minutes:** Approve Minutes of the City Council Retreat of February 21, 2023. (A. Rodriguez)
3. **Receive and Accept:** Treasurer's Report – Month Ended December 31, 2022 (J. Du)
4. **Receive and Accept:** Quarterly Investment Portfolio Report – Quarter Ended December 31, 2022 (J. Du)
5. **City Council Goals:** Adopt a Resolution affirming the City Council Strategic Goals (J. Maginot)
6. **Award Construction Contract for Sewer System Repair Program, Project WW-01001:** Award the construction contract for the Base Bid and the Additive Alternate No. 1 (Total Bid) for the Sewer System Repair Program Project WW-01001 to Casey Construction, Inc. as the lowest responsive bidder submitting a bid in the amount not-to-exceed \$778,550 and approve the City Manager the authority up to 15% construction contingency if needed, in the amount not-to-exceed \$116,783 (T. Nguyen)
7. **Santa Clara Valley Runoff Pollution Prevention Program:** Approve Contract Amendment No. 4 with Santa Clara Valley Runoff Pollution Prevention Program (SCVURPPP); find that the approval of the amendment is exempt from review under the California Environmental Quality Act ("CEQA") pursuant to CEQA Guidelines Sections 15061(b)(3) and 15308 (E. McDannold) – *Removed by STAFF and continued to the April 11, 2023 meeting*
8. **2022 Housing Element Annual Progress Report:** Adopt a resolution authorizing staff to submit the Housing Element Annual Progress Report to HCD (S. Williams)
9. **SVCE Decarbonization Grant Program Agreement:** Adopt Resolution 2023-\_\_\_ authorizing the City Manager to 1) Accept the SVCE Decarbonization Grant Program Agreement for the design, procurement, and construction of the Energization Station Project (CF-XXX), 2) Appropriate the grant funds of \$200,684 to the CIP Project Funds (CF-XXX), and 3) Transfer \$8,500 from Sustainability Operating Budget (5330-5270) to the CIP Project Funds (CF-XXX) (E. McDannold)
10. **2023 Update of City Investment Policy:** Adopt the revised Investment Policy for 2023 (J. Du)
11. **Fiscal Year 2022 Audited Financial Statements and Compliance reports:** Accept Fiscal Year 2022 Audited Financial Statements and Compliance reports (J. Du)
12. **Hybrid Ford Police Interceptor Vehicles:** Approve Purchase of two Marked Patrol Hybrid Ford Police Vehicles from Folsom Lake Ford for a total of \$114,284.88 (K. Krauss)

Councilmember Dailey pulled Item 12 from the Consent Calendar and Mayor Meadows placed the item after Item 15 for consideration. Vice Mayor Weinberg asked a clarifying question about Item 5 and Assistant City Manager Maginot responded.

There was no public comment.

A motion by Vice Mayor Weinberg, seconded by Councilmember Dailey, to approve Items 1 through 6 and 8 through 11 from the Consent calendar was approved with the following roll call vote:

AYES: Councilmembers Fligor, Lee Eng, Dailey, Vice Mayor Weinberg, Mayor Meadows  
 NOES: None  
 ABSENT: None  
 ABSTAIN: None

## PUBLIC HEARINGS

### 13. Single-use Foodware Accessories and Condiments Ordinance in Compliance with AB 1276:

Introduce and waive further reading of a Single-use Foodware Accessories and Condiments Ordinance, in compliance with AB 1276, of the City Council of the City of Los Altos adding Chapter 6.45 (Single-use Foodware Accessories and Condiments) to Title 6 (Health and Safety) of the Los Altos Municipal Code adopting by reference Chapter 5.2 (commencing with section 42270) of Part 3 of Division 30 of the Public Resources Code prohibiting a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer and authorizing City and County enforcement and penalties, and set a Public Hearing on April 11, 2023 for adoption of the Ordinance. (T. Katbi)

Sustainability Coordinator Tania Katbi presented the item to Council.

Councilmember Fligor asked clarifying questions and Sustainability Coordinator Katbi and Environmental Services and Utilities Director Freedman responded.

The following member of the public spoke: Carl Van Reis.

A motion by Vice Mayor Weinberg, seconded by Councilmember Fligor, to adopt an Ordinance of the City Council of the City of Los Altos adding Chapter 6.45 (Single-use Foodware Accessories and Condiments) to Title 6 (Health and Safety) of the Los Altos Municipal Code adopting by reference Chapter 5.2 (commencing with section 42270) of Part 3 of Division 30 of the Public Resources Code prohibiting a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer and authorizing City and County enforcement and penalties, and set a Public Hearing on April 11, 2023 for the second reading and adoption was approved with the following roll call vote:

AYES: Councilmembers Fligor, Lee Eng, Dailey, Vice Mayor Weinberg, Mayor Meadows  
 NOES: None  
 ABSENT: None  
 ABSTAIN: None

### 14. Administrative Appeal: 389 and 425 1st Street

City Manager Engeland asked if any Councilmember had any ex parte communication or meeting with the appellant prior to this meeting with regards specifically to the item at hand to disclose that before the proceedings. Vice Mayor Weinberg and Councilmember Fligor did have prior substantive email exchanges with the appellant as well as a request for a meeting which they declined. No other members of the Council had prior communication.

City Attorney Houston introduced the item to Council and explained the appellate process.

Mr. Jeff Warmoth and his Attorney Mr. Clark Morrison, the appellants, addressed the Council.

Vice Mayor Weinberg, Councilmember Fligor, and Mayor Meadows asked clarifying questions and Messrs. Warmoth and Morrison responded.

City Attorney Houston and City Engineer Chen presented to Council.

Councilmember Fligor and Vice Mayor Weinberg asked clarifying questions to staff and they responded.

The following member of the public spoke: Nancy.

Mr. Morrison addressed the Council in response to public comment and answered further questions from Council.

Council engaged in discussion.

A motion by Vice Mayor Weinberg, seconded by Mayor Meadows, to deny the appeal was approved with the following roll call vote:

AYES:	Councilmembers Fligor, Lee Eng, Dailey, Vice Mayor Weinberg, Mayor Meadows
NOES:	None
ABSENT:	None
ABSTAIN:	None

At 8:35 pm, Mayor Meadows called for a recess and reconvened the meeting at 8:46 pm.

- 15. AB 481 Military Equipment Use Annual Report:** Review and renew Ordinance No. 2023-489 by introducing and waiving further reading of Ordinance No. 2023-489 approving Los Altos Police Policy 709 pertaining to the funding, acquisition, and use of military equipment as mandated by Assembly Bill 481 (K. Krauss)

Chief of Police Angela Averitt and Captain Katie Krauss presented to Council.

Councilmember Fligor asked clarifying questions and Captain Krauss responded.

The following members of the public spoke: Cindy Sidaris, Jacob Sterling Silver, Toni Moos, Jeanine Valadez, Roberta Phillips, and Tanya Maluf.

The Council engaged in discussion.

A motion by Councilmember Lee Eng, seconded by Vice Mayor Fligor, to renew the Ordinance No. 2023-489 by introducing and waiving further reading of Ordinance No. 2023-489 approving Los Altos Police Policy 709 pertaining to the funding, acquisition, and use of military equipment as mandated by Assembly Bill 481 and approve the acquisition of the replacement equipment items of military equipment listed in the annual report and also approve the acquisition and use of the new items of military equipment that are listed in the annual report. Councilmember Fligor asked for a friendly amendment to have language edited in a paragraph 709.3.1, which was accepted by Councilmember Lee Eng. The motion was approved with the following roll call vote:

AYES:	Councilmembers Fligor, Lee Eng, Dailey, Vice Mayor Weinberg, Mayor Meadows
NOES:	None

ABSENT: None  
 ABSTAIN: None

**12. Hybrid Ford Police Interceptor Vehicles:** Approve Purchase of two Marked Patrol Hybrid Ford Police Vehicles from Folsom Lake Ford for a total of \$114,284.88 (K. Krauss)

Police Chief Averiett presented the item to Council.

Councilmember Dailey, Vice Mayor Weinberg and Councilmember Lee Eng asked clarifying questions that Chief Averiett responded to.

There was no public comment.

The Council engaged in discussion.

A motion by Councilmember Lee Eng, seconded by Vice Mayor Meadows, to approve the purchase of two Marked Patrol Hybrid Ford Police Vehicles from Folsom Lake Ford for a total of \$114,284.88 and secure an extended warranty if available. A friendly amendment by Mayor Meadows to remove language about extended warranty was accepted by Councilmember Lee Eng. The motion was approved with the following roll call vote:

AYES: Councilmembers Fligor, Lee Eng, Dailey, Vice Mayor Weinberg, Mayor Meadows  
 NOES: None  
 ABSENT: None  
 ABSTAIN: None

**16. Adopt Housing Element Update Ordinance:** Adopt an ordinance of the City Council of the City of Los Altos amending chapters 2.08, 12.44, 13.04, 14.76, and 14.78 of the Los Altos municipal code to implement certain provisions of program 3.H and 3.K of the sixth cycle Housing Element Update, this ordinance is exempt from environmental review pursuant to section 15061(b)(3) of the state guidelines implementing the California Environmental Quality Act of 1970. (N. Zornes)

Community Development Director Nick Zornes presented the item to Council.

Council asked a clarifying questions and Director Zornes responded.

There was no public comment.

Council engaged in discussion.

A motion by Councilmember Dailey, seconded by Mayor Meadows, to adopt an ordinance of the City Council of the City of Los Altos amending chapters 2.08, 12.44, 13.04, 14.76, and 14.78 of the Los Altos municipal code to implement certain provisions of program 3.H and 3.K of the sixth cycle Housing Element Update, and finding this ordinance exempt from environmental review pursuant to section 15061(b)(3) of the state guidelines implementing the California Environmental Quality Act of 1970 was approved with the following roll call vote:

AYES: Councilmembers Lee Eng, Dailey, Vice Mayor Weinberg, Mayor Meadows  
 NOES: Councilmember Fligor

ABSENT: None  
 ABSTAIN: None

At 10:21 pm, Mayor Meadows called for a recess and reconvened the meeting at 10:29 pm.

- 17. Update on Return to In-Person City Council and Commission meetings:** Receive an update on the return to in-person City Council and Commission meetings and provide direction if needed (J. Maginot)

Assistant City Manager Jon Maginot presented the item to Council.

Councilmember Lee Eng and Fligor asked clarifying questions and staff responded.

The following member of the public spoke: Joe Beninato.

Council engaged in discussion and City Manager Engeland commented.

A motion by Mayor Meadows, seconded by Councilmember Lee Eng, to have the same rules for remote meeting participation that apply to Council also apply to Commissions with an assessment in 6 months, have staff recommend possible restrictions around application, and that the City will not bear any costs to enable remote participation. Councilmember Dailey provided a friendly amendment to revise the changes in the Commission handbook which was accepted by Mayor Meadows. The motion was approved by the following roll call vote:

AYES: Councilmembers Fligor, Lee Eng, Vice Mayor Weinberg, Mayor Meadows  
 NOES: Councilmember Dailey  
 ABSENT: None  
 ABSTAIN: None

- 18. SB43 Support Letter:** Discuss and Provide Direction regarding the SB43 Letter of Support regarding Mental Health Reforms

Mayor Meadows introduced the item to the Council. Councilmember Fligor further explained the legislative bills for consideration.

Council engaged in discussion.

There was no public comment.

A motion by Councilmember Fligor, seconded by Vice Mayor Weinberg, to give the Mayor authority to sign the letter contained in the packet in support of SB 43/ SB363 was approved with the following roll call vote:

AYES: Councilmembers Fligor, Lee Eng, Dailey, Vice Mayor Weinberg, Mayor Meadows  
 NOES: None  
 ABSENT: None  
 ABSTAIN: None

## INFORMATIONAL ITEMS ONLY

- 19. Tentative Council Calendar**

**COUNCIL/STAFF REPORTS AND DIRECTIONS ON FUTURE AGENDA ITEMS**

Councilmember Lee Eng gave a report to the Council regarding her attendance of the National League of Cities Congressional City Conference.

Council reported out on events they have participated in recently.

Councilmember Fligor reported that she plans on attending the Cal Cities Leaders’ summit in April.

Councilmember Fligor requested an Emergency Operations Report and that Commission recommendations be part of Staff reports. City Manager Engeland responded that Emergency Operations Report was in the works and that Commission feedback will start coming forward in staff reports.

Councilmember Dailey requested a discussion of mitigation of power failures, which received support from Councilmember Lee Eng. Council will wait to discuss mitigation of power failures until after receiving a report from the City Manager on the recent power outages.

Councilmember Lee Eng asked for a report on the City’s Neighborhood Watch which will come back as an informational report. Councilmember Lee Eng also asked to support SB 423, which received a second from Councilmember Fligor to come back to Council.

Mayor Meadows asked for a Council Travel Policy, which received support from Councilmember Fligor and Vice Mayor Weinberg.

**ADJOURNMENT**

Mayor Meadows adjourned the meeting at 12:08 am.

ATTEST:

\_\_\_\_\_  
Sally Meadows, MAYOR

\_\_\_\_\_  
Angel Rodriguez, INTERIM CITY CLERK





**AGENDA REPORT SUMMARY**

**Meeting Date:** April 11, 2023

**Subject:** Consider Approving Contract Amendment No. 4: Santa Clara Valley Runoff Pollution Prevention Program (SCVURPPP); find that the approval of the amendment is exempt from review under the California Environmental Quality Act (“CEQA”) pursuant to CEQA Guidelines Sections 15061(b)(3) and 15308

**Prepared by:** Erin McDannold, Assistant Civil Engineer  
**Reviewed by:** Aida Fairman, Director of Environmental Services & Utilities Department  
**Approved by:** Gabriel Engeland, City Manager

**Attachments:**  
1. Fourth Amendment to Memorandum of Agreement (MOA)  
A. Resolution No. 2023-XX

**Initiated by:**  
SCVURPPP/City Staff

**Previous Council Consideration:**  
November 22, 1999 – Original SCVURPPP Memorandum of Agreement (MOA)  
November 23, 2004 – First Amendment  
December 21, 2005 – Second Amendment  
October 25, 2016 – Third Amendment  
November 15, 2022 – Municipal Regional Stormwater Permit: Overview of New Requirements

**Fiscal Impact:**  
None at this time.

The City’s proportionate share of the Program costs is 1.59%. Program costs are paid from the allocated Stormwater Operating Budget, which is funded by the General Fund. The Progress Assessment for the City of Los Altos for FY 22-23 was \$82,568 (4310-5270), which was paid for from the adopted budget. The Progress Assessment for FY 23-24 will be \$89,970.



**Subject:** Contract Amendment No. 4: Santa Clara Valley Runoff Pollution Prevention Program

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**Environmental Review:**

The approval of the Fourth Amendment to the MOA is exempt from review under the California Environmental Quality Act (“CEQA”) pursuant to CEQA Guidelines Section 15061(b)(3) (Commonsense Exemption) and 15308 (Actions Taken by Regulatory Agencies for the Protection of the Environment), in that the action merely continues the City’s existing participation in a program that fosters compliance with state and federal law intended to protect water quality, the action will not involve construction activities or relaxation of standards allowing for environmental degradation, and none of the circumstances stated in CEQA Guidelines Section 15300.2 applies.

**Policy Questions for Council Consideration:**

Not applicable



**Subject:** Contract Amendment No. 4: Santa Clara Valley Runoff Pollution Prevention Program

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**Summary:**

- The Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) assists the City of Los Altos and other agencies in Santa Clara County to negotiate and comply with a federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit that cities are required to have for stormwater that flows to creeks, streams, and, ultimately, San Francisco Bay.
- The City of Los Altos and other agencies in Santa Clara County expect to use the Program to continue to represent their interests relative to Municipal Regional Permit (MRP 3.0), to help them effectuate certain aspects of compliance with MRP 3.0, and to negotiate the terms of a further renewed NPDES Permit when MRP 3.0 nears the end of its five-year term and any administrative extension provided.
- All Program participants are required to obtain approval from the legislative authority for the MOA amendment extending the agreement through 2028. The current MOA will expire in July of 2023, if not extended.

**Staff Recommendation:**

Approve the Fourth Amendment to the Santa Clara Valley Urban Runoff Pollution Prevention Program’s Memorandum of Agreement (MOA) and direct the City Manager to execute the Amendment on behalf of the City



**Subject:** Contract Amendment No. 4: Santa Clara Valley Runoff Pollution Prevention Program

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**Purpose**

Execute the Fourth Amendment to the Santa Clara Valley Urban Runoff Pollution Prevention Program MOA.

**Background**

The Santa Clara Valley Urban Pollution Prevention and Urban Runoff Program (Program) was originally formed through a memorandum of agreement (MOA) with other Santa Clara Valley-based local governments in the late 1980s. This was a means to assist the City of Los Altos in negotiating and complying with a federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit that cities are required to have for stormwater that flows to creeks, streams, and, ultimately, the San Francisco Bay. Bay Area municipalities were recently issued a new Municipal Regional Stormwater Permit in May 2022, which became effective July 1, 2022. This permit is shared by 76 permittees in the San Francisco Area.

This MRP 3.0 includes and expands on many of the previous requirements and contains new provisions. MRP 3.0 includes more stringent requirements on existing provisions for new development/redevelopment, trash load reduction, PCB, mercury and bacteria controls, and water quality monitoring and introduces new provisions on unsheltered homeless populations, cost reporting, and asset management. Outside those mentioned above, previously existing provisions also encountered minor changes. An overview of new MRP 3.0 requirements was shared with City Council on November 15, 2022. Thus far, the Program has been highly engaged in understanding these changes with local regulatory agencies and helping permittees adapt to new MRP 3.0 requirements.

The Program allows the City of Los Altos to undertake a coordinated approach and leverage resources with respect to our stormwater permit. This method has been highly effective in assisting the City to address our responsibilities, twice winning national awards issued by the U.S. Environmental Protection Agency. Since its original formation, the participating local governments, including the City of Los Altos, have thrice previously authorized a continuation of the Program without changing its original terms.

**Discussion/Analysis**

Based on a recent vote of the Program’s Management Committee, in which the City participates, a fourth amendment of the MOA to extend the Program on its original terms was unanimously approved for referral to our governing body for execution. The extension will allow the Program to continue to operate and serve the participating agencies throughout the current Clean Water Act Permit’s term plus one additional fiscal year (providing Program assistance until at least the July of 2028 and addressing the Permit’s next re-issuance by the Regional Water Quality Control Board).



**Subject:** Contract Amendment No. 4: Santa Clara Valley Runoff Pollution Prevention Program

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All Program participants are required to obtain approval from the legislative authority for the MOA amendment extending the agreement through July 2028. The current MOA will expire in July of 2023 if not extended.

The City of Los Altos and other agencies in Santa Clara County expect to utilize the Program to continue to represent their interests relative to Municipal Regional Permit (MRP 3.0), to help them effectuate certain aspects of compliance with MRP 3.0, and to negotiate the terms of a further renewed NPDES Permit when MRP 3.0 nears the end of its five-year term and any administrative extension provided.

**Recommendation**

Approve the Fourth Amendment to the Santa Clara Valley Urban Runoff Pollution Prevention Program’s Memorandum of Agreement (MOA) and direct the City Manager to execute the Amendment on behalf of the City

**FOURTH AMENDMENT TO AGREEMENT  
PROVIDING FOR IMPLEMENTATION OF  
THE SANTA CLARA VALLEY URBAN RUNOFF  
POLLUTION PREVENTION PROGRAM**

THIS FOURTH AMENDMENT TO AGREEMENT PROVIDING FOR IMPLEMENTATION OF THE SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTION PROGRAM (the “Amendment”) is entered into by and between the SANTA CLARA VALLEY WATER DISTRICT, a local public agency of the State of California (“District”); CITY OF CAMPBELL, a municipal corporation of the State of California; CITY OF CUPERTINO, a municipal corporation of the State of California; CITY OF LOS ALTOS, a municipal corporation of the State of California; TOWN OF LOS ALTOS HILLS, a municipal corporation of the State of California; TOWN OF LOS GATOS, a municipal corporation of the State of California; CITY OF MILPITAS, a municipal corporation of the State of California; CITY OF MONTE SERENO, a municipal corporation of the State of California; CITY OF MOUNTAIN VIEW, a municipal corporation of the State of California; CITY OF PALO ALTO, a municipal corporation of the State of California; CITY OF SAN JOSE, a municipal corporation of the State of California; CITY OF SANTA CLARA, a municipal corporation of the State of California; CITY OF SARATOGA, a municipal corporation of the State of California; CITY OF SUNNYVALE, a municipal corporation of the State of California; and COUNTY OF SANTA CLARA, a political subdivision of the State of California.

All of the above-mentioned entities are hereinafter collectively referred to as “Parties” or individually as “Party.”

**RECITALS**

A. The Parties previously entered into that certain Agreement Providing For Implementation of the Santa Clara Valley Urban Runoff Pollution Prevention Program (the “Agreement” or “MOA”) pursuant to which the Parties established certain terms and conditions relating to the implementation and oversight of the Santa Clara Valley Urban Runoff Pollution Prevention Program (the “Program”), including a cost sharing allocation, which was appended thereto as Exhibit A. Unless otherwise set forth herein, all terms shall have the meaning set forth in the Agreement as amended. A copy of the Agreement inclusive of Exhibit A is attached hereto as Appendix 1. A copy of the Agreement inclusive of all of its previous amendments is available via the internet at [https://scvurppp.org/wp-content/uploads/2019/10/MOA\\_2016\\_complete\\_package\\_DEC\\_2016.pdf](https://scvurppp.org/wp-content/uploads/2019/10/MOA_2016_complete_package_DEC_2016.pdf));

B. The Agreement originally provided for a five-year term, which, based on its execution, was set to conclude on or about March 10, 2005. However, on or about February 20, 2005, the Parties unanimously entered into a First Amendment to the Agreement, which extended the term of the Agreement by one additional year;

C. The Parties thereafter unanimously entered into a Second Amendment to the Agreement, which extended the term of the amended Agreement by “one fiscal year beyond the termination date of the (then) next NPDES Permit issued to the Parties, including any administrative extension of the (then) next NPDES Permit’s term which occurred pursuant to the NPDES regulations.” The next NPDES permit applicable to the Parties (and others) was subsequently adopted by the California Regional Water Quality Control Board, San Francisco Bay Region (“RWQCB SFBR”) on October 14, 2009 and was known as the Municipal Regional Permit (“MRP”) because it covered numerous public agencies in the San Francisco Bay Region in addition to the Parties. The MRP was then administratively extended until a new NPDES Permit applicable to the Parties (and the other public entities in the San Francisco Bay Region) was adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on November 19, 2015 (“MRP 2.0”). MRP 2.0 became effective on January 1, 2016 and was originally scheduled to terminate on December 31, 2020;

D. The Parties thereafter unanimously entered into a Third Amendment to the Agreement, which once again extended the term of the amended Agreement by “one fiscal year beyond the termination date of the next NPDES Permit issued to the Parties, including any administrative extension of the next NPDES Permit’s term which occurred pursuant to the NPDES regulations.” MRP 2.0 was then administratively extended, largely due to the COVID-19 pandemic, until a new NPDES Permit applicable to the Parties (and the other public entities in the San Francisco Bay Region) was adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on May 11, 2022 (“MRP 3.0”). MRP 3.0 became effective on July 1, 2022 and is currently scheduled to terminate on June 30, 2027 unless administratively extended;

E. The Parties expect to utilize the Program to continue to represent their interests relative to MRP 3.0 (including with respect to an administrative appeal of its adoption that the State Water Resources Control Board is considering to pursue on its own motion), to help them effectuate certain aspects of compliance with MRP 3.0, and, beyond that, in negotiating the terms of a further renewed NPDES Permit when MRP 3.0 nears the end of its anticipated five-year term and any administrative extension provided thereto;

F. The Parties also expect to continue to utilize the Program’s preferred approach of achieving consensus to resolve issues and reach decisions, and to rely on the Majority Vote mechanism set forth in Section 2.08 of the Agreement at the Management Committee level only when consensus-based resolutions appear or become elusive;

G. The Parties now desire to update the Agreement as previously amended and further extend the term of the MOA as set forth below;

H. Section 7.02 of the MOA provides that it may be amended by the unanimous written agreement of the Parties and that all Parties agree to bring any proposed amendments to their Council or Board, as applicable, within three (3) months following acceptance by the Management Committee; and

I. The Program’s Management Committee accepted this Amendment for referral to the Parties’ Councils and/or Boards at its meeting on [January 19, 2023].

**NOW, THEREFORE, THE PARTIES HERETO FURTHER AGREE AS FOLLOWS:**

1. Recognition of Current Permit. Recital F of the Agreement, as previously amended, is hereby further amended by the addition of the following subsections:

6. Order No. R2-2009-0074 (the Municipal Regional Permit, NPDES Permit CAS612008); adopted October 14, 2009 and amended by the RWQCB SFBR on November 28, 2011;

7. Order No. R2-2015-0049 (MRP 2.0, NPDES Permit CAS612008); adopted by the RWQCB SFBR on November 19, 2015;

8. Order No. R2-2022-0018 (MRP 3.0, NPDES Permit CAS612008); adopted by the RWQCB SFBR on May 11, 2022.

2. Extension of Term of Agreement. Sections 6.02 and 6.02.01 of the Agreement, as previously amended, are hereby replaced as follows:

This Agreement shall have a term extending one fiscal year beyond the date of termination of MRP 3.0; such termination date shall, however, be deemed to include any administrative extension of MRP 3.0 which occurs or arises pursuant to the NPDES regulations or any modification of the MRP 3.0 termination date that arises from an NPDES permitting action undertaken by the RWQCB SFBR or California State Water Resources Control Board.

3. Superseding Effect. This Fourth Amendment of the Agreement shall supplement all prior amendments of the Agreement and supersede any conflicting provisions of the prior amendments of the Agreement.

[remainder of page intentionally blank]



**IN WITNESS WHEREOF**, the Parties have executed this Fourth Amendment effective as of the last date indicated below or [April 19, 2023], whichever arises earlier.

***Santa Clara Valley Water District:*** By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

***County of Santa Clara:*** By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

***City of \_\_\_\_\_:*** By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

RESOLUTION NO. 2023-\_\_

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LOS ALTOS DIRECTING THE CITY MANAGER TO APPROVE AND EXECUTE THE FOURTH AMENDMENT TO THE MEMORANDUM OF AGREEMENT WITH OTHER SANTA CLARA VALLEY MUNICIPALITIES TO ALLOW FOR CONTINUATION OF THE SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTION PROGRAM**

**WHEREAS**, the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) was originally formed in 1990 through the Memorandum of Agreement to aid Santa Clara Valley-based jurisdictions with stormwater permit compliance per the Municipal Regional Permit; and

**WHEREAS**, the SCVURPPP is invaluable in providing and pooling resources to meet permit requirements since its' formation; and

**WHEREAS**, the existing Memorandum of Agreement has already been amended three times prior and SCVURPPP will cease to exist July 1, 2023 if not amended for a fourth time by April 19, 2023.

**NOW THEREFORE, BE IT RESOLVED**, that the City Council of the City of Los Altos hereby authorizes the following:

1. That the City Manager is directed to execute the Fourth Ammendment to the Memorandum of Agreement; and
2. That the acceptance of the work under this MOA is exempt from review under the California Environmental Quality Act ("CEQA") for reasons stated in the staff report.

**I HEREBY CERTIFY** that the foregoing is a true and correct copy of a Resolution passed and adopted by the City Council of the City of Los Altos at a meeting thereof on the 11<sup>th</sup> day of April, 2023 by the following vote:

AYES:  
NOES:  
ABSENT:  
ABSTAIN:

\_\_\_\_\_  
Sally Meadows, MAYOR

Attest:

\_\_\_\_\_  
Angel Rodriguez, INTERIM CITY CLERK



**AGENDA REPORT SUMMARY**

**Meeting Date:** April 11, 2023

**Subject** AB 481 Ordinance No. 2023-489 Adoption

**Prepared by:** Katie Krauss, Police Captain  
**Reviewed by:** Angela Averiett, Police Chief  
**Approved by:** Gabriel Engeland, City Manager

**Attachment(s):**

- 1. AB 481 Ordinance No. 2023-489
- 2. Military Equipment Policy 709
- 3. Military Equipment Inventory Policy 709.9

**Initiated by:**

Police Department, per requirements of Assembly Bill 481

**Previous Council Consideration:**

September 20, 2022  
March 28, 2023

**Fiscal Impact:**

There is no fiscal impact to the General Fund.

**Environmental Review:**

This Ordinance is not subject to the California Environmental Quality Act (“CEQA”) pursuant to Sections 15060(c)(2) of the CEQA Guidelines (Title 14, Chapter 3 of the California Code of Regulations) (the activity will not result in a direct or reasonable foreseeable indirect physical change in the environment) and 15060(c)(3) (the activity is not a project as defined in Section 15378 of the CEQA Guidelines because it has no potential for resulting in physical change to environment, directly or indirectly).

**Policy Question(s) for Council Consideration:**

- 1. Does the Council wish to adopt Ordinance No. 2023-489 approving Los Altos Police Policy 709 pertaining to the funding, acquisition, and use of military equipment as mandated by Assembly Bill 481?

City Manager

GE

**Reviewed By:**

City Attorney

JH

Finance Director

JE



Subject: Title

**Summary:**

- California Assembly Bill 481 requires the Los Altos Police Department to report annually on the inventory, procurement, use and misuse of covered military equipment items. The Annual Report also includes a description of new military equipment the police department seeks City Council approval for acquisition and funding for. The AB 481 Annual Report was presented to Council on 3/28/23
- Within a year of the initial approval, and at least annually thereafter, the City Council will review this ordinance and related resolutions. The City Council may, by resolution, make amendments, modifications or revisions to the military equipment use policy adopted by the Los Altos Police Department. The ordinance must be reviewed and renewed annually.
- Ordinance 2023-489 was introduced to Council on 3/28/23 and Council waived further reading.

**Staff Recommendation:**

- Staff recommends adoption of Ordinance No. 2023-489 approving Los Altos Police Policy 709 pertaining to the funding, acquisition, and use of military equipment as mandated by Assembly Bill 481

**Purpose**

To adopt Ordinance No. 2023-489 approving Los Altos Police Policy 709 pertaining to the funding, acquisition, and use of military equipment as mandated by Assembly Bill 481.

**Background**

On September 30, 2021, Governor Newsom signed a series of eight (8) policing reform legislation aimed at increasing transparency of peace officer misconduct records and creates a system to decertify peace officers for serious misconduct, improving policing responsibility and accountability guidelines, raising eligibility standards, banning harmful restraint techniques, and creates a public forum for the funding, acquisition and use of military equipment. Assembly Bill 481 (AB 481) was authored by Assemblymember David Chiu (D-San Francisco) to address the funding, acquisition and use of military equipment.

California Government Section 7071 requires a law enforcement agency’s military equipment policy, which includes the type of equipment the department may acquire and use, to be approved by the governing body. “Military equipment” is not related to whether or not the



**Subject:** Title

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equipment was acquired through military sources. The Los Altos Police Department does not possess any equipment specifically designed for military use, nor has the department acquired any equipment through a military surplus program, commonly known as the 1033 Program. Our “military equipment” is included in the attached policy under inventory, and includes items such as patrol rifles, several less lethal force options, and training flash bangs utilized as diversionary devices by our SWAT team.

As part of the approval process outlined in Assembly Bill 481, the proposed military equipment policy was made available on the department website at least 30 days prior to any public hearing concerning the military equipment at issue (Government Code § 7071). The police department also hosted a community meeting to discuss AB 481 on May 12<sup>th</sup>, 2022. The Military Equipment Use Policy was presented to Council on September 20, 2022 and was approved with minor amendments. The Annual Report, a requirement of AB 481, was presented to citizens at a Town Hall meeting on February 8, 2023.

The Annual Report was presented to Council on 3/28/23. Per the requirements of AB 481, the ordinance (2023-489) was introduced on 3/28/23 and Council waived further reading. Ordinance No. 2023-489 needs to be adopted as an ordinance of the City of Los Altos.

**Discussion/Analysis**

California Assembly Bill 481, signed into law on September 30, 2021, requires police agencies to obtain City Council approval by the adoption of a military equipment use policy prior to taking certain actions relating to the funding, acquisition, or use of military equipment as defined by the legislature. The bill requires an annual report to the governing board regarding the military equipment. If an agency wishes to acquire additional equipment that is defined as military equipment, they must receive Council approval. The policy/ordinance governing military equipment use must be reviewed and renewed annually.

**Recommendation**

Staff recommends Council adopt Ordinance No. 2023-489 approving Los Altos Police Policy 709 pertaining to the funding, acquisition, and use of military equipment as mandated by Assembly Bill 481.

**ORDINANCE NO. 2023-489**

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF LOS ALTOS ADDING A NEW CHAPTER 7.30, ENTITLED “MILITARY EQUIPMENT POLICY,” TO THE LOS ALTOS CITY CODE IN COMPLIANCE WITH ASSEMBLY BILL 481**

**WHEREAS**, on September 30, 2021, Governor Gavin Newsom signed into law Assembly Bill 481 (“AB 481”) (creating Government Code, Section 7070, et seq.), relating to the use of military equipment by California law enforcement agencies; and

**WHEREAS**, AB 481 seeks to provide transparency, oversight, and an opportunity for meaningful public input on decisions regarding whether and how military equipment is funded, acquired, or used; and

**WHEREAS**, the Los Altos Police Department is in possession of certain items of equipment that qualify as “military equipment” under AB 481; and

**WHEREAS**, AB 481 requires that a law enforcement agency possessing and using such qualifying equipment prepare a publicly released, written military equipment use policy document covering the inventory, description, purpose, use, acquisition, maintenance, fiscal impacts, procedures, training, oversight, and complaint process applicable to the Los Altos Police Department’s use of such equipment; and

**WHEREAS**, the Policy and supporting information must be approved by the governing body by Ordinance and reviewed annually; and

**WHEREAS**, the City Council of the City of Los Altos, having received the information required under AB 481 regarding the Los Altos Police Department’s use of military equipment as defined in said law, deems it to be in the best interest of the City to approve the Military Equipment Policy as set forth herein.

**NOW THEREFORE**, the City Council of the City of Los Altos does hereby ordain as follows:

**SECTION 1. AMENDMENT TO CHAPTER 7 OF THE MUNICIPAL CODE.** Section 7.30.010 is hereby added to the Los Altos Municipal Code to read as follows:

**“7.30.010. Military equipment policy.**

- A. The City Council has made the following determinations:
  1. The military equipment inventoried and presented to the City Council is necessary because there is no reasonable alternative that can achieve the same objective of officer and civilian safety.
  2. The proposed military equipment use policy (“Policy”) will safeguard the public’s welfare, safety, civil rights and civil liberties (said Policy is attached hereto as Exhibit “A” and incorporated by this reference).

3. The equipment is reasonably cost-effective compared to available alternatives that can achieve the same objective of officer and civilian safety (if any).
4. Prior military equipment use complied with the applicable equipment use policy (which included equipment now defined as military equipment) that was in effect at the time, or if prior uses did not comply with the accompanying military equipment use policy, corrective action has been taken to remedy nonconforming uses and ensure future compliance.

B. The Policy was considered by the City Council as an agenda item in an open session of regular meeting and noticed in accordance with the Ralph M. Brown Act, at which public comment was permitted.

C. The Policy shall be made publicly available on the Los Altos police department’s website for as long as the military equipment is available for use.

D. The Los Altos police department shall submit an annual military equipment report to the city council containing the information required in California Government Code, Section 7072, and the city council shall determine whether each type of military equipment identified in that report has complied with the standards for approval set forth in Paragraphs (a)(1)-(4) above.

E. The City Council shall review this Ordinance and vote on whether to renew it, on an annual basis at a regular meeting, in accordance with California Government Code Section 7071(e)(2).

F. The City Council approves the use of the Policy and finds that it satisfies the requirements of California Government Code Section 7070(d).”

**SECTION 2.** This Ordinance is not subject to the California Environmental Quality Act (“CEQA”) pursuant to Sections 15060(c)(2) of the CEQA Guidelines (Title 14, Chapter 3 of the California Code of Regulations) (the activity will not result in a direct or reasonable foreseeable indirect physical change in the environment) and 15060(c)(3) (the activity is not a project as defined in Section 15378 of the CEQA Guidelines because it has no potential for resulting in physical change to environment, directly or indirectly).

**SECTION 3. CONSTITUTIONALITY.** If any section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this Ordinance.

**SECTION 4. PUBLICATION.** This Ordinance shall be published as provided in Government Code section 36933.

**SECTION 5. EFFECTIVE DATE.** This Ordinance shall be effective upon the commencement of the thirty-first day following the adoption date.

The foregoing Ordinance was duly and properly introduced at a regular meeting of the City Council of the City of Los Altos held on \_\_\_\_\_, 2023 and was thereafter, at a regular meeting held on \_\_\_\_\_, 2023 passed and adopted by the following vote:

- AYES:
- NOES:
- ABSENT:
- ABSTAIN:

\_\_\_\_\_  
Sally Meadows, MAYOR

Attest:

\_\_\_\_\_  
Angel Rodriguez, INTERIM CITY CLERK



# Military Equipment

## 709.1 PURPOSE AND SCOPE

The purpose of this policy is to provide guidelines for the approval, acquisition, and reporting requirements of military equipment (Government Code § 7070; Government Code § 7071; Government Code § 7072). Assembly Bill 481 (AB 481), signed into law on September 30, 2021, requires law enforcement agencies to create a policy establishing guidelines and requirements for the funding, acquisition, and use of "military equipment" (Government Code § 7070, 7071, and 7072), including requirements to host informational meetings with the public, generate annual "military equipment" use reports, and seek annual approval from their respective governing bodies. The purpose of this policy is to make sure that safeguards exist, including transparency, governing body oversight, and accountability measures, to ensure the funding, acquisition, and use of "military equipment" is consistent with the provisions set forth by the governing body and as outlined in AB 481. This policy will also provide the public with a transparent view of the "military equipment" utilized by the Los Altos Police Department. The military equipment use policy will safeguard the public's welfare, safety, civil rights and civil liberties.

### 709.1.1 DEFINITIONS

Definitions related to this policy include (Government Code § 7070):

**Governing body** – The Los Altos City Council for the adoption of this ordinance and the approval of the annual report

**POST** - Peace Officer Standards and Training

**SWAT** - Special Weapons and Tactics

**Military equipment** – Per AB 481, military equipment includes but is not limited to the following:

- (1) Unmanned, remotely piloted, powered aerial or ground vehicles.
- (2) Mine-resistant ambush-protected (MRAP) vehicles or armored personnel carriers. However, police versions of standard consumer vehicles are specifically excluded from this subdivision.
- (3) High mobility multipurpose wheeled vehicles (HMMWV), commonly referred to as Humvees, two and one-half-ton trucks, five-ton trucks, or wheeled vehicles that have a breaching or entry apparatus attached. However, unarmored all-terrain vehicles (ATVs) and motorized dirt bikes are specifically excluded from this subdivision.
- (4) Tracked armored vehicles that provide ballistic protection to their occupants and utilize a tracked system instead of wheels for forward motion.
- (5) Command and control vehicles that are either built or modified to facilitate the operational control and direction of public safety units.
- (6) Weaponized aircraft, vessels, or vehicles of any kind.

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(7) Battering rams, slugs, and breaching apparatuses that are explosive in nature. However, items designed to remove a lock, such as bolt cutters, or a handheld ram designed to be operated by one person, are specifically excluded from this subdivision.

(8) Firearms of .50 caliber or greater. However, standard issue shotguns are specifically excluded from this subdivision.

(9) Ammunition of .50 caliber or greater. However, standard issue shotgun ammunition is specifically excluded from this subdivision.

(10) Specialized firearms and ammunition of less than .50 caliber, including assault weapons as defined in Sections 30510 and 30515 of the Penal Code, with the exception of standard issue service weapons and ammunition of less than .50 caliber that are issued to officers, agents, or employees of a law enforcement agency or a state agency.

(11) Any firearm or firearm accessory that is designed to launch explosive projectiles.

(12) "Flashbang" grenades and explosive breaching tools, "tear gas," and "pepper balls," excluding standard, service-issued handheld pepper spray.

(13) Taser Shockwave, microwave weapons, water cannons, and the Long Range Acoustic Device (LRAD).

(14) The following projectile launch platforms and their associated munitions: 40mm projectile launchers, "bean bag," rubber bullet, and specialty impact munition (SIM) weapons.

(15) Any other equipment as determined by a governing body or a state agency to require additional oversight.

(16) Notwithstanding paragraphs (1) through (15), "military equipment" does not include general equipment not designated as prohibited or controlled by the federal Defense Logistics Agency.

### **709.2 POLICY**

It is the policy of the Los Altos Police Department that members of the department comply with the provisions of Government Code § 7071 with respect to qualifying "military equipment". "Military equipment" should be used by members of the Department who have completed applicable training, including training required by the Commission on Peace Officer Standards and Training (POST). See the Military Equipment Inventory List (section 709.4) for associated "military equipment" training requirements.

"Military equipment", which has been approved for use by the governing body, shall be used in accordance with all other applicable department policies and laws. These policies and laws include, but are not limited to:

- Los Altos Police Department Policy 300 (Use of Force)
- Los Altos Police Department Policy 308 (Control Devices and Techniques)
- Los Altos Police Department Policy 312 (Firearms)

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- Los Altos Police Department Policy 414 (Hostage and Barricade Incidents)
- California Assembly Bill No. 48 (Use of Kinetic Energy Projectiles and Chemical Agents-Assemblies, Protests, and Demonstrations)
- California Penal Code Section 13652 (Use of Kinetic Energy Projectiles and Chemical Agents)

This policy expressly prohibits the use of "military equipment" on individuals or groups solely based on actual or perceived characteristics, such as race, ethnicity, national origin, religion, sex, sexual orientation, gender identity or expression, economic status, age, cultural group, or disability.

### **709.3 APPROVAL**

The Chief of Police or the authorized designee shall obtain approval from the governing body by way of an ordinance adopting the military equipment policy. As part of the approval process, the Chief of Police or the authorized designee shall ensure the proposed military equipment policy is submitted to the governing body and is available on the department website at least 30 days prior to any public hearing concerning the military equipment at issue (Government Code § 7071). The military equipment policy must be approved by the governing body before the Department engages in any of the following (Government Code § 7071):

- (a) Requests military equipment made available pursuant to 10 USC § 2576a.
- (b) Seeks funds for military equipment, including but not limited to applying for a grant, soliciting or accepting private, local, state, or federal funds, in-kind donations, or other donations or transfers.
- (c) Acquires military equipment either permanently or temporarily, including by borrowing or leasing.
- (d) Collaborates with another law enforcement agency in the deployment or other use of military equipment within the jurisdiction of this department.
- (e) Uses any new or existing military equipment for a purpose, in a manner, or by a person not previously approved by the governing body.
- (f) Solicits or responds to a proposal for, or enters into an agreement with, any other person or entity to seek funds for, apply to receive, acquire, use, or collaborate in the use of military equipment.
- (g) Acquires military equipment through any means not provided above.

#### **709.3.1 EXIGENCY- PROCUREMENT AND USE**

Subject to this paragraph, nothing in this policy shall prohibit the procurement or use of controlled equipment when exigent circumstances exist. In rare circumstances, exigent circumstances may occur where the immediate procurement and use of controlled equipment may be necessary to preserve life, prevent physical harm to officers or other persons, prevent the destruction of relevant evidence, prevent the escape of the suspect, or maintain public safety. In the event such an event occurs, the Chief of Police or the authorized designee may authorize the procurement and

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use of controlled equipment. Any exigent procurement and/or use of controlled equipment will be reported to the governing body, in writing, unless such information is confidential or privileged under local, state or federal law.

### **709.3.2 MAINTENANCE AND RESUPPLY OF CONTROLLED EQUIPMENT**

In the event a previously approved supply of controlled equipment falls below the approved quantity, the Department may replenish the supply, as needed, without first obtaining additional approval from the Governing Body.

### **709.4 COORDINATION WITH OTHER JURISDICTIONS**

Military equipment used by other law enforcement agencies that are providing mutual aid to this jurisdiction or otherwise engaged in law enforcement operations within this jurisdiction should comply with their respective military equipment policies in rendering mutual aid.

### **709.5 ANNUAL REPORT**

Upon approval of a military equipment policy, the Chief of Police or the authorized designee should submit a military equipment report to the governing body for each type of military equipment approved within one year of approval, and annually thereafter for as long as the military equipment is available for use (Government Code § 7072).

The Chief of Police or the authorized designee should also make each annual military equipment report publicly available on the department website for as long as the military equipment is available for use. The report shall include all information required by Government Code § 7072 for the preceding calendar year for each type of military equipment in department inventory.

### **709.6 POLICY COMPLIANCE AND SUBMITTING COMPLAINTS**

The Chief of Police or the authorized designee will ensure that all Los Altos Police Department employees comply with this policy. Suspected violations of the provisions set forth in this policy, or in other laws or policies governing the use of "military equipment", should be handled in accordance with Los Altos Police Department Policy 340 (Standards of Conduct). Additionally, violations of the provisions set forth in this policy, or in other laws or policies governing the use of "military equipment", will be reported to the governing body via the annual Military Equipment Report.

Any member of the community can submit a complaint regarding the use of "military equipment" to any Los Altos Police Department employee or the Independent Intake Official. Complaints can be submitted in any form (e.g., in person, online, telephone, email, etc.). Once a complaint is received, it will be handled in accordance with Los Altos Police Department Policy 340 (Standards of Conduct) and LAPD Policy 1020 (Personnel Complaints). Formal complaints regarding alleged violations of this policy will be handled by an independent investigator.

Complaints may be made directly to the Independent Intake Official (IIO) Stephanie Atigh in one of the following ways:

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### Online Submission:

[Complaint IIO WEBFORM](#) (online)

### By Email:

Fill out the appropriate Civilian Complaint Submission form (located online), save it to your computer and email as an attachment to [stephatigh@sbcglobal.net](mailto:stephatigh@sbcglobal.net)

### By Phone:

(831) 915-4643

Complaints may be made directly to the Los Altos Police Department in one of the following ways (for online options, please visit <https://www.losaltosca.gov/police/page/how-are-we-doing-0>):

### In Person:

Los Altos Police Department  
1 N. San Antonio Road, Los Altos, CA 94022

### Online Submission:

[Complaint PD WEBFORM](#)

### By Email:

Fill out the appropriate Civilian Complaint Submission form (online), save it to your computer and email as an attachment to [PoliceFeedback@losaltosca.gov](mailto:PoliceFeedback@losaltosca.gov)

### By Phone:

(650) 947-2770

## **709.7 COMMUNITY ENGAGEMENT**

Within 30 days of submitting and publicly releasing the annual report, the Department should hold at least one well-publicized and conveniently located community engagement meeting, at which the Department should discuss the report and respond to public questions regarding the funding, acquisition, or use of military equipment.

## **709.8 MILITARY EQUIPMENT COORDINATOR**

The Chief of Police should designate a member of this department to act as the military equipment coordinator. The responsibilities of the military equipment coordinator include but are not limited to:

- (a) Acting as liaison to the governing body for matters related to the requirements of this policy.
- (b) Identifying department equipment that qualifies as military equipment in the current possession of the Department, or the equipment the Department intends to acquire that requires approval by the governing body.
- (c) Conducting an inventory of all military equipment at least annually.

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- (d) Collaborating with any allied agency that may use military equipment within the jurisdiction of Los Altos Police Department (Government Code § 7071).
- (e) Preparing for, scheduling, and coordinating the annual community engagement meeting to include:
  - 1. Publicizing the details of the meeting.
  - 2. Preparing for public questions regarding the department's funding, acquisition, and use of equipment.
- (f) Preparing the annual military equipment report for submission to the Chief of Police and ensuring that the report is made available on the department website (Government Code § 7072).
- (g) Establishing the procedure for a person to register a complaint or concern, or how that person may submit any questions about the use of a type of military equipment, and how the Department will respond in a timely manner.

### **709.9 MILITARY EQUIPMENT INVENTORY**

See attachment: [MILITARY\\_EQUIPMENT\\_INVENTORY\\_709.9.pdf](#)

## Attachments

## MILITARY\_EQUIPMENT\_INVENTORY\_709.9.pdf



## 709.9 MILITARY EQUIPMENT INVENTORY

The following constitutes a list and description of qualifying equipment for the Department:

1. **40 MM Launchers and Rounds:** 40mm Launchers are utilized by department personnel as a less lethal tool to launch impact rounds.
  - (a) Description, quantity, capabilities, and purchase cost
    - i. PENN ARMS GL-140-C, 40MM SINGLE SHOT LAUNCHER, cost: \$1,000, quantity: 3. The 40mm Single Launcher is a tactical single shot launcher that features a collapsible stock. It will fire standard 40mm less lethal ammunition, up to 6.0 inches in cartridge length. 40mm launchers are capable of firing a variety of munitions with a maximum effective range of one hundred twenty (120) feet.
    - ii. SAGE CONTROL ORDINANCES INC K041 STANDARD ENERGY IMPACT BATON PROJECTILE, cost: \$21.00, quantity: 14. A less lethal 40mm impact baton projectile fired from a single 40mm grenade launcher with a rifled barrel at 51-72 MPS (meters per second). The projectile provides accurate and effective performance when fired from the recommended firing distances of not less than 10 feet and no greater than 75 feet.
  - (b) Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.
  - (c) Authorized Use: Subject to subsection (g) below, situations for use of the less lethal weapon systems may include, but are not limited to the following:
    - i. The suspect is armed with a weapon and the tactical circumstances allow for the safe application of approved munitions.
    - ii. The suspect has made credible threats to harm him/herself or others.
    - iii. The suspect is engaged in riotous behavior or is throwing rocks, bottles or other dangerous projectiles at people and/or officers.
    - iv. There is probable cause to believe that the suspect has already committed a crime of violence and is refusing to comply with lawful orders.
    - v. Other situations not listed here may also be deemed authorized use cases under applicable penal code and case law, and shall reflect necessary, reasonable, and proportional use of less lethal weapon system.
  - (d) Training: All personnel who are authorized to carry a control device must be properly trained and certified to carry the specific control device and are retrained or re-certified as necessary. Proficiency training shall be monitored and documented by a certified, control-device weapons or tactics instructor.
  - (e) Lifespan:
    - i. Penn Arms GL-140-C- No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear
    - ii. K041 Standard Energy Impact Batons-5 years

## MILITARY EQUIPMENT INVENTORY

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- (f) Fiscal Impact: Annual maintenance is approximately \$100 for each launcher.
  - (g) Legal and Procedural Rules: Use of the 40mm launcher and 40mm baton rounds are subject to the requirements of Policy 300 (USE OF FORCE), 308 (CONTROL DEVICES AND TECHNIQUES), 308.9 (KINETIC ENERGY PROJECTILE GUIDELINES), and Policy 312 (FIREARMS). It is the policy of the Los Altos Police Department to utilize the 40mm only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.
2. **Less Lethal Shotgun and Rounds:** Less Lethal Shotgun is used to deploy the less lethal 12-gauge Super-Sock Beanbag Round.
- (a) Description, quantity, capabilities, and purchase cost
    - i. REMINGTON 870 LESS LETHAL SHOTGUN, cost: \$950, quantity: 11. The Remington 870 Less Lethal Shotgun is used to deploy the less lethal 12-gauge Super-Sock Beanbag Round up to a distance of 75 feet. The range of the weapon system helps to maintain space between officers and a suspect reducing the immediacy of the threat which is a principle of deescalation. The less lethal 12- gauge shotgun is distinguishable by an orange butt stock and fore grip.
    - ii. 12-GAUGE SUPER-SOCK BEANBAG ROUND 2581, cost: \$6, quantity: 90. A less lethal 2.4-inch 12-gauge shotgun round firing a ballistic fiber bag filled with 40 grams of lead shot at a velocity of 270-290 feet per second (FPS). CTS (Combined Tactical Systems) Super-Sock rounds are discharged from a dedicated 12- gauge shotgun that is distinguishable by an orange butt stock and fore grip. This round provides accurate and effective performance when fired from the approved distance of not fewer than five (5) feet. The maximum effective range of this munition is up to 75 feet from the target. The Model 2581 Super-Sock is in its deployed state immediately upon exiting the barrel. It does not require a minimum range to "unfold" or "stabilize." The Super-Sock is an aerodynamic projectile. However, accuracy is relative to the shotgun, barrel length, environmental conditions, and the operator. The Super-Sock is very accurate. However, effectiveness depends on many variables, such as distance, clothing, stature, and the point where the projectile impacts.
  - (b) Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.
  - (c) Authorized Use - Subject to subsection (g) below, situations for use of the less lethal weapon systems may include, but are not limited to the following:
    - i. The suspect is armed with a weapon and the tactical circumstances allow for the safe application of approved munitions.
    - ii. The suspect has made credible threats to harm him/herself or others.
    - iii. The suspect is engaged in riotous behavior or is throwing rocks, bottles or other dangerous projectiles at people and/or officers.

## MILITARY EQUIPMENT INVENTORY

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- iv. There is probable cause to believe that the suspect has already committed a crime of violence and is refusing to comply with lawful orders.
- v. Other situations not listed here may also be deemed authorized use cases under applicable penal code and case law, and shall reflect necessary, reasonable, and proportional use of less lethal weapon system.
- (d) Lifespan:
  - i. Remington 970 Less Lethal Shotgun-25 years
  - ii. Super Sock Round Model 2581: No listed expiration date
- (e) Training: All personnel who are authorized to carry a control device must be properly trained and certified to carry the specific control device and are retrained or re-certified as necessary. Proficiency training shall be monitored and documented by a certified, control-device weapons or tactics instructor.
- (f) Fiscal Impact: Annual maintenance is approximately \$100 per shotgun.
- (g) Legal and Procedural Rules: Use of the less lethal shotgun and Super Sock rounds are subject to the requirements of Policy 300 (USE OF FORCE), 308 (CONTROL DEVICES AND TECHNIQUES), 308.9 (KINETIC ENERGY PROJECTILE GUIDELINES), and Policy 312 (FIREARMS). It is the policy of the Los Altos Police Department to utilize the less lethal shotgun only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.
- 3. **5.56mm Semi-Automatic Rifles and Ammunition:** The Colt AR-15/M4 5.56 mm/.223 semiautomatic rifles are used for both patrol and the SWAT Team.
  - (a) Description, quantity, capabilities, and purchase cost
    - i. COLT AR RIFLES, cost: \$1200, quantity: 27. These rifles, equipped and locked in each patrol car or police motorcycle, offer a higher degree of accuracy at a longer distance. The ammunition used in rifles are also more effective at penetrating body armor (as some suspects have worn during high-profile shooting events in the country). They are normally kept secured in patrol cars or in the Police station and are only deployed on specific incidents where officers believe guns or weapons are involved.
    - ii. .223 CALIBER or 5.56MM RIFLE AMMUNITION, cost: \$280 per case of 500 rounds, quantity: 10,800 rounds. This rifle ammunition used in conjunction with an AR-15 type rifle provides officers the ability to engage hostile suspects at distances generally greater than the effective distance of their handguns. Rifle ammunition fired from AR-15 rifles offer advantages over handguns, such as increased accuracy potential and the ability to defeat soft body armor but are not appropriate for every situation.
  - (b) Purpose: To address a threat with more precision and/or greater distances than a handgun, if present and feasible.
  - (c) Authorized Use - Members may deploy the patrol rifle in any circumstance where the member can articulate a reasonable expectation that the rifle may

## MILITARY EQUIPMENT INVENTORY

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be needed. Subject to subsection (g) below), situations for use of these weapon systems may include, but are not limited to the following:

- i. Situations where the member reasonably anticipates an armed encounter.
- ii. When a member is faced with a situation that may require accurate and effective fire at long range.
- iii. Situations where a member reasonably expects the need to meet or exceed a suspect's firepower.
- iv. When a member reasonably believes that there may be a need to fire on a barricaded person or a person with a hostage.
- v. When a member reasonably believes that a suspect may be wearing body armor.
- vi. When authorized or requested by a supervisor.
- vii. When needed to euthanize an animal.
- viii. When an officer is training at an approved range or other approved facility
- ix. Other situations not listed here may also be deemed authorized use cases under applicable penal code and case law, and shall reflect necessary, reasonable, and proportional use of this weapon system.

(d) Lifespan:

- i. Colt AR Rifles: Approximately 15-20 years
- ii. 223 Caliber or 5.56mm rifle ammunition: No expiration

(e) Training: Officers must successfully complete a 24-hour patrol rifle course as well as regular Department firearms training and qualifications as required by law and policy. Firearm Instructors attend a 40-hour POST-approved rifle instructor class, and SWAT personnel must attend an 80-hour basic SWAT Team course.

(f) Fiscal Impact: Annual maintenance is approximately \$100 per rifle.

(g) Legal and Procedural Rules: Use of the patrol rifles and ammunition are subject to the requirements of Policy 300 (USE OF FORCE), Policy 312.3.2 (PATROL RIFLES), and Policy 312 (FIREARMS). It is the policy of the Los Altos Police Department to utilize rifles only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.

4. **.308 Caliber Remington 700 and Heckler & Koch HK-91 Sniper Rifles and Ammunition:** The sniper rifles are capable of firing a .308 caliber bullet. This rifle may only be used by a SWAT Officer trained and certified to be a sniper (LAPD currently has two such officers) and may be deployed to assist the SWAT Team in a critical incident or emergency.

(a) Description, quantity, capabilities, and purchase cost

MILITARY EQUIPMENT INVENTORY

- i. .308 CALIBER REMINGTON 700 AND 700 LTR RIFLE, cost: \$1,000, quantity: 2. Remington 700: No cost, surveyed, Remington 700LTR \$1,000.
  - ii. .308 CALIBER HECKLER & KOCH HK-91 RIFLE, cost: No cost, surveyed, , quantity: 1.
  - iii. .308 AMMUNITION, cost: \$1.50 per round, quantity: 3,040 rounds. These nickel-plated bonded soft-point 308/7.62 cartridges from Speer Gold-Dot are resistant to corrosion, capable of expansion from barrels as short as 10", and retain accuracy from a variety of barrels lengths.
- (b) Purpose: This rifle may only be used by a SWAT Officer trained and certified to be a sniper and may be deployed to assist the SWAT Team in a critical incident or emergency. The main use of this weapon system is for observation of an incident and to be able to accurately and immediately be able to stop a threat to life.
- (c) Authorized Use: Subject to subsection (g) below, examples of situations for deploying the sniper rifle may include, but are not limited to the following:
- i. where the Officer reasonably anticipates an armed encounter;
  - ii. when the Officer is faced with a situation that may require accurate and effective fire at a long distance;
  - iii. where an Officer reasonably expects the need to meet or exceed the firearms and ammunition that a suspect is reported or believed to possess;
  - iv. when an Officer reasonably believes that there may be a need to fire on a barricaded person or a person with a hostage;
  - v. when an Officer reasonably believes that a suspect may be wearing body armor.
  - vi. When an officer is training at an approved range or other approved facility
  - vii. Other situations not listed here may also be deemed authorized use cases under applicable penal code and case law, and shall reflect necessary, reasonable, and proportional use of this weapon system.
- (d) Lifespan:
- i. .308 Caliber Remington 700/700LTR: Approximately 15 years
  - ii. .308 Caliber Heckler & Koch HK-91: Approximately 15 years
  - iii. .308 Ammunition: No expiration
- (e) Training: In addition to patrol rifle and standard SWAT operator training, SWAT snipers must successfully complete a California POST-certified sniper course as well as regular SWAT sniper training and qualifications as required by law and policy.
- (f) Fiscal Impact: Annual maintenance is approximately \$100 per Remington rifle. The HK is not used.

## MILITARY EQUIPMENT INVENTORY

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- (g) Legal and Procedural Rules: Use of the sniper rifles and ammunition are subject to the requirements of the SWAT Standard Operating Procedures for Mountain View/Los Altos, Policy 300 (USE OF FORCE), Policy 312.3.2 (PATROL RIFLES), Policy 312 (FIREARMS), and Policy 414 (HOSTAGE AND BARRICADE INCIDENTS). It is the policy of the Los Altos Police Department to utilize rifles only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.
5. **Benelli M3Super90 12 gauge shotgun and ammunition: This firearm is not currently used by the department and is stored in the armory.** The Benelli M3 is a dual-mode (hybrid pump-action and semi-automatic) shotgun The ammunition for the shotgun is 00 Buck and slug rounds.
- (a) Description, quantity, capabilities, and purchase cost
- i. BENELLI M3SUPER90 12 GAUGE SHOTGUN, cost \$500, quantity: 1. The Benelli M3 is a combination Pump-Action and Semi-Automatic Shotgun. The shotgun can be chambered for 12 GA shells with a 20 inch barrel.
  - ii. 00 BUCK AMMUNITION, cost: \$1.80 per round, quantity: 600 rounds. A typical 12-gauge, 2 ¾-inch 00 Buckshot shell holds 8 pellets that are 0.33" in diameter. A 3-inch shell most often contains 12 of these same sized pellets.
  - iii. SLUG AMMUNITION, cost: \$1.40 per round, quantity: 100. The Foster-type shotgun slug features exterior rifled grooves which contact the shotgun's bore to give it spin; and, the slug's hollow-point design initiates expansion to augment stopping power.
- (b) Purpose: This shotgun is not currently utilized by the department. The only shotguns used by the Department are the less lethal shotguns. The ammunition is purchased solely for recruits in the police academy, where shotgun instruction occurs.
- (c) Authorized Use: There is currently no authorized use for the shotgun in our policy.
- (d) Lifespan:
- i. Benelli M3Super90 12 gauge shotgun: Approximately 15 years
  - ii. OO Buck Ammunition: No expiration
  - iii. Slug ammunition: No expiration
- (e) Training: Officers receive training in shotgun use in the police academy, and have to pass firearm qualifications. There is no further training with the Benelli shotgun or ammunition.
- (f) Fiscal Impact: None, the weapon is not utilized. When equipment is being used, yearly maintenance costs are estimated to be \$100.

## MILITARY EQUIPMENT INVENTORY

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- (g) Legal and Procedural Rules: Use of all firearms fall under the following policies: Policy 300 (USE OF FORCE) and Policy 312 (FIREARMS). It is the policy of the Los Altos Police Department to utilize firearms only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.
6. **Remington 870 MCS 12 Gauge Breaching shotgun and breaching rounds: This firearm/ammunition is not currently used by the department and is stored in the SWAT armory.**
- (a) Description, quantity, capabilities, and purchase cost
- i. REMINGTON 870 MCS 12 GAUGE BREACHING SHOTGUN, cost: \$1,400, quantity: 1. Extremely compact breaching model 12 gauge with a ten inch cylinder bore breaching barrel with parkerized finish, a Knox recoil reducing breacher pistol grip stock, and synthetic modular fore-end.
- ii. 12 GAUGE BREACHING ROUNDS, cost: \$5.00 per round, quantity: 25 rounds. The 12-Gauge TKO Breaching Round is a 12-Gauge shell loaded with a compressed zinc slug, utilizing smokeless powder as a propellant. The is a widely used method to breach door locks or hinges for entry during tactical operations.
- (b) Purpose: The breaching shotgun is used to safely gain entry into a structure. When properly deployed, the TKO breaching round is capable of defeating door lock mechanisms, door knobs, hinges, dead bolts, safety chains, and pad locks on both wooden or hollow core doors. Upon impact with the target, the zinc slug disintegrates in to a fine powder eliminating fragmentation. The Explosive Breaching Program, conducted in conjunction with the Mountain View Police Department, was established to provide the joint SWAT Team the ability to quickly create an opening in a wall or window to quickly enter a building for an emergency rescue of hostages. It is reserved for rescue operations only.
- (c) Authorized Use: Subject to subsection (g) below, this equipment would only be deployed during a SWAT incident, and its use would need specific authorization from the Incident Commander. The equipment may only be used by a "tactical breacher" on the SWAT team. We currently do not have any authorized users at the Department.
- (d) Lifespan:
- i. Remington 870 MCS 12 Gauge Breaching shotgun: Approximately 15 years
- ii. 12-Gauge TKO Breaching Round: Approximately 5 years
- (e) Training: The training consists of an 80-hour course for a member of the SWAT Team specifically designated as the "breacher." At the conclusion of the course, the breacher must pass a test proctored by CAL/OSHA. The OSHA certification is valid for 5 years. Before the expiration of the certification, the breacher must retake and pass the test.

**MILITARY EQUIPMENT INVENTORY**

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- (f) Fiscal Impact: None, the weapon is not utilized. When equipment is being used, yearly maintenance costs are estimated to be \$100.
  - (g) Legal and Procedural Rules: Use of the breaching shotgun and ammunition are subject to the requirements of the SWAT Standard Operating Procedures for Mountain View/Los Altos. Use is also under Policy 414 (HOSTAGE AND BARRICADE INCIDENTS). It is the policy of the LAPD to utilize diversion devices only for official law enforcement purposes and pursuant to State and Federal law regarding the use of force.
7. **Kaiser Precision Vulcan II Munitions Pole: Telescoping tool utilized by SWAT personnel to safely deliver approved noise/diversionary devices.**
- (a) Description, quantity, capabilities, and purchase cost
    - i. KAISER PRECISION VULCAN II MUNITIONS POLE, cost: \$2,000, quantity: 1. The munitions pole is a multi-purpose breaching tool, constructed of lightweight aluminum square tubing used to deploy distraction devices and chemical munitions in order to gain entrance into a building, structure or even a vehicle.
  - (b) Purpose: The munitions pole is used to safely deploy diversionary devices, chemical munitions, or other objects (cell phones, cameras) during SWAT operations.
  - (c) Authorized Use: Subject to subsection (g) below, this equipment would be deployed during primarily during a SWAT incident, but could be utilized to gain entry into a residence during other high-risk operations on patrol.
  - (d) Lifespan: Approximately 10 years
  - (e) Training: Kaiser Precision provided an instructional video for individual and team training.
  - (f) Fiscal Impact: None, does not require annual maintenance
  - (g) Legal and Procedural Rules: Use of the munitions pole are subject to the requirements of the SWAT Standard Operating Procedures for Mountain View/Los Altos. Use is also under Policy 317 (HIGH RISK OPERATIONS PROTOCOL), Policy 322 (SEARCH AND SEIZURE), and Policy 414 (HOSTAGE AND BARRICADE INCIDENTS). It is the policy of the LAPD to utilize diversion devices only for official law enforcement purposes and pursuant to State and Federal law regarding the use of force.
8. **CTS Flash-bang Training Kit: The training flash-bangs are built and weigh exactly the same as it's equivalent live Flash-Bang, but have no flash charge.**
- (a) Description, quantity, capabilities, and purchase cost
    - i. CTS FLASH-BANG TRAINING KIT, cost: \$964, Quantity 1 kit (comes with 70 reload Training Fuzes, 1 body), current fuze inventory is 25. The training bodies are painted with a bright blue coating, and can be used an unlimited number of times. The M201FB fuze for this system has 10 times the output of a normal M201 fuze and it is threaded with a left hand thread so it can not



## MILITARY EQUIPMENT INVENTORY

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be accidentally used in any other munitions. The training devices produce an output of about 120db.

- (b) Purpose: Flash-bangs are used to distract and temporarily immobilize dangerous suspects by overwhelming their senses of vision and hearing. The distraction gives Officers time to seize a moment and create an opportunity to take control of high-risk or dangerous situations.
  - (c) Authorized Use: Subject to subsection (g) below, SWAT operators may utilize the training flash-bangs as a training tool to distract and temporarily immobilize dangerous suspects by overwhelming their senses of vision and hearing. Los Altos Police Department does not have any live flash-bangs in the inventory. Our operators use live flash-bangs while on SWAT events or at training with Mountain View Police Department.
  - (d) Lifespan: 5 years
  - (e) Training: These are a training tool. SWAT operators must attend and pass an 80-hour SWAT training class. Flash-bang training is provided by an instructor who has completed an 8-hour noise flash diversionary device course.
  - (f) Fiscal Impact: None, does not require annual maintenance
  - (g) Legal and Procedural Rules: Use of the **live** flash-bangs are subject to the requirements of the SWAT Standard Operating Procedures for Mountain View/Los Altos. Use is also under Policy 317 (HIGH RISK OPERATIONS PROTOCOL), Policy 322 (SEARCH AND SEIZURE), and Policy 414 (HOSTAGE AND BARRICADE INCIDENTS). It is the policy of the LAPD to utilize diversion devices only for official law enforcement purposes and pursuant to State and Federal law regarding the use of force.
9. **Specialty Impact Munition (SIM) weapons and ammunition:** Simunition® is the pioneer and world leader in providing military, law enforcement and approved range members with the most realistic and non-lethal force-on-force, short range, simulation training system.
- (a) Description, quantity, capabilities, and purchase cost
    - i. SIMUNITION GLOCK 17T, cost: \$500 each, quantity: 8. The GLOCK Training Pistols were developed with the purpose of enabling reality-based tactical operations training using color marking or plastic projectile ammunition. When utilized in a pistol caliber barrel training platform (9mm), SIMs have an effective range of 25 feet.
    - ii. SIM CONVERTED BERETTA 92, cost: \$500 each, quantity: 4. The Simunition® conversion kit, conversion bolt, bolt carrier assembly and safety-ring insert allow the FX® Marking Cartridges and the SecuriBlank® to be fired safely from the user's own service weapon. These easy-to-install kits help preclude the inadvertent chambering of live ammunition and ensure the proper operation and cycling of the weapons. When utilized in a pistol caliber barrel training platform (9mm), SIMs have an effective range of 25 feet.

## MILITARY EQUIPMENT INVENTORY

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- iii. HK MP5 CONVERSION KITS, cost: \$500 each, quantity 2. The Simunition® conversion kit, conversion bolt, bolt carrier assembly and safety-ring insert allow the FX® Marking Cartridges and the SecuriBlank® to be fired safely from the user's own service weapon. These easy-to-install kits help preclude the inadvertent chambering of live ammunition and ensure the proper operation and cycling of the weapons. When utilized with a training munition bolt carrier group in a 5.56mm rifle platform, SIMs have an effective range of approximately 27 yards.
  - iv. SIMUNITION COLT AR-15 CARBINE RIFLE UPPERS, cost: \$1,000 each, quantity: 3. The Simunition® conversion kit, conversion bolt, bolt carrier assembly and safety-ring insert allow the FX® Marking Cartridges and the SecuriBlank® to be fired safely from the user's own service weapon. These easy-to-install kits help preclude the inadvertent chambering of live ammunition and ensure the proper operation and cycling of the weapons. When utilized with a training munition bolt carrier group in a 5.56mm rifle platform, SIMs have an effective range of approximately 27 yards.
  - v. FX MARKING CARTRIDGES, cost: \$350 for 500 rounds, quantity: 3,500 rounds. The reduced-energy, non-lethal cartridges leave a detergent-based, water-soluble color-marking compound. The visible impacts allow accurate assessment of simulated lethality. They feature tactical accuracy up to 25 feet (7.6 meters).
- (b) Purpose: Enabling reality-based, force-on-force tactical operations training using color marking or plastic projectile ammunition.
- (c) Authorized Use: Subject to subsection (g) below, simunition weapons and marking rounds are non-operational rounds and non-operational weapons systems. These munitions provide for realistic close quarters firearms training while allowing the shooter to visually assess shot placement and accuracy in force on force training scenarios. These items are used for training purposes for all sworn staff members.
- (d) Lifespan:
- i. Simunition Glock 17T: – 24-month limited warranty. No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear.
  - ii. Sim Converted Beretta: – 24-month limited warranty. No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear.
  - iii. HK MP5 Conversion Kits: – 24-month limited warranty. No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear.
  - iv. Simunition Colt AR-15 Rifle Uppers: – 24-month limited warranty. No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear.
  - v. FX Marking Cartridges: Shelf life five (5) years.

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- (e) Training: These are a training tool. Simunition Instructors attend an informative, three-day (24-hour) course designed to provide students with substantial hands-on experience with Simunition® FX® training ammunition technology, weapons conversion kits, and the Simunition® line of protective equipment. The course provides in-depth, hands-on instruction in scenario-based training program development and training methodology, and gives critical practical experience to students on the best use of Simunition® training products in a highly effective, realistic, extremely safe training program. Sworn staff members are given extensive firearms handling courses and weapons safety instruction to include the use of SIMs for training purposes.
- (f) Fiscal Impact: Annual maintenance cost is approximately \$500 for all of the simunition weapons to be inspected and repaired.
- (g) Legal and Procedural Rules: Use of the Simunition firearms and marking rounds are subject to the requirements of Policy 300 (USE OF FORCE) and Policy 312 (FIREARMS) while training. It is the policy of the Los Altos Police Department to utilize Simunition equipment only for official law enforcement training purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.

## 709.9 MILITARY EQUIPMENT INVENTORY

The following constitutes a list and description of qualifying equipment for the Department:

1. **40 MM Launchers and Rounds:** 40mm Launchers are utilized by department personnel as a less lethal tool to launch impact rounds.
  - (a) Description, quantity, capabilities, and purchase cost
    - i. PENN ARMS GL-140-C, 40MM SINGLE SHOT LAUNCHER, cost: \$1,000, quantity: 3. The 40mm Single Launcher is a tactical single shot launcher that features a collapsible stock. It will fire standard 40mm less lethal ammunition, up to 6.0 inches in cartridge length. 40mm launchers are capable of firing a variety of munitions with a maximum effective range of one hundred twenty (120) feet.
    - ii. SAGE CONTROL ORDINANCES INC K041 STANDARD ENERGY IMPACT BATON PROJECTILE, cost: \$21.00, quantity: 14. A less lethal 40mm impact baton projectile fired from a single 40mm grenade launcher with a rifled barrel at 51-72 MPS (meters per second). The projectile provides accurate and effective performance when fired from the recommended firing distances of not less than 10 feet and no greater than 75 feet.
  - (b) Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.
  - (c) Authorized Use: Subject to subsection (g) below, situations for use of the less lethal weapon systems may include, but are not limited to the following:
    - i. The suspect is armed with a weapon and the tactical circumstances allow for the safe application of approved munitions.
    - ii. The suspect has made credible threats to harm him/herself or others.
    - iii. The suspect is engaged in riotous behavior or is throwing rocks, bottles or other dangerous projectiles at people and/or officers.
    - iv. There is probable cause to believe that the suspect has already committed a crime of violence and is refusing to comply with lawful orders.
    - v. Other situations not listed here may also be deemed authorized use cases under applicable penal code and case law, and shall reflect necessary, reasonable, and proportional use of less lethal weapon system.
  - (d) Training: All personnel who are authorized to carry a control device must be properly trained and certified to carry the specific control device and are retrained or re-certified as necessary. Proficiency training shall be monitored and documented by a certified, control-device weapons or tactics instructor.
  - (e) Lifespan:
    - i. Penn Arms GL-140-C- No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear
    - ii. K041 Standard Energy Impact Batons-5 years

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- (f) Fiscal Impact: Annual maintenance is approximately \$100 for each launcher.
  - (g) Legal and Procedural Rules: Use of the 40mm launcher and 40mm baton rounds are subject to the requirements of Policy 300 (USE OF FORCE), 308 (CONTROL DEVICES AND TECHNIQUES), 308.9 (KINETIC ENERGY PROJECTILE GUIDELINES), and Policy 312 (FIREARMS). It is the policy of the Los Altos Police Department to utilize the 40mm only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.
2. **Less Lethal Shotgun and Rounds:** Less Lethal Shotgun is used to deploy the less lethal 12-gauge Super-Sock Beanbag Round.
- (a) Description, quantity, capabilities, and purchase cost
    - i. REMINGTON 870 LESS LETHAL SHOTGUN, cost: \$950, quantity: 11. The Remington 870 Less Lethal Shotgun is used to deploy the less lethal 12-gauge Super-Sock Beanbag Round up to a distance of 75 feet. The range of the weapon system helps to maintain space between officers and a suspect reducing the immediacy of the threat which is a principle of deescalation. The less lethal 12- gauge shotgun is distinguishable by an orange butt stock and fore grip.
    - ii. 12-GAUGE SUPER-SOCK BEANBAG ROUND 2581, cost: \$6, quantity: 90. A less lethal 2.4-inch 12-gauge shotgun round firing a ballistic fiber bag filled with 40 grams of lead shot at a velocity of 270-290 feet per second (FPS). CTS (Combined Tactical Systems) Super-Sock rounds are discharged from a dedicated 12- gauge shotgun that is distinguishable by an orange butt stock and fore grip. This round provides accurate and effective performance when fired from the approved distance of not fewer than five (5) feet. The maximum effective range of this munition is up to 75 feet from the target. The Model 2581 Super-Sock is in its deployed state immediately upon exiting the barrel. It does not require a minimum range to "unfold" or "stabilize." The Super-Sock is an aerodynamic projectile. However, accuracy is relative to the shotgun, barrel length, environmental conditions, and the operator. The Super-Sock is very accurate. However, effectiveness depends on many variables, such as distance, clothing, stature, and the point where the projectile impacts.
  - (b) Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.
  - (c) Authorized Use - Subject to subsection (g) below, situations for use of the less lethal weapon systems may include, but are not limited to the following:
    - i. The suspect is armed with a weapon and the tactical circumstances allow for the safe application of approved munitions.
    - ii. The suspect has made credible threats to harm him/herself or others.
    - iii. The suspect is engaged in riotous behavior or is throwing rocks, bottles or other dangerous projectiles at people and/or officers.

## MILITARY EQUIPMENT INVENTORY

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- iv. There is probable cause to believe that the suspect has already committed a crime of violence and is refusing to comply with lawful orders.
- v. Other situations not listed here may also be deemed authorized use cases under applicable penal code and case law, and shall reflect necessary, reasonable, and proportional use of less lethal weapon system.
- (d) Lifespan:
  - i. Remington 970 Less Lethal Shotgun-25 years
  - ii. Super Sock Round Model 2581: No listed expiration date
- (e) Training: All personnel who are authorized to carry a control device must be properly trained and certified to carry the specific control device and are retrained or re-certified as necessary. Proficiency training shall be monitored and documented by a certified, control-device weapons or tactics instructor.
- (f) Fiscal Impact: Annual maintenance is approximately \$100 per shotgun.
- (g) Legal and Procedural Rules: Use of the less lethal shotgun and Super Sock rounds are subject to the requirements of Policy 300 (USE OF FORCE), 308 (CONTROL DEVICES AND TECHNIQUES), 308.9 (KINETIC ENERGY PROJECTILE GUIDELINES), and Policy 312 (FIREARMS). It is the policy of the Los Altos Police Department to utilize the less lethal shotgun only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.
- 3. **5.56mm Semi-Automatic Rifles and Ammunition:** The Colt AR-15/M4 5.56 mm/.223 semiautomatic rifles are used for both patrol and the SWAT Team.
  - (a) Description, quantity, capabilities, and purchase cost
    - i. COLT AR RIFLES, cost: \$1200, quantity: 27. These rifles, equipped and locked in each patrol car or police motorcycle, offer a higher degree of accuracy at a longer distance. The ammunition used in rifles are also more effective at penetrating body armor (as some suspects have worn during high-profile shooting events in the country). They are normally kept secured in patrol cars or in the Police station and are only deployed on specific incidents where officers believe guns or weapons are involved.
    - ii. .223 CALIBER or 5.56MM RIFLE AMMUNITION, cost: \$280 per case of 500 rounds, quantity: 10,800 rounds. This rifle ammunition used in conjunction with an AR-15 type rifle provides officers the ability to engage hostile suspects at distances generally greater than the effective distance of their handguns. Rifle ammunition fired from AR-15 rifles offer advantages over handguns, such as increased accuracy potential and the ability to defeat soft body armor but are not appropriate for every situation.
  - (b) Purpose: To address a threat with more precision and/or greater distances than a handgun, if present and feasible.
  - (c) Authorized Use - Members may deploy the patrol rifle in any circumstance where the member can articulate a reasonable expectation that the rifle may

## MILITARY EQUIPMENT INVENTORY

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be needed. Subject to subsection (g) below), situations for use of these weapon systems may include, but are not limited to the following:

- i. Situations where the member reasonably anticipates an armed encounter.
- ii. When a member is faced with a situation that may require accurate and effective fire at long range.
- iii. Situations where a member reasonably expects the need to meet or exceed a suspect's firepower.
- iv. When a member reasonably believes that there may be a need to fire on a barricaded person or a person with a hostage.
- v. When a member reasonably believes that a suspect may be wearing body armor.
- vi. When authorized or requested by a supervisor.
- vii. When needed to euthanize an animal.
- viii. When an officer is training at an approved range or other approved facility
- ix. Other situations not listed here may also be deemed authorized use cases under applicable penal code and case law, and shall reflect necessary, reasonable, and proportional use of this weapon system.

(d) Lifespan:

- i. Colt AR Rifles: Approximately 15-20 years
- ii. 223 Caliber or 5.56mm rifle ammunition: No expiration

(e) Training: Officers must successfully complete a 24-hour patrol rifle course as well as regular Department firearms training and qualifications as required by law and policy. Firearm Instructors attend a 40-hour POST-approved rifle instructor class, and SWAT personnel must attend an 80-hour basic SWAT Team course.

(f) Fiscal Impact: Annual maintenance is approximately \$100 per rifle.

(g) Legal and Procedural Rules: Use of the patrol rifles and ammunition are subject to the requirements of Policy 300 (USE OF FORCE), Policy 312.3.2 (PATROL RIFLES), and Policy 312 (FIREARMS). It is the policy of the Los Altos Police Department to utilize rifles only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.

4. **.308 Caliber Remington 700 and Heckler & Koch HK-91 Sniper Rifles and Ammunition:** The sniper rifles are capable of firing a .308 caliber bullet. This rifle may only be used by a SWAT Officer trained and certified to be a sniper (LAPD currently has two such officers) and may be deployed to assist the SWAT Team in a critical incident or emergency.

(a) Description, quantity, capabilities, and purchase cost

MILITARY EQUIPMENT INVENTORY

- i. .308 CALIBER REMINGTON 700 AND 700 LTR RIFLE, cost: \$1,000, quantity: 2. Remington 700: No cost, surveyed, Remington 700LTR \$1,000.
  - ii. .308 CALIBER HECKLER & KOCH HK-91 RIFLE, cost: No cost, surveyed, , quantity: 1.
  - iii. .308 AMMUNITION, cost: \$1.50 per round, quantity: 3,040 rounds. These nickel-plated bonded soft-point 308/7.62 cartridges from Speer Gold-Dot are resistant to corrosion, capable of expansion from barrels as short as 10", and retain accuracy from a variety of barrels lengths.
- (b) Purpose: This rifle may only be used by a SWAT Officer trained and certified to be a sniper and may be deployed to assist the SWAT Team in a critical incident or emergency. The main use of this weapon system is for observation of an incident and to be able to accurately and immediately be able to stop a threat to life.
- (c) Authorized Use: Subject to subsection (g) below, examples of situations for deploying the sniper rifle may include, but are not limited to the following:
- i. where the Officer reasonably anticipates an armed encounter;
  - ii. when the Officer is faced with a situation that may require accurate and effective fire at a long distance;
  - iii. where an Officer reasonably expects the need to meet or exceed the firearms and ammunition that a suspect is reported or believed to possess;
  - iv. when an Officer reasonably believes that there may be a need to fire on a barricaded person or a person with a hostage;
  - v. when an Officer reasonably believes that a suspect may be wearing body armor.
  - vi. When an officer is training at an approved range or other approved facility
  - vii. Other situations not listed here may also be deemed authorized use cases under applicable penal code and case law, and shall reflect necessary, reasonable, and proportional use of this weapon system.
- (d) Lifespan:
- i. .308 Caliber Remington 700/700LTR: Approximately 15 years
  - ii. .308 Caliber Heckler & Koch HK-91: Approximately 15 years
  - iii. .308 Ammunition: No expiration
- (e) Training: In addition to patrol rifle and standard SWAT operator training, SWAT snipers must successfully complete a California POST-certified sniper course as well as regular SWAT sniper training and qualifications as required by law and policy.
- (f) Fiscal Impact: Annual maintenance is approximately \$100 per Remington rifle. The HK is not used.



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**MILITARY EQUIPMENT INVENTORY**

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- (g) Legal and Procedural Rules: Use of the sniper rifles and ammunition are subject to the requirements of the SWAT Standard Operating Procedures for Mountain View/Los Altos, Policy 300 (USE OF FORCE), Policy 312.3.2 (PATROL RIFLES), Policy 312 (FIREARMS), and Policy 414 (HOSTAGE AND BARRICADE INCIDENTS). It is the policy of the Los Altos Police Department to utilize rifles only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.
5. **Benelli M3Super90 12 gauge shotgun and ammunition: This firearm is not currently used by the department and is stored in the armory.** The Benelli M3 is a dual-mode (hybrid pump-action and semi-automatic) shotgun The ammunition for the shotgun is 00 Buck and slug rounds.
- (a) Description, quantity, capabilities, and purchase cost
- i. BENELLI M3SUPER90 12 GAUGE SHOTGUN, cost \$500, quantity: 1. The Benelli M3 is a combination Pump-Action and Semi-Automatic Shotgun. The shotgun can be chambered for 12 GA shells with a 20 inch barrel.
  - ii. 00 BUCK AMMUNITION, cost: \$1.80 per round, quantity: 600 rounds. A typical 12-gauge, 2 ¾-inch 00 Buckshot shell holds 8 pellets that are 0.33" in diameter. A 3-inch shell most often contains 12 of these same sized pellets.
  - iii. SLUG AMMUNITION, cost: \$1.40 per round, quantity: 100. The Foster-type shotgun slug features exterior rifled grooves which contact the shotgun's bore to give it spin; and, the slug's hollow-point design initiates expansion to augment stopping power.
- (b) Purpose: This shotgun is not currently utilized by the department. The only shotguns used by the Department are the less lethal shotguns. The ammunition is purchased solely for recruits in the police academy, where shotgun instruction occurs.
- (c) Authorized Use: There is currently no authorized use for the shotgun in our policy.
- (d) Lifespan:
- i. Benelli M3Super90 12 gauge shotgun: Approximately 15 years
  - ii. OO Buck Ammunition: No expiration
  - iii. Slug ammunition: No expiration
- (e) Training: Officers receive training in shotgun use in the police academy, and have to pass firearm qualifications. There is no further training with the Benelli shotgun or ammunition.
- (f) Fiscal Impact: None, the weapon is not utilized. When equipment is being used, yearly maintenance costs are estimated to be \$100.

## MILITARY EQUIPMENT INVENTORY

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- (g) Legal and Procedural Rules: Use of all firearms fall under the following policies: Policy 300 (USE OF FORCE) and Policy 312 (FIREARMS). It is the policy of the Los Altos Police Department to utilize firearms only for official law enforcement purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.
6. **Remington 870 MCS 12 Gauge Breaching shotgun and breaching rounds: This firearm/ammunition is not currently used by the department and is stored in the SWAT armory.**
- (a) Description, quantity, capabilities, and purchase cost
- i. REMINGTON 870 MCS 12 GAUGE BREACHING SHOTGUN, cost: \$1,400, quantity: 1. Extremely compact breaching model 12 gauge with a ten inch cylinder bore breaching barrel with parkerized finish, a Knox recoil reducing breacher pistol grip stock, and synthetic modular fore-end.
  - ii. 12 GAUGE BREACHING ROUNDS, cost: \$5.00 per round, quantity: 25 rounds. The 12-Gauge TKO Breaching Round is a 12-Gauge shell loaded with a compressed zinc slug, utilizing smokeless powder as a propellant. The is a widely used method to breach door locks or hinges for entry during tactical operations.
- (b) Purpose: The breaching shotgun is used to safely gain entry into a structure. When properly deployed, the TKO breaching round is capable of defeating door lock mechanisms, door knobs, hinges, dead bolts, safety chains, and pad locks on both wooden or hollow core doors. Upon impact with the target, the zinc slug disintegrates in to a fine powder eliminating fragmentation. The Explosive Breaching Program, conducted in conjunction with the Mountain View Police Department, was established to provide the joint SWAT Team the ability to quickly create an opening in a wall or window to quickly enter a building for an emergency rescue of hostages. It is reserved for rescue operations only.
- (c) Authorized Use: Subject to subsection (g) below, this equipment would only be deployed during a SWAT incident, and its use would need specific authorization from the Incident Commander. The equipment may only be used by a "tactical breacher" on the SWAT team. We currently do not have any authorized users at the Department.
- (d) Lifespan:
- i. Remington 870 MCS 12 Gauge Breaching shotgun: Approximately 15 years
  - ii. 12-Gauge TKO Breaching Round: Approximately 5 years
- (e) Training: The training consists of an 80-hour course for a member of the SWAT Team specifically designated as the "breacher." At the conclusion of the course, the breacher must pass a test proctored by CAL/OSHA. The OSHA certification is valid for 5 years. Before the expiration of the certification, the breacher must retake and pass the test.

## MILITARY EQUIPMENT INVENTORY

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- (f) Fiscal Impact: None, the weapon is not utilized. When equipment is being used, yearly maintenance costs are estimated to be \$100.
  - (g) Legal and Procedural Rules: Use of the breaching shotgun and ammunition are subject to the requirements of the SWAT Standard Operating Procedures for Mountain View/Los Altos. Use is also under Policy 414 (HOSTAGE AND BARRICADE INCIDENTS). It is the policy of the LAPD to utilize diversion devices only for official law enforcement purposes and pursuant to State and Federal law regarding the use of force.
7. **Kaiser Precision Vulcan II Munitions Pole: Telescoping tool utilized by SWAT personnel to safely deliver approved noise/diversionary devices.**
- (a) Description, quantity, capabilities, and purchase cost
    - i. KAISER PRECISION VULCAN II MUNITIONS POLE, cost: \$2,000, quantity: 1. The munitions pole is a multi-purpose breaching tool, constructed of lightweight aluminum square tubing used to deploy distraction devices and chemical munitions in order to gain entrance into a building, structure or even a vehicle.
  - (b) Purpose: The munitions pole is used to safely deploy diversionary devices, chemical munitions, or other objects (cell phones, cameras) during SWAT operations.
  - (c) Authorized Use: Subject to subsection (g) below, this equipment would be deployed during primarily during a SWAT incident, but could be utilized to gain entry into a residence during other high-risk operations on patrol.
  - (d) Lifespan: Approximately 10 years
  - (e) Training: Kaiser Precision provided an instructional video for individual and team training.
  - (f) Fiscal Impact: None, does not require annual maintenance
  - (g) Legal and Procedural Rules: Use of the munitions pole are subject to the requirements of the SWAT Standard Operating Procedures for Mountain View/Los Altos. Use is also under Policy 317 (HIGH RISK OPERATIONS PROTOCOL), Policy 322 (SEARCH AND SEIZURE), and Policy 414 (HOSTAGE AND BARRICADE INCIDENTS). It is the policy of the LAPD to utilize diversion devices only for official law enforcement purposes and pursuant to State and Federal law regarding the use of force.
8. **CTS Flash-bang Training Kit: The training flash-bangs are built and weigh exactly the same as it's equivalent live Flash-Bang, but have no flash charge.**
- (a) Description, quantity, capabilities, and purchase cost
    - i. CTS FLASH-BANG TRAINING KIT, cost: \$964, Quantity 1 kit (comes with 70 reload Training Fuzes, 1 body), current fuze inventory is 25. The training bodies are painted with a bright blue coating, and can be used an unlimited number of times. The M201FB fuze for this system has 10 times the output of a normal M201 fuze and it is threaded with a left hand thread so it can not

## MILITARY EQUIPMENT INVENTORY

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be accidentally used in any other munitions. The training devices produce an output of about 120db.

- (b) Purpose: Flash-bangs are used to distract and temporarily immobilize dangerous suspects by overwhelming their senses of vision and hearing. The distraction gives Officers time to seize a moment and create an opportunity to take control of high-risk or dangerous situations.
  - (c) Authorized Use: Subject to subsection (g) below, SWAT operators may utilize the training flash-bangs as a training tool to distract and temporarily immobilize dangerous suspects by overwhelming their senses of vision and hearing. Los Altos Police Department does not have any live flash-bangs in the inventory. Our operators use live flash-bangs while on SWAT events or at training with Mountain View Police Department.
  - (d) Lifespan: 5 years
  - (e) Training: These are a training tool. SWAT operators must attend and pass an 80-hour SWAT training class. Flash-bang training is provided by an instructor who has completed an 8-hour noise flash diversionary device course.
  - (f) Fiscal Impact: None, does not require annual maintenance
  - (g) Legal and Procedural Rules: Use of the **live** flash-bangs are subject to the requirements of the SWAT Standard Operating Procedures for Mountain View/Los Altos. Use is also under Policy 317 (HIGH RISK OPERATIONS PROTOCOL), Policy 322 (SEARCH AND SEIZURE), and Policy 414 (HOSTAGE AND BARRICADE INCIDENTS). It is the policy of the LAPD to utilize diversion devices only for official law enforcement purposes and pursuant to State and Federal law regarding the use of force.
9. **Specialty Impact Munition (SIM) weapons and ammunition:** Simunition® is the pioneer and world leader in providing military, law enforcement and approved range members with the most realistic and non-lethal force-on-force, short range, simulation training system.
- (a) Description, quantity, capabilities, and purchase cost
    - i. SIMUNITION GLOCK 17T, cost: \$500 each, quantity: 8. The GLOCK Training Pistols were developed with the purpose of enabling reality-based tactical operations training using color marking or plastic projectile ammunition. When utilized in a pistol caliber barrel training platform (9mm), SIMs have an effective range of 25 feet.
    - ii. SIM CONVERTED BERETTA 92, cost: \$500 each, quantity: 4. The Simunition® conversion kit, conversion bolt, bolt carrier assembly and safety-ring insert allow the FX® Marking Cartridges and the SecuriBlank® to be fired safely from the user's own service weapon. These easy-to-install kits help preclude the inadvertent chambering of live ammunition and ensure the proper operation and cycling of the weapons. When utilized in a pistol caliber barrel training platform (9mm), SIMs have an effective range of 25 feet.

## MILITARY EQUIPMENT INVENTORY

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- iii. HK MP5 CONVERSION KITS, cost: \$500 each, quantity 2. The Simunition® conversion kit, conversion bolt, bolt carrier assembly and safety-ring insert allow the FX® Marking Cartridges and the SecuriBlank® to be fired safely from the user's own service weapon. These easy-to-install kits help preclude the inadvertent chambering of live ammunition and ensure the proper operation and cycling of the weapons. When utilized with a training munition bolt carrier group in a 5.56mm rifle platform, SIMs have an effective range of approximately 27 yards.
  - iv. SIMUNITION COLT AR-15 CARBINE RIFLE UPPERS, cost: \$1,000 each, quantity: 3. The Simunition® conversion kit, conversion bolt, bolt carrier assembly and safety-ring insert allow the FX® Marking Cartridges and the SecuriBlank® to be fired safely from the user's own service weapon. These easy-to-install kits help preclude the inadvertent chambering of live ammunition and ensure the proper operation and cycling of the weapons. When utilized with a training munition bolt carrier group in a 5.56mm rifle platform, SIMs have an effective range of approximately 27 yards.
  - v. FX MARKING CARTRIDGES, cost: \$350 for 500 rounds, quantity: 3,500 rounds. The reduced-energy, non-lethal cartridges leave a detergent-based, water-soluble color-marking compound. The visible impacts allow accurate assessment of simulated lethality. They feature tactical accuracy up to 25 feet (7.6 meters).
- (b) Purpose: Enabling reality-based, force-on-force tactical operations training using color marking or plastic projectile ammunition.
- (c) Authorized Use: Subject to subsection (g) below, simunition weapons and marking rounds are non-operational rounds and non-operational weapons systems. These munitions provide for realistic close quarters firearms training while allowing the shooter to visually assess shot placement and accuracy in force on force training scenarios. These items are used for training purposes for all sworn staff members.
- (d) Lifespan:
- i. Simunition Glock 17T: – 24-month limited warranty. No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear.
  - ii. Sim Converted Beretta: – 24-month limited warranty. No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear.
  - iii. HK MP5 Conversion Kits: – 24-month limited warranty. No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear.
  - iv. Simunition Colt AR-15 Rifle Uppers: – 24-month limited warranty. No lifespan indicated by manufacturer. Lifespan varies on operational usage and wear.
  - v. FX Marking Cartridges: Shelf life five (5) years.

## MILITARY EQUIPMENT INVENTORY

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- (e) Training: These are a training tool. Simunition Instructors attend an informative, three-day (24-hour) course designed to provide students with substantial hands-on experience with Simunition® FX® training ammunition technology, weapons conversion kits, and the Simunition® line of protective equipment. The course provides in-depth, hands-on instruction in scenario-based training program development and training methodology, and gives critical practical experience to students on the best use of Simunition® training products in a highly effective, realistic, extremely safe training program. Sworn staff members are given extensive firearms handling courses and weapons safety instruction to include the use of SIMs for training purposes.
- (f) Fiscal Impact: Annual maintenance cost is approximately \$500 for all of the simunition weapons to be inspected and repaired.
- (g) Legal and Procedural Rules: Use of the Simunition firearms and marking rounds are subject to the requirements of Policy 300 (USE OF FORCE) and Policy 312 (FIREARMS) while training. It is the policy of the Los Altos Police Department to utilize Simunition equipment only for official law enforcement training purposes, in accordance with all requirements under State and Federal law, including those regarding the use of force.



## PUBLIC CORRESPONDENCE

The following is public correspondence received by the City Clerk’s Office after the posting of the original agenda. Individual contact information has been redacted for privacy. This may *not* be a comprehensive collection of the public correspondence, but staff makes its best effort to include all correspondence received to date.

To send correspondence to the City Council, on matters listed on the agenda please email [PublicComment@losaltosca.gov](mailto:PublicComment@losaltosca.gov)

**From:** [Jeanine Valadez](#)  
**To:** [Public Comment](#)  
**Cc:** [Angel Rodriguez](#); [Kathryn Krauss](#); [Angela Averiett](#); [Gabriel Engeland](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM #3 4/11/2023  
**Date:** Monday, April 10, 2023 1:53:14 PM

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Honorable Mayor, Vice-Mayor, and Councilmembers,

Please pull Item 3 MEUP from the consent calendar.

Thank you.  
Jeanine Valadez



**From:** [Jeanine Valadez](#)  
**To:** [Public Comment](#)  
**Cc:** [Angel Rodriguez](#); [Kathryn Krauss](#); [Angela Averiett](#); [Gabriel Engeland](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM #3 4/11/2023  
**Date:** Monday, April 10, 2023 1:59:35 PM

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Honorable Mayor, Vice-Mayor, and Councilmembers,

I continue to have major concerns that our Policy 709 is not complaint with AB481, thus exposing our city to significant risk and liability should something ever go awry, as is apt to happen.

Indep oversight: first: need to add the words "independent oversight" to the list of required content in the first section of the policy, "Purpose and Scope." There is no way the Chief, nor the City manager, who manages the Chief, nor the City Council, who manages the CM, are INDEPENDENT. This lack of explicit conformance violates the intent and letter of the law.

Make community engagement compliant with letter of AB481: the community engagement (townhall) is not for the Department to discuss, it is for the General Public to discuss. Solution: in section titled COmmunity Engagement, first sentence: Within 30 days of submitting and publicly releasing the annual report, the Department should [change to shall] hold at least one well-publicized and conveniently located community engagement meeting, at which the Department [replace Department with AB481 wording: General Public] should [change to shall] discuss the report and [add: ask questions to the Department, who will] respond to public questions regarding the funding, acquisition, or use of military equipment.

I disapprove of the paragraph on Exigency. And CM Fligor's addition does nothing to quell my concerns. Even if we agree to have the paragraph, there must be much more due diligence post-use for documenting, justifying and, to extent law allows, allow the public to weigh in on whether we as a community accepts the use of said ME in such cases after the fact. Other communities have specifically outlawed use of certain MEUp in this regard, such as water cannons, etc.

Finally, did you all notice the changed the order of sections again? Military Equipment Coordinator has been moved to the end in this version without letting the public know. I thought it had been dropped until I scanned the entire policy.

There is much room for discussion here.

Jeanine Valadez



## PUBLIC CORRESPONDENCE

The following is public correspondence received by the City Clerk’s Office after the posting of the original agenda. Individual contact information has been redacted for privacy. This may *not* be a comprehensive collection of the public correspondence, but staff makes its best effort to include all correspondence received to date.

To send correspondence to the City Council, on matters listed on the agenda please email [PublicComment@losaltosca.gov](mailto:PublicComment@losaltosca.gov)

**From:** [Cindy Sidaris](#)  
**To:** [Public Comment](#)  
**Cc:** [Cindy Sidaris](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM 3 - 4/11/2023  
**Date:** Monday, April 10, 2023 4:16:51 PM

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April 10, 2023

To: Los Altos City Council  
Fm: Cindy Sidaris, Los Altos Resident  
RE: Item #3, Military Equipment Policy

I am concerned that our Policy 709 (dated 23/04/05) does not meet the requirements of AB481 properly and completely, which opens our city to risk and potential liability. My concerns

1. Chapter 12.8 of AB481, Section d.6 states, the policy shall include “the mechanisms to ensure compliance with the military equipment use policy, including which independent persons or entities have oversight authority...”. Our policy does not include mention of independent oversight.
2. The policy document (Section 709.7 is lacking – it uses the term “should” when the more definitive “shall” or “must” is correct:

“Within 30 days of submitting and publicly releasing the annual report, the Department should [**change to ‘shall’ or ‘must’**] hold at least one well-publicized and conveniently located community engagement meeting, at which the Department [**should use AB481 wording: General Public**] should [**change to ‘shall’ or ‘must’**] discuss the report and [**add: ask questions to the Department, who will**] respond to [**add: all**] public questions regarding the funding, acquisition, or use of military equipment.

3. Section 709.3 of the policy should reference Section 709.7, Community Engagement, to include announcing the availability of the DRAFT updated policy and the meeting to be held in no less than 30 days for the public to review the policy. The meeting with the governing body for approval of the updated policy must not occur before the public review meeting.
4. The latest Military Equipment Inventory, section, 709.9, posted in the City Council amended agenda on April 7<sup>th</sup>, is dated 22/09/23, and does not include the new and replacement military equipment purchases the City Council approved on March 28. The policy document cannot be approved with the incorrect equipment inventory.

I apologize for submitting my comment after the Monday 2pm deadline. The amended agenda containing the updated policy was not posted to the City Council website until Friday, April 7.

Sincerely,  
*Cindy Sidaris*

**From:** [Los Altos Racial Equity](#)  
**To:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM #3 04/10/2023  
**Date:** Monday, April 10, 2023 10:35:13 PM

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To Mayor, Vice-Mayor & Councilmembers,

I am requesting that Item #3 - Military Equipment Policy be pulled from the Consent Calendar.

There are discrepancies, missing items, and violations of procedure under AB 481 that have yet to be resolved. The new military equipment purchases which have been approved by City Council have **not even been added in to** the policy, so legally can not be purchased, acquired or used without being added in the policy for the public to review. Our lack of adherence to this procedure is disturbing and points to an "anything goes" attitude when it comes to oversight of the PD.

Renee Rashid  
On behalf of Los Altos for Racial Equity

**From:** [Los Altos Racial Equity](#)  
**To:** [Public Comment](#)  
**Subject:** AGENDA ITEM ITEM #3 04/10/2023  
**Date:** Tuesday, April 11, 2023 11:55:12 AM

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To Mayor, Vice-Mayor & Councilmembers,

LARE has serious concerns about the lack of transparency and adherence to procedure in compliance of AB 481 - Military Equipment Funding, Acquisition & Use.

1. AB 481 requires the City Council to approve the types, quantities, authorized uses and costs for any military equipment PRIOR TO requesting, buying, funding or using the military equipment.

City Council proceeded to approve purchases of military equipment requested by PD BEFORE THEY HAVE BEEN ADDED TO MEUP POLICY. This is in violation of state law.

2. AB 481 in 7070(d)(6) requires that the MEUP address: "The mechanisms to ensure compliance with the military equipment use policy, including which **independent persons or entities** have oversight authority, and, if applicable, what legally enforceable sanctions are put in place for violations of the policy."

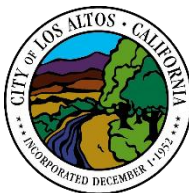
Our policy states that the Chief of Police has oversight authority, which is not an independent person or entity. This is also a violation of state law.

3. The wording in 709.7 has been arbitrarily changed and does not reflect the wording of AB 481, which should be:

Within 30 days of submitting and publicly releasing an annual military equipment report pursuant to this section, the law enforcement agency **shall** hold at least one well-publicized and conveniently located community engagement meeting, at which the **general public** may discuss and ask questions regarding the annual military equipment report and the law enforcement agency's funding, acquisition, or use of military equipment.

4. In addition, we do not believe there is any need for the addition of chemical grenades into our military equipment. MV SWAT does have them and they haven't been used for 20 years. 47% of our budget already goes to PD. We don't need to spend more money on things we are not going to use.

Renee Rashid,  
On behalf of Los Altos for Racial Equity



### AGENDA REPORT SUMMARY

**Meeting Date:** April 11, 2023

**Subject** Adopt the Single-use Foodware Accessories and Condiments Ordinance, in compliance with AB 1276, adding Chapter 6.45 (Single-use Foodware Accessories and Condiments) to Title 6 (Health and Safety) of the Los Altos Municipal Code by adopting by reference Chapter 5.2 (commencing with section 42270) of Part 3 of Division 30 of the Public Resources Code prohibiting a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer and authorizing City and County enforcement and penalties

**Prepared by:** Tania Katbi, Sustainability Coordinator  
**Reviewed by:** Aida Fairman, Director – Environmental Services and Utilities Dept.  
**Approved by:** Gabriel Engeland, City Manager

**Attachment:**  
1. Draft Ordinance 2023-488

**Initiated by:**  
City Staff

**Previous Council Consideration:**  
March 28, 2023

**Fiscal Impact:**  
AB 1276 imposes a state-mandated local program by creating a new infraction and imposing additional duties on local governing bodies. The City may incur costs for outreach, education, and enforcement of the law, as amended. By adopting an ordinance to enforce Chapter 5.2 (commencing with Section 42270) of Part 3 of Division 30 of the Public Resources Code, the City will be authorized to collect fines allowed under the legislation. Fines begin after the second notice of violation and include a fine of \$25 for each day in violation, but not to exceed an annual total of \$300.

Except for any collected fines following the second notice of violation, there should be no fiscal impact to food facilities. There is a potential for cost savings to food facilities from not providing single-use foodware accessories or condiments to all customers.

<b>Reviewed By:</b>		
City Manager	City Attorney	Finance Director
<u>GE</u>	<u>JH</u>	<u>JD</u>



**Subject:** Adopt the Single-use Foodware Accessories and Condiments Ordinance, in compliance with AB 1276, adding Chapter 6.45 (Single-use Foodware Accessories and Condiments) to title 6 (Health and Safety) of the Los Altos Municipal Code by adopting by reference Chapter 5.2 (commencing with section 42270) of Part 3 of Division 30 of the Public Resources Code prohibiting a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer and authorizing City and County enforcement and penalties

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**Environmental Review:**

The adoption of this Ordinance is exempt from review under the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines Section 15308 (Actions by Regulatory Agencies for the Protection of the Environment) in that this Ordinance sets forth regulatory procedures for the protection of the environment including, more particularly, regulations prohibiting or limiting the use of foodware accessories and condiments that pose a substantial environmental threat for reasons set forth in this staff report. The adoption of this Ordinance does not involve construction activity or the relaxation of existing environmental standards, and none of the circumstances set forth in CEQA Guidelines Section 15300.2 applies.

**Summary:**

- At the March 28, 2023, City Council meeting, staff introduced and waived a further reading of the Ordinance.
- On October 5, 2021, Governor Newsom signed Assembly Bill (“AB”) 1276 (Carillo) into law to prohibit a food facility from providing any single-use foodware accessory or standard condiment, as defined, to a consumer unless requested by the consumer.
- AB 1276, which amends Chapter 5.2 (commencing with Section 42270) of Part 3 of Division 30 of the Public Resources Code, requires a city, county, or city and county, to authorize an enforcement agency to enforce the new requirements.
- Santa Clara County does not have plans at this time to enforce AB 1276 requirements in cities within the County, except for mobile food facilities.
- In order to enforce the new law, staff recommend adopting the state law by reference to ensure that the language in the City’s Municipal Code remains consistent with the state law as it is currently written, and as it may be amended in the future. This approach will reduce the number of times that the City must revisit and readopt amended state law language. There are additional procedural steps that the City must follow to adopt a state law by reference, as further described below.

AB 1276 Summary

- AB 1276 is designed to reduce excess packaging and undesired condiments and utensils from being given to a customer when eating on premises or taking food to go.



**Subject:** Adopt the Single-use Foodware Accessories and Condiments Ordinance, in compliance with AB 1276, adding Chapter 6.45 (Single-use Foodware Accessories and Condiments) to title 6 (Health and Safety) of the Los Altos Municipal Code by adopting by reference Chapter 5.2 (commencing with section 42270) of Part 3 of Division 30 of the Public Resources Code prohibiting a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer and authorizing City and County enforcement and penalties

- 
- The law, as amended, is intended to give consumers more choices about single-use foodware accessories and condiments in order to reduce waste.
  - The law prohibits single-use foodware accessories from being bundled or packaged in a way that prohibits the customer from taking only the item desired.
  - It authorizes a food facility to ask a drive-through customer if the customer wants a single-use foodware accessory in specified circumstances.
  - The law requires a food facility using a third-party food delivery platform to list on its menu the availability of single-use foodware accessories and standard condiments and to only provide those items when requested.
  - The law excludes from these requirements correctional institutions, health care facilities, residential care facilities, and public and private school cafeterias.

The main provisions of AB 1276 are summarized below:

1. A food facility is required to only provide single-use accessories to consumers upon request;
2. A food facility is required to avoid bundling of single-use accessories or condiments;
3. A food facility is required to only offer those single-use items needed to eat or prevent spillage of the ready-to-eat food at a drive-through as well as in a public use airport.
4. A third-party food delivery platform shall provide consumers with the option to request single-use accessories for ready-to-eat food;
5. A food facility that uses a third-party platform shall customize their menu with a list of available single-use accessories or condiments. Only those items chosen by the consumer will be delivered. If no single-use accessories or condiments are requested none will be provided;
6. Unwrapped, single-use foodware accessories that are self-serve, standard condiments that are self-serve, and/or bulk dispensed condiments may still be used; and
7. The first and second violations of the provisions result in a notice of violation, and any subsequent violation is an infraction punishable by a fine of \$25 for each day in violation, but not to exceed an annual total of \$300.

Ordinance Adopting State Law by Reference





**Subject:** Adopt the Single-use Foodware Accessories and Condiments Ordinance, in compliance with AB 1276, adding Chapter 6.45 (Single-use Foodware Accessories and Condiments) to title 6 (Health and Safety) of the Los Altos Municipal Code by adopting by reference Chapter 5.2 (commencing with section 42270) of Part 3 of Division 30 of the Public Resources Code prohibiting a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer and authorizing City and County enforcement and penalties

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In order to comply with AB 1276, the City must authorize an enforcement agency to enforce the provisions of this law. Staff propose that this be accomplished through adopting the entire state law (Attachment 1) by reference in the City’s Municipal Code. In order to adopt the state law by reference the City must follow the specific procedures required under Government Code Section 50022.1, et. seq.

Government Code Section 50022.4 requires any penalties to be set out in full. The proposed ordinance adopts the entire law by reference, authorizes the City and County to enforce the ordinance, and sets forth in full the penalties for violating the ordinance, establishing that the first and second violations of the provisions result in a notice of violation, and any subsequent violation is an infraction punishable by a fine of \$25 for each day in violation, but not to exceed an annual total of \$300.

**Staff Recommendation:**

Adopt Ordinance No. 2023-XX to add Chapter 6.45 (Single-use Foodware Accessories and Condiments) to Title 6 (Health and Safety) of the Los Altos Municipal Code.

**ORDINANCE NO. 2023-**

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF LOS ALTOS  
ADDING CHAPTER 6.45 (SINGLE-USE FOODWARE ACCESSORIES AND  
CONDIMENTS) TO TITLE 6 (HEALTH AND SAFETY) OF THE LOS ALTOS  
MUNICIPAL CODE ADOPTING BY REFERENCE CHAPTER 5.2 (COMMENCING  
WITH SECTION 42270) OF PART 3 OF DIVISION 30 OF THE CALIFORNIA  
PUBLIC RESOURCES CODE PROHIBITING A FOOD FACILITY FROM  
PROVIDING ANY SINGLE-USE FOODWARE ACCESSORY OR STANDARD  
CONDIMENT UNLESS REQUESTED BY CONSUMER AND AUTHORIZING CITY  
AND COUNTY ENFORCEMENT AND PENALTIES**

**WHEREAS**, Governor Gavin Newsom signed Assembly Bill (“AB”) 1276 into law on October 5, 2021, which prohibits a food facility or a third-party food delivery platform from providing single-use food accessories, such as cutlery, straws and condiment packets, to a customer unless requested by the customer.

**WHEREAS**, prior to adoption of AB 1276, state law (AB 1884 (adopted 2018)) prohibited a full-service restaurant from providing single-use plastic straws to customers unless requested by the customer. The state law required the plastic straw regulation to be enforced by the local health and environmental health officers and their agents.

**WHEREAS**, AB 1276 revised the state law by expanding the scope from full-service restaurants to food facilities, which generally includes all retail food operations; expanded the scope from single-use plastic straws to single-use foodware accessories, which includes utensils, condiments, and straws (but does not include napkins); and revised the enforcement obligation from the local health and environmental health officers (as applicable to the City of Los Altos, this would be the Santa Clara County health official) to whichever entity cities and counties deem appropriate.

**WHEREAS**, AB 1276 is designed to reduce excess packaging and undesired condiments and implements from being given to a customer when eating on premises or taking food to go, and prohibits single-use foodware accessories from being bundled or packaged in a way that prohibits the customer from taking only the item desired. AB 1276 does, however, authorize a food facility to ask a drive-through customer, if the customer wants a single-use foodware accessory in specified circumstances.

**WHEREAS**, a food facility using a third-party food delivery platform is required to list on its menu the availability of single-use foodware accessories and standard condiments and only provide those items when requested. The law excludes from these requirements correctional institutions, health care facilities, residential care facilities, and public and private school cafeterias.

**WHEREAS**, AB 1276 specifies that the first and second violations of the provisions result in a notice of violation, and any subsequent violation is an infraction punishable by a fine of \$25 for each day in violation, but not to exceed an annual total of \$300.

**WHEREAS**, a city, county, or city and county, on or before June 1, 2022, is required to authorize an enforcement agency to enforce the requirements established under AB 1276.

**WHEREAS**, Santa Clara County Recycling and Waste Reduction Commission informed the City that they do not currently anticipate that they will be in a position to assume enforcement responsibilities for AB 1276 on behalf of cities in the county.

**WHEREAS**, in order to comply with the enforcement requirements of AB 1276, the City Council of the City of Los Altos now wishes to adopt an ordinance adding Chapter 6.45 (Single-use Foodware Accessories and Condiments) to Title 6 (Health and Safety) of the Los Altos Municipal Code adopting by reference of Chapter 5.2 (commencing with Section 42270) of Part 3 of Division 30 of the Public Resources Code prohibiting a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer, and authorizing City and County enforcement.

**WHEREAS**, Government Code Section 50022.1, et. seq, sets forth the procedures by which a city may adopt a state law by reference.

**WHEREAS**, the City will comply with the procedures set forth in Government Code Section 50022.1, et. seq., including holding a public hearing at the second reading, following notice requirements under Government Code Section 6066, and making available the entire language of the state law to be adopted by reference.

**WHEREAS**, The adoption of this Ordinance is exempt from review under the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines Section 15308 (Actions by Regulatory Agencies for the Protection of the Environment) in that this Ordinance sets forth regulatory procedures for the protection of the environment including, more particularly, regulations prohibiting or limiting the use of foodware accessories and condiments that pose a substantial environmental threat for reasons set forth in this staff report. The adoption of this Ordinance does not involve construction activity or the relaxation of existing environmental standards, and none of the circumstances set forth in CEQA Guidelines Section 15300.2 applies.

**NOW THEREFORE**, the City Council of the City of Los Altos does hereby ordain as follows:

**SECTION 1. AMENDMENT OF CODE:**

Los Altos Municipal Code, Title 6, entitled HEALTH AND SAFETY, is amended by adding a new Chapter 6.45, Single-use Foodware Accessories and Condiments to read as follows:

**“Chapter 6.45 SINGLE-USE FOODWARE ACCESSORIES AND CONDIMENTS**

**Section 6.45.010.** Chapter 5.2 (commencing with Section 42270) of Part 3 of Division 30 of the California Public Resources Code is herein adopted by reference and shall prohibit a food facility from providing any single-use foodware accessory or standard condiment unless requested by consumer and authorizing City and County enforcement and penalties.

**Section 6.45.020 Enforcement.**

A. The City Manager or the City Manager’s designee has primary responsibility for the enforcement of this chapter. The City Manager or the City Manager’s designee is authorized to promulgate regulations and to take any and all other actions reasonable and necessary to enforce this chapter, including, but not limited to, investigating violations, issuing fines, and entering the premises of any food facility during business hours. Other City staff may assist with this enforcement responsibility by entering the premises of a food facility as part of their regular inspection functions and reporting any alleged violations to the City Manager or the City Manager’s designee.

B. The County of Santa Clara and its agents are authorized to take any and all actions reasonable and necessary to enforce this chapter, including, but not limited to, investigating violations, issuing fines, and entering the premises of any food facility during business hours.

**Section 6.45.030 Penalties.**

Pursuant to Public Resources Code Section 42272(b) as adopted by reference and incorporated herein, the first and second violations of Chapter 5.2 (commencing with Section 42270) of Part 3 of Division 30 of the Public Resources Code shall result in a notice of violation, and any subsequent violation shall constitute an infraction punishable by a fine of twenty-five dollars (\$25) for each day in violation, but not to exceed three hundred dollars (\$300) annually.”

**SECTION 2. CONSTITUTIONALITY.** If any section, subsection, sentence, clause or phrase of this code is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this code. \_

**SECTION 3. PUBLICATION.** This ordinance shall be published as provided in Government Code section 36933.

**SECTION 4. EFFECTIVE DATE.** This ordinance shall be effective upon the commencement of the thirty-first day following the adoption date.

**The foregoing ordinance was duly and properly introduced at a regular meeting of the City Council of the City of Los Altos held on \_\_\_\_\_, 2023 and was thereafter, at a regular meeting held on \_\_\_\_\_, 2023 passed and adopted by the following vote:**

AYES:

NOES:

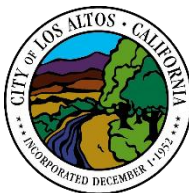
ABSENT:  
ABSTAIN:

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SALLY MEADOWS, MAYOR

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[XXXXX], CITY CLERK



**AGENDA REPORT SUMMARY**

**Meeting Date:** April 11, 2023

**Subject** Ordinance No. 2023-xxx: Prohibition on possession of firearms in sensitive places

**Prepared by:** Jon Maginot, Assistant City Manager

**Reviewed by:** Jolie Houston, City Attorney

**Approved by:** Gabriel Engeland, City Manager

**Attachment(s):**

- 1. Ordinance No. 2023-xxx
- 2. Santa Clara County Public Health Report - Cost of Gun Violence in Santa Clara County

**Initiated by:**

City Council

**Previous Council Consideration:**

None

**Fiscal Impact:**

None

**Environmental Review:**

Not applicable

**Policy Question(s) for Council Consideration:**

- Does the Council wish to adopt an ordinance prohibiting the possession of firearms in sensitive places?

**Summary:**

- There has been a rise in mass shootings throughout the Country, many of which occur in public spaces such as schools or government buildings
- The US Supreme Court has determined that government agencies can place restrictions on the possession of firearms in sensitive areas
- Surrounding cities have or will soon consider ordinances prohibiting possession of firearms in sensitive areas

City Manager

GE

**Reviewed By:**

City Attorney

JH

Finance Director

JD



**Subject:** Ordinance No. 2023-xxx: Prohibition on possession of firearms in sensitive places

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**Staff Recommendation:**

Introduce and waive further reading of Ordinance No. 2023-xxx prohibiting the possession of firearms in sensitive places



**Subject:** Ordinance No. 2023-xxx: Prohibition on possession of firearms in sensitive places

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**Purpose**

To consider an ordinance prohibiting the possession of a firearm in sensitive places

**Background**

On July 12, 2022, the City Council requested a future agenda item to consider restricting firearms on public property. At this time, the carrying of a firearm with a valid permit is lawful in most public places within California. A 2022 report from the Santa Clara County Public Health Department outlines the public cost of gun violence within Santa Clara County (Attachment 2). In addition, there has been a rise in mass shootings throughout the country, including the 2021 VTA railyard shooting.

**Discussion/Analysis**

While the Second Amendment to the United States Constitution places limits on a government’s ability to regulate firearms, the United States Supreme Court has found that the Second Amendment does not prohibit all regulations. The Supreme Court has found three times that restrictions may be placed on carrying firearms in “sensitive places.”

Several surrounding cities have implemented ordinances prohibiting the carrying of firearms in sensitive areas. City of Sunnyvale has prohibited firearms on government property, public transit and places of worship. City of Mountain View has prohibited firearms on City property and the City Council has requested consideration of an ordinance expanding the prohibition to include sensitive areas. On March 6, 2023, City of Palo Alto approved a prohibition of firearms in sensitive locations.

The proposed Ordinance (Attachment 1) would prohibit the possession of a firearm in any City building, City parks, polling places and schools.

**Recommendation**

Staff recommends the Council introduce and waive further reading of Ordinance No. 2023-xxx prohibiting the possession of firearms in sensitive places



**ORDINANCE NO. 2023-\_\_\_**

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF  
LOS ALTOS PROHIBITING THE POSSESSION OF FIREARMS  
IN SENSITIVE PLACES**

**WHEREAS**, the City Council of the City of Los Altos finds there is a compelling interest in protecting the health and safety of the public; and

**WHEREAS**, the incidence of firearm-related fatalities and injuries has increased in recent years and the age-adjusted firearm death rate in Santa Clara County was 4.8 people per 100,00 in 2020, the highest rate in the past decade; and

**WHEREAS**, the State of California experienced 369 mass shootings (defined as an incident that kills or injures four or more people) between 2014 and January 2023, including incidents at the VTA railyard (May 26, 2021) and Gilroy Garlic Festival (July 28, 2019); and

**WHEREAS**, while the United States Supreme Court has made clear that the Second Amendment to the United States Constitution imposes some restrictions on states’ ability to regulate firearms it has recognized that the Second Amendment to the United States Constitution is not a “regulatory straightjacket.” N.Y. State Rifle & Pistol Ass’n v. Bruen (2022), 142 S. Ct. 2111, 2133. Indeed, the Second Amendment allows States to adopt a “‘variety’ of gun regulations.” N.Y. State Rifle & Pistol Ass’n (2022), 142 S. Ct. 2111, 2162. And when it comes to restrictions on carrying firearms in public, the United States Supreme Court has recognized three times that states may restrict the carrying of firearms in “sensitive places.” N.Y. State Rifle & Pistol Ass’n v. Bruen (2022), 142 S. Ct. 2111, 2133; see also McDonald v. City of Chicago (2010) 561 U.S. 742, 786; District of Columbia v. Heller (2008) 554 U.S. 570, 626; and

**WHEREAS**, this Ordinance is exempt from environmental review pursuant to Section 15061(b)(3) of the State Guidelines implementing the California Environmental Quality Act of 1970, as amended.

**NOW THEREFORE**, the City Council of the City of Los Altos does hereby ordain as follows:

**SECTION 1. AMENDMENT OF CODE:** Los Altos Municipal Code is hereby amended by adding a new Chapter 7.30 entitled “Possession of Firearms in Sensitive Places” to read as follows:

**7.30.010 Definitions**

For the purposes of this chapter, unless otherwise apparent from the context, certain words and phrases used in this chapter are defined as follows:

- A. *“Firearm”* means any gun, pistol, revolver, rifle or any device that is designed or modified to be used as a weapon, from which is expelled through a barrel a projectile by the force of an explosion or other form of combustion. “Firearm” does not include imitation

firearms, BB guns, or air rifles as defined in Government Code Section 53071.5 or any successor legislation;

- B. “Sensitive place” means any of the following places:
  - i. City property, meaning real property, including any buildings thereon, owned or leased by city, and in city’s possession. “City property” does not include any public right-of-way owned by the city, including any area across, along, on, over, upon, and within the dedicated public alleys, boulevards, courts, lanes, roads, sidewalks, streets, expressways, and ways within the city;
  - ii. Any polling place while voting is occurring;
  - iii. Any school. For the purposes of this section, “school” includes all institutions that provide preschool, elementary, secondary, post-secondary, technical, or trade or vocational education, and includes all athletic facilities, offices, cafeteria and eating establishments, health care facilities, research facilities, parking lots, and shared rooms and common areas of dormitories thereof. “School” does not include a private residence at which education is provided for children who are all related to one another by blood, marriage, or adoption.

**7.30.020 Prohibition on carrying of firearms in sensitive places**

- A. Except as otherwise provided by federal or state law, no person shall carry a firearm in any sensitive place unless they are subject to an exemption under Section 7.30.020. This prohibition applies to persons licensed to carry a concealed firearm.

**7.30.030 Exemptions**

- A. This section shall not apply to:
  - i. A federal, state, or local law enforcement officer when such person is authorized to carry a concealed weapon or a loaded firearm under state law or under 18 U.S.C. Section 926B or any successor legislation;
  - ii. An honorably retired officer or agent of a law enforcement agency, when authorized to carry a concealed or loaded weapon under state law or 18 U.S.C. Section 926C;
  - iii. A security guard or messenger of a financial institution, a guard of a contract carrier operating an armored vehicle, a licensed private investigator, a patrol operator, an alarm company operator, or security guard, when such persons are authorized by applicable state or federal law to carry a firearm and when such persons are engaged in the exercise of their official duties;
  - iv. A person bringing or transporting an unloaded firearm onto city property to exchange, transfer, or relinquish it to law enforcement, in compliance with any city operated, approved, or sponsored program to purchase, exchange, or otherwise obtain voluntary relinquishment of firearms;
  - v. A person lawfully possessing an unloaded firearm in the locked trunk of, or inside a locked container in, a motor vehicle.
  - vi. A hunter with a valid hunting license when going to or returning from a legal hunting expedition; provided, however, that when transiting through any area where firearms are prohibited, any firearm is safely stored in a locked container or

otherwise secured using a firearm safety device as defined by California Penal Code Section 16540 or any successor legislation.

**7.30.040 Penalties**

A. Any person violating any of the provisions of this section shall be guilty of a misdemeanor punishable as set forth in Chapter 1.20 of the Los Altos Municipal Code.

**SECTION 2. CONSTITUTIONALITY.** If any section, subsection, sentence, clause or phrase of this code is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

**SECTION 3. PUBLICATION.** This ordinance shall be published as provided in Government Code section 36933.

**SECTION 4. EFFECTIVE DATE.** This ordinance shall be effective upon the commencement of the thirty-first day following the adoption date.

The foregoing ordinance was duly and properly introduced at a regular meeting of the City Council of the City of Los Altos held on \_\_\_\_\_, 2023 and was thereafter, at a regular meeting held on \_\_\_\_\_, 2023 passed and adopted by the following vote:

- AYES:
- NOES:
- ABSENT:
- ABSTAIN:

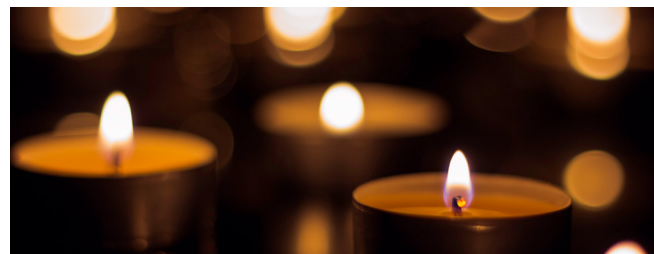
\_\_\_\_\_  
Sally Meadows, MAYOR

Attest:

\_\_\_\_\_  
Angel Rodriguez, INTERIM CITY CLERK

# Cost of Gun Violence

## in Santa Clara County



In collaboration with  
**Pacific Institute for Research and Evaluation**  
**Prevention Institute**

## Acknowledgments

### Santa Clara County Board of Supervisors

Supervisor Mike Wasserman, District 1  
Supervisor Cindy Chavez, District 2  
Supervisor Otto Lee, District 3  
Supervisor Susan Ellenberg, District 4  
Supervisor Joe Simitian, District 5

### County Executive

Jeffrey V. Smith, MD, JD

### Deputy County Executive and Director of Santa Clara Valley Health & Hospital System

René G. Santiago MPH

### County of Santa Clara Public Health Department

Sara H. Cody, MD,  
Health Officer and Public Health Director

### Community Members

We are deeply grateful to all the community members who contributed their time and effort for participating in the Cost of Gun Violence study.

### County of Santa Clara Public Health Department project team

Diana Davila, Lidia Doniz, Thao Hoang, Rhonda McClinton-Brown, Marianna Moles, Maritza Rodriguez, Mandeep Sidhu, Anandi Sujeer, Yun (Annie) Wu

### Community Organizations and Resident Groups

Black Leadership Kitchen Cabinet, Brady United, Cadillac-Winchester Neighborhood Association, Carry the Vision, Catholic Charities of Santa Clara County, CIVIC, Community Solutions, Foxdale Neighborhood Association, Justice4Josiah, Moms Demand Action for Gun Sense in America, Next Door Solutions to Domestic Violence, Scrubs Addressing the Firearm Epidemic (SAFE), San Ysidro Nueva Vida, Silicon Valley Alliance for Gun Safety, SOMOS Mayfair, Valley Palms Unidos, Youth Alliance

### County and City Partner Agencies

City of Gilroy, City of Morgan Hill, City of Mountain View, City of Santa Clara, City of Sunnyvale, City of San José, County of Santa Clara Behavioral Health Services, County of Santa Clara District Attorney’s Office, County of Santa Clara Office of Diversity, Equity, and Belonging, County of Santa Clara Probation Department, County of Santa Clara Office of Reentry Services, County of Santa Clara Office of Pretrial Services, First 5 Santa Clara County Family Resource Centers, Gilroy Police Department, Milpitas Police Department, Palo Alto Police Department

### Violence Prevention Experts

Amir Chapel, David Lee, Sarah Burd-Sharps, Steve Wirtz, Becca Knox

### Research Partners

Bruce A. Lawrence, Ted R. Miller, David I. Swedler  
Pacific Institute for Research and Evaluation  
William Crary, Alissa Leung, Lisa Fujie Parks, Zachary Tarro  
Prevention Institute

### Graphic Design

Studio Em Graphic Design

# County of Santa Clara Public Health Department

Public Health Administration  
976 Lenzen Avenue, 2nd Floor  
San José, CA 95126  
408.792.5040



August 12, 2022

### To the Residents of Santa Clara County,

In October 2019, the County of Santa Clara Board of Supervisors requested an analysis of the public cost of gun violence from 2000 to 2020, launching a journey that led to this report. During that time, much has changed. COVID-19 swept through our country, accompanied by economic hardship and political upheaval at scales unseen in a generation. Gun violence, unfortunately, also rose precipitously during the pandemic. Nationwide, firearm deaths increased to a record level in 2020, the highest in the past 40 years. Here in our county, the age-adjusted firearm death rate was 4.8 per 100,000 people in 2020, the highest rate in the past decade. Several mass shootings took place in the U.S., including the 2021 VTA railyard shooting, the worst in the county’s history.

These grim statistics remind us that violence is a symptom, not a disease. The pandemic and the political environment have exacerbated the root causes of violence: poverty, lack of opportunities, social isolation, discrimination, and racism that serves as a breeding ground for fear, despair, desperation and hate that ultimately lead to acts of brutality. The solution to gun violence requires more than just legislative or criminal justice action; it requires a multi-sectoral, system-wide response that includes thoughtful and transformative partnerships with the communities most deeply affected.

Beyond the cost analysis, this report presents extensive and in-depth data on fatal and nonfatal injuries related to gun violence and possession. Reading this report may not be easy. Behind every statistic of death and injury are families who have lost loved ones and communities robbed of peace, safety, and opportunities to thrive. This report tells their story through data. At the same time, this project would not have been possible without the help of all those working to address gun violence at all levels through government, nonprofit, and grassroots efforts. This report is a tribute to their courage and self-sacrifice. Just as violence impacts us all, each one of us can play a role in creating a more peaceful future.

Sincerely,

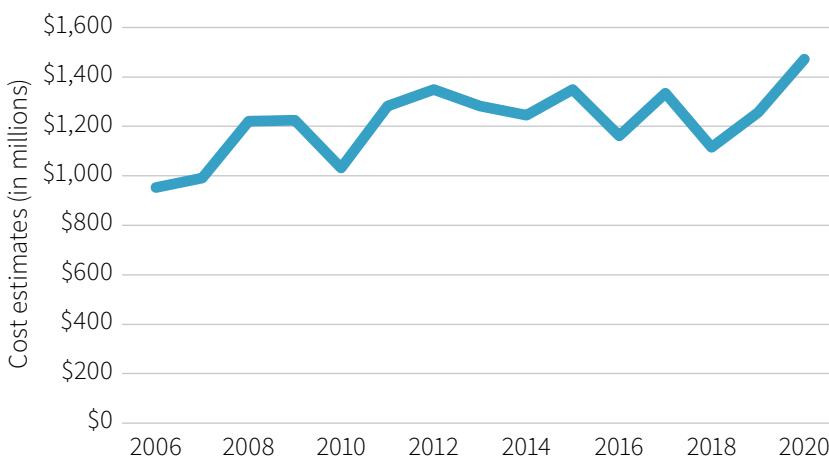
Sara H. Cody, MD  
Health Officer and Director  
County of Santa Clara, Public Health Department  
San José , CA

# Executive Summary

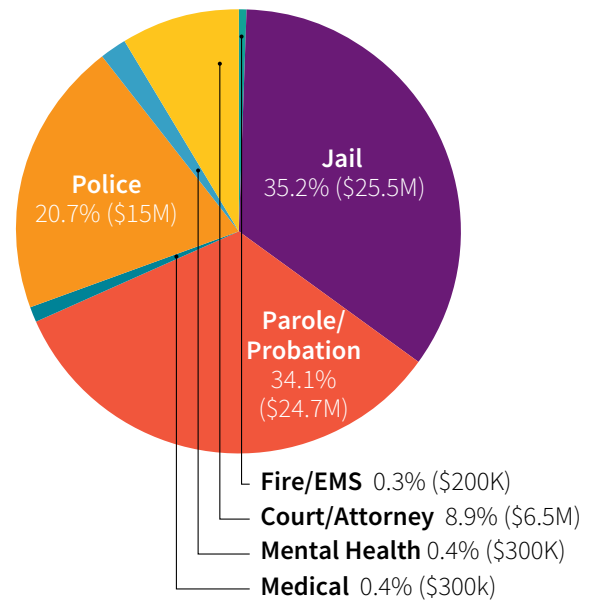
## Cost of Gun Violence Study

**Purpose:** Quantify the economic and societal costs associated with gun violence in Santa Clara County from 2000 to 2020 and inform policy options and strategies to advance violence prevention.

**Costs of Firearm Violence in Santa Clara County, 2006-2020**



**Public Cost of Firearm Violence**



**\$1.2B**

The average annual cost of firearm violence was 1.2B in Santa Clara County during 2016-20.

**\$72.5M**

The average annual public sector costs of firearm violence were \$72.5M in the county.

**>50%**

More than half of the total cost were related to firearm assault/homicide (53%, \$727M) and 37% (\$517M) for self-inflicted injuries and suicide.

**\$35M**

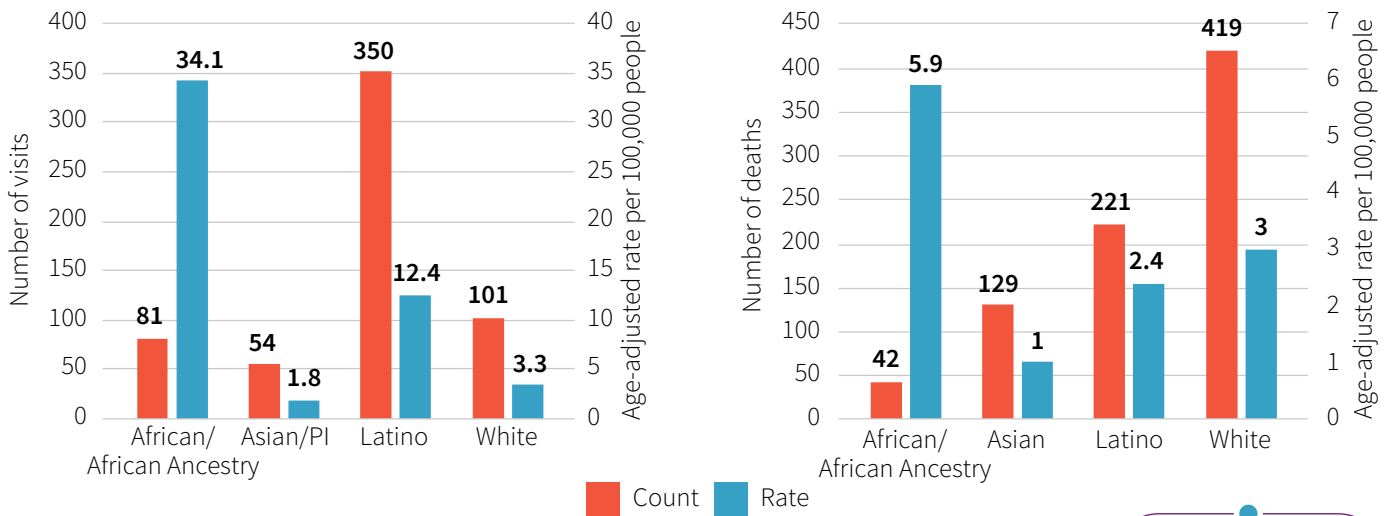
The total cost increased nearly \$35M annually from 2006 to 2020; a 54% increase over the 15-year period.

**28,000**

During 2017-21, an average of 28,000 firearms were purchased annually in Santa Clara County.



### Count and age-adjusted rate of non-fatal firearm injury-related emergency department visits and firearm deaths by race/ethnicity among Santa Clara County residents, 2016-20



**2X**

Annual count of non-fatal firearm injury-related emergency department (ED) visits doubled during the past decade, increasing from 60 in 2011 to 156 in 2020.



**2 in 3**

Nearly 2 in 3 (65%) of the non-fatal firearm injury-related ED visits were among adults ages 18 to 34 years.



**34%**

One in 3 (34%) firearm deaths were among county residents ages 18 to 34 years.



**6 in 10**

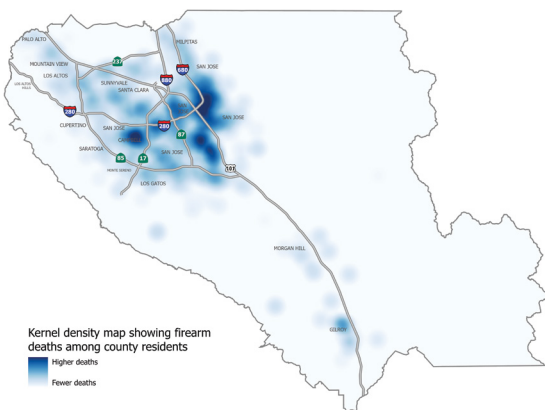
Six in 10 firearm deaths were suicide (60%) and 34% were homicide.



**RACE**

Latinos had the most non-fatal firearm injury-related ED visits, while African/African Ancestry had the highest rate.

#### Firearm death density



Higher density areas within the city of San José are hot spots for firearm violence and have higher rates of fatal and non-fatal firearm injuries.

Per-capita costs for firearm injuries were nearly double in San José (\$977) compared to rest of the county (\$523).

### Recommendations ►



# Recommendations

## Strengthen Policy, Advocacy, and Public Awareness

1

**Encourage the adoption of gun safety policies and practices** to ensure gun safety for gun owners and the broader community.

2

**Adopt the use of Racial Equity Impact Assessment tools** to evaluate the County’s policy position on guns and advocate for more equitable gun violence prevention policies at the county, state, and federal levels.

3

**Implement public awareness and education campaigns on gun violence prevention** to improve gun safety practices, broaden public understanding of gun safety laws, advance public health prevention strategies, and support trauma-informed healing.

## Increase Protective Factors that Advance Equity

4

**Adopt and replicate community-centered, place-based approaches** to gun violence prevention in neighborhoods facing concentrated disadvantage and/or concentration of risk factors for gun violence.

5

**Expand partnerships with ethnic behavioral health service providers** to strengthen community-based crisis intervention, de-escalation, and mobile mental health crisis care; improve policies and protocols to separate people in crisis from access to firearms and reduce the use of force during intervention.

6

**Support excluded youth by increasing partnerships between cities, school districts, and the County** to expand community-led social, recreational, behavioral, educational, and employment opportunities.

## Strengthen Government and Community Level Coordination and Data Systems

7

**Establish a gun safety data workgroup** to guide the development of a data-to-action dashboard.

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# Introduction

## Impact of Gun Violence at the National and State Level

Gun violence is a public health crisis and has become one of the leading causes of premature deaths. It affects many communities and families daily, whether through suicide, domestic violence, community violence, or other forms.<sup>1</sup> With a comprehensive public health approach, gun violence is preventable.<sup>2</sup>

Each day, nearly 124 people are killed by gunshot, and more than 200 are injured nationwide.<sup>3</sup> According to a recent Centers for Disease Control and Prevention (CDC) report, 45,222 people died due to firearm injuries in 2020, the highest number of deaths due to firearm injuries in the U.S. in a year.<sup>4</sup> Firearm injuries were among the five leading causes of death for people ages 1-44 in the United States.<sup>3</sup>

In California, there were 3,449 firearm-related deaths in 2020.<sup>5</sup> Statewide, the increase in the firearm-related homicides contributed to increase of homicides overall. The use of firearms also became more prevalent in other crime categories such as robbery and assault.<sup>6</sup>

Certain population subgroups are more impacted by firearm injuries than others. Nearly 9 in 10 firearm injury deaths (86%) and non-fatal injuries (87%) occurred among men. Firearm homicides are more common among teens and young adults (15 to 34 age group) while firearm suicides are more common among White seniors (75 years and older). People of color (African/African Ancestry<sup>7</sup>, American Indian or Alaska Natives, and Latinos) experience disproportionately higher rates of firearm homicides. In addition, American Indian or Alaska Natives and non-Hispanic Whites encounter higher rates of firearm suicide.<sup>5</sup>

A firearm injury is a gunshot wound or penetrating injury from a weapon that uses a powder charge to fire a projectile such as handguns, rifles, or shotguns.<sup>3</sup>

Firearm injury can be:

- Intentional self-harm (suicide)
- Intentional interpersonal violence (homicide)
- Unintentional injury
- Legal intervention
- Undetermined intent.

**Not all guns are considered firearms. For example, BB guns and pellet guns are not firearms. However, for the purposes of this report, the term “gun” and “firearm” are used interchangeably but represent data for firearms only.**

The magnitude and impacts of gun violence are complex, making it difficult to fully understand its true toll on society. In addition to the lives lost and economic impact of firearm violence, it also affects human lives in ways that are not as easy to measure, such as family members lost to shootings or suicide, people who witness shootings, or children who grow up in an environment of pervasive gun use. Without investment over time to support individual and community healing, the trauma resulting from these incidents lasts throughout the life course and even extends across generations, with social and economic consequences to neighborhoods, communities, and society. This report is an attempt at capturing the tangible and intangible costs of gun violence on our society. It helps us look at not only the economic values lost, but the potential we could gain through more effective prevention.



# Demographic Overview of Santa Clara County

With an estimated population of 1,936,259 in 2020, Santa Clara County was the 6th largest county in California, and the most populous county in the Bay Area.<sup>8</sup> According to the U.S. Census Bureau, more than 1 in 4 county residents (22%) were children under 18 years of age and 1 in 7 county residents (14%) were seniors ages 65 years and over. Santa Clara County was a minority-majority county comprised of 25% Latino, 2% African/African Ancestry, 0.2% American Indian and Alaska Native, 37% Asian, 0.3% Native Hawaiian and Other Pacific Islander and 31% non-Hispanic White residents. Nearly 3% of the county population were civilian veterans.<sup>9</sup>

Four in 10 county residents (40%) were foreign-born representing various world regions; amongst them 68% from Asia and 21% from Latin America. More than half of county residents ages 5 years and over (53%) speak a language other than English at home. More than half of county residents ages 25 years and older (54%) have attained a bachelor's degree or higher education. Median household income in the county was \$130,890 during 2016-20.<sup>9</sup>



# Purpose of the Study

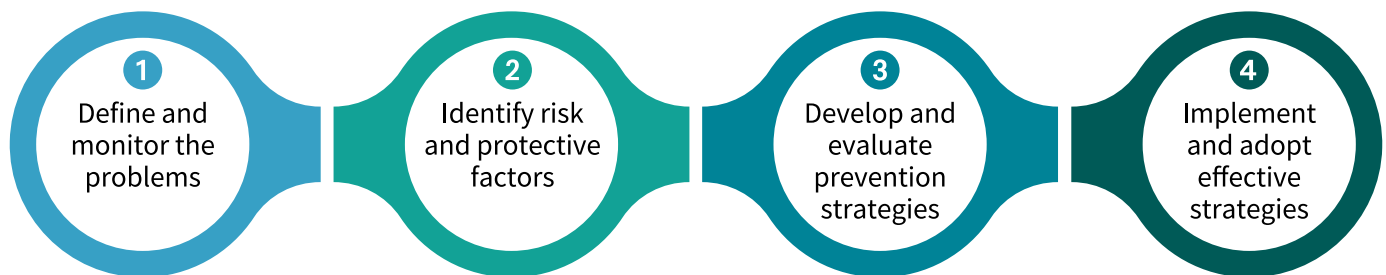
In August 2019, the County of Santa Clara Board of Supervisors directed the Public Health Department to undertake a study on the public cost of firearm violence.

The purpose of the Cost of Gun Violence Study is to quantify the economic costs of firearm violence in the county. In addition to the countywide data summarization, data on select cities are included in

the report to provide local context.

This study provides the County Board of Supervisors and other decision makers with a public health framework for firearm violence prevention and shares recommendations for a comprehensive set of strategies with emphasis on upstream and systemic violence prevention.

## Public Health framework includes the following steps:



Adapted from CDC’s Public Health Approach to Violence Prevention (<https://www.cdc.gov/violenceprevention/about/publichealthapproach.html>)

**1. Define and monitor the problem:** Data are presented to quantify firearm violence prevalent in the county.

**2. Identify risk and protective factors:** Institutional and systemic factors such as poverty, lack of economic and educational opportunities, racism and discrimination, unsafe neighborhood environment, and lack of support networks contribute to inequitable outcomes, especially for people of color. Firearm violence related racial/ethnic disproportionalities are highlighted in this report. Protective factors such as social connectedness and community assets are included in the recommendations.

**3. Develop and evaluate prevention strategies:** Report recommendations propose population-level upstream strategies, with an equity focus to help those impacted the most from firearm violence.

**4. Implement and ensure adoption of effective strategies:** This step ensures effective implementation of prevention strategies at multiple levels; from individual to neighborhood to community to countywide.



## Methods Overview

The County of Santa Clara Public Health Department collaborated with the Pacific Institute for Research and Evaluation (PIRE), and Prevention Institute (PI) to undertake this study. This study used a peer-reviewed framework for estimating the cost of firearm violence developed by PIRE.<sup>10</sup>

Fatal and non-fatal firearm injuries included in the report are based on county death, hospital, emergency department, and police databases. The firearm violence costs are derived using a mix of county data sources where available, with cost per event estimates derived from national data sources and extrapolated to county data. The medical, fire department, police, and criminal justice costs are mostly calculated using county and state data sources. The other major cost categories including mental health, wage loss, quality of life loss, and cost to employers are derived using national estimates and studies published in peer-reviewed journals.

A series of key informant and stakeholder meetings were conducted to understand the community and stakeholder concerns, perspectives on root causes, and possible solutions and policy recommendations to be included in further action planning. These meetings were represented by community members, resident groups, community

based organizations, criminal justice partners, County Health System and department partners, advocacy groups, subject matter experts, and city agencies.

Rates are useful in assessing the disease or death burden for a given population, compared with another population, regardless of size. Crude and age-specific death rates is calculated as the total number of deaths during a specific time period in the population category of interest, divided by the at-risk population for that category. However, crude rates are influenced by the underlying age distribution of the population, which can change over time and can be different in different population subgroups and geographic areas. Age-adjusting the rates ensures that differences in deaths between one population subgroup and another are not due to differences in their age distribution. Age-adjusted death rate is a weighted average of the age-specific death rates, where the weights are the proportions of persons in the corresponding age groups of a standard population. (Centers for Disease Control and Prevention; [https://www.cdc.gov/cancer/uscs/technical\\_notes/stat\\_methods/rates.htm](https://www.cdc.gov/cancer/uscs/technical_notes/stat_methods/rates.htm))

For more information about methods and limitations, please see Appendix B and C respectively.



# Data Sources Used in the Study



## Health and Hospital

- Death data
- Emergency department data
- Hospitalization data
- EMS data



## Mental Health

- Mental health services provided in community following mass shootings
- Staff hours, salaries, and other staffing information



## Indirect Costs

- Loss of wage estimates
- Loss of quality of life estimates



## Criminal Justice

- Gun sales
- Firearm offenses
- Gun violence restraining orders
- Firearm-related hearings and sentencing
- Victim compensation



## Population Health Surveys

- Behavioral Risk Factor Survey
- California Healthy Kids Survey
- California Safety and Wellbeing Survey



## Local Contextual Data

- National and State comparison data
- Local demographic data
- Local trends data on gun violence indicators

**Cost assessment using a peer-reviewed framework applied to all these data domains**

# Results

## Data Overview

**Table 1.** Firearm Violence, Santa Clara County, 2016-20

The table contains the summary counts, percent distribution and rates for non-fatal firearm injury-related emergency department visits and hospitalizations, and firearm deaths among Santa Clara County residents during 2016-20.

	Non-fatal firearm injury-related emergency department visits			Non-fatal firearm injury-related hospitalizations			Firearm deaths		
	Count	Percent	Rate	Count	Percent	Rate	Count	Percent	Rate
<b>2016-20</b>									
<b>Santa Clara County</b>	610	-	6.8	479	-	5.3	394	-	
<b>Female</b>	63	10%	1.5	32	7%	0.7	44	11%	1
<b>Male</b>	547	90%	11.9	447	93%	9.8	350	89%	7.9
<b>African/African Ancestry</b>	81	13%	34.1	71	15%	30.5	21	5%	5.9
<b>Asian*</b>	54	9%	1.8	32	7%	1.1	59	15%	1
<b>Latino</b>	350	57%	12.4	266	56%	10.0	104	26%	2.4
<b>White</b>	101	17%	3.3	82	17%	2.9	209	53%	3
<b>Less than 18 years</b>	50	8%	11.6	32	7%	7.4			
<b>18 to 24 years</b>	199	33%	125.9	135	28%	85.4	59	15%	7.3
<b>25 to 34 years</b>	197	32%	73.1	138	29%	51.2	75	19%	4.8
<b>35 to 44 years</b>	86	14%	30.9	77	16%	27.7			
<b>45 to 64 years</b>				78	16%	17.4	102	26%	4.2
<b>65 years and over</b>				19	4%	9.6	94	24%	7.2

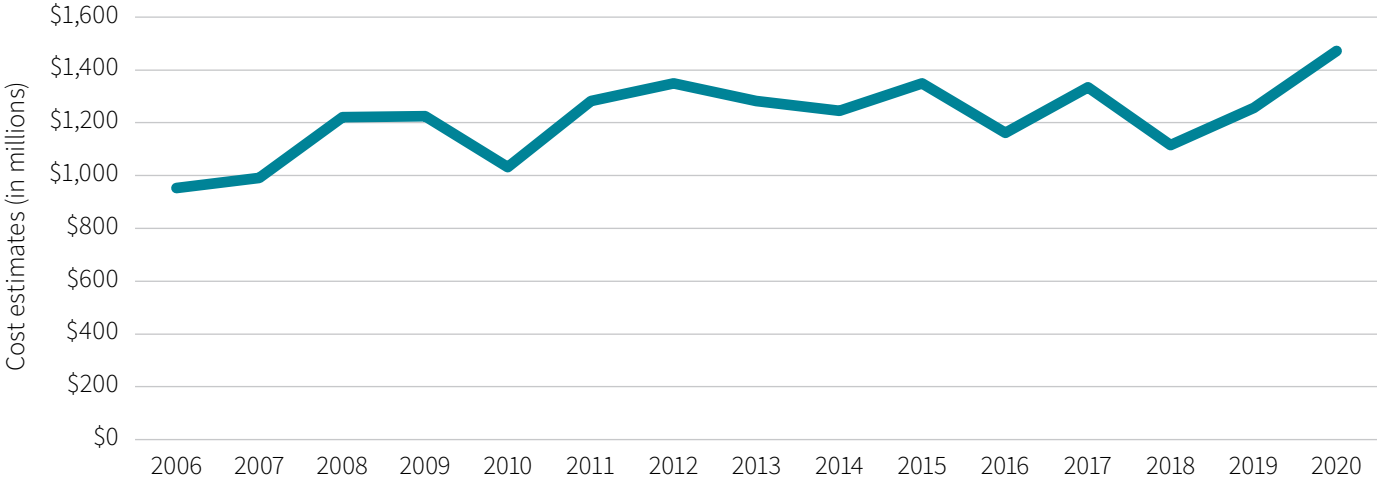
Sources : Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), Emergency Department Visits and Patient Discharge Database, 2016-20, Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death data, 2011-20

Notes: \*Data are presented as Asian/Pacific Islanders combined for emergency department visits/hospitalizations and Asians for deaths. Age-adjusted death rates by race/ethnicity are for 10-year time period (2011 to 2020) while rest of the data in the table are for 5-year time period (2016 to 2020). Age-adjusted rates per 100,000 are presented for county overall, gender and race/ethnicity. Age-specific rates per 100,000 are presented for age groups. Data (blank cells) are not presented when the number of emergency department visits is 15 or fewer and when the number of deaths is 1 to 10. Whites refer to non-Hispanic Whites in this report.



# Estimated Costs for Firearm Injuries and Deaths

Figure 1. Costs of firearm violence in Santa Clara County, 2006-2020



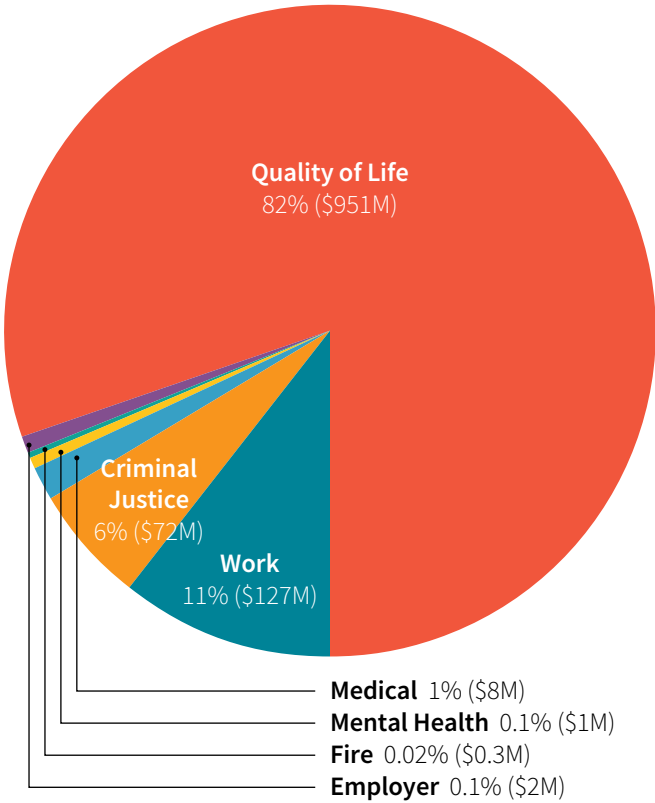
Source: Cost estimates are built based on local firearm-related data sources, local cost data and budget analyses, and published models of injury and crime costs (Zonfrillo et al. 2018, Miller et al. 2021, Hunt et al. 2019)

In the U.S., firearm violence costs \$280 billion in an average year. This amount includes the lifetime costs associated with firearm violence: immediate medical treatment, long-term physical and mental health care, lost wages, criminal justice costs and quality of life lost estimates.<sup>11</sup>

From 2006 through 2020, the annual societal costs of firearm violence in Santa Clara County increased from \$952 million to nearly \$1.472 billion (costs in 2020-dollar amount). The average annual increase of \$35 million equates to a 54% increase over the 15-year period.<sup>12</sup>



**Figure 2.** Costs of firearm violence by sector type



Source: Cost estimates are built based on local firearm-related data sources, local cost data and budget analyses, and published models of injury and crime costs (Zonfrillo et al. 2018, Miller et al. 2021, Hunt et al. 2019)

During 2016-20, the average annual costs related to firearm injuries and deaths were nearly \$1.2 billion dollars in Santa Clara County. This total cost estimate represented medical, criminal justice, mental health, lost wages, quality of life, emergency services, and employer-related costs. During 2016-20, quality of life costs (82%, \$951 million) accounted for the largest share of the cost estimates for firearm injuries and deaths in the county.

**Components of Firearm Injury and Crime Costs**

**Medical Care:** The cost of all medical treatment associated with firearm injuries including emergency medical transport, acute care, rehabilitation and physical therapy, follow-up care, long-term medical and institutional care, prescriptions, prosthetic devices, home modifications, coroner services, and the costs of health insurance claims processing.

**Fire:** Costs of emergency medical response by fire departments.

**Mental Health Care:** The cost of behavioral health care of those shot and their families and friends, including treatment for grief, depression, anxiety, and post-traumatic stress disorder. Costs of treating suicidality that caused a firearm injury are excluded.

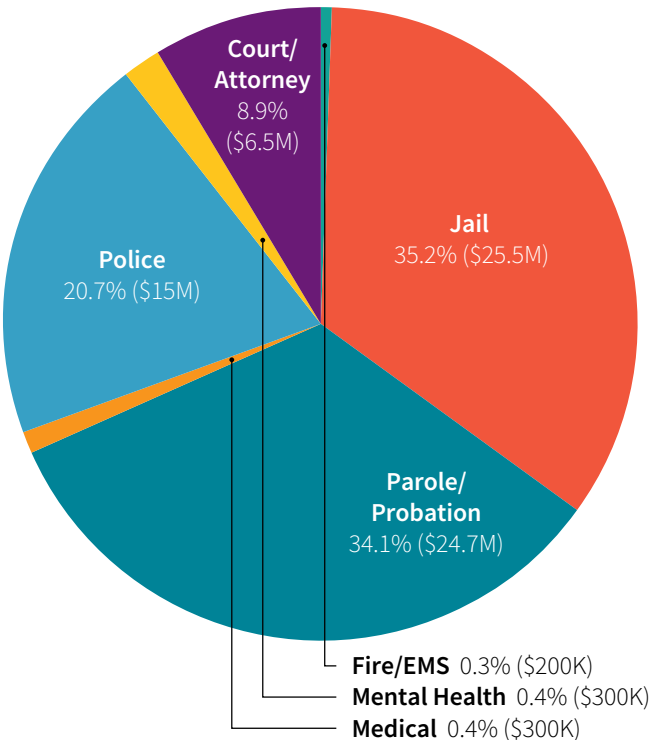
**Work related:** Wages, benefits like health insurance and leave, and household work (valued at the price for hiring a person to accomplish the same tasks) lost over the victim’s remaining life span.

**Quality of Life:** The dollar value of the pain and lost well-being that families experience due to death and injury, exclusive of the work-related costs. The study adopts a value prescribed by the U.S. Department of Health and Human Services based on what people pay for small reductions in their risk of death and injury.

**Employer related:** Costs of workplace disruption resulting from loss or absence of an employee. This includes the cost of hiring and training new employees, overtime required to accomplish work of the injured employee, and the administrative costs of processing personnel changes. To avoid double counting work-related costs, this category excludes sick leave.

**Criminal Justice:** Costs of police response and investigation, victim services, district attorney, public defender, jail, prison, probation, and parole.

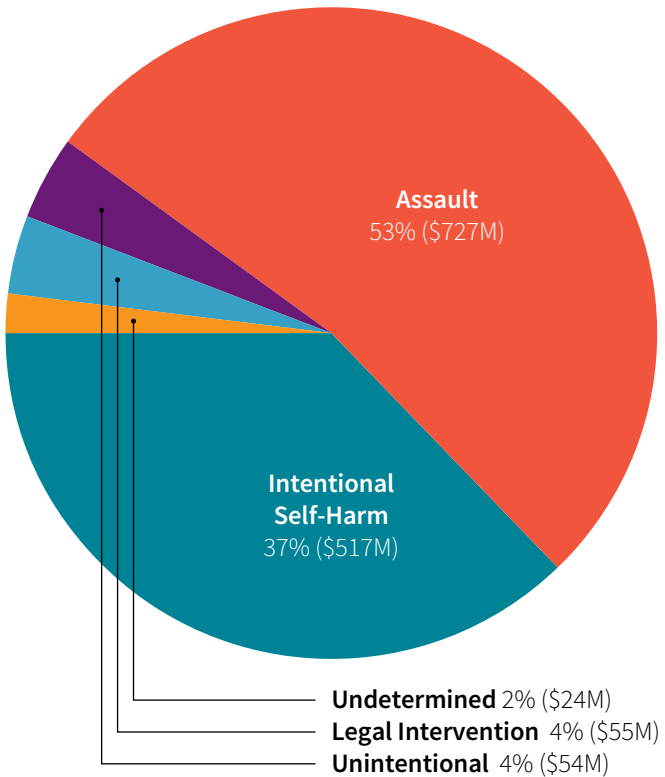
**Figure 3. Costs of firearm violence by County Departments**



Source: Cost estimates are built based on local firearm-related data sources, local cost data and budget analyses, and published models of injury and crime costs (Zonfrillo et al. 2018, Miller et al. 2021, Hunt et al. 2019)

Costs of firearm violence can be divided between public and private sectors. Public Cost is the cost to the public sector, paid for by taxpayers (e.g., uninsured person admitted to ED); Private cost is cost to the private sector (employers), and cost borne by individuals. During 2016-20, the average annual public sector costs of firearm violence were \$72.5 million in the county. The county-level public sector cost estimate represented the following sectors: jail at \$25.5 million, probation/parole at \$24.7 million, medical at \$300,000, police at \$15 million, mental health at \$300,000, court/attorney fees at \$6.5 million, and emergency services at \$200,000. At Federal and State level, the prison costs added an additional \$215 million per year for incarceration related to firearm violence in the county.

**Figure 4. Costs of firearm violence by intent**



Source: Cost estimates are built based on local firearm-related data sources, local cost data and budget analyses, and published models of injury and crime costs (Zonfrillo et al. 2018, Miller et al. 2021, Hunt et al. 2019)

During 2016-20, more than half of the firearm violence costs in the county were related to firearm assaults/homicides (53%, \$727 million). Costs due to other types of firearm violence were: \$517 million for firearm self-inflicted injuries/suicide, \$55 million for legal intervention-involved firearm injuries/deaths (see pg 37 for more information), \$54 million for unintentional firearm injuries/deaths, and \$24 million for undetermined firearm injuries/deaths. Figure 4 includes the \$215 million per year in Federal and State prison costs, which are not included in figure 2.

**Table 2.** Selected average annual costs of firearm violence by outcome, 2016-20

The table contains the annual cost estimates for medical and mental health, work, quality of life and total costs for firearm deaths, hospitalizations and emergency department visits among county residents during 2016-20. Data below excludes \$287 million in criminal justice costs spread across these incidents and firearm crimes that did not result in death or hospital-treated injury. Also, state and federal prison costs are not included in the table below.

Firearm injury outcome	Medical & mental health	Work	Quality of life	Subtotal
Fatal (firearm deaths)	\$1,748,886	\$113,508,784	\$873,877,606	\$989,135,276
Non-fatal hospitalizations	\$7,402,692	\$13,225,170	\$73,530,151	\$94,158,013
Non-fatal emergency department visits	\$325,068	\$544,288	\$3,919,709	\$4,789,065
<b>Total</b>	<b>\$9,476,646</b>	<b>\$127,278,242</b>	<b>\$951,327,466</b>	<b>\$1,088,082,354</b>

Source: Cost estimates are built based on local firearm-related data sources, local cost data and budget analyses, and published models of injury and crime costs (Zonfrillo et al. 2018, Miller et al. 2021, Hunt et al. 2019)

During 2016-20, firearm deaths accounted for most of the work-related costs (89%, \$114 million) and quality of life costs (92%, \$874 million) while non-fatal firearm injury-related hospitalizations accounted for most of the medical and mental health costs (78%, \$7 million).

### Costs of Firearm Violence at City Level, Santa Clara County

There are 15 cities and towns in Santa Clara County; with San José being the largest city with a population of 1,013,240.<sup>13</sup> Cost estimates are only presented for San José in this report due to the following reasons. First, smaller population and relatively lower incidence of firearm violence in other cities did not permit the sharing of data per data deidentification guidelines. Also, margin of error will be larger for costs estimated based on small counts in other cities. Second, San José has a disproportionately higher rate of gun violence relative to its population, with several crime hot spots within its borders, requiring greater attention in data analysis.

County Public Health Department collaborated with the City of San José for estimating the costs of gun violence. On January 19, 2022, City of San José and PIRE publicly released the [Incidence and Cost of Firearm Injuries in San Jose, CA report](#). The data presented in the county report is an update to the societal costs originally published in the above-mentioned report.





On average, 228 fatal and non-fatal firearm injuries occurred annually among San José residents during 2019-2020 time period. The average included 64 firearm assaults, 29 intentional self-harm firearm injuries, and 135 unintentional or undetermined intent firearm injuries.

The lifetime costs of fatal and non-fatal firearm injuries among San José residents averaged \$995 million in 2019-20. Lost quality of life accounted for most of these costs (68%). Criminal justice was the second largest cost component (22%). Costs were \$643 million for assault and legal intervention firearm injuries; \$298 million for self-harm firearm injuries; and \$53 million for unintentional and undetermined intent firearm injuries. The method to estimate the costs of firearm violence is same for the county and San José.

Per-capita costs for firearm injuries were \$977 in San José, nearly double the per-capita cost of \$523 in rest of the county. The updated costs are higher than those published in the January 2022 City report. The difference in cost estimate is mostly due to the change in the value per life lost of \$11.2 million used by the U.S. Department of Health and Human Services in 2020<sup>14</sup> from a \$5.8 million value (in 2020 dollars) based on a 1990 systematic review.<sup>15</sup>

For detailed information about firearms present in the county, prevalence of firearm injuries and death among county residents, and different types of firearm injuries, please see Appendix A. Aligning with the report’s primary purpose to provide estimated costs of gun violence in the county, the results section only has the brief data overview and detailed costs of gun violence. Appendix A has the comprehensive data for firearm violence impacting the county residents.



# Recommendations

In recent years, the county has grappled with several alarming trends related to gun violence that pose severe risks to our communities. These trends include spike in gun ownership in the general population and lack of safe storage practices, proliferation of ghost guns and its facilitation of criminal activities, ease of access to firearms among prohibited and high-risk persons, increase in firearm-related assaults and crimes, more frequent use of guns among youth population and in gang activities, rise in mental health incidents and domestic violence disputes involving a firearm.<sup>16</sup> Interviews with community leaders further revealed a climate of fear that permeates people’s social relationships and general outlook, deeply tied to broader societal anxieties arising from the pandemic, the hostile political environment, economic upheavals, and other macro-level factors.

As with most complex social issues, gun violence is a preventable public health issue that is most effectively remedied by addressing population-level risk factors like concentrated poverty and systemic racism. A strong consensus emerged through the stakeholder meetings that calls for the application of a public health approach centered on racial equity and the root causes of violence.

While the Public Health framework guides the implementation of strategies, a socioecological framework aids in the development and alignment of strategies for maximum impact. The socioecological framework can provide a helpful roadmap in advancing programmatic and policy solutions in the arenas mentioned above. It also helps guide policy makers to map out strategies at multiple levels and across sectors that mutually reinforce each other. This framework examines contributors, drivers, and interventions that comprehensively target the individual, community, organization, and societal levels as summarized in sectors that mutually reinforce each other. This framework examines contributors, drivers, and interventions that comprehensively target the individual, community, organization, and societal levels as summarized in the [Public Health Pathways to Preventing Violence framework developed by Prevention Institute.](#)

**Figure 5. Socioecological Framework**

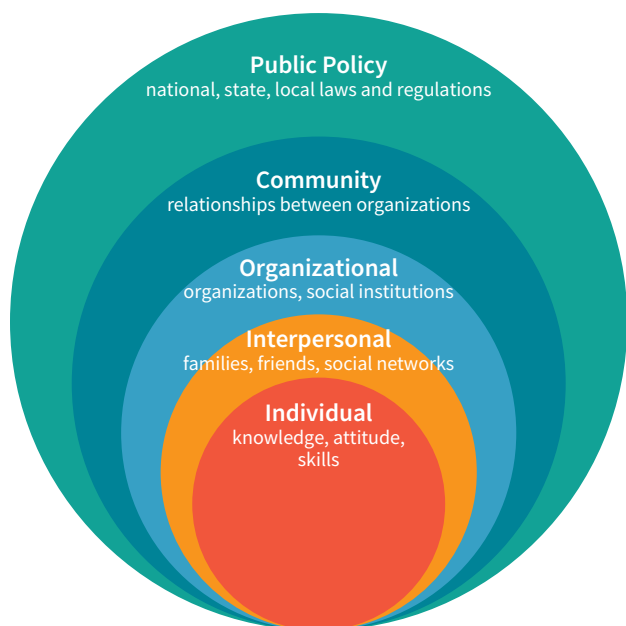


Image courtesy of CDC.

The highlighted recommendations provide a promising path forward for reducing gun violence and creating community safety. The recommendations represent a strong desire among stakeholders to strengthen a coordinated violence prevention response among multiple partners, including residents, community-based organizations, county and city elected officials and county and city departments, and advocacy groups. While this list is not exhaustive of all possible actions, it underscores the critical importance of targeting efforts that invest in and

support individuals and communities at greatest risk of experiencing gun violence. Moreover, further research and advocacy are required to fully understand the complexities of gun violence, its historic role as a tool of power and domination, and explore more aggressive gun control policies beyond the local level.<sup>17</sup> Implementation of these recommendations requires strong commitment and deeper collaboration among multiple cross-sector and institutional partners, as well as financial investment.

## Recommendations to Strengthen Policy, Advocacy, and Public Awareness

**RECOMMENDATION 1**  
Encourage the adoption of gun safety policies and practices to ensure gun safety for gun owners and the broader community.

Increases in gun ownership and the presence of unsafely stored guns in the home are associated with increased firearm injuries and an increase in the risk of suicide among adults and adolescents. Additionally, unsecured guns in the home increases the likelihood of gun theft.<sup>18</sup> Advancing a culture of gun safety requires establishing more robust and evidence-based gun safety policies and practices. One example of such policies is safer storage ordinances requiring firearms to be stored with a locking device or in a locked container, unloaded, and separate from ammunition. Another example is the adoption of policies that require gun owners to report or more promptly report the loss or theft of their firearm. Several local jurisdictions have already implemented stronger gun safety policies and lead the way for others to do the same. Gun safety laws significantly reduce the risk of intentional and unintentional firearm injuries, particularly among children and youth.

*“A major part of gun violence and safe storage education is undoing the idea that putting a gun in the closet or under the bed is “safe”. We need to create a norm change so that safe gun storage is as commonplace as wearing your seatbelt.”*  
— Stakeholder Meeting, Gun Safety Advocate

**RECOMMENDATION 2**  
Adopt the use of Racial Equity Impact Assessment tools<sup>19</sup> to evaluate its policy position on guns and advocate for more equitable gun violence prevention policies at the city, county, state, and federal levels.

A Racial Equity Impact Assessment (REIA) is a systematic examination of how different racial groups can potentially be affected by a policy decision or action. The REIA is used to identify unintended or disproportionate negative consequences that may fall upon historically disadvantaged racial groups to mitigate harm and increase equity: how do we ensure the data analysis and decision points do not result in further harm to communities of color? In the context of gun violence, a REIA can be used to reduce victimization and minimize arrests and incarceration which disproportionately impacts communities of color. Typical questions in a REIA include: What types of racial disparities could potentially result from the policy’s design and implementation? Who are the specific communities that the policy will impact?<sup>20</sup> The use of REIA is relatively new in the U.S, but adoption is on the rise among counties and cities. The City of Seattle has been using Racial Equity Analysis in its policy development and budget planning since 2012. Other regions, such as Iowa and Connecticut, which have passed legislation requiring examination of the racial impacts of all new sentencing laws prior to passage.<sup>21</sup>



Intertwined with the legacy of systemic racial discrimination in the United States, there are continuing disparities in enforcing and implementing firearm restrictions. Gun violence prevention policy advocates have a renewed awareness of the potential for racial bias in developing and implementing gun violence prevention policies. Gun violence prevention researchers urgently recommend racial equity impact assessments for all gun violence policies.<sup>22</sup>

*“We must pursue permanent solutions that uplift communities and youth rather than temporary fixes. Talking about things is not enough, allocation of resources and support is key to making any impact.”*  
— Stakeholder Meeting, Community-based organization staff

**RECOMMENDATION 3**  
**Develop and implement robust public awareness and education campaigns to improve gun safety practices, broaden public understanding of gun safety laws and effective public health prevention strategies, and encourage trauma-informed healing and support.**

Communication strategies provide vital information and influence individuals and communities to be active participants in public health action addressing gun violence. Public awareness campaigns can effectively encourage safer gun safety practices, dispel the stigma associated with a mental health crisis, build understanding of effective prevention strategies, and promote healing and support by elevating the voices of victims, families, and communities impacted by gun violence.<sup>23</sup> According to the Centers for Disease Control and Prevention, there is growing evidence for the use of targeted, culturally tailored campaigns addressing such factors.

Communications and education campaigns are most effective when they leverage and help build understanding, relationships, shared vision, and trust across sectors for the goal of reframing violence as a preventable issue. This can be accomplished through partnerships with CBOs, schools, gun shop owners, and others.

Community education messages about gun prevention policies, such as California’s Red Flag Law and Gun Violence Restraining Orders (GVRO), also provide mechanisms to prevent gun harm during a mental health crisis. This public education may include messaging about warning signs and how to activate life-saving tools through GVROs. Integrating violence prevention and anti-bullying curriculum in schools is another important element. Interjurisdictional and intersectoral coordination would yield tremendous progress on this front.

Finally, educational campaigns must work to create a paradigm shift around how guns are discussed, perceived, and understood in society. Public education must include tools to critically examine the deep relationship guns have to colonialism, power, patriarchy, and nationalism. It must also examine the way guns, as both a physical and symbolic weapon, has been continually used to reinforce oppressive gender and racial hierarchies and maintain power over Black, Indigenous and people of color.

*“[We] need a policy change from investing in jails and punishment to invest in human beings. Stop investment in criminal justice system. Start with better education. Invest in school structures. Investing upfront.”*  
— Stakeholder Meeting participant, Black Leadership Kitchen Cabinet member



# Recommendations to Increase Protective Factors that Advance Equity

**RECOMMENDATION 4**  
Adopt and replicate community-centered, place-based approaches to gun violence prevention in neighborhoods facing concentrated disadvantage/concentration of risk factors for gun violence.

A history of racially discriminatory practices such as redlining and other inequitable investments has created communities of concentrated disadvantage resulting in the high prevalence of risk factors for gun violence. In these places, gun violence can be prevented by strengthening the economic health, built environment conditions, social environment, and civic infrastructure of neighborhoods and cities.

Effective place-based programs currently exist in Santa Clara County and can serve as models to scale or replicate in neighborhoods experiencing high rates of gun violence. An increasing body of evidence for place-based strategies is prompting the federal, state, and local jurisdictions to adopt this approach.<sup>24</sup> Community-centered, place-based approaches include resident engagement and leadership development activities to support neighborhood action planning, culturally rooted, community-based violence prevention and intervention; community health worker programs; resident-led healing and trauma-informed neighborhood projects; and campaigns for educational equity and affordable housing/anti-displacement. These strategies directly address the root causes impacting community health and foster new community norms that serve as protective factors against gun violence.<sup>20</sup>

Well-resourced communities can play a role by acknowledging the institutional and systemic structures that perpetuate inequalities and actively partner with disadvantaged communities to fight these injustices.



*East San José Safe and Peaceful Neighborhood Event*

**RECOMMENDATION 5**  
Expand partnerships with ethnic behavioral health service providers to strengthen community-based crisis intervention, de-escalation, and mobile mental health crisis care; improve policies and protocols to separate people in crisis from access to firearms and reduce the use of force during intervention.

Community-based crisis interventions and mobile teams offer targeted interventions and violence interruptions to individuals and groups in need wherever they are, including at home, work, or elsewhere in the community. Mobile crisis units already exist in various locations within county and can be scaled up and enhanced. Several promising

models in cities, such as South Bronx, New York and Richmond, California, have shown evidence of effectively reducing the incidence and harm related to gun violence.<sup>25</sup> This recommendation strengthens and extends the county’s focus on community-based crisis intervention and mobile teams by expanding partnerships with ethnic service providers. Multi-disciplinary teams, including trained, licensed providers, local community-based programs, and trusted community members with lived experiences, would work collectively to mediate conflict, de-escalate situations, and provide mental health and healing support as part of the crisis continuum of care, especially among communities of color and within specific geographic areas most at risk for gun violence. This strategy seeks to reduce police officer-involved injuries, reduce arrests of individuals with mental illness, minimize officers’ use of force, increase diversion of mentally ill individuals from the criminal justice system, and enhance their access to mental health and other prevention services addressing social determinants of health.

*“Don’t sit there and wait for crisis. We need to build capacity in the community around conflict resolution, addressing the fear people have of each other. We need to train community members as peace makers and de-escalators.”*

— Stakeholder Meeting Participant,  
Black Leadership Kitchen Cabinet Member

**RECOMMENDATION 6**  
Support excluded youth by increasing partnerships between cities, school districts, and the County to expand community-led social, recreational, behavioral, educational, and employment opportunities.

Many opportunities exist to support young people’s flourishing. Yet, a segment of the county’s youth have social, recreational, behavioral, educational, and employment-related needs that remain unmet. Due to structural inequalities, these young people are more likely to suffer from poor mental and behavioral health and have a higher risk for gun violence perpetration and victimization. Too often, these disadvantaged young people are met with punitive responses rather than opportunities that increase their positive experiences and strengthen their community’s protective factors. Supportive options should be explicitly designed with input from this population to emphasize safe, stable, and nurturing connections and environments, with attention to cultural and community fit.

*“How do we start to employ young people, exposing them to opportunities, help them be involved in leadership, and to learn empathy. If we plant the seed, then families will catch on. Whatever policy or program we create now will expand 7 generations into the future.”*

— Stakeholder Meeting Participant,  
Community Based Organization staff

# Recommendations to Strengthen Government and Community-Level Coordination and Data Systems

**RECOMMENDATION 7**  
Establish a gun safety data workgroup to guide the development of a data-to-action dashboard.

The complexity of multiple data systems involved in tracking the actual cost of gun violence and a lack of non-governmental contributions of data as part of the entire data-to-action planning process presents challenges in fully understanding the impact of gun violence. Establishing a collaborative, multisectoral data working group is needed to develop a centralized data platform to address these challenges and barriers. The

workgroup would be represented by county departments, city agencies, community-based organizations, advocacy groups, and resident leaders involved in gun violence prevention efforts. Governmental and non-governmental agencies would be encouraged to make more data available publicly in the spirit of transparency and to support data-driven decision-making.<sup>26</sup> This type of information repository, such as data lake or warehouse, would require data contributions from all stakeholders, not just criminal justice and hospital systems, in order to meet the magnitude of this intractable issue. Data sharing agreements would facilitate the inter-departmental sharing of de-identified record-level and population-level data to allow for continuous analysis along the spectrum of gun violence, greater collective understanding of the impact of gun violence, and more robust and informed prevention action planning among the collaborative.



# Conclusion

For decades, gun violence research has been restricted due to the Dickey Amendment, a provision in the U.S. government’s annual appropriations legislation that prohibits the use of federal funds to advocate or promote gun control. However, a 2018 decision from Congress to end such restrictions offers new opportunities to advance knowledge and policies in this area.<sup>27</sup> An economic analysis of the impact of gun violence has been conducted on the national and state level, but rarely within a local jurisdiction, for the purpose of informing locally driven actions and strategies. This report pioneered an innovative approach to firearm research through multi-disciplinary methodologies and inter-sectoral

collaborations. It opened the door to an exciting frontier of questions and learnings for years to come.

Now, more than ever, there is need for an upstream and comprehensive, public health approach for addressing gun violence. In a difficult environment for federal gun control legislation, this report offers a promising path forward by pointing towards efforts that tackle root causes of violence, promote resiliency, and build capacity in both government systems and the community.



# Appendices

## Appendix A: Detailed Firearm Violence Data

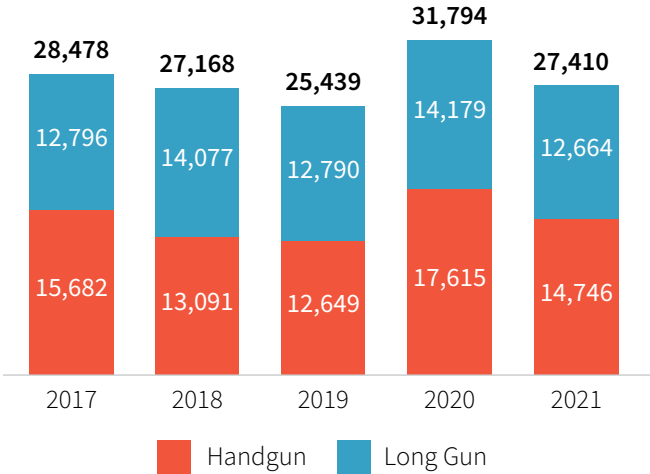
### Firearms Availability in Santa Clara County

Compared to other developed countries, the U.S. has the most firearms present among civilians along with the weakest firearm laws.<sup>28</sup> The availability of firearms increased nationwide in recent years.<sup>29</sup> In the U.S., there was a record number of firearm sales in 2020; millions of people, including many first-time purchasers, bought firearms.<sup>30</sup> Nationally, the firearm sales in 2020 increased by 64% compared to 2019.<sup>31</sup>

When firearm sales increase, resulting in higher availability of firearms, research shows total suicides, firearm suicides, total homicides, firearm homicides, and unintentional firearm injuries/fatalities also increase.<sup>32</sup>

In 2021, nearly 550,000 firearms were purchased and/or owned by Santa Clara County residents. Based on the historical data from 2001 to 2015, nearly half of the firearms purchased in the county were handguns.<sup>33</sup>

**Figure 6. Registered firearms in Santa Clara County by type, 2017-2021**



Source: California Department of Justice

During 2017-21, an average of 28,000 firearms were purchased annually in Santa Clara County. More than half of these firearms (74,714, 53%) were purchased in San José.<sup>32</sup>

Nationally, the average firearm-owning household possessed 4.8 to 5.16 firearms.<sup>34</sup> Based on the national data, an estimated 17% to 18% of households in the county own firearms (106,300 to 114,300 households). Similarly, an estimated 15% to 18% of households (49,000 to 57,500) own firearms in San José.<sup>32</sup>

**Table 3.** Number, percent, and rate of newly purchased firearms, by jurisdiction, Santa Clara County, 2017-21

Community	Count of firearms	Percent of firearms	Rate of firearms per 100 residents
Campbell	4,684	3.3%	10.7
Cupertino	3,025	2.2%	5.0
Gilroy	8,601	6.1%	14.5
Los Altos	2,222	1.6%	7.0
Los Altos Hills	624	0.4%	7.4
Los Gatos	3,867	2.8%	11.5
Milpitas	4,978	3.5%	6.2
Monte Sereno	436	0.3%	12.5
Morgan Hill	7,786	5.5%	17.1
Mountain View	5,178	3.7%	6.3
Palo Alto	3,355	2.4%	4.9
San José	74,714	53.3%	7.4
Santa Clara	8,256	5.9%	6.5
Saratoga	2,688	1.9%	8.7
Sunnyvale	8,511	6.1%	5.5
Unincorporated	1,364	1.0%	1.5
Santa Clara County	140,289	100.0%	7.2

Source: California Department of Justice, Firearm sales background check system

Table 3 summarizes the number of newly acquired firearms in Santa Clara County by jurisdiction. Higher proportion of firearms were purchased in the cities of San José (53%), Gilroy (6.1%), Sunnyvale (6.1%), Santa Clara (5.9%), and Morgan Hill (5.5%). The firearm acquisition rate was similar in San José (7.4 purchased firearm per 100 residents) and the county (7.2) during 2017-21. Firearm acquisition rates were highest in the cities of Morgan Hill (17.1), Gilroy (14.5), Monte Sereno (12.5), Los Gatos (11.5) and Campbell (10.7).

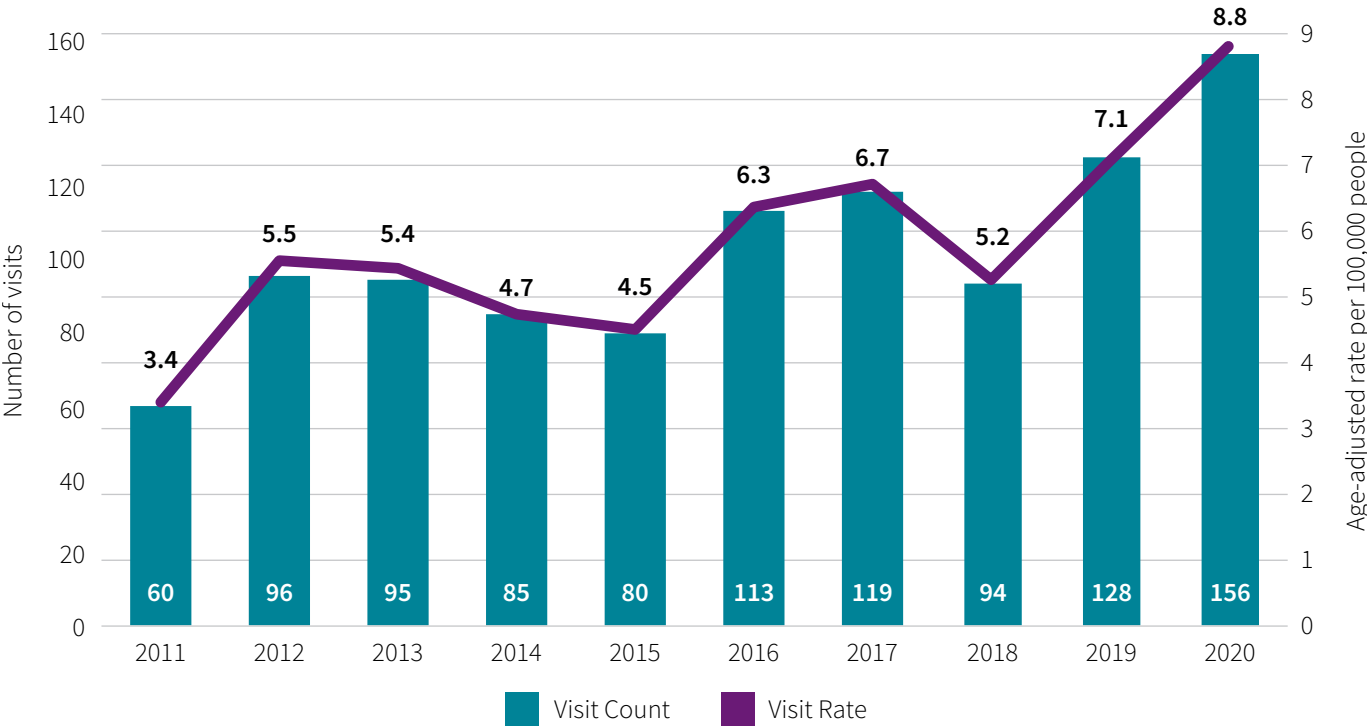


Photo from May 22, 2022 Santa Clara county gun buyback.

# Non-fatal Firearm Injury-related Emergency Department (ED) Visits

In Santa Clara County and nationwide, people more often survive than die from a firearm injury, unless it is intentionally self-inflicted. Most of the firearm injury-related emergency department visits were assault related and unintentional firearm injuries.<sup>35</sup>

**Figure 7. Non-fatal firearm injury-related emergency department visits, Santa Clara County, 2011-2020**



Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2011-2020

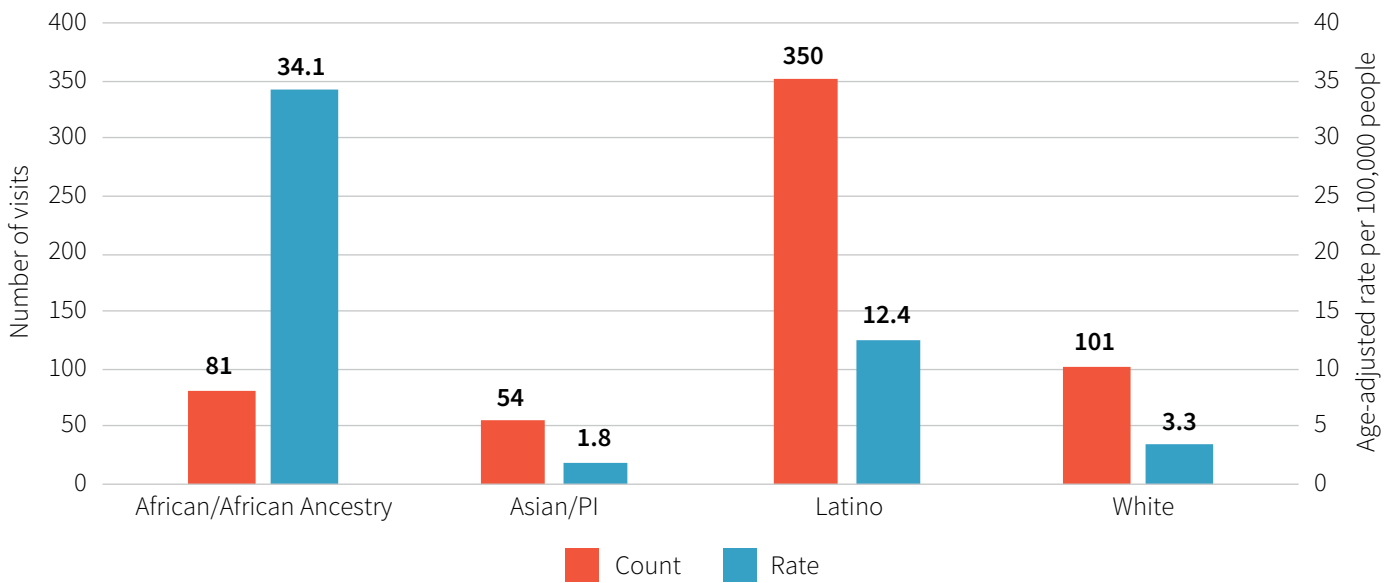
Note: Data for 2011 to Q3 2015 are summarized using ICD-9-CM classification. Data for Q4 2015 to 2020 are summarized using ICD-10-CM classification. Any differences in data measures should be interpreted with caution, as these might be partially due to changes in the classification system.

The count of annual non-fatal firearm injury-related emergency department visits more than doubled during the past decade, increasing from 60 in 2011 to 156 in 2020. Similarly, age-adjusted rate of visits increased from 3.4 per 100,000 people in 2011 to 8.8 in 2020. Nine in ten (90%) of the non-fatal firearm injury-related emergency department visits were among males.<sup>36</sup>

During 2016-20, unintentional/accidental firearm injuries (77%) were the most common cause of non-fatal firearm injury-related emergency department visits.<sup>36</sup>



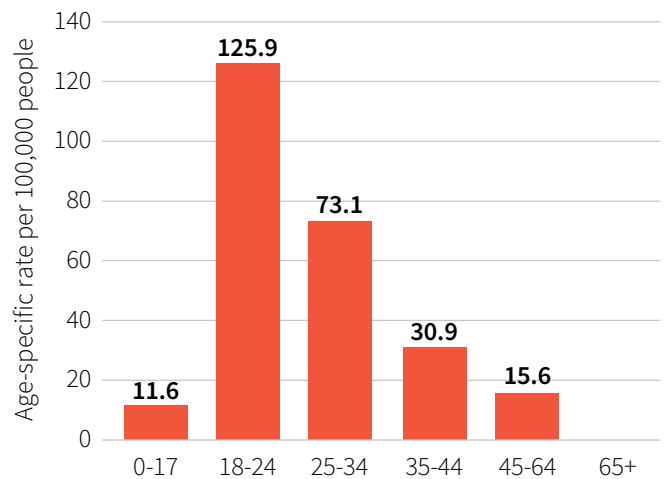
**Figure 8.** Count and age-adjusted rate of firearm injury related emergency department visits by race/ethnicity among Santa Clara County residents, 2016-20



During 2016-20, nearly 6 in 10 non-fatal firearm injury-related emergency department visits were among Latinos (57%) residing in the county followed by Whites (17%), African/African Ancestry (13%) and Asian/Pis (9%). The age-adjusted rate of non-fatal firearm injury-related emergency department visits was highest among African/African Ancestry (34.1 per 100,000 people) followed by Latinos (12.4), Whites (3.3) and Asian/Pis (1.8).<sup>36</sup>



**Figure 9.** Age-specific rate of non-fatal firearm injury-related emergency department visits, Santa Clara County, 2016-20



Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2016-20



A higher proportion of non-fatal firearm injury-related emergency department visits were among young adults. During 2016-20, nearly 2 in 3 (65%) of the non-fatal firearm injury-related emergency department visits were among adults ages 18- to 34 years.<sup>36</sup>

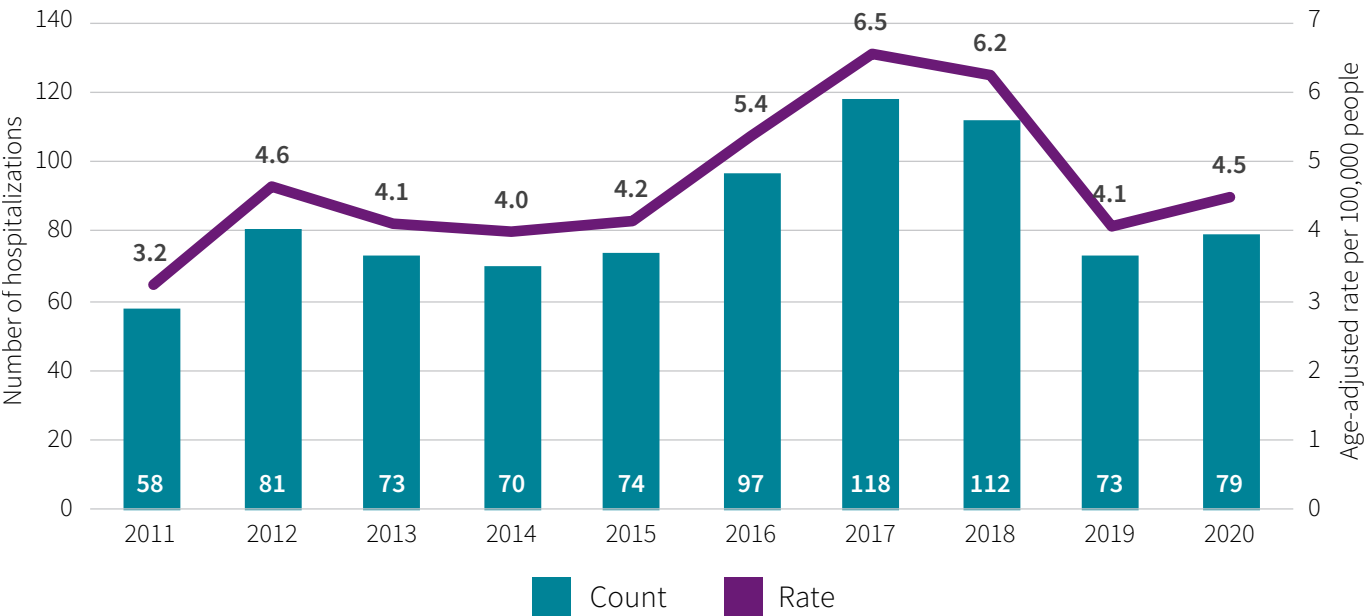
### Non-fatal Firearm Injury-related Hospitalizations

Hospitalizations due to firearm injury are an important component for assessing the complete scope of non-fatal firearm injuries. Hospitalized firearm injuries tend to be more serious than those treated in the emergency department, resulting in longer and more complex medical care,<sup>37</sup> with medical costs for non-fatal firearm injuries per case averaging \$72,640 for hospitalizations versus \$2,371 for ED visits.

In Santa Clara County, the count of annual non-fatal firearm injury-related hospitalizations increased from 58 in 2011 to a peak of 118 in 2017 and then decreased to 79 in 2020. Similarly, the age-adjusted rate of hospitalizations increased from 3.2 per 100,000 people in 2011 to 6.5 in 2017 and then decreased to 4.5 in 2020. Most of the non-fatal firearm injury-related hospitalizations were assault related and unintentional firearm injuries.<sup>38</sup>

During 2011-15, firearm assault (66%) accounted for two-thirds of the firearm injury-related hospitalizations, followed by 23% due to unintentional firearm injuries. However, in 2016-20, more than 1 in 2 (56%) of the firearm injury-related hospitalizations were due to unintentional firearm injuries, followed by 1 in 3 (35%) due to firearm assaults.<sup>39</sup>

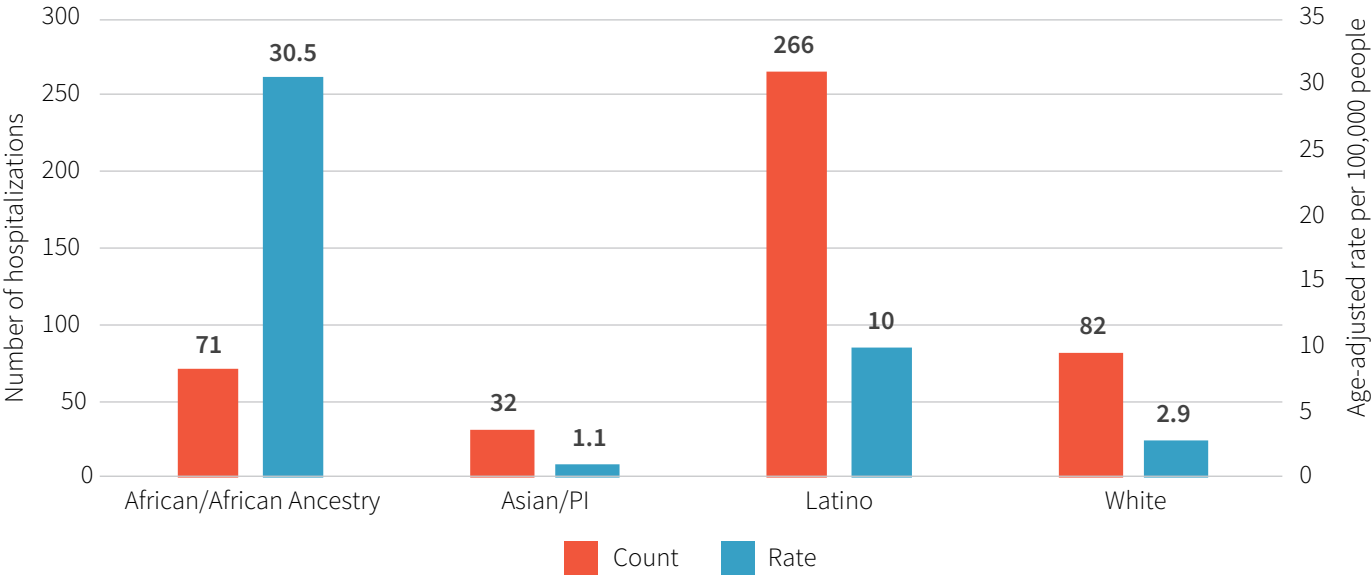
**Figure 10.** Non-fatal firearm injury-related hospitalizations



Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2001-2020

Note: Data for 2001 to Q3 2015 are summarized using ICD-9-CM classification. Data for Q4 2015 to 2020 are summarized using ICD-10-CM classification. Any differences in data measures should be interpreted with caution, as these may be partially due to changes in the classification system.

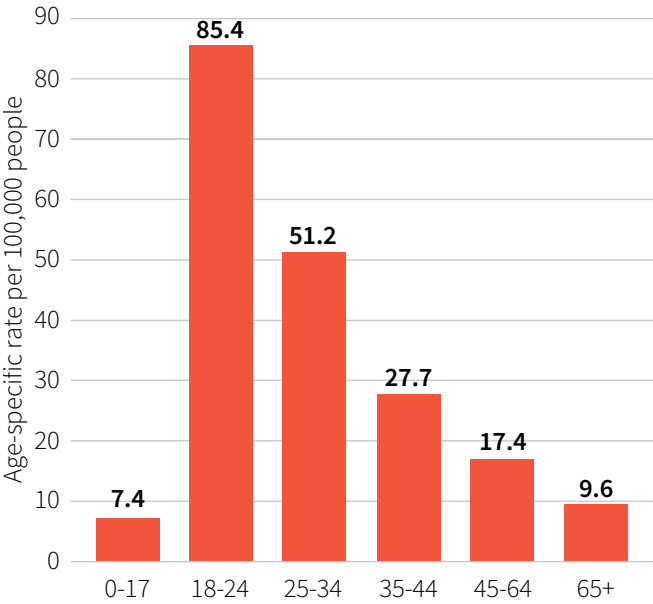
**Figure 11.** Count and age-adjusted rate of non-fatal firearm injury-related hospitalizations by race/ethnicity



Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2016-20

During 2016-20, more than 9 in 10 (93%) firearm injury-related hospitalizations were among males. Latinos in the county accounted for more than half (56%) of non-fatal firearm injury-related hospitalizations, followed by Whites (17%), African/African Ancestry (15%) and Asian/Pis (7%). The age-adjusted rate of non-fatal firearm injury-related hospitalizations was highest among African/African Ancestry (30.5 per 100,000 people) followed by Latinos (10.0), Whites (2.9) and Asian/Pis (1.1). The racial/ethnic distribution was similar between the non-fatal firearm injuries treated in the emergency departments and hospitals.<sup>38</sup>

**Figure 12.** Age-specific rate of non-fatal firearm injury-related hospitalizations



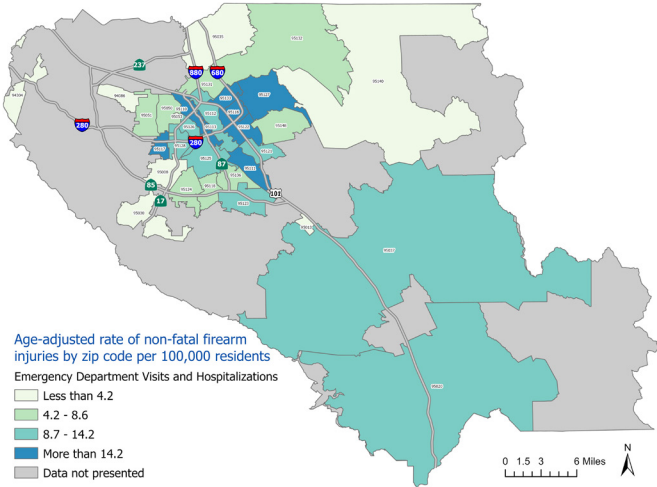
Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2016-20

A majority of non-fatal firearm injury-related hospitalizations were among young adults. During 2016-20, adults ages 18 to 34 accounted for 57% of the non-fatal firearm injury-related hospitalizations.<sup>38</sup>

### Non-fatal Firearm Injuries by Place of Residence

The place of residence and its socio-economic status plays a vital role in health outcomes of people living there. Areas with poor socio-economic status like high poverty rate, lower education attainment, lower per-capita income, higher unemployment rate, higher single parent households, overcrowded households are risk factors for firearm violence. These factors increase the risk for higher rates of firearm injury-related emergency department visits compared to areas with better socio-economic status.<sup>40</sup>

**Figures 13. Non-fatal firearm injuries treated in medical facilities**



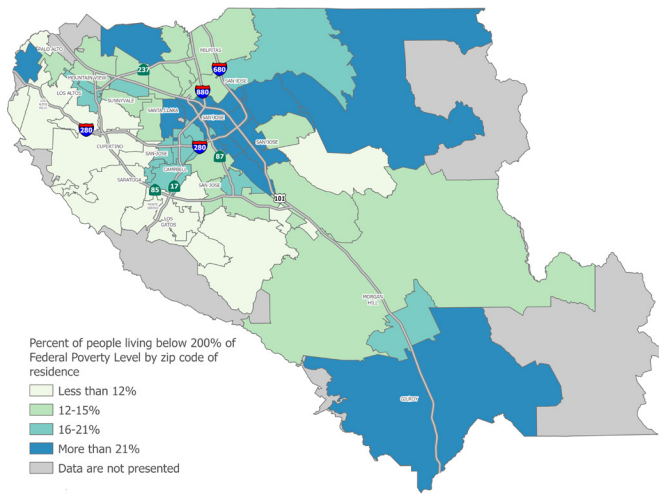
Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2011-20

Note: Data are masked when the number of events is 15 or fewer. Data are not presented for zip codes that cross county boundary. Age-adjusted rates per 100,000 people are mapped.

Data are combined for emergency visits and hospitalizations related to non-fatal firearm injuries and mapped by injured person’s zip code of residence. Zip codes in the East San José region of the county had the highest rate of non-fatal firearm injuries treated in a medical facility during 2011-20. The zip code with the highest count and rate of non-fatal firearm injuries were 95116 (223 service encounters with a rate of 39.4 per 100,000 people), followed by 95122 (155, 24.4), 95111 (135, 21.6), 95127 (116, 17.9), and 95112 (77, 10.7).<sup>41</sup>

The following maps show the zip codes in the county with relatively higher rate of poverty, lower education attainment, higher rate of single parent households with children under the age of 18, and overcrowded households.<sup>42</sup> These maps highlight the zip codes with poor socio-economic status in the county. The non-fatal firearm injuries map (fig. 12) and the social conditions maps (fig. 13 to fig. 16) have overlap in the East San José region highlighting the interaction of poor socio-economic factors and higher prevalence of non-fatal firearm injuries.

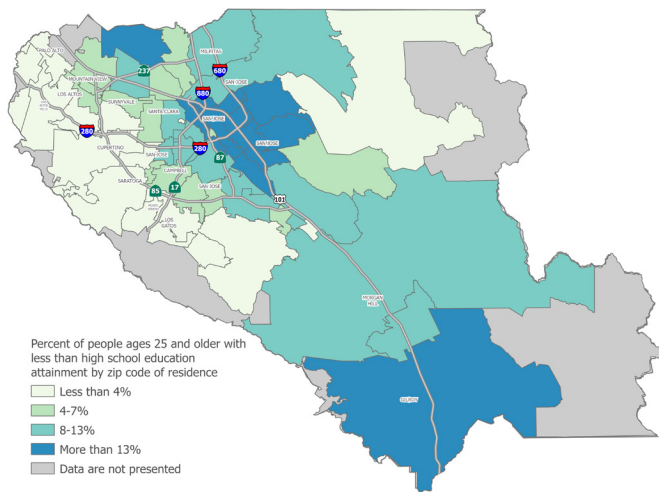
**Figures 14.** People living below 200% Federal Poverty Level



Source: U.S. Census Bureau, 2016-20 American Community Survey 5-year estimates, Table C17002

Note: Data are only presented for zip codes that are completely within Santa Clara County.

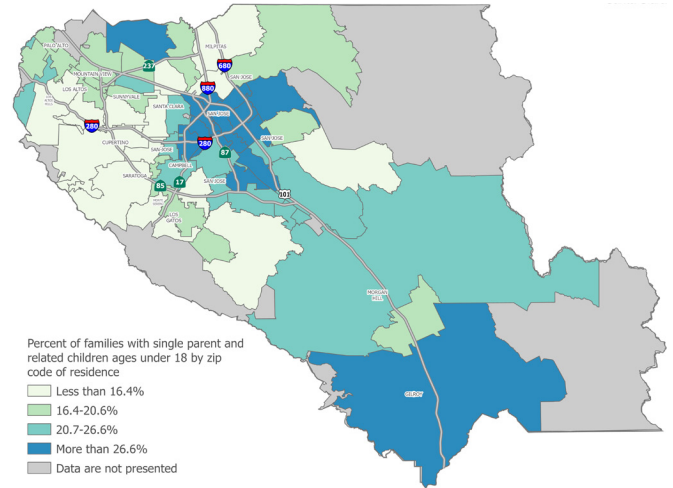
**Figures 15.** Less than high school education attainment



Source: U.S. Census Bureau, 2016-20 American Community Survey 5-year estimates, Table B15002

Note: Data are only presented for zip codes that are completely within Santa Clara County.

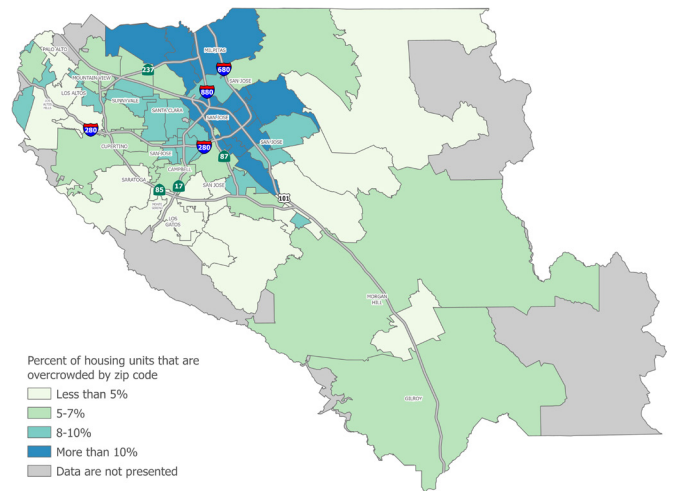
**Figures 16.** Single parent families



Source: U.S. Census Bureau, 2016-20 American Community Survey 5-year estimates, Table B11004

Note: Data are only presented for zip codes that are completely within Santa Clara County.

**Figures 17.** Overcrowded households



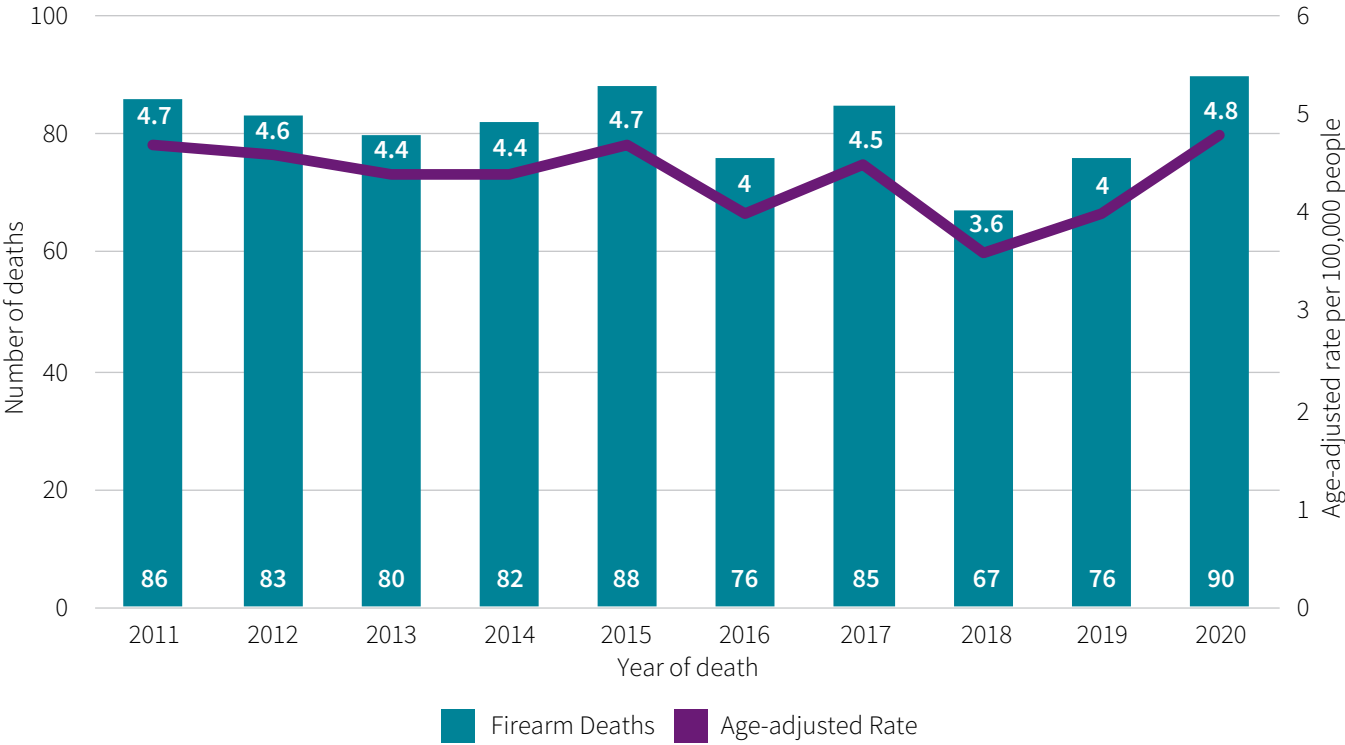
Source: U.S. Census Bureau, 2016-20 American Community Survey 5-year estimates, Table B25014

Note: Data are only presented for zip codes that are completely within Santa Clara County.

# Firearm Deaths

Nationwide, the number of firearm deaths increased to record level in 2020, the most in the past 40 years. Firearm suicides accounted for more than half (54%) of the firearm deaths, with firearm homicides accounted for 43% of the firearm deaths.<sup>43</sup>

**Figures 18.** Firearm deaths, Santa Clara County 2011-2020

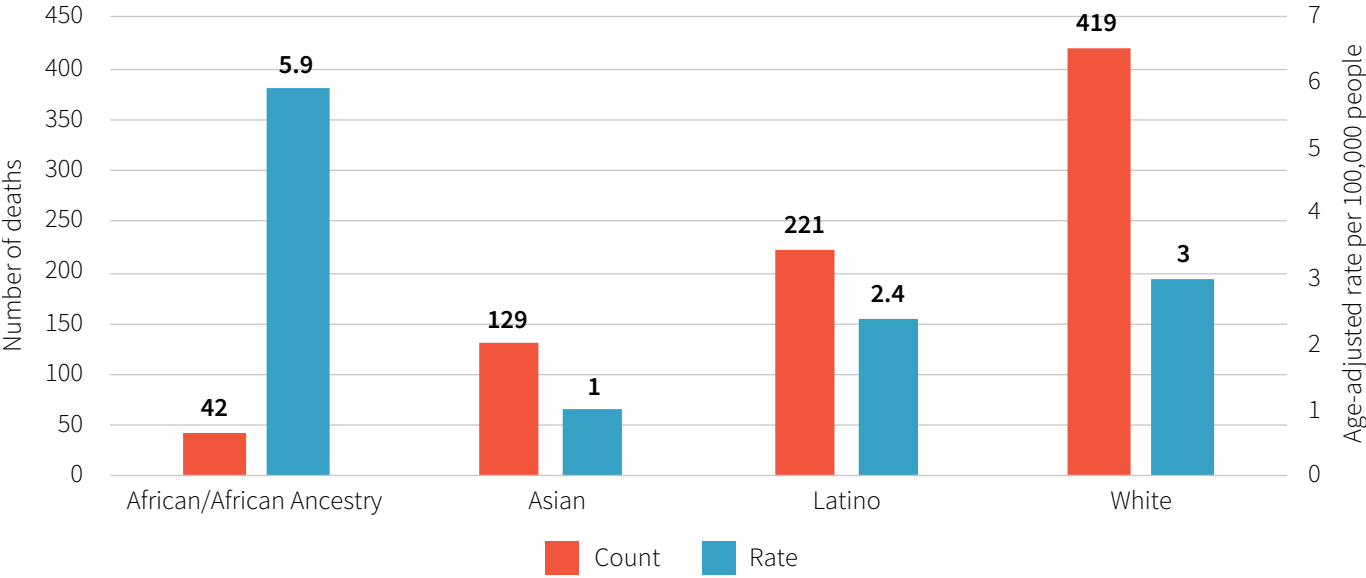


Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death data, 2011-2020

From 2001 to 2020, 1,494 county residents died due to a firearm-related injury. The annual count and rate of firearm deaths among county residents remained relatively stable during the past decade. The firearm deaths increased from 76 in 2019 to 90 in 2020, mirroring the nationwide trend. The age-adjusted firearm death rate was 4.8 deaths per 100,000 people in 2020, the highest rate in the past decade.<sup>44</sup>

During 2016-20, 9 in 10 (89%) firearm deaths were among males. The age-adjusted firearm death rate among males (7.9 deaths per 100,000) was 8 times higher than females (1.0).<sup>44</sup>

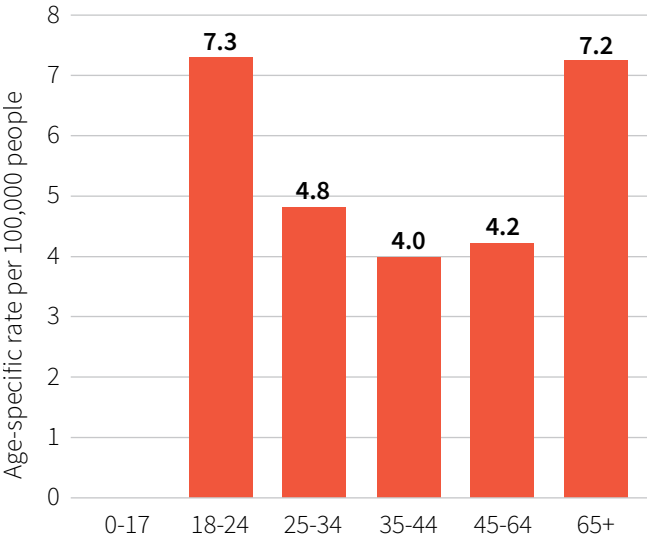
**Figures 19.** Count and age-adjusted rate of firearm deaths by race/ethnicity, Santa Clara County, 2016-20



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death data, 2016-20  
 Note: Data are not presented when the number of deaths is between 1 to 10.

During 2016-20, nearly 6 in 10 (57%, 209 deaths) firearm deaths were among Whites residing in the county followed by Latinos (28%, 104), Asians (16%, 59) and African/African Ancestry (6%, 21). The age-adjusted rate of firearm deaths was highest among African/African Ancestry (5.9 deaths per 100,000), followed by Whites (3.0), Latinos (2.4) and Asians (1.0).<sup>44</sup>

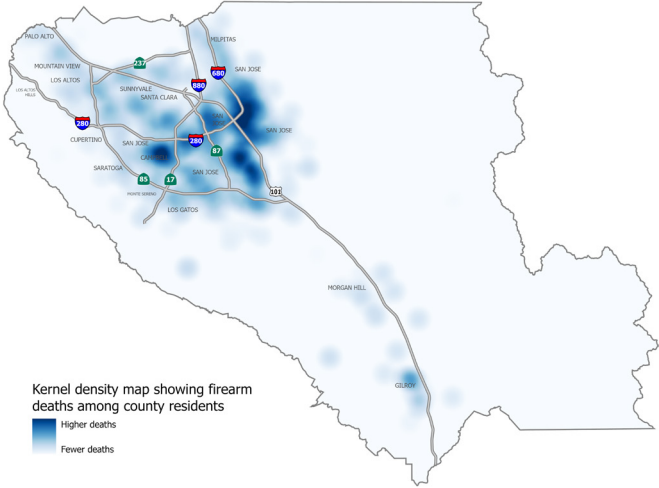
**Figures 20.** Age-specific rate of firearm death by age group, Santa Clara County, 2016-20



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death data, 2016-20  
 Note: Data are not presented when the number of deaths is between 1 to 10.

A higher proportion of firearm deaths were among adults ages 18 to 34. During 2016-20, 1 in 3 (34%, 134 deaths) firearm deaths was among county residents ages 18 to 34, followed by 1 in 4 deaths among 45-64 (26%, 102) and 65 and older (24%, 94) age groups each. The age-specific firearm death rate was highest among adults ages 18-24 years (7.3 per 100,000 people) and 65 and older (7.2).<sup>44</sup>

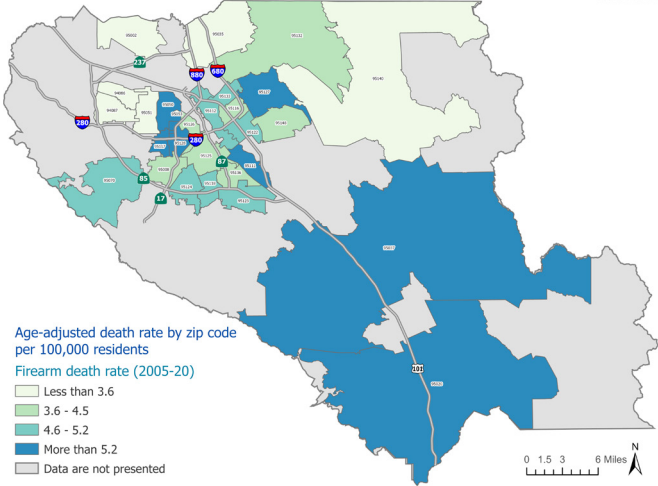
**Figures 21. Firearm death density**



Source: Santa Clara County Public Health Department, Vital Records Business Intelligence System (VRBIS), 2005-2020. Data as of 7/12/2021.

Firearm deaths density map above shows San José, Campbell, and Gilroy had relatively higher density of firearm deaths among county residents.<sup>45</sup>

**Figures 22. Firearm death rate**



Source: Santa Clara County Public Health Department, Vital Records Business Intelligence System (VRBIS), 2005-2020. Data as of 7/1/2021

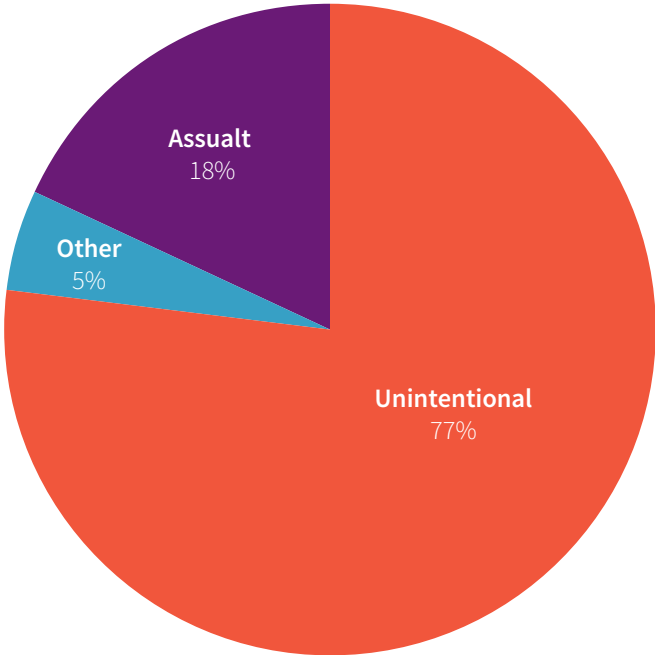
Note: Data are not presented when the death count is between 1 to 20. Age-adjusted death rates per 100,000 are mapped.

The age-adjusted firearm death rate map above shows zip codes located in San José and south county region had higher firearm death rates compared to other zip codes in the county.<sup>46</sup>

# Firearm Violence by Intent

Firearm violence can be grouped based on the intent: intentional self-inflicted, intentional assault (interpersonal), unintentional or accidental, legal intervention and undetermined intent. Most of the non-fatal and fatal firearm injuries are either self-inflicted (suicide) or assault (homicide).<sup>47</sup> Due to their high lethality<sup>48</sup>, firearms contributed to increases in suicide and homicide nationwide.<sup>49</sup>

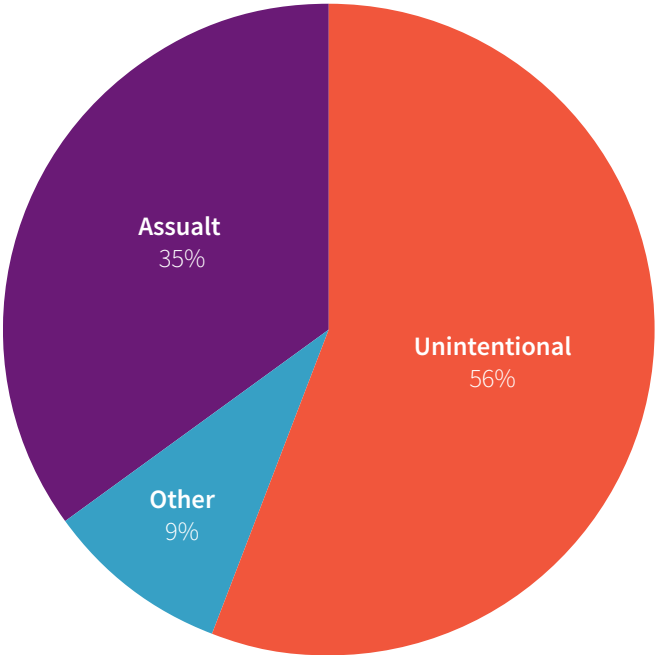
**Figure 23.** Non-fatal firearm injury-related emergency department visits by intent, Santa Clara County residents, 2016-20



Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2016-20

During 2016-20, more than 3 in 4 non-fatal firearm injury-related emergency department visits were unintentional (77%, 469 visits), followed by 18% (108) visits due to assault. Visits due to self-inflicted, legal intervention and undetermined intent combined accounted for 5% (33 visits) of total non-fatal firearm injury-related emergency department visits among county residents.<sup>50</sup>

**Figure 24.** Non-fatal firearm injury-related hospitalizations by intent, Santa Clara County, 2016-20

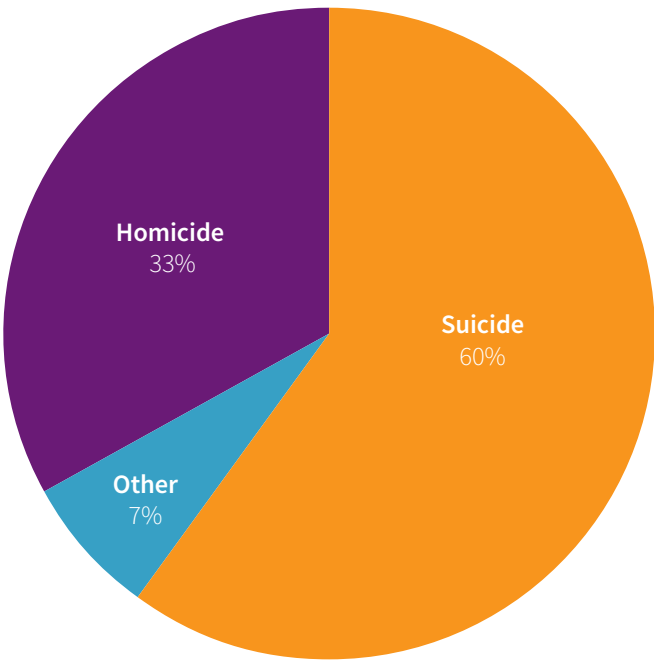


Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2016-20.

During 2011-15, firearm assault (66%) accounted for two-thirds of the non-fatal firearm injury-related hospitalizations, followed by 23% due to unintentional firearm injuries. However, in 2016-20, more than 1 in 2 (56%) of the non-fatal firearm injury-related hospitalizations were due to unintentional firearm injuries, followed by 1 in 3 (35%) due to firearm assaults.<sup>51</sup>



**Figure 25. Firearm deaths by intent, Santa Clara County, 2016-20**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death data, 2016-20

The most common cause for firearm deaths among county residents was self-inflicted firearm injuries (suicide). During 2016-20, 6 in 10 firearm deaths among county residents were suicide (60%, 236 deaths) and 1 in 3 were assault/homicide (33%, 129). Firearm deaths due to legal intervention, unintentional and undetermined intent combined accounted for 7% (26 deaths) of total firearm deaths among county residents.<sup>52</sup>

**Intentional self-inflicted firearm injuries**

Suicide is death caused by injuring oneself with the intent to die. A suicide attempt is when someone harms themselves with any intent to end their life, but they do not die from their actions.<sup>53</sup>

During 2016-20, firearm self-inflicted injuries represented less than 1% of total non-fatal self-

inflicted injuries among county residents being treated in the emergency department.<sup>54</sup>

Data for non-fatal self-inflicted firearm injury-related emergency department visits and hospitalizations is not presented per data deidentification guidelines. Data are not presented when the number of events is 15 or fewer to minimize risk of record identification.<sup>54</sup>

During 2016-20, 3 in 10 suicide deaths were firearm suicides (31%, 236 firearm suicide deaths). The number of firearm suicides increased in the county from 214 in 2006-10 to 236 in 2016-20; similar to the increase in total suicide deaths. The proportion of suicides that involved a firearm (30%) stayed stable during this time period.<sup>55</sup>

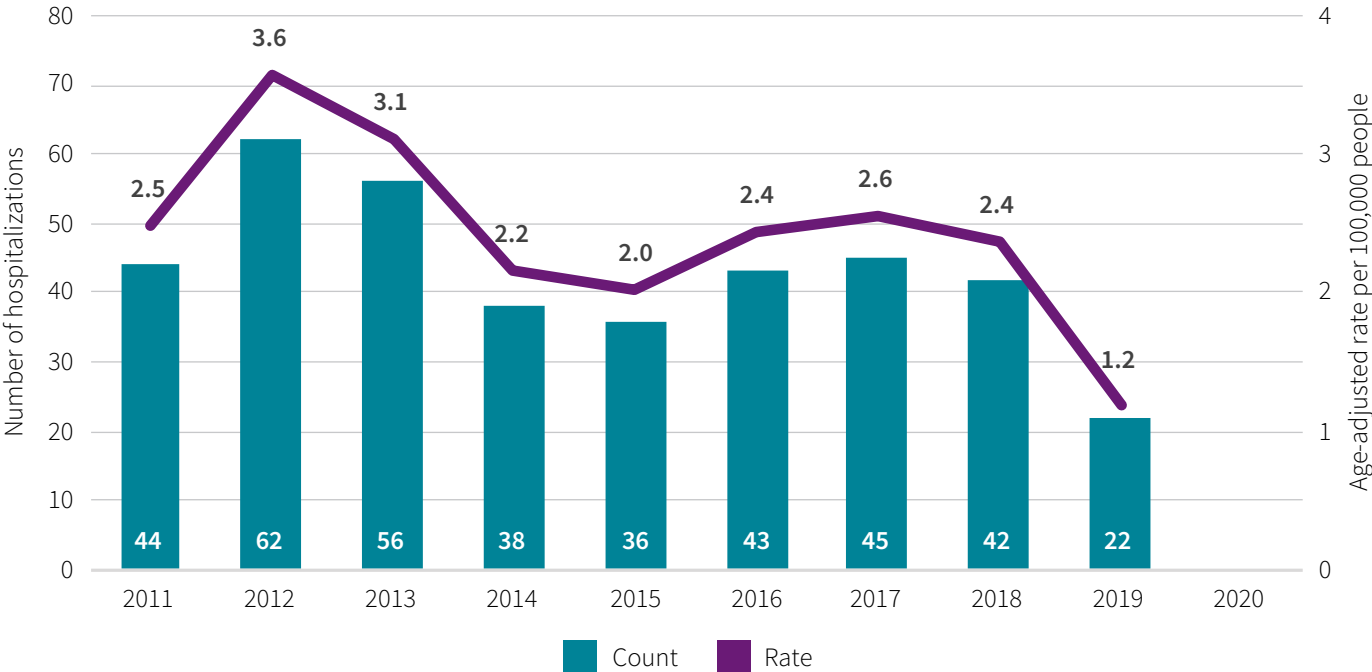
**Intentional assault firearm injuries – Interpersonal violence**

Homicide is fatal injury inflicted by another person with intent to injure or kill, by any means. Injuries due to legal intervention and operations of war are not included in homicide data.<sup>56</sup>

During 2016-20, firearm assault injuries represented less than 1% of total non-fatal assault injuries among county residents being treated in the emergency department.<sup>57</sup>

During 2016-20, there were 108 non-fatal firearm assault-related emergency department visits among county residents. Latinos accounted for more than half of these visits (54%) followed by Whites (17%) and African/African Ancestry (16%). The age-adjusted rate of non-fatal firearm assault related emergency department visits was highest among African/African Ancestry (8.8 visits per 100,000 people) followed by Latinos (2.0) and Whites (0.8). Adults ages 18 to 34 years (67%) accounted for 2 in 3 visits related to non-fatal firearm assaults.<sup>57</sup>

**Figure 26. Non-fatal firearm assault-related hospitalizations, Santa Clara County, 2011-2020**



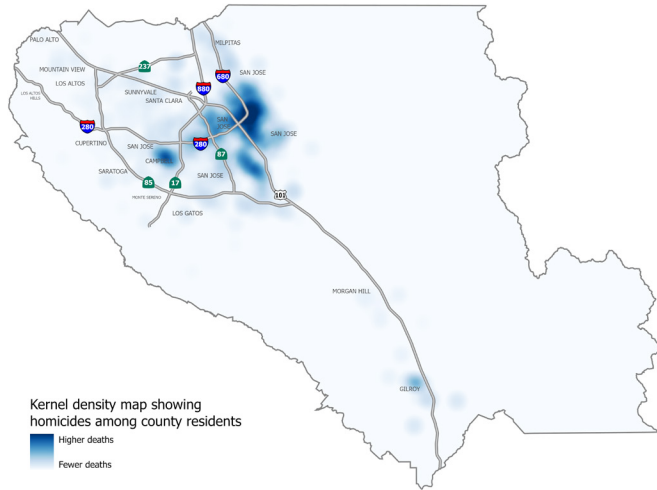
Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2011-2020

Note: Data are not presented when the number of hospitalizations is 15 or less. Data for 2011 to Q3 2015 are summarized using ICD-9-CM classification. Data for Q4 2015 to 2020 are summarized using ICD-10-CM classification. Any differences in data measures should be interpreted with caution, as these may be partially due to changes in the classification system.

During the past decade, the number of non-fatal firearm assault-related hospitalizations ranged from a high of 62 in 2012 to a low of 22 in 2019. During 2016-20, there were 167 non-fatal firearm assault-related hospitalizations among county residents, with an age-adjusted rate of 1.9 per 100,000 people. Latinos accounted for nearly 6 in 10 (58%) of these hospitalizations followed by Whites (16%) and African/African Ancestry (13%). The age-adjusted rate of non-fatal firearm assault-related hospitalizations was highest among African/African Ancestry (9.1 per 100,000 people) followed by Latinos (3.5) and Whites (0.9). Adults ages 18 to 34 years (62%) accounted for more than 6 in 10 hospitalizations-related to non-fatal firearm assaults.<sup>58</sup>

During 2016-20, more than half of the homicide deaths among county residents were firearm homicides (54%, 129 firearm homicide deaths). The number of firearm homicides increased in the county from 113 in 2006-10 to 129 in 2016-20; similar to the increase in total homicide deaths. During this time period, firearm homicides continue to account for more than half of total homicide deaths.<sup>59</sup>

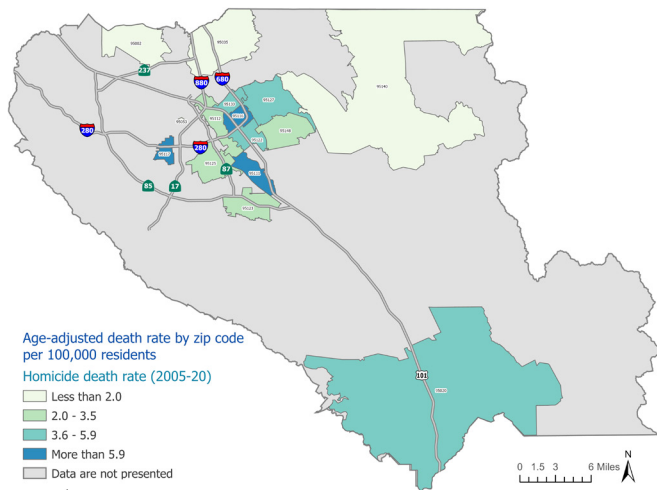
Figure 27. Homicide density



Source: Santa Clara County Public Health Department, Vital Records Business Intelligence System (VRBIS), 2005-2020. Data as of 7/1/2021

The homicide density map above shows San José, Campbell, and Gilroy had relatively higher density of homicide deaths among county residents.<sup>60</sup>

Figure 28. Homicide rate



Source: Santa Clara County Public Health Department, Vital Records Business Intelligence System (VRBIS), 2005-2020. Data as of 7/1/2021

Note: Data are not presented when the death count is between 1 to 20. Age-adjusted death rates per 100,000 people are mapped.

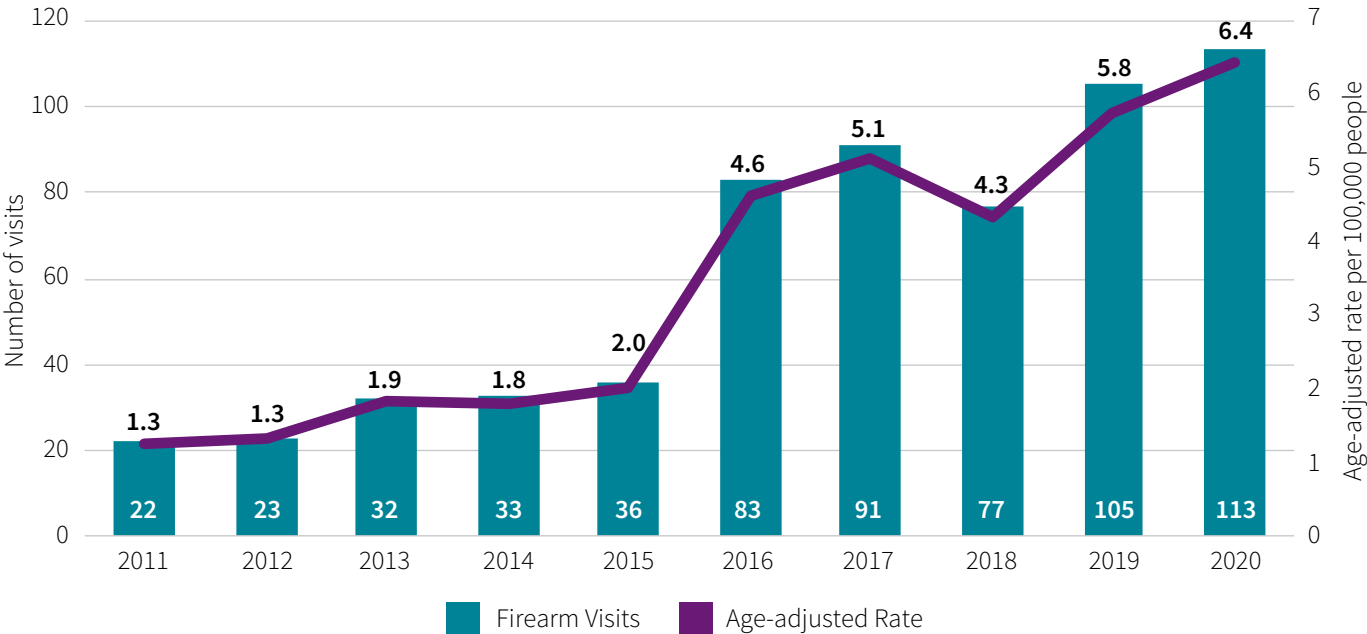
The age-adjusted homicide rate map in figure 28 shows zip codes located in the cities of San José and Gilroy had higher rates compared to other zip codes.<sup>60</sup>

### Unintentional Firearm Injuries

Unintentional injuries are accidental injuries. Unintentional firearm injuries include fatal or nonfatal firearm injuries that happen while someone is cleaning or playing with a firearm or other incidents of an accidental firing without evidence of intentional harm.<sup>61</sup>

Unintentional firearm injuries accounted for 3 in 4 (75%) of the total non-fatal firearm injury-related emergency department visits among county residents during 2016-20. The increase in total non-fatal firearm injury-related emergency department visits is mostly driven by the increase in the unintentional firearm injuries which increased five-fold from 2011 (n=22) to 2020 (113).<sup>62</sup>

**Figure 29.** Non-fatal unintentional firearm injury-related emergency department visits, Santa Clara County, 2011-2020



Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2011-2020

Note: Data for 2011 to Q3 2015 are summarized using ICD-9-CM classification. Data for Q4 2015 to 2020 are summarized using ICD-10-CM classification. Any differences in data measures should be interpreted with caution, as these may be partially due to changes in the classification system.

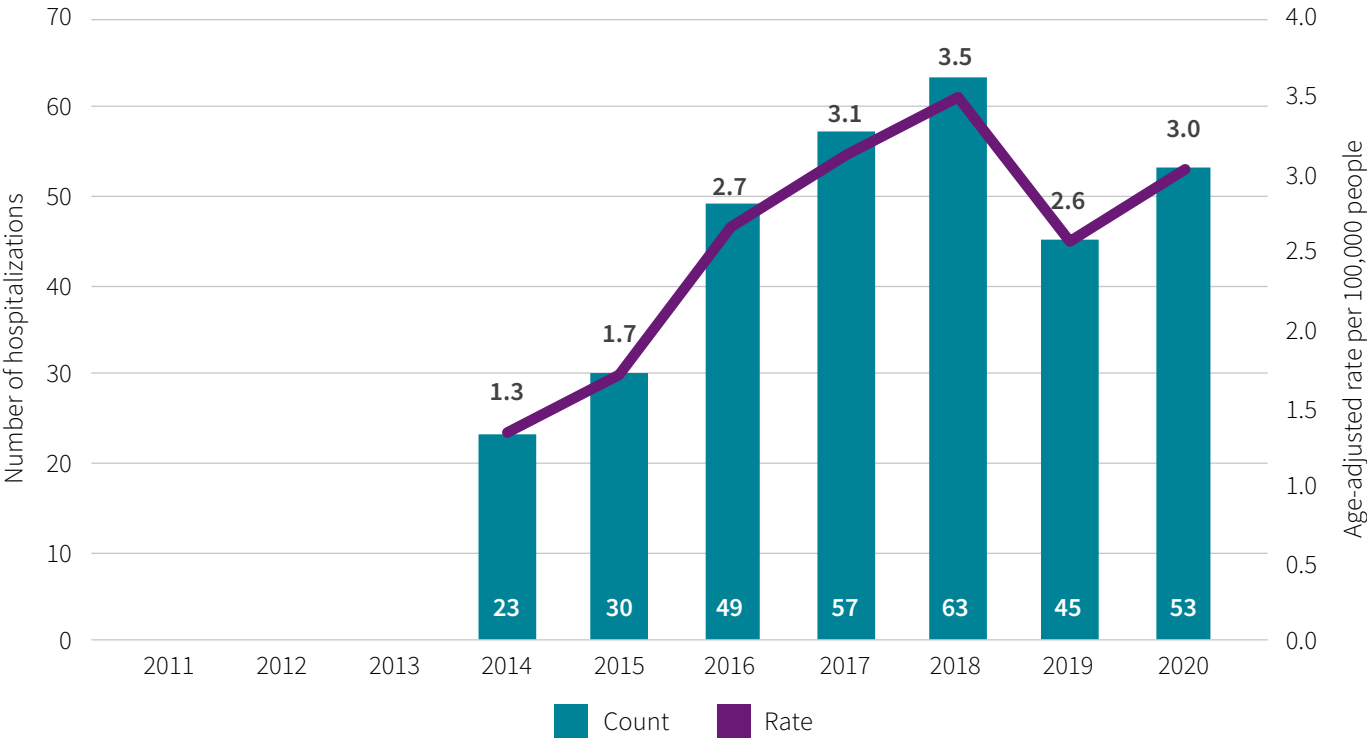
During 2016-20, 9 in 10 non-fatal unintentional firearm injury-related emergency department visits were among males (90%, 423 visits) residing in the county. Age-adjusted rate of these visits was 8 times higher among males (9.2 visits per 100,000) than among females (1.1).<sup>62</sup>

During 2016-20, Latinos (58%, 274 visits) accounted for more than half of the non-fatal unintentional firearm injury-related emergency department visits, followed by Whites (16%, 75), African/African

Ancestry (13%, 62) and Asian/Pis (9%, 41). African/African Ancestry had the highest age-adjusted rate (26.4 visits per 100,000) followed by Latinos (9.7), Whites (2.4) and Asian/Pis (1.3).<sup>62</sup>

During 2016-20, 2 in 3 non-fatal unintentional firearm injury-related emergency department visits were among adults ages 18 to 34 (66%, 306 visits) followed by adults ages 35 to 44 (15%, 70) and 45 to 64 (11%, 51).<sup>60</sup>

**Figures 30.** Non-fatal unintentional firearm injury-related hospitalizations, Santa Clara County, 2011-2020



Source: Santa Clara County Public Health Department, Office of Statewide Health Planning and Development (OSHPD), 2011-2020

Note: Data are not presented when the number of hospitalizations is 15 or less. Data for 2011 to Q3 2015 are summarized using ICD-9-CM classification. Data for Q4 2015 to 2020 are summarized using ICD-10-CM classification. Any differences in data measures should be interpreted with caution, as these may be partially due to changes in the classification system.

The non-fatal unintentional firearm injury-related hospitalizations increased from 23 hospitalizations in 2014 to 53 in 2020. During 2016-20, more than 9 in 10 (94%) of these hospitalizations were among males residing in the county. Age-adjusted rate among males (5.5 hospitalizations per 100,000) was 14 times higher than among females (0.4).<sup>63</sup>

During 2016-20, Latinos (57%, 152 hospitalizations) accounted for more than half of the non-fatal unintentional firearm injury-related hospitalizations, followed by Whites (16%, 44), African/African

Ancestry (16%, 43) and Asian/Pis (7%, 18). African/African Ancestry had the highest age-adjusted rate (19.1 hospitalizations per 100,000) followed by Latinos (5.9), Whites (1.6) and Asian/Pis (0.6). More than half (55%) of the non-fatal unintentional firearm injury-related hospitalizations were among adults ages 18 to 34 (55%, 148 hospitalizations).<sup>63</sup>

Data for unintentional firearm deaths are not presented per data deidentification guidelines. Data are not presented when the number of deaths is between 1 to 10.

### Legal Intervention-Involved Firearm Injuries

Legal intervention-involved firearm injuries are those inflicted by the police or other law enforcement agents acting in the line of duty. For example, firearm injuries that occur while arresting or attempting to arrest someone, maintaining order, or ensuring safety.<sup>64</sup>

In California, between 2016 and 2021, 838 people died due to legal intervention when an on-duty police officer shot them.<sup>65</sup> Most of the legal intervention-involved firearm deaths were among males (95%, 1051 deaths), Latinos (36%, 399) and adults ages 18 to 44 (69%, 768). Nearly 1 in 2 (48%) of the legal intervention-involved firearm deaths were among young adults ages 18 to 34, followed by people ages 35 to 44 (21%), 45 to 54 (12%), 55 to 64 (6%), 65 years and older and less than 18 years (2% each). Nearly 1 in 3 (36%) of the legal intervention-involved firearm deaths were among Latinos, followed by Whites (24%, 265 deaths), African/ African Ancestry people (15%, 163) and Asians (3%, 37). African/ African Ancestry people had the highest rate of the legal intervention-involved firearm deaths (7.6 deaths per 100,000 people); four times higher than Whites (1.8 per 100,000) and three times higher than Latinos (1.4 per 100,000).<sup>66</sup>



Based on the Fatal Force database, 22 legal intervention-involved firearm deaths occurred in the county during 2016-20; matching with the death data from the County Vital Statistics data. Among the county residents, there were 17 legal intervention-involved firearm deaths during 2016-20.<sup>66, 67, 68</sup>

Among the county residents, there were 41 legal intervention-involved firearm deaths during the past decade (2011-20). Most of these deaths were among males (93%), adults ages 18 to 44 (76%) and Latinos (44%) residing in the county.<sup>68</sup>

Data for legal intervention involved-firearm injury-related emergency department visits and hospitalizations are not presented in the report per data deidentification guidelines. Data are not presented when the number of events is 15 or fewer.<sup>69</sup>

### Firearm Injuries With Undetermined Intent

Firearm injuries with undetermined intent are those where there is not enough information to determine whether the injury was intentionally self-inflicted, unintentional, the result of legal intervention, or from an act of interpersonal violence.<sup>70</sup> During 2016-20, there were 16 non-fatal firearm injury-related hospitalizations that were of undetermined intent with an age-adjusted rate of 0.2 hospitalizations per 100,000 people residing in the county.<sup>71</sup>

Data for firearm deaths and non-fatal firearm injury-related emergency department visits with undetermined intent are not presented per data deidentification guidelines. Data are not presented when the number of emergency department visits is 15 or fewer and death data are not presented when the count is between 1 to 10.



## Appendix B: Methods

The societal cost assessment used a peer-reviewed framework for costing firearm violence. The framework was developed by PIRE more than 20 years ago and periodically updated.<sup>72</sup> This framework consists of an economic analysis of direct out-of-pocket costs across the continuum of public services, employer responses associated with injury and death, and indirect cost data following an event. Direct costs include police, emergency response, hospital-related expenses, healthcare claims, family mental health services, court, criminal justice, and employer costs. Indirect costs include victim loss of wages and the estimated value of lost quality of life, typically captured through established metrics and benchmarks. Costs can also include the vast array of prevention and intervention efforts in response to firearm violence across different public sectors.

Original estimates are built from mortality data, hospital data on charges for initial visits multiplied by hospital-specific cost to charge ratios; a published injury cost model (Zonfrillo et al., 2018) that provided diagnosis-specific ratios of physician and other professional payments to hospital costs and of lifetime medical costs post-discharge to the costs of the initial hospital visit, as well as work loss and quality of life loss; and a combination of county data on police and criminal justice processing combined with two national studies (Miller et al. 2021, Hunt et al. 2019), California State budget data, and a California Sentencing Institute (2021) study of cost per case.

PIRE developed the widely published injury cost models and methods to estimate injury-related costs, including firearm injuries and other causes of injuries. This injury cost model is used for estimating firearm injury-related costs for the report. In summary, initial cost models cover non-fatal firearm injuries admitted as inpatients or treated in the emergency department (ED) without hospital admission using the county's statewide Patient Discharge Database and Emergency

Department Visits Database. For hospitalized patients, medical costs are based on hospital charges that were multiplied by hospital-and-year-specific cost-to-charge ratios. This base cost was multiplied by factors for professional fees associated with the admission, follow-up admissions, and post-discharge medical costs. Additional nursing home or inpatient rehabilitation costs were added for discharges to those settings. Since Kaiser hospitals do not record charges for services, we substituted the mean cost for an initial admission at similar hospitals by diagnosis. For firearm injury-related emergency department visits (treat and release), the initial admission cost by diagnosis was computed based on the Market Scan National Claims Database. Then the initial cost estimate was multiplied by factors for follow-up costs. The mean cost of transport by ambulance was added to all inpatient admissions and emergency department visits.

Work loss and quality of life cost methods include patients' injuries, age, and sex. The calculations used average wages across the 2007-2018 business cycle adjusted to Santa Clara County wage levels. For suicides, the costs of mental health treatment post-discharge were excluded because those costs were costs of suicidality rather than of the firearm injury. Injury costs for year 2015 and later were difficult to calculate due to transition in the diagnosis coding from Clinical Modification of the 9th revision of the International Classification of Diseases (ICD9-CM) to the 10th revision (ICD10-CM) starting October 1, 2015. Therefore, PIRE used average costs per firearm injury by intent in 2014 for later years rather than costing each event. Those estimates are less precise than the costs calculated for 2014 and earlier years.

Police, jail, victim services, and fire department emergency medical service costs are specific to Santa Clara County, while prison, parole, and probation costs are California-specific. PIRE's crime cost model provided mental health care and

criminal adjudication costs per firearm incident. Employer costs per firearm incident by intent/severity and the duration of sanctions are national averages, with costs adjusted to prices in Santa Clara County.

Cost estimation method for firearm deaths was similar to the method used for non-fatal firearm injuries. For fatalities, PIRE determined the medical costs based on place of death, drawing average inpatient and emergency department medical costs for a firearm fatality from Health Care Utilization Program (HCUP) National Inpatient and Nationwide Emergency Department Sample datasets. The indirect costs of fatalities were computed for each victim in the county, taking account of victim's age and sex, then summed up to get overall cost estimates.



Counts of firearms purchased and firearm ownership in the county are estimates derived based on the State of California background check data and firearm sales data. State of California background check data showed 363,725 firearms were purchased/registered in Santa Clara County between 2001 and 2015.<sup>73</sup> Data procured from the State data system indicated that another 140,289 handguns and long guns were purchased in the county during 2017-2021. In 2017-2019, 3.5% of the guns purchased statewide were purchased in the county. Multiplying the 3.5% times firearm sales statewide in 2016 suggests 44,666 firearms were sold in the county in 2016. Annual numbers of firearms sold were summed to yield the county's estimated firearm count over time.

Same method was used to estimate firearm ownership in San José as used at the county level. First, the 11% ownership rate was applied to the 2014 household count of 325,114 for San José, then multiplied times 4.8 to 5.16 firearms per household with firearms.<sup>74</sup> This approach yielded a range of 164,856 to 177,298 firearms in San José in 2014. Alternatively, published literature and research shows that the number of firearms in a jurisdiction tracks the number of suicide by firearm deaths in the jurisdiction. This finding was used along with the survey-based county counts (multiplied times 4.8 to 5.16) and the sales-based county counts separately to yield two estimates. Using this alternative method indicated that San José had an estimated 154,530 to 166,274 firearms in 2015. Across the 5 calculated counts, the mean number of firearms in San Jose during 2014-15 was 165,830, with a range from 154,530 to 177,298. Adding the 98,157 firearms purchased/registered in San José during 2016-2021 to the 165,830 for 2014-2015 yielded the best estimate of 263,987 firearms in San José, with a range from 252,700 to 275,500. The number of estimated firearms was divided by the number of households in San José to derive estimated number of households with firearms in San José.



# Appendix C: Limitations

**Change in classification coding:** For both the inpatient discharge and emergency department datasets, the diagnosis coding changed from ICD9-CM to ICD10-CM in 2015. These two coding classification systems do not crossmatch which makes it difficult to compare data across these time periods and calculate costs for services provided.

**Data access and availability:** County EMS data were not available for 2007 and prior years so the costs were estimated for these years. This might result in underestimating the costs. Cost estimation does not include non-fatal firearm injuries that did not result in any hospital or emergency room encounter, including untreated injuries and injuries treated at physician’s offices or urgent care clinics. Data were not available for time spent by law enforcement personnel responding to firearm-related calls without physical injury and were not included in the cost estimation. The county lacked a dataset that indicated whether arraignments for firearm-involved crimes led to a conviction or what sanctions were imposed. The modeled costs based on the sanctioning profile

from aggregated California statewide data has wide uncertainty. Firearm buy-back programs have been implemented in the county. The cost estimates could not include the costs related to the buy-back events and their administration. Behavioral Health Services (BHS) data does not collect information about mental health services provided in the schools and communities after mass shootings. The BHS data system is set up to track services provided and not to track people which makes it impossible to estimate countywide prevalence of mental health needs and accessibility to services. Data could not be accessed for the impact of firearm violence in the education system: student suspensions related to firearms, firearm related incidents on campus, etc. Data were not available to estimate the amount of law enforcement and school staff time spent responding to firearm violence and threats in schools.

For additional limitations related to the cost methodology used for this study, please refer to the technical paper [Medical and Work Loss Cost Estimation Methods for the WISQARS Cost of Injury Module](#).<sup>75</sup>



## Appendix D: Firearm Violence Stakeholder Meetings

Between February and July 2022, Prevention Institute and the County Public Health Department jointly conducted a series of stakeholder meetings with communities most impacted by gun violence, as well as with community-based organizations and government agencies working at the forefront of this issue. In total, around 124 individuals participated in 11 meetings. Participants represented the following groups and sectors: community members, resident groups, community-based organizations, criminal justice partners, County Health System and department partners, advocacy groups, subject matter experts, and city agencies. Participants also represented members from African/African Ancestry and Latino communities, youth, working adults, seniors, and residents living in high impacted areas throughout Santa Clara County.

The purpose of the stakeholder meetings was to understand stakeholders’ concerns around gun violence and their perspectives on its root causes. Ideas around programmatic solutions and policy recommendations were also solicited for developing the recommendations in the report and for future action planning. The following three main questions were asked to all participants.

- Describe the forms of firearm violence you are most concerned about.
- Describe what you identify as the root causes and other factors that contribute to these forms of firearm violence.
- What ideas do you have for policy, program, and budget-related solutions? We are particularly interested in solutions that advance racial equity, gender, and economic equity.



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74 Azrael D, Hepburn L, Hemenway D, Miller M. The Stock and Flow of US firearms: Results from the 2015 National Firearms Survey. RSF: The Russell Sage Foundation Journal of the Social Sciences. 2017;3(5):38-57. The 5.16 average was computed by extending Table A1 in the article from 2013 to 2015, then multiplying the 4.8 average for 2015 from the survey by the 285-million-gun count from Table A1 (based on Federal gun excise tax data adjusted for some guns being decommissioned) divided by the 265 million survey count.

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**AGENDA REPORT SUMMARY**

**Meeting Date:** April 11, 2023

**Subject:** City of Los Altos Outdoor Dining Program

**Prepared by:** Anthony Carnesecca, Assistant to the City Manager

**Reviewed by:** Jon Maginot, Assistant City Manager

**Approved by:** Gabriel Engeland, City Manager

**Attachment(s):**

1. City of Los Altos Parklet Program Guide
2. Resolution 2022-XX City of Los Altos Parklet Program
3. City of Los Altos Sidewalk Dining Program Guide
4. Resolution 2022-XX City of Los Altos Sidewalk Dining Program
5. City of Los Altos Outdoor Display Guide
6. Resolution 2022-XX City of Los Altos Outdoor Display Program

**Initiated by:**

City staff

**Previous Council Consideration:**

November 19, 2019; August 28, 2020; November 30, 2021; & January 24, 2023

**Fiscal Impact:**

None.

**Environmental Review:**

Not applicable.

**Policy Question(s) for Council Consideration:**

- Does the City Council wish to approve the updated Los Altos Outdoor Dining Program?
- Does the City Council wish to approve the proposed fee structure for parking stalls and the Los Altos Outdoor Dining Program?

**Summary:**

- This program will allow businesses the option of having outdoor dining in the public right-of-way.

**Staff Recommendation:**

- Extend the current COVID parklet program through October 1, 2023
- Adopt the City of Los Altos Resolution No. 2023-XX to amend the Los Altos Parklet Program

**Reviewed By:**

City Manager

GE

City Attorney

JH

Finance Director

JD





**Subject:** City of Los Altos Outdoor Dining Program

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- Adopt the City of Los Altos Resolution No. 2023-XX to establish the Los Altos Sidewalk Dining Program
  - Adopt the City of Los Altos Resolution No. 2023-XX to amend the Los Altos Outdoor Display Program

**Purpose**

The goals of the Los Altos Outdoor Dining Program are to increase the vibrancy and atmosphere of Downtown Los Altos, stimulate local economy through improved outdoor dining spaces in sidewalks and parklets, and encourage creative use of public spaces by activating sidewalks and adjacent areas.

**Background**

In June 2004, the Los Altos City Council approved a resolution establishing a downtown public sidewalk display permit program that “developed a set of sidewalk clearance guidelines and design criteria allowing for the placement of A-frame or similar signs, flowerpots, flower carts, statues, sculptures, or other similar decorative display items, and outdoor dining furniture on or over the public sidewalks in the downtown triangle area.” This allowed many businesses to display a-frames with store information on sidewalks and outdoor seating for restaurants.

In August 2018, the Los Altos City Council adopted the Downtown Vision. The vision provides the City of Los Altos with long-term improvements and short-term programs that will increase vibrancy in the downtown triangle. Outdoor dining was identified as an effective way to provide unique and positive dining opportunities for residents and visitors in Downtown Los Altos.

In November 2019, the Los Altos City Council unanimously approved the City of Los Altos Pilot Parklet Program. This pilot program was intended to allow restaurant owners to build parklets that would expand outdoor seating opportunities through Fall 2021 and would allow restaurants to have two full years with their parklets before a Council review of the program. These parklets were required to be built-out deck structures with design and construction specifications. This program limited the number of parklets on any given block downtown and prevented parklets from being installed across the street from one another.

In January 2020, City staff conducted preliminary meetings with numerous restaurants that were interested in a parklet installation. Many restaurants were interested, but some were hesitant to invest money on a parklet installation for a two-year period without a long-term timeline. No parklet applications were received from restaurants under the pilot program prior to the start of the COVID-19 pandemic.

In summer 2020, the City began exploring potential options for restaurants to expand their outdoor dining space into the public right-of-way. Through many meetings with community stakeholders, the City decided to close sections of downtown streets for “Open Streets Los Altos” allowing restaurants to expand their outdoor seating area into the public right-of-way with approved permit application



**Subject:** City of Los Altos Outdoor Dining Program

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and proof of liability insurance. This program closed Main Street and State Street for pedestrian-only traffic every Thursday morning through Sunday night from June 2020 through September 2020.

Open Streets Los Altos was successful in allowing restaurants to expand outdoor dining space as guidelines required tables to be ten feet apart from one another and keep diners six feet apart from one another at all times in compliance with social distancing guidelines provided by the County. Some neighboring businesses were frustrated with the sections of the block that did not have restaurants and large sections of the block were not fully utilized. Some other businesses were frustrated with loss of on-street parking spaces adjacent to storefronts. City staff met with restaurants, retailers, and personal service businesses who indicated that parklets may be a middle ground solution allowing restaurants to have outdoor dining space while re-opening the street to vehicular traffic and open additional parking spaces near storefronts.

As Open Streets Los Altos came to a close, the City implemented the COVID Parklet Program in Fall 2020. Through the COVID Parklet Program, businesses installed a protective barrier of wine barrels filled with 500 lbs. of water, sand or concrete along the perimeter of the parklet. These barrels have created a unique and uniform feel to the parklets that make them unique to Los Altos. However, as time as passed, the barrels have weathered and fallen into disrepair as they were not designed for outdoor use over long periods of time.

As winter set-in and restaurants wanted to add canopies and heaters, SCC Fire Department became involved in helping us develop Outdoor Dining Winterization Guidelines that assured temporary parklets would comply with the State and County fire codes.

In November 2021, the Los Altos City Council approved a Permanent Parklet Program to go into effect at the end of the local emergency health order. City staff has identified a number of improvements to the parklet program.

As of March 2023, the City has approved 20 parklet applications under the COVID Parklet Program. These 20 approved parklets are located at various restaurants in downtown that have allowed outdoor dining opportunities even with restrictions on indoor dining.

On January 24, 2023, staff presented a draft outdoor dining program. City Council directed staff to meet with business owners within the community to identify their concerns and provide more information to City Council in order to make a better informed decision.

City staff presented to the Los Altos Chamber of Commerce Government Affairs Committee on February 1, 2023, hosted a direct Q&A session with business owners on February 2, 2023, and presented to Los Altos Property Owners Downtown on February 8, 2023 for larger group feedback sessions.



**Subject:** City of Los Altos Outdoor Dining Program

In addition to these presentations, City staff, Chamber President & CEO Kim Mosley, and LAVA Executive Director Scott Hunter have met individually with businesses for a review of the guidelines in the context of their unique scenario and feedback. As of this meeting, almost every current parklet operator has met with at least one of these individuals to discuss the program and provide recommendations on the program moving forward.

City staff has updated the parklet program guidelines with feedback from restaurant owners and conversations with state agencies, such as California Alcohol Beverage Control, and local agencies, such as Santa Clara County Fire.

**Discussion/Analysis**

City staff has edited these programs incorporating feedback from business owners that will ensure this program is as successful as possible. All the edits that have been incorporated into the program guides have been highlighted to show where City staff has worked to meet business owners’ needs within the program.

Restaurants will have the option to submit for either a Parklet Program Application or Sidewalk Dining Application due to two major concerns.

The first concern is that restaurants will not be able to meet Americans with Disabilities Act (ADA) accessibility requirements for pedestrians and dining areas. It will be very difficult, and impossible in some cases, to provide a five-foot path of travel for pedestrians on the sidewalk. Furthermore, ADA regulations stipulate that all dining facilities must provide equal access to the same dining opportunities so individuals must be allowed to have the same dining experience with regards to size of seats at a dining table, alcohol consumption, etc. whether on sidewalk or in parklet.

The second concern is that restaurants will not be able to meet the California Alcohol Beverage Control (ABC) standards that govern outdoor dining along the sidewalk while also having a parklet in place. When ABC provides an approval for the outdoor service and consumption of alcoholic beverages from a restaurant, they are provided a list of conditions in order to be allowed service. An ABC Licensing Representative indicated that they would “advise that the restaurant to put a barrier, such as stanchion or planter, so that the licensee will have control of alcohol on their licensed premises and to make sure patron will not have access to walk around at the public premises with an open container.” Our sidewalks are so narrow in many portions that it would be near impossible to provide a full dining area, barrier, and five-foot path of travel for pedestrians to allow full service.

City staff does not feel comfortable allowing businesses to operate on both the sidewalk and parklets. Currently, the City of Palo Alto concurs with this assessment and do not allow businesses to operate on both the sidewalk and in a parklet.



**Subject:** City of Los Altos Outdoor Dining Program

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Parklet Program

The City will allow current parklets to continue to operate under the COVID Parklet Program through October 1, 2023 when they will need to remove the temporary parklets. If businesses would like to receive an extension to build a parklet under the Parklet Program by the end of the calendar year, the applicant must submit a Letter of Intent to the City by October 1, 2023 with a timeline that includes targeted application submission and construction. The applicant will then have until December 31, 2023 to remove their COVID parklet and build their new parklet under the Parklet Program.

Businesses will always have the ability to apply for a parklet at any point in time with a completed application submittal.

Through the various parklet programs and continued outreach with the business community, staff have learned a great deal about what will encourage restaurants to build and sustain great outdoor dining in Los Altos.

The amended long-term parklet program incorporates lessons learned through crafting both programs, seeing parklets built out under the COVID Parklet Program, identifying some of the shortcomings in the programs that may be improved moving forward to maintain the aesthetics of parklets in downtown Los Altos, and through discussions with business owners.

Required adjustments to the Los Altos Parklet Program due to regulations include:

- Require greater distance from centerline to ensure safer vehicular traffic for emergency vehicles.
- Protected dining area with concrete barriers and metal railings instead of wine barrels for California ABC compliance.
- Canopy structures are prohibited for Fire Code compliance.

Proposed adjustments to the Los Altos Parklet Program due to lessons learned include:

- Require all parklets to include a wood platform structure that meets the sidewalk grade.
- Parklets limited to whichever is greater of either:
  - (1) All parking stalls within primary building frontage
  - (2) Five angular (on Main) or three parallel (on State) parking stalls.
- Establish annual program fee.

Based upon conversations with business owners after the City Council study session, staff has adjusted the program with the following recommendations:

- Increased the maximum number of parking spaces for parklets.
- Shortened distance from centerline on Main Street to 13 feet.
- Provided greater flexibility on top layer of platform structure.
- No longer require dining furniture to be brought into restaurant outside of business hours.



**Subject:** City of Los Altos Outdoor Dining Program

- Allowing City staff to work with existing non-conforming decked parklet owners to identify long-term solutions for parklets.
- Allowing propane heaters after conversations with County Fire.
- Altered the timeline for the end of the COVID Parklet Program to allow businesses more time to build their permanent parklets.

After reaching out to County Fire, their staff indicated that propane heaters could be permitted so long as the applicants meet all applicable code sections (CFC 605.5.2 – 605.5.2.3.4) from County Fire. City staff will allow business owners to utilize propane heaters so long as they meet all the applicable Fire Code requirements, but staff will have the rights to revoke a business’ ability to utilize propane heaters if they do not meet those guidelines similar to all other aspects of the parklet program. The City of Palo Alto requires a HAZMAT permit to allow propane heaters within parklets, including several strict requirements and an additional annual permit fee.

Parklet Fee

City staff has explored fee structures and options for parklet programs. Options include charging a fee on square footage or per parking stall. Staff recommends establishing a square footage fee because there is no standard parking stall fee and some parklets will utilize angular parking stalls versus parallel parking stalls, which could create inequity in the fee structure. Neighboring cities that charge or plan to charge a square footage fee include Palo Alto, Mountain View, and Redwood City.

The average ground floor retail lease rate in Los Altos is roughly \$46 per square foot. This rate is for built-out indoor spaces that fluctuate depending upon market conditions, quality of spaces, and individual agreements for tenant improvements.

Comparatively, here is the average cost for retail space for those cities which charge a square footage fee for their parklet program:

- Palo Alto – \$61 per square foot
- Mountain View – \$37 per square foot
- Redwood City – \$44 per square foot

As Los Altos’ average square footage cost for retail is similar to Mountain View and Redwood City, staff proposes to compare the Los Altos square footage cost with those two agencies, which is approximately \$10 per square foot. Mountain View has not finalized this rate, but is currently conducting outreach on this rate within their community.

Staff believes this rate is high as it would be 20% of the average indoor lease rate for these unfinished parking stalls that will still require significant investment to initially build and maintain parklets.



**Subject:** City of Los Altos Outdoor Dining Program

Staff therefore further recommends discounting from that rate to \$3 per square foot to incentivize businesses to utilize funds that would otherwise have been applied to the fee to maintain and beautify their parklets.

Staff also proposes to charge an initial application fee in addition to the annual license fee. Mountain View is proposing a similar fee structure. Redwood City also charges an initial application fee and annual license fee as well as an annual renewal fee. Palo Alto is still working on finalizing their fee structure.

	<b>Los Altos (Proposed)</b>	<b>Palo Alto</b>	<b>Mountain View (Proposed)</b>	<b>Redwood City</b>
<b>Initial Application Fee</b>	\$500	\$2,250	\$769	\$2,226
<b>Annual License Fee (per sq ft)</b>	\$3/sq ft	TBD	\$10/sq ft	\$10.16/sq ft

Sidewalk Dining Program

Currently, sidewalk dining is permitted under the Outdoor Display Program. Applicants apply to place outdoor dining furniture and outdoor displays as part of the same program. This process is illogical in that sidewalk dining and any outdoor displays should be divided into two categories with separate requirements. Staff recommends City Council adopt the Sidewalk Dining Program as part of the overall Outdoor Dining Program.

The sidewalk dining program fee will be \$250 for the initial application fee and \$500 annually. This amount will cover a portion of the City’s cost to administer this program while also incentivizing businesses to invest in their sidewalk dining facilities.

**Staff Recommendation:**

- Extend the current COVID parklet program through October 1, 2023
- Adopt the City of Los Altos Resolution No. 2023-XX to amend the Los Altos Parklet Program
- Adopt the City of Los Altos Resolution No. 2023-XX to establish the Los Altos Sidewalk Dining Program
- Adopt the City of Los Altos Resolution No. 2023-XX to amend the Los Altos Outdoor Display Program



# City of Los Altos Parklet Program Guide

April 2023



# Overview

This program guide describes the procedures existing and proposed downtown businesses must follow to be permitted for outdoor dining within the public right-of-way immediately adjacent to the establishment. Interested businesses must provide a complete submittal with all required documents and the initial application fee to the City of Los Altos for consideration.

Approved dining areas are executed by a City Removal & Maintenance Agreement that is reviewed annually for operational standards set forth within this Program Guide. Each approved dining area shall be automatically renewed each year unless otherwise determined during its annual review.

City staff will complete an annual inspection in addition to ongoing monitoring to verify and ensure aesthetics, cleanliness, and the approved precise seating layout of the dining area are maintained. Approved dining areas shall remain safe and compliant with all applicable accessibility standards including but not limited to the Americans with Disabilities Act Accessibility Standards and Chapter 11B of the California Building Code, Los Altos Municipal Code, or other applicable laws.

Any inspections performed by the City are for its sole and exclusive benefit and for the benefit of the general public, and a business owner should not rely on the fact that the City has performed an inspection as evidence that the business' dining area is safe or compliant with applicable accessibility standards including but not limited to the Americans with Disabilities Act Accessibility Standards and Chapter 11B of the California Building Code, Los Altos Municipal Code, or other applicable laws.

# Timeline

- All businesses interested in the installation of a parklet under these guidelines will be required to submit a Letter of Intent to the City of Los Altos by October 1, 2023 if they would like to keep their COVID parklet through the end of the calendar year.
- Should the City not receive a Letter of Intent to build a permanent parklet, the business must remove their current COVID parklet by October 1, 2023.
- Thus, all COVID parklets will be removed by December 31, 2023 at the latest.
- Businesses will always be able to submit a new application for the parklet program outside of this application period.



# Parklet Design Specifications

## Location

- Shall be installed at businesses that provide table service with items delivered and/or carried away by an employee.
- Shall utilize the length of their primary building frontage only or a maximum of **four five** angular parking spaces for Main Street or **two three** parallel parking spaces for State Street.
- Shall receive written permission from both neighboring business owner and property owner to place parklet in front of neighboring business.
- **Shall not interfere with line of sight for neighboring businesses.**
- Shall maintain a minimum distance of **1513** feet from the centerline of Main Street and 11 feet from the centerline of State Street to the most outer edge of the parklets barriers or as determined by the Public Works Director for sight visibility and safety.
- Shall ensure access to utility panels, vaults, boxes, hatches, manholes, storm drains, and similar items.

## Platform Structure

- Shall have a **top layer** made of **ipe hardwood decking similar to ipe or composite product similar to Trex.**
- **Shall be made with wood frame custom fit to crown of road or leveling system to remain level across parklet.**
- Shall have impermeable layer under deck across entire square footage of platform to prevent any debris from falling below platform.
- Shall have impermeable edging to prevent any entry points for critters.
- Shall be textured or treated with a non-skid coating on a regular basis.
- Shall be flush with the sidewalk without a horizontal or vertical separation greater than 1/2 inch. Vertical separations between 1/4 inch and 1/2 inch high shall be beveled with a slope not steeper than 1:4 (25%).
- Shall not be bolted into the street or sidewalk.
- **Shall have a clear gutter space along the entire length of the proposed platform with a screen on both ends to allow free flow of water.**
- Shall meet all additional building requirements.

## Barriers

- Barriers will have two major components as seen in the example below:
  - Gray rectangular concrete planter every eight linear feet that is 16 inches wide, 48 inches long, and 42 inches high.
  - Brown 42-inch high railing that has a 2 inch x 3 inch tube steel frame with 5/8-inch metal rod infill.



- Planter must maintain fresh plants that may flow out from the barrier.
- Shall not have any display of art or any other information on barrier.
- Shall be constructed to enclose the entire perimeter of the parklet to ensure that patrons of each establishment only enter and exit from the adjacent sidewalk.

**Accessibility**

- Shall provide access to and throughout the seating areas by meeting the minimum requirements for accessibility based on the Americans with Disabilities Act 2010 Accessibility Standards, the current California Building Code (CBC), Chapter 11B – Accessibility, as well as other applicable standards and guidelines.
  - A business owner is strongly encouraged to engage the services of a Certified Access Specialist. The City does not guarantee that a parklet designed in accordance with City standards will comply with applicable disability access laws.
- Minimum 5% of all outdoor seating to be accessible and identify all the accessible tables with the International Symbol of Accessibility.
- Shall provide the specific requirements for accessible routes leading to and through the parklets including clear width, slope, cross slope, vertical transitions, protruding object/headroom hazards, and openings along the circulation path.

**Furniture**

- Shall be made of high-quality metal or wood material.
- Shall replace outdoor dining furniture on a regular basis.
- ~~Businesses must bring all furniture, except for dining tables, inside their business outside of posted operating business hours.~~

**Lighting**

- Shall be LED Bistro Lights rated for outdoor use in clear color only.
- Shall be installed in accordance with state and local electric code requirements and manufacturer’s instructions.
- Shall be plugged directly into outlet.
- Shall not be lower than 8 feet in height.

**Heating**

- Propane heat lamps are allowed as long as they meet the following requirements:
  - Must be more than 5 feet away from the building or any shade structure, such as umbrella or shade sail
  - Shall be equipped with a tilt switch that automatically shuts off if tilted more than 15 degrees
  - Shall be permanently guarded so that there will be no incidental contact
  - Gas containers shall not be stored inside of buildings
  - Must meet all other requirements in CFC 605.5.2 - 605.5.2.3.4
- Electric heat lamps are permitted on a case-by-case basis.

**Tents & Canopies**

- Tents and canopies are prohibited.

**Umbrellas**

- Umbrellas must be included in parklet layout.
- Shall be secured with umbrella stand.
- Shall have a headroom clearance of 80” minimum high.
- All umbrellas shall be uniform in color for each parklet with no advertising or signage.

**Other requirements**

- Existing non-conforming decked parklets can be reviewed on a case-by-case basis to identify how the platform structure can come into substantial compliance with the current program guidelines, but they shall be required to have the same uniform barrier and meet all additional requirements required by City staff.
- Demonstrate that the parklet is regularly used by customers and maintained by the business owner.
- Businesses shall include area in ABC license.
- Abide by all other restrictions placed by the City of Los Altos not outlined in this guide.
- No private garbage cans, bus stations, or dish collectors may be located in dining areas.

**Submittal Fee**

Applicants must submit a one-time initial application fee of \$500 to cover the costs of reviewing the initial application, construction, and approval of the parklets.

By every December 31<sup>st</sup>, in alignment with the business license and downtown parking permit deadlines, applicants will provide a signed copy of the application, signed permit agreement, updated liability insurance documents, and a check for the parklet fee.

The annual parklet renewal fee will be \$3.00 per square foot. For example, the average parking stall is 9 feet by 18 feet for a square footage of 162 multiplied by the parking stall total would

equal 648 square feet. If you multiply 648 square feet by the \$3.00 per square foot fee, a business would pay an annual fee of \$1,944 for a four parking stall parklet.

## **Submittal Requirements**

- Completed Los Altos Parklet Program Application
- Signed City Removal & Maintenance Agreement
- Precise layout plan for the proposed parklet, including the parking spaces proposed for parklet, precise floor plan of tables, description and schematic of barrier, lighting and power plan that includes details of the wiring and power source, and disability access plan<sup>1</sup>
- Certificate of liability insurance

Please submit all the above required documents to the City of Los Altos for review through email to [acarnesecca@losaltosca.gov](mailto:acarnesecca@losaltosca.gov).

Every applicant is required to schedule an on-site meeting with a City staff representative prior to an application submission. If you have any questions regarding parklets, please contact the City of Los Altos at (650) 947-2620 or [acarnesecca@losaltosca.gov](mailto:acarnesecca@losaltosca.gov).

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<sup>1</sup> The City is not responsible for determining whether the disability access plan complies with the Americans with Disabilities Act or other applicable disability access laws. Every business owner that participates in the parklet program is strongly encouraged to engage the services of a Certified Access Specialist.

**RESOLUTION NO. 2023-\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LOS ALTOS  
ESTABLISHING A CITY OF LOS ALTOS PARKLET PROGRAM**

**WHEREAS**, the City of Los Altos adopted the Pilot Parklet Program, COVID Parklet Program, and Permanent Parklet Program at various points over the past three years by City Council action that will all be rescinded by December 31, 2023; and

**WHEREAS**, these previous iterations of the parklet program have informed the development of this new parklet program; and

**WHEREAS**, outdoor dining in parklets adjacent to restaurants can be an asset to the downtown business district by providing an enhanced visitor experience; and

**WHEREAS**, these parklets will adhere to the City Removal & Maintenance Agreement that ensures the aesthetics, cleanliness, and the approved precise seating layout of the parklet are maintained ; and

**WHEREAS**, these parklets will adhere to common design guidelines that will create a common aesthetic for parklet dining within Downtown Los Altos; and

**WHEREAS**, applicants must re-apply annually for this program with their application, certification of insurance documents, and annual fee.

**NOW THEREFORE, BE IT RESOLVED**, that the City Council of the City of Los Altos hereby adopts the policy attached hereto as **City of Los Altos Parklet Program Guide**.

**I HEREBY CERTIFY** that the foregoing is a true and correct copy of a Resolution passed and adopted by the City Council of the City of Los Altos at a meeting thereof on the \_\_\_ day of \_\_\_, 2023 by the following vote:

- AYES:
- NOES:
- ABSENT:
- ABSTAIN:

\_\_\_\_\_  
Sally Meadows, MAYOR

Attest:

\_\_\_\_\_  
Angel Rodriguez, INTERIM CITY CLERK



# City of Los Altos Sidewalk Dining Program Guide

April 2023

# **Description**

This program guide describes the procedures existing and proposed downtown businesses must follow to be permitted for outdoor dining within the public right-of-way immediately adjacent to the establishment. Interested businesses must provide a complete submittal with all required documents and the initial application fee to the City of Los Altos for consideration.

Approved dining areas are executed by a City Removal & Maintenance Agreement that is reviewed annually for operational standards set forth within this Program Guide. Each approved dining area shall be automatically renewed each year unless otherwise determined during its annual review.

City staff will complete an annual inspection in addition to ongoing monitoring to verify and ensure aesthetics, cleanliness, and the approved precise seating layout of the dining area are maintained. Approved dining areas shall remain safe and compliant with all applicable accessibility standards including but not limited to the Americans with Disabilities Act Accessibility Standards and Chapter 11B of the California Building Code, Los Altos Municipal Code, or other applicable laws.

Any inspections performed by the City are for its sole and exclusive benefit and for the benefit of the general public, and a business owner should not rely on the fact that the City has performed an inspection as evidence that the business' dining area is safe or compliant with applicable accessibility standards including but not limited to the Americans with Disabilities Act Accessibility Standards and Chapter 11B of the California Building Code, Los Altos Municipal Code, or other applicable laws.

# **Design Specifications**

## **Location**

- Shall maintain at least a 5-foot wide minimum clearance along the sidewalk to provide an accessible route along the existing public right of way. This clearance must be marked with a clear delineation that must always remain open for pedestrians.
- Shall ensure that pedestrians have a safe route from parked vehicles to the sidewalk.
- Shall receive written permission from neighboring business owner to place sidewalk dining in front of neighboring business.

## **Accessibility**

- Shall provide access to and throughout the seating areas by meeting the minimum requirements for accessibility based on the Americans with Disabilities Act 2010 Accessibility Standards, the current California Building Code (CBC), Chapter 11B – Accessibility, as well as other applicable standards and guidelines.
  - A business owner is strongly encouraged to engage the services of a Certified Access Specialist. The City does not guarantee that a dining area designed in accordance with City standards will comply with applicable disability access laws.
- Minimum 5% of all outdoor seating to be accessible and identify all the accessible tables with the International Symbol of Accessibility.
- Shall provide the specific requirements for accessible routes leading to and through the dining areas including clear width, slope, cross slope, vertical transitions, protruding object/headroom hazards, and openings along the circulation path.

## **Furniture**

- Shall be made of high quality metal or wood material.
- Shall replace outdoor dining furniture on a regular basis.
- Businesses must bring all furniture, except for dining tables, inside their business outside of posted operating business hours.

## **Umbrellas**

- Secure umbrellas down with umbrella stand.
- Must have a headroom clearance of 80” minimum high.
- All umbrellas shall be uniform in color for each table with no advertising or signage.

## **Other requirements**

- Demonstrate that the dining area is regularly used by customers and maintained by the business owner.
- Businesses must include area in ABC license if required.
- Abide by all other restrictions placed by the City of Los Altos not outlined in this guide.



- No private garbage cans, bus stations, or dish collectors may be located in dining areas.

## **Submittal Fee**

Applicants must submit a one-time initial application fee of \$250 to cover the costs of reviewing the initial application and approval of the sidewalk dining.

By every December 31<sup>st</sup>, in alignment with the business license and downtown parking permit deadlines, applicants will need to provide a new signed copy of the application, signed permit agreement, updated insurance documents, and a check for the Council-approved fee.

The annual sidewalk dining fee will be \$500.

## **Submittal Requirements**

- Completed Los Altos Sidewalk Dining Program Application
- Signed City Removal & Maintenance Agreement
- Layout plan for the proposed dining area project, including the precise floor plan of tables, description and schematic of barrier, and disability access plan<sup>1</sup>
- Certificate of insurance

Please submit all the above required documents to the City of Los Altos for review through email to [acarnesecca@losaltosca.gov](mailto:acarnesecca@losaltosca.gov).

Every applicant is required to schedule an on-site meeting with a City staff representative prior to an application submission. If you have any questions regarding the dining areas or dining area application process, please contact the City of Los Altos Economic Development team at (650) 947-2620 or [acarnesecca@losaltosca.gov](mailto:acarnesecca@losaltosca.gov).

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<sup>1</sup> The City is not responsible for determining whether the disability access plan complies with the Americans with Disabilities Act or other applicable disability access laws. Every business owner that participates in the dining area program is strongly encouraged to engage the services of a Certified Access Specialist.

**RESOLUTION NO. 2023-\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LOS ALTOS  
ESTABLISHING A CITY OF LOS ALTOS SIDEWALK DINING GUIDE**

**WHEREAS**, the City of Los Altos rescinds Resolution No. 04-15, which established a Downtown Public Sidewalk Display Program that allowed downtown businesses to place objects and outdoor dining furniture on the sidewalk; and

**WHEREAS**, this previous resolution shall be broken into two different programs; and

**WHEREAS**, outdoor dining along the sidewalk can be an asset to the downtown business district by providing an enhanced visitor experience; and

**WHEREAS**, these outdoor furniture items shall be located only on a public sidewalk that allow five feet for pedestrian pathway; and

**WHEREAS**, applicants must re-apply annually for this program with their application, certification of insurance documents, and annual fee.

**NOW THEREFORE, BE IT RESOLVED**, that the City Council of the City of Los Altos hereby adopts the policy attached hereto as **City of Los Altos Sidewalk Dining Guide**.

**I HEREBY CERTIFY** that the foregoing is a true and correct copy of a Resolution passed and adopted by the City Council of the City of Los Altos at a meeting thereof on the \_\_\_ day of \_\_\_, 2023 by the following vote:

- AYES:
- NOES:
- ABSENT:
- ABSTAIN:

\_\_\_\_\_  
Sally Meadows, MAYOR

Attest:

\_\_\_\_\_  
Angel Rodriguez, INTERIM CITY CLERK



# City of Los Altos Outdoor Display Guide

January 2023

The following needs to be submitted in order to process an outdoor display permit for the downtown triangle area only:

- Completed application form
- \$100 annual fee (updated annually within the fee schedule)
- Dimensioned diagram or photograph of display object
- Dimensioned diagram of proposed sidewalk location
- Certificate of liability insurance

**PURPOSE OF GUIDELINES**

Signs and other display objects, which are appropriately designed and placed, can be an asset to the downtown business district. While these types of displays may be more traditionally located on private property, the City Council has decided to allow limited use of the public sidewalk for this purpose. The intent is to allow signs and other display objects which are complementary to the appearance of the business district and are safe for pedestrians.

**OUTDOOR DISPLAY PERMIT REQUIREMENTS**

The Development Services Director may authorize the placement of A-frame or similar signs, flowerpots, flower carts, statues, or other similar decorative display items on either private property or the public sidewalk in the downtown triangle area in accordance with the following:

1. A sidewalk display permit shall be obtained from the City of Los Altos. Such permit shall be issued only when in the opinion of the Development Services Director that the sign or other display object would not have an adverse affect on nearby public and private properties.
2. The applicant shall hold the City, its officers, agents, employees, and volunteers harmless from all damages, costs or expenses in law or equity that may at any time arise because of damage to property or personal injury received by reason of or in the course of displaying a sign or other display object in the public right-of-way.
3. The applicant shall obtain and maintain insurance against injuries to persons or damages to property, which may arise. The City of Los Altos and its officers, agents, employees, and volunteers shall be named as "insured" in the insurance policy. Expiration or cancellation of insurance will automatically revoke the sidewalk permit.
4. Except as otherwise provided by these guidelines, the sign or other display object, including railing or other similar enclosures, shall be located only on a public sidewalk and directly in front of the applicant's business.
5. The sign or other display object must be appropriately designed, executed, and maintained so as to be complementary to the appearance and operation of the business district. Signs, including outdoor dining area railing or other similar enclosures, shall be wood or metal. Plastic signs or furniture are not permitted. Signs or furniture that are not maintained appropriately will result in the revocation of the outdoor display permit.

6. The sign or other display object shall utilize materials that are intended for outdoor use.
7. A-frame signs are subject to design review and are not permitted to simply advertise a business address, phone number, or list of products and prices.
8. A-frame signs are only permitted during listed business operating hours.
9. Noncompliance with the maintenance agreement will result in the revocation of the sidewalk display permit.
10. Guidelines for encroachments on public sidewalks:
  - a. Minimum horizontal clearance from curb: 2 feet
  - b. Minimum pedestrian pathway: 5 feet
  - c. Minimum height of object: 30 inches
  - d. Maximum height of object: 60 inches
  - e. Maximum sign area: 6 square feet

**RESOLUTION NO. 2023-\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LOS ALTOS ESTABLISHING A CITY OF LOS ALTOS OUTDOOR DISPLAY PROGRAM**

**WHEREAS**, the City of Los Altos rescinds Resolution No. 04-15, which established a Downtown Spublic Sidewalk Display Program that allowed downtown businesses to place objects and outdoor dining furniture on the sidewalk; and

**WHEREAS**, this previous resolution shall be broken into two different programs; and

**WHEREAS**, A-frame or similar signs, flowerpots, flower carts, statues, or other similar decorative display items, made of wood or metal, can be an asset to the downtown business district by providing an enhanced visitor experience; and

**WHEREAS**, these items shall be located only on a public sidewalk that allow five feet for pedestrian pathway; and

**WHEREAS**, applicants must re-apply annually for this program with their application, certification of insurance documents, and annual fee.

**NOW THEREFORE, BE IT RESOLVED**, that the City Council of the City of Los Altos hereby adopts the policy attached hereto as **City of Los Altos Outdoor Display Guide**.

**I HEREBY CERTIFY** that the foregoing is a true and correct copy of a Resolution passed and adopted by the City Council of the City of Los Altos at a meeting thereof on the \_\_ day of \_\_, 2023 by the following vote:

- AYES:
- NOES:
- ABSENT:
- ABSTAIN:

\_\_\_\_\_  
Sally Meadows, MAYOR

Attest:

\_\_\_\_\_  
Angel Rodriguez, INTERIM CITY CLERK



## PUBLIC CORRESPONDENCE

The following is public correspondence received by the City Clerk's Office after the posting of the original agenda. Individual contact information has been redacted for privacy. This may *not* be a comprehensive collection of the public correspondence, but staff makes its best effort to include all correspondence received to date.

To send correspondence to the City Council, on matters listed on the agenda please email [PublicComment@losaltosca.gov](mailto:PublicComment@losaltosca.gov)

**From:** [Roberta Phillips](#)  
**To:** [Public Comment](#); [City Council](#)  
**Subject:** [External Sender]Outdoor Dining Item #6 Council Meeting April 11, 2023  
**Date:** Saturday, April 8, 2023 11:40:57 AM

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Dear Council Members

I read the report on the Outdoor Dining program.

1. The price of \$3 per square foot is very low. I spoke to several real estate brokers and this is nowhere close to the value of the land being utilized. Other cities recognize this, so why can't we? The report says that we might need to take money out of our General Fund to support this program. I object to our public funds being used to support private restaurants. When people lease or rent space from Los Altos at the Community Centers they are paying a lot more.
2. The report recommends allowing more parking spaces to be removed than the original plan. It says this change is based on feedback from businesses. However there was no feedback from community members. The original plan was better for access to other businesses downtown, and allows for more ADA compliance.
3. The report recommends reducing the width from the centerline on Main Street from 15 feet to 13 feet, reducing the width of the street by 4 feet. This is dangerous and makes it difficult for emergency vehicles to have adequate space during emergencies. The turning radius at the corners would be made more difficult.

Council needs to find the right balance to support outdoor dining, while being fiscally responsible and equitable .

Sincerely

Roberta Phillips  
650-941-6940



**From:** [Pat Marriot](#)  
**To:** [Public Comment](#)  
**Subject:** [External Sender]PUBLIC COMMENT ITEM #6 APRIL 11, 2023  
**Date:** Saturday, April 8, 2023 4:23:51 PM

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Council Members:

My concerns and questions regarding the staff report:

1. page 1

**Fiscal Impact:**

None.

There’s no economic analysis of the program looking out several years from the start of the new program. There are 20 parklet applications as of March 2023. How many will there be once the permanent program is approved? If we have to subsidize any restaurants from the General Fund – or any other fund – how can we assume no fiscal impact?

2. page 4 “City staff has edited these programs incorporating feedback from business owners that will ensure this program is as successful as possible.” Did staff get feedback from non-restaurant businesses as well as restaurants? Where can we see that feedback?

3. page 5

“Required adjustments to the Los Altos Parklet Program due to regulations include:

- Require greater distance from centerline to ensure safer vehicular traffic for emergency vehicles. “

“Based upon conversations with business owners after the City Council study session, staff has adjusted the program with the following recommendations:

- Shortened distance from centerline on Main Street to 13 feet.

???? What does the fire department have to say about this?

4. page 6 “Allowing City staff to work with existing non-conforming decked parklet owners to identify long-term solutions for parklets.” What does this mean? Will some non-conforming parklets be able to avoid the new standards?

5. page 7 “Staff therefore further recommends discounting from that rate to \$3 per square foot to incentivize businesses to utilize funds that would otherwise have been applied to the fee to maintain and beautify their parklets.” Why are we afraid to charge so much less than any nearby cities? This is exactly why we need an economic analysis vs. saying there will be no fiscal impact! Residents have a right to know how much we might have to subsidize restaurants – in addition to giving up parking spaces and potentially hurting other businesses.

Pat Marriott

**Adelina Del Real**

**From:** Roberta Phillips <robertaphillips1@gmail.com>  
**Sent:** Thursday, April 6, 2023 1:47 PM  
**To:** Public Comment; City Council  
**Subject:** REACH Codes Public Comment Item #6 April 11 Council Meeting

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

**Categories:** Yellow category

Dear Council Members

I looked today , April 6th, for the report on the agenda for the REACH Codes, but it said "report forthcoming" . I know that people are writing to you supporting the new REACH Codes, but how do they know what is being proposed or w there is no report?

As you know, many people suffered from the recent power outages for days. No heat, no hot water, no internet, nowhere to critically, no way to use necessary medical equipment . Common sense tells us that we need as many sources of energy as pos gas, wind, solar and nuclear power. It is obvious the PG&E cannot handle the most basic demands. I read in Bloomberg recent needs \$9.3 Billion in Upgrades. <https://url.avanan.click/v2/> <https://financialpost.com/pmn/business-pmn/california-g-upgrade-in-renewables-shift>

<https://url.avanan.click/v2/> .YXAzOmxvc2FsdG9zY2E6YTpvOjA1MmRhMTNjYzg5OWRjYzEzYTgzYzU2ZWE4ZTJiNjhOjY6NGE4N2Q1NmU2NTM3NWRIYWQ4MmM2YzI2NjNkM2ZhODY5MmYwMWE4MDE5MmFIYTYwMTc3Mjc1ZG

In Addition, any requirements, forcing current homeowners to switch to all electric is an extremely expensive and time consu severe hardship for me and many other residents to spend \$40,000 to \$50.000 or more to convert to all electric for heat and who just put in a backup generator that cost \$30,000 just for the generator and installation

It is important that the City Council respect the needs of seniors,those on fixed income and low income families so that they c My husband who is 83 years old was unable to use his nebulizer to take his medication.

I built a fire in my fireplace to try to get warm. ( Which I had not used for years) and it set off the smoke alarms. I had made si fire department had to come and air out the house. I then had to spend \$425 to have the smoke/ carbon monoxide detectors department could not stop them from beeping. I lost food in my refrigerator . Many of my friends had to move to hotels.

I have heard Council members say that they are leaders. As leaders, you must consider that we felt like we were living in a thir need to do what we can to mitigate climate change, but not step over the fine line, supporting policies that are dangerous to i community. Requiring all electric for new construction is reasonable, but not banning natural gas furnaces and hot water heat It is time the City got a backup generator for thr Hillview Community Center and Grant Park Community Center. Residents of L and cooling centers .

I know that many ideas are aspirational, but you are the decision makers who should prioritize the safety of community memt OVERREACH

Sincerely  
Roberta Phillips  
650-941-6940

To LA Council Members

Mon 4/10/23

Agenda Item # 6.

Re: Making Parklets Permanent being considered  
a meeting on Tuesday 4/11/23

- I urge a "no" on permanent. I believe they have their value as we enjoy outdoor dining as well as indoor. However they need to be "reined in" and they
- ① need to pay real use fees to the city for taking of public property (street parking, sidewalk usage, blocking of city benches, etc.)
  - ② need to leave walking space that acomodates the width of 2 wheelchairs. ~~in oppo~~
  - ③ need to be located only in front of their business property.
  - ④ can in no way visually (ie. no canopies) block ~~#~~ or physically block their neighboring retail businesses

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Some restaurant locations might benefit by doing grasshopper construction over their current building and elevating their outdoor dining away from the traffic and creating patio dining above.

Jackie Stephens  
1535 Vineyard Dr. LA 94024  
iece\_vts@sprynet.com

**From:** [Couture, Terri](#)  
**To:** [Gabriel Engeland](#); [Public Comment](#)  
**Subject:** city council meeting tonite Agenda item 6  
**Date:** Tuesday, April 11, 2023 2:12:13 PM

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Dear Mr Engeland and City council members

Has the fire department reviewed your recommendations? I see NOTHING in the packet that shows they have signed off.

I beg of you to delay this, until the fire and police department can review the plans to make sure this plan meets safety standards!

Thank you  
Terri Couture

PS sorry for the lateness of this email, but with the full agenda not being posted until late on a holiday weekend, it was extremely difficult to read all the reports, do more research and comment in a timely manner.

Sent from [Mail](#) for Windows

**\*Wire Fraud is Real\*. Before wiring any money, call the intended recipient at a number you know is valid to confirm the instructions.** Additionally, please note that the sender does not have authority to bind a party to a real estate contract via written or verbal communication.



**AGENDA REPORT SUMMARY**

**Meeting Date:** April 11, 2023

**Subject:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

**Prepared by:** Tania Katbi, Sustainability Coordinator  
**Reviewed by:** Nick Zornes, Director of Development Services  
**Approved by:** Gabriel Engeland, City Manager

**Attachments:**

- 1. Draft Ordinance 2023-XX
- 2. Local Cost Analysis
- 3. State Cost-Effectiveness Studies (3)
- 4. Peer Jurisdiction Research

**Initiated by:**

Environmental Commission

**Previous Council Consideration:**

September 6, 2022

**Fiscal Impact:**

Proposed code requirements may result in a minor increase in building permit revenues and an increase in construction costs for EV charging infrastructure requirements.

**Environmental Review:**

This Ordinance has been assessed in accordance with the California Environmental Quality Act (Cal. Pub. Res. Code, § 21000 et seq.) (“CEQA”) and the State CEQA Guidelines (14 Cal. Code Regs. § 15000 et seq.) and is categorically exempt from CEQA under CEQA Guidelines, § 15061(b)(3), which exempts from CEQA any project where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment. Adoption of the proposed Ordinance would not be an activity with potential to cause significant adverse effect on the environment because the changes made to the California Green Buildings Standards Code within are enacted to provide more protection to the environment, and therefore is exempt from CEQA. It is also exempt from CEQA pursuant to CEQA Guidelines, § 15308

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**Reviewed By:**

City Manager  
GE

City Attorney  
JH

Finance Director  
JD



**Subject:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

which exempts actions taken by regulatory agencies for the enhancement and protection of the environment. As such, the Ordinance is categorically exempt from CEQA, and none of the circumstances set forth in CEQA Guidelines Section 15300.2 applies.

**Summary:**

Every three years, the State of California adopts new building standards that are organized in Title 24 of the California Code of Regulations, referred to as the California Building Standards Code (CBSC). On November 29<sup>th</sup>, 2022, the City adopted the 2022 CBSC with local amendments, which became effective on January 1, 2023. Cities can adopt local amendments also called Reach Codes, to building codes that have requirements that exceed minimum building code requirements. The proposed Reach Codes provide requirements that exceed the standards for the Energy Code and Green Building Standards Code.

On September 6, 2022, the Environmental Commission Reach Code Subcommittee went to City Council to present their Reach Code recommendations. Before adopting the proposed Reach Codes, City Council determined that further research was required by staff and provided additional direction on next steps. As suggested by staff and directed by City Council, the following has been completed:

1. Readoption of the existing Reach Codes that are not in conflict with the new 2022 California Building Codes.
2. Completion of a local cost effectiveness study (local cost analysis) based on recommendations of the Environmental Commission and determination of any fiscal impacts associated with code compliance.
3. Research on other peer and local agencies’ Reach Codes after the new State Codes took effect on 1/1/2023.

The local cost analysis, state cost-effectiveness studies, peer jurisdictions research, and the final Environmental Commission Reach Code policy recommendations are attached and summarized in this report.

**Recommendation**

The Environmental Commission recommends the City Council Introduce and Waive further reading of Ordinance No. 2023-XX to amend Los Altos Municipal Code Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code.”

**Purpose**

Amend Title 12 Buildings and Construction of Los Altos Municipal Code and adopt updated local amendments to the 2022 California Building Standards Code to align with City Council’s goals to reduce greenhouse gas emissions associated with buildings as written in the Climate Action and Adaption Plan (CAAP), improve indoor air quality and safety, and maintain consistency with other





**Subject:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

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local and peer cities. The ordinances will put into effect requirements that mandate newly constructed buildings to be all-electric with exceptions and require installation of electric vehicle charging infrastructure for new construction.

**Background**

On September 6, 2022, the Environmental Commission Reach Code Subcommittee presented the City Council with recommended Reach Codes to the 2022 California Building Standards Code. The recommendations consisted of:

1. All electric construction requirements for all new building types, with no exceptions;
2. All-electric construction requirements for substantial additions / modifications to existing buildings; and
3. Increased electric vehicle requirements for Single Family Residences, Multi-Family Residences, and other building types.

During the September 6, 2022, meeting, City Council directed staff to implement the following:

1. Staff recommends the completion of a cost effectiveness study (local cost analysis) based on the recommendations of the Environmental Commission on Reach Codes to determine or quantify any fiscal impacts associated with Code Compliance.
2. Staff recommends the City Council refer the recommended Codes to the California Energy Commission (CEC) for comment.
3. Staff recommends the City Council affirm or re-adopt the current Reach Codes to continue after 12/31/2022, should the CEC review or cost effectiveness study not be completed by this date. The State Codes will pre-empt local ordinances that are not adopted again after this date.
4. Staff recommends the City Council direct staff to review what other peer and local agencies have adopted with regards to Reach Codes after the new State Codes take effect on 1/1/2023.

At the February 13, 2023, Environmental Commission meeting, City staff presented their findings and changes to the Commission’s proposed Reach Codes. The Commission also discussed, refined, and accepted the policy recommendations that are presented within this Staff Report.

**Discussion**

California Health and Safety Code Sections 17958.7 and 18941.5 authorize cities to adopt the California Building Standards Code with modifications determined to be reasonably necessary because of local climatic, geological, or topographical conditions. As directed by the City Council, staff is providing additional amendments to the Los Altos Municipal Code based on the recommendations of the Environmental Commission, which were presented at the September 6, 2022, meeting. The local amendments included within the draft ordinance incorporates the Reach Code provisions that are not in conflict with the 2022 California Building Standards Code.



**Subject:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

The citizens and government of Los Altos have a long history of bold and forward-looking climate action. In addition, on March 8, 2022, City Council approved the City’s Climate Action and Adaptation Plan, in which the following action items were set forth:

- 2.2A: Adopt evolving Reach Codes and expand to include large additions/major remodels
- 1.4B: Actively promote EV adoption and require EV-only parking
- 1.5A: Increase the number of available Level 2 EV charging stations in workplace, commercial, and multifamily areas
- 1.5C: Expand the current Electric Vehicle charging and pre-wiring requirements in future Reach Code updates

Electrifying new residential and non-residential buildings and increasing electric vehicle charging infrastructure are important components of reducing greenhouse gas emissions and addressing the local climatic, geological, or topographical conditions.

To align with the above, the Environmental Commission has proposed Reach Codes for the Energy Code and Green Building Standards Code.

**Reach Code Recommendations**

The recommended Reach Codes put forth by the Environmental Commission will require more restrictive building electrification and EV requirements based largely on the Bay Area Model Reach Code. During the review of the initial recommendations, staff considered the environmental benefits, alignment with CAAP Goals, alignment with Reach Codes in neighboring jurisdictions, EV short-term and long-term demand, feasibility of implementation and impacts on the permit review process.

The following tables are comparisons of the current Los Altos Reach Code, 2022 CA Building Standards Code, Bay Area Model Code, and proposed Environmental Commission recommendations:

**Building Electrification Reach Codes**

<b>Building Type</b>	<b>Current Los Altos Reach Code</b>	<b>2022 CA Building Standards Code</b>	<b>Bay Area Model Reach Code</b>	<b>Commission Recommendation</b>
Single-Family	All-electric, exceptions for cooking and fireplaces	Mixed-fuel	All-electric, no exceptions	All-electric, no exceptions
Multi-Family	All-electric,	Mixed-fuel	All-electric,	All-electric,





**Subject:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

	exceptions for cooking and fireplace		no exceptions	no exceptions
Non-Residential	All-electric, <u>automatic exception</u> for for-profit restaurants.  Non-residential buildings, laboratories, public buildings <u>may apply for an exception.</u>	Mixed-fuel	All-electric, no exceptions	All-electric, non-residential buildings, for-profit restaurants, laboratories, public buildings <u>may apply for an exception.</u>

In addition to the recommendations in the table above, the Environmental Commission recommends:

- Including a 50% requirement in the new construction definition for projects that include a substantial addition or alteration. If this 50% rule is triggered for an addition or alteration project, existing exterior gas infrastructure is not required to be electrified,
- Including a project valuation threshold of \$250,000 that would trigger all-electric building requirements, and
- Extension of gas infrastructure, including but not limited to gas infrastructure to support interior or exterior gas appliances, is not permitted.

**Electric Vehicle Reach Codes**

Building Type	Current Los Altos Reach Code	2022 CA Building Standards Code	Bay Area Model Reach Code	Commission Recommendation
Single-Family	<ul style="list-style-type: none"> <li>• Level 2 EV Ready space</li> <li>• (1) Level 2 EV Ready for 2+ spaces</li> </ul>	<ul style="list-style-type: none"> <li>• (1) EV Capable</li> </ul>	<ul style="list-style-type: none"> <li>• Level 2 EV Ready space</li> <li>• (1) Level 1 EV Ready</li> </ul>	<ul style="list-style-type: none"> <li>• No Change</li> </ul>
Multi-Family	<ul style="list-style-type: none"> <li>• 25% Level 2 EV Capable</li> <li>• 75% Level 2 EV Ready</li> </ul>	<p><b>&lt; 20 units:</b> 10% EV Capable 25% EV Ready</p> <p><b>&gt; 20 units:</b> 10% EV Capable 25% EV Ready 5% EVCS</p>	<p><b>Option A:</b> 15% Level 2 EVCS + 85% Level 2 EV Ready (low power)</p> <p><b>Option B:</b> 40% Level 2 EVCS 60% Level 1 EV Ready</p>	<p><b>Option A:</b> 15% Level 2 EVCS + 85% Low Power Level 2 EV Ready</p>



**Subject:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

Hotels and Motels	<ul style="list-style-type: none"> <li>• 25% Level 2 EV Capable</li> <li>• 75% Level 2 EV Ready</li> </ul>	<p><b>&lt; 20 units:</b> 10% EV Capable 25% EV Ready</p> <p><b>&gt; 20 units:</b> 10% EV Capable 25% EV Ready 5% EVCS</p>	<ul style="list-style-type: none"> <li>• 5% Level 2 EVCS</li> <li>• 25% Low Power Level 2 EV Ready</li> <li>• 10% Level 2 EV Capable</li> </ul>	<ul style="list-style-type: none"> <li>• 10% Level 2 EVCS</li> <li>• 30% Low Power Level 2 EV Ready</li> <li>• 60% Level 2 EV Capable</li> </ul>
Office & Institutional	<p>(&gt; 10 spaces)</p> <ul style="list-style-type: none"> <li>• 50% Level 2 EVCS</li> <li>• 20% Level 1 EV Ready</li> <li>• 30% Level 2 EV Capable</li> </ul>	Based on total number of parking spaces (see CGBC Table 5.106.5.3.1)	<ul style="list-style-type: none"> <li>• 20% Level 2 EVCS</li> <li>• 30% Level 2 EV Capable</li> </ul>	<p>(&gt; 10 spaces)</p> <ul style="list-style-type: none"> <li>• 50% Level 2 EVCS</li> <li>• 20% Level 2 Low Power EV Ready</li> <li>• 30% Level 2 EV Capable</li> </ul>
Non-Residential	<p>(&gt; 10 spaces)</p> <ul style="list-style-type: none"> <li>• 6% Level 2 EVCS</li> <li>• 5% at least Level 1 EV Ready</li> </ul>	Based on total number of parking spaces (see CGBC Table 5.106.5.3.1)	<ul style="list-style-type: none"> <li>• 10% Level 2 EVCS</li> <li>• 10% Level 2 EV Capable</li> </ul>	<ul style="list-style-type: none"> <li>• 10% Level 2 EVCS</li> <li>• 40% Level 2 Capable</li> </ul>

In addition to the recommendations in the table above, the Environmental Commission recommends that for an existing building parking addition, alteration, or renovation, 10% of the total number of parking spaces added or altered shall be Level 2 EVCS. Additionally, any existing EV Capable spaces on the building property should be upgraded to a minimum of Level 2 EV Ready.

Findings:

Peer Jurisdiction Research: Staff collected data on fifteen local jurisdictions. Based on research, the Environmental Commission’s proposed modifications are consistent with those adopted by peer and local jurisdictions in the area as follows:

- 53% of jurisdictions include a 50% rule for additions or alterations,
- 73% of jurisdictions include 50% or 75% rules for additions or alterations,
- 60% of jurisdictions require all electric with no exceptions for Residential buildings, and
- 80% of jurisdictions require all electric with exceptions for Non-Residential buildings.

Local Cost Analysis: City staff worked with three independent contractors to provide estimated costs for the installation of electric appliances that could be triggered by the proposed 50% rule for additions or alterations. The analysis is based on a scenario project that adds or alters at least 50% of the existing structure in a 3,500 square foot home (average home size in Los Altos) and



**Subject:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

has the following gas appliances: furnace, water heater, stove/cooktop, dryer, indoor/outdoor fireplace, outdoor cooktop/grill, and pool/spa heater.

The installation costs provided in the attachment reflect the estimated costs received from all three contractors. Since estimates represent an ideal environment when contractors do not have excessive workloads, it is possible that the actual cost of installation could be 20-25% higher. In addition, hardware costs for the appliances show a range of prices for standard appliances and do not reflect potential available rebates.

Statewide Cost-Effectiveness Studies: Statewide Cost-Effectiveness Studies were conducted by Pacific Gas and Electric Company and Southern California Edison and funded by the California utility customers under the support of the California Public Utilities Commission. Three studies were conducted that each used energy and cost-based approaches to evaluate the cost-effectiveness of various energy measures for new construction of specific building types that exceed the minimum state requirements.

1. Single-family New Construction: The first study analyzes traditional detached single family and detached accessory dwelling unit (ADUs) building types and evaluates mixed fuel and all-electric package options in all sixteen California climate zones (CZs).
2. Multi-family New Construction: The second study analyzes low-rise and mid-rise multi-family building types and evaluates mixed fuel and all electric options in sixteen CZs.
3. Non-residential New Construction: The third study analyzes various scenarios for common non-residential new construction buildings under various measures (Medium Office, Medium Retail, Quick-Service Restaurant, and Small Hotel).

If the Reach Codes are to be adopted by City Council, staff will file the local amendments with California Energy Commission (CEC), including the SVCE cost-effectiveness studies, to demonstrate that the amendments to the code are financially responsible and do not represent an unreasonable burden to the residential and non-residential applicants.

Options:

1. Approve the Environmental Commission’s Reach Codes as presented above and move to Introduce and Waive further reading of the Ordinance.
2. Do not amend Title 12 Buildings and Construction Chapter 12.22 Energy Code and Chapter 12.26 Green Building Code of the Los Altos Municipal Code as proposed and keep existing Reach Codes.
3. Provide additional information and/or direction to staff on the proposed Reach Codes.



**Subject:** Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

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**Recommendation/Possible Action:**

Introduce and Waive further reading of Ordinance No. 2023-XX to Amend Los Altos Municipal Code, Chapter 12.22 “Energy Code” and Chapter 12.26 “Green Building Code”

**ORDINANCE NO. 2023-XX**

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF LOS ALTOS  
AMENDING TITLE 12 OF THE MUNICIPAL CODE BY REPEALING  
CHAPTERS 12.22 AND 12.26 AND ADDING NEW CHAPTERS 12.22 AND 12.26  
TO ADOPT LOCAL AMENDMENTS FURTHER IMPLEMENTING THE  
CITY’S CLIMATE ACTION AND ADAPTATION PLAN (CAAP)**

**WHEREAS**, The California Building Standards Commission has published the California Building Standards Code, 2022 edition, as provided in the California Code of Regulations, Title 24, and these State mandated regulations went into effect January 1, 2023; and

**WHEREAS**, California Health and Safety Code Sections 17958.7 and 18941.5 authorize cities to adopt the California Building Standards Code with modifications determined to be reasonably necessary because of local climatic, geological or topographical conditions; and

**WHEREAS**, adoption of these updated versions of the California Code of Regulations, with local amendments as set forth in this ordinance, are necessary to enhance and safeguard public health, safety, general welfare and to provide safety to firefighters and emergency responders during emergency operations as required by the City’s unique climatic, geological and topographical conditions; and

**WHEREAS**, the Ordinance amendments set forth below have been reviewed and considered by the City Council in accordance with the provisions of the California Environmental Quality Act of 1970, as amended (“CEQA”), and the guidelines promulgated thereunder and, further, said Council finds that it can be seen with certainty that there is no possibility that said amendments may have a significant effect on the environment and said amendments are therefore exempt from the requirements of the CEQA pursuant to the provisions of Section 15061(b)(3) of Division 6 of Title 14 of the California Code of Regulations.

**NOW THEREFORE**, the City Council of the City of Los Altos does hereby ordain as follows:

**SECTION 1. AMENDMENT OF CODE:** Title 12, Chapter 12.22, of the Municipal Code is hereby repealed.

**SECTION 2. AMENDMENT OF CODE:** A new Title 12, Chapter 12.22 of the Municipal Code is hereby added to read as follows:

**Chapter 12.22 ENERGY CODE**

**12.22.010 Adoption of the California Energy Code.**

The 2022 California Energy Code, contained in the California Code of Regulations, Title 24, Part 6, published by the International Code Council, and each and all of its regulations and provisions was duly adopted by reference by Ordinance No. 2022-487. One copy is on file for use and examination by the public in the office of the building official.

**12.22.020 Amendments for all-electric buildings.**

City of Los Altos local amendments to the 2022 California Energy Code. Upon adoption of Ordinance 2022-487 and this Code in the event that there is any conflict between local amendments and the 2022 California Energy Code the most restrictive shall prevail.

- A. Amend Section 100.1(b) of the Energy Code by adding the following definitions to read as follows:

**ALL-ELECTRIC BUILDING.** A building that contains no combustion equipment or plumbing for combustion equipment within the building or building property lines.

**COMBUSTION EQUIPMENT.** Any equipment or appliance used for space heating, water heating, cooking, clothes drying and/or lighting that uses fuel gas.

**FUEL GAS.** A gas that is natural, manufactured, liquefied petroleum, or a mixture of these.

**NEWLY CONSTRUCTED BUILDING.** (Applicable to Chapter 12.22 Energy Code Section 12.22.020 Amendments) For the purposes of All-Electric Building requirements, "newly constructed buildings" shall include the buildings defined in Section 100.1 as well as the following:

- 1. Newly constructed additions or alterations where greater than fifty (50) percent of the sum total of the footings and foundation, roof-framing, or exterior walls are added, removed, replaced or relocated for purposes other than a repair or reinforcement as defined in California Existing Building Code Section 202 shall be considered “new construction”. If any of these criteria are met within a three (3) year period, measured from the date of permit issuance of past additions and/or alterations, the project shall be subject to the all-electric building requirements. The Building Official shall make the final determination regarding the application of this section.

Tenant improvements shall not be considered new construction. The final determination whether a project meets the definition of substantial reconstruction/alteration shall be made by the local enforcing agency.

- 2. **VALUATION THRESHOLD.** For the purpose of this chapter, additions and alterations projects with a valuation of over \$250,000 shall be considered “new construction”. If this criteria is met within a three (3) year period, measured from the date of permit issuance of past additions and/or alterations, the project shall be subject to the all-electric building requirements.

**PUBLIC BUILDING** is a building used by the public for any purpose, such as municipal buildings and education.

**SCIENTIFIC LABORATORY BUILDING** is a building or area where research, experiments, and measurement in medical, life, and physical sciences are performed and/or stored requiring examination of fine details. The building may include workbenches, countertops, scientific instruments, and supporting offices.

**B.** Amend Section 100.0(e)2.A. of the Energy Code to read as follows:

**2. Newly constructed buildings.**

- A. Sections 110.0 through 110.12 apply to all newly constructed buildings within the scope of Section 100.0(a). In addition, newly constructed buildings shall meet the requirements of Subsections B, C, D or E, as applicable and shall be an all-electric building as defined in Section 100.1(b).

**Exception:** Non-residential buildings, including non-residential buildings containing for-profit restaurants open to the public, Scientific Laboratory Buildings and Public Buildings, may apply to the Building Division of the Los Altos Development Services Department for an exception to install a non-electric fueled appliance or piece of equipment. The Building Division of the Los Altos Development Services Department shall grant an exception if they find the following conditions are met:

- i. The applicant shows that there is a public or business-related need that cannot be reasonably met with an electric fueled appliance or piece of equipment.
- ii. The applicant complies with the pre-wiring provisions to the non-electric appliance or piece of equipment as noted in this subsection.

The decision of the Building Division of the Los Altos Development Services Department shall be final unless the applicant appeals the decision to the City Manager or their designee within 14 days of the date of the decision. The City Manager's or their designee's decision on the appeal shall be final.

**Wiring to accommodate future electric appliances or equipment.**

- i. If a non-electric appliance or piece of equipment is allowed to be installed, the appliance or equipment location must also be electrically pre-wired for future electric appliance or equipment installation, including:
  - a. A dedicated circuit, phased appropriately, with a minimum amperage requirement for a comparable electric appliance with an electrical receptacle or junction box that is connected to the electric panel with conductors of adequate capacity, extending to within 3 feet of the appliance and accessible with no obstructions. Appropriately sized conduit may be installed in lieu of conductors; and
  - b. Both ends of the unused conductor or conduit shall be labeled with the words "For Future Electric appliance or equipment" and be electrically isolated; and
  - c. A reserved circuit breaker space shall be installed in the electrical panel adjacent to the circuit breaker for the branch circuit and labeled for each circuit, an example is as follows (i.e. "For Future Electric Range;"); and
  - d. All electrical components, including conductors, receptacles, junction boxes, or blank covers, related to this section shall be installed in accordance with the California Electrical Code.



**12.22.030 Prohibitions**

**Exterior Gas Infrastructure.**

- i. Existing fuel gas infrastructure shall not be extended to any appliance, system or device within the building or building property. Inactive fuel gas infrastructure shall not be activated or otherwise operated.

**Prohibition on Conversion to Mixed-Fuel Buildings**

- i. No building that is required to be constructed as an All-Electric building, or that currently uses electricity as its sole fuel source for appliances, space conditioning systems, water heating systems, pool and spa systems, or any other building systems, shall be altered or modified to use any fuel source other than electricity for appliances, space conditioning systems, water heating systems, pool and spa systems, or any other building systems.

**SECTION 3. AUTHORITY AND FINDINGS.**

The following findings support that the above amendments and modifications are reasonably necessary because of local climatic, geological, or topographical conditions:

The City of Los Altos is located in Climate Zone 4 as established in the 2022 California Energy Code. Climate Zone 4 includes Santa Clara County, San Benito County, portions of Monterey County and San Luis Obispo. The City experiences an average of 19 inches of precipitation per year. In Los Altos, January is the rainiest month of the year while July is the driest month of the year. Temperatures average about 80 degrees Fahrenheit in the summer and about 40 degrees Fahrenheit in the winter. These climatic conditions along with the effects of climate change caused by Green House Gas (GHG) emissions generated from burning natural gas to heat buildings and emissions from Vehicle Miles Traveled results in an overall increase in global average temperature. Higher global temperatures are contributing to rising sea levels, record heat waves, droughts, wildfires, and floods.

The above local amendments to the 2022 California Energy Code are necessary to combat the ever-increasing harmful effects of global climate change. Implementation of the proposed code amendments will achieve decarbonization and provide an accelerated path to reduce GHG emissions. The proposed Ordinance containing these amendments would ensure that new buildings use cleaner sources of energy which helps meet the goal of cutting carbon emissions in half by 2030.

All-electric building design benefits the health, welfare, and resiliency of Los Altos and its residents.

**SECTION 4. AMENDMENT OF CODE:** Title 12, Chapter 12.26 of the Municipal Code is hereby repealed.

**SECTION 5. AMENDMENT OF CODE:** A new Title 12, Chapter 12.26 of the Municipal Code is hereby added to read as follows:



**Chapter 12.26 CALIFORNIA GREEN BUILDING STANDARDS CODE**

City of Los Altos local amendments to the 2022 California Green Building Standards Code. Upon adoption of Ordinance No. 2022-487 and this Code in the event that there is any conflict between local amendments and the 2022 California Green Building Standards Code the most restrictive shall prevail.

**Section 12.26.010 Adoption of the California Green Building Standards Code**

The 2022 California Green Building Standards Code, contained in the California Code of Regulations, Title 24, Part 11, published by the International Code Council, and each and all of its regulations and provisions was duly adopted by reference by Ordinance No. 2022-487. One copy is on file for use and examination by the public in the office of the Building Official.

**Section 12.26.020 Amendments, Additions or Deletions**

The 2022 California Green Building Standards Code referred to in Section 12.26.010 is adopted, together with Chapters 1 Administration, 3 Green Building, 4 Residential Mandatory Measures, and 5 Nonresidential Mandatory Measures, of the 2022 California Green Building Standards Code, with the following amendments as follows:

Chapter 1 Section 102.4 Scope and Mandatory Compliance is hereby added to read as follows.

**Section 102.4 Scope and Mandatory Compliance**

- A. This Code contains both mandatory and voluntary green building measures. Mandatory and voluntary measures are identified in the appropriate chapters contained in this Code. Compliance measures and methods shall be by one of the following measures approved by the Building Official.

The means by which compliance measures are achieved shall be mandatory measures with appendix sections voluntarily applied, building division mandatory check list, whole house Build it Green GreenPoint check list, LEED, other recognized point systems, Title 24 Part 6 Energy Efficiency Standards, or equivalent approved methods. Green Building Compliance measures in addition to checklists shall be incorporated into the project drawings approved by the Building Official prior to building permit submittal.

Prior to issuance of a building permit, the owner or responsible Registered Design Professional acting as the owner’s agent shall employ and/or retain a Qualified Green Building Professional to the satisfaction of the Building Official, and prior to final inspection shall submit verification that the project is in compliance with this code.

Chapter 3, Section 301.1.1 is amended to read as follows:

**301.1.1 Additions and Alterations**

[HCD] The mandatory provisions of Chapter 4 shall be applied to additions or alterations of existing residential buildings where the addition or alteration increases the building’s conditioned area, volume or size. The requirements shall apply only to and/or within the

specific area of the addition or alteration.

The mandatory provisions of Section 4.106.4.2 may apply to additions or alterations of existing parking facilities or the addition of new parking facilities serving existing multifamily buildings. See Section 4.106.4.2.2 for application.

**Add or amend Section 4.106.4 to read as follows:**

**4.106.4 Electric Vehicle (EV) Charging - Residential.** Residential construction shall comply with Section 4.106.4.1 or 4.106.4.2, and 4.106.4.3, to facilitate future installation and use of EV chargers. Electric vehicle supply equipment (EVSE) shall be installed in accordance with the California Electrical Code, Article 625. For EVCS signs, refer to Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Markings) or its successor(s). Calculation for spaces shall be rounded up to the nearest whole number.

**Exceptions:**

1. Accessory Dwelling Units (ADU) and Junior Accessory Dwelling Units (JADU) without additional parking facilities and without electrical panel upgrade or new panel installation. Detached ADUs, attached ADUs, and JADUs without additional parking but with electrical panel upgrades or new panels must have reserved breakers and electrical capacity according to the requirements of 4.106.4.1.

**4.106.4.1 One- and Two-Family Dwellings and Townhouses with Dedicated Off-Street Parking Spaces.**

**4.106.4.1.1 New Construction.** One parking space provided shall be a Level 2 EV Ready space. If a second parking space is provided, it shall be provided with a Level 2 EV Ready space. ALMS shall be permitted to reduce load when multiple vehicles are charging.

**4.106.4.1.2. Existing Building.** Parking additions or electrical panel upgrades must have reserved breaker spaces and electrical capacity according to the requirements of 4.106.4.1.1.

**4.106.4.2 Multifamily Dwellings with Residential Parking Facilities.** Requirements apply to parking spaces that are assigned or leased to individual dwelling units, as well as unassigned residential parking. Visitor or common area parking is not included.

**4.106.4.2.1 New Construction.** Fifteen percent (15%) of dwelling units with parking spaces shall be Level 2 EVCS. ALMS shall be permitted to reduce load when multiple vehicles are charging. Eighty-five percent (85%) of dwelling units with parking spaces shall be provided with a Low Power Level 2 EV Ready space. EV ready spaces and EVCS in multifamily developments shall comply with California Building Code, Chapter 11A, Section 1109A. EVCS shall comply with the accessibility provisions for EV chargers in the California Building Code, Chapter 11B.

Note: The total number of EV spaces should be one-hundred percent (100%) of dwelling units or one-hundred percent (100%) of residential parking spaces, whichever is less.

**Exceptions:**

- 1. When EV chargers (Level 2 EVSE) are installed in a number equal to or greater than the required number of EV Ready.
- 2. When EV chargers (Level 2 EVSE) are installed in a number less than the required number of EV Ready spaces, the number of EV Ready spaces required may be reduced by a number equal to the number of EV chargers installed.

**4.106.4.2.2 Existing Buildings.**

- 1. When new parking facilities are added, or electrical systems or lighting of existing parking facilities are added or altered and the work requires a building permit, ten percent (10%) of the total number of parking spaces added or altered shall be EVCS. Additionally, EV Capable spaces on the building property required by the locally adopted codes at the time of building permit shall be upgraded to a minimum of Level 2 EV Ready. Upgrades shall be required at currently designated vehicle parking spaces. Upgrades shall be required for remaining parking spaces after meeting the accessibility requirements of California Building Code Chapters 11A and 11B.
- 2. When new parking facilities are added and ALMS is installed, the ALMS system must be designed to deliver no less than 2.2 kVa (110/120 volt, 20-ampere).

**4.106.4.3 Electric vehicle charging stations (EVCS).**

Electric vehicle charging stations required by Section 4.106.4.2 shall comply with Section 4.106.4.3.

**Exception:** Electric vehicle charging stations serving public accommodations, public housing, motels, and hotels shall not be required to comply with this section. See California Building Code, Chapter 11B, for applicable requirements.

**4.106.4.3.1 Location.**

EVCS shall comply with at least one of the following options:

- 1. The charging space shall be located adjacent to an accessible parking space meeting the requirements of the California Building Code, Chapter 11A, to allow use of the EV charger from the accessible parking space.
- 2. The charging space shall be located on an accessible route, as defined in the California Building Code, Chapter 2, to the building.

Exception: Electric vehicle charging stations designed and constructed in compliance with the California Building Code, Chapter 11B, are not required to comply with Section 4.106.4.3.1 and Section 4.106.4.3.2, Item 3.

**4.106.4.3.2 Dimensions.**

The charging spaces shall be designed to comply with the following:

1. The minimum length of each EV space shall be 18 feet (5486 mm).
2. The minimum width of each EV space shall be 9 feet (2743 mm).
3. One in every 25 charging spaces, but not less than one, shall also have an 8- foot (2438 mm) wide minimum aisle. A 5-foot (1524 mm) wide minimum aisle shall be permitted provided the minimum width of the EV space is 12 feet (3658 mm).
  - a. Surface slope for this EV space and the aisle shall not exceed 1 unit vertical in 48 units horizontal (2.083 percent slope) in any direction.

**Exception:** Where the City’s Municipal or Zoning Code permits parking space dimensions that are less than the minimum requirements stated in this section 4.106.4.3.2, and the compliance with which would be infeasible due to particular circumstances of a project, an exception may be granted while remaining in compliance with California Building Code Section Table 11B-228.3.2.1 and 11B-812, as applicable.

**4.106.4.4 Direct current fast charging stations.** One DCFC may be substituted for up to five (5) EVCS to meet the requirements of 4.106.4.1 and 4.106.4.2. Where ALMS serves DCFC stations, the power demand from the DCFC shall be prioritized above Level 1 and Level 2 spaces.

**Add or amend Section 5.106.3 to read as follows:**

**5.106.5.3 Electric Vehicle (EV) Charging - Nonresidential.** Construction to provide electric vehicle infrastructure and facilitate electric vehicle charging shall comply with Section 5.106.5.3.1 and shall be provided in accordance with regulations in the California Building Code and the California Electrical Code. Accessible EVCS shall be provided in accordance with the California Building Code Chapter 11B Section 11B-228.3. For EVCS signs, refer to Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Markings) or its successor(s). Calculation for spaces shall be rounded up to the nearest whole number.

**5.106.5.3.1 Office and Institutional Buildings**

**5.106.5.3.1.1 New Construction.** (>10 spaces) Fifty percent (50%) of parking spaces provided shall be Level 2 EVCS. ALMS shall be permitted to reduce load when multiple vehicles are charging. Twenty percent (20%) Level 2 Low Power EV Ready, thirty percent (30%) Level 2 EV Capable.

**5.106.5.3.1.2 Existing Buildings.** When new parking facilities are added, or electrical systems or lighting of existing parking facilities are added or altered and the work requires a building permit, ten percent (10%) of the total number of parking spaces added or altered shall be EVCS with Level 2 EV Ready. Additionally, any existing EV Capable spaces on the building property required by the locally adopted codes at the time of building permit shall be upgraded to a minimum of Level 2 EV Ready. Upgrades shall be required at currently designated vehicle parking spaces. Upgrades shall be required for remaining

parking spaces after meeting the accessibility requirements of California Building Code Chapters 11A and 11B.

**5.106.5.3.2 Hotel and Motel Occupancies**

**5.106.5.3.2.1 New Construction.** Ten percent (10%) Level 2 EVCS. ALMS shall be permitted to reduce load when multiple vehicles are charging. Thirty percent (30%) Level 2 Low Power EV Ready, sixty percent (60%) Level 2 EV Capable.

**5.106.5.3.3.2 Existing Buildings.** When new parking facilities are added, or electrical systems or lighting of existing parking facilities are added or altered and the work requires a building permit, ten percent (10%) of the total number of parking spaces added or altered shall be EVCS with Level 2 EV Ready. Additionally, EV Capable spaces on the building property required by the locally adopted codes at the time of building permit shall be upgraded to a minimum of Level 2 EV Ready. Upgrades shall be required at currently designated vehicle parking spaces. Upgrades shall be required for remaining parking spaces after meeting the accessibility requirements of California Building Code Chapters 11A and 11B.

**5.106.5.3.3 All Other Nonresidential Occupancies**

**5.106.5.3.3.1 New Construction.** Ten percent (10%) of parking spaces provided shall be Level 2 EVCS. ALMS shall be permitted to reduce load when multiple vehicles are charging. Forty percent (40%) of parking spaces provided shall be Level 2 EV Capable.

**5.106.5.3.3.2 Existing Buildings.** When new parking facilities are added, or electrical systems or lighting of existing parking facilities are added or altered and the work requires a building permit, ten percent (10%) of the total number of parking spaces added or altered shall be EVCS with Level 2 EV Ready. Additionally, EV Capable spaces on the building property required by the locally adopted codes at the time of building permit shall be upgraded to a minimum of Level 2 EV Ready. Upgrades shall be required at currently designated vehicle parking spaces. Upgrades shall be required for remaining parking spaces after meeting the accessibility requirements of California Building Code Chapters 11A and 11B.

**5.106.5.3.4 Direct current fast charging stations.** One DCFC may be substituted for up to five (5) EVCS to meet the requirements of 5.106.5.3.1, 5.106.5.3.2, and 5.106.5.3.3. Where ALMS serve DCFC stations, the power demand from the DCFC shall be prioritized above Level 1 and Level 2 spaces.

**Section 12.26.030 Definitions**

**AUTOMATIC LOAD MANAGEMENT SYSTEMS (ALMS).** A control system which

allows multiple EV chargers or EV-Ready electric vehicle outlets to share a circuit or panel and automatically reduce power at each charger, providing the opportunity to reduce electrical infrastructure costs and/or provide demand response capability. ALMS systems must be designed to deliver at least 1.4kW to each EV Capable, EV Ready or EVCS space served by the ALMS. The connected amperage on-site shall not be lower than the required connected amperage per Part 11, 2019 California Green Building Code for the relevant building types.

**BUILD IT GREEN.** Build It Green is a California professional non-profit membership organization whose mission is to promote healthy, energy and resource-efficient buildings.

**DIRECT CURRENT FAST CHARGING (DCFC).** A parking space provided with electrical infrastructure that meets the following conditions:

- i. A minimum of 48 kVa (480 volt, 100-ampere) capacity wiring.
- ii. Electric vehicle supply equipment (EVSE) located within three (3) feet of the parking space providing a minimum capacity of 80-ampere.

**ELECTRIC VEHICLE CHARGING STATION (EVCS).** A parking space that includes installation of electric vehicle supply equipment (EVSE) at an EV Ready space. An EVCS space may be used to satisfy EV Ready space requirements. EVSE shall be installed in accordance with the California Electrical Code, Article 625.

**ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE).** The conductors, including the ungrounded, grounded and equipment grounding conductors and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

**GREEN POINT RATED.** Rating system developed by Build It Green.

**LEED.** "Leadership in Energy and Environmental Design" program developed by the U.S. Green Building Council. The U.S. Green Building Council is a National professional non-profit membership organization whose mission is to promote buildings that are environmentally responsible.

**LEED ACCREDITED PROFESSIONAL.** A person or organization determined by the Building Official to be qualified to perform inspections and provide documentation to assure compliance with the U.S. Green Building Council LEED requirements.

**LEVEL 2 EV CAPABLE.** A parking space provided with electrical infrastructure that meets the following requirements:

- i. Conduit that links a listed electrical panel with sufficient capacity to a junction box or receptacle located within three (3) feet of the parking space.
- ii. The conduit shall be designed to accommodate at least 8.3 kVa (208/240 volt, 40-ampere) per parking space. Conduit shall have a minimum nominal trade size of 1 inch inside diameter and may be sized for multiple circuits as allowed by the California Electrical Code. Conduit shall be installed at a minimum in spaces that will be inaccessible after construction, either trenched underground or where penetrations to walls, floors, or other partitions would otherwise be required for

future installation of branch circuits, and such additional elements deemed necessary by the Building Official. Construction documents shall indicate future completion of conduit from the panel to the parking space, via the installed inaccessible conduit.

- iii. The electrical panel shall reserve a space for a 40-ampere overcurrent protective device space(s) for EV charging, labeled in the panel directory as “EV CAPABLE.”
- iv. Electrical load calculations shall demonstrate that the electrical panel service capacity and electrical system, including any on-site distribution transformer(s), have sufficient capacity to simultaneously charge all EVs at all required EV spaces at a minimum of 40 amperes.
- v. The parking space shall contain signage with at least a 12” font adjacent to the parking space indicating the space is EV Capable.

**LEVEL 2 EV READY.** A parking space that is served by a complete electric circuit with the following requirements:

- i. A minimum of 8.3 kVa (208/240 volt, 40-ampere) capacity wiring.
- ii. A receptacle labeled “Electric Vehicle Outlet”, or electric vehicle supply equipment located within three (3) feet of the parking space. If EVSE is provided the minimum capacity of the EVSE shall be 30-ampere.

**LOW POWER LEVEL 2 EV READY.** A parking space that is served by a complete electric circuit with the following requirements:

- i. A minimum of (208/240 Volt, 20-ampere) capacity wiring.
- ii. A receptacle labeled “Electric Vehicle Outlet”, or electric vehicle supply equipment located within three (3) feet of the parking space. If EVSE is provided the minimum capacity of the EVSE shall be 16-ampere.
- iii. Conduit oversized to accommodate future Level 2 EV Ready (208/240 volt, 40-ampere) at each parking space.

**QUALIFIED GREEN BUILDING PROFESSIONAL.** A person trained through the USGBC as a "LEED AP" (accredited professional), or through Build It Green as a GreenPoint Rater, or other qualifications when acceptable to the Building Official. A certified green building professional, architect, designer, builder, or building inspector may be considered a qualified green building professional when determined appropriate by the Building Official.

**SECTION 6. AUTHORITY AND FINDINGS.**

The following findings support that the above amendments and modifications are reasonably necessary because of local climatic, geological, or topographical conditions:

The City of Los Altos is located in Climate Zone 4 as established in the 2019 California Energy Code. Climate Zone 4 includes Santa Clara County, San Benito County, portions of Monterey County and San Luis Obispo. The City experiences an average of 19 inches of precipitation per year. In Los Altos, January is the rainiest month of the year while July is the driest month of the year. Temperatures average about 80 degrees Fahrenheit in the summer and about 40 degrees Fahrenheit in the winter. These climatic conditions along

with the effects of climate change caused by Green House Gas (GHG) emissions generated from burning natural gas to heat buildings and emissions from Vehicle Miles Traveled results in an overall increase in global average temperature. Higher global temperatures are contributing to rising sea levels, record heat waves, droughts, wildfires, and floods.

The above local amendments to the 2022 California Green Building Standards Code are necessary to combat the ever-increasing harmful effects of global climate change. Implementation of the proposed code amendments will achieve decarbonization and provide an accelerated path to reduce GHG emissions. The proposed Ordinance containing these amendments would ensure that new buildings use cleaner sources of energy which helps meet the goal of cutting carbon emissions in half by 2030.

Increased Electric Vehicle Infrastructure integrated into building design benefits the health, welfare, and resiliency of Los Altos and its residents.

**SECTION 7. CEQA.** The City Council hereby finds and determines that this Ordinance has been assessed in accordance with the California Environmental Quality Act (Cal. Pub. Res. Code, § 21000 et seq.) (“CEQA”) and the State CEQA Guidelines (14 Cal. Code Regs. § 15000 et seq.) and is categorically exempt from CEQA under CEQA Guidelines, § 15061(b)(3), which exempts from CEQA any project where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment. Adoption of the proposed Ordinance would not be an activity with potential to cause significant adverse effect on the environment because the changes made to the California Green Buildings Standards Code within are enacted to provide more protection to the environment, and therefore is exempt from CEQA. It is also exempt from CEQA pursuant to CEQA Guidelines, § 15308 which exempts actions taken by regulatory agencies for the enhancement and protection of the environment. As such, the Ordinance is categorically exempt from CEQA, and none of the circumstances set forth in CEQA Guidelines Section 15300.2 applies.

**SECTION 8.** The City Clerk is hereby directed to file a copy of this Ordinance with the California Building Standards Commission of the State of California.

**SECTION 9. CONSTITUTIONALITY.** If any section, subsection, sentence, clause, or phrase of this Ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

**SECTION 10. PUBLICATION.** This Ordinance shall be published as provided in Government Code section 36933.

**SECTION 11. EFFECTIVE DATE.** This Ordinance shall be effective upon the commencement of the thirty-first day following the review and approval by the California Energy Commission.



The foregoing Ordinance was duly and properly introduced at a regular meeting of the City Council of the City of Los Altos held on \_\_\_\_\_, 2023 and was thereafter, at a regular meeting held on \_\_\_\_\_, 2023 passed and adopted by the following vote:

AYES:  
NOES:  
ABSENT:  
ABSTAIN:

\_\_\_\_\_  
Sally Meadows, MAYOR

Attest:

\_\_\_\_\_  
Angel Rodrigues, Interim CITY CLERK

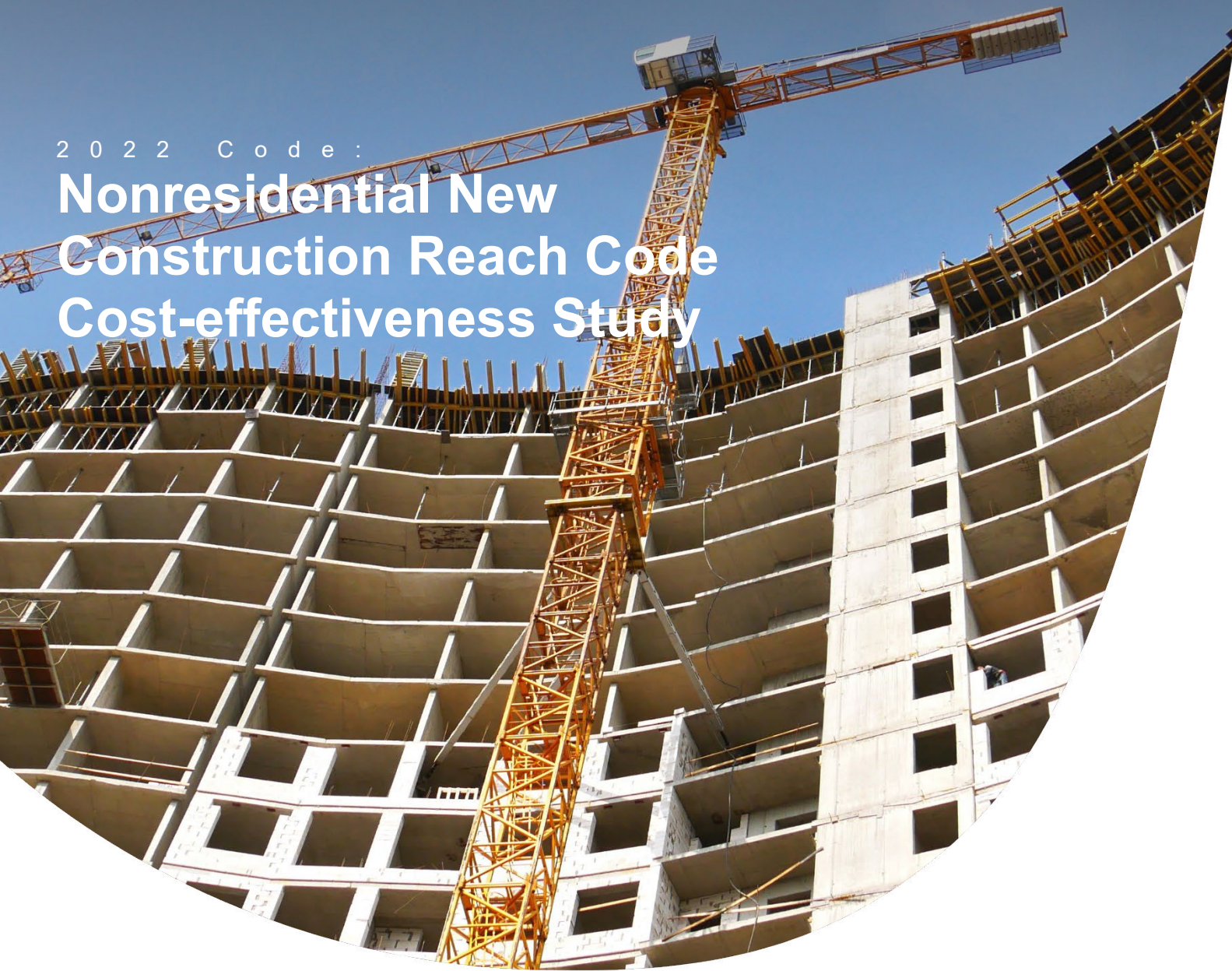
**LOCAL COST ANALYSIS - SUMMARY**

**Scenario:**

A 3500 Square foot existing home, no addition proposed, interior alteration with 50% of the existing framing and/or foundation being replaced. Home currently has the following gas appliances:  
 Furnace, water heater, stove/cooktop, dryer, fireplace, outdoor fireplace, outdoor cooktop/grill, pool/spa heater

Appliance Replacement Costs (Estimated)			
Existing Appliance	Replacement Appliance	Estimated Equipment Cost	Estimated Installation Cost
<i>Indoor Appliances</i>			
Water Heater (Existing Water Heater in Garage)	Heat Pump Water Heater	\$1,700 - \$2,000	\$2,070
Heater/Furnace (Option 1)	Central Heat Pump Space Heater (Option 1)	\$2,500 - \$8,000	\$4,630
(No existing ductwork or damaged ductwork)	New Ductwork for Central Heat Pump Heater		\$13,670
Gas Wall Heater (Option 2)	Ductless Mini-Split Heat Pump (Option 2)	\$700 - \$1,500	\$4,850
Gas Clothes Dryer	Heat Pump Clothes Dryer	\$1,000 - \$1,400	\$1,680
Gas Stove	Electric Stove/Induction Cooktop	\$550 - \$3,000/\$600 - \$4,000	\$1,680
Gas Fireplace	Electric Fireplace	\$600 - \$4,000+	\$1,880
<i>Outdoor Appliances</i>			
Outdoor Gas Fireplace	Outdoor Electric Fireplace	\$600 - \$3,500	\$2,980
Outdoor Gas Cooktop/Grill	Outdoor Electric / Induction Cooktop	\$600 - \$3,000	\$2,980
Pool/spa heater	Electric pool/spa heater	\$750 - \$1,500	\$3,880

Infrastructure Costs (Estimated)	
Electrical Panel Upgrade (Assume 225amps, overhead lines)	\$5,550
Electrical Panel Upgrade (Assume 225amps, underground lines)	\$7,670
Cap/Remove Gas Infrastructure	\$8,750
Install New Electric Infrastructure (Indoors)	\$21,330
Install New Electric Infrastructure (Outdoors)	\$13,330
Upgrade PG&E line to home	\$25,000



2 0 2 2 C o d e :  
**Nonresidential New  
Construction Reach Code  
Cost-effectiveness Study**

**Prepared by:**  
Avani Goyal, Farhad Farahmand  
TRC Companies Inc.

**Prepared for:**  
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## Acronym List

- AC – Air Conditioner
- ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
- B/C – Benefit-to-Cost Ratio
- BOD – Basis of Design
- BSC – Building Standards Commission
- Btu – British thermal unit
- CAV – Constant Air Volume
- CBECC - California Building Energy Code Compliance
- CBECS - Commercial Building Energy Consumption Survey
- CBSC - California Building Standards Commission
- CEC - California Energy Commission
- CPAU – City of Palo Alto Utilities
- CZ – Climate Zone
- DCKV – Demand-Controlled Kitchen Ventilation
- DHW – Domestic Hot Water
- DEER – Database for Energy Efficient Resources
- DOE – U.S. Department of Energy
- E3 – Energy and Environmental Economics
- EUI – Energy Use Index
- FDD – Fault Detection and Diagnostics
- GHG - Greenhouse Gas
- GPM – Gallons Per Minute
- HVAC – Heating, Ventilation, and Air Conditioning
- IOU – Investor-Owned Utility



- kWh – Kilowatt Hour
- LADWP – Los Angeles Department of Water and Power
- LBNL – Lawrence Berkeley National Lab
- LPD – Lighting Power Density
- NPV – Net Present Value
- QSR – Quick-Service Restaurant
- PNNL – Pacific Northwest National Laboratory
- POU – Publicly Owned Utility
- PTHP – Packaged Terminal Heat Pump
- PG&E – Pacific Gas & Electric (utility)
- PTAC – Packaged Terminal Air Conditioning
- PV - Solar Photovoltaic
- SCE – Southern California Edison (utility)
- SCG – Southern California Gas (utility)
- SDG&E – San Diego Gas & Electric (utility)
- SHW – Service Hot Water
- SMUD – Sacramento Municipal Utility District
- SZ – Single Zone
- TDV – Time Dependent Valuation
- VAV – Variable Air Volume
- TDV - Time Dependent Valuation
- Title 24 – California Code of Regulations Title 24, Part 6
- TOU – Time of Use

Summary of Revisions		
Date	Description	Reference (page or section)
11/16/2022	Original Release	-

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## Executive Summary

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

The Reach Code Team (the Team) provides this report and accompanying Reach Code Results Workbook to present measures and measure packages that local jurisdictions can adopt to achieve energy savings and emissions reductions beyond what will be accomplished by enforcing the minimum state requirements according to the 2022 Building Energy Efficiency Standards (Title 24, Part 6), effective January 1, 2023. This report documents a variety of above-code electrification, energy efficiency, load flexibility, and solar photovoltaic (PV) packages applied to a set of four nonresidential building prototypes: Medium Office, Standalone Retail, Quick-Service Restaurant, and Small Hotel.

The Team evaluated energy simulation results and code compliance using the CBECC v1.0 software version released in June 2022. Results may change with future software versions. Results across all prototypes indicate the efficiency measures included in the analysis, both On-Bill and TDV, are cost-effective across all climate zones when added to the prescriptive baseline prototype. In all cases all-electric packages are capable of achieving the greatest greenhouse gas emissions reductions as compared to mixed-fuel buildings.

These results, including the attached Reach Code Results Workbook, indicate that all-electric packages can achieve the greatest greenhouse gas emissions reductions as compared to mixed-fuel buildings. Results align with the decarbonization objectives set by California Energy Commission (Energy Commission), and several new construction new construction ordinances focusing on all-electric design. The results of this study by prototype are summarized below:



**Medium Office:** Due to the lack of a prescriptive compliance pathway and performance modeling approach in CBECC, all-electric space heating is simulated as electric-resistance variable-air-volume reheat. This system selection limits operational benefits, energy code compliance, and cost-effectiveness. All-electric packages are cost-effective with energy efficiency and load flexibility measures in many climate zones, but do not achieve code compliance across all three metrics—with efficiency TDV margin being the most challenging. Results will be updated in the first half of 2023 when central heat pump boilers can be simulated in CBECC. Jurisdictions may adopt reach codes that exempt building systems that do not have a prescriptive pathway in the energy code and cannot be modeled to comply using the performance approach. Efficiency packages over the mixed-fuel baseline are cost-effective and compliant across all climate zones.



**Medium Retail:** All-electric is prescriptively required in most scenarios in Retail buildings. The Team identified cost-effective and code compliant packages with energy efficiency measures over an all-electric baseline in most climate zones. This study analyzed mixed-fuel retail buildings with large (>240 kBtuh) gas furnace packaged units replacing the smaller (<240 kBtuh) packaged heat pumps. The mixed-fuel building is neither cost-effective nor code compliant in most climate zones.



**Quick-Service Restaurant:** The Team identified cost-effective, *nearly* cost-effective, and code compliant packages in several climate zones for all-electric space conditioning and service water heating when including energy efficiency and solar PV measures. The Team could not identify cost-effective packages including all-electric commercial cooking equipment except for City of Palo Alto Utility (CPAU) territory. Also, when including energy efficiency measures, restaurants with all-electric cooking achieve compliance and are *nearly* On-Bill cost-effective in Sacramento Municipal Utility District (SMUD) territory as well. Jurisdictions may adopt All-Electric reach codes that exempt commercial cooking equipment or require energy efficiency for either mixed-fuel and/or all-electric buildings, in many climate zones.



**Small Hotel:** All-electric packages are cost-effective and code-compliant in most climate zones. The remaining climate zones are very close to meeting the TDV Efficiency compliance criteria and may achieve compliance by re-evaluating nonresidential-area modeling using central heat pump boiler instead of electric resistance VAV systems. In addition to electrification packages that include single-zone packaged heat pumps, the Team analyzed an alternative scenario with packaged terminal heat pumps (PTHPs) that improved all-electric code minimum cost-effectiveness due to high first-cost savings, but PTHPs do not achieve TDV Efficiency compliance. Mixed-fuel plus energy efficiency is code compliant and cost-effective across all climate zones.

Jurisdictions may use these results for amending Part 6, Part 11, other parts of the California building code, or their municipal code as determined appropriate for the given jurisdiction. A cost-effectiveness study is required to amend Part 6 of the California building code or when adopting energy efficiency or energy conservation measures, including solar PV or batteries. The Energy Commission has previously concluded that all-electric requirements do not constitute an energy efficiency or energy conservation standard and are outside the scope of Public Resources Code section 25402.1(h)(2).<sup>1</sup> Jurisdictions may adopt an All-Electric reach code when amending Part 11 or their municipal code. Even reach code policies that only require electrification, and do not require energy efficiency or conservation, will benefit from findings in this study to inform potential economic impacts of a policy decision. This study documents the estimated costs, benefits, energy impacts and GHG 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 [www.localenergycodes.com](http://www.localenergycodes.com). Local jurisdictions that are considering adopting an ordinance are encouraged to contact the program for further technical support at [info@localenergycodes.com](mailto:info@localenergycodes.com).

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<sup>1</sup> CEC Letter to South San Francisco 2021: <https://bayareareachcodes.org/wp-content/uploads/2022/10/CEC-Letter-to-SSF-Signed.pdf>

# 1 Introduction

This report documents cost-effective combinations of measures that exceed the minimum state requirements, the 2022 California Building Energy Efficiency Standards Title 24, Part 6 (Title 24) (CEC 2022), effective January 1, 2023, for newly constructed nonresidential buildings. This report was developed in coordination with the California Statewide Investor-Owned Utilities (CA IOUs) Codes and Standards Program, key consultants, and engaged cities—collectively known as the Reach Code Team (or “the Team” for short). The objectives of this report are to inform discourse for local reach code adoption and, where applicable, support approval of local energy code amendments from the California Energy Commission (the Energy Commission).

The Reach Code Team performed cost-effectiveness analysis for the following scenarios above prescriptive 2022 Title 24 code requirements in all 16 California climate zones (CZs):

- Fuel substitution with federal code-minimum efficiency appliances, compared to a prescriptive minimum design compliance pathway.
  - 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.
- Energy efficiency measures
- Load flexibility measures
- Solar PV and Battery

The Reach Code Team analyzed four prototypes—Medium Office, Medium Retail, Quick-Service Restaurant, and Small Hotel—to represent common nonresidential new construction buildings in the California. The selected building types align with the requests received from dozens of jurisdictions seeking to adopt reach codes. The results of this cost-effectiveness study could potentially be extrapolated to other building types that have similar properties such as occupancy pattern, HVAC design and layout. These results were attained using the first version of California Building Energy Compliance Calculator (CBECC) software that is approved by CEC for 2022 code compliance. There are a few gaps in functionalities and standard design assumptions in this software version, described in Section 2.5, the Reach Code team has been actively coordinating with the CBECC software team to inform future software updates.

Title 24 is maintained and updated every three years by two state agencies: 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). When adopting local energy efficiency or conservation ordinances, 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 formal approval from the Energy Commission and file the ordinance with the BSC for the ordinance to be legally enforceable. Local jurisdictions do not require Energy Commission approval when adopting ordinances that do not require efficiency or conservation, such as only electrification-required ordinances.

The Department of Energy (DOE) sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act, including heating, cooling, and water heating equipment (E-CFR 2020). Since state and local governments are prohibited from adopting higher minimum equipment efficiencies than the federal standards require, the focus of this study is to identify and evaluate cost-effective packages that do not include high efficiency heating, cooling, and water heating equipment. High efficiency appliances are often the easiest and most affordable measures to increase energy performance. While federal preemption limits

reach code mandatory requirements for covered appliances, in practice, builders may install any package of compliant measures to achieve the performance requirements.

This study references the statewide reach code study performed in 2019 for newly constructed nonresidential buildings as a starting point for additional measure definitions. Importantly, the current 2022 cost-effectiveness report introduced a new restaurant building type and updated the modeling and cost assumptions.

## 2 Methodology and Assumptions

The Reach Code Team analyzed four prototypes—Medium Office, Medium Retail, Quick-Service Restaurant, and Small Hotel—using the cost-effectiveness methodology detailed in this section below.

### 2.1 Cost-effectiveness

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 15-year duration accounting for a three percent discount rate and energy cost inflation per Appendix 8.2.
- **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 uses 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.

#### 2.1.2 Costs

The Reach Code Team assessed the incremental costs and savings of the energy packages over a 15 year lifecycle. 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.

For heating, ventilation, and air conditioning (HVAC) and water heating baseline and measure costs, including gas and electrical infrastructure, the Reach Code Team contracted two different firms, one mechanical contractor (Western Allied Mechanical, based in Menlo Park) and one mechanical designer (P2S Engineering, based in Irvine) to provide cost data. The Reach Code Team developed a basis of design for all prototypes described in section 3.1 and worked with the mechanical contractor and designer to get cost estimates. The Reach Code Team determined HVAC design heating and cooling loads and capacities by climate zone from the energy models. For each HVAC system type, the Reach Code Team requested costs for the smallest capacity unit required and the largest capacity unit required and specified federal minimum equipment efficiency.

The mechanical contractor and mechanical designer collected equipment costs and labor assumptions from their vendors and manufacturers’ representatives, as well as through their own recent projects. The mechanical contractor and designer provided material and labor cost estimates for the entire HVAC and DHW systems, disaggregated by the HVAC and DHW equipment itself; refrigerant piping; structural; electrical supply; gas supply; controls; commissioning and startup; general conditions and overhead; design and engineering; permit, testing, and inspection; and a contractor profit or market factor. The mechanical contractor and designer provided costs for each of the system capacities, based on which the Reach Code Team developed a relationship between HVAC system capacity and cost to calculate the cost for each building in each climate zone. In most cases, the analysis uses the average of the costs provided by

the contractor and the costs provided by the designer. In some limited cases where costs provided by one source were unlikely to be representative of the measure, costs from only the other source were used. The Reach Code Team added taxes, contractor markups, maintenance costs, and replacement costs where needed, and adjusted material and labor costs for each climate zone based on weighting factors from RS Means (presented in Appendix 8.3).

Actual project costs vary widely based on a range of real-building considerations. The costs that the Reach Code Team determined through contractors are likely costs for the given prototypes and are not representative of all projects.

### 2.1.3 Metrics

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

- **NPV:** Net savings (NPV benefits minus NPV costs). If the net savings of a measure or package is positive over a lifetime of 15 years, 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 incremental costs to implement the measure (i.e., construction and maintenance cost savings) outweigh the negative energy cost impacts.
- **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 capital investment, though in some cases an energy measure may be cost neutral or have a lower cost. 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. 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., shows positive 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 IOU and POU rate teams the Reach Code Team determined appropriate utility rates for each CZ and package as of October 2022. The utility tariffs, summarized in Table 1, were determined based on the annual load profile of each prototype and the corresponding package, the most prevalent rate in each utility territory, and information indicating that the rates were unlikely to be phased out during the code cycle.

A time-of-use (TOU) rate was applied to most cases, some POUs may not have TOU rates. In addition to energy consumption charges, there are kW demand charges for monthly peak loads. Utilities calculate the peak load by the highest kW of the 15-minute interval readings in the month. However, the energy modeling software produces results on hourly intervals; hence, the Team calculated the demand charges by multiplying the highest load of all hourly loads in a month with the corresponding demand charge per kW. The utility rates applicable to a prototype may vary by package and CZ especially between a mixed fuel and all-electric package if the monthly peak demand loads exceed the applicable threshold.

The Reach Code Team coordinated with utilities to select tariffs for each prototype given the annual energy demand profile of each specific prototype, climate zone, and measure package and the most prevalent rates in each utility territory. The Reach Code Team did not compare a variety of tariffs to determine their impact on cost-effectiveness. Utility rate updates can affect cost-effectiveness results. For a more detailed breakdown of the rates selected, refer to Appendix 8.2.



For packages with PV generation, the approved Net Energy Metering (NEM) 2.0 tariffs were applied along with minimum daily use billing and mandatory non-bypassable charges. For the PV cases, annual electric production was always less than the modeled annual electricity consumption; therefore, no credits for surplus generation were necessary.

The analysis assumes that utility rates escalate over time for commercial buildings, as described in Appendix 8.2. Escalation rates above inflation for electricity beyond 2023 are assumed to be between 0.2% and 0.7%, before dropping to a steady 0.6% escalation per year in 2030. Natural gas is assumed to escalate at a relatively higher rate, peaking at 7.7% in 2024, then escalating more slowly to a rate of approximately 2% in the latter years of the analysis period.

**Table 1. Utility Tariffs Used Based on CZ (October 2022)**

CZs	Electric / Gas Utility	Electricity	Natural Gas
<b>Investor-Owned Utilities</b>			
1-5,11-13,16	Pacific Gas & Electric Company (PG&E)	B-1 / B-10	G-NR1
6, 8-10, 14, 15	Southern California Edison (SCE) / Southern California Gas (SCG)	TOU-GS-1 / TOU-GS-2 /TOU-GS-3	G-10 (GN-10)
7, 10, 14	San Diego Gas and Electric Company (SDG&E)	AL-TOU + EECC (AL-TOU)	GN-3
<b>Publicly Owned Utilities</b>			
4	City of Palo Alto Utilities (CPAU)	E-2	G-2
12	Sacramento Municipal Utilities District (SMUD)	CI-TOD 1 (CITS-0 /CITS-1)	G-NR1

## 2.2 Energy Simulations

The Reach Code Team performed energy simulations using California’s Building Energy Code Compliance Software CBECC 2022.1.0 (1250) with ruleset version BEMCmpMgr 2022.1.0 (7361) (California Building Energy Code Compliance 2022).<sup>2</sup> This is the first 2022 Title 24 code compliance software approved by Energy Commission for compliance of nonresidential buildings on June 8, 2022. The CBECC software combined the capabilities of CBECC-Com and CBECC-Res software into one to model both nonresidential and multifamily building prototypes in one interface.

The Reach Code Team set up parametric simulations using Modelkit software to run thousands of measure packages for each prototype in all California’s CZs. Individual measures were simulated separately and combined into cost-effective measure packages for each CZ. Where necessary, the Reach Code Team employed minor ruleset changes, such as load flexibility measures that alter thermostat setpoint schedules, to improve the cost-effectiveness of measure packages. While these measures produce operational savings, they may not be used to achieve code compliance without further software upgrades.

## 2.3 2022 T24 Compliance Metrics

2022 Title 24 Section 140.1 defines the energy budget of the building based on source energy and TDV energy for space-conditioning, indoor lighting, mechanical ventilation, photovoltaic (PV) and battery storage systems, and service

<sup>2</sup> Prior to the CBECC software, the Reach Code Team used CBECC-Com 2022 and CBECC 2022.0.8 Beta to model nonresidential prototypes for the 2022 reach code analysis. The Reach Code Team noted the changes in results due to updates in functionalities and standard design assumptions.



water heating and covered process loads. CEC has introduced two new compliance metrics in addition to Total Compliance TDV Margin for 2022 code cycle. A building needs to comply with all three compliance metrics below:

- **Efficiency TDV.** Efficiency TDV accounts for all regulated end-uses but does not include the impacts of PV and battery storage.
- **Total TDV.** Total TDV Compliance metric includes regulated end-uses accounting for PV and battery storage contributions.
- **Source Energy.** Source energy is based on fuel used for power generation, assuming utilities meet all Renewable Portfolio Standard (RPS) goals and other obligations projected over 15-year lifecycle.

## 2.4 GHG Emissions

The analysis uses the GHG emissions estimates built into CBECC. The GHG emission multipliers were developed by Energy + Environmental Economics (E3) to support development of compliance metrics for use in the 2022 California energy code (E3 2021). There are 8,760 hourly multipliers accounting for time dependent energy use and carbon emissions based on source emissions, including RPS projections. For the 2022 code cycle, the multipliers incorporate GHG from methane and refrigerant leakage, which are two significant sources of GHG emissions (NORESO 2020). There are 32 strings of multipliers, with a different string for each California CZ and each fuel type (metric tons of CO<sub>2</sub> per kWh for electricity and metric tons of CO<sub>2</sub> per therm for natural gas).

## 2.5 Limitations and Further Considerations

The Team encountered some modeling limitations, outside of the Team's control that should be noted while using these results to inform reach code policies,

- **CBECC Software:**
  - The Reach Code Team coordinated with the CBECC software development team on potential differences in our understanding of 2022 code requirements and its implementation in standard design such as battery controls. The version of 2022 CBECC software v1.0, described in Section 2.2, available to the Reach Code Team at the time of the analysis has limited functionalities and could not model heat pump hydronic system or other measures like drain water heat recovery. As the software evolves, some results may look different.
  - 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. 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.
  - The team identified some apparent anomalies in software-reported compliance margins when they became available in June 2022. The Reach Code Team is in the midst of discussing outputs and ramifications with software development team specifically related to ventilation such as fan power and heat recovery, among other modeling methods. Results may change with future software versions. In the interim, the Reach Code Team manually calculated the compliance margins using the mixed fuel baseline model created in this study based on our best understanding.
- **Prototype Building:** The cost-effectiveness analysis is based on standard prototypical buildings, which may differ from actual buildings being constructed. Jurisdictions should keep this in mind while extrapolating to the buildings in their territory.

- **System Cost Assumptions:** The incremental electrification and additional measure costs are based on specific system selection and assumptions made by experienced professionals. These costs can vary based on contractor, system design and specifications, and regional variation.

The Team will re-evaluate packages with central heat pump boiler system in Medium Office and Small Hotel in early 2023. In addition to the packages assessed in the report, there are other future potential enhancements that can be considered for more cost-effective or compliant packages:

- Adding more solar PV than already analyzed if the building has more roof space to accommodate.
- Adding battery at higher levels than prescriptively required in 2022 Title 24 with more advanced controls.
- Adding energy efficiency measures as software capability evolves such as drain water heat recovery.
- Applying federally pre-emptive (high) efficiency energy systems or appliances.

### 3 Prototypes, Measure Packages, and Costs

This section describes the prototype characteristics and the scope of analysis including measures and their corresponding costs. The Reach Code Team used versions of the following four DOE building prototypes to evaluate cost-effectiveness of measure packages in the occupancy types listed below:

- Medium Office
- Medium Retail
- Quick-Service Restaurant (QSR)
- Small Hotel

The Reach Code Team designed the baseline prototypes to be mixed fuel based on 2022 Title 24 Final Express Terms requirements. The Reach Code Team reviewed the 2022 T24 ACM HVAC system map to ensure alignment as applicable for most cases, differences if any are discussed in subsequent sections. The Team built new construction prototypes to have compliance margins as close to zero as possible to reflect a prescriptively compliant new construction building in each CZ. The code compliance is based on the first publicly available CBEC v1.0 compliance software as described in Section 2.2. Misalignments have been reported back to the software team for future software iterations, as described in Section 2.5.

#### 3.1 Prototype Characteristics

The DOE provides building prototype models which, when modified to comply with 2022 Title 24 requirements, can be used to evaluate the cost-effectiveness of efficiency measures (U.S. Department of Energy 2022 A). These prototypes have historically been used by the Energy Commission to assess potential code enhancements. The selection of four building types for this analysis is based on the priority suggested by a group of California cities. The cost-effectiveness results of this study could potentially be extrapolated to other building types that have similar properties such as occupancy pattern, HVAC design and layout.

Water heating includes both service hot water (SHW) for office and retail buildings and domestic hot water for hotel guest rooms. In this report, water heating or SHW is used to refer to both. The compliance software assumes a Standard Design, where HVAC and SHW systems are based on the system maps included in 2022 Nonresidential ACM Reference Manual. However, the Reach Code Team applied both 2022 Title 24 prescriptive requirements and 2022 ACM system map for baseline mixed fuel model, HVAC and SHW system characteristics as described below.

- **Medium Office**
  - The HVAC design is a variable air volume (VAV) reheat system with two gas hot water boilers, three packaged rooftop units (one serving each floor), and VAV terminal units with hot water reheat coils.
  - The SHW design includes one 8.7 kW electric resistance hot water heater with a 5-gallon storage tank.
- **Medium Retail**
  - For CZs 2 to 15, the 2022 Title 24 ACM System Map Standard Design informed the baseline model to have three packaged Single Zone Heat Pump (SZHP) systems for the smaller capacity (<240 kBtuh) thermal zones, in alignment with 2022 Title 24 prescriptive code requirements.<sup>3</sup> The large (>240 kBtuh) core thermal zone has two smaller (<240 kBtuh) SZHPs with VAV fans instead of one large SZHP, since larger rooftop packaged heat pumps are not available in the market. The 2022 Title 24 ACM Standard Design assumes a large SZHP for larger zones as well, however this deviation does not impact the results considerably.<sup>3</sup>

<sup>3</sup> <https://www.energy.ca.gov/publications/2022/2022-nonresidential-and-multifamily-alternative-calculation-method-reference>

- For CZs 1 and 16, the baseline model assumed all-electric packaged single zone heat pumps similar to CZs 2-15. The assumption deviates from 2022 Title24 ACM System Map that suggests a single zone dual fuel heat pump. Presumably this will not impact results significantly because the dual fuel system will be in heat-pump mode most times.
- The SHW design includes one 8.7 kW electric resistance hot water heater with a 5-gallon storage tank.

▪ **Quick-Service Restaurant**





- HVAC includes two SZAC (VAV or constant volume, depending on capacity) with gas furnace, one for kitchen and another for dining area. An exhaust fan is applied for kitchens in all climates based on prescriptive requirements in 2022 Title 24 code.
- The SHW design includes a gas storage water heater with a 100-gallon storage tank.





▪ **Small Hotel**

- The nonresidential HVAC design is a VAV reheat system with two gas hot water boilers, four packaged rooftop units (one serving each floor), and VAV terminal units with hot water reheat coils. The SHW design includes a small electric resistance water heater with 30-gallon storage tank.
- The guest room HVAC design includes one packaged SZAC unit with gas furnace serving each guest room. The water heating design includes a central gas water heater with a 250-gallon storage tank and recirculation pump, serving all guest rooms.

Table 2 summarizes the baseline mixed-fuel prototype characteristics, based on prescriptive 2022 Title 24 new construction requirements.

**Table 2. Baseline Prototype Characteristics**

	 Medium Office	 Medium Retail	 Quick-Service Restaurant	 Small Hotel
<b>Conditioned floor area (ft<sup>2</sup>)</b>	53,628	24,563	2,501	42,554 (77 guest rooms) (Nonresidential area: 15,282 (36%))
<b>Number of stories</b>	3	1	1	4
<b>Window-to-Wall Area ratio</b>	0.33	0.07	0.11	0.14
<b>Window U-factor/SHGC</b>	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	<u>Nonresidential:</u> 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>Guest Rooms:</u> U-factor: 0.36 SHGC: 0.25
<b>Solar PV size</b>	123 kW – 204 kW Depending on CZ	64 kW – 87 kW Depending on CZ	None	17 kW – 25 kW Depending on CZ
<b>Battery Storage</b>	217 kWh – 360 kWh Depending on CZ	70 kWh – 94 kWh Depending on CZ	None	16 kWh – 24 kWh Depending on CZ

	 Medium Office	 Medium Retail	 Quick-Service Restaurant	 Small Hotel
<b>HVAC System</b>	VAV reheat system with packaged rooftop units, gas boilers, VAV terminal units with hot water reheat	<u>CZ 1</u> Heat recovery for Core Retail space only  < 65 kBtu/h: SZHP > 65 kBtu/h and < 240 kBtu/h: SZHP VAV > 240 kBtu/h: SZHP VAV	< 65 kBtu/h: SZAC + gas furnace  > 65 kBtu/h: SZAC VAV	<u>Nonresidential and Laundry:</u> VAV reheat system with packaged rooftop units, gas boilers, VAV terminal units with hot water reheat  <u>Guest Rooms:</u> SZAC with gas furnaces
<b>SHW System</b>	5-gallon electric resistance water heater	5-gallon electric resistance water heater	100-gallon gas water heater	<u>Nonresidential:</u> 30-gallon electric resistance water heater <u>Laundry Room:</u> 120-gal gas storage water heater <u>Guest rooms:</u> Central gas water heater, 250 gallons storage, recirculation loop

### 3.2 Measure Definitions and Costs

The measures evaluated in the analysis fall into four different categories:



#### Fuel Substitution

- Heat pump or electric space heating or gas furnace
- Heat pump or electric water heaters
- Electric cooking
- Electric clothes dryer
- Electrical panel capacity
- Natural gas infrastructure



#### Energy Efficiency

- Envelope
- Mechanical equipment (HVAC and SHW)
- Lighting



#### Load Flexibility

- Peak Load shedding
- Load shift



#### Additional solar PV and/or battery storage.

These measures are detailed further in this section.

#### 3.2.1 Fuel Substitution

The Reach Code Team investigated the cost and performance impacts and associated infrastructure costs associated with changing the mixed-fuel baseline HVAC and water heating systems to all-electric equipment for all prototypes except Medium Retail where the baseline is already an all-electric design.

For Medium Office, Quick Service Restaurant and Small Hotel, the fuel substitution measure entails electrification including heat pump space heating, electric resistance re-heat coils, electric water heaters with storage tank, heat pump water heating, increasing electrical capacity, and eliminating natural gas connections that would have been present in mixed-fuel new construction.





For Medium Retail with all-electric baseline, the fuel substitution measure entails mixed-fuel space conditioning system including single zone packaged AC with gas furnace, dual fuel heat pump, adding gas infrastructure costs and eliminating any additional electric infrastructure.

### 3.2.1.1 HVAC and Water Heating

The 2022 T24 nonresidential standards analysis uses a mixed-fuel baseline for most of the Standard Design mechanical equipment, primarily gas for space heating, except for some heat pump scenarios in Retail prototype (see Table 2). Quick-Service Restaurant has a gas storage water heater in baseline, and heat pump water heater in all-electric scenario. The Small Hotel has a central gas water heating system serving the guest rooms and a separate gas storage water heater for laundry room. In the all-electric scenario, gas equipment serving HVAC and water heating end-uses is replaced with electric equipment. Full details of HVAC and water heating systems in baseline and proposed fuel substitution measure package are described in Table 3.

Regions of California covered by the South Coast Air Quality Management District have emissions restrictions imposed on mechanical equipment. The Reach Code Team investigated the potential cost implications of meeting these requirements for gas furnaces and boilers but found that costs are minimal for mechanical systems under 2,000,000 Btu/h, and therefore did not include them. All gas-fired mechanical systems in this study are under 2,000,000 Btu/h and are subject to only an initial permitting fee, while larger systems require additional permitting costs and annual renewals.

**Table 3. HVAC and Water Heating Characteristics Summary**

		 Medium Office	 Medium Retail	 Quick-Service Restaurant	 Small Hotel
HVAC	Baseline	Packaged DX + VAV with hot water reheat. Central <b>gas</b> boilers.	All zones and CZs: Single zone packaged <b>heat pumps</b>	Packaged SZAC + <b>gas</b> furnace	<u>Nonresidential</u> : Packaged DX + VAV with hot water reheat. Central <b>gas</b> boilers.  <u>Guest Rooms</u> : Packaged SZAC + <b>gas</b> furnaces
	Proposed – Fuel Substitution	Packaged DX + VAV with electric <b>resistance</b> reheat.	<u>Core zone (&gt;30 ton)</u> : Packaged SZAC + VAV + <b>gas</b> furnace <u>Other small zones</u> : SZHP, or dual fuel heat pump for CZ 1 and 16	Single zone packaged <b>heat pumps</b>	<u>Nonresidential</u> : Packaged DX + VAV with electric <b>resistance</b> reheat  <u>Guest Rooms</u> : SZHPs
SHW	Baseline	Electric <b>resistance</b> with storage	Electric <b>resistance</b> with storage	<b>Gas</b> storage water heater	<u>Nonresidential</u> : Electric <b>resistance</b> storage  <u>Guest Rooms</u> : Central <b>gas</b> storage with recirculation
	Proposed – Fuel Substitution			Unitary <b>heat pump</b> water heater	<u>Nonresidential</u> : Electric <b>resistance</b> storage  <u>Guest Rooms</u> : Central <b>heat pump water heater</b> with recirculation

The Reach Code Team received cost data for mechanical equipment from two experienced mechanical design firms including equipment and material, labor, subcontractors (for example, HVAC and SHW control systems), and contractor overhead.

**3.2.1.1.1 Medium Office**

For the Medium Office all-electric HVAC design, the Reach Code Team investigated several potential all-electric design options, including variable refrigerant flow, packaged heat pumps, and variable volume and temperature 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 writing of this report. As such, 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 by Q1 2023 according to discussions with the CBECC software development team, and the cost-effectiveness analysis should become available in the first half of 2023.

After seeking feedback from the design community and considering the software modeling constraints, the Reach Code Team determined that the most feasible all-electric HVAC system is a VAV system with an electric resistance reheat instead of hot water reheat coil. A parallel fan-powered box (PFPB) implementation of electric resistance reheat





would further improve efficiency due to reducing ventilation requirements, but an accurate implementation of PFPBs is not currently available in compliance software.

The actual gas consumption for the VAV hot water reheat baseline may be higher than the current simulation results due to a combination of boiler and hot water distribution losses. A recent research study shows that the total losses can account for as high as 80 percent of the boiler energy use.<sup>4</sup> If these losses are considered savings for the electric resistance reheat (which has zero associated distribution loss), cost-effectiveness may be higher than presented.

The all-electric SHW system remains the same electric resistance water heater as the baseline and has no associated incremental costs. Cost data for Medium Office designs are presented in Table 4. The all-electric HVAC system presents cost savings compared to the hot water reheat system from elimination of the hot water boiler and associated hot water piping distribution. CZ10 and CZ15 all-electric design costs are slightly higher because they require larger size rooftop heat pumps than the other CZs.

**Table 4. Medium Office Average Mechanical System Costs**

Components (HVAC Only)	 Baseline – Mixed Fuel	 Proposed – All-electric	Incremental Cost
<b>Description</b>	Packaged units, boilers, hot water piping, VAV boxes, ductwork, grilles	Packaged units, electric resistance VAV boxes, electric circuitry, ductwork, grilles	VAV Boxes, electric infrastructure
<b>Material</b>	\$491,630	\$438,555	\$(53,075)
<b>Labor</b>	\$173,816	\$102,120	\$(71,696)
<b>Electric Infrastructure</b>	\$0	\$112,340	\$112,340
<b>Gas Infrastructure</b>	\$17,895	\$0	\$(17,895)
<b>Overhead &amp; CZ adjustment **</b>	\$267,052	\$250,114	\$(16,938)
<b>TOTAL</b>	<b>\$950,393</b>	<b>\$903,129</b>	<b>\$(47,264)</b>

\*\* The overhead and CZ adjustment factors are presented in Section 8.3.

**3.2.1.1.2 Medium Retail**

The baseline HVAC system includes five packaged single zone heat pumps. Based on fan control requirements in [Section 140.4\(m\)](#), units with cooling capacity ≥ 65,000 Btu/h have variable air volume fans, while smaller units have constant volume fans. For the Medium Retail proposed fuel substitution scenario, the Reach Code Team assumed one large Single Zone Packaged ACs with gas furnaces to replace the two smaller packaged heat pumps in the large core thermal zone. The all-electric SHW system remains the same electric resistance water heater as the baseline and has no associated incremental costs. In addition, according to the prescriptive requirement in Section 140.4 (q), the air system of Core Retail Zone in CZ1 meets the requirement in Table 140.4 J, which should include exhaust air heat recovery. Cost data for Medium Retail designs are presented in Table 5. Costs for rooftop air-conditioning systems are very similar to rooftop heat pump systems.



<sup>4</sup> Raftery, P., A. Geronazzo, H. Cheng, and G. Paliaga. 2018. Quantifying energy losses in hot water reheat systems. *Energy and Buildings*, 179: 183-199. November. <https://doi.org/10.1016/j.enbuild.2018.09.020>. Retrieved from <https://escholarship.org/uc/item/3qs8f8qx>



For climate zones 2 to 15, the proposed fuel substitution HVAC design includes three SZHP units (VAV or constant volume, depending on capacity) based on prescriptive requirements and one large SZAC that is between 35-45 tons for the core zone.

For climate zones 1 and 16, the smaller capacity (<240 kBtu/h) thermal zones may have either of dual-fuel SZHPs or SZACs, depending on capacity. The core zone with 35-to-45-ton cooling capacity is assumed to have one large SZAC. CZ 1 also assumes an exhaust air heat recovery system for core zone based on prescriptive requirement in Title 24 Part 6 Section 140.4.

**Table 5. Medium Retail Average Mechanical System Costs**

Components (HVAC Only)	 Baseline – All-electric	 Proposed – Mixed Fuel	Incremental Cost
<b>Description</b>	SZHPs	Single zone AC + furnace, SZHP, or dual fuel SZHP, depending upon capacity and CZ	SZAC with gas furnace, Added gas infrastructure cost
<b>HVAC – Material</b>	\$189,160	\$183,157	\$(6,003)
<b>HVAC – Labor</b>	\$54,785	\$52,886	\$(1,899)
<b>Electric Infrastructure</b>	\$0	\$0	-
<b>Gas Infrastructure</b>	\$0	\$17,895	\$17,895
<b>Overhead &amp; CZ adjustment **</b>	\$94,600	\$98,519	\$3,919
<b>TOTAL</b>	<b>\$338,546</b>	<b>\$352,458</b>	<b>\$13,912</b>



\*\* The overhead and CZ adjustment factors are presented in Section 8.3.

**3.2.1.1.3 Quick-Service Restaurant**

The baseline HVAC system includes two packaged single zone rooftop ACs with gas furnaces. Based on fan control requirements in [Section 140.4\(m\)](#), units with cooling capacity ≥ 65,000 Btu/h have variable air volume fans, while smaller units have constant volume fans. The SHW design includes one central gas storage water heater with 150 kBtu/h input capacity and a 100-gallon storage tank. For the QSR all-electric design, the Reach Code Team assumed packaged heat pumps and an A.O. Smith CHP-120 heat pump water heater with a 120-gallon storage tank. Cost data for the QSR designs are presented in Table 6, which shows the costs for full electrification of the HVAC and water heating equipment.

The Team has not included costs of electrifying the cooking equipment because of the negative impact on cost-effectiveness, as demonstrated in a [2021 Restaurants cost-effectiveness study](#) (TRC, P2S Engineers, and Western Allied Mechanical 2022). The HVAC and SHW electrification packages are referred to as the HS package to reflect all-electric HVAC and SHW.

**Table 6. Quick-Service Restaurant Average Mechanical System Costs - HS Package**

Components	 Baseline – Mixed Fuel	 Proposed – All-electric	Incremental Cost
<b>Description</b>	Single zone AC + furnace, gas storage water heater	SZHP, heat pump water heater	HVAC +SHW electrification
<b>HVAC Material</b>	\$50,065	\$52,785	\$2,719
<b>HVAC Labor</b>	\$6,748	\$6,249	\$(499)
<b>SHW – Material</b>	\$10,198	\$13,720	\$3,523
<b>SHW – Labor</b>	\$2,650	\$2,529	\$(121)
<b>Electric Infrastructure</b>	\$0	\$12,960	\$12,960

<b>Gas Infrastructure</b>	\$17,895	\$15,878	-\$2,017
<b>Overhead &amp; CZ adjustment **</b>	\$41,633	\$47,612	\$5,979
<b>TOTAL</b>	<b>\$150,838</b>	<b>\$173,382</b>	<b>\$22,544</b>

\*\* The overhead and CZ adjustment factors are presented in Section 8.3.



**3.2.1.1.4 Small Hotel**

The Small Hotel has two different baseline equipment systems, one for the nonresidential spaces and one for the guest rooms. The nonresidential HVAC system includes two gas hot water boilers, four packaged rooftop units, and twenty-eight VAV terminal boxes with hot water reheat coil. The SHW design includes a small electric water heater with storage tank for nonresidential areas and gas storage water heater dedicated to laundry room. The guest rooms HVAC design includes one single-zone AC unit with gas furnace for each guest room, and the water heating design includes one central gas storage water heater with a recirculation pump for all guest rooms.

For the Small Hotel all-electric design, the Reach Code Team assumed the nonresidential HVAC system to be packaged heat pumps with electric resistance VAV terminal units, and the SHW system will remain a small electric resistance water heater. As described in Section 3.2.1.1.1 above, a central heat pump boiler may be the most commonly employed system type but was not evaluated in this study because of modeling limitations. For the guest room all-electric HVAC system, the Team assumed SZHPs and a central heat pump water heater serving all guest rooms. For the laundry room, all-electric HVAC system is same as other nonresidential areas and all-electric water heating is a split heat pump water heater. The central heat pump water heater includes a temperature maintenance loop with an electric resistance backup heater.

Cost data for Small Hotel designs are presented in Table 7. The all-electric design presents substantial cost savings because there is no hot water plant or piping distribution system serving the nonresidential spaces. The incremental cost savings are further enhanced considerably if packaged terminal heat pumps (PTHPs) are used instead of SZHPs in guest rooms compared to split DX/furnace systems with individual flues.

**Table 7. Small Hotel HVAC and Water Heating System Costs**



Components	 Baseline – Mixed Fuel	 Proposed – All-electric	Incremental Cost
<b>Description</b>	Non-residential spaces: Packaged units, boilers, hot water piping, VAV boxes, ductwork, grilles, gas water heater for laundry  Guest rooms: SZAC + furnace, central gas water heater	Non-residential spaces: Packaged units, electric resistance VAV boxes, electric circuitry, ductwork, grilles, heat pump water heater for laundry  Guest rooms: SZHP, central heat pump water heater	HVAC (NR and Guest Rooms) Electrification SHW (Laundry Room and Guest Rooms)
<b>HVAC - Material</b>	\$802,004	\$625,642	\$(176,361)
<b>HVAC - Labor</b>	\$366,733	\$282,394	\$(84,339)
<b>SHW - Material</b>	\$55,829	\$139,087	\$83,258
<b>SHW - Labor</b>	\$11,780	\$15,080	\$3,300
<b>Electric Infrastructure</b>	\$-	\$119,625	\$119,625
<b>Gas Infrastructure</b>	\$74,943	\$-	\$(74,943)
<b>Overhead &amp; CZ adjustment **</b>	\$518,741	\$461,001	\$(57,739)
<b>TOTAL</b>	<b>\$1,830,029</b>	<b>\$1,642,830</b>	<b>\$(187,199)</b>
<b>TOTAL HVAC (PHTP option)</b>	<b>\$1,830,029</b>	<b>\$1,161,178</b>	<b>(\$668,851)</b>

\*\* The overhead and CZ adjustment factors are presented in 8.3.

**3.2.1.2 Commercial Cooking Equipment**

For Quick-Service Restaurant prototype, the Reach Code Team evaluated electrification of commercial cooking equipment extensively in 2019 Restaurants Cost Effectiveness analysis and leveraged it for cost and other specifications for the this study. It assumes a Type I exhaust hood and shows high incremental cost affecting the cost-effectiveness of this measure. Table 8 summarizes the quick-service restaurant cooking equipment costs for both mixed-fuel and all-electric scenarios.

**Table 8. Quick-Service Restaurant Cooking Equipment Costs**

Components	 Baseline – Mixed Fuel	 Proposed – All-electric (non “HS” scenario)	Incremental Cost
<b>Description</b>	Gas based appliances	Electric cooking appliance	Cooking appliance electrification
<b>Cooking equipment cost</b>	\$21,649	\$43,534	\$21,886
<b>TOTAL</b>	<b>\$21,649</b>	<b>\$43,534</b>	<b>\$21,886</b>



This measure also adds electric infrastructure cost as detailed in Table 10 below.

**3.2.1.3 Commercial Clothes Dryer**

For the all-electric measure, the Reach Code Team assumed electric resistance clothes dryers for Small Hotel prototype. Commercial-scale heat pump clothes dryers take significantly longer time to dry compared to a conventional

gas or electric dryer and are not common in the United States On-Premise Laundry (OPL) market, where labor is relatively expensive and use of heat pump dryers implies hotels may need to require more than one shift to perform laundry duties. Most commercial clothes dryers are available in models that use either gas or electricity as the fuel source, so there is negligible incremental cost for electric resistance dryers. Table 9 summarizes the Small Hotel construction costs for both mixed-fuel and all-electric OPL scenarios.

**Table 9. Small Hotel Clothes Dryer Costs**

Components	 Baseline – Mixed Fuel	 Proposed – All-electric	Incremental Cost
Description	Gas clothes dryer	Electric resistance clothes dryer	-
Clothes Dryer cost	\$29,342	\$29,342	\$0
<b>TOTAL</b>	<b>\$29,342</b>	<b>\$29,342</b>	<b>\$(0)</b>

This measure also adds electric infrastructure cost as detailed in Table 10 below.

**3.2.1.4 Infrastructure Impacts**

**3.2.1.4.1 Electrical infrastructure**

Electric heating appliances and equipment often require a larger electrical connection than an equivalent gas appliance because of the higher voltage and amperage necessary to electrically generate heat. Thus, many buildings may require larger electrical capacity than a comparable building with natural gas appliances. This includes:

- Electric resistance VAV space heating in the medium office and common area spaces of the small hotel.
- Heat pump water heating for the guest room spaces of the small hotel.

Table 10 details the cost impact of additional electrical panel sizing and wiring required for all-electric scenarios as compared to their corresponding mixed-fuel scenario. The costs are based on estimates from one contractor. The Reach Code Team excluded costs associated with electrical service connection upgrades because these costs are very often rate-based and highly complex.

**Table 10. Electrical Infrastructure Costs**

	Mixed-Fuel Equipment	All-electric Equipment	Electrical Infrastructure Impact	Incremental Cost
<b>Medium Office</b>	Hot water reheat system with gas boiler plant and VAV boxes with hot water reheat coils	VAV boxes with electric resistance reheat coils	Upgraded transformers, transformer feeders, switchboards, and branch circuits	\$ 112,340
<b>Medium Retail</b>	Mix of SZHPs and single zone AC plus furnace serving all zones	SZHPs serving all zones	Electrical requirements are driven by cooling capacity, so no impact.	\$0
<b>Quick-Service Restaurant</b>	Gas water heater	Heat pump water heater	Upgraded switchboard, transformer feeder, and branch circuits	\$12,960
	Gas Water heater, Gas cooking	Heat pump water heater, Electric cooking	Upgraded switchboard, transformer feeder, and branch circuits	\$95,260
<b>Small Hotel</b>	<p><u>Guest rooms HVAC:</u> Single zone AC plus furnace</p> <p><u>Non-residential spaces HVAC:</u> Hot water reheat system with gas boiler plant and VAV boxes with hot water reheat coils.</p> <p><u>Water heating:</u> Gas water heating serving both laundry and guest rooms.</p> <p><u>Process:</u> Gas dryers.</p>	<p><u>Guest rooms HVAC:</u> SZHPs</p> <p><u>Non-residential spaces HVAC:</u> VAV boxes with electric resistance reheat coils.</p> <p><u>Water heating:</u> Heat pump water heating serving both laundry and guest rooms.</p> <p><u>Process:</u> Electric resistance dryers.</p>	Upgraded transformers, transformer feeders, switchboards, and branch circuits	\$119,625

**3.2.1.4.2 Gas Piping**

The Reach Code Team assumes that gas would not be supplied to the site in an all-electric new construction scenario. Eliminating natural gas in new construction would save costs associated with connecting a service line from the street main to the building, piping distribution within the building, and monthly connection charges by the utility.

The Reach Code Team determined that for a new construction building with natural gas piping, there is a service line (branch connection) from the natural gas main to the building meter. Table 11 gives a summary of the gas infrastructure costs by component, assuming 1-inch corrugated stainless-steel tubing (CSST) material is used for the plumbing distribution. The Reach Code Team assumes that the gas meter costs vary depending on the gas load. Based on typical space heating loads for all building types, the Reach Code Team categorized CZs 1 and 16 as ‘High-load CZs’ and CZs 2-15 as ‘Low-load CZs’. The Reach Code Team assumed an interior plumbing distribution length based on the expected layout. Table 12 gives the total gas infrastructure cost by building type. The costs are based on estimates from one contractor.

**Table 11. Gas Infrastructure Costs by Component**

Component	Details	Cost
<b>Meter, including Pressure Regulator, and Earthquake Valve</b>	Low load CZ (CZ 2-15)	\$11,056
	High load CZ (CZ 1,16)	\$15,756
<b>Gas lateral</b>	Cost per linear foot of 1" CSST	\$40
<b>Connection charges</b>	Includes street cut and plan review	\$1,015
<b>Interior plumbing distribution</b>	Cost per linear foot of 1" CSST	\$40

**Table 12. Total Gas Infrastructure Cost Estimates by Building Type**

Building Prototype	Interior plumbing distribution length (ft)	Total gas infrastructure cost	
		Low load CZ	High load CZ
Medium Office	100	\$17,307	\$22,007
Medium Retail	100	\$17,307	\$22,007
Quick-Service Restaurant	100	\$2,017*	
Small Hotel	1,412	\$70,243	\$74,943

\*The Quick-Service Restaurant package includes gas cooking appliances, which will require a gas lateral and meter. These costs represent only the interior plumbing distribution costs that would have served the HVAC and SHW systems.

### 3.2.2 Efficiency

The Reach Code Team started with a potential list of energy efficiency measures proposed for the 2025 Title 24 energy code update by the Statewide Building Codes Advocacy program (CASE Team)<sup>5</sup>, which initially included over 500 options. Other options originated in previous energy code cycles or were drawn from other codes or standards (examples: ASHRAE 90.1 and International Energy Conservation Code [IECC]), literature reviews, or expert recommendations. The Reach Code Team leveraged the CASE Team's assessment tools for the 2025 Cycle, focusing on measures prioritized by the CASE Team. The Reach Code Team filtered the list of potential measures based on building type (to remove measures that applied to building types not covered in this study), measure category (to remove end-uses and loads that are not relevant to the prototypes) and impacts to new construction. Based on this filtering, the Team was left with around 100 measures to consider. The Reach Code Team ranked this list of potential measures based on applicability to the prototypes in this study, ability to model in simulation software, demonstrated energy savings potential, and market readiness.

Please note that the **measures requiring a ruleset update cannot currently be modeled for compliance purposes**. The modeling method for each efficiency measure is defined in their respective measure descriptions in Section 3.2.2.1 and if the ruleset amendment was applied. Please refer to Section 2.5 for further details.

The subsections below describe the energy efficiency measures that the Team analyzed, including description, modeling approach, and specification.

#### 3.2.2.1 Envelope

- 1. Cool Roof:** Requires higher reflectance and emittance values for the Medium Office building only. This measure was not shown to produce substantial savings in the other prototypes.

<sup>5</sup> <https://title24stakeholders.com/>

Modeling: Modeled cool roof measure in efficiency measures package by updating Aged Solar Reflectance (ASR) and/or Thermal Emittance (TE) in CBECC software.

Specification: Increased ASR from 0.63 to 0.70 with a TE of 0.85 in CZs 4 and 6-15.

- 2. **Efficient Vertical Fenestration:** Requires lower U-factor and Solar Heat Gain Coefficient (SHGC) for windows in select climate zones for three building types (Medium Office, Retail, and Small Hotel). The measure details and the climate zone selection are based on the proposition of 2022 NR CASE Report (Statewide CASE Team 2020 B).

Modeling: Modeled high performance windows in efficiency measures package by updating U-factor and SHGC inputs in CBECC software.

Specification: Reduced U-factor from 0.36 to 0.34 and SHGC from 0.25 to 0.22 in CZs 2, 6, 7 and 8 for Medium Office and Retail, Reduced U-factor from 0.36 to 0.34 and SHGC from 0.25 to 0.22 in all CZs for Small Hotel.

- 3. **Vertical Fenestration as a Function of Orientation:** Limit the amount of fenestration area as a function of orientation for the Medium Office. East-facing and west-facing windows are each limited to one-half of the average amount of north-facing and south-facing windows.

Modeling: Change z-coordinate input of windows in CBECC software for Medium Office to increase or decrease fenestration area for the Medium Office.

Specification: Decreased east-facing and west-facing fenestration area from 468 to 390 square feet. Increased north-facing and south-facing fenestration area from 703 to 781 square feet.

**3.2.2.2 Mechanical Equipment (SHW and HVAC)**

- 4. **Water Efficient Fixtures in Kitchen:** Specifies commercial dishwashers that use 20% less water than ENERGY STAR® specifications. In addition, the dishwasher includes heat recovery function such that it only needs connection to cold water and reduces hot water demand and central SHW system capacity. For QSRs, which typically specify a three-compartment sink for dishwashing, this measure would replace or add a dishwasher to reduce total hot water load. The measure also adds 1.0 gallon per minute (GPM) faucet aerators to hand-washing sinks in the kitchen to reduce water usage. Title 20 requires kitchen sinks to have a flow rate of 1.8 GPM at most. The reduced hot water load from the water efficient fixtures above allows the heat pump water heater (HPWH) to operate without an electric resistance back-up.

Modeling: Reduced water usage in the ruleset based on calculations of expected water usage from literature review and fixture specifications. HPWH coefficient of performance (COP) is increased since there is no electric resistance back-up.

Specification: Decreased hot water usage by 26% in the software ruleset (13.4 gallons per person to 9.9 gallons per person) and increased HPWH COP from 3.1 to 4.2.

- 5. **Ozone Washing Machines:** Adds an ozone system to the large on-premises washing machines. The ozone laundry system generates ozone, which helps clean fabrics by chemically reacting with soils in cold water. This measure saves energy by reducing hot water usage and by reducing cycle time for laundry systems. Refer to DEER Deemed measure SWAP005-01 for more information (California Public Utilities Commission 2022).

Modeling: Reduced the total runtime of each cycle and hot water hourly usage per person (gallons per hour per person) for laundry area in software ruleset.

Specification: Reduced hot water usage by 85%, from 48.4 to 7.3 gal/hour-person based on the deemed measure data from the California electronic Technical Reference Manual (California Technical Forum 2022).



- 6. **Efficient Hot Water Distribution:** Reduces domestic hot water (DHW) distribution system pipe heat losses in two ways. First, the Team used pipe sizing requirements in Appendix M of the California Plumbing Code instead of Appendix A. Appendix M reduces pipe diameters for the cold and hot water supply lines based on advancements made in water efficiency standards for plumbing fixtures found in hotel bathrooms. Second, the Team added more stringent pipe insulation thickness requirements for hotels to match that of single and multifamily dwellings using Title 24 Table 160.4-A *Pipe Insulation Thickness Requirements for Multifamily DHW Systems* instead of Table 120.3-A.

Modeling: The Team calculated the pipe heat loss savings for the Small Hotel prototype by following the modelling methodology applied to the low-rise loaded corridor multi-family building prototype in the 2022 CASE Multifamily Domestic Hot Water Distribution report (Statewide CASE Team 2020 A). The Team designed a riser distribution system for the Small Hotel prototype building using the baseline Appendix A and modern Appendix M pipe sizing tables. The pipe design and total pipe surface area of the supply and return lines for the Small Hotel closely matched the Low-Rise Loader Corridor Building prototype. The hotel insulated pipe heat loss for both Appendix A and M was approximated from the multifamily building heat loss modelling results for the 16 CZs and water heater energy savings calculated for the two sub-measures.

Specification: (a) Pipe diameter decreased from Appendix A requirements to Appendix M multifamily plumbing requirements (b) For pipe diameters at or above 1.5 inches, increase the insulation thickness from 1.5 to two inches thick for fluids operating in the 105-140°F temperature range. . The Team reduced the DHW energy consumption by 0.4 – 0.7% depending on CZ in a post-processing of the model.

- 7. **Demand Control Ventilation (DCV) and Transfer Air:** The California Energy Code requires kitchen exhaust to have DCV if the exhaust rate is greater than 5,000 cfm. This measure expands this requirement and applies DCV regardless of the exhaust rate for the QSR. Additionally, the kitchen makeup air supply is decreased by requiring at least 15% of replacement air to come from the transfer air in the dining space that would otherwise be exhausted.

Modeling: Changed exhaust fan from constant speed fan to variable speed and reduce kitchen ventilation airflow rate for the QSR.

Specification: Changed Kitchen Exhaust Fan Control Method to Variable Flow Variable Speed Drive, reduced kitchen ventilation from 2,730 cfm to 2,293 cfm.

- 8. **Guest Room Ventilation and Fan Power:** Uses the 2021 IECC fan power limitation requirements for ventilation fans under 1/12 horsepower, and approximates the ASHRAE 90.1 Small Hotel guestroom control requirements , which require shutting off ventilation within five minutes of all occupants leaving the room and changing the cooling setpoint to at least 80°F and heating setpoint to at most 60°F.

Modeling: Since variable occupancy cannot be modeled in CBECC, the Reach Code Team revised the software ruleset ventilation schedule and setpoints from 8:00 AM to 7:00 PM—the time range where the CBECC software assumed occupancy to be less than half for all guestrooms.

Specification: Heating setpoint reduced from 68°F to 66°F, cooling setpoint increased from 78°F to 80°F PM, and ventilation shut off from 8:00 AM to 7:00 PM. Guestroom ventilation fans have fan efficacy of 0.263 W/cfm.

- 9. **Variable speed Fans:** Require variable speed fans at lower capacities than required by Title 24 Part 6 Section 140.4(m), currently at 65,000 Btu/hr. This measure is based on the 2022 Title 24 Part 6, Section 140.4(m),



where direct expansion units greater than 65,000 Btu/hr that control the capacity of the mechanical cooling directly shall have a minimum of two stages of mechanical cooling capacity and variable speed fan control.

Modeling: Reduced the cooling capacity threshold from 65,000 Btu/hr to 48,000 Btu/hr. Changed the supply fan control from constant speed to variable speed for zones that have cooling capacity > 48,000 Btu/hr and < 65,000 Btu/hr in the Medium Retail and QSR.

Specification: Changed the supply fan control from Constant Volume to Variable Speed Drive for the Front Retail and Point-of-Sale thermal zones in Medium Retail prototype and the Dining Zone in the QSR prototype.

### 3.2.2.3 Lighting

- 10. Interior lighting reduced lighting power density:** Update lighting power densities (LPD, measured as Watts/ft<sup>2</sup>) requirements based on technology advances (e.g., optical efficiency, thermal management, and improved bandgap materials). Identify spaces with opportunities for more savings from lowered LPDs—not all spaces are subject to LPD reductions. Take into consideration IES recommended practices and biological effectiveness metrics (such as WELL) when developing the proposed LPD values (WELL 2022).

The 2022 Indoor Lighting CASE Study (Statewide CASE Team 2021 D) provided a survey of 2x2 troffer products available in the Design Lights Consortium Qualified Products List (DLC-QPL) and the efficacy level each measured. This study indicated that at the time of the report approximately 20% of available DLC-QPL products exceeded the performance level of the ‘Standard’ DLC-QPL listing by approximately 15%, meeting the ‘Premium’ listing criteria. The Title 24 2022 CASE Report uses the ‘Standard’ designation performance level as the design baseline for all the LPD calculations in the code. This document proposes using the ‘Premium’ designation performance as the basis of the LPD allowances.

A DOE study on solid-state light sources (LEDs) provides projections of efficacy improvement for LED light sources that are in the range of 2.5 to 3% per year, continuing for the next five or ten years (U.S. Department of Energy 2019 B). So, the products offered for sale by the luminaire manufacturers are improving as older products are discontinued and newer ones are introduced. Even in just three years, the overall performance of the products available can improve by 7 to 9%.

A recent Navigant LED pricing study shows a slightly negative cost to efficacy correlation, indicating that higher performing products may be slightly lower in cost (Navigant Consulting 2018). This is likely to be in part caused by the decreasing cost of the LED chips with each subsequent generation produced. There is likely to be no cost associated with employing higher performing LED luminaires.

Modeling: Reduce LPDs by approximately 13% in each space listed below under regulated lighting below Title 24 prescriptive requirements.

Specification:

- Medium Office
  - All spaces: 0.52 W/ft<sup>2</sup>
- Medium Retail
  - Storage: 0.36 W/ft<sup>2</sup>
  - Retail sales: 0.86 W/ft<sup>2</sup>
  - Main entry lobby: 0.63 W/ft<sup>2</sup>
- QSR
  - Dining: 0.41 W/ft<sup>2</sup>
  - Kitchen: 0.86 W/ft<sup>2</sup>
- Small Hotel

Stairs: 0.54 W/ft<sup>2</sup>  
Corridor: 0.36 W/ft<sup>2</sup>  
Lounge: 0.50 W/ft<sup>2</sup>

The measures are summarized below by building type, including measure costs, in Table 13.

Table 13. Efficiency Measures Applicability, Costs, and Sources

Measure Applicability									
<ul style="list-style-type: none"> <li>Included in packages with energy efficiency measures</li> <li>Not Applicable</li> </ul>									
Measure	Baseline T24 Requirement	Proposed Measure	Med Office	Med Retail	Quick-Service Restaurant	Small Hotel: Guest Rooms	Small Hotel: Nonresidential	Incremental Cost	Sources & Notes
<b>Envelope</b>									
1. Cool Roof	For low slope roofs: ASR = 0.63 TE = 0.75	For low slope roofs: ASR = 0.7 TE = 0.85	•	–	–	–	–	\$0.04/ft <sup>2</sup>	Final Nonresidential High Performance Envelope Case Report (Statewide CASE Team 2020 B)
2. Efficient Vertical Fenestration	U-factor = 0.36 SHGC = 0.25	U-factor = 0.34 SHGC = 0.22	•	•	–	•	•	\$1.75/ft <sup>2</sup>	Final Nonresidential High Performance Envelope Case Report (Statewide CASE Team 2020 B)
3. Vertical Fenestration as a Function of Orientation	40% window-to-wall ratio in each orientation per Title 24 Table 140.3-B.	Redistribute window areas by orientation	•	–	–	–	–	\$0	No additional cost. This measure is a design consideration.
<b>HVAC and SHW</b>									
4. Water Efficient Fixtures in Kitchen	Kitchen faucet max flow rate is 1.8 GPM (Title 20)	Kitchen faucet flow rate is 1 GPM	–	–	•	–	–	High efficiency, door-type, high temperature dishwasher: \$7,633/unit Faucet aerator: \$8/unit	Combination of literature review, online sources such as Home Depot and manufacturer websites
5. Ozone Washing Machine	Not required	Reduced hot water use	–	–	–	–	•	\$25,469/unit	DEER Deemed measure SWAP005-01 (California Public Utilities Commission 2022)

Measure Applicability

- Included in packages with energy efficiency measures
- Not Applicable

Measure	Baseline T24 Requirement	Proposed Measure	Med Office	Med Retail	Quick-Service Restaurant	Small Hotel: Guest Rooms	Small Hotel: Nonresidential	Incremental Cost	Sources & Notes
6. Efficient Hot Water Distribution	Appendix A Pipe Sizing with standard pipe insulation thickness 1.5"	Appendix M pipe sizing with 2" pipe insulation thickness	-	-	-	•	-	\$5,819	Multifamily Domestic Hot Water Final CASE Report
7. DCV & Transfer Air	DCV required in kitchen for exhaust air rate > 5000 cfm	DCV for all exhaust fans	-	-	•	-	-	\$8,500	Mechanical contractor cost estimate
8. Guest Room Ventilation, Temperature Setback, and Fan Power	Guest rooms required to have occupancy sensing zone controls, but no ventilation fan power requirement.	Updated fan power and HVAC schedules	-	-	-	•	-	\$0	No cost increase, as guest rooms already have controls.
9. Variable Speed Fans	Variable speed required if cooling capacity is greater than 65,000 Btu/h	Variable speed control for smaller capacity systems	-	•	•	-	-	\$6,390/unit	Mechanical contractor cost estimate
<b>Lighting</b>									
10. Interior Lighting Reduced LPD	Per Area Category Method, varies by Primary Function Area.	Top 20% of market products	•	•	•	-	•	\$0	Industry report on LED pricing analysis shows that costs are not correlated with efficacy. (Navigant Consulting 2018)

### 3.2.3 Load Flexibility

The Reach Code Team investigated a range of high-impact demand flexibility strategies potentially applicable to the four prototypes. The list of strategies is informed by DOE’s Grid-interactive Efficient Buildings efforts and the 2022 Nonresidential Grid Integration CASE report (U.S. Department of Energy 2021, Statewide CASE Team 2020). The Team selected the three measures based on their load flexibility potential, cost, compliance software modeling capabilities, savings potential and the ease of project implementation and field verification:

Please note that these measures require a ruleset update and cannot be modeled currently for compliance purposes.

**11. Temperature Setback using Smart Thermostat:** This measure leverages the existing mandatory requirement for HVAC zone thermostatic controls to pre-condition spaces prior to, and to shed demand during, peak period. This measure introduces a setback in temperature setpoint during peak period and incurs no additional cost because Occupant-Controlled Smart Thermostats (OCSTs) are already required for buildings similar to the Medium Office prototype.

Modeling: Instead of utilizing the demand responsive features, OCST would be used to change temperature setpoints and setpoint schedules. These changes were integrated by altering the setpoint schedules directly in the backend ruleset files of CBECC software.

Specification: In the base case, the Medium Office prototype HVAC equipment schedules dictate "on" hours (at desired temperature) from 6:00 AM through 12:00 AM on weekdays and 6:00 AM – 7:00 PM on Saturdays. All Sunday hours are "off." Cooling setpoints are 75°F during "on" and 85°F when "off" hours; heat setpoints are 70°F during "on" and 60°F during "off" hours. The Team modified this schedule such that the "on" setpoints are stepped back by 2°F from 4:00 PM through 12:00 AM on weekdays; and from 4:00 PM – 7:00 PM on Saturdays.

**12. Demand Response Capable HPWH:** The Reach Code Team modeled a measure intended to reduce the peak demand of the significant hot water loads in the QSR prototype. The measure increases costs due to adding a 100-gallon storage tank and plumbing hardware. The additional hot water storage enables pre-heating water ahead of demand by effectively increasing the HPWH’s thermal storage capacity. The extra plumbing hardware is needed to keep the stored hot water stratified to maintain efficient HPWH operations. The Team did not directly address the issue of storage tank location but assumed floor plan design would be able to accommodate it.

Modeling: The measure uses the HPWH and additional storage tank capacity to produce and store hot water ahead of actual use during evening peak period. QSR hot water baseline schedule exhibits a low morning load (6:00 AM – 8:00 AM), moderate load near lunch time (11:00 AM), and a peak evening load (4:00 PM – 11:00 PM). These changes were made by changing the hot water load fraction in the ruleset.

Specification: Implements an early pre-heat that starts at 12:00 PM and finishes by 7:00 PM, avoiding the super peak hours of 7:00 PM – 9:00 PM.

**13. Demand Response Lighting:** This measure extends existing Title 24 mandatory requirements for demand responsive lighting by shedding demand during peak hours. There are no additional measure costs because demand responsive control capability is already required for nonresidential buildings with more than 4kW of total lighting load. This measure does not require additional commissioning.

Modeling: The baseline lighting schedule exhibits a plateau of 0.65 load fraction from 8:00 AM – 8:00 PM and trails off after 8:00 PM through the end of the day for weekdays. The Team altered the ruleset to reduce the load fraction during 4:00 PM – 9:00 PM.

Specification: The Team implemented a 10% setback during the 4-9pm peak hours.

The load flexibility measure applications to each prototype are summarized in Table 14.

**Table 14. Load Flexibility Measure Summary**

Measure	Med Office	Med Retail	QSR	Small Hotel	Incremental Cost	Other Notes
<b>11. Smart Thermostat</b>	•	-	-	-	\$0	Capability already required
<b>12. Demand Control HPWH</b>	-	-	•	-	\$5,400	An additional 100-gallon tank, plumbing hardware, and related labor hours
<b>13. Demand Response Lighting</b>	•	-	-	-	\$0	Capability already required

None of the measures apply to the Medium Retail or Small Hotel prototypes. While the Small Hotel contains some office space and common areas, the Medium Office load flexibility measures were not applied to the Small Hotel spaces because of the potential for unpopular impacts, varying occupancy schedules, difficult field maintenance, and limited energy impacts. Team also explored the impact of load flexibility in all-electric clothes dryer scenario but did not see enough savings impact, hence the measure was not included in the package.

**3.2.4 Additional Solar PV and Battery Storage**

The Reach Code Team considered additional solar PV and battery storage measures that exceed the 2022 Title 24 prescriptive requirements to improve the cost-effectiveness of proposed scenarios. For Medium Office and Retail, the prescriptive solar PV sizes are large enough to occupy the entirety of the available roof space. Additional rooftop solar PV could not be considered for the two prototypes. For the Quick-Service Restaurant, solar PV is not prescriptively required since the prototype qualifies for the exception and the Reach Code Team considered adding solar PV to improve cost-effectiveness. For Small Hotel, the required PV size in the code-compliant models did not occupy the entire available roof space. Additional PV system capacity was considered as a measure to improve cost-effectiveness.

For the cost-effectiveness analysis, the Team evaluated additional solar PV for all-electric scenarios for the two building types, Quick Service Restaurant and Small Hotel. The additional PV size is calculated based on available roof space, assuming the maximum available space is 50% of total roof space and 15 Watt per square foot panel size.

- Modeling: Updated PV capacity (kW) input in CBECC software.
- Specification: Baseline requirement is 0 kW and 22-32.6 (depending on climate zone) kW for Quick-Service Restaurant and Small Hotel respectively. Proposed measure specification is 18.8 kW and 79.8 kW for Quick-Service Restaurant and Small Hotel respectively.

The costs for PV include first cost to purchase and install the system, inverter replacement costs, and annual maintenance costs. A summary of incremental costs and sources is given in Table 15 below.

**Table 15. Additional Solar PV Measure Summary**

Measure	Med Office	Med Retail	QSR	Small Hotel	Incremental Cost	Cost Source
Solar PV	-	-	●	●	First Cost: \$3.20/W Inverter replacement cost at 10-yr: \$0.15/W Annual Maintenance Cost: \$0.02/W ITC Federal Incentive: 30%	National Renewable Energy Laboratory (NREL) Q1 2016 (National Renewable Energy Laboratory 2016)  E3 Rooftop Solar PV System Report (Energy and Environmental Economics, Inc. 2017)

Upfront solar PV system costs are lowered because of the federal income tax credit (ITC)—approximately 30 percent based on the passage of Inflation Reduction Act. PV energy output is built into CBECC and is based on NREL’s PVWatts calculator, which includes long term performance degradation estimates.

A battery storage system is prescriptively required for three prototypes: Medium Office, Medium Retail, and Small Hotel. The current software, CBECC v1.0, applies the appropriate prescriptive battery size (kWh) and capacity (kW) in the standard design. However, the control assumed in standard design is “Basic Control”, which does not function for optimum battery use. The Team did not evaluate additional battery measures because the compliance software does not apply the “Time of Use” battery control method in standard design, which impacts the incremental energy costs and TDV benefits.

### 3.3 Measure Packages

The Reach Code Team compared a baseline Title 24 prescriptive package to mixed-fuel packages and two to four electrification packages depending on applicability of building type. Note that *most* QSR all-electric packages exclude kitchen electrification, while the Small Hotel all-electric package does include electric laundry cost and energy impacts.

- **Mixed Fuel Code Minimum:** Mixed-fuel prescriptive building per 2022 Title 24 requirements.
- **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 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). The results section includes results for both scenarios since all-electric package with electric cooking appliance can be cost-effective in POU territories. This study did not evaluate pre-empted package with all-electric HVAC and SHW to

have higher efficiency than required by federal regulations, that will potentially enhance cost-effectiveness and/or compliance margins.

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.



## 4 Cost-Effectiveness Results

Cost-effectiveness results are presented in this section and the attached workbook per prototype and measure packages described in Section 3. The TDV and On-Bill based cost-effectiveness results are presented in terms of B/C ratio and NPV.

In the following figures, the result **Both** (shown in green shading) indicates that the result is cost-effective on both On-Bill and (Total) TDV basis. The result **On-Bill** or **TDV** (shown in yellow shading) indicates that the result is either cost-effective on On-Bill or (Total) TDV basis, respectively. The result “ - ” (results with no shading) indicates that the result is not cost-effective on either an On-Bill basis or (Total) TDV basis.

Across all prototypes and climate zones, efficiency measures improve cost-effectiveness when added to the mixed-fuel baseline prototype and all-electric federal code minimum designs.

All-electric cost-effectiveness results by prototype can be summarized as:



**Medium Office** (Figure 1): All-electric space heating is predominantly achieved through electric resistance due to modeling limitations, which limits operational benefits. Efficiency measures yield some On-Bill cost-effective all-electric packages in milder climate zones. Adding load flexibility measures increases the cost-effectiveness to most climates.



**Medium Retail** (Figure 2): All-electric packages are cost-effective in all climate zones with added efficiency measures over all-electric baseline. Proposed mixed-fuel packages are cost-effective too with added efficiency measures in most climate zones primarily driven by cost-equivalency in the all-electric package compared to a mixed-fuel package.



**Quick-Service Restaurant** (Figure 3): All-electric package with and without cooking electrification is cost-effective in CPAU and SMUD territories only, On-Bill. All-electric HVAC and SHW package with added efficiency measures is On-Bill cost-effective in CZs 1, 3-5 and 12. Adding efficiency and solar PV is On-Bill cost-effective in CZs 1-5, 11-13, and 16. While not depicted in Figure 3, the Results Workbook indicates that all-electric HVAC and SHW plus efficiency packages are *nearly* cost-effective (greater than -\$350/month) in all climate zones using On-Bill Net Present Values.




**Small Hotel** (Figure 4): The all-electric hotel has tremendous cost savings compared to a mixed-fuel package, primarily due to the avoidance of gas infrastructure to each guest room. All-electric packages achieve TDV cost-effectiveness in all CZs except 16. On-Bill cost-effectiveness is limited to CZs 2-5, 12 and 15 with single zone ducted heat pumps, but nearly all CZs with a packaged terminal heat pump.

### 4.1 Medium Office

In the all-electric Medium Office building, the upfront cost savings associated with avoiding boiler and gas infrastructure supports cost-effective packages in several climate zones, particularly with additional efficiency and load flexibility measures.

- Adding energy efficiency measures over mixed fuel code minimum is On-Bill cost-effective in all climate zones.
- The all-electric code minimum efficiency package is cost-effective for CZs 4 (CPAU), 6-10, 12 (SMUD) and 15.
- Adding energy efficiency measures to the all-electric code minimum package extends On-Bill cost-effectiveness to CZ 3 as well.
- All-electric energy efficiency along with load flexibility measure package is On-Bill cost-effective in most climate zones except 1, 11 and 16.

**Figure 1. Medium Office Cost-Effectiveness Summary**


Climate Zone		CZ1	CZ2	CZ3	CZ4	CZ5	CZ6	CZ7	CZ8	CZ9	CZ10	CZ11	CZ12	CZ13	CZ14	CZ15	CZ16
Prototype	Utility	PG&E	PG&E	PG&E	PG&E	PG&E	SCE	SDG&E	PG&E	SCE	SDG&E	PG&E	PG&E	PG&E	SDG&E	SCE	PG&E
	Package				CPAU	SCG					SCE		SMUD		SCE		
Medium Office (MO) 	Mixed Fuel + Efficiency Measures	Both	Both	Both	Both Both	Both Both	Both	Both	Both	Both	Both Both	Both	Both Both	Both	Both Both	Both	Both
	All Electric Code Minimum Efficiency	-	-	-	On-Bill On-Bill	-	Both	Both	Both	On-Bill	On-Bill On-Bill	-	On-Bill	-	-	Both	-
	All Electric Energy Efficiency	-	-	On-Bill	Both Both	-	Both	Both	Both	Both	Both Both	-	On-Bill	-	-	Both	-
	All-Electric Energy Efficiency + Load Flexibility	-	Both	Both	Both Both	Both Both	Both	Both	Both	Both	Both Both	On-Bill	Both Both	Both	On-Bill On-Bill	Both	-

## 4.2 Medium Retail

2022 Title 24 code prescriptively requires heat pumps in most scenarios already. This report evaluates added energy efficiency measures over the baseline all-electric scenario and proposed mixed-fuel packages.

- The mixed-fuel code minimum is not cost-effective by itself in most climate zones.
- Adding energy efficiency measures to the mixed-fuel code minimum package is On-Bill and/or TDV cost-effective in most climate zones.
- Adding energy efficiency measures over prescriptive all-electric package is also cost-effective in most climate zones except CZ16 using TDV.

**Figure 2. Medium Retail Cost-effectiveness Summary**


Climate Zone		CZ1	CZ2	CZ3	CZ4	CZ5	CZ6	CZ7	CZ8	CZ9	CZ10	CZ11	CZ12	CZ13	CZ14	CZ15	CZ16
Prototype	Utility	PG&E	PG&E	PG&E	PG&E	PG&E	SCE	SDG&E	PG&E	SCE	SDG&E	PG&E	PG&E	PG&E	SDG&E	SCE	PG&E
	Package	PG&E	PG&E	PG&E	CPAU	SCG	SCE	SDG&E	PG&E	SCE	SCE	PG&E	SMUD	PG&E	SCE	SCE	PG&E
Retail (RE) 	Mixed Fuel Code Minimum	Both	-	-	-	-	-	-	-	-	-	-	-	-	On-Bill	-	On-Bill
	Mixed Fuel + Efficiency Measures	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	On-Bill	Both	Both	Both	Both	On-Bill
	All Electric Energy Efficiency	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	On-Bill

### 4.3 Quick-Service Restaurant (QSR)

High incremental cost for HVAC and SHW electrification (“HS” package) makes restaurant electrification challenging. Because cooking electrification packages are very expensive – both upfront and operationally in IOU territories – the Team evaluated HS packages that do not consider cooking equipment electrification. This affects cost-effectiveness as gas infrastructure cost savings do not materialize.

- Adding energy efficiency measures over mixed fuel code minimum is On-Bill cost-effective in all climate zones.
- All-electric HVAC and SHW “HS” package is On-Bill cost-effective in CZ4 (CPAU) and CZ12 (SMUD) territory only.
- Adding energy efficiency and load flexibility measures extends On-Bill cost-effectiveness to CZs 1, 3 and 5.
- All-electric HVAC and SHW “HS” package with energy efficiency and solar PV measure is On-Bill cost-effective in climate zones 1-5, 11-13 and 16.
- All-electric package including cooking electrification is On-Bill cost-effective in CZ 4 (CPAU) territory only.
- The Results Workbook indicates that all-electric HVAC and SHW plus efficiency packages are nearly cost-effective (greater than -\$350/month) in all climate zones using On-Bill Net Present Values.

Figure 3. QSR Cost-effectiveness Summary


Climate Zone		CZ1	CZ2	CZ3	CZ4	CZ5	CZ6	CZ7	CZ8	CZ9	CZ10	CZ11	CZ12	CZ13	CZ14	CZ15	CZ16
Prototype	Utility	PG&E	PG&E	PG&E	PG&E	PG&E	SCE	SDG&E	PG&E	SCE	SDG&E	PG&E	PG&E	PG&E	SDG&E	SCE	PG&E
	Package				CPAU	SCG					SCE		SMUD		SCE		
 Quick-Service Restaurant (QSR)	Mixed Fuel + Efficiency Measures	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both
	All Electric HS Code Minimum Efficiency	-	-	-	On-Bill	-	-	-	-	-	-	-	On-Bill	-	-	-	-
	All Electric HS Energy Efficiency	On-Bill	-	On-Bill	On-Bill	On-Bill	-	-	-	-	-	-	On-Bill	-	-	-	-
	All-Electric HS Energy Efficiency + Load Flexibility	On-Bill	-	On-Bill	On-Bill	-	-	-	-	-	-	-	On-Bill	-	-	-	-
	All Electric HS Energy Efficiency + Solar PV	On-Bill	On-Bill	On-Bill	On-Bill	On-Bill	On-Bill	-	-	-	-	On-Bill	On-Bill	On-Bill	-	-	On-Bill
	All Electric Code Minimum Efficiency	-	-	-	On-Bill	-	-	-	-	-	-	-	-	-	-	-	-
	All Electric Energy Efficiency	-	-	-	On-Bill	-	-	-	-	-	-	-	-	-	-	-	-

### 4.4 Small Hotel

The all-electric hotel has cost savings compared to a mixed-fuel package, primarily due to the avoidance of boilers and gas infrastructure to each guest room. The analysis assumes single zone ducted heat pump for all all-electric scenarios; however, the Team analyzed a Packaged Terminal Heat Pump (PTHP) scenario as well. PTHP shows higher incremental cost savings as compared to a baseline of mixed fuel single zone packaged system and hence are cost-effective in many climate zones.

- Adding energy efficiency measures over mixed fuel code minimum is On-Bill cost-effective in all climate zones.
- All-electric code minimum packages with or without energy efficiency measure packages are TDV cost-effective in all climate zones except 16, and On-Bill cost-effective in CZ4 (CPAU) and CZ12 (SMUD) due to relatively lower electricity costs.
- Additional solar PV over all-electric energy efficiency package extends On-Bill cost-effectiveness to CZs 2, 3, 4 (PG&E), 5 and 15.
- The alternative all-electric scenario with PTHP is cost-effective in all climates, On-Bill in most CZs except 7,10 and 14 SDG&E territories.

Figure 4. Small Hotel Cost-effectiveness Summary

Climate Zone		CZ1	CZ2	CZ3	CZ4	CZ5	CZ6	CZ7	CZ8	CZ9	CZ10	CZ11	CZ12	CZ13	CZ14	CZ15	CZ16	
Prototype	Utility	PG&E	PG&E	PG&E	PG&E	PG&E	SCE	SDG&E	PG&E	SCE	SDG&E	PG&E	PG&E	PG&E	SDG&E	SCE	PG&E	
	Package				CPAU	SCG					SCE		SMUD		SCE			
 Small Hotel (SH)	Mixed Fuel + Efficiency Measures	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	
	All Electric Code Minimum Efficiency	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	-	
	All Electric Energy Efficiency	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	-
	All Electric Energy Efficiency + Solar PV	TDV	Both	Both	Both	Both	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	Both	-
	All Electric Code Minimum Efficiency (PTHP)	Both	Both	Both	Both	Both	Both	TDV	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both

## 5 Energy Code Compliance Results and Reach Code Considerations

This section combines the cost-effectiveness and 2022 Title 24 energy code compliance metric results — efficiency TDV, total TDV, and source energy, described in Section 2.3 — to highlight the viable reach code options for local jurisdictions. The Reach Code Team calculated metrics using both:

1. Software outputs using the ACM standard design and
2. Manually by subtraction against the baseline model because of software limitations that are beyond the Reach Code Team’s control.<sup>6</sup>

All Efficiency TDV margins presented in this section are the lower of the two approaches, Software output and Manual, to be conservative and inform the minimum compliance margins that can be met by a typical modeler. Full details of compliance margins and cost-effectiveness results are presented in the Final Results Workbook for reference.

Importantly, the workbook shows that for all prototypes, all-electric packages are capable of achieving greater greenhouse savings as compared to mixed-fuel buildings. Below is a summary of how compliance results as well as cost-effectiveness for each prototype and package could influence reach code options. The Reach Code Team outlines recommendations using the following framework, based on reach codes that were adopted across California under the 2019 building code cycle:

- **Mixed fuel buildings are allowed, with efficiency.** Local amendments governing efficiency and conservation must be performed in the Title 24 Part 6 Building Energy Efficiency Standards and be approved by the Energy Commission.
  - *Energy Efficiency* — Require energy efficiency for buildings regardless of fuel type. A jurisdiction can require different compliance thresholds for all-electric and/or mixed-fuel. The thresholds should be set considering how they may affect mixed-fuel or all-electric buildings.
  - *Electric-Preferred* — Allow mixed-fuel appliances but require a higher building performance via efficiency, total, or source compliance metric (for example, (Milpitas 2019), section 140.1).<sup>7</sup> Applies only to mixed-fuel buildings.
- **Mixed fuel buildings are not allowed.** Local amendments governing green building requirements may be performed in the Title 24 Part 11 Green Building Standards Code and must be filed with the Building Standards Commission. Alternatively, the local amendment may be performed in a municipal code chapter of their respective jurisdictions.
  - *All-Electric* — Require certain all-electric only appliances, with exceptions (for example (Menlo Park 2019)). Does not involve efficiency or conservation measures, and cost-effectiveness is not a legal requirement.<sup>8</sup> Local amendments may be performed through other building code sections, such as Part 11. See discussion on Exceptions below.
  - *All-Electric + Efficiency* — Require certain all-electric appliances, but with a higher building performance via efficiency, total, or source compliance metric. Also requires amendment to Title 24 Part 6 and approval by the Energy Commission.

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<sup>6</sup> The difference between the two methods of calculating TDV margins occurs due to various software limitations. The Team had challenges modeling a baseline showing zero-percent (exactly compliant) compliance margin, and differing interpretations of 2022 Title 24 code regarding fan power, exhaust fan, heat recovery, battery control, and other aspects. Most scenarios show similar trends between software calculated compliance margin and the Team’s manual subtraction against baseline model, with a difference in magnitude. For example, if the Total TDV Compliance margin as shown by software directly is negative, it is typically negative per manual calculation as well. Nonetheless, modeling limitations introduce error into the calculations, which may affect results. Many scenarios have very low negative compliance margin and are very close to being zero. While this uncertainty in error may lead to imprecision in results, relative performance across packages can yield information helpful for decision-making.

<sup>7</sup> Note Milpitas has since adopted an All-electric with Exceptions code for the 2022 code cycle.

<sup>8</sup> See letter from [CEC to South San Francisco](#) for reference.

Exceptions enable reach codes to broadly require electrification except for specific building systems. These systems may have uncertainty on energy code compliance, building industry electrification approaches, or other related impacts on economic development. During the 2019 code cycle, cities developed exemptions based on discussions with local stakeholders, resulting in a wide array of exemption types.<sup>9</sup> For the four prototypes in this study, the Team has determined two exemptions that may be necessary for cities passing All-Electric reach codes.

- **Building systems without a prescriptive compliance pathway in the energy code.** This exemption considers that all-electric central space heating does not have a prescriptive pathway in Title 24, and central heat pump boilers cannot be currently modeled, which has impacted compliance results for the Medium Office and Small Hotel. This exemption has broad precedence and can apply to other large nonresidential buildings (e.g., (Berkeley 2019), section 12.80.040.A Exception 1). These exemptions typically state that the building is also not able to comply via the performance approach using commercially available technology.
- **Commercial cooking.** Cooking electrification does not considerably impact code compliance but is not nearly cost-effective against a mixed-fuel baseline. To account for this challenge, cities may wish to adopt reach codes that exempt commercial kitchen cooking appliances (e.g., (Menlo Park 2019) 100.0(e)2.A Exception 4).

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<sup>9</sup> See list of exemptions on [Bay Area Reach Codes](#).

Table 16. Reach Code Pathway Considerations

Prototype	Compliance and Cost-Effectiveness Results Summary	Energy Efficiency	Electric-Preferred	All-Electric	All-Electric + Efficiency
<b>Medium Office</b>	<p>The Team could not identify any all-electric package that complies with all three compliance metrics, with the Efficiency TDV Compliance margin being the most challenging.</p> <p>Future iterations of this study will re-evaluate the Medium Office with a central heat pump boiler, an anticipated compliance software capability in early 2023, instead of electric resistance VAVs.</p>	To Be Determined. Modeling constraints impacted achievable compliance margins for all-electric packages.	All CZs.	Exempt building systems without a prescriptive pathway in the energy code.	To Be Determined. Modeling constraints impacted achievable compliance margins for all-electric packages
<b>Medium Retail</b>	<p>The Team identified cost-effective and code compliant packages of all-electric + energy efficiency measures across most CZs.</p> <p>Mixed-fuel + efficiency was cost-effective but not code compliant in most CZs.</p>	CZs 7 and 9.	CZs 7 and 9.	CZs 2-15. 2022 T24 prescriptive baseline	CZs 1-10, 12-14.
<b>Quick-Service Restaurant</b>	<p>The Mixed-fuel + efficiency package is cost-effective and compliant in many climate zones. Code compliance and cost-effectiveness results support reach code adoption for all-electric space conditioning and service water heating when adding efficiency and solar PV for CZs 1 and 3-7, others are likely to be compliant with future modeling input updates. Cost-effectiveness is achieved or <i>nearly</i> achieved (Net Present Value is greater than -\$350/month) On-Bill in all CZs.</p> <p>Cooking electrification does not impact code compliance but is not cost-effective against a mixed-fuel baseline except for CPAU territory.</p>	CZs 1, 3-7.	CZs 1-7, 13.	CZs 1, 3-7. Exempt commercial kitchen appliances, except CZ4 (CPAU). Nearly all remaining CZs have a <i>nearly</i> cost-effective and/or nearly compliant pathway for HVAC and SHW only.	CZs 1, 3-7.
<b>Small Hotel</b>	<p>Results support Electric-Preferred reach code for all CZs. The all-electric packages are <i>near</i> compliant and TDV cost-effective for most CZs when including energy efficiency measures and additional solar PV. They are <i>likely</i> to be compliant with future modeling iterations.</p> <p>Future iterations of this study will re-evaluate the nonresidential areas of the hotel with a central heat pump boiler, as mentioned for the Medium Office, which can potentially improve code compliance.</p>	To Be Determined. Modeling constraints impacted achievable compliance margins for all-electric packages.	All CZs.	Exempt building systems without a prescriptive pathway in the energy code.	To Be Determined. Modeling constraints impacted achievable compliance margins for all-electric packages.



The combined result of cost-effectiveness and code compliance across all climate zones and packages are detailed in Section 5.1 through 5.4 below. The tables are formatted to show:

- Cost-effectiveness results with color highlight:
  - **Green** highlight — for scenarios that are cost-effective on both On-Bill and TDV metrics, may or may not be compliant.
  - **Yellow** highlight — for scenarios that are cost-effective on either one of the On-Bill/TDV metrics, may or may not be compliant.
  - **Gray** highlight — for scenarios that are not cost-effective on either metric, either compliant currently or likely to be compliant in future.
  - White highlight — for scenarios that are not cost-effective on either metric and are not compliant.
- Compliance results with cell values:
  - “EffTDV Margin” percentages — for scenarios that are compliant, across both Manual and CBECC software output, the reported value is the minimum of the two.
  - “-” for scenarios that do not comply across any one code compliance metric.

“TBD” – for scenarios that are likely to be compliant with modeling updates or software versions in future, maybe compliant across either one of the Manual or CBECC software output approach or has a system type modeling limitation such as central heat pump boiler for Medium Office and Small Hotel. The package names in table results columns are as follows, as defined in Section 3.3:

- **Mixed fuel — Code Min:** Mixed Fuel Code Minimum Efficiency
- **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

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.

## 5.1 Medium Office

For Medium Office, the Reach Code Team analyzed EE measures over mixed fuel baseline model and three electrification packages: 1) Code Min, 2) EE and 3) EE + LF packages, results shown in Table 17.

The most likely all-electric replacement for a central gas boiler serving a VAV 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.

- Results support reach code adoption for energy efficiency measures over mixed fuel baseline, also known as the “Electric-Preferred”. A compliance margin of 4–5% is achievable depending on the climate zone.
- No all-electric package complies with all three-compliance metrics, with the efficiency compliance TDV margin being the most challenging. The Reach Code Team explored other efficiency measures that reduce the efficiency compliance TDV margin, but not enough to make the TDV margin positive. The compliance values are labeled as “TBD” for all-electric packages, as they are likely to be compliant with future modeling and/or software updates. Some climate zones are compliant currently on either one of the Software output or Manual compliance approaches.

**Table 17. Cost-effectiveness and Compliance Summary – Medium Office**

CZ	Utility	Mixed Fuel	All-electric		
		EE	Code Min	EE	EE + LF
cz01	PG&E	4%	TBD	TBD	TBD
cz02	PG&E	5%	TBD	TBD	TBD
cz03	PG&E	5%	TBD	TBD	TBD
cz03-2	PCE	5%	TBD	TBD	TBD
cz04	PG&E	4%	TBD	TBD	TBD
cz04-2	CPAU	4%	TBD	TBD	TBD
cz05	PG&E	5%	TBD	TBD	TBD
cz05-2	SCG	5%	TBD	TBD	TBD
cz06	SCE	5%	TBD	TBD	TBD
cz07	SDG&E	5%	TBD	TBD	TBD
cz08	SCE	5%	TBD	TBD	TBD
cz09	SCE	5%	TBD	TBD	TBD
cz10	SDG&E	5%	TBD	TBD	TBD
cz10-2	SCE	5%	TBD	TBD	TBD
cz11	PG&E	3%	TBD	TBD	TBD
cz12	PG&E	4%	TBD	TBD	TBD
cz12-2	SMUD	4%	TBD	TBD	TBD
cz13	PG&E	4%	TBD	TBD	TBD
cz14	SDG&E	4%	TBD	TBD	TBD
cz14-2	SCE	4%	TBD	TBD	TBD
cz15	SCE	4%	TBD	TBD	TBD
cz16	PG&E	4%	TBD	TBD	TBD

\* These results will be re-evaluated with central heat pump boiler system instead of electric resistance VAV systems, which largely are unable to achieve energy code compliance.

Cell Color		Cell Value	
Green	Cost effective on both TDV/On-Bill metrics	X%	EffTDV Compliance Margin percentages (Lowest common)
Yellow	Cost effective on either TDV/On-Bill metrics	X%	Compliant on both Manual and Software output approaches
Grey	Compliant, not cost effective	TBD	Likely to comply with future modeling updates or software versions, maybe compliant on either Manual or Software output approach
White	Not compliant nor cost effective	-	Not compliant on either approach

## 5.2 Medium Retail

For Medium Retail, the Team analyzed EE measure package over an all-electric baseline model and two mixed fuel packages — Code Min and EE, with results in Table 18.

- Results support reach code adoption for energy efficiency measures over mixed fuel code minimum package, also known as “Electric-Preferred” or “Energy Efficiency” reach code pathways in climate zones 7 and 9.
- Results also support “All-Electric + Efficiency” reach code option, with compliance margins of 4-14% above the all-electric code minimum baseline in climate zones 1-10 and 12-14.
- For some scenarios in climate zone 6, 8, 11, 15 and 16, labeled as “TBD”, the package is cost-effective and likely to be compliant in future with modeling input and/or software version updates.

**Table 18. Cost-effectiveness and Compliance Summary – Medium Retail**

CZ	Utility	Mixed Fuel		All-electric
		Code Min	EE	EE
cz01	PG&E	-	-	6%
cz02	PG&E	-	-	4%
cz03	PG&E	-	-	12%
cz04	PG&E	-	-	11%
cz04-2	CPAU	-	-	11%
cz05	PG&E	-	-	12%
cz05-2	SCG	-	-	12%
cz06	SCE	-	TBD	9%
cz07	SDG&E	-	12%	14%
cz08	SCE	-	TBD	8%
cz09	SCE	-	11%	12%
cz10	SDG&E	-	-	5%
cz10-2	SCE	-	-	5%
cz11	PG&E	-	-	TBD
cz12	PG&E	-	-	10%
cz12-2	SMUD	-	-	10%
cz13	PG&E	-	-	4%
cz14	SDG&E	-	-	7%
cz14-2	SCE	-	-	7%
cz15	SCE	-	-	TBD
cz16	PG&E	-	-	TBD

Cell Color		Cell Value	
	Cost effective on both TDV/On-Bill metrics	X%	EffTDV Compliance Margin percentages (Lowest common) Compliant on both Manual and Software output approaches
	Cost effective on either TDV/On-Bill metrics	TBD	Likely to comply with future modeling updates or software versions, maybe compliant on either Manual or Software output approach
	Compliant, not cost effective	-	Not compliant on either approach
	Not compliant nor cost effective		

### 5.3 Quick-Service Restaurant (QSR)

The Team analyzed efficiency measures over a mixed fuel baseline and electrification packages, with and without cooking appliance electrification. For the “HS” scenario including HVAC and SHW electrification only, packages with EE, EE + LF and EE + PV were analyzed, with results in Table 19.

- Results support reach code adoption for energy efficiency measures over a mixed fuel baseline, also known as “Electric-Preferred” in climate zones 1 to 7 and 13, or “Energy Efficiency” in CZs 1 and 3 to 7.
- All-electric “HS” packages including energy efficiency measures or load flexibility are compliant in CZs 1 and 3 to 7 but cost-effective on at least one metric in CZs 1, 3, 4 (CPAU) and 12 (SMUD) territories only.
- All-electric “HS” HVAC and SHW option can be adopted in CZs 1 and 3-7, it is cost-effective on at least one metric and code compliant with additional efficiency measures and solar PV.
- Packages labeled as “TBD” may or may not be cost-effective but are likely to be compliant in the future with modeling input and/or software updates.

**Table 19. Cost-effectiveness and Compliance Summary – Quick-Service Restaurant (without cooking electrification)**

CZ	Utility	Mixed Fuel	All-electric "HS" (HVAC+SHW)			
		EE	Code Min	EE	EE + LF	EE + PV
cz01	PG&E	16%	-	6%	16%	6%
cz02	PG&E	6%	-	TBD	TBD	TBD
cz03	PG&E	18%	-	8%	13%	8%
cz04	PG&E	16%	-	5%	8%	5%
cz04-2	CPAU	16%	-	5%	8%	5%
cz05	PG&E	18%	-	8%	15%	8%
cz05-2	SCG	18%	-	8%	15%	8%
cz06	SCE	16%	-	3%	6%	3%
cz07	SDG&E	21%	-	9%	13%	9%
cz08	SCE	TBD	-	-	-	TBD
cz09	SCE	TBD	-	TBD	TBD	TBD
cz10	SDG&E	TBD	-	-	-	TBD
cz10-2	SCE	TBD	-	-	-	TBD
cz11	PG&E	TBD	-	TBD	TBD	TBD
cz12	PG&E	TBD	-	TBD	TBD	TBD
cz12-2	SMUD	TBD	-	TBD	TBD	TBD
cz13	PG&E	7%	-	TBD	TBD	TBD
cz14	SDG&E	TBD	-	TBD	TBD	TBD
cz14-2	SCE	TBD	-	TBD	TBD	TBD
cz15	SCE	TBD	-	TBD	TBD	TBD
cz16	PG&E	TBD	-	-	TBD	-

Cell Color		Cell Value	
	Cost effective on both TDV/On-Bill metrics	X%	EffTDV Compliance Margin percentages (Lowest common)
	Cost effective on either TDV/On-Bill metrics		Compliant on both Manual and Software output approaches
	Compliant, not cost effective	TBD	Likely to comply with future modeling updates or software versions, maybe compliant on either Manual or Software output approach
	Not compliant nor cost effective	-	Not compliant on either approach

The Reach Code Team analyzed a completely all-electric package including cooking appliances, results shown in Table 20, which show compliance in many climate zones with added efficiency and load flexibility. Remaining CZs are “TBD”, except climate zone 16, which comply on either one of the Manual or Software output approaches currently and are likely to show compliance with future modeling updates. However, the all-electric package is cost-effective in CZ4 CPAU territory only and very close to being cost-effective in SMUD territory. Cooking electrification is expensive and challenging to show cost-effective.

**Table 20. Cost-effectiveness and Compliance Summary – Quick-Service Restaurant (with cooking electrification)**

CZ	Utility	All-electric		
		Code Min	EE	EE + LF
cz01	PG&E	-	6%	15%
cz02	PG&E	-	TBD	2%
cz03	PG&E	-	10%	14%
cz04	PG&E	-	8%	10%
cz04-2	CPAU	-	8%	10%
cz05	PG&E	-	10%	17%
cz05-2	SCG	-	10%	17%
cz06	SCE	-	6%	10%
cz07	SDG&E	-	11%	14%
cz08	SCE	-	TBD	TBD
cz09	SCE	-	TBD	TBD
cz10	SDG&E	-	TBD	TBD
cz10-2	SCE	-	TBD	TBD
cz11	PG&E	-	TBD	0%
cz12	PG&E	-	TBD	TBD
cz12-2	SMUD	-	TBD	TBD
cz13	PG&E	-	TBD	TBD
cz14	SDG&E	-	TBD	TBD
cz14-2	SCE	-	TBD	TBD
cz15	SCE	-	TBD	2%
cz16	PG&E	-	-	-

Cell Color		Cell Value	
	Cost effective on both TDV/On-Bill metrics	x%	EffTDV Compliance Margin percentages (Lowest common) Compliant on both Manual and Software output approaches
	Cost effective on either TDV/On-Bill metrics	TBD	Likely to comply with future modeling updates or software versions, maybe compliant on either Manual or Software output approach
	Compliant, not cost effective	-	Not compliant on either approach
	Not compliant nor cost effective		

### 5.4 Small Hotel

The Team analyzed EE package over mixed fuel baseline and three electrification packages - Code Min, EE, EE+PV, with results in Table 21.

- Results support reach code adoption for energy efficiency measures over mixed fuel baseline, also known as “Electric-Preferred” reach code pathway with 2-5% compliance margin.
- All-electric packages with efficiency measures and/or solar PV in most CZs are cost-effective and likely to be compliant in future with modeling and/or software version updates. Some climate zones are compliant currently across either one of the Manual or Software output approaches.
- All all-electric scenarios are labeled as “TBD” because 36% of conditioned floor area is nonresidential space and has the same system type limitation as Medium Office (see Section 5.1). Hence, the Small Hotel will be re-evaluated as well with a central heat pump boiler system instead of electric resistance VAV system in early 2023. The current results show compliance on either one of the Manual or Software output approaches in some climate zones with efficiency measures and solar PV, still labeled as “TBD” until the software inconsistencies are resolved.

**Table 21. Cost-effectiveness and Compliance Summary – Small Hotel.**

CZ	Utility	Mixed Fuel	All-electric		
		EE	Code Min	EE	EE + PV
cz01	PG&E	5%	TBD	TBD	TBD
cz02	PG&E	4%	TBD	TBD	TBD
cz03	PG&E	5%	TBD	TBD	TBD
cz04	PG&E	5%	TBD	TBD	TBD
cz04-2	CPAU	5%	TBD	TBD	TBD
cz05	PG&E	5%	TBD	TBD	TBD
cz05-2	SCG	5%	TBD	TBD	TBD
cz06	SCE	5%	TBD	TBD	TBD
cz07	SDG&E	4%	TBD	TBD	TBD
cz08	SCE	5%	TBD	TBD	TBD
cz09	SCE	5%	TBD	TBD	TBD
cz10	SDG&E	5%	TBD	TBD	TBD
cz10-2	SCE	5%	TBD	TBD	TBD
cz11	PG&E	3%	TBD	TBD	TBD
cz12	PG&E	4%	TBD	TBD	TBD
cz12-2	SMUD	4%	TBD	TBD	TBD
cz13	PG&E	3%	TBD	TBD	TBD
cz14	SDG&E	4%	TBD	TBD	TBD
cz14-2	SCE	4%	TBD	TBD	TBD
cz15	SCE	5%	TBD	TBD	TBD
cz16	PG&E	2%	TBD	TBD	TBD

Cell Color		Cell Value	
	Cost effective on both TDV/On-Bill metrics	x%	EffTDV Compliance Margin percentages (Lowest common) Compliant on both Manual and Software output approaches
	Cost effective on either TDV/On-Bill metrics	TBD	Likely to comply with future modeling updates or software versions, maybe compliant on either Manual or Software output approach
	Compliant, not cost effective	-	Not compliant on either approach
	Not compliant nor cost effective		

The Team analyzed an additional scenario that proposes PTHP compared to the same SZAC mixed fuel baseline model, results shown in Table 22. Though PTHP is a much cheaper alternative than SZHP, it is not compliant by itself.

**Table 22. Cost-effectiveness and Compliance Summary – Small Hotel (PTHP)**

CZ	Utility	All-electric
		Code Min (PTHP)
cz01	PG&E	-
cz02	PG&E	-
cz03	PG&E	-
cz04	PG&E	-
cz04-2	CPAU	-
cz05	PG&E	-
cz05-2	SCG	-
cz06	SCE	-
cz07	SDG&E	-
cz08	SCE	-
cz09	SCE	-
cz10	SDG&E	-
cz10-2	SCE	-
cz11	PG&E	-
cz12	PG&E	-
cz12-2	SMUD	-
cz13	PG&E	-
cz14	SDG&E	-
cz14-2	SCE	-
cz15	SCE	-
cz16	PG&E	-

Cell Color		Cell Value	
	Cost effective on both TDV/On-Bill metrics	X%	EffTDV Compliance Margin percentages (Lowest common)
	Cost effective on either TDV/On-Bill metrics		Compliant on both Manual and Software output approaches
	Compliant, not cost effective	TBD	Likely to comply with future modeling updates or software versions, maybe compliant on either Manual or Software output approach
	Not compliant nor cost effective	-	Not compliant on either approach

## 6 Conclusions

The Reach Code Team developed a variety of packages involving fuel substitution, energy efficiency, load flexibility, and solar PV, simulated them in building modeling software, and gathered costs to determine the cost-effectiveness of multiple scenarios. The 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, fuel costs, other costs, energy escalation rates, software or utility tariffs may change the results.

These results, including the attached Reach Code Results Workbook, indicate all-electric packages are capable of achieving the greatest GHG savings as compared to mixed-fuel buildings, see Appendix 8.5. Jurisdictions may adopt a variety of reach codes such as “Energy Efficiency”, “Electric-Preferred”, “All-Electric” or “All-Electric + Efficiency.” In summary:

- The Reach Code Team has identified a cost-effective and code compliant energy efficiency measure package for most prototypes and climate zones analyzed, which supports an “Electric-Preferred” and/or “Energy Efficiency” reach code pathways for jurisdictions.
- “All-Electric” reach codes are feasible for all building types and climate zones when Part 11 is modified, including some exceptions.
  - All-electric HVAC consisting of packaged single zone systems, including rooftop units in the Medium Retail and Quick-Service Restaurant, and single zone heat pumps in the Small Hotel guest rooms, are widely shown to be cost-effective and energy code compliant, with exceptions in CZs 1 and 16.
  - All-electric SHW systems have a prescriptive pathway for all building types and have not been shown to be an impediment to cost-effectiveness or energy code compliance of all-electric packages in this study.
  - All-electric laundry in the Small Hotel can be cost-effective with added energy efficiency and additional solar PV than required prescriptively by 2022 Title 24 code.
  - Medium Office all-electric packages are cost-effective with energy efficiency and load flexibility measures, but not code compliant due to the use of electric resistance VAV reheat systems. The Small Hotel faces a similar issue for its smaller nonresidential area HVAC systems in some climate zones. This indicates that further efficiency measures would need to be added to achieve energy code compliance which may not be cost-effective. As described in Sections 5.1 and 5.4, modeling limitations impacted the code compliance results for the medium office and nonresidential portion of the small hotel. These prototypes will be re-evaluated using a more appropriate central heat pump boiler HVAC system, likely available in compliance software in early 2023. In the meantime, jurisdictions can choose to exempt building systems that do not have a prescriptive compliance pathway in the energy code. See Berkeley’s all-electric ordinance (Berkeley 2019) section 12.80.040.A Exception 1 for an example.
- Commercial kitchen electrification is challenging to design cost-effectively currently. These results align with a previous study focusing on restaurants (Statewide IOU Team 2022). Jurisdictions may choose to exempt cooking appliances until cost-effectiveness factors improve. See Menlo Park’s ordinance (Menlo Park 2019) 100.0(e)2.A Exception 4 for an example.
- For the Medium Retail prototype in CZs 2 to 15, there is already a prescriptive pathway to comply with packaged single zone heat pumps in smaller (<240 kBtuh) thermal zones. This study supports an “All-Electric + Efficiency” reach code pathway for many climates. However, mixed-fuel scenarios with SZAC and gas furnaces for larger (>240 kBtuh) thermal zones are challenging to show cost-effectiveness and/or code compliance, except for climate zones 7 and 9, when including efficiency measures.



Further discussion is required at the jurisdiction and community members to review results and determine appropriate reach code pathways. Please refer to the limitations of this study, described in Section 2.5, while using them to inform reach code policies. Of note:

- The Team employed several CBECC ruleset modifications to support achieving cost-effective packages, especially load flexibility measures. Ruleset modifications cannot be used by the building industry for code compliance without supporting justification or alternate methods. Where jurisdictions want to encourage the adoption of Load Flexibility measures through modeling estimates, the Reach Code Team can support cities and building applicants by providing modeling approximations that may achieve similar energy and compliance total impacts, in coordination with the Energy Commission. For example, for the Demand Response Lighting measure, the Team may be able to share a TDV/ft<sup>2</sup> impact of the measure in that climate zone or provide guidance to the building applicant’s energy consultant on appropriate modeling and documentation.
- Results are predominantly based on the code compliance metrics that are manually calculated based on the mixed fuel baseline model and not the standard design model assumed by the current software version. The Team also provided software reported compliance metrics in the workbook for reference. The Team is in communication with software development team to resolve differences in future iterations of this study and the software and improve code compliance reporting.

Even considering the limitations, this study has identified a set of reach code pathways for all climate zones, and jurisdictions have broad discretion on how to interpret the study’s findings. Jurisdictions can adopt reach codes requiring energy efficiency via a Title 24 Part 6 local amendment, or electrification via a Title 24 Part 11 (or municipal code) amendment, or both. Jurisdictions may choose to except particular building systems from certain reach codes pathways.

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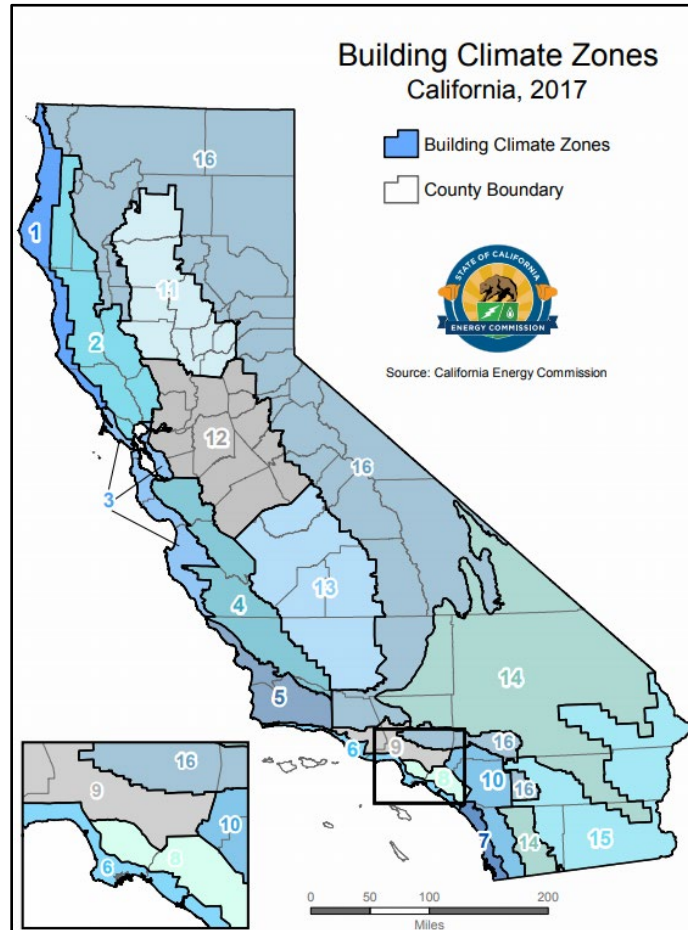
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## 8 Appendices

### 8.1 Map of California CZs

Climate Zone geographical boundaries are depicted in Figure 5 below. An interactive GIS location based map and zip-code based search directory is available at: [Climate Zone tool, maps, and information supporting the California Energy Code](#)

Figure 5. Map of California CZs



## 8.2 Utility Rate Schedules

The Reach Codes Team used the IOU and POU rates depicted in to determine the On-Bill savings for each prototype.

**Table 23. Utility Tariffs Analyzed Based on CZ – Detailed View**

CZs	Utility	Electric Rate (Time of Use)				Gas Rate
		Medium Office	Medium Retail	QSR	Small Hotel	All Prototypes
CZ01	PG&E	B-10	B-1	B-1	B-1 or B-10	G-NR1
CZ02	PG&E	B-10	B-1 or B-10	B-1 or B-10	B-1 or B-10	G-NR1
CZ03	PG&E	B-10	B-1	B-1	B-1 or B-10	G-NR1
CZ04	PG&E	B-10	B-1 or B-10	B-1 or B-10	B-1 or B-10	G-NR1
CZ04-2	CPAU	E-2	E-2	E-2	E-2	G-2
CZ05	PG&E	B-10	B-1	B-1	B-1 or B-10	G-NR1
CZ05-2	SCG	B-10	B-1	B-1	B-1 or B-10	G-10 (GN-10)
CZ06	SCE	TOU-GS-2	TOU-GS-2	TOU-GS-2	TOU-GS-2	G-10 (GN-10)
CZ07	SDG&E	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	GN-3
CZ08	SCE	TOU-GS-2	TOU-GS-2	TOU-GS-2	TOU-GS-2	G-10 (GN-10)
CZ09	SCE	TOU-GS-2	TOU-GS-2	TOU-GS-2	TOU-GS-2	G-10 (GN-10)
CZ10	SDG&E	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	G-10 (GN-10)
CZ10-2	SCE	TOU-GS-2	TOU-GS-2	TOU-GS-2	TOU-GS-2	GN-3
CZ11	PG&E	B-10	B-10	B-1 or B-10	B-10	G-NR1
CZ12	PG&E	B-10	B-1 or B-10	B-1 or B-10	B-10	G-NR1
CZ12-2	SMUD	CITS-1 (CI-TOD 1)	CITS-1 (CI-TOD 1)	CITS-1 (CI-TOD 1)	CITS-1	G-NR1
CZ13	PG&E	B-10	B-10	B-1 or B-10	B-10	G-NR1
CZ14	SDG&E	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	G-10 (GN-10)
CZ14-2	SCE	TOU-GS-2	TOU-GS-2	TOU-GS-2	TOU-GS-2 or TOU-GS-3	GN-3
CZ15	SCE	TOU-GS-2	TOU-GS-2	TOU-GS-2	TOU-GS-2	G-10 (GN-10)
CZ16	PG&E	B-10	B-1 or B-10	B-1 or B-10	B-1 or B-10	G-NR1

8.2.1 PG&E

Figure 6. PG&E Electric Schedule - B-1


	<b>Pacific Gas and Electric Company</b> U 39 San Francisco, California	Cancelling Revised Revised	Cal. P.U.C. Sheet No. 53377-E Cal. P.U.C. Sheet No. 52618-E
	<b>ELECTRIC SCHEDULE B-1                  SMALL GENERAL SERVICE</b>		Sheet 3
RATES: Total bundled service charges are calculated using the total rates shown below. Direct Access (DA) and Community Choice Aggregation (CCA) charges shall be calculated in accordance with the paragraph in this rate schedule titled Billing.			
<u>Total Bundled Time-of-Use Rates</u>		<u>B-1 Rates</u>	<u>B1-ST Rates</u> (T)
<u>Total Customer Charge Rates</u>			
Customer Charge Single-phase (\$ per meter per day)	\$0.32854		\$0.32854
Customer Charge Poly-phase (\$ per meter per day)	\$0.82138		\$0.82138
<u>Demand Charge (for B1-ST only)</u> Total Demand Rate (per metered kW/month assessed from 2:00 p.m. to 11:00 p.m. only)			
Summer	---		\$4.75 (I)
Winter	---		\$4.75 (I)
<u>Total TOU Energy Rates (\$ per kWh)</u>			
Peak Summer	\$0.38827	(I)	\$0.44884 (I)
Part-Peak Summer	\$0.33904	(I)	\$0.30754 (I)
Off-Peak Summer	\$0.31824	(I)	\$0.26021 (I)
Peak Winter	\$0.31285	(I)	\$0.35089 (I)
Partial-Peak Winter (for B1-ST only)	---		\$0.32139 (I)
Off-Peak Winter	\$0.29674	(I)	\$0.23234 (I)
Super Off-Peak Winter	\$0.28032	(I)	\$0.21592 (I)
<u>PDP Rates (Consecutive Day and Five-Hour Event Option)*</u>			
PDP Charges (\$ per kWh)			
All Usage During PDP Event	\$0.60		
PDP Credits			
Energy (\$ per kWh)			
Peak Summer	(\$0.05687)		
Part-Peak Summer	(\$0.01683)		
* See PDP Detail, section g, for corresponding reduction in PDP credits and charges if other option(s) elected.			
(Continued)			
Advice Decision	6603-E-A	Issued by <b>Robert S. Kenney</b> Vice President, Regulatory Affairs	Submitted Effective Resolution May 31, 2022 June 1, 2022

Figure 7. PG&E Electric Schedule - B-10


 U 39	<b>Pacific Gas and Electric Company<sup>®</sup></b> San Francisco, California	Cancelling	Revised	Cal. P.U.C. Sheet No.	53381-E
			Revised	Cal. P.U.C. Sheet No.	52969-E
<b>ELECTRIC SCHEDULE B-10</b> MEDIUM GENERAL DEMAND-METERED SERVICE				Sheet 3	
RATE:					
Total bundled service charges shown on customers' bills are unbundled according to the component rates shown below. Direct Access (DA) and Community Choice Aggregation (CCA) charges shall be calculated in accordance with the paragraph in this rate schedule titled Billing.					
<b>TOTAL BUNDLED TIME-OF-USE RATES</b>					
		Secondary Voltage	Primary Voltage	Transmission Voltage	(T)
<b>Total Customer Charge Rates</b>					
Customer Charge (\$ per meter per day)	\$6.42016	(I)	\$6.42016	(I)	\$6.42016 (I)
<b>Total Demand Rates (\$ per kW)</b>					
Summer	\$17.47	(I)	\$17.19	(I)	\$13.66 (I)
Winter	\$17.47	(I)	\$17.19	(I)	\$13.66 (I)
<b>Total Energy Rates (\$ per kWh)</b>					
Peak Summer	\$0.31411	(I)	\$0.29823	(I)	\$0.23025 (I)
Part-Peak Summer	\$0.25242	(I)	\$0.23993	(I)	\$0.17351 (I)
Off-Peak Summer	\$0.21985	(I)	\$0.20909	(I)	\$0.14344 (I)
Peak Winter	\$0.23784	(I)	\$0.22538	(I)	\$0.17720 (I)
Off-Peak Winter	\$0.20236	(I)	\$0.19174	(I)	\$0.14436 (I)
Super Off-Peak Winter	\$0.16802	(I)	\$0.15540	(I)	\$0.10802 (I)
<b>PDP Rates (Consecutive Day and Five-Hour Event Option)</b>					
<b>PDP Charges (\$ per kWh)</b>					
All Usage During PDP Event	\$0.90		\$0.90		\$0.90
<b>PDP Credits Energy (\$ per kWh)</b>					
Peak Summer	(\$0.07825)		(\$0.07825)		(\$0.07825)
Part-Peak Summer	(\$0.02710)		(\$0.02710)		(\$0.02710)
* See PDP Details, section g, for corresponding reduction in PDP credits and charges if other option(s) elected.					
(Continued)					
Advice Decision	6603-E-A	Issued by <b>Robert S. Kenney</b> Vice President, Regulatory Affairs		Submitted Effective Resolution	May 31, 2022 June 1, 2022



Figure 8. PG&E Gas Schedule – G-NR1

**Core Commercial Gas Rates**

Rates below are effective October 1, 2022, through October 31, 2022.

**Small Commercial: Schedule G-NR1** (Usage less than 20,800 therms per month)\*

	HIGHEST AVERAGE DAILY USAGE**				
	0 - 5.0 THERMS	5.1 - 16.0 THERMS	16.1 - 41.0 THERMS	41.1 - 123.0 THERMS	123.1 & UP THERMS
Customer Charge (per day)	\$0.27048	\$0.52106	\$0.95482	\$1.66489	\$2.14936
		PER THERM			
		SUMMER		WINTER	
		FIRST 4,000 THERMS	EXCESS THERMS	FIRST 4,000 THERMS	EXCESS THERMS
Procurement Charge (per therm)		\$0.87890	\$0.87890	\$0.87890	\$0.87890
Transportation Charge (per therm)		\$0.93090	\$0.58273	\$1.09498	\$0.68545
<b>Total G-NR1 Schedule Charge <sup>1/</sup></b>		<b>\$1.80980</b>	<b>\$1.46163</b>	<b>\$1.97388</b>	<b>\$1.56435</b>
Cap-and-Trade Cost Exemption Credit <sup>2/</sup>		\$0.10235			
Schedule G-PPPS (Public Purpose Program Surcharge) <sup>1/</sup> (per therm)		\$0.06237	\$0.06237	\$0.06237	\$0.06237

\*Excluding months during which usage is less than 200 therms.

\*\*Based on customer's highest Average Daily Usage (ADU) determined from among the billing periods occurring within the last twelve months, including current billing period. PG&E calculates the ADU for each billing period by dividing the total usage by the number of days in the billing period.



8.2.2 SCE

Figure 9. SCE Electric Schedule – TOU-GS-1

**SOUTHERN CALIFORNIA EDISON**  
An Edison International Company  
Southern California Edison  
Rosemead, California (U 338-E)

Revised Cal. PUC Sheet No. 74535-E  
Cancelling Revised Cal. PUC Sheet No. 73990-E

**Schedule TOU-GS-1**  
**TIME-OF-USE**  
**GENERAL SERVICE**  
(Continued)

Sheet 5

**RATES (Continued)**

Option D	Delivery Service								Generation*		
	Trans <sup>1</sup>	Distrib <sup>2</sup>	NSGC <sup>3</sup>	NDC <sup>4</sup>	PPPC <sup>5</sup>	WFC <sup>6</sup>	DWRA <sup>11</sup>	PUCRF <sup>8</sup>	Total <sup>9</sup>	UG <sup>10</sup>	DWREC <sup>11</sup>
<b>Energy Charge - \$/Wh</b>											
Summer Season On-Peak	(0.00059)	0.03298 (R)	0.00967 (R)	0.00010	0.01845 (R)	0.00952	(0.00208)	0.00130	0.06625 (R)	0.11330 (I)	0.00000
Mid-Peak	(0.00059)	0.03298 (R)	0.00967 (R)	0.00010	0.01845 (R)	0.00952	(0.00208)	0.00130	0.06625 (R)	0.10231 (I)	0.00000
Off-Peak	(0.00059)	0.01374 (I)	0.00967 (R)	0.00010	0.01845 (R)	0.00952	(0.00208)	0.00130	0.04731 (I)	0.06705 (I)	0.00000
Winter Season											
Mid-Peak	(0.00059)	0.03298 (R)	0.00967 (R)	0.00010	0.01845 (R)	0.00952	(0.00208)	0.00130	0.06925 (R)	0.10988 (I)	0.00000
Off-Peak	(0.00059)	0.01374 (I)	0.00967 (R)	0.00010	0.01845 (R)	0.00952	(0.00208)	0.00130	0.04731 (I)	0.07551 (R)	0.00000
Super-Off-Peak	(0.00059)	0.00520 (R)	0.00967 (R)	0.00010	0.01845 (R)	0.00952	(0.00208)	0.00130	0.03877 (R)	0.05654 (R)	0.00000
<b>Fixed Recovery Charge - \$/Wh</b>											
Customer Charge - \$/day		0.498 (R)							0.498 (R)		
<b>Facilities Related Demand Charge - \$/kW</b>											
	3.81	13.16 (I)							16.97 (I)		
<b>Time Related Demand Charge - \$/kW</b>											
Summer Season On-Peak		3.80 (R)							3.80 (R)	15.97 (R)	
Winter Season											
Mid-peak - Weekdays (4-4pm)		0.00							0.00	4.90 (I)	
<b>Three-Phase Service - \$/day</b>											
		0.048 (I)							0.048 (I)		
<b>Voltage Discount, Energy - \$/Wh</b>											
From 2 kV to 50 kV	0.00000	0.00000 (R)							0.00000 (R)	(0.00945) (R)	
From 51 kV to 219 kV	0.00000	0.00000 (R)							0.00000 (R)	(0.00069) (R)	
220 kV and above	0.00000	(0.01943) (R)							(0.01943) (R)	(0.00002) (R)	
<b>Voltage Discount, Demand - \$/kW</b>											
Facilities Related											
From 2 kV to 50 kV	0.00	(0.26) (I)							(0.26) (I)		
Above 50 kV but below 220 kV	0.00	(5.78) (R)							(5.78) (R)		
At 220 kV	0.00	(13.16) (I)							(13.16) (I)		
<b>Voltage Discount, Summer On Peak Demand - \$/kW</b>											
From 2 kV to 50 kV		(0.08) (I)							(0.08) (I)	(0.20)	
Above 50 kV but below 220 kV		(1.44) (I)							(1.44) (I)	(0.47)	
At 220 kV		(1.44) (R)							(1.44) (R)	(0.47)	
<b>Voltage Disc, Winter Weekdays (4-4pm) Demand - \$/kW</b>											
From 2 kV to 50 kV		0.00							0.00	(0.20)	
Above 50 kV but below 220 kV		0.00							0.00	(0.47)	
At 220 kV		0.00							0.00	(0.47)	
<b>California Alternate Rates for Energy Discount - %</b>											
		100.00*							100.00*		
<b>California Climate Credit - \$/meter</b>											
		(59.00)							(59.00)		

\* Represents 100% of the discount percentage as shown in the applicable Special Condition of this Schedule.  
 \*\* The ongoing Competition Transition Charge (CTC) of \$(0.00015) per kWh is recovered in the UG component of Generation.  
 1 Trans - Transmission and the Transmission Owners Tariff Charge Adjustments (TOTCA) which are FERC approved. The TOTCA represents the Transmission Revenue Balancing Account Adjustment (TRBAA) of \$(0.00141) per kWh, Reliability Services Balancing Account Adjustment (RSBAA) of \$(0.00087) per kWh, and Transmission Access Charge Balancing Account Adjustment (TACBAA) of \$0.00189 per kWh  
 2 Distribn - Distribution  
 3 NSGC - New System Generation Charge  
 4 NDC - Nuclear Decommissioning Charge  
 5 PPPC - Public Purpose Programs Charge (includes California Alternate Rates for Energy Surcharge where applicable.)  
 6 WFC - Wildfire Fund Non-Bypassable Charge. The Wildfire Fund Non-Bypassable Charge supports the California Wildfire Fund and is not applicable to exempt Customers pursuant to D.19-10-056.  
 7 PUCRF - The PUC Reimbursement Fee is described in Schedule RF-E.  
 8 Total - Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.  
 9 Generation - The Generation rates are applicable only to Bundled Service Customers. See Special Condition below for PCIA recovery.  
 10 DWREC - Department of Water Resources (DWR) Energy Credit - For more information on the DWR Energy Credit, see the Billing Calculation Special Condition of this Schedule.  
 11 DWRA - A refund from the California Department of Water Resources (DWR) relating to the purchase of power during the 2000-2001 energy crisis.

(Continued)

(To be inserted by utility)

Advice 4864-E  
Decision 22-08-001

Issued by  
Michael Backstrom  
Vice President

(To be inserted by Cal. PUC)

Date Submitted Sep 15, 2022  
Effective Oct 1, 2022  
Resolution \_\_\_\_\_

8C11

Figure 10. SCE Electric Schedule – TOU-GS-2



Southern California Edison  
Rosemead, California (U 338-E)

Revised Cal. PUC Sheet No. 74551-E  
Cancelling Revised Cal. PUC Sheet No. 74003-E

Schedule TOU-GS-2										Sheet 4		
TIME-OF-USE - GENERAL SERVICE - DEMAND METERED												
(Continued)												
RATES (Continued)												
TOU Pricing	Option D / Option D-CPP	Delivery Service								Generation*		
		Trans <sup>1</sup>	Distrib <sup>2</sup>	NSGC <sup>3</sup>	NDC <sup>4</sup>	PPPC <sup>5</sup>	WFC <sup>6</sup>	DWRA <sup>11</sup>	PUCRF <sup>7</sup>	Total <sup>8</sup>	Gen <sup>9</sup>	DWREC <sup>10</sup>
Energy Charge - \$/kWh	Summer Season - On-Peak	(0.00012)	0.01503 (R)	0.00940 (R)	0.00010	0.01919 (R)	0.00062	(0.00200)	0.00130	0.04694 (R)	0.10001 (R)	0.00000
	Mid-Peak	(0.00012)	0.01433 (R)	0.00940 (R)	0.00010	0.01919 (R)	0.00062	(0.00200)	0.00130	0.04694 (R)	0.09921 (R)	0.00000
	Off-Peak	(0.00012)	0.01403 (R)	0.00940 (R)	0.00010	0.01919 (R)	0.00062	(0.00200)	0.00130	0.04634 (R)	0.09305 (R)	0.00000
	Winter Season - Mid-Peak	(0.00012)	0.01503 (R)	0.00940 (R)	0.00010	0.01919 (R)	0.00062	(0.00200)	0.00130	0.04694 (R)	0.07345 (R)	0.00000
	Off-Peak	(0.00012)	0.01433 (R)	0.00940 (R)	0.00010	0.01919 (R)	0.00062	(0.00200)	0.00130	0.04694 (R)	0.07339 (R)	0.00000
	Super-Off-Peak	(0.00012)	0.01359 (R)	0.00940 (R)	0.00010	0.01919 (R)	0.00062	(0.00200)	0.00130	0.04790 (R)	0.05079 (R)	0.00000
Fixed Recovery Charge - \$/kWh										0.00089 (R)		
Customer Charge - \$/Meter/Month				189.75 (R)						189.75 (R)		
Facilities Related Demand Charge - \$/kW		5.14		16.40 (R)						21.62 (R)		
Time Related Demand Charge - \$/kW												
Summer Season - \$/kW	On-Peak			13.63 (R)						13.63 (R)	20.20 (R)	
Winter Season - \$/kW	Mid-peak - Weekdays (4-4pm)			2.20 (R)						2.20 (R)	5.30 (R)	
Single Phase Service - \$/Month				(6.58) (R)						(6.58) (R)		
Voltage Discount, Demand - \$/kW	Facilities Related											
	From 2 kV to 50 kV	0.00		(0.33) (R)						(0.33) (R)	0.00	
	Above 50 kV but below 220 kV	0.00		(7.34) (R)						(7.34) (R)	0.00	
	At 220 kV	0.00		(16.40) (R)						(16.40) (R)	0.00	
Voltage Discount, Summer On Peak - \$/kW	From 2 kV to 50 kV	0.00		(0.27) (R)						(0.27) (R)	(0.48) (R)	
	Above 50 kV but below 220 kV	0.00		(5.15) (R)						(5.15) (R)	(1.06) (R)	
	At 220 kV	0.00		(13.63) (R)						(13.63) (R)	(1.07) (R)	
Voltage Discount, Winter Weekday Mid-Peak - \$/kW	From 2 kV to 50 kV	0.00		(0.04) (R)						(0.04) (R)	(0.12) (R)	
	Above 50 kV but below 220 kV	0.00		(0.83) (R)						(0.83) (R)	(0.28) (R)	
	At 220 kV	0.00		(0.20) (R)						(0.20) (R)	(0.28) (R)	
Voltage Discount, Energy - \$/kWh	From 2 kV to 50 kV	0.00000		(0.00205) (R)						(0.00205) (R)	(0.00391) (R)	
	Above 50 kV but below 220 kV	0.00000		(0.00494) (R)						(0.00494) (R)	(0.00187) (R)	
	At 220 kV	0.00000		(0.01314) (R)						(0.01314) (R)	(0.00199) (R)	
California Alternate Rates for Energy Discount - %	\$/Meter/Month			100.00*						100.00*		
TOU Option	RTEM			25.83						25.83		
California Climate Credit - \$/meter				(59.00)						(59.00)		
Option D-CPP											0.80000	
CPP Event Energy Charge - \$/kWh												0.80000
Summer CPP Non-Event Credit												(6.85)
On-Peak Demand Credit - \$/kW												
Maximum Available Credit - \$/kW*	Summer (4-6pm)											(20.20) (R)

\* Represents 100% of the discount percentage as shown in the applicable Special Condition of this Schedule.  
 \*\* The ongoing Competition Transition Charge (CTC) of \$(0.00015) per kWh is recovered in the UG component of Generation. (R)  
 \*\*\* The Maximum Available Credit is the capped credit amount for CPP Customers dual participating in other demand response programs.  
 1 Trans - Transmission and the Transmission Owners Tariff Charge Adjustments (TOTCA) which are FERC approved. The TOTCA represents the Transmission Revenue Balancing Account Adjustment (TRBAA) of \$(0.0141) per kWh, Reliability Services Balancing Account Adjustment (RSBAA) of \$(0.00060) per kWh, and Transmission Access Charge Balancing Account Adjustment (TACBAA) of \$0.00189 per kWh.  
 2 Distribn - Distribution  
 3 NSGC - New System Generation Charge  
 4 NDC - Nuclear Decommissioning Charge  
 5 PPPC - Public Purpose Programs Charge (Includes California Alternate Rates for Energy Surcharge where applicable.)  
 6 WFC - Wildfire Fund Non-Bypassable Charge. The Wildfire Fund Non-Bypassable Charge supports the California Wildfire Fund and is not applicable to exempt Customers pursuant to D.19-10-056.  
 7 PUCRF - The PUC Reimbursement Fee is described in Schedule RF-E.  
 8 Total - Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.  
 9 Generation - The Generation rates are applicable only to Bundled Service Customers. See Special Condition below for PCIA recovery.  
 10 DWREC - Department of Water Resources (DWR) Energy Credit - For more information on the DWR Energy Credit, see the Billing Calculation Special Condition of this Schedule.  
 11 DWRA - A refund from the California Department of Water Resources (DWR) relating to the purchase of power during the 2000-2001 energy crisis.

(Continued)

(To be inserted by utility)  
 Advice 4864-E  
 Decision 22-08-001  
 4C11

Issued by  
Michael Backstrom  
 Vice President

(To be inserted by Cal. PUC)  
 Date Submitted Sep 15, 2022  
 Effective Oct 1, 2022  
 Resolution \_\_\_\_\_

Figure 11. SCE Electric Schedule – TOU-GS-3



Southern California Edison  
Rosemead, California (U 338-E)

Revised Cal. PUC Sheet No. 73208-E  
Cancelling Revised Cal. PUC Sheet No. 72721-E

Schedule TOU-GS-3										Sheet 3	
TIME-OF-USE - GENERAL SERVICE - DEMAND METERED											
(Continued)											
RATES (Continued)											
Delivery Service										Generation*	
Trans	Distribn	NSGC	NDC	PPPC	DWRBC	PUCRF	Total	UG**	DWREC**		
<b>Option D / Option D-CPP</b>											
Energy Charge - \$/Wh/Meter/Month											
Summer Season - On-Peak											
	0.00095	0.00098 (I)	0.00888 (R)	0.00010	0.01771 (R)	0.00652	0.00130	0.04540 (R)	0.10353 (I)	0.00000	
Summer Season - Mid-Peak											
	0.00095	0.00098 (I)	0.00888 (R)	0.00010	0.01771 (R)	0.00652	0.00130	0.04540 (R)	0.09309 (I)	0.00000	
Summer Season - Off-Peak											
	0.00095	0.00098 (I)	0.00888 (R)	0.00010	0.01771 (R)	0.00652	0.00130	0.04540 (R)	0.06120 (I)	0.00000	
Winter Season											
Winter Season - Mid-Peak											
	0.00095	0.00098 (I)	0.00888 (R)	0.00010	0.01771 (R)	0.00652	0.00130	0.04540 (R)	0.08038 (I)	0.00000	
Winter Season - Off-Peak											
	0.00095	0.00098 (I)	0.00888 (R)	0.00010	0.01771 (R)	0.00652	0.00130	0.04540 (R)	0.06747 (I)	0.00000	
Winter Season - Super-Off-Peak											
	0.00095	0.00098 (I)	0.00888 (R)	0.00010	0.01771 (R)	0.00652	0.00130	0.04540 (R)	0.04329 (I)	0.00000	
Customer Charge - \$/Meter/Month											
			496.98 (I)					496.98 (I)			
Demand Charge - \$/kW of Billing Demand/Meter/Month											
Facilities Related											
	5.65	13.29 (I)						18.94 (I)			
Time Related											
Summer Season - On-Peak											
		16.14 (I)						16.14 (I)	22.36 (I)		
Winter Season - Mid-Peak - Weekdays (4-9pm)											
		5.47 (I)						5.47 (I)	4.06 (I)		
Voltage Discount, Demand - \$/kW											
Facilities Related											
			0.00					(0.19) (I)			
			0.00					(8.13) (I)			
			0.00					(13.29) (I)			
Voltage Discount, Summer On Peak and Winter Weekdays (4-9pm) Demand - \$/kW											
			0.00					(0.13)	(0.18) (I)		
			0.00					(3.93) (I)	(0.47) (I)		
			0.00					(9.31) (I)	(0.47) (I)		
Voltage Discount, Energy - \$/Wh											
			0.00000					(0.00013)	(0.00104) (I)		
			0.00000					(0.00364) (I)	(0.00229) (I)		
			0.00000					(0.00670) (I)	(0.00250) (I)		
Power Factor Adjustment - \$/kVAR											
								0.54			
								0.80			
California Alternate Rates for Energy Discount - %											
			100.00*					100.00*			
<b>Option D-CPP</b>											
CPP Event Energy Charge - \$/MWh											
									0.80000		
Summer CPP Non-Event Credit											
									(7.55)		
On-Peak Demand Credit - \$/kW											
Maximum Available Credit - \$/kW**											
											(22.36) (I)

(To be inserted by utility)  
Advice 4719-E  
Decision \_\_\_\_\_

Issued by  
Michael Backstrom  
Vice President

(To be inserted by Cal. PUC)  
Date Submitted Feb 15, 2022  
Effective Mar 1, 2022  
Resolution \_\_\_\_\_

307

8.2.3 SCG

Figure 12. SCG Gas Schedule – G-10

**SOUTHERN CALIFORNIA GAS COMPANY** Revised CAL. P.U.C. SHEET NO. 46445-G  
 LOS ANGELES, CALIFORNIA CANCELING Revised CAL. P.U.C. SHEET NO. 46215-G  
 43002-G

Schedule No. G-10 Sheet 1  
**CORE COMMERCIAL AND INDUSTRIAL SERVICE**  
 (Includes GN-10, GN-10C and GT-10 Rates)

**APPLICABILITY**

Applicable to core non-residential natural gas service, including both procurement service (GN rates) and transportation-only service (GT rates) including Core Aggregation Transportation (CAT). This schedule is also available to residential customers with separately metered service to common facilities (swimming pools, recreation rooms, saunas, spas, etc.) only and otherwise eligible for service under rates designated for GM-C, GM-CC, GM-BC, GM-BCC, GT-MC or GT-MBC, as appropriate, if so elected by the customer. Also applicable to service not provided under any other rate schedule. Pursuant to D.02-08-065, this schedule is not available to those electric generation, refinery, and enhanced oil recovery customers that are defined as ineligible for core service in Rule No. 23.B.

The California Alternate Rates for Energy (CARE) discount of 20%, reflected as a separate line item on the bill, is applicable to Nonprofit Group Living Facilities and Qualified Agricultural Employee Housing Facilities (migrant farmworker housing centers, privately owned employee housing, and agricultural employee housing operated by nonprofit entities) that meet the requirements for the CARE as set forth in Schedule No. G-CARE.

**TERRITORY**

Applicable throughout the service territory.

**RATES**

**Customer Charge**

Per meter, per day:

All customers except "Space Heating Only"	49.315¢
"Space Heating Only" customers:	
Beginning Dec. 1 through Mar. 31	\$1.48760
Beginning Apr. 1 through Nov. 30	None

(Continued)

(TO BE INSERTED BY UTILITY)

ADVICE LETTER NO. 4152  
 DECISION NO. 98-07-068  
1011

ISSUED BY  
**Lee Schavrien**  
 Senior Vice President  
 Regulatory Affairs

(TO BE INSERTED BY CAL. PUC)

DATE FILED Sep 30, 2010  
 EFFECTIVE Oct 1, 2010  
 RESOLUTION NO. \_\_\_\_\_



SOUTHERN CALIFORNIA GAS COMPANY Revised CAL P.U.C. SHEET NO. 60204-G  
 LOS ANGELES, CALIFORNIA CANCELING Revised CAL P.U.C. SHEET NO. 60169-G

Schedule No. G-10 Sheet 2  
**CORE COMMERCIAL AND INDUSTRIAL SERVICE**  
 (Includes GN-10, GN-10C and GT-10 Rates)  
 (Continued)

RATES (Continued)

All Procurement, Transmission, and Commodity Charges are billed per therm.

	<u>Tier I<sup>1/</sup></u>	<u>Tier II<sup>1/</sup></u>	<u>Tier III<sup>1/</sup></u>	
<u>GN-10:</u> <sup>4/</sup> Applicable to natural gas procurement service to non-residential core customers, including service not provided under any other rate schedule.				
Procurement Charge: <sup>2/</sup> G-CPNR .....	64.959¢	64.959¢	64.959¢	R,R,R
<u>Transmission Charge:</u> GPT-10 .....	106.047¢	60.635¢	30.186¢	
Commodity Charge: GN-10 .....	171.006¢	125.594¢	95.145¢	R,R,R
<u>GN-10C:</u> <sup>4/</sup> Core procurement service for previous non-residential transportation-only customers returning to core procurement service, including CAT customers with annual consumption over 50,000 therms, as further defined in Schedule No. G-CP.				
Procurement Charge: <sup>2/</sup> G-CPNRC .....	72.898¢	72.898¢	72.898¢	
<u>Transmission Charge:</u> GPT-10 .....	106.047¢	60.635¢	30.186¢	
Commodity Charge: GN-10C .....	178.945¢	133.533¢	103.084¢	
<u>GT-10:</u> <sup>4/</sup> Applicable to non-residential transportation-only service including CAT service, as set forth in Special Condition 13.				
Transmission Charge: GT-10 .....	106.047¢ <sup>3/</sup>	60.635¢ <sup>3/</sup>	30.186¢ <sup>3/</sup>	

<sup>1/</sup> Tier I rates are applicable for the first 250 therms used per month. Tier II rates are applicable for usage above Tier I quantities and up through 4,167 therms per month. Tier III rates are applicable for all usage above 4,167 therms per month. Under this schedule, the winter season shall be defined as December 1 through March 31 and the summer season as April 1 through November 30.

<sup>2/</sup> This charge is applicable for service to Utility Procurement Customers as shown in Schedule No. G-CP, in the manner approved by D.96-08-037, and subject to change monthly, as set forth in Special Condition 5.

<sup>3/</sup> These charges are equal to the core commodity rate less the following two components as approved in D.97-04-082: (1) the weighted average cost of gas; and (2) the core brokerage fee.

(Footnotes continue next page.)

(Continued)


(TO BE INSERTED BY UTILITY)  
 ADVICE LETTER NO. 6051  
 DECISION NO. 98-07-068  
208

ISSUED BY  
**Dan Skopec**  
 Senior Vice President  
 Regulatory Affairs

(TO BE INSERTED BY CAL. PUC)  
 SUBMITTED Oct 31, 2022  
 EFFECTIVE Nov 1, 2022  
 RESOLUTION NO. \_\_\_\_\_

8.2.4 SDG&E

Figure 13. SDG&E Electric Schedule – AL-TOU



San Diego Gas & Electric Company  
San Diego, California

Revised Cal. P.U.C. Sheet No. 35374-E  
 Canceling Revised Cal. P.U.C. Sheet No. 31333-E

**SCHEDULE AL-TOU** Sheet 2  
GENERAL SERVICE - TIME METERED

**RATES\***

Description – AL-TOU	Transm	Distr	PPP	ND	CTC	LGC	RS	TRAC	UDC Total
<b>Basic Service Fees</b>									
(\$/month)									
<u>0-500 kW</u>									
Secondary		199.35	I						199.35 I
Primary		53.75	I						53.75 I
Secondary Substation		18,717.35	I						18,717.35 I
Primary Substation		18,717.35	I						18,717.35 I
Transmission		289.91	I						289.91 I
<u>&gt; 500 kW</u>									
Secondary		766.91	I						766.91 I
Primary		63.95	I						63.95 I
Secondary Substation		18,717.35	I						18,717.35 I
Primary Substation		18,717.35	I						18,717.35 I
Transmission		1,159.95	I						1,159.95 I
<u>&gt; 12 MW</u>									
Secondary Substation		31,585.50	I						31,585.50 I
Primary Substation		31,644.17	I						31,644.17 I
<u>Trans. Multiple Bus</u>		3,000.00							3,000.00
<u>Distance Adjust. Fee</u>									
Secondary - OH		1.23							1.23
Secondary - UG		3.17							3.17
Primary - OH		1.22							1.22
Primary - UG		3.13							3.13

(Continued)

2C7

Advice Ltr. No. 3855-E

Decision No. 21-07-010

Issued by  
**Dan Skopec**  
 Vice President  
 Regulatory Affairs

Submitted Sep 30, 2021

Effective Nov 1, 2021

Resolution No. \_\_\_\_\_



San Diego Gas & Electric Company  
 San Diego, California

Revised Cal. P.U.C. Sheet No. 36350-E

Canceling Revised Cal. P.U.C. Sheet No. 35768-E

**SCHEDULE AL-TOU**  
GENERAL SERVICE - TIME METERED

Sheet 3

RATES\* (Continued)

Description – AL-TOU	Transm	Distr	PPP	ND	CTC	LGC	RS	TRAC	UDC Total
<u>Demand Charges (\$/kW)</u>									
<u>Non-Coincident</u>									
Secondary	18.63	12.69	I		0.00		0.00		31.32 I
Primary	18.00	12.62	I		0.00		0.00		30.62 I
Secondary Substation	18.63	0.23	I	0.52	0.37	I	0.00		19.75 I
Primary Substation	18.00	0.23	I	0.52	0.37	I	0.00		19.12 I
Transmission	17.93	0.23	I	0.52	0.37	I	0.00		19.05 I
<u>Maximum On-Peak</u>									
<u>Summer</u>									
Secondary	3.90	23.90	I						27.80 I
Primary	3.77	23.77	I						27.54 I
Secondary Substation	3.90	0.00							3.90
Primary Substation	3.77	0.00							3.77
Transmission	3.75	0.00							3.75
<u>Winter</u>									
Secondary	0.82	27.92	I						28.74 I
Primary	0.79	27.77	I						28.56 I
Secondary Substation	0.82	0.00							0.82
Primary Substation	0.79	0.00							0.79
Transmission	0.79	0.00							0.79
<u>Power Factor (\$/kvar)</u>									
Secondary		0.25							0.25
Primary		0.25							0.25
Secondary Substation		0.25							0.25
Primary Substation		0.25							0.25
Transmission		0.00							0.00

(Continued)

3C9  
 Advice Ltr. No. 4004-E  
 Decision No. 22-03-003

Issued by  
**Dan Skopec**  
 Vice President  
 Regulatory Affairs

Submitted May 16, 2022  
 Effective Jun 1, 2022  
 Resolution No. \_\_\_\_\_



San Diego Gas & Electric Company  
 San Diego, California

Revised Cal. P.U.C. Sheet No. 36351-E

Canceling Revised Cal. P.U.C. Sheet No. 35769-E

**SCHEDULE AL-TOU**  
**GENERAL SERVICE - TIME METERED**

Sheet 4

RATES\* (Continued)

Description - AL-TOU	Transm	Distr	PPP	ND	CTC	LGC	RS	TRAC	UDC Total
<b>Energy Charges (\$/kWh)</b>									
<b>On-Peak - Summer</b>									
Secondary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Primary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Secondary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Primary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Transmission	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
<b>Off-Peak - Summer</b>									
Secondary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Primary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Secondary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Primary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Transmission	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
<b>Super Off-Peak</b>									
Secondary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Primary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Secondary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Primary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Transmission	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
<b>On-Peak - Winter</b>									
Secondary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Primary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Secondary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Primary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Transmission	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
<b>Off-Peak - Winter</b>									
Secondary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Primary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Secondary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Primary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Transmission	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
<b>Super Off-Peak</b>									
Secondary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Primary	(0.01745)	0.00132	I 0.01979	0.00007	0.00106	I 0.00289	I 0.00001		0.00769
Secondary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Primary Substation	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457
Transmission	(0.01745)	0.00088	I 0.01837	0.00007		0.00289	I 0.00001		0.00457

Notes: Transmission Energy charges include the Transmission Revenue Balancing Account Adjustment (TRBAA) of \$(0.00130) per kWh and the Transmission Access Charge Balancing Account Adjustment (TACBAA) of \$(0.01815) per kWh. The PPP rate is composed of Energy and Demand charges. For all voltage levels, the PPP Energy charges includes Low Income PPP rate (LI-PPP) \$0.01080/kWh, Non-low Income PPP rate (Non-LI-PPP) \$0.00300/kWh (pursuant to PU Code Section 399.8, the Non-LI-PPP rate may not exceed January 1, 2000 levels), Procurement Energy Efficiency Surcharge Rate of \$0.00477/kWh. For Secondary and Primary voltage levels, the PPP Energy charge also includes California Solar Initiative rate (CSI) of \$0.00000/kWh and Self-Generation Incentive Program rate (SGIP) \$ 0.00142 /kWh. For Secondary Substation, Primary Substation and Transmission voltage levels, the PPP rate includes Demand charges for CSI of \$0.00 /kW and SGIP of \$0.52 /kW.

\*These rates are not applicable to TOU Period Grandfathering Eligible Customer Generators, please refer to SC 20 for applicable rates.

(Continued)

4C8 Issued by Submitted May 18, 2022  
 Advice Ltr. No. 4004-E **Dan Skopec** Effective Jun 1, 2022  
 Decision No. 22-03-003 Vice President Resolution No. \_\_\_\_\_  
 Regulatory Affairs



Figure 14. SDG&E Electric Schedule - EECC



		Revised	Cal. P.U.C. Sheet No. <u>36409-E</u>
San Diego Gas & Electric Company San Diego, California		Canceling	Cal. P.U.C. Sheet No. <u>35858-E</u>
<b>SCHEDULE EECC</b>			Sheet 5
<u>ELECTRIC ENERGY COMMODITY COST</u>			
<u>Commodity Rates (Continued)</u>			
<u>Schedule A-TC</u>		<u>(\$/kWh)</u>	
Summer		0.08147	R
Winter		0.08147	R
<u>Schedule TOU-M</u>			
Summer			
On-Peak Energy		0.34164	R
Off-Peak Energy		0.11656	R
Super Off-Peak Energy		0.06544	R
Winter			
On-Peak Energy		0.13581	R
Off-Peak Energy		0.07640	R
Super Off-Peak Energy		0.05903	R
<u>Schedule OL-TOU</u>			
Summer			
On-Peak Energy		0.40931	R
Off-Peak Energy		0.13921	R
Super Off-Peak Energy		0.07661	R
Winter			
On-Peak Energy		0.16089	R
Off-Peak Energy		0.09017	R
Super Off-Peak Energy		0.06966	R
<u>Schedule AL-TOU</u>		<u>(\$/kW)</u>	
Maximum On-Peak Demand: Summer			
Secondary		12.18	R
Primary		12.12	R
Secondary Substation		12.18	R
Primary Substation		12.12	R
Transmission		11.60	R
Maximum On-Peak Demand: Winter			
Secondary			
Primary			
Secondary Substation			
Primary Substation			
Transmission			
On-Peak Energy: Summer		<u>(\$/kWh)</u>	
Secondary		0.17868	R
Primary		0.17782	R
Secondary Substation		0.17868	R
Primary Substation		0.17782	R
Transmission		0.17021	R
Off-Peak Energy: Summer			
Secondary		0.10423	R
Primary		0.10375	R
Secondary Substation		0.10423	R
Primary Substation		0.10375	R
Transmission		0.09933	R
Super Off-Peak Energy: Summer			
Secondary		0.09960	R
Primary		0.09927	R
Secondary Substation		0.09960	R
Primary Substation		0.09927	R
Transmission		0.09526	R
(Continued)			
5C8		Issued by	Submitted <u>May 16, 2022</u>
Advice Ltr. No. <u>4004-E</u>		<b>Dan Skopec</b>	Effective <u>Jun 1, 2022</u>
Decision No. <u>22-03-003</u>		Vice President Regulatory Affairs	Resolution No. _____

Figure 15. SDG&E Gas Schedule – GN-3



San Diego Gas & Electric Company  
San Diego, California

Revised Cal. P.U.C. Sheet No. 18445-G

Canceling Revised Cal. P.U.C. Sheet No. 18058-G

**SCHEDULE GN-3** Sheet 1

NATURAL GAS SERVICE FOR CORE NON-RESIDENTIAL CUSTOMERS  
 (Includes Rates for GN-3, GN-3C, GN-3/GTC and GN-3/GTCA)

**APPLICABILITY**

Applicable to core nonresidential natural gas service, including both procurement service and transportation-only service including Core Aggregation Transportation (CAT). Also applicable to service not provided under any other rate schedule. This schedule is not available to electric generation customers who generator's rated capacity exceeds one megawatt, refinery customers, and enhanced oil recovery customers, whose gas consumption exceeds 250,000 therms per year.

The GN-3 rate is applicable to natural gas procurement and transportation service to nonresidential core customers and to separately metered, common area use service to residential detached homes. This schedule is optionally available to customers with separately metered, common area use service to residential, multi-family accommodations, as defined in Rule 1.

The GN-3C cross-over rate is a core procurement service for previous transportation-only customers returning to core procurement service customers with annual consumption over 50,000 therms, as set forth in Special Condition 8.

The GN-3/GTC (GTC) and GN-3/GTCA (GTCA) rates are applicable to intrastate gas transportation-only services as set forth in Special Conditions 9-14.

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 G-CARE.

Agricultural Employee Housing Facilities, as defined in Schedule G-CARE, may qualify for a 20% CARE discount on the bill if all eligibility criteria set forth in Form 142-4032 or Form 142-4035 is met.

**TERRITORY**

Within the entire territory served natural gas by the Utility.

<u>RATES</u>	<u>GN-3</u>	<u>GN-3-C</u>	<u>GTC/GTCA</u>
<u>Customer charges</u> , \$ per meter per month:	\$10.00	\$10.00	\$10.00

(Continued)

1C11

Advice Ltr. No. 1980-G

Decision No. \_\_\_\_\_

Issued by  
**Lee Schavrien**  
Senior Vice President  
Regulatory Affairs

Date Filed Oct 15, 2010

Effective Nov 14, 2010

Resolution No. \_\_\_\_\_

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N  
T

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San Diego Gas & Electric Company  
 San Diego, California

Revised Cal. P.U.C. Sheet No. 26223-G

Canceling Revised Cal. P.U.C. Sheet No. 26210-G

**SCHEDULE GN-3**

Sheet 2

NATURAL GAS SERVICE FOR CORE NON-RESIDENTIAL CUSTOMERS  
 (Includes Rates for GN-3, GN-3C, GN-3/GTC and GN-3/GTCA)

RATES (continued)

Volumetric charges, \$ per therm:

	<u>GN-3</u>	<u>GN-3C</u>		<u>GTC/GTCA<sup>2</sup></u>
Procurement Charge (0 to 1,000)	\$0.65036	\$0.71790	R	N/A
<u>Transportation Charge</u>	<u>\$0.72856</u>	<u>\$0.72856</u>		<u>\$0.72858</u>
Total Charge	\$1.37892	\$1.44646	R	\$0.72858
Procurement Charge (1,001 to 21,000)	\$0.65036	\$0.71790	R	N/A
<u>Transportation Charge</u>	<u>\$0.48510</u>	<u>\$0.48510</u>		<u>\$0.48512</u>
Total Charge	\$1.13546	\$1.20300	R	\$0.48512
Procurement Charge (Over 21,000)	\$0.65036	\$0.71790	R	N/A
<u>Transportation Charge</u>	<u>\$0.41632</u>	<u>\$0.41632</u>		<u>\$0.41634</u>
Total Charge	\$1.06668	\$1.13422	R	\$0.41634

<sup>2</sup> The rates for core transportation-only customers, with the exception of customers taking service under Schedule GT-NGV, include any FERC Settlement Proceeds Memorandum Account (FSPMA) credit adjustments.

Standby Service Fee for GTC/GTCA Customers

Per decatherm \$10

This fee shall be assessed to customers only during curtailments of transportation services to firm noncore customers. This fee will apply only to the difference between the customer's nominations and their confirmed deliveries.

The customer's storage volumes, if available, may be used to offset the standby service fee. Revenues collected from this fee shall be credited to the Utility's Non-Margin Fixed Cost Account (NMFCA). Curtailments of standby services provided to core customers are described in Rule 14.

GTC/GTCA customers who receive service under this schedule shall also be eligible for standby services ahead of such services offered to noncore customers, including core subscription customers.

Billing adjustments may be necessary to reflect changes in volumes used in developing prior periods' transportation charges.

(Continued)

2C6  
 Advice Ltr. No. 3138-G  
 Decision No.

Issued by  
**Dan Skopec**  
 Senior Vice President  
 Regulatory Affairs

Submitted Nov 7, 2022  
 Effective Nov 10, 2022  
 Resolution No.

8.2.5 CPAU

Figure 16. CPAU Electric Schedule – E-2

**RESIDENTIAL MASTER-METERED AND SMALL NON-RESIDENTIAL ELECTRIC SERVICE**

UTILITY RATE SCHEDULE E-2

**A. APPLICABILITY:**

This Rate Schedule applies to the following Customers receiving Electric Service from the City of Palo Alto Utilities:

1. Small non-residential Customers receiving Non-Demand Metered Electric Service; and
2. Customers with Accounts at Master-Metered multi-family facilities.

**B. TERRITORY:**

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

**C. UNBUNDLED RATES:**

<u>Per kilowatt-hour (kWh)</u>	<u>Commodity</u>	<u>Distribution</u>	<u>Public Benefits</u>	<u>Total</u>
Summer Period	\$0.12151	\$0.09276	\$0.00469	\$0.21896
Winter Period	0.08715	0.06171	0.00469	0.15355
<u>Minimum Bill (\$/day)</u>				0.8777


**D. SPECIAL NOTES:**

1. **Calculation of Cost Components**  
 The actual bill amount is calculated based on the applicable rates in Section C above and adjusted for any applicable discounts, surcharges and/or taxes. On a Customer's bill statement, the bill amount may be broken down into appropriate components as calculated under Section C.
2. **Seasonal Rate Changes**  
 The Summer Period is effective May 1 to October 31 and the Winter Period is effective from November 1 to April 30. When the billing period includes use in both the Summer and the Winter Periods, the usage will be prorated based on the number of days in each seasonal period, and the charges based on the applicable rates therein. For further discussion of bill calculation and proration, refer to Rule and Regulation 11.

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**CITY OF PALO ALTO UTILITIES**  
 Issued by the City Council

*Supersedes Sheet No E-2-1 dated 7-1-2019*



**CITY OF PALO ALTO UTILITIES**

Sheet No E-2-1  
 Effective 7-1-2022



Figure 17. CPAU Gas Schedule – G-2



**Monthly Gas  
Commodity & Volumetric Rates**

Your gas bill includes two charge types: 1) a service charge, and 2) a volumetric charge. The service charge for your gas service can be found on the appropriate rate schedule, which you can find in the following locations: [Residential Rate Schedules](#), and [Business Rate Schedules](#).

The volumetric charge depends on your consumption, and the rate varies monthly based on the current price of gas. The following tables show the volumetric rates (\$/Therm) for each gas rate schedule. The volumetric rates include a) a Commodity charge, which represents the cost of the gas, b) a Distribution rate, c) a Cap and Trade Compliance charge, a d) Carbon Offset Charge and e) a Transportation Charge. The Cap and Trade charge covers the cost of acquiring compliance instruments in California’s Cap and Trade program, and will change in response to market conditions, sales volumes, and the quantity of allowances required. The Transportation Charge is based on the current PG&E G-WSL rate for Palo Alto, accounting for delivery losses to the Customer’s Meter. Prior to November 1, 2016, it was included within the Distribution rate.

On September 15, 2014, Council adopted Resolution #9451 authorizing the City’s participation in a natural gas purchase from Municipal Gas Acquisition and Supply Corporation (MuniGas) for the City’s entire retail gas load for a period of at least 10 years. The MuniGas transaction includes a mechanism for municipal utilities to utilize their tax-exempt status to achieve a discount on the market price of gas. As of November 1, 2018, gas will begin flowing under this program, reducing the City’s gas commodity cost by about \$1 Million per year and saving gas customers approximately \$0.03 per Therm on the commodity portion of their bills.

These charges are shown on the left-hand side of the table below for information purposes, while the total volumetric rate (Commodity+ Distribution+ Cap and Trade Compliance+ Carbon Offset+ Transportation) is shown on the right-hand side of the table. To calculate your variable gas costs, apply the total rate to your consumption for each month. If you are a resident, note that your gas rate varies based on how much you consume (Tier 1 and Tier 2). For information on consumption tiers please refer to the [G-1 Residential Gas Service Rate Schedule](#).

If you have questions on your bill, please call the City of Palo Alto Utilities Customer Service Center at 650-329-2161.

Effective Date	Commodity Rate	Cap and Trade Compliance Charge	Transportation Charge	Carbon Offset Charge	Total Volumetric Rate			
					G-1 (Residential)		G-2 (Master Metered Multi-Family and Small Commercial)	G-3 (Large Commercial)
					Tier 1	Tier 2		
	per Therm	per Therm	per Therm	per Therm	per Therm	per Therm	per Therm	per Therm
3/1/22	0.5370	0.0486	0.15000	0.040	1.30460	2.12820	1.47040	1.46350
2/1/22	0.5360	0.0486	0.15000	0.040	1.30360	2.12720	1.46940	1.46250
1/1/22	0.7714	0.0486	0.15000	0.040	1.53900	2.36260	1.70480	1.69790
12/1/21	0.6321	0.0486	0.12274	0.040	1.37244	2.19604	1.53824	1.53134
11/1/21	0.7505	0.0486	0.12274	0.040	1.49084	2.31444	1.65664	1.64974
10/1/21	0.7175	0.0486	0.12274	0.040	1.45784	2.28144	1.62364	1.61674
9/1/21	0.5217	0.0486	0.12274	0.040	1.26204	2.08564	1.42784	1.42094
8/1/21	0.5492	0.0486	0.12274	0.040	1.28954	2.11314	1.45534	1.44844
7/1/21	0.4800	0.0486	0.12274	0.040	1.22034	2.04394	1.38614	1.37924
6/1/21	0.3982	0.0486	0.12214	0.040	1.11274	1.89714	1.27064	1.26404
5/1/21	0.3901	0.0486	0.12200	0.040	1.10450	1.88890	1.26240	1.25580
4/1/21	0.3375	0.0486	0.12200	0.040	1.05190	1.83630	1.20980	1.20320
3/1/21	0.3577	0.0486	0.12200	0.040	1.07210	1.85650	1.23000	1.22340

8.2.6 SMUD (Electric Only)

Figure 18. SMUD Electric Schedule – CITS-0/CITS-1

<b>Commercial &amp; Industrial Time-of-Day Rate Schedule CI-TOD1</b>			
<b>C. Restructured Commercial &amp; Industrial Time-of-Day Rates</b>			
	Effective as of October 1, 2021	Effective as of March 1, 2022	Effective as of January 1, 2023
<b>CITS-0: C&amp;I Secondary 0-20 kW</b>			
<b>Non-Summer Season (October - May)</b>			
System Infrastructure Fixed Charge per month per meter	\$28.40	\$28.85	\$35.15
Maximum Demand Charge \$ per monthly max kW	\$0.000	\$0.000	\$0.000
<b>Electricity Usage Charge</b>			
Peak \$/kWh	\$0.1430	\$0.1451	\$0.1440
Off-Peak \$/kWh	\$0.1393	\$0.1414	\$0.1364
Off-Peak Saver \$/kWh	\$0.1373	\$0.1394	\$0.1323
<b>Summer Season (June - September)</b>			
System Infrastructure Fixed Charge per month per meter	\$28.40	\$28.85	\$35.15
Maximum Demand Charge \$ per monthly max kW	\$0.000	\$0.000	\$0.000
<b>Electricity Usage Charge</b>			
Peak \$/kWh	\$0.2355	\$0.2390	\$0.2554
Off-Peak \$/kWh	\$0.1331	\$0.1351	\$0.1349
<b>CITS-1: C&amp;I Secondary 21-299 kW</b>			
<b>Non-Summer Season (October - May)</b>			
System Infrastructure Fixed Charge per month per meter	\$88.05	\$89.35	\$158.30
Site Infrastructure Charge per 12 months max kW or contract capacity	\$7.930	\$8.049	\$7.568
<b>Electricity Usage Charge</b>			
Peak \$/kWh	\$0.1169	\$0.1187	\$0.1230
Off-Peak \$/kWh	\$0.1136	\$0.1153	\$0.1158
Off-Peak Saver \$/kWh	\$0.1078	\$0.1094	\$0.1030
<b>Summer Season (June - September)</b>			
System Infrastructure Fixed Charge per month per meter	\$88.05	\$89.35	\$158.30
Site Infrastructure Charge per 12 months max kW or contract capacity	\$7.930	\$8.049	\$7.568
Summer Peak Demand Charge \$ per monthly Peak max kW	\$1.680	\$1.705	\$3.468
<b>Electricity Usage Charge</b>			
Peak \$/kWh	\$0.1897	\$0.1925	\$0.1983
Off-Peak \$/kWh	\$0.1102	\$0.1119	\$0.1119
<i>New restructured commercial rates beyond 2023 are effective as shown in Section IX. Transition Schedule.</i>			
<b>IV. Electricity Usage Surcharges</b>			
Refer to the following rate schedules for details on these surcharges:			
A. Hydro Generation Adjustment (HGA). Refer to Rate Schedule HGA.			
<b>V. Rate Option Menu</b>			
A. Energy Assistance Program for Nonprofit Agencies. Refer to Rate Schedule EAPR.			
B. Campus Rates. Refer to Rate Schedule CB.			
C. Implementation of Energy Efficiency Program or Installation of New Solar/Photovoltaic or Storage Systems			
Customers who implement a SMUD-sponsored Energy Efficiency program or who install a SMUD-approved solar/photovoltaic or storage system to offset their on-site energy usage may request, in writing, within 30 days of the project completion and commissioning, an adjustment to their twelve month maximum demand based on the anticipated reduction in kW from the Energy Efficiency Project Worksheet. The adjusted twelve month maximum demand is valid for 12 months or until it is exceeded by actual maximum demand.			
<b>SACRAMENTO MUNICIPAL UTILITY DISTRICT</b>		Sheet No. CI-TOD1-3	
Resolution No. 21-09-06 adopted September 16, 2021		Effective: September 17, 2021	
		Edition: September 17, 2021	

### 8.2.7 Escalation Rates

Utility rates are assumed to escalate over time, using assumptions from research conducted by Energy and Environmental Economics (E3) in Appendix 8.2. The 2019 study *Residential Building Electrification in California* (Energy + Environmental Economics 2019a) and escalation rates used in the development of the 2022 TDV multipliers

Table 24 below demonstrate the escalation rates used for nonresidential buildings. As stated by E3 in the TDV report, this latter assumption “does not presuppose specific new investments, changes in load and gas throughput, or other measures associated with complying with California’s climate policy goals” (i.e., business-as-usual is assumed).

**Table 24. Real Utility Rate Escalation Rate Assumptions Above Inflation**

	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%

### 8.3 HVAC and SHW System Cost Scalers

Table 25 shows the material and labor adjustment factors used to determine the costs.

**Table 25. Materials and Labor Adjustment Factors by Climate Zone**

	Materials	Labor
CZ 01	0.963	0.994
CZ 02	0.963	1.387
CZ 03	1.001	1.291
CZ 04	0.998	1.298
CZ 05	0.964	0.997
CZ 06	0.960	0.997
CZ 07	0.999	0.985
CZ 08	0.998	0.996
CZ 09	0.964	0.996
CZ 10	0.998	0.996
CZ 11	1.002	0.990
CZ 12	1.000	1.000



<b>CZ 13</b>	1.000	0.990
<b>CZ 14</b>	0.964	0.980
<b>CZ 15</b>	0.963	0.996
<b>CZ 16</b>	0.967	0.990

Table 26 shows the contractor markup values used to determine the costs.

**Table 26. Contractor Markup Values**

	Contractor 1	Contractor 2
<b>General Conditions and Overhead</b>	15%	20%
<b>Design and Engineering</b>	5%	10%
<b>Permit, testing and inspection</b>	5%	3%
<b>Contractor Profit/Market Factor</b>	10%	10%

### 8.4 Mixed Fuel Baseline Figures

**Table 27. Mixed Fuel Baseline Model – Medium Office**

Climate zone	Utility	Annual Electricity Consumption (kWh)	Annual Natural Gas Consumption (therms)	Total kTDV/ft2	Total TDV Compliance kTDV/ft2	Efficiency TDV Compliance kTDV/ft2	GHG Emissions tons/yr	Total TDV Compliance Margin	Proposed Elec Utility Cost	Proposed Gas Utility Cost
CZ01	PG&E	186,894	5,331	130	10	72	63	1	\$67,234	\$10,377
CZ02	PG&E	163,979	3,253	142	12	107	52	2	\$67,798	\$6,493
CZ03	PG&E	176,640	2,672	131	5	83	48	1	\$67,999	\$5,352
CZ04	PG&E	163,768	2,003	125	-2	107	46	1	\$68,366	\$4,093
CZ04-2	CPAU	163,768	2,003	125	-2	107	46	1	\$30,988	\$6,966
CZ05	PG&E	170,544	2,575	113	-8	76	46	1	\$66,040	\$5,156
CZ05-2	SCG	170,544	2,575	113	-8	76	46	1	\$66,040	\$4,242
CZ06	SCE	163,722	1,066	122	-7	76	39	0	\$76,817	\$1,980
CZ07	SDG&E	169,611	747	114	-9	76	38	0	\$120,127	\$1,150
CZ08	SCE	191,703	941	130	-2	76	41	1	\$83,752	\$1,763
CZ09	SCE	169,514	1,119	135	0	76	41	1	\$82,274	\$2,046
CZ10	SDG&E	185,682	1,445	141	10	76	45	2	\$134,646	\$2,113
CZ10-2	SCE	185,682	1,445	141	10	76	45	2	\$86,338	\$2,474
CZ11	PG&E	209,343	3,309	166	40	136	59	2	\$81,001	\$6,669
CZ12	PG&E	178,461	2,864	145	19	118	53	2	\$72,381	\$5,784
CZ12-2	SMUD	178,461	2,864	145	19	118	53	2	\$26,576	\$5,784
CZ13	PG&E	211,193	2,377	165	37	139	55	2	\$81,491	\$4,852
CZ14	SDG&E	156,689	3,058	147	13	139	52	3	\$128,390	\$4,337
CZ14-2	SCE	156,689	3,058	147	13	139	52	3	\$83,690	\$4,756
CZ15	SCE	209,720	662	161	32	139	47	2	\$101,041	\$1,311
CZ16	PG&E	177,562	5,799	127	9	94	67	4	\$68,281	\$11,409

**Table 28. All-electric Baseline Model – Medium Retail**

Climate zone	Utility	Annual Electricity Consumption (kWh)	Annual Natural Gas Consumption (therms)	Total kTDV/ft2	Total TDV Compliance kTDV/ft2	Efficiency TDV Compliance kTDV/ft2	GHG Emissions tons/yr	Total TDV Compliance Margin	Proposed Elec Utility Cost	Proposed Gas Utility Cost
CZ01	PG&E	138,367	0	192	110	162	28	-8	\$43,917	\$0
CZ02	PG&E	131,521	0	211	125	198	28	-15	\$50,499	\$0
CZ03	PG&E	112,237	0	176	91	156	25	-1	\$36,206	\$0
CZ04	PG&E	122,256	0	197	111	193	27	-5	\$47,522	\$0
CZ04-2	CPAU	122,256	0	197	111	193	27	-5	\$22,961	\$0
CZ05	PG&E	108,753	0	159	76	146	24	-8	\$35,179	\$0
CZ05-2	SCG	108,753	0	159	76	146	24	-8	\$35,179	\$0
CZ06	SCE	111,442	0	175	89	146	24	-8	\$42,572	\$0
CZ07	SDG&E	109,079	0	172	87	146	23	0	\$71,108	\$0
CZ08	SCE	129,105	0	196	107	146	26	-10	\$47,404	\$0
CZ09	SCE	123,673	0	193	105	146	26	-3	\$46,830	\$0
CZ10	SDG&E	114,235	0	174	87	146	25	4	\$77,903	\$0
CZ10-2	SCE	114,235	0	174	87	146	25	4	\$45,763	\$0
CZ11	PG&E	144,411	0	229	144	218	30	-6	\$54,592	\$0
CZ12	PG&E	141,639	0	221	136	211	30	-4	\$53,798	\$0
CZ12-2	SMUD	141,639	0	221	136	211	30	-4	\$21,079	\$0
CZ13	PG&E	153,371	0	244	158	236	32	-15	\$56,701	\$0
CZ14	SDG&E	145,499	0	223	135	236	31	-8	\$86,177	\$0
CZ14-2	SCE	145,499	0	223	135	236	31	-8	\$52,840	\$0
CZ15	SCE	146,092	0	244	158	236	29	-24	\$56,750	\$0
CZ16	PG&E	157,944	0	224	144	214	34	-31	\$57,190	\$0

**Table 29. Mixed Fuel Baseline Model – Quick-Service Restaurant**

Climate zone	Utility	Annual Electricity Consumption (kWh)	Annual Natural Gas Consumption (therms)	Total kTDV/ft2	Total TDV Compliance kTDV/ft2	Efficiency TDV Compliance kTDV/ft2	GHG Emissions tons/yr	Total TDV Compliance Margin	Proposed Elec Utility Cost	Proposed Gas Utility Cost
CZ01	PG&E	63,187	12,237	1,974	820	820	80	5	\$20,126	\$23,401
CZ02	PG&E	66,343	11,170	1,989	839	839	74	20	\$21,332	\$21,422
CZ03	PG&E	67,877	10,605	1,922	769	769	71	1	\$21,657	\$20,336
CZ04	PG&E	77,615	10,277	2,062	910	910	71	-4	\$24,931	\$19,725
CZ04-2	CPAU	77,615	10,277	2,062	910	910	71	-4	\$15,041	\$30,442
CZ05	PG&E	69,442	10,655	1,898	744	744	71	-2	\$22,105	\$20,416
CZ05-2	SCG	69,442	10,655	1,898	744	744	71	-2	\$22,105	\$14,924
CZ06	SCE	78,813	9,600	1,934	778	744	67	-1	\$19,698	\$13,599
CZ07	SDG&E	76,653	9,425	1,898	739	744	66	18	\$26,903	\$13,116
CZ08	SCE	77,418	9,554	1,948	792	744	66	28	\$20,356	\$13,542
CZ09	SCE	77,625	9,687	1,993	837	744	67	7	\$20,405	\$13,709
CZ10	SDG&E	81,897	9,907	2,032	877	744	69	26	\$31,166	\$13,782
CZ10-2	SCE	81,897	9,907	2,032	877	744	69	26	\$21,407	\$13,986
CZ11	PG&E	85,725	10,748	2,259	1,109	1,109	75	-12	\$27,885	\$20,664
CZ12	PG&E	74,131	10,726	2,080	928	928	72	2	\$24,000	\$20,605
CZ12-2	SMUD	74,131	10,726	2,080	928	928	72	2	\$11,272	\$20,605
CZ13	PG&E	88,060	10,441	2,240	1,089	1,089	73	-2	\$28,620	\$20,070
CZ14	SDG&E	87,498	10,655	2,251	1,097	1,089	74	-31	\$30,692	\$14,728
CZ14-2	SCE	87,498	10,655	2,251	1,097	1,089	74	-31	\$22,471	\$14,925
CZ15	SCE	118,353	9,194	2,444	1,289	1,089	71	-13	\$28,746	\$13,090
CZ16	PG&E	75,373	12,242	2,143	983	983	82	2	\$24,194	\$23,494

**Table 30. Mixed Fuel Baseline Model – Small Hotel**

Climate zone	Utility	Annual Electricity Consumption (kWh)	Annual Natural Gas Consumption (therms)	Total kTDV/ft2	Total TDV Compliance kTDV/ft2	Efficiency TDV Compliance kTDV/ft2	GHG Emissions tons/yr	Total TDV Compliance Margin	Proposed Elec Utility Cost	Proposed Gas Utility Cost
CZ01	PG&E	230,187	16,824	299	161	173	137	7	\$72,520	\$32,208
CZ02	PG&E	243,164	13,161	287	152	169	117	5	\$77,188	\$25,351
CZ03	PG&E	232,511	12,725	272	136	151	113	6	\$73,496	\$24,461
CZ04	PG&E	251,386	11,608	280	146	165	109	5	\$80,034	\$22,342
CZ04-2	CPAU	251,386	11,608	280	146	165	109	5	\$48,175	\$34,218
CZ05	PG&E	232,585	12,375	264	127	143	111	6	\$73,479	\$23,746
CZ05-2	SCG	232,585	12,375	264	127	143	111	6	\$73,479	\$17,084
CZ06	SCE	251,627	10,100	260	124	143	100	4	\$53,976	\$14,227
CZ07	SDG&E	250,625	9,977	257	120	143	100	3	\$77,312	\$13,878
CZ08	SCE	271,204	9,874	269	136	143	101	3	\$60,488	\$13,943
CZ09	SCE	265,607	10,246	273	140	143	103	4	\$60,896	\$14,411
CZ10	SDG&E	276,218	9,903	276	142	143	102	3	\$91,917	\$13,642
CZ10-2	SCE	276,218	9,903	276	142	143	102	3	\$63,534	\$13,980
CZ11	PG&E	285,482	12,457	315	179	197	118	4	\$82,170	\$24,172
CZ12	PG&E	263,561	11,890	293	158	176	112	2	\$76,104	\$23,029
CZ12-2	SMUD	263,561	11,890	293	158	176	112	2	\$34,853	\$23,029
CZ13	PG&E	293,124	11,309	310	175	193	113	1	\$84,632	\$21,924
CZ14	SDG&E	276,292	12,071	298	166	193	115	2	\$89,492	\$16,232
CZ14-2	SCE	276,292	12,071	298	166	193	115	2	\$63,611	\$16,703
CZ15	SCE	349,319	7,895	309	174	193	98	-4	\$78,507	\$11,458
CZ16	PG&E	228,611	17,363	310	170	195	142	9	\$72,664	\$33,471

### 8.5 GHG Savings Summary

This section shows the percent GHG savings for each package. GHG multipliers in CBECC software have utility emissions multipliers assigned only to each of the California’s sixteen climate zones, does not vary by utility within each zone. Individual utility assumptions may vary widely. In the Medium Office, the GHG emissions increases in all-electric package because the proposed all-electric system is electric resistance VAV system instead of a more efficient heat pump boiler system.

Figure 19. Percentage GHG Savings – Medium Office

CZ	Mixed Fuel	All-electric		
	EE	Code Min	EE	EE + LF
cz01	0%	3%	4%	12%
cz02	1%	0%	1%	8%
cz03	1%	0%	1%	8%
cz04	2%	-1%	1%	7%
cz05	1%	0%	2%	9%
cz06	2%	0%	2%	8%
cz07	3%	0%	3%	8%
cz08	3%	0%	2%	8%
cz09	2%	-1%	2%	7%
cz10	2%	-2%	0%	6%
cz11	1%	-3%	-1%	5%
cz12	1%	-2%	-1%	5%
cz13	2%	-3%	-1%	4%
cz14	2%	-4%	-2%	5%
cz15	3%	-1%	2%	7%
cz16	1%	1%	2%	7%

Figure 20. Percentage GHG Savings – Medium Retail

CZ	Mixed Fuel		All-electric
	EE	Code Min	EE
cz01	-4%	-2%	9%
cz02	-21%	-13%	10%
cz03	-18%	-8%	11%
cz04	-14%	-5%	10%
cz05	-15%	-5%	12%
cz06	-7%	4%	13%
cz07	-5%	7%	14%
cz08	-7%	4%	12%
cz09	-8%	3%	13%
cz10	-12%	-9%	3%
cz11	-23%	-21%	2%
cz12	-19%	-11%	9%
cz13	-17%	-8%	10%
cz14	-15%	-5%	10%
cz15	-3%	0%	3%
cz16	-34%	-33%	2%

Figure 21. Percentage GHG Savings – Quick Service Restaurant

CZ	Mixed Fuel	All-electric "HS" (HVAC+SHW)				All-electric	
	EE	Code Min	EE	EE + LF	EE + PV	Code Min	EE
cz01	10%	21%	26%	28%	27%	47%	52%
cz02	7%	16%	19%	21%	21%	45%	49%
cz03	8%	14%	20%	22%	22%	45%	51%
cz04	7%	12%	17%	19%	19%	43%	49%
cz05	8%	14%	20%	22%	22%	45%	51%
cz06	7%	9%	15%	16%	17%	43%	48%
cz07	6%	8%	14%	15%	16%	43%	48%
cz08	4%	9%	12%	13%	14%	43%	46%
cz09	5%	9%	12%	13%	15%	43%	46%
cz10	5%	10%	13%	14%	15%	42%	46%
cz11	6%	13%	17%	18%	18%	43%	46%
cz12	6%	14%	17%	18%	19%	44%	48%
cz13	6%	12%	15%	16%	17%	43%	46%
cz14	6%	13%	16%	17%	18%	42%	46%
cz15	4%	7%	9%	11%	12%	40%	42%
cz16	8%	18%	23%	24%	24%	44%	49%

Figure 22. Percentage GHG Savings – Small Hotel

CZ	Mixed Fuel	All-electric			All-electric
	EE	Code Min	EE	EE + PV	Code Min (PTHP)
cz01	13%	47%	48%	50%	47%
cz02	11%	42%	44%	47%	43%
cz03	12%	43%	45%	48%	43%
cz04	11%	41%	44%	46%	42%
cz05	11%	43%	45%	48%	43%
cz06	10%	41%	43%	46%	41%
cz07	10%	41%	43%	47%	41%
cz08	10%	40%	42%	46%	40%
cz09	10%	40%	42%	46%	40%
cz10	11%	37%	39%	43%	37%
cz11	12%	39%	41%	43%	39%
cz12	12%	38%	41%	43%	39%
cz13	11%	37%	39%	42%	37%
cz14	12%	38%	40%	44%	38%
cz15	10%	33%	35%	40%	33%
cz16	13%	43%	46%	48%	45%

## 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 Code Team stands ready to assist jurisdictions at any stage of a reach code project.



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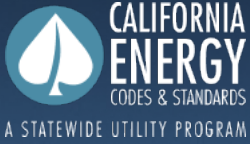


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Last modified: 2022/09/12  
Revision: 1.0

# 2022 Cost-Effectiveness Study: Single Family New Construction



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## Acronym List

2023 PV\$ – Present value costs in 2023

ACH50 – Air Changes per Hour at 50 pascals pressure differential

ACM – Alternative Calculation Method

ADU – Accessory Dwelling Unit

AFUE – Annual Fuel Utilization Efficiency

B/C – Lifecycle Benefit-to-Cost Ratio

BEopt – Building Energy Optimization Tool

BSC – Building Standards Commission

CA IOUs – California Investor-Owned Utilities

CASE – Codes and Standards Enhancement

CBEECC-Res – Computer program developed by the California Energy Commission for use in demonstrating compliance with the California Residential Building Energy Efficiency Standards

CFI – California Flexible Installation

CFM – Cubic Feet per Minute

CO<sub>2</sub> – Carbon Dioxide

CPAU – City of Palo Alto Utilities

CPUC – California Public Utilities Commission

CZ – California Climate Zone

DHW – Domestic Hot Water

DOE – Department of Energy

DWHR – Drain Water Heat Recovery

EDR – Energy Design Rating

EER – Energy Efficiency Ratio

EF – Energy Factor



- GHG – Greenhouse Gas
- HERS Rater – Home Energy Rating System Rater
- HPA – High Performance Attic
- HPWH – Heat Pump Water Heater
- HSPF – Heating Seasonal Performance Factor
- HVAC – Heating, Ventilation, and Air Conditioning
- IECC – International Energy Conservation Code
- IOU – Investor Owned Utility
- kBtu – kilo-British thermal unit
- kWh – Kilowatt Hour
- LBNL – *Lawrence Berkeley National Laboratory*
- LCC – Lifecycle Cost
- LLAHU – Low Leakage Air Handler Unit
- VLLDCS – Verified Low Leakage Ducts in Conditioned Space
- MF – Multifamily
- NEEA – Northwest Energy Efficiency Alliance
- NEM – Net Energy Metering
- NPV – Net Present Value
- NREL – *National Renewable Energy Laboratory*
- PG&E – Pacific Gas and Electric Company
- POU – Publicly-Owned-Utilities
- PV – Photovoltaic
- SCE – Southern California Edison
- SDG&E – San Diego Gas and Electric
- SEER – Seasonal Energy Efficiency Ratio
- SF – Single Family
- SMUD – Sacramento Municipal Utility District
- SoCalGas – Southern California Gas Company
- TDV – Time Dependent Valuation
- Therm – Unit for quantity of heat that equals 100,000 British thermal units
- Title 24 – Title 24, Part 6
- TOU – Time-Of-Use
- UEF – Uniform Energy Factor
- ZNE – Zero-net Energy

Summary of Revisions		
Date	Description	Reference (page or section)
9/12/2022	Original Release	N/A



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## Executive Summary

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.

This report documents cost-effectiveness analysis results for traditional new detached single family and detached accessory dwelling unit (ADUs) building types. It evaluates mixed fuel and all-electric package options in all sixteen California climate zones (CZs). Packages include combinations of efficiency measures, on-site renewable energy, and battery energy storage.

The following summarizes key results from the study:

- All-electric packages have lower GHG emissions than mixed-fuel packages in all cases, due to the clean power sources currently available from California’s power providers.
- The Reach Codes Team found all-electric new construction to be feasible and cost effective based on TDV in all cases. In many cases all-electric code minimum construction results in an increase in utility costs and is not cost-effective On-Bill. Some exceptions include the SMUD and CPAU territories where lower electricity rates relative to natural gas rates result in lower overall utility bills.
- The 2022 Title 24 Code’s new source energy metric combined with the heat pump baseline encourage all-electric construction, providing an incentive that allows for some amount of prescriptively required building efficiency to be traded off. This compliance benefit for all-electric homes highlights a unique opportunity for jurisdictions to incorporate efficiency into all-electric reach codes. Efficiency and electrification have symbiotic benefits and are both critical for decarbonization of buildings. As demand on the electric grid is increased through electrification, efficiency can reduce the negative impacts of additional electricity demand on the grid, reducing the need for increased generation and storage capacity, as well as the need to upgrade upstream transmission and distribution equipment. The Reach Codes Team recommends that jurisdictions adopting an all-electric reach code for single family buildings also include an efficiency requirement with EDR2 margins consistent with the all-electric code minimum package.
- The code compliance margins for the ADU all-electric code minimum package are lower than for the single family prototype and code compliance can be more challenging for smaller dwelling units. As a result, the Reach Codes Team does not recommend an additional efficiency requirement for all-electric ADU ordinances.
- Electrification combined with increased PV capacity results in utility cost savings and was found to be On-Bill cost effective in all cases. These results were based on today’s net energy metering rules and do not account for future changes to utility agreements, which are expected to decrease the value of PV to the consumer.
- For jurisdictions interested in 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 in all cases. Cost effectiveness was marginal because of the high cost of the battery system. EDR2 margins ranged from 7 to 30 for the cost-effective packages.
- Applying the CARE rates has the overall impact to increase utility cost savings for an all-electric building compared to a code compliant mixed fuel building, improving On-Bill cost-effectiveness.

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. For example, jurisdictions that only want to require all-electric construction may amend Part 11 instead of Part 6 of the CA Building Code requiring

review and approval by the Building Standards Commission (BSC) but not the California Energy Commission (Energy Commission). Reach codes that amend Part 6 of the CA Building Code and require energy performance beyond state code minimums must demonstrate the proposed changes are cost-effective and obtain approval from the Energy Commission. Although a cost-effectiveness study is only required to amend Part 6 of the CA Building Code, this study provides valuable context for jurisdictions pursuing other ordinance paths 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](https://LocalEnergyCodes.com). Local jurisdictions that are considering adopting an ordinance may contact the program for further technical support at [info@localenergycodes.com](mailto:info@localenergycodes.com).

# 1 Introduction

This report documents cost-effective combinations of measures that exceed the minimum state requirements, the 2022 Building Energy Efficiency Standards, effective January 1, 2023, for newly constructed single family buildings. This report was developed in coordination with the California Statewide Investor-Owned Utilities (CA IOUs) Codes and Standards Program, key consultants, and engaged cities—collectively known as the Reach Codes Team.

The analysis considers traditional detached single family and detached accessory dwelling unit (ADUs) building types and evaluates mixed fuel and all-electric package options in all sixteen California climate zones (CZs).<sup>1</sup> Packages include combinations of efficiency measures, on-site renewable energy, and battery energy storage.

The California Building Energy Efficiency Standards Title 24, Part 6 (Title 24) (California Energy Commission, 2021a) is maintained and updated every three years by two state agencies: the California Energy Commission (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.

The Department of Energy (DOE) sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act, including heating, cooling, and water heating equipment (E-CFR, 2020). Since state and local governments are prohibited from adopting higher minimum efficiencies than the federal standards require, the focus of this study is to identify and evaluate cost-effective packages that do not include high efficiency heating, cooling, and water heating equipment. High efficiency appliances are often the easiest and most affordable measures to increase energy performance. While federal preemption limits reach code mandatory requirements for covered appliances, in practice, builders may install any package of compliant measures to achieve the performance requirements.

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<sup>1</sup> See Appendix 7.1 Map of California Climate Zones for a graphical depiction of climate zone locations.

## 2 Methodology and Assumptions

### 2.1 Analysis for Reach Codes

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

#### 2.1.1 Modeling

The Reach Codes Team performed energy simulations using software approved for 2022 Title 24 Code compliance analysis, CBECC-Res 2022.1.0.

The general approach applied in this analysis is to evaluate performance and determine cost effectiveness of various energy efficiency upgrade measures, individually and as packages, in single family buildings. Using the 2022 baseline as the starting point, prospective measures and packages were identified and modeled in each of the prototypes to determine the projected energy (therm and kWh) and compliance impacts. A large set of parametric runs were conducted to evaluate various options and develop packages of measures that met or exceeded minimum code performance. The analysis utilized a Python based parametric tool to automate and manage the generation of CBECC-Res input files. This allowed for quick evaluation of various efficiency measures across multiple climate zones and prototypes and improved quality control. The batch process functionality of CBECC-Res was utilized to simulate large groups of input files at once.

#### 2.1.2 Cost-Effectiveness

##### 2.1.2.1 Benefits

This analysis used two different metrics to assess cost effectiveness of the proposed upgrades. Both methodologies require estimating and quantifying the incremental costs and energy savings associated with each energy efficiency measure. The main difference between the methodologies is the manner in which they value energy and thus the cost savings of reduced or avoided energy use:

**Utility Bill Impacts (On-Bill):** Customer-based lifecycle cost (LCC) approach that values energy based upon estimated site energy usage and customer utility bill savings using today's electricity and natural gas utility tariffs. Total savings are estimated over a 30-year duration and include discounting of future costs and energy cost inflation.

**Time Dependent Valuation (TDV):** Energy Commission LCC methodology, which is intended to capture the total value or cost of energy use over 30 years. This method accounts for long-term projected costs, such as the cost of providing energy during peak periods of demand and other societal costs, such as projected costs for carbon emissions, as well as grid transmission and distribution impacts. This metric values energy use differently depending on the fuel source (natural gas, electricity, and propane), time of day, and season. For example, electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods due to the less inefficient energy generation sources providing peak electricity (Horii, Cutter, Kapur, Arent, & Conotyannis, 2014). This is the methodology used by the Energy Commission in evaluating cost effectiveness for efficiency measures in Title 24, Part 6.

##### 2.1.2.2 Costs

The Reach Codes Team assessed the incremental costs of the measures and packages over a 30-year lifecycle. 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. Present value of replacement cost is included for measures with lifetimes less than the evaluation period.

In calculating On-Bill cost effectiveness, incremental first costs were assumed to be financed into a mortgage or loan with a 30-year loan term and four percent interest rate. Financing was not applied to future replacement or maintenance costs. In calculating TDV cost effectiveness, incremental first costs were not assumed to be financed into a mortgage or loan.

**2.1.2.3 Metrics**

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

**NPV Savings:** The lifetime NPV savings is reported as a cost-effectiveness metric, Equation 1 demonstrates how this is calculated. If the net savings of a measure or package is positive, it is considered cost-effective. Negative savings represent net costs.

**B/C Ratio:** Ratio of the present value (PV) of all benefits to the present value of all costs over 30 years (PV benefits divided by PV costs). The criteria benchmark for cost effectiveness is a B/C ratio greater than one. A value of one indicates the NPV of the savings over the life of the measure is equivalent to the NPV of the lifetime incremental cost of that measure. A value greater than one represents a positive return on investment. The B/C ratio is calculated according to Equation 2.

**Equation 1**

$$NPV\ Savings = PV\ of\ lifetime\ benefit - PV\ of\ lifetime\ cost$$

**Equation 2**

$$Benefit - to - Cost\ Ratio = \frac{PV\ of\ lifetime\ benefit}{PV\ of\ lifetime\ cost}$$

Improving the efficiency of a project often requires an initial incremental investment. In most cases the benefit is represented by annual On-Bill utility or TDV savings, and the cost is represented 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”.

The lifetime costs or benefits are calculated according to Equation 3.

**Equation 3**

$$PV\ of\ lifetime\ cost\ or\ benefit = \sum_{t=0}^n \frac{(Annual\ cost\ or\ benefit)_t}{(1 + r)^t}$$

Where:

- *n* = analysis term in years
- *r* = discount rate

The following summarizes the assumptions applied in this analysis to both methodologies.

- Analysis term of 30 years
- Real discount rate of three percent

TDV is a normalized monetary format and there is a unique procedure for calculating the present value benefit of TDV energy savings. The present value of the energy cost savings in dollars is calculated by multiplying the TDV savings (reported by the CBECC-Res simulation software) by a NPV factor developed by the Energy Commission (see (Energy + Environmental Economics, 2020)). The 30-year residential NPV factor is \$0.173/kTDV kBtu for the 2022 code cycle.

**Equation 4**

$$TDV\ PV\ of\ lifetime\ benefit = TDV\ energy\ savings * NPV\ factor$$

### 2.1.3 Utility Rates

In coordination with the CA IOU rate team (comprised of representatives from Pacific Gas and Electric (PG&E), Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E)) and two Publicly-Owned-Utilities (POUs) (Sacramento Municipal Utility District (SMUD) and City of Palo Alto Utilities (CPAU)), the Reach Codes Team determined appropriate utility rates for each climate zone in order to calculate utility costs and determine On-Bill cost effectiveness for the proposed measures and packages. The utility tariffs, summarized in Table 1, were determined based on the most prevalent active rate in each territory. Utility rates were applied to each climate zone based on the predominant IOU serving the population of each zone, with a few climate zones evaluated multiple times under different utility scenarios. Climate Zones 10 and 14 were evaluated with both SCE/SoCalGas and SDG&E tariffs since each utility has customers within these climate zones. Climate Zone 5 is evaluated under both PG&E and SoCalGas natural gas rates. Two POU or municipal utility rates were also evaluated: SMUD in Climate Zone 12 and CPAU in Climate Zone 4.

First-year utility costs were calculated using hourly electricity and natural gas output from CBECC-Res and applying the utility tariffs summarized in Table 1. Annual costs were also estimated for customers eligible for the CARE tariff discounts on both electricity and natural gas bills. Appendix 7.2 Utility Rate Schedules includes details of each utility tariff. For cases with PV generation, the approved NEM2 tariffs were applied along with minimum daily use billing and mandatory non-bypassable charges. Future changes to the NEM tariffs are likely and the California Public Utilities Commission (CPUC) has issued a proposed decision with suggested changes that is expected to be finalized in 2022.<sup>2</sup> The ADU was assumed to have separate electric and gas meters from the main house.

**Table 1. Utility Tariffs Used Based on Climate Zone**

Climate Zones	Electric / Gas Utility	Electricity	Natural Gas
<b>IOUs</b>			
1-5,11-13,16	PG&E / PG&E	E-TOU Option C	G1
5	PG&E / SoCalGas	E-TOU Option C	GR
6, 8-10, 14, 15	SCE / SoCalGas	TOU-D Option 4-9	GR
7, 10, 14	SDG&E / SDG&E	TOU-DR-1	GR
<b>POUs</b>			
4	CPAU / CPAU	E-1	G-2
12	SMUD / PG&E	R-TOD (RT02)	G1

Utility rates are assumed to escalate over time according to the 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. See Appendix 7.2.7 Fuel Escalation Assumptions for details.

### 2.2 Greenhouse Gas Emissions

The analysis reports the greenhouse gas (GHG) emission estimates based on assumptions within CBECC-Res. There are 8,760 hourly multipliers accounting for time dependent energy use and carbon based on source emissions, including renewable portfolio standard projections. There are two strings of multipliers—one for Northern California

<sup>2</sup> <https://www.cpuc.ca.gov/nemrevisit>



climate zones, and another for Southern California climate zones.<sup>3</sup> GHG emissions are reported as average annual metric tons of CO<sub>2</sub> equivalent over the 30-year building lifetime.

### 2.3 Energy Design Rating

The 2019 Title 24 Code introduced California’s Energy Design Rating (EDR) as the primary metric to demonstrate compliance with the energy code for single family buildings. This EDR was based on the hourly TDV energy use from a building that is compliant with the 2006 International Energy Conservation Code (IECC) as the Reference Building. The Reference Building has an EDR score of 100 while a zero-net energy (ZNE) home has an EDR score of zero. While the Reference Building is used to set the scale for the rating, the Proposed Design is still compared to the Standard Design based on the Title 24 prescriptive baseline assumptions to determine compliance.

In the 2022 Title 24 Code a second new EDR metric was introduced based on hourly source energy. The two EDR metrics are described below:

- EDR1 is calculated based on source energy.
- EDR2 is calculated based on TDV energy.

Furthermore, EDR2 is composed of two components for compliance purposes. The Efficiency EDR2 which represents the energy efficiency features of a home. The PV/Flexibility EDR2 includes the effects of PV and battery storage systems. Total EDR2 combines both the Efficiency and PV/Flexibility impacts. While the Efficiency EDR2 does not include the full impact of a battery system, it can include a self-utilization credit for batteries if certain conditions are met.

For a new, single family building to comply with the 2022 Title 24 Code, three criteria are required:

1. The Proposed EDR1 must be equal to or less than the EDR1 of the Standard Design, and
2. The Proposed Efficiency EDR2 must be equal to or less than the Efficiency EDR2 of the Standard Design, and
3. The Proposed Total EDR2 must be equal to or less than the Total EDR2 of the Standard Design.

This concept, consistent with California’s “loading order” which prioritizes energy efficiency ahead of renewable generation, requires projects meet a minimum Efficiency EDR2 before PV is credited but allows for PV to be traded off with additional efficiency when meeting the Total EDR2. A project may improve on building efficiency beyond the minimum required and subsequently reduce the PV generation capacity necessary to achieve the required Total EDR2. However, it may not increase the size of the PV system and trade this off with a reduction of efficiency measures.

Results from this analysis are presented as EDR Margin, a reduction in the EDR score relative to the Standard Design. EDR Margin is a better metric to use than absolute EDR in the context of a reach code because absolute values vary based on the home design and characteristics such as size and orientation. Referencing the margin results in similar requirements across a variety of designs. This approach aligns with how compliance is reported for the 2019 and 2022 Title 24 Code. The EDR Margin is calculated according to Equation 5.

#### Equation 5

$$EDR\ Margin = Standard\ Design\ EDR - Proposed\ Design\ EDR$$

<sup>3</sup> CBECC-Res multipliers are the same for CZs 1-5 and 11-13 (Northern California), while there is another set of multipliers for CZs 6-10 and 14-16 (Southern California).

### 3 Prototypes, Measure Packages, and Costs

This section describes the prototypes and the scope of analysis drawing from previous 2019 Reach Code research where necessary.

#### 3.1 Prior Reach Code Research

In 2019, the Reach Codes Team analyzed the cost-effectiveness of residential single family new construction projects for mixed-fuel and all-electric packages (Statewide Reach Codes Team, 2019). Using this analysis, several cities and counties in California adopted local energy code amendments encouraging or requiring that low-rise residential new construction be all-electric. As there were few changes to the single family requirements, this analysis for the 2022 code cycle leveraged the work completed for the 2019 reports. Initial efficiency packages were based on the final packages from the 2019 research and were revised to reflect measure specifications and costs based on new data.

#### 3.2 Prototype Characteristics

The Energy Commission defines building prototypes which it uses to evaluate the cost-effectiveness of proposed changes to Title 24 requirements. For the 2022 code cycle the Energy Commission used two single family prototypes, both of which were used in this analysis. Additional details on the prototypes can be found in the Alternative Calculation Method (ACM) Approval Manual (California Energy Commission, 2018).

Additionally, a detached new construction ADU prototype was developed to reflect recent trends in California construction related to the high cost of housing (TRC, 2021). ADUs are additional dwelling units typically built on the property of an existing single-family parcel. ADUs are defined as new construction in the energy code when they are ground-up developments, do not convert an existing space to livable space, and are not attached to the primary dwelling. The evaluated prototype is not representative of an attached ADU constructed as an addition to an existing home.

The Reach Codes Team leveraged prior research to define the detached ADU baseline and measure packages. The house size and number of bedrooms were based on data from a survey conducted by UC Berkeley’s Center for Community Innovation (UC Berkeley Center for Community Innovation, 2021). The survey found that the average square footage for new ADUs statewide is 615 square feet and that the majority (61 percent) of new ADUs have one bedroom.

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

**Table 2: Prototype Characteristics**

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

The Energy Commission’s protocol for the two single family prototypes is to weight the simulated energy impacts by a factor that represents the distribution of single-story and two-story homes being built statewide. This study assumed 50 percent single-story and 50 percent two-story. Simulation results in this study are characterized according to this ratio, which is approximately equivalent to a 2,400-square foot (ft<sup>2</sup>) house.<sup>4</sup> ADU results are presented separately.

<sup>4</sup>2,400 ft<sup>2</sup> = (50% x 2,100 ft<sup>2</sup>) + (50% x 2,700 ft<sup>2</sup>)

The methodology used in the analyses for each of the prototypical building types begins with a design that precisely meets the minimum 2022 prescriptive requirements (zero compliance margin). Table 150.1-A in the 2022 Standards (California Energy Commission, 2021a) lists the prescriptive measures that determine the baseline design in each climate zone. Other features are consistent with the Standard Design in the ACM Reference Manual (California Energy Commission, 2022), and are designed to meet, but not exceed, the minimum requirements. Each prototype building has the following features:

- Slab-on-grade foundation.
- Vented attic.
- High performance attic in climate zones where prescriptively required (CZ 4, 8-16) with insulation installed at the ceiling and below the roof deck per Option B. (Refer to Table 150.1-A in the 2022 Standards.)
- Ductwork located in the attic.

Table 3 describes additional characteristics as they were applied to the base case energy model in this analysis. In a shift from the 2019 Standards, the 2022 Standards define a prescriptive fuel source for space heating and water heating establishing a heat pump baseline. In each climate zone one heat pump is prescriptively required. In most climate zones the prescriptive base case includes a heat pump water heater and a natural gas furnace for space heating. In Climate Zones 3, 4, 13, and 14 this is reversed, where the base case has a heat pump space heater and natural gas tankless water heater.

**Table 3: Base case Characteristics of the Prototypes**

Characteristic	Single Family	ADU
Space Heating/Cooling <sup>1,2</sup>	<a href="#">CZs 1-2,5-12,15-16</a> : Natural gas furnace, split AC 80 AFUE, 14 SEER, 11.7 EER <a href="#">CZs 3-4,13-14</a> : Split heat pump – 8.2 HSPF, 14 SEER, 11.7 EER	Same as single family
Water Heater <sup>1,2</sup>	<a href="#">CZs 1-2,5-12,15-16</a> : Heat pump water heater (HPWH) UEF = 2.0 located in the garage <a href="#">CZs 3-4,13-14</a> : Natural gas tankless – UEF = 0.81	Same equipment type as SF except HPWH is located inside the conditioned space with the supply air ducted from outside <sup>3</sup>
Hot Water Distribution	Code minimum, all hot water lines insulated <a href="#">CZs 1,16</a> : Basic compact distribution credit	Same as single family
Drain Water Heat Recovery Efficiency	<a href="#">CZ 16</a> : 65%, equal flow to shower & water heater	Same as single family
Cooking	Natural Gas	Same as single family
Clothes Drying	Natural Gas	Same as single family
PV System	Sized to offset 100% of electricity use for space cooling, ventilation, lighting, appliance, & other miscellaneous electric loads. Size differs by climate zone ranging from 2.64 kW to 5.33 kW, see Table 4.	PV is not required when the PV system size required based on the prescriptive calculations is less than 1.8 kW, as is the case in Climate Zones 1-9, 12, 14, and 16. In the other climate zones the PV size ranges from 1.74 kW to 2.56 kW, see Table 4. <sup>4</sup>

<sup>1</sup> Equipment efficiencies are equal to minimum federal appliance efficiency standards.

<sup>2</sup> AFUE = annual fuel utilization efficiency. SEER = seasonal energy efficiency ratio. EER = energy efficiency ratio. HSPF = heating seasonal performance factor. UEF = uniform energy factor.

<sup>3</sup> This version of CBEC-Res used in this analysis did not have the capability to directly model ducted HPWHs even though this configuration is called out as the Standard Design in the 2022 ACM (California Energy Commission, 2022). This was modeled by indicating that the tank is located within the conditioned space with the compressor unit located outside.

<sup>4</sup> Exception 2 to Section 150.1(c)14 states that “no PV system is required when the minimum PV system size specified by section 150.1(c)14 is less than 1.8 kWdc.” In this analysis this exception is applied based on the sizes calculated per Equation 150.1-C of Section 150.1(c)14. The performance software sizes the PV system based on the estimated energy use, which differs slightly from the prescriptive sizing. As a result, the baseline PV capacity from the performance software for Climate Zone 10 is less than 1.8 kWdc.

Table 4 summarizes the PV capacities for the base case packages.

**Table 4: Base Package PV Capacities (kW-DC)**

Climate Zone	Base Package	
	Single Family	ADU
CZ01	3.54	0
CZ02	2.99	0
CZ03	2.81	0
CZ04	2.90	0
CZ05	2.62	0
CZ06	2.64	0
CZ07	2.84	0
CZ08	3.13	0
CZ09	2.97	0
CZ10	3.19	1.74
CZ11	3.91	2.07
CZ12	3.12	0
CZ13	4.08	2.11
CZ14	3.16	0
CZ15	5.33	2.56
CZ16	2.90	0

### 3.3 Measure Definitions and Costs

Measures evaluated in this study fall into two categories: those associated with general efficiency, onsite generation, and demand flexibility and those associated with building electrification. The Reach Codes Team selected measures based on cost-effectiveness as well as decades of experience with residential architects, builders, and engineers along with general knowledge of the relative consumer acceptance of many measures.

The following sections describe the details and incremental cost assumptions for each of the measures. Incremental costs represent the equipment, installation, replacement, and maintenance costs of the proposed measures relative to the base case.<sup>5</sup> Replacement costs are applied for roofs, mechanical equipment, PV inverters and battery systems over the 30-year evaluation period. Maintenance costs are estimated for PV systems, but not any other measures. Costs were estimated to reflect costs to the building owner. All costs are provided as present value in 2023 (2023 PV\$).

The Reach Codes Team obtained measure costs from distributors, contractors, literature review, and online sources such as Home Depot and RS Means. Contractor markups are incorporated. These are the Reach Codes Team best estimate of average costs statewide. However, it's recognized that local costs may differ, and that inflation and supply chain issues may also impact costs.

#### 3.3.1 Efficiency, Solar PV, and Batteries

Following are descriptions of each of the efficiency, PV, and battery measures evaluated under this analysis and applied in at least one of the packages presented in this report. Table 5 summarizes the incremental cost assumptions for each of these measures.

<sup>5</sup> All first costs are assumed to be financed in a mortgage and interest costs due to financing are included in the incremental costs. See Section 2.1.2 for details.

**Reduced Infiltration (ACH50):** Reduce infiltration in single family homes from the default infiltration assumption of five (5) air changes per hour at 50 Pascals (ACH50)<sup>6</sup> by 40 percent to 3 ACH50. HERS rater field verification and diagnostic testing of building air leakage according to the procedures outlined in the 2022 Reference Appendices RA3.8 (California Energy Commission, 2021b).

**Lower U-Factor Fenestration:** Reduce window U-factor to 0.24. The prescriptive U-factor is 0.30 in all climates.

**Higher SHGC Fenestration:** Increase solar heat gain coefficient (SHGC) to 0.50 in climate zones where heating loads dominate. The baseline solar heat gain coefficient (SHGC) applied in the Standard Design is 0.35 in Climate Zones 1, 3, 5, and 16.

**Cool Roof:** Install a roofing product that's rated by the Cool Roof Rating Council to have an aged solar reflectance (ASR) equal to or greater than 0.25. Steep-sloped roofs were assumed in all cases. The 2022 Title 24 specifies a prescriptive ASR of 0.20 for Climate Zones 10 through 15.

**Increased Ceiling Insulation:** Increase ceiling level insulation in a vented attic to R-49 or R-60 insulation.

**Slab Insulation:** Install R-10 perimeter slab insulation at a depth of 16-inches. This measure doesn't apply to Climate Zone 16 where slab insulation is required prescriptively.

**Low Pressure Drop Ducts:** Upgrade the duct distribution system to reduce external static pressure and meet a maximum fan efficacy of 0.35 Watts per cfm. This may involve upsizing ductwork, reducing the total effective length of ducts, and/or selecting low pressure drop components such as filters. Fan watt draw must be verified by a HERS rater according to the procedures outlined in the 2022 Reference Appendices RA3.3 (California Energy Commission, 2021b).

**Buried Radial Duct Design:** Bury all ductwork in ceiling insulation by laying the ducts across the ceiling joists or in-between ceiling joists directly on the ceiling drywall. Duct design is based on a radial design where individual ducts are run to each supply register. This allows for smaller diameter ducts, reducing duct losses and more easily meeting fully or deeply buried conditions.<sup>7</sup> Duct burial and duct system design must be verified by a HERS rater according to the procedures outlined in the 2022 Reference Appendices RA3.1.4.1.5 and RA3.1.4.1.6 (California Energy Commission, 2021b). This applies to the single family prototypes only.

**R-8 Duct Insulation:** Increase duct insulation to R-8 in the climate zones where R-6 insulation is prescriptive.

**Ductless Mini-Split Heat Pump:** In the ADU prototype replace the ducted split system with a ductless mini-split heat pump with three indoor heads. The system is evaluated as meeting the criteria for the variable capacity heat pump (VCHP) credit, introduced in the 2019 code cycle, which must be verified by a HERS rater according to the procedures outlined in the 2022 Reference Appendices RA3.4.4.3 (California Energy Commission, 2021b). This credit requires verification of refrigerant charge, that all equipment is entirely within conditioned space, that airflow is directly supplied to all habitable space and that wall mounted thermostats serve any zones greater than 150 square feet.

**Compact Hot Water Distribution:** Design the hot water distribution system to meet minimum requirements for the basic compact hot water distribution credit according to the procedures outlined in the 2022 Reference Appendices RA4.4.6 (California Energy Commission, 2021b). In many single family homes this may require moving the water heater from an exterior to an interior garage wall. CBECC-Res software assumes a 30% reduction in distribution losses for the basic credit.

**Solar PV:** Installation of on-site PV is required in the 2022 residential code unless an exception is met. The PV sizing methodology in each package was developed to offset annual building electricity use and avoid oversizing which would

<sup>6</sup> Whole house leakage tested at a pressure difference of 50 Pascals between indoors and outdoors.

<sup>7</sup> The duct systems in the Central Valley Research Homes Project Final Project Report are illustrative of this approach (Proctor, Wilcox, & Chitwood, 2018).

violate net energy metering (NEM) rules.<sup>8</sup> In all cases, PV is evaluated in CBECC-Res according to the California Flexible Installation (CFI) assumptions.

The Reach Codes Team used two options within the CBECC-Res software for sizing the PV system, described below. The first option, “Standard Design PV”, was applied in the base case simulations and packages where the PV system size was not changed from the minimum system size required. For the PV packages, the second option was used with a scaling of 100 percent. The Reach Codes Team evaluated an all-electric single family and ADU home with a PV system sized to offset 100 and 90 percent of the total calculated electricity use. Sizing to 100 percent proved to be more cost-effective based on customer utility bills in most cases. As a result, the PV packages were sized to offset 100 percent of electricity use.

- Standard Design PV – the same PV capacity as is required for the Standard Design case<sup>9</sup>
- Specify PV System Scaling – a PV system sized to offset a specified percentage of the estimated electricity use of the Proposed Design case

One exception to the PV requirement is when the minimum PV system size required is less than 1.8 kWh. This exception applies to the ADU models in Climate Zones 1-9, 12, 14, and 16. For these cases no PV system is required by code and no PV system was modeled in the base case simulations.

**Battery Energy Storage:** A battery system was evaluated in CBECC-Res with control type set to “Advanced Demand Response Control” and with default efficiencies of 95% for both charging and discharging. The “Advanced Demand Response Control” option assumes the battery system will charge or discharge depending on the needs of the grid. To qualify for the Advanced Demand Response Control the battery system must meet the requirements outlined in the 2022 Reference Appendices JA13.3.3.2 (California Energy Commission, 2021b).

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<sup>8</sup> NEM rules apply to the IOU territories only.

<sup>9</sup> The Standard Design PV system is sized to offset the electricity use of the building loads which are typically electric in a mixed fuel home, which includes all loads except space heating, water heating, clothes drying, and cooking.



**Table 5: Incremental Cost Assumptions**

Measure	Performance Level	Incremental Cost (2023 PV\$) <sup>1</sup>		Source & Notes
		Single Family	ADU	
<b>Non-Preempted Measures</b>				
Reduced Infiltration	3.0 vs 5.0 ACH50	\$591	\$362	\$0.115/ft <sup>2</sup> based on NREL's BEopt cost database plus \$250 HERS rater verification.
Window U-factor	0.24 vs 0.30	\$2,280	\$285	\$4.23/ft <sup>2</sup> window area based on analysis conducted for the 2019 and 2022 Title 24 cycles (Statewide CASE Team, 2018).
Window SHGC	0.50 vs 0.35	\$0	\$0	Based on feedback from Statewide CASE Team that higher SHGC does not necessarily have any incremental cost (Statewide CASE Team, 2017).
Cool Roof	0.25 vs 0.20 aged solar reflectance	\$219	\$53	\$0.07per ft <sup>2</sup> of roof area first incremental cost for asphalt shingle product based on the 2022 Nonresidential High Performance Envelope CASE Report (Statewide CASE Team, 2020a). Total costs assume present value of replacement at year 20 and residual cost for remaining product life at end of 30-year analysis period. Higher reflectance values for lower cost are achievable for tile roof products
Attic Insulation	R-49 vs R-30	\$872	n/a	Based on costs from the 2022 Residential Additions & Alterations CASE Report (Statewide CASE Team, 2020b).
	R-60 vs R-30	\$1,420	n/a	
	R-60 vs R-38	\$1,096	n/a	
Slab Edge Insulation	R-10 vs R-0	\$651	\$449	\$4 per linear foot of slab perimeter based on internet research. Assumes 16in depth.
Low Pressure Drop Ducts	0.35 vs 0.45 W/cfm	\$99	\$49	Costs assume one-hour labor for single family and half-hour for the ADU. Labor rate of \$88 per hour is from 2022 RS Means for sheet metal workers and includes a weighted average City Cost Index for labor for California.
Buried Ducts	Buried, radial design	\$281	n/a	No cost for laying ducts on attic floor versus suspending, in some cases there will be cost savings. Neutral cost for radiant design versus trunk and branch design. A \$250 HERS Rater verification fee is included.
Duct Insulation	R-8 vs R-6	\$201	n/a	Based on costs from the 2022 Residential Additions & Alterations CASE Report (Statewide CASE Team, 2020b).



Measure	Performance Level	Incremental Cost (2023 PV\$) <sup>1</sup>		Source & Notes
		Single Family	ADU	
Ductless Mini-Split Heat Pump	Ductless system meeting the VCHP credit vs. ducted split heat pump	n/a	\$1,571	Costs were developed based on data from E3's 2019 report Residential Building Electrification in California (Energy & Environmental Economics, 2019) and the 2022 All-Electric Multifamily CASE Report (Statewide CASE Team, 2020c). Equipment costs are from the CASE Report for the 10-story multifamily prototype assuming similar sized equipment between the multifamily dwelling unit and the ADU. Thermostat, wiring, electrical, and ducting costs are from the E3 study. A \$250 HERS Rater verification fee is also included. Where this measure is applied to the mixed fuel home with a gas furnace, this cost is in addition to the cost difference for a heat pump versus a gas furnace/split AC reported in Section 3.3.2.
Compact Hot Water Distribution	Basic credit – homes with gas tankless	\$196	\$0	For single family homes with a gas tankless water heater (mixed fuel homes in Climate Zones 3,4,13,14) assumes adding 20-foot venting at \$14.69 per linear foot to locate water heater on interior garage wall, less 20-foot savings for PEX and pipe insulation at \$5.98 per linear foot. Costs from online retailers. For single family homes with a HPWH there is an incremental cost savings from less pipe being required. For the ADU it is assumed the credit can be met without any changes to design and there is no cost impact.
	Basic credit – homes with HPWH	\$-134	\$0	
<b>PV + Battery</b>				
PV System	First Cost	\$3.21/W	\$3.21/W	First costs from LBNL's Tracking the Sun 2021 costs (Barbose, Darghouth, O'Shaughnessy, & Forrester, 2021) and represent median costs in California in 2020 of \$3.90/WDC for residential systems. The first cost was reduced by the solar energy Investment Tax Credit of 30%. <sup>2</sup> Costs are presented as the average of 2023, 2024, and 2025. Inverter replacement cost of \$0.14/WDC present value includes replacements at year 11 at \$0.15/WDC (nominal) and at year 21 at \$0.12/WDC (nominal) per the 2019 PV CASE Report (California Energy Commission, 2017). System maintenance costs of \$0.31/WDC present value assume \$0.02/WDC (nominal) annually per the 2019 PV CASE Report (California Energy Commission, 2017).
	Inverter replacement	\$0.14/W	\$0.14/W	
	Maintenance	\$0.31/W	\$0.31/W	

Measure	Performance Level	Incremental Cost (2023 PV\$) <sup>1</sup>		Source & Notes
		Single Family	ADU	
Battery	First cost	\$617/kWh	\$617/kWh	Costs are based on research conducted for the 2021 Batteries in Single Family Homes reach code report (Statewide Reach Codes Team, 2021a). \$1,000/kWh first cost in 2020 based on Self-Generation Incentive Program (SGIP) residential participant cost data. To estimate the first cost in future years this was reduced by 7% annually based on SDG&E's Behind-the-Meter Battery Market Study (E-Source companies, 2020). The first cost is reduced by the solar energy Investment Tax Credit of 30%. <sup>2</sup> Costs are presented as the average of 2023, 2024, and 2025. No SGIP incentives are included. Replacement cost at year 10 and 20 was calculated based on the 2023 cost reduced by 7% annually over the next 10 years for a future value cost of \$389 (present value of \$290 in year 10 and \$216 in year 20).
	Replacement cost	\$505/kWh	\$505/kWh	

<sup>1</sup>All first costs are assumed to be financed in a mortgage and interest costs due to financing are included in the incremental costs. See Section 2.1.2 for details. Interest costs were not included for calculating TDV cost-effectiveness.

<sup>2</sup>As part of the Inflation Reduction Act in August 2022 the Section 25D Investment Tax Credit was extended and raised to 30% through 2032 with a step-down beginning in 2033. <https://www.seia.org/sites/default/files/2022-08/Inflation%20Reduction%20Act%20Summary%20PDF%20FINAL.pdf>

### 3.3.2 All-Electric

This analysis compared a code compliant mixed fuel prototype, which uses natural gas for three appliances (cooking, clothes drying and either space heating or water heating), with a code compliant all-electric prototype. In these cases, the relative costs between natural gas and electric appliances, differences between in-house electricity and natural gas infrastructure and the associated infrastructure costs for providing natural gas to the building were included.

To estimate costs the Reach Codes Team leveraged costs from the 2019 reach code cost-effectiveness studies for residential new construction (Statewide Reach Codes Team, 2019) and detached accessory dwelling units (Statewide Reach Codes Team, 2021b), 2022 RS Means, PG&E data, published utility schedules and rules, and online research.

Incremental costs for natural gas infrastructure to a single family building are presented in Table 6 through Table 11. These costs are applied as cost savings for an all-electric home when compared to a mixed fuel home. This is the component with the highest degree of variability for all-electric homes. These costs are project dependent and may be significantly impacted by such factors as utility territory, site characteristics, distance to the nearest natural gas main and main location, joint trenching, whether work is conducted by the utility or a private contractor, and number of dwelling units per development. All gas utilities participating in this study were solicited for cost information. The CA IOU costs for single family homes presented are based primarily on cost data provided by PG&E.

Table 6 presents assumed gas main distribution line extension costs within gas CA IOU territory. Total distribution line extension costs are based on cost data provided by PG&E for new greenfield development. Total costs are reduced to account for deductions per the Utility Gas Main Extensions rules.<sup>10</sup> These rules categorize distribution line extensions as “refundable” costs, which are offset or subsidized by all other ratepayers. Refundable costs are first subsidized by appliance allowances, which are defined in Table 7. If there are additional costs in excess of the allowances, the developer has the option to either be refunded for the remaining amount over ten years or receive a 50 percent discount at time of application. The latter discount option is assumed in this analysis and is more commonly used by developers (California Public Utilities Commission, 2022). Two scenarios are presented in Table 6 since the appliance allowances differ by type of appliance. One is for the base case home with a prescriptive heat pump space heater which assumes a gas water heater, gas cooking, and gas clothes dryer (Climate Zones 3, 4, 13, and 14). The second is for the base case home with a prescriptive heat pump water heater which assumes a gas furnace, gas cooking, and gas clothes dryer. and a natural gas furnace for space heating (Climate Zones 1, 2, 5 through 12, 15, and 16).

The costs less the deductions were applied under the On-Bill cost-effectiveness methodology. The total costs before the deductions were applied under the TDV cost-effectiveness methodology to better reflect the full cost of gas main extensions since the deductions are subsidized by ratepayers and recovered via revenue from customers. This follows the analysis approach in the 2019 reach code study (Statewide Reach Codes Team, 2019) and was based on input received from the Energy Commission and agreement from the Reach Codes technical advisory team that the approach is appropriate. TDV cost savings impacts extend beyond the customer and account for societal impacts of energy use. Accounting for the full cost of the infrastructure upgrades was determined to be justified when evaluating under the TDV methodology.

The CPUC issued a Proposed Decision in August 2022 that recommends eliminating the subsidies effective July 1, 2023. At the time of publishing this report there had been no ruling on this decision and therefore this analysis assumes the existing rules will remain in place through the 2022 code cycle. A sensitivity analysis of how the results would change if the Proposed Decision were adopted is included in the results of this report.

<sup>10</sup> PG&E Rule 15: [https://www.pge.com/tariffs/assets/pdf/tariffbook/GAS\\_RULES\\_15.pdf](https://www.pge.com/tariffs/assets/pdf/tariffbook/GAS_RULES_15.pdf).  
 SoCalGas Rule 20: <https://www.socalgas.com/regulatory/tariffs/tm2/pdf/20.pdf>.  
 SDG&E Rule 15: [https://tariff.sdge.com/tm2/pdf/GAS\\_GAS-RULES\\_GRULE15.pdf](https://tariff.sdge.com/tm2/pdf/GAS_GAS-RULES_GRULE15.pdf).

**Table 6. Single Family IOU Natural Gas Main Distribution Line Extension Costs**

	Total	Less Gas Extension Rule Deductions <sup>1</sup>		
		PG&E	SoCalGas	SDG&E
Gas Water Heater Base	\$1,020	\$0	\$13	\$0
Gas Space Heater Base		\$0	\$0	\$0

<sup>1</sup>After Utility Gas Main Extension Rule deductions.

**Table 7. Residential IOU Gas Line Extension Appliance Allowances**

Appliance	PG&E	SoCalGas	SDG&E
Water Heating	\$1,391	\$682	\$1,138
Space Heating	\$987	\$818	\$987
Oven/Range	\$84	\$152	\$201
Dryer Stub	\$24	\$160	\$289
<b>Total - Gas Water Heater Base</b>	<b>\$1,499</b>	<b>\$994</b>	<b>\$1,628</b>
<b>Total – Gas Space Heater Base</b>	<b>\$1,095</b>	<b>\$1,130</b>	<b>\$1,477</b>

Table 8 presents costs for the extension of service lines from a main distribution line to the home within gas CA IOU territory. These costs are based on data provided by PG&E excluding trenching. Costs are presented separately for a new subdivision in an undeveloped area as well as an infill development. The service extension is typically more costly in an infill scenario due to the disruption of existing roads, sidewalks, and other structures. For this analysis an average of the new subdivision and infill development costs was used, representing 80 percent of the new subdivision and 20 percent infill.

**Table 8. Single Family IOU Natural Gas Service Line Extension Costs**

New Subdivision	Infill Development	Average (80% New, 20% Infill)
\$1,300	\$6,750	\$2,390

Table 9 presents other relative costs within gas CA IOU territory including gas meter installation and IOU plan review. These costs are based on data provided by PG&E.

**Table 9. Single Family IOU Other Natural Gas Infrastructure Costs**

Meter	\$300
Plan Review	\$850

Table 10 presents total costs including distribution and service line extensions, meter installation and plan review for the three gas CA IOUs for the two base case scenarios. Costs are based on the average service line extension costs from Table 8. For the single family analysis, based on the Reach Codes Team's conversations with the industry it is assumed that no upgrades to the electrical panel are required and that a 200 Amp panel is typically installed for both mixed fuel and all-electric homes.

**Table 10. Single Family IOU Total Natural Gas Infrastructure Costs<sup>1</sup>**

	Total	Less Gas Extension Rule Deductions <sup>2</sup>		
		PG&E	SoCalGas	SDG&E
Total - Gas Water Heater Base	\$4,560	\$3,540	\$3,553	\$3,540
Total - Gas Space Heater Base		\$3,540	\$3,540	\$3,540

<sup>1</sup>Based on average service line extension costs from Table 8.

<sup>2</sup>After Utility Gas Main Extension Rule deductions.

CPAU provides gas service to its customers and therefore separate costs were evaluated based on CPAU gas service connection fees.<sup>11</sup> Table 11 presents the breakdown of gas infrastructure costs used in this analysis for CPAU. There is no main distribution line component since Palo Alto has little greenfield space remaining and most of the development is infill.

**Table 11. Single Family CPAU Total Natural Gas Infrastructure Costs**

Item	Cost
Service Extension	\$5,892
Meter	\$1,012
Plan Review Costs	\$924
<b>Total</b>	<b>\$7,828</b>

Table 12 presents incremental costs for natural gas infrastructure for the detached ADU. These costs are directly from the 2019 detached ADU reach code report (Statewide Reach Codes Team, 2021b) and were obtained from interviews and RS Means. For the ADU scenario it’s assumed that natural gas already exists on the lot and is being extended to the location of the ADU typically at the back of the lot. There are incremental cost savings for an all-electric ADU from not extending the natural gas service; however, there is also a small incremental cost for upgrading the electric service to accommodate the additional electrical load. The Reach Codes Team found that a new detached ADU would require that the building owner upgrade the service connection to the lot in both the mixed-fuel ADU design and the all-electric design. The most common size for this upgrade is to upsize the existing panel to 225A, which would not represent an incremental cost from the mixed-fuel project to the all-electric project. Feeder wiring to the ADU and the ADU subpanel will need to be slightly upgraded for the all-electric design.

<sup>11</sup> CPAU Schedule G-5 effective 09-01-2019: <https://www.cityofpaloalto.org/files/assets/public/utilities/utilities-engineering/general-specifications/gas-service-connection-fees.pdf>

**Table 12. ADU Utility Infrastructure Costs**

Mixed Fuel Measure	Mixed Fuel Cost	All-Electric Measure	All-Electric Cost	All-Electric Incremental Cost
Site natural gas service extension	\$1,998	No site natural gas service	\$0	(\$1,998)
Site electrical service connection upgrade 225A	\$3,500	Site electrical service connection upgrade 225A	\$3,500	\$0
100A feeder to ADU with breaker	\$933	125A feeder to ADU with breaker	\$1,206	\$273
100A ADU subpanel	\$733	125A ADU subpanel	\$946	\$213
<b>Totals</b>	<b>\$7,164</b>		<b>\$5,652</b>	<b>(\$1,512)</b>

Equipment lifetimes applied in this analysis for the water heating and space conditioning measures are summarized in Table 13. The lifetime for the heat pump, furnace, and air conditioner are based on the Database for Energy Efficient Resources (DEER) (California Public Utilities Commission, 2021b). In DEER, heat pump and air conditioner measures are assigned an effective useful lifetime (EUL) of 15 years and a furnace an EUL of 20 years. The heating and cooling system components are typically replaced at the same time when one reaches the end of its life and the other is near it. Therefore, it is assumed that both the furnace and air conditioner are replaced at the same time at year 17.5, halfway between 15 and 20 years. For HVAC system costing, air-conditioning is included in all cases in both the base case and proposed models. Present value replacement costs are included in the total lifetime incremental costs.

**Table 13: Lifetime of Water Heating & Space Conditioning Equipment Measures**

Measure	Lifetime
Gas Furnace	17.5
Air Conditioner	17.5
Heat Pump	15
Gas Tankless Water Heater	20
Heat Pump Water Heater	15

Appliance incremental costs are shown in Table 14 and Table 15. Replacement costs are applied to HVAC and DHW equipment over the 30-year evaluation period. Costs were estimated to reflect costs to the building owner. All costs are provided as present value in 2023 (2023 PV\$). Costs due to variations in furnace, air conditioner, and heat pump capacity by climate zone were not accounted for.

The Reach Codes Team determined that the typical first installed cost for electric appliances is similar to that for natural gas appliances. Cost differences include equipment cost and installation, costs for natural gas piping from the meter to the appliance, and costs for electrical wiring to service the appliances.

**Space Heater:** Typical HVAC incremental costs were based on material costs from the AC Wholesalers website and labor costs from 2022 RS Means. In most cases the Reach Codes Team found that the material costs were slightly higher for the heat pump, but the labor costs were slightly higher for the gas furnace/AC installation. Costs were calculated for capacities ranging from a 2-ton to a 5-ton and the incremental costs used in this study were based on a weighted average of the expected nominal capacities from CBECC-Res autosizing results for the 2,100 square foot prototype. Incremental replacement costs for the heat pump are based on a 17.5-year lifetime for the gas furnace and air conditioner and a 15-year lifetime for the heat pump. Residual value of the gas furnace/AC at the end of the 30-year analysis period was accounted for to represent the remaining life of the equipment.



**Water Heater:** Various cost sources were reviewed and the Reach Codes Team determined that installed first costs for a garage installed tankless gas water heater and HPWH are very similar and no incremental cost was applied for the equipment and installation (see below for details on costs for gas piping and electrical wiring). This accounts for slightly higher equipment costs for the HPWH but lower installation labor due to the elimination of the combustion gas venting. Incremental replacement costs account for a 15-year HPWH lifetime and a 20-year lifetime for the gas tankless water heater. Residual value of the gas tankless at the end of the 30-year analysis period was accounted for to represent the remaining life of the equipment. For the ADU analysis the water heater is evaluated within the conditioned space with the supply air ducted from the outside. An HVAC contractor provided a cost estimate for supply air ducting through the wall in an ADU where the water heater is in an interior room adjacent to an exterior wall. The estimated total cost for this was \$652.

A high efficiency HPWH that meets the Northwest Energy Efficiency Alliance (NEEA)<sup>12</sup> Tier 3 rating was also evaluated. HPWHs certified to meet NEEA Tier 3 or Tier 4 are the dominant product on the market today. According to NEEA all major HPWH manufacturers are represented in NEEA’s qualified product list<sup>13</sup> and there are only 11 listed products certified as Tier 1 or Tier 2.<sup>14</sup> While the Reach Codes Team evaluated a HPWH that just meets the federal minimum efficiency standards of close to 2.0 UEF to satisfy federal preemption requirements, the Reach Codes Team is not aware of any 2.0 UEF products that are available. The Reach Codes Team was unable to find any of the Tier 1 or Tier2 HPWHs for sale online and was unable to find any products for sale online that were not NEEA Tier 3 or Tier 4 certified. As a result, no incremental cost is assumed for a NEEA Tier 3 product versus a federal minimum efficiency product.

**Clothes Dryer and Range:** After review of various sources, the Reach Codes Team concluded that the cost difference between gas and electric resistance equipment for clothes dryers and stoves is negligible and that the lifetimes of the two technologies are also similar.

**Electric Service Upgrade:** The 2022 Title 24 Code requires electric readiness for gas appliances; as a result, the incremental costs to provide electrical service for electric appliances are minimal. The incremental costs accounted for in this study are calculated as the cost to install 220V service for the electric appliances less the cost for the electric ready requirements and for installing 110V service for the comparable gas appliance. Incremental costs are applied for the space heater, water heater, and cooking range. Based on builder surveys, it’s assumed that in a typical mixed fuel home both electric and gas service are provided to the dryer location and therefore no incremental costs for the dryer were applied. Costs assume 50A service for the range and 30A service for the space heater and water heater. Costs are assumed to be the same for the single family and ADU analyses.

**In-House Natural Gas Infrastructure (from meter to appliances):** Installation cost to run a natural gas line from the meter to the appliance location was estimated at \$580 per appliance. These costs were based on material costs from Home Depot and labor costs from 2022 RS Means. The material costs were about 1/3 higher in RS Means than Home Depot, so the Reach Codes Team used the lower costs from Home Depot. The Reach Codes Team conducted a pipe sizing analysis for the two single family and one ADU prototype homes to estimate the length and diameter of gas piping required assuming the home included a gas furnace, gas tankless water heater, gas range, and gas dryer. Total estimated costs were very similar for each of the three prototypes and an average cost per appliance of \$580 was determined. Costs are assumed to be the same for the single family and ADU analyses.

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<sup>12</sup> Based on operational challenges experienced in the past, NEEA established rating test criteria to ensure newly installed HPWHs perform adequately, especially in colder climates. The NEEA rating requires products comply with ENERGY STAR and includes requirements regarding noise and prioritizing heat pump use over supplemental electric resistance heating.

<sup>13</sup> <https://neea.org/success-stories/heat-pump-water-heaters>

<sup>14</sup> <https://neea.org/img/documents/residential-unitary-HPWH-qualified-products-list.pdf>



**Table 14. Single Family All-Electric Appliance Incremental Costs**

Measure	Incremental Cost (2023 PV\$)		
	First Cost	Replacement Cost	Total Lifetime Financed
<b><i>Heat Pump vs Gas Furnace/Split AC</i></b>			
Equipment & Installation	(\$151)	\$703	\$533
Electric Service Upgrade	\$43	\$0	\$49
In-House Gas Piping	(\$580)	\$0	(\$651)
<b>Total</b>	<b>(\$688)</b>	<b>\$703</b>	<b>(\$69)</b>
<b><i>Heat Pump Water Heater vs Gas Tankless</i></b>			
Equipment & Installation	\$0	\$652	\$652
Electric Service Upgrade	\$43	\$0	\$49
In-House Gas Piping	(\$580)	\$0	(\$651)
<b>Total</b>	<b>(\$537)</b>	<b>\$652</b>	<b>\$49</b>
<b><i>NEEA Tier 3 HPWH vs Federal Minimum HPWH</i></b>			
Equipment	\$0	\$0	\$0
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b><i>Electric Resistance vs Gas Cooking</i></b>			
Equipment & Installation	\$0	\$0	\$0
Electric Service Upgrade	\$100	\$0	\$113
In-House Gas Piping	(\$580)	\$0	(\$651)
<b>Total</b>	<b>(\$480)</b>	<b>\$0</b>	<b>(\$539)</b>
<b><i>Electric Resistance vs Gas Clothes Drying</i></b>			
Equipment & Installation	\$0	\$0	\$0
Electric Service Upgrade	\$0	\$0	\$0
In-House Gas Piping	(\$580)	\$0	(\$651)
<b>Total</b>	<b>(\$580)</b>	<b>\$0</b>	<b>(\$651)</b>

**Table 15. ADU All-Electric Appliance Incremental Costs**

Measure	Incremental Cost (2023 PV\$)		
	First Cost	Replacement Cost	Total Lifetime Financed
<b>Heat Pump vs Gas Furnace/Split AC</b>			
Equipment & Installation	(\$151)	\$703	\$533
Electric Service Upgrade	\$43	\$0	\$49
In-House Gas Piping	(\$580)	\$0	(\$651)
<b>Total</b>	<b>(\$688)</b>	<b>\$703</b>	<b>(\$69)</b>
<b>Heat Pump Water Heater vs Gas Tankless</b>			
Equipment & Installation	\$652	\$652	\$1,384
Electric Service Upgrade	\$43	\$0	\$49
In-House Gas Piping	(\$580)	\$0	(\$651)
<b>Total</b>	<b>\$115</b>	<b>\$652</b>	<b>\$781</b>
<b>NEEA Tier 3 HPWH vs Federal Minimum HPWH</b>			
Equipment	\$0	\$0	\$0
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Electric Resistance vs Gas Cooking</b>			
Equipment & Installation	\$0	\$0	\$0
Electric Service Upgrade	\$100	\$0	\$113
In-House Gas Piping	(\$580)	\$0	(\$651)
<b>Total</b>	<b>(\$480)</b>	<b>\$0</b>	<b>(\$539)</b>
<b>Electric Resistance vs Gas Clothes Drying</b>			
Equipment & Installation	\$0	\$0	\$0
Electric Service Upgrade	\$0	\$0	\$0
In-House Gas Piping	(\$580)	\$0	(\$651)
<b>Total</b>	<b>(\$580)</b>	<b>\$0</b>	<b>(\$651)</b>

### 3.4 Measure Packages

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. In some instances, the prescriptive minimum package did not comply with code and efficiency measures were added to meet minimum compliance requirements. The added efficiency measures can be found in Table 45 and Table 46.
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

### 4.1 2022 Metrics and Compliance

The Reach Codes Team evaluated the compliance impacts of a prescriptive all-electric home as well as a traditional mixed fuel home with four gas appliances (space heating, water heating, cooking, clothes drying). Compliance is relative to the 2022 prescriptive base case home with three gas appliances. The impacts for the single family home and the ADU are presented in Figure 1 and Figure 2, respectively. The all-electric single family home prototype is code compliant with both EDR1 (source energy) and efficiency EDR2 (TDV energy) in all climate zones except Climate Zones 15 and 16. In addition to this climate zone, the all-electric ADU is also not compliant in Climate Zones 4 through 10 and 13 through 15. The four gas appliance single family home is presented in Figure 3. This case is not code compliant in any climate zone.

This analysis illustrates a couple of interesting points. One is that the new 2022 compliance metrics are important drivers encouraging electrification. The compliance penalties assessed the four gas appliance home scenarios are significant and will require deep efficiency measures to overcome. Another is that the 2022 Title 24 Code’s new source energy metric combined with the heat pump baseline encourage all-electric construction, providing a compliance benefit, at least in larger homes, that allows for some amount of prescriptively required building efficiency to be traded off and still comply when using the performance method.

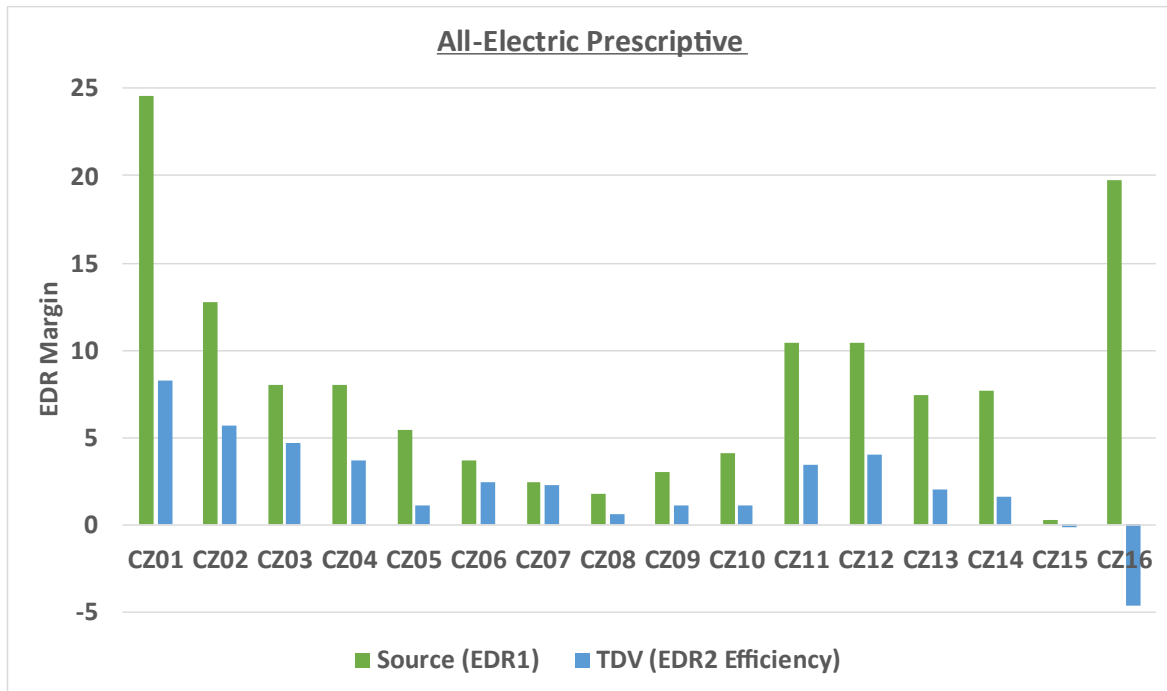


Figure 1: Single Family All-Electric Home Compliance Impacts

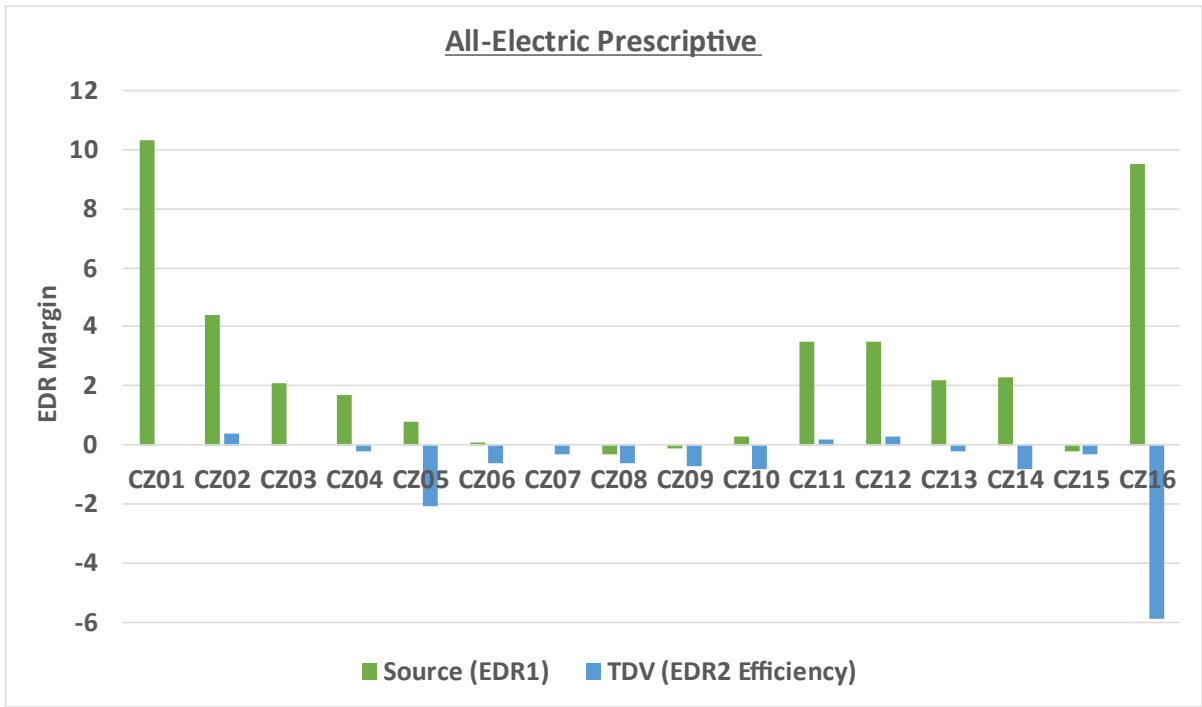


Figure 2: ADU All-Electric Home Compliance Impacts

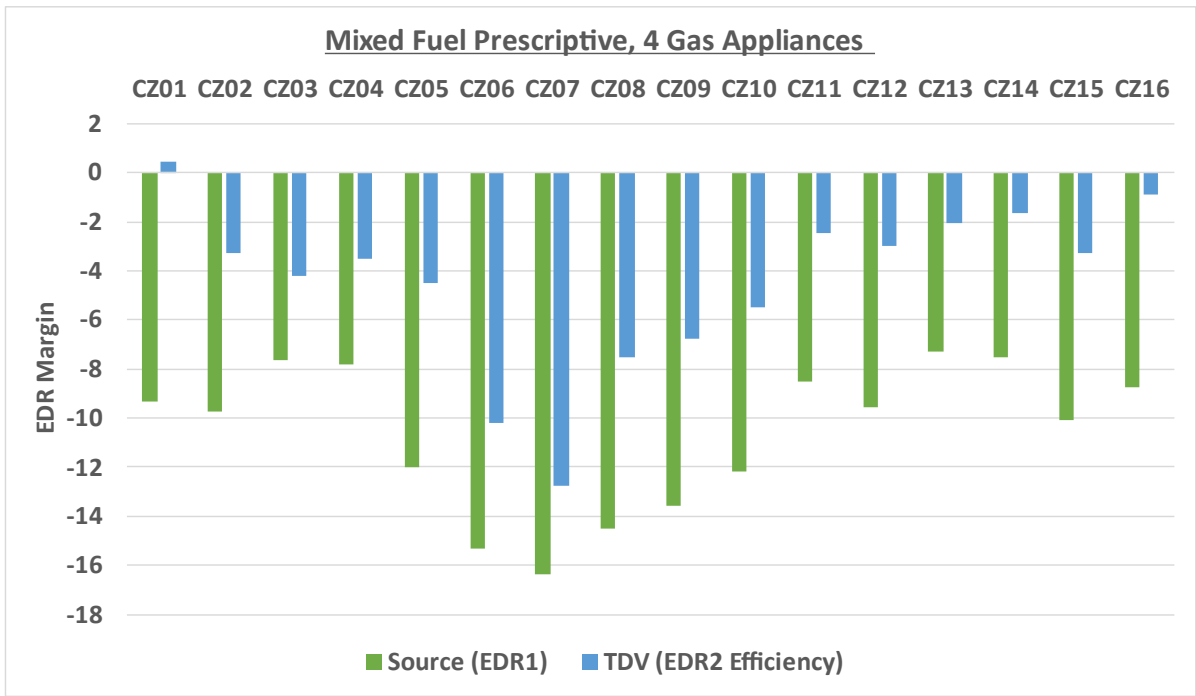


Figure 3: Single Family Four Gas Appliance Home Compliance Impacts

## 4.2 All-Electric Code Minimum Results

Table 16 shows results for the single family all-electric code minimum case compared to the 2022 baseline. This package reflects the prescriptive minimum requirements except in Climate Zones 15 and 16, where efficiency measures were added to meet minimum code compliance. Utility cost savings are negative, indicating an increase in utility costs for the all-electric building, in all cases except in CPAU and SMUD territories. In all cases the incremental cost is negative, which reflects a cost savings for the all-electric building due to eliminating the gas infrastructure costs. The package is cost effective based on TDV in all cases; however, it's only cost-effective On-Bill in Climate Zones 4 in CPAU territory, 6, 8, 9, 12 in SMUD territory, and 15.

Table 17 shows the all-electric code minimum case results for the ADU. This package reflects the prescriptive minimum requirements except in Climate Zones 4 through 10 and 13 through 16, where efficiency measures were added to meet minimum code compliance. The conclusions related to cost-effectiveness are similar for the ADU as for the single family analysis.

A summary of measures included in each package is provided in Appendix 7.3 Summary of Measures by Package. The efficiency measures added to the all-electric package to meet minimum code requirements are described in Table 45 and Table 46.

Table 16. Single Family Cost-Effectiveness: All-Electric Code Minimum

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	8.3	-4,628	400	1.5	(\$721)	(\$10,848)	(\$5,288)	(\$5,234)	0.5	(\$5,614)	>1	\$5,566
CZ02	PGE	5.7	-3,170	247	0.8	(\$581)	(\$10,060)	(\$5,288)	(\$5,234)	0.5	(\$4,826)	>1	\$5,390
CZ03	PGE	4.7	-2,413	171	0.7	(\$510)	(\$9,954)	(\$5,136)	(\$5,116)	0.5	(\$4,838)	63.5	\$4,414
CZ04	PGE	3.7	-2,233	163	0.7	(\$455)	(\$8,756)	(\$5,136)	(\$5,116)	0.6	(\$3,641)	>1	\$4,929
CZ04	CPAU	3.7	-2,233	163	0.7	\$21	\$3,274	(\$9,424)	(\$9,931)	>1	\$13,205	>1	\$9,217
CZ05	PGE	1.1	-2,123	133	0.4	(\$452)	(\$8,930)	(\$5,288)	(\$5,234)	0.6	(\$3,696)	2.5	\$2,776
CZ05	PGE/SCG	1.1	-2,123	133	0.4	(\$455)	(\$9,027)	(\$5,288)	(\$5,234)	0.6	(\$3,793)	2.5	\$2,776
CZ06	SCE/SCG	2.5	-1,481	84	0.3	(\$269)	(\$5,120)	(\$5,288)	(\$5,234)	1.0	\$115	3.2	\$3,142
CZ07	SDGE	2.3	-1,328	69	0.2	(\$456)	(\$10,904)	(\$5,288)	(\$5,234)	0.5	(\$5,670)	3.1	\$3,081
CZ08	SCE/SCG	0.6	-1,331	67	0.2	(\$249)	(\$4,864)	(\$5,288)	(\$5,234)	1.1	\$371	2.8	\$2,951
CZ09	SCE	1.2	-1,513	85	0.3	(\$269)	(\$5,109)	(\$5,288)	(\$5,234)	1.0	\$126	3.3	\$3,179
CZ10	SCE/SCG	1.1	-1,777	107	0.3	(\$307)	(\$5,720)	(\$5,288)	(\$5,234)	0.9	(\$486)	3.5	\$3,285
CZ10	SDGE	1.1	-1,777	107	0.3	(\$657)	(\$15,474)	(\$5,288)	(\$5,234)	0.3	(\$10,239)	3.5	\$3,285
CZ11	PGE	3.5	-2,934	227	0.7	(\$444)	(\$7,106)	(\$5,288)	(\$5,234)	0.7	(\$1,872)	>1	\$5,135
CZ12	PGE	4.0	-2,751	213	0.7	(\$437)	(\$7,213)	(\$5,288)	(\$5,234)	0.7	(\$1,979)	>1	\$5,002
CZ12	SMUD/PGE	4.0	-2,751	213	0.7	\$58	\$4,526	(\$5,288)	(\$5,234)	>1	\$9,761	>1	\$5,002
CZ13	PGE	2.1	-2,099	154	0.6	(\$383)	(\$7,136)	(\$5,136)	(\$5,116)	0.7	(\$2,021)	>1	\$4,904
CZ14	SCE/SCG	1.6	-2,301	159	0.6	(\$411)	(\$7,590)	(\$5,136)	(\$5,116)	0.7	(\$2,475)	>1	\$4,493
CZ14	SDGE	1.6	-2,301	159	0.6	(\$914)	(\$21,350)	(\$5,149)	(\$5,130)	0.2	(\$16,219)	>1	\$4,506
CZ15	SCE/SCG	1.6	-944	53	0.2	(\$165)	(\$3,084)	(\$5,407)	(\$5,369)	1.7	\$2,285	10.3	\$4,247
CZ16	PG&E	6.0	-4,314	404	1.5	(\$545)	(\$6,642)	(\$3,257)	(\$2,954)	0.4	(\$3,687)	>1	\$3,139



Table 17. ADU Cost-Effectiveness: All-Electric Code Minimum

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	0.0	-1,832	114	0.4	(\$346)	(\$6,791)	(\$3,260)	(\$2,957)	0.4	(\$3,834)	1.2	\$489
CZ02	PGE	0.4	-1,380	75	0.2	(\$353)	(\$7,539)	(\$3,260)	(\$2,957)	0.4	(\$4,582)	1.2	\$403
CZ03	PGE	0.0	-1,665	123	0.5	(\$384)	(\$7,667)	(\$2,457)	(\$2,106)	0.3	(\$5,560)	2.0	\$888
CZ04	PGE	0.2	-1,591	118	0.5	(\$351)	(\$6,970)	(\$3,260)	(\$2,957)	0.4	(\$4,013)	15.9	\$2,395
CZ04	CPAU	0.2	-1,591	118	0.5	\$42	\$3,285	(\$3,260)	(\$2,957)	>1	\$6,242	15.9	\$2,395
CZ05	PGE	0.4	-1,031	49	0.1	(\$268)	(\$5,966)	(\$3,260)	(\$2,957)	0.5	(\$3,009)	1.2	\$460
CZ05	PGE/SCG	0.4	-1,031	49	0.1	(\$226)	(\$4,656)	(\$3,260)	(\$2,957)	0.6	(\$1,699)	1.2	\$460
CZ06	SCE/SCG	0.2	-909	38	0.1	(\$215)	(\$4,435)	(\$3,260)	(\$2,957)	0.7	(\$1,478)	1.4	\$666
CZ07	SDGE	0.4	-879	37	0.1	(\$384)	(\$9,528)	(\$3,260)	(\$2,957)	0.3	(\$6,571)	1.4	\$771
CZ08	SCE/SCG	0.6	-864	36	0.1	(\$212)	(\$4,397)	(\$3,216)	(\$2,908)	0.7	(\$1,489)	1.5	\$876
CZ09	SCE	0.6	-901	38	0.1	(\$190)	(\$3,861)	(\$3,216)	(\$2,908)	0.8	(\$953)	1.6	\$896
CZ10	SCE/SCG	0.4	-962	43	0.1	(\$184)	(\$3,663)	(\$3,216)	(\$2,908)	0.8	(\$755)	1.7	\$1,055
CZ10	SDGE	0.4	-962	43	0.1	(\$404)	(\$9,951)	(\$3,216)	(\$2,908)	0.3	(\$7,043)	1.7	\$1,055
CZ11	PGE	0.2	-1,322	71	0.2	(\$297)	(\$6,281)	(\$3,260)	(\$2,957)	0.5	(\$3,324)	1.5	\$843
CZ12	PGE	0.3	-1,283	69	0.2	(\$298)	(\$6,354)	(\$3,260)	(\$2,957)	0.5	(\$3,397)	1.4	\$716
CZ12	SMUD/PGE	0.3	-1,283	69	0.2	(\$75)	(\$1,053)	(\$3,260)	(\$2,957)	2.8	\$1,904	1.4	\$716
CZ13	PGE	0.1	-1,594	112	0.4	(\$296)	(\$5,748)	(\$3,260)	(\$2,957)	0.5	(\$2,791)	11.3	\$2,330
CZ14	SCE/SCG	0.4	-1,658	115	0.4	(\$282)	(\$5,107)	(\$3,216)	(\$2,908)	0.6	(\$2,199)	12.6	\$2,313
CZ14	SDGE	0.4	-1,658	115	0.4	(\$455)	(\$10,294)	(\$3,216)	(\$2,908)	0.3	(\$7,386)	12.6	\$2,313
CZ15	SCE/SCG	1.3	-783	36	0.1	(\$146)	(\$2,872)	(\$3,216)	(\$2,908)	1.0	\$35	2.3	\$1,408
CZ16	PG&E	0.1	-1,807	122	0.4	(\$348)	(\$6,698)	(\$2,640)	(\$2,261)	0.3	(\$4,437)	1.0	\$22

### 4.3 All-Electric Plus Efficiency, PV, and Battery Results

Table 18 and Table 19 compare cost-effectiveness results for the all-electric packages for the single family and ADU prototypes, respectively. In all cases the packages are cost effective based on TDV. On-Bill cost effectiveness generally improves with the addition of efficiency measures, improves significantly with an upsized PV system, and then declines again once batteries are added.

**Table 18. Single Family Cost-Effectiveness: All-Electric Energy Efficiency + Additional PV + Battery**

Climate Zone	Electric /Gas Utility	All Electric Efficiency				All Electric Efficiency + NEEA				All Electric Efficiency + PV				All Electric Efficiency + PV + Battery			
		On-Bill		TDV		On-Bill		TDV		On-Bill		TDV		On-Bill		TDV	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	0.7	(\$1,256)	>1	\$8,122	4.0	\$2,407	>1	\$10,497	2.8	\$22,471	1.9	\$9,517	1.5	\$11,220	1.4	\$9,062
CZ02	PGE	0.6	(\$1,957)	>1	\$7,579	1.1	\$236	>1	\$8,957	3.5	\$16,261	2.9	\$10,678	1.3	\$4,955	1.9	\$13,716
CZ03	PGE	0.5	(\$3,826)	>1	\$4,674	0.6	(\$1,851)	>1	\$6,023	3.5	\$10,584	2.9	\$7,145	0.96	(\$685)	1.6	\$9,058
CZ04	PGE	0.5	(\$3,085)	>1	\$5,328	0.7	(\$1,599)	>1	\$6,220	3.7	\$9,560	3.7	\$8,348	0.9	(\$1,607)	1.8	\$10,519
CZ04	CPAU	>1	\$12,524	>1	\$9,616	>1	\$13,328	>1	\$10,508	>1	\$13,692	>1	\$12,636	1.4	\$3,815	2.6	\$14,807
CZ05	PGE	0.6	(\$2,601)	12.6	\$3,140	1.1	\$363	>1	\$5,239	4.9	\$11,566	3.3	\$6,058	1.0	\$583	1.6	\$7,976
CZ05	PGE/SCG	0.6	(\$2,698)	12.6	\$3,140	1.1	\$266	>1	\$5,239	4.8	\$11,469	3.3	\$6,058	1.0	\$486	1.6	\$7,976
CZ06	SCE/SCG	0.9	(\$500)	21.3	\$2,785	1.2	\$554	>1	\$3,582	5.3	\$6,705	4.9	\$5,331	0.96	(\$530)	1.6	\$7,663
CZ07	SDGE	0.4	(\$5,221)	6.1	\$2,929	0.5	(\$3,795)	>1	\$3,706	13.2	\$11,129	7.2	\$4,840	0.97	(\$355)	1.5	\$6,158
CZ08	SCE/SCG	1.0	\$129	8.8	\$3,006	1.4	\$1,028	>1	\$3,618	10.2	\$6,404	10.7	\$5,797	0.99	(\$82)	1.8	\$8,401
CZ09	SCE	0.996	(\$14)	102.1	\$3,357	1.3	\$959	>1	\$4,073	8.5	\$7,052	8.7	\$6,238	1.1	\$626	1.9	\$10,710
CZ10	SCE/SCG	0.9	(\$403)	>1	\$3,475	1.2	\$668	>1	\$4,260	5.5	\$7,389	5.5	\$6,432	1.1	\$1,597	1.7	\$7,804
CZ10	SDGE	0.3	(\$9,171)	>1	\$3,475	0.3	(\$7,637)	>1	\$4,260	8.4	\$12,063	5.5	\$6,432	1.0	\$514	1.7	\$7,804
CZ11	PGE	1.1	\$356	>1	\$6,751	2.9	\$1,988	>1	\$7,863	3.9	\$15,570	3.1	\$9,509	1.3	\$4,736	1.8	\$12,035
CZ12	PGE	0.8	(\$923)	>1	\$5,727	1.4	\$840	>1	\$6,925	3.8	\$14,386	2.9	\$8,684	1.2	\$3,221	1.8	\$11,629
CZ12	SMUD/PGE	>1	\$8,792	>1	\$5,727	>1	\$9,445	>1	\$6,925	3.2	\$11,636	2.9	\$8,684	1.1	\$1,351	1.8	\$11,629
CZ13	PGE	1.0	(\$134)	>1	\$6,391	1.7	\$1,204	>1	\$7,315	4.5	\$12,333	3.9	\$8,944	1.1	\$1,808	1.9	\$12,609
CZ14	SCE/SCG	0.96	(\$226)	>1	\$6,168	2.6	\$1,429	>1	\$7,337	3.5	\$11,205	3.8	\$10,769	1.4	\$6,530	1.9	\$13,315
CZ14	SDGE	0.2	(\$12,027)	>1	\$6,181	0.2	(\$8,562)	>1	\$7,350	4.2	\$14,424	3.8	\$10,782	1.2	\$2,882	1.9	\$13,328
CZ15	SCE/SCG	3.2	\$2,088	>1	\$4,185	10.7	\$2,739	>1	\$4,639	>1	\$5,871	>1	\$5,572	1.2	\$2,471	1.7	\$7,367
CZ16	PG&E	0.3	(\$2,843)	>1	\$3,675	0.5	(\$1,291)	>1	\$4,277	3.1	\$22,017	1.9	\$8,576	1.5	\$10,722	1.6	\$11,922

**Table 19. ADU Cost-Effectiveness: All-Electric Energy Efficiency + Additional PV + Battery**

Climate Zone	Electric /Gas Utility	All Electric Efficiency Only				All Electric Efficiency + NEEA				All Electric Efficiency + PV				All Electric Efficiency + PV + Battery			
		On-Bill		TDV		On-Bill		TDV		On-Bill		TDV		On-Bill		TDV	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	0.3	(\$2,010)	>1	\$1,155	2.5	\$610	>1	\$3,162	2.2	\$16,861	1.2	\$2,976	1.2	\$5,286	1.0	\$168
CZ02	PGE	0.2	(\$4,208)	3.3	\$481	0.3	(\$2,696)	>1	\$1,403	2.5	\$15,218	1.5	\$4,707	1.2	\$3,791	1.3	\$6,522
CZ03	PGE	0.1	(\$6,115)	14.1	\$325	0.1	(\$4,828)	>1	\$1,206	2.3	\$12,653	1.5	\$4,249	1.1	\$1,285	1.2	\$4,720
CZ04	PGE	0.0	(\$5,883)	20.7	\$992	0.0	(\$4,940)	34.2	\$1,672	2.3	\$13,081	1.7	\$6,179	1.1	\$1,797	1.4	\$6,977
CZ04	CPAU	>1	\$3,951	20.7	\$992	>1	\$4,509	34.2	\$1,672	1.7	\$6,738	1.7	\$6,179	0.8	(\$4,973)	1.4	\$6,977
CZ05	PGE	0.3	(\$4,141)	0.6	(\$698)	0.3	(\$2,912)	1.3	\$222	2.9	\$15,238	1.5	\$3,921	1.2	\$3,903	1.2	\$3,473
CZ05	PGE/SCG	0.3	(\$2,831)	0.6	(\$698)	0.5	(\$1,602)	1.3	\$222	3.1	\$16,548	1.5	\$3,921	1.3	\$5,212	1.2	\$3,473
CZ06	SCE/SCG	0.4	(\$2,272)	0.996	(\$5)	0.5	(\$1,672)	1.7	\$444	2.6	\$11,941	1.8	\$5,275	1.1	\$2,134	1.3	\$5,984
CZ07	SDGE	0.2	(\$6,766)	1.0	\$4	0.2	(\$5,978)	1.7	\$435	3.8	\$22,595	1.6	\$4,364	1.6	\$11,005	1.2	\$3,943
CZ08	SCE/SCG	0.4	(\$2,380)	0.98	(\$23)	0.4	(\$1,832)	1.4	\$334	2.5	\$12,446	1.9	\$6,579	1.2	\$2,991	1.4	\$7,829
CZ09	SCE	0.4	(\$1,858)	1.1	\$53	0.5	(\$1,255)	1.5	\$367	2.6	\$12,699	1.9	\$6,334	1.2	\$3,232	1.5	\$9,406
CZ10	SCE/SCG	0.5	(\$1,556)	1.4	\$280	0.6	(\$800)	4.9	\$828	2.7	\$3,430	2.1	\$2,156	0.6	(\$5,734)	1.2	\$2,118
CZ10	SDGE	0.2	(\$7,442)	1.4	\$280	0.2	(\$6,395)	4.9	\$828	3.1	\$4,264	2.1	\$2,156	0.5	(\$7,385)	1.2	\$2,118
CZ11	PGE	0.3	(\$2,749)	>1	\$1,115	0.4	(\$1,634)	>1	\$1,901	2.1	\$3,811	1.8	\$2,577	0.5	(\$7,415)	1.3	\$4,046
CZ12	PGE	0.2	(\$3,692)	3.1	\$430	0.3	(\$2,597)	>1	\$1,320	2.6	\$16,095	1.6	\$5,047	1.2	\$4,800	1.3	\$6,745
CZ12	SMUD/PGE	3.1	\$645	3.1	\$430	>1	\$1,076	>1	\$1,320	1.4	\$4,399	1.6	\$5,047	0.7	(\$6,294)	1.3	\$6,745
CZ13	PGE	0.0	(\$3,425)	17.9	\$1,657	0.0	(\$2,455)	25.7	\$2,419	1.7	\$2,505	1.9	\$3,158	0.4	(\$8,653)	1.4	\$5,829
CZ14	SCE/SCG	0.0	(\$3,402)	4.0	\$1,280	0.0	(\$2,270)	6.0	\$2,097	2.4	\$13,741	2.0	\$8,807	1.2	\$5,041	1.5	\$10,045
CZ14	SDGE	0.0	(\$7,519)	4.0	\$1,280	0.0	(\$5,884)	6.0	\$2,097	3.8	\$28,555	2.0	\$8,807	1.8	\$16,912	1.5	\$10,045
CZ15	SCE/SCG	1.0	(\$47)	>1	\$1,212	1.3	\$204	>1	\$1,264	3.5	\$3,155	2.9	\$2,387	0.6	(\$5,030)	1.3	\$3,480
CZ16	PG&E	0.3	(\$3,414)	9.9	\$748	0.3	(\$2,658)	>1	\$1,580	2.8	\$19,246	1.7	\$6,200	1.4	\$7,856	1.4	\$7,321

### 4.4 Mixed Fuel Results

Table 20 and Table 21 show results for the Mixed Fuel Efficiency + PV + Battery package compared to the 2022 baseline for Single Family and ADU, respectively. This package is cost-effective based on TDV everywhere for the single family prototype. It's TDV cost-effective in most cases for the ADU with the exception of Climate Zones 1 and 10. The package is cost-effective On-Bill for the single family home only in Climate Zone 1. For the ADU the package is cost-effective On-Bill in Climate Zones 1, 2, 5, 7, 9, 12 in PG&E territory, 14, and 16. For the climate zones where there is no PV requirement in the base package, the addition of a new PV system substantially reduced utility costs and the high cost-effectiveness of the PV measure helped to offset the high cost of the battery system.

**Table 20. Single Family Cost-Effectiveness: Mixed Fuel Efficiency + PV + Battery**

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	30.0	1,577	118	1.1	\$710	\$18,829	\$9,845	\$17,192	1.1	\$1,636	1.4	\$5,664
CZ02	PGE	13.5	1,264	35	0.7	\$419	\$10,499	\$8,951	\$15,899	0.7	(\$5,400)	1.4	\$6,396
CZ03	PGE	11.2	1,073	7	0.6	\$295	\$7,072	\$7,718	\$14,333	0.5	(\$7,261)	1.2	\$2,956
CZ04	PGE	8.4	912	6	0.5	\$244	\$5,862	\$8,056	\$14,763	0.4	(\$8,902)	1.2	\$3,219
CZ04	CPAU	8.4	912	6	0.5	\$159	\$3,839	\$8,056	\$14,763	0.3	(\$10,925)	1.2	\$3,219
CZ05	PGE	16.8	1,186	43	0.8	\$416	\$10,571	\$8,517	\$15,361	0.7	(\$4,790)	1.3	\$4,171
CZ05	PGE/SCG	16.8	1,186	43	0.8	\$394	\$9,850	\$8,517	\$15,361	0.6	(\$5,512)	1.3	\$4,171
CZ06	SCE/SCG	9.2	894	6	0.5	\$370	\$8,721	\$8,097	\$14,780	0.6	(\$6,059)	1.2	\$3,134
CZ07	SDGE	8.3	841	4	0.5	\$358	\$9,129	\$8,029	\$14,709	0.6	(\$5,579)	1.1	\$1,612
CZ08	SCE/SCG	9.5	783	2	0.5	\$381	\$8,924	\$7,494	\$14,074	0.6	(\$5,150)	1.3	\$3,991
CZ09	SCE	8.6	839	3	0.5	\$390	\$9,148	\$7,509	\$14,094	0.6	(\$4,946)	1.5	\$5,914
CZ10	SCE/SCG	8.3	854	2	0.5	\$416	\$9,733	\$7,139	\$13,724	0.7	(\$3,990)	1.2	\$2,863
CZ10	SDGE	8.3	854	2	0.5	\$314	\$7,983	\$7,139	\$13,724	0.6	(\$5,741)	1.2	\$2,863
CZ11	PGE	11.0	1,034	27	0.7	\$398	\$9,903	\$8,478	\$15,286	0.6	(\$5,383)	1.4	\$5,505
CZ12	PGE	11.0	1,107	23	0.6	\$364	\$9,006	\$8,733	\$15,626	0.6	(\$6,620)	1.4	\$5,074
CZ12	SMUD/PGE	11.0	1,107	23	0.6	\$252	\$6,354	\$8,733	\$15,626	0.4	(\$9,272)	1.4	\$5,074
CZ13	PGE	9.6	1,168	5	0.6	\$407	\$9,736	\$8,713	\$15,536	0.6	(\$5,801)	1.4	\$5,562
CZ14	SCE/SCG	11.2	1,737	6	0.7	\$663	\$15,570	\$9,664	\$16,695	0.9	(\$1,125)	1.4	\$5,435
CZ14	SDGE	11.2	1,737	6	0.7	\$403	\$10,291	\$9,664	\$16,695	0.6	(\$6,404)	1.4	\$5,435
CZ15	SCE/SCG	8.5	532	2	0.5	\$486	\$11,372	\$7,170	\$13,536	0.8	(\$2,164)	1.3	\$3,451
CZ16	PG&E	22.6	1,235	115	1.2	\$571	\$15,439	\$10,780	\$18,007	0.9	(\$2,568)	1.5	\$8,024

**Table 21. ADU Cost-Effectiveness: Mixed Fuel Efficiency + PV + Battery**

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	24.3	3,642	79	0.8	\$1,211	\$29,946	\$15,209	\$25,617	1.2	\$4,329	0.9	(\$1,365)
CZ02	PGE	14.5	3,451	40	0.6	\$1,028	\$25,019	\$12,944	\$22,587	1.1	\$2,431	1.2	\$4,938
CZ03	PGE	12.1	2,750	2	0.4	\$715	\$16,948	\$11,077	\$19,325	0.9	(\$2,377)	1.1	\$1,349
CZ04	PGE	12.2	2,860	2	0.4	\$759	\$17,992	\$11,523	\$19,837	0.9	(\$1,845)	1.1	\$2,417
CZ04	CPAU	12.2	2,860	2	0.4	\$316	\$7,490	\$11,523	\$19,837	0.4	(\$12,347)	1.1	\$2,417
CZ05	PGE	7.8	3,293	14	0.5	\$959	\$22,944	\$11,409	\$20,621	1.1	\$2,324	1.1	\$1,409
CZ05	PGE/SCG	7.8	3,293	14	0.5	\$952	\$22,711	\$11,409	\$20,621	1.1	\$2,090	1.1	\$1,409
CZ06	SCE/SCG	9.8	3,292	3	0.5	\$815	\$19,093	\$11,028	\$20,110	0.9	(\$1,017)	1.2	\$3,650
CZ07	SDGE	9.1	3,306	1	0.5	\$1,172	\$29,683	\$11,381	\$20,583	1.4	\$9,100	1.1	\$1,603
CZ08	SCE/SCG	10.1	3,527	1	0.5	\$887	\$20,746	\$11,594	\$20,867	0.99	(\$121)	1.3	\$4,990
CZ09	SCE	8.9	3,512	3	0.5	\$883	\$20,676	\$11,361	\$20,556	1.0	\$120	1.4	\$6,682
CZ10	SCE/SCG	9.0	729	7	0.4	\$244	\$5,806	\$7,005	\$14,720	0.4	(\$8,914)	0.96	(\$473)
CZ10	SDGE	9.0	729	7	0.4	\$206	\$5,312	\$7,005	\$14,720	0.4	(\$9,408)	0.96	(\$473)
CZ11	PGE	13.1	870	36	0.5	\$277	\$7,182	\$8,022	\$15,995	0.4	(\$8,813)	1.1	\$2,192
CZ12	PGE	12.6	3,589	33	0.6	\$1,063	\$25,738	\$12,806	\$22,393	1.1	\$3,345	1.2	\$4,771
CZ12	SMUD/PGE	12.6	3,589	33	0.6	\$591	\$14,577	\$12,806	\$22,393	0.7	(\$7,816)	1.2	\$4,771
CZ13	PGE	12.8	359	1	0.4	\$77	\$1,846	\$7,009	\$13,789	0.1	(\$11,943)	1.2	\$2,069
CZ14	SCE/SCG	14.2	3,624	2	0.5	\$909	\$21,262	\$12,054	\$20,466	1.0	\$795	1.2	\$4,545
CZ14	SDGE	14.2	3,624	2	0.5	\$1,292	\$32,729	\$12,054	\$20,466	1.6	\$12,263	1.2	\$4,545
CZ15	SCE/SCG	11.2	546	0	0.4	\$252	\$5,891	\$6,588	\$14,077	0.4	(\$8,186)	1.1	\$964
CZ16	PG&E	16.2	3,652	87	0.8	\$1,178	\$29,323	\$13,234	\$23,007	1.3	\$6,316	1.2	\$4,937

Table 22 and Table 23 compare cost-effectiveness results across all the mixed fuel packages for the single family and ADU prototypes, respectively. The single family Efficiency Only package and Efficiency + PV package are cost effective based on On-Bill and TDV under most scenarios. The trends are similar for the ADU except the Efficiency Only package is not cost effective in many climate zones.

**Table 22. Single Family Cost-Effectiveness: Mixed Fuel Packages**

Climate Zone	Electric /Gas Utility	Mixed Fuel Efficiency Only				Mixed Fuel Efficiency + PV				Mixed Fuel Efficiency + PV + Battery			
		On-Bill		TDV		On-Bill		TDV		On-Bill		TDV	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	2.8	\$3,619	2.7	\$3,160	2.4	\$8,979	1.6	\$3,526	1.1	\$1,636	1.4	\$5,664
CZ02	PGE	2.0	\$1,940	2.5	\$2,664	2.2	\$5,608	1.8	\$3,565	0.7	(\$5,400)	1.4	\$6,396
CZ03	PGE	1.1	\$226	0.97	(\$56)	1.6	\$2,688	1.2	\$602	0.5	(\$7,261)	1.2	\$2,956
CZ04	PGE	0.8	(\$379)	1.1	\$107	1.4	\$1,493	1.2	\$862	0.4	(\$8,902)	1.2	\$3,219
CZ04	CPAU	0.5	(\$1,159)	1.1	\$107	0.8	(\$910)	1.2	\$862	0.3	(\$10,925)	1.2	\$3,219
CZ05	PGE	1.4	\$516	1.3	\$300	2.1	\$4,449	1.4	\$1,359	0.7	(\$4,790)	1.3	\$4,171
CZ05	PGE/SCG	1.2	\$303	1.3	\$300	2.1	\$4,235	1.4	\$1,359	0.6	(\$5,512)	1.3	\$4,171
CZ06	SCE/SCG	0.6	(\$696)	0.9	(\$180)	1.5	\$1,950	1.2	\$757	0.6	(\$6,059)	1.2	\$3,134
CZ07	SDGE	1.3	\$395	0.97	(\$36)	2.9	\$5,981	1.3	\$697	0.6	(\$5,579)	1.1	\$1,612
CZ08	SCE/SCG	0.8	(\$238)	1.1	\$103	1.7	\$2,013	1.4	\$1,099	0.6	(\$5,150)	1.3	\$3,991
CZ09	SCE	0.9	(\$148)	1.2	\$250	1.8	\$2,266	1.5	\$1,229	0.6	(\$4,946)	1.5	\$5,914
CZ10	SCE/SCG	1.0	\$5	1.2	\$263	1.7	\$2,323	1.4	\$1,140	0.7	(\$3,990)	1.2	\$2,863
CZ10	SDGE	1.6	\$960	1.2	\$263	2.6	\$5,010	1.4	\$1,140	0.6	(\$5,741)	1.2	\$2,863
CZ11	PGE	2.0	\$2,242	2.1	\$2,187	2.2	\$5,142	1.8	\$2,824	0.6	(\$5,383)	1.4	\$5,505
CZ12	PGE	1.4	\$949	1.6	\$1,207	1.9	\$4,150	1.5	\$2,039	0.6	(\$6,620)	1.4	\$5,074
CZ12	SMUD/PGE	1.1	\$131	1.6	\$1,207	1.2	\$933	1.5	\$2,039	0.4	(\$9,272)	1.4	\$5,074
CZ13	PGE	1.5	\$1,236	1.5	\$1,160	2.0	\$4,442	1.5	\$1,821	0.6	(\$5,801)	1.4	\$5,562
CZ14	SCE/SCG	1.3	\$981	1.5	\$1,290	1.9	\$4,917	1.6	\$2,877	0.9	(\$1,125)	1.4	\$5,435
CZ14	SDGE	2.3	\$4,109	1.5	\$1,290	1.9	\$4,753	1.6	\$2,877	0.6	(\$6,404)	1.4	\$5,435
CZ15	SCE/SCG	1.7	\$1,534	1.7	\$1,444	1.7	\$1,653	1.7	\$1,465	0.8	(\$2,164)	1.3	\$3,451
CZ16	PG&E	1.8	\$3,124	2.2	\$4,123	2.2	\$8,324	1.9	\$5,419	0.9	(\$2,568)	1.5	\$8,024

**Table 23. ADU Cost-Effectiveness: Mixed Fuel Packages**

Climate Zone	Electric /Gas Utility	Mixed Fuel Efficiency				Mixed Fuel Efficiency + PV				Mixed Fuel Efficiency + PV + Battery			
		On-Bill		TDV		On-Bill		TDV		On-Bill		TDV	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	1.6	\$1,228	1.3	\$616	2.1	\$15,985	1.2	\$2,051	1.2	\$4,329	0.9	(\$1,365)
CZ02	PGE	0.7	(\$634)	1.1	\$148	2.3	\$13,934	1.4	\$3,499	1.1	\$2,431	1.2	\$4,938
CZ03	PGE	0.6	(\$666)	0.7	(\$475)	2.2	\$9,045	1.3	\$1,856	0.9	(\$2,377)	1.1	\$1,349
CZ04	PGE	0.5	(\$941)	0.7	(\$515)	2.1	\$9,487	1.4	\$2,679	0.9	(\$1,845)	1.1	\$2,417
CZ04	CPAU	0.3	(\$1,507)	0.7	(\$515)	0.99	(\$115)	1.4	\$2,679	0.4	(\$12,347)	1.1	\$2,417
CZ05	PGE	0.7	(\$456)	0.2	(\$1,141)	2.5	\$13,761	1.3	\$2,473	1.1	\$2,324	1.1	\$1,409
CZ05	PGE/SCG	0.5	(\$689)	0.2	(\$1,141)	2.5	\$13,528	1.3	\$2,473	1.1	\$2,090	1.1	\$1,409
CZ06	SCE/SCG	0.3	(\$976)	0.6	(\$638)	2.1	\$9,282	1.5	\$3,477	0.9	(\$1,017)	1.2	\$3,650
CZ07	SDGE	0.4	(\$830)	0.5	(\$717)	3.3	\$20,716	1.3	\$2,676	1.4	\$9,100	1.1	\$1,603
CZ08	SCE/SCG	0.3	(\$1,069)	0.4	(\$819)	2.1	\$10,035	1.5	\$4,415	0.99	(\$121)	1.3	\$4,990
CZ09	SCE	0.3	(\$1,024)	0.5	(\$780)	2.1	\$10,242	1.5	\$4,195	1.0	\$120	1.4	\$6,682
CZ10	SCE/SCG	0.4	(\$1,004)	0.5	(\$750)	1.4	\$1,118	1.0	\$71	0.4	(\$8,914)	0.96	(\$473)
CZ10	SDGE	1.5	\$721	0.5	(\$750)	1.7	\$2,230	1.0	\$71	0.4	(\$9,408)	0.96	(\$473)
CZ11	PGE	1.0	(\$11)	1.2	\$316	1.6	\$2,473	1.3	\$1,064	0.4	(\$8,813)	1.1	\$2,192
CZ12	PGE	0.6	(\$761)	0.9	(\$224)	2.4	\$14,704	1.4	\$3,458	1.1	\$3,345	1.2	\$4,771
CZ12	SMUD/PGE	1.0	(\$70)	0.9	(\$224)	1.3	\$2,975	1.4	\$3,458	0.7	(\$7,816)	1.2	\$4,771
CZ13	PGE	0.6	(\$850)	1.1	\$206	0.6	(\$807)	1.1	\$240	0.1	(\$11,943)	1.2	\$2,069
CZ14	SCE/SCG	1.0	\$20	1.0	\$107	2.2	\$10,862	1.6	\$4,977	1.0	\$795	1.2	\$4,545
CZ14	SDGE	1.5	\$1,310	1.0	\$107	3.7	\$23,840	1.6	\$4,977	1.6	\$12,263	1.2	\$4,545
CZ15	SCE/SCG	1.2	\$411	1.1	\$205	1.4	\$916	1.2	\$388	0.4	(\$8,186)	1.1	\$964
CZ16	PG&E	0.7	(\$456)	1.0	\$52	2.6	\$17,779	1.4	\$4,505	1.3	\$6,316	1.2	\$4,937

#### 4.5 CARE Rate Comparison

Table 24 and Table 25 present a comparison of On-Bill cost-effectiveness results for CARE tariffs relative to standard tariffs. The all-electric code minimum package for the single family and ADU prototypes is shown in Table 24. Applying the CARE rates lowers both electric and gas utility bills for the consumer and the net impact is lower overall bills for an all-electric home and improved cost-effectiveness relative to the standard tariffs. The opposite trend occurs for the mixed fuel packages shown in Table 25 where the CARE rate lowers utility cost savings and the benefit-to-cost ratios decline.



**Table 24. On-Bill Cost-Effectiveness with CARE Tariffs: All-Electric Code Minimum**

Climate Zone	Electric /Gas Utility	Single Family				ADU			
		Standard		CARE		Standard		CARE	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	0.5	(\$5,614)	0.8	(\$997)	0.4	(\$3,834)	0.7	(\$1,505)
CZ02	PGE	0.5	(\$4,826)	0.8	(\$1,281)	0.4	(\$4,582)	0.6	(\$2,146)
CZ03	PGE	0.5	(\$4,838)	0.8	(\$924)	0.3	(\$5,560)	0.4	(\$2,733)
CZ04	PGE	0.6	(\$3,641)	0.96	(\$215)	0.4	(\$4,013)	0.7	(\$1,465)
CZ04	CPAU	>1	\$13,205	>1	\$9,931	>1	\$6,242	>1	\$2,957
CZ05	PGE	0.6	(\$3,696)	0.9	(\$647)	0.5	(\$3,009)	0.7	(\$1,158)
CZ05	PGE/SCG	0.6	(\$3,793)	1.1	\$444	0.6	(\$1,699)	1.1	\$243
CZ06	SCE/SCG	1.0	\$115	1.6	\$1,984	0.7	(\$1,478)	0.97	(\$98)
CZ07	SDGE	0.5	(\$5,670)	0.8	(\$1,636)	0.3	(\$6,571)	0.5	(\$3,441)
CZ08	SCE/SCG	1.1	\$371	1.7	\$2,073	0.7	(\$1,489)	0.95	(\$139)
CZ09	SCE	1.0	\$126	1.6	\$2,001	0.8	(\$953)	1.1	\$261
CZ10	SCE/SCG	0.9	(\$486)	1.5	\$1,703	0.8	(\$755)	1.2	\$433
CZ10	SDGE	0.3	(\$10,239)	0.5	(\$4,330)	0.3	(\$7,043)	0.4	(\$3,645)
CZ11	PGE	0.7	(\$1,872)	1.1	\$568	0.5	(\$3,324)	0.7	(\$1,344)
CZ12	PGE	0.7	(\$1,979)	1.1	\$457	0.5	(\$3,397)	0.7	(\$1,395)
CZ12	SMUD/PGE	>1	\$9,761	>1	\$12,640	2.8	\$1,904	>1	\$4,281
CZ13	PGE	0.7	(\$2,021)	1.2	\$783	0.5	(\$2,791)	0.7	(\$991)
CZ14	SCE/SCG	0.7	(\$2,475)	1.1	\$505	0.6	(\$2,199)	0.9	(\$222)
CZ14	SDGE	0.2	(\$16,219)	0.4	(\$7,861)	0.3	(\$7,386)	0.5	(\$3,249)
CZ15	SCE/SCG	1.7	\$2,285	2.6	\$3,330	1.0	\$35	1.5	\$927
CZ16	PG&E	0.4	(\$3,687)	0.8	(\$825)	0.3	(\$4,437)	0.5	(\$2,157)

**Table 25. On-Bill Cost-Effectiveness with CARE Tariffs: Mixed Fuel Efficiency+ PV+ Battery Package**

Climate Zone	Electric /Gas Utility	Single Family				ADU			
		Standard		CARE		Standard		CARE	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	1.1	\$1,636	0.7	(\$4,574)	1.2	\$4,329	0.7	(\$6,549)
CZ02	PGE	0.7	(\$5,400)	0.4	(\$8,958)	1.1	\$2,431	0.7	(\$6,728)
CZ03	PGE	0.5	(\$7,261)	0.3	(\$9,524)	0.9	(\$2,377)	0.6	(\$8,471)
CZ04	PGE	0.4	(\$8,902)	0.3	(\$10,706)	0.9	(\$1,845)	0.6	(\$8,329)
CZ04	CPAU	0.3	(\$10,925)	0.0	(\$14,763)	0.4	(\$12,347)	0.0	(\$19,837)
CZ05	PGE	0.7	(\$4,790)	0.5	(\$8,377)	1.1	\$2,324	0.7	(\$6,030)
CZ05	PGE/SCG	0.6	(\$5,512)	0.4	(\$8,540)	1.1	\$2,090	0.7	(\$6,067)
CZ06	SCE/SCG	0.6	(\$6,059)	0.3	(\$9,638)	0.9	(\$1,017)	0.6	(\$8,203)
CZ07	SDGE	0.6	(\$5,579)	0.5	(\$7,676)	1.4	\$9,100	0.96	(\$836)
CZ08	SCE/SCG	0.6	(\$5,150)	0.4	(\$8,775)	0.99	(\$121)	0.6	(\$7,852)
CZ09	SCE	0.6	(\$4,946)	0.4	(\$8,642)	1.0	\$120	0.6	(\$7,580)
CZ10	SCE/SCG	0.7	(\$3,990)	0.4	(\$7,862)	0.4	(\$8,914)	0.2	(\$11,587)
CZ10	SDGE	0.6	(\$5,741)	0.5	(\$7,396)	0.4	(\$9,408)	0.3	(\$10,388)
CZ11	PGE	0.6	(\$5,383)	0.4	(\$8,671)	0.4	(\$8,813)	0.3	(\$11,145)
CZ12	PGE	0.6	(\$6,620)	0.4	(\$9,617)	1.1	\$3,345	0.7	(\$6,094)
CZ12	SMUD/PGE	0.4	(\$9,272)	0.1	(\$14,636)	0.7	(\$7,816)	0.1	(\$20,989)
CZ13	PGE	0.6	(\$5,801)	0.4	(\$9,016)	0.1	(\$11,943)	0.1	(\$12,502)
CZ14	SCE/SCG	0.9	(\$1,125)	0.6	(\$6,889)	1.0	\$795	0.7	(\$7,099)
CZ14	SDGE	0.6	(\$6,404)	0.5	(\$8,940)	1.6	\$12,263	1.1	\$1,271
CZ15	SCE/SCG	0.8	(\$2,164)	0.5	(\$6,384)	0.4	(\$8,186)	0.2	(\$10,846)
CZ16	PG&E	0.9	(\$2,568)	0.6	(\$7,747)	1.3	\$6,316	0.8	(\$4,356)

#### 4.6 Utility Infrastructure Cost Sensitivity

Table 26 compares cost effectiveness results for the three natural gas service line extension cost scenarios presented in Table 8. The average cost scenario reflects the costs applied in the results presented in the prior sections (Table 16). The gas infrastructure cost savings are lower for the new subdivision case and higher for the infill development case. For the latter, the all-electric home is On-Bill cost-effective in all climate zones except Climate Zones 1, 2, 10 in SDG&E territory, and 14 in SDG&E territory. Table 27 presents the impact on On-Bill cost-effectiveness if the subsidies currently allowed under the utility gas main extension rules were removed per a recent CPUC Proposed Decision (see discussion in Section 3.3.2). If the subsidies were removed On-Bill cost-effectiveness improves but only enough to change the outcome in one case, Climate Zones 10 in SoCalGas territory.

**Table 26. Single Family Cost-Effectiveness Comparison with Range of Natural Gas Utility Infrastructure Costs:  
All-Electric Code Minimum**

Climate Zone	Electric /Gas Utility	Average				New Subdivision				Infill Development			
		On-Bill		TDV		On-Bill		TDV		On-Bill		TDV	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	0.5	(\$5,614)	>1	\$5,566	0.4	(\$6,838)	>1	\$4,476	0.9	(\$718)	>1	\$9,926
CZ02	PGE	0.5	(\$4,826)	>1	\$5,390	0.4	(\$6,050)	>1	\$4,300	1.0	\$70	>1	\$9,750
CZ03	PGE	0.5	(\$4,838)	63.5	\$4,414	0.4	(\$6,062)	48.1	\$3,324	1.0	\$57	125.3	\$8,774
CZ04	PGE	0.6	(\$3,641)	>1	\$4,929	0.4	(\$4,865)	>1	\$3,839	1.1	\$1,255	>1	\$9,289
CZ04	CPAU	>1	\$13,205	>1	\$9,217	>1	\$13,205	>1	\$9,217	>1	\$13,205	>1	\$9,217
CZ05	PGE	0.6	(\$3,696)	2.5	\$2,776	0.4	(\$4,920)	1.9	\$1,686	1.1	\$1,200	4.9	\$7,136
CZ05	PGE/SCG	0.6	(\$3,793)	2.5	\$2,776	0.4	(\$5,017)	1.9	\$1,686	1.1	\$1,103	4.9	\$7,136
CZ06	SCE/SCG	1.0	\$115	3.2	\$3,142	0.8	(\$1,109)	2.4	\$2,052	2.0	\$5,011	6.2	\$7,502
CZ07	SDGE	0.5	(\$5,670)	3.1	\$3,081	0.4	(\$6,894)	2.3	\$1,991	0.9	(\$774)	6.0	\$7,441
CZ08	SCE/SCG	1.1	\$371	2.8	\$2,951	0.8	(\$853)	2.1	\$1,861	2.1	\$5,266	5.5	\$7,311
CZ09	SCE	1.0	\$126	3.3	\$3,179	0.8	(\$1,098)	2.5	\$2,089	2.0	\$5,022	6.4	\$7,539
CZ10	SCE/SCG	0.9	(\$486)	3.5	\$3,285	0.7	(\$1,710)	2.7	\$2,195	1.8	\$4,410	6.9	\$7,645
CZ10	SDGE	0.3	(\$10,239)	3.5	\$3,285	0.3	(\$11,463)	2.7	\$2,195	0.7	(\$5,344)	6.9	\$7,645
CZ11	PGE	0.7	(\$1,872)	>1	\$5,135	0.6	(\$3,096)	>1	\$4,045	1.4	\$3,024	>1	\$9,495
CZ12	PGE	0.7	(\$1,979)	>1	\$5,002	0.6	(\$3,203)	>1	\$3,912	1.4	\$2,917	>1	\$9,362
CZ12	SMUD/PGE	>1	\$9,761	>1	\$5,002	>1	\$8,537	>1	\$3,912	>1	\$14,656	>1	\$9,362
CZ13	PGE	0.7	(\$2,021)	>1	\$4,904	0.5	(\$3,245)	>1	\$3,814	1.4	\$2,875	>1	\$9,264
CZ14	SCE/SCG	0.7	(\$2,475)	>1	\$4,493	0.5	(\$3,699)	>1	\$3,403	1.3	\$2,421	>1	\$8,853
CZ14	SDGE	0.2	(\$16,219)	>1	\$4,506	0.2	(\$17,443)	>1	\$3,416	0.5	(\$11,323)	>1	\$8,866
CZ15	SCE/SCG	1.7	\$2,285	10.3	\$4,247	1.3	\$1,061	7.9	\$3,157	3.3	\$7,181	19.8	\$8,607
CZ16	PG&E	0.4	(\$3,687)	>1	\$3,139	0.3	(\$4,911)	>1	\$2,049	1.2	\$1,208	>1	\$7,499

**Table 27. Single Family Cost-Effectiveness On-Bill Impact of CPUC Proposed Decision on Gas Line Extension Allowances: All-Electric Code Minimum**

Climate Zone	Electric /Gas Utility	No Allowances			
		With Allowance		No Allowances	
		B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	0.5	(\$5,614)	0.6	(\$4,469)
CZ02	PGE	0.5	(\$4,826)	0.6	(\$3,681)
CZ03	PGE	0.5	(\$4,838)	0.6	(\$3,693)
CZ04	PGE	0.6	(\$3,641)	0.7	(\$2,495)
CZ04	CPAU	>1	\$13,205	>1	\$13,205
CZ05	PGE	0.6	(\$3,696)	0.7	(\$2,551)
CZ05	PGE/SCG	0.6	(\$3,793)	0.7	(\$2,647)
CZ06	SCE/SCG	1.0	\$115	1.2	\$1,260
CZ07	SDGE	0.5	(\$5,670)	0.6	(\$4,524)
CZ08	SCE/SCG	1.1	\$371	1.3	\$1,516
CZ09	SCE	1.0	\$126	1.2	\$1,271
CZ10	SCE/SCG	0.9	(\$486)	1.1	\$660
CZ10	SDGE	0.3	(\$10,239)	0.4	(\$9,094)
CZ11	PGE	0.7	(\$1,872)	0.9	(\$726)
CZ12	PGE	0.7	(\$1,979)	0.9	(\$834)
CZ12	SMUD/PGE	>1	\$9,761	>1	\$10,906
CZ13	PGE	0.7	(\$2,021)	0.9	(\$875)
CZ14	SCE/SCG	0.7	(\$2,475)	0.8	(\$1,329)
CZ14	SDGE	0.2	(\$16,219)	0.3	(\$15,088)
CZ15	SCE/SCG	1.7	\$2,285	2.1	\$3,430
CZ16	PG&E	0.4	(\$3,687)	0.6	(\$2,542)

#### 4.7 Greenhouse Gas Reductions

Table 28 and Table 29 present greenhouse gas reductions for the single family and ADU prototypes, respectively. Savings represent average annual savings over the 30-year lifetime of the analysis. Greenhouse gas reductions are greatest for the all-electric Efficiency + PV + Battery package in all cases. For the single family homes, the all-electric code minimum case reduces greenhouse gas emissions as much or greater than the mixed fuel Efficiency + PV + Battery package in Climate Zones 1 through 4, 11, 12, 13, and 16. The trend differs for the ADU where the mixed fuel Efficiency + PV + Battery package results in more greenhouse gas savings than the all-electric code minimum in all climate zones except Climate Zones 3, 4, and 13.

**Table 28: Single Family Greenhouse Gas Reductions (metric tons)**

Climate Zone	Single Family All-Electric					Single Family Mixed Fuel		
	Code Minimum	Efficiency Only	Efficiency + NEEA	Efficiency + PV	Efficiency + PV + Battery	Efficiency Only	Efficiency + PV	Efficiency + PV + Battery
CZ01	1.5	1.6	1.7	1.8	2.2	0.4	0.5	1.1
CZ02	0.8	0.9	1.0	1.1	1.5	0.3	0.3	0.7
CZ03	0.7	0.8	0.8	0.9	1.3	0.1	0.1	0.6
CZ04	0.7	0.7	0.8	0.8	1.3	0.1	0.1	0.5
CZ05	0.4	0.4	0.5	0.6	1.1	0.1	0.1	0.8
CZ06	0.3	0.3	0.3	0.4	0.9	0.1	0.1	0.5
CZ07	0.2	0.2	0.3	0.3	0.8	0.0	0.1	0.5
CZ08	0.2	0.2	0.3	0.3	0.8	0.0	0.1	0.5
CZ09	0.3	0.3	0.3	0.4	0.9	0.0	0.1	0.5
CZ10	0.3	0.3	0.4	0.4	0.9	0.1	0.1	0.5
CZ11	0.7	0.9	0.9	1.0	1.4	0.2	0.2	0.7
CZ12	0.7	0.8	0.8	0.9	1.3	0.2	0.2	0.6
CZ13	0.6	0.7	0.7	0.8	1.3	0.1	0.1	0.6
CZ14	0.6	0.7	0.8	0.9	1.4	0.2	0.2	0.7
CZ15	0.2	0.2	0.2	0.3	0.7	0.1	0.1	0.5
CZ16	1.5	1.6	1.6	1.8	2.3	0.7	0.8	1.2

**Table 29 ADU Greenhouse Gas Savings (metric tons)**

Climate Zone	ADU All-Electric					ADU Mixed Fuel		
	Code Minimum	Efficiency Only	Efficiency + NEEA	Efficiency + PV	Efficiency + PV + Battery	Efficiency Only	Efficiency + PV	Efficiency + PV + Battery
CZ01	0.4	0.5	0.5	0.6	0.9	0.4	0.5	0.8
CZ02	0.2	0.3	0.3	0.4	0.8	0.2	0.3	0.6
CZ03	0.5	0.5	0.6	0.7	1.0	0.1	0.1	0.4
CZ04	0.5	0.5	0.5	0.7	1.0	0.0	0.1	0.4
CZ05	0.1	0.2	0.2	0.3	0.7	0.0	0.2	0.5
CZ06	0.1	0.1	0.1	0.3	0.6	0.0	0.2	0.5
CZ07	0.1	0.1	0.1	0.3	0.6	0.0	0.2	0.5
CZ08	0.1	0.1	0.1	0.3	0.7	0.0	0.2	0.5
CZ09	0.1	0.1	0.1	0.3	0.7	0.0	0.2	0.5
CZ10	0.1	0.1	0.2	0.2	0.6	0.0	0.1	0.4
CZ11	0.2	0.3	0.3	0.3	0.7	0.2	0.2	0.5
CZ12	0.2	0.2	0.3	0.4	0.7	0.1	0.3	0.6
CZ13	0.4	0.5	0.5	0.6	0.9	0.1	0.1	0.4
CZ14	0.4	0.5	0.5	0.7	1.1	0.1	0.2	0.5
CZ15	0.1	0.1	0.2	0.2	0.6	0.0	0.0	0.4
CZ16	0.4	0.5	0.5	0.7	1.0	0.4	0.5	0.8

## 5 Summary

The Reach Codes Team identified packages of energy efficiency measures as well as packages combining energy efficiency with solar PV generation and battery storage, 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 30 (all-electric) and Table 31 (mixed fuel) summarize results for each prototype and depicts the efficiency EDR2 compliance margins achieved for each climate zone and 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.

Following are key takeaways and recommendations from the analysis.

- All-electric packages have lower GHG emissions than mixed-fuel packages in all cases, due to the clean power sources currently available from California's power providers.
- The Reach Codes Team found all-electric new construction to be feasible and cost effective based on TDV in all cases. In many cases all-electric code minimum construction results in an increase in utility costs and is not cost-effective On-Bill. Some exceptions include the SMUD and CPAU territories where lower electricity rates relative to gas rates result in lower overall utility bills.
- The 2022 Title 24 Code's new source energy metric combined with the heat pump baseline encourage all-electric construction, providing an incentive that allows for some amount of prescriptively required building efficiency to be traded off. This compliance benefit for all-electric homes highlights a unique opportunity for jurisdictions to incorporate efficiency into all-electric reach codes. Efficiency and electrification have symbiotic benefits and are both critical for decarbonization of buildings. As demand on the electric grid is increased through electrification, efficiency can reduce the negative impacts of additional electricity demand on the grid, reducing the need for increased generation and storage capacity, as well as the need to upgrade upstream transmission and distribution equipment. The Reach Codes Team recommends that jurisdictions adopting an all-electric reach code for single family buildings also include an efficiency requirement with EDR2 margins consistent with the all-electric code minimum package results in Table 30.
- The code compliance margins for the ADU all-electric code minimum package are lower than for the single family prototype and code compliance can be more challenging for smaller dwelling units. As a result, the Reach Codes Team does not recommend an additional efficiency requirement for all-electric ADU ordinances.
- Electrification combined with increased PV capacity results in utility cost savings and was found to be On-Bill cost effective in all cases. These results were based on today's net energy metering rules and do not account for future changes to utility agreements, which are expected to decrease the value of PV to the consumer.
- For jurisdictions interested in 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 in all cases. Cost effectiveness was marginal because of the high cost of the battery system. EDR2 margins ranged from 7 to 30 for the cost-effective packages as is shown in Table 31.
- Applying the CARE rates has the overall impact to increase utility cost savings for an all-electric building compared to a code compliant mixed fuel building, improving On-Bill cost-effectiveness.



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. For example, jurisdictions that only want to require all-electric construction may amend Part 11 instead of Part 6 of the CA Building Code requiring review and approval by the BSC but not the Energy Commission. Reach codes that amend Part 6 of the CA Building Code and require energy performance beyond state code minimums must demonstrate the proposed changes are cost-effective and obtain approval from the Energy Commission.

**Table 30. Summary of All-Electric Efficiency EDR2 Margins and Cost-Effectiveness**

Climate Zone	Electric /Gas Utility	Single Family				ADU			
		Code Min	EE	EE+PV	EE+PV/B	Code Min	EE	EE+PV	EE+PV/B
CZ01	PGE	8.3	18.8	18.8	29.6	0.0	15.1	15.1	24.6
CZ02	PGE	5.7	13.5	13.5	19.1	0.4	9.5	9.5	14.6
CZ03	PGE	4.7	10.5	10.5	15.8	0.0	5.7	5.7	10.5
CZ04	PGE	3.7	8.6	8.6	13.5	0.2	6.3	6.3	10.8
CZ04	CPAU	3.7	8.6	8.6	13.5	0.2	6.3	6.3	10.8
CZ05	PGE	1.1	6.1	6.1	14.3	0.4	2.4	2.4	7.9
CZ05	PGE/SCG	1.1	6.1	6.1	14.3	0.4	2.4	2.4	7.9
CZ06	SCE/SCG	2.5	7.8	7.8	11.6	0.2	6.2	6.2	9.8
CZ07	SDGE	2.3	7.0	7.0	9.9	0.4	6.3	6.3	9.1
CZ08	SCE/SCG	0.6	4.0	4.0	10.4	0.6	3.6	3.6	10.0
CZ09	SCE	1.2	4.6	4.6	9.9	0.6	3.7	3.7	8.8
CZ10	SCE/SCG	1.1	4.6	4.6	10.1	0.4	3.8	3.8	9.1
CZ10	SDGE	1.1	4.6	4.6	10.1	0.4	3.8	3.8	9.1
CZ11	PGE	3.5	8.4	8.4	14.1	0.2	7.7	7.7	13.2
CZ12	PGE	4.0	8.5	8.5	14.7	0.3	6.8	6.8	12.6
CZ12	SMUD/PGE	4.0	8.5	8.5	14.7	0.3	6.8	6.8	12.6
CZ13	PGE	2.1	6.8	6.8	12.0	0.1	6.8	6.8	11.9
CZ14	SCE/SCG	1.6	7.9	7.9	13.2	0.4	7.3	7.3	12.4
CZ14	SDGE	1.6	7.9	7.9	13.2	0.4	7.3	7.3	12.4
CZ15	SCE/SCG	1.6	4.2	4.2	8.6	1.3	6.5	6.5	11.1
CZ16	PG&E	6.0	9.7	9.7	18.1	0.1	8.8	8.8	16.4

**Table 31. Summary of Mixed Fuel Efficiency EDR2 Margins and Cost-Effectiveness**

Climate Zone	Electric /Gas Utility	Single Family			ADU		
		EE	EE+PV	EE+PV/B	EE	EE+PV	EE+PV/B
CZ01	PGE	12.0	12.0	30.0	14.9	14.9	24.3
CZ02	PGE	8.8	8.8	13.5	9.4	9.4	14.5
CZ03	PGE	5.7	5.7	11.2	6.3	6.3	12.1
CZ04	PGE	4.8	4.8	8.4	6.7	6.7	12.2
CZ04	CPAU	4.8	4.8	8.4	6.7	6.7	12.2
CZ05	PGE	4.8	4.8	16.8	2.3	2.3	7.8
CZ05	PGE/SCG	4.8	4.8	16.8	2.3	2.3	7.8
CZ06	SCE/SCG	6.1	6.1	9.2	6.1	6.1	9.8
CZ07	SDGE	5.5	5.5	8.3	6.3	6.3	9.1
CZ08	SCE/SCG	3.5	3.5	9.5	3.6	3.6	10.1
CZ09	SCE	3.6	3.6	8.6	3.7	3.7	8.9
CZ10	SCE/SCG	3.7	3.7	8.3	3.8	3.8	9.0
CZ10	SDGE	3.7	3.7	8.3	3.8	3.8	9.0
CZ11	PGE	5.7	5.7	11.0	7.5	7.5	13.1
CZ12	PGE	5.3	5.3	11.0	6.8	6.8	12.6
CZ12	SMUD/PGE	5.3	5.3	11.0	6.8	6.8	12.6
CZ13	PGE	4.7	4.7	9.6	7.2	7.2	12.8
CZ14	SCE/SCG	6.2	6.2	11.2	8.5	8.5	14.2
CZ14	SDGE	6.2	6.2	11.2	8.5	8.5	14.2
CZ15	SCE/SCG	4.3	4.3	8.5	6.6	6.6	11.2
CZ16	PG&E	14.9	14.9	22.6	8.7	8.7	16.2

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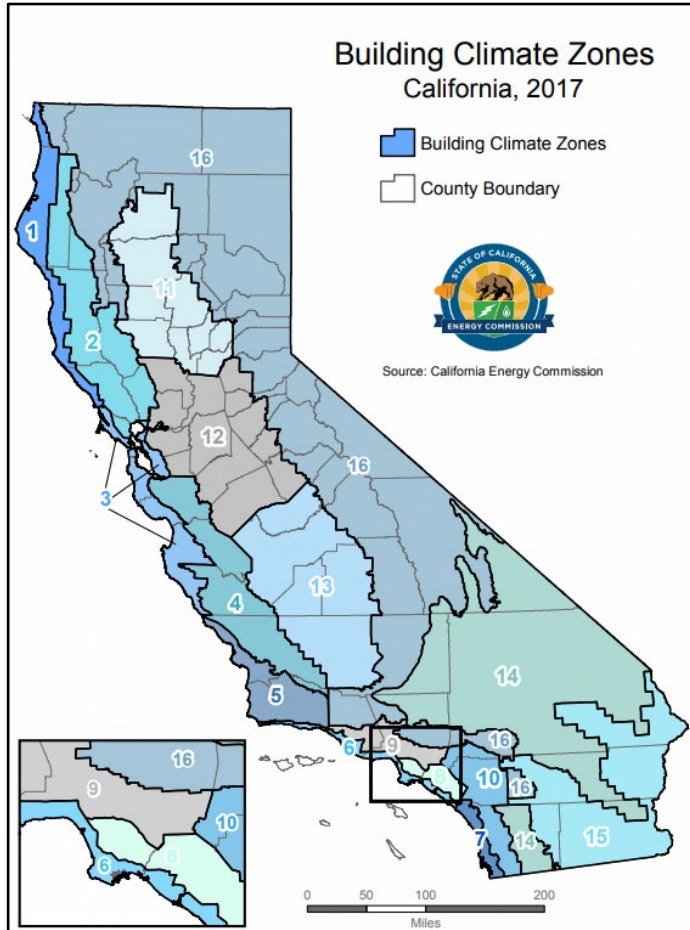
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## 7 Appendices

### 7.1 Map of California Climate Zones

Climate zone geographical boundaries are depicted in Figure 4. The map in Figure 4 along with a zip-code search directory is available at: [https://ww2.energy.ca.gov/maps/renewable/building\\_climate\\_zones.html](https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html)

Figure 4. Map of California climate zones.



## 7.2 Utility Rate Schedules

The Reach Codes Team used the CA IOU and POU rate tariffs detailed below to determine the On-Bill savings for each package. The California Climate Credit was applied for both electricity and natural gas service for the IOUs using the 2022 credits shows below.<sup>15</sup> The credits were applied to reduce the total calculated annual bill, including any fixed fees or minimum bill amounts.

### 2022 Electric California Climate Credit Schedule

	April	May	June	July	Aug	Sept	Oct
<b>PG&amp;E</b>	\$39.30						\$39.30
<b>SCE</b>	\$59.00						\$59.00
<b>SDG&amp;E</b>					\$64.17	\$64.17	

## Residential Natural Gas California Climate Credit

The 2022 Natural Gas California Climate Credit is distributed in April.

	2018 <sup>†</sup>	2019	2020	2021	2022	Total Value Received Per Household 2018-2022
<b>PG&amp;E</b>	\$30	\$25	\$27	\$25	\$47.83	<b>\$154</b>
<b>SDG&amp;E</b>	*	\$34	\$21	\$18	\$43.06	<b>\$116</b>
<b>Southwest Gas</b>	\$22	\$25	\$27	\$28	\$49.44	<b>\$150</b>
<b>SoCalGas</b>	*	\$50	\$26	\$22	\$44.17	<b>\$142</b>

### 7.2.1 Pacific Gas & Electric

The following pages provide details on the PG&E electricity and natural gas tariffs applied in this study. Table 32 describes the baseline territories that were assumed for each climate zone. A net surplus compensation rate of \$0.0362 / kWh was applied to any net annual electricity generation based on a one-year average of the rates between April 2021 and March 2022.

<sup>15</sup> <https://www.cpuc.ca.gov/industries-and-topics/natural-gas/greenhouse-gas-cap-and-trade-program/california-climate-credit>

**Table 32: PG&E Baseline Territory by Climate Zone**

	Baseline Territory
CZ01	V
CZ02	X
CZ03	T
CZ04	X
CZ05	T
CZ11	R
CZ12	S
CZ13	R
CZ16	Y

The PG&E monthly gas rate in \$/therm was applied on a monthly basis for the 12-month period ending August 2021 according to the rates shown in Table 33. The corresponding CARE rates are shown in Table 34.

**Table 33: PG&E Monthly Gas Rate (\$/therm)**

Month	Procurement Charge	Transportation Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2022	\$0.76338	\$1.33589	\$1.79545	\$2.09927	\$2.55883
Feb 2022	\$0.73412	\$1.33589	\$1.79545	\$2.07001	\$2.52957
Mar 2022	\$0.61773	\$1.33589	\$1.79545	\$1.95362	\$2.41318
Apr 2021	\$0.22304	\$1.19868	\$1.68034	\$1.42172	\$1.90338
May 2021	\$0.21063	\$1.19868	\$1.68034	\$1.40931	\$1.89097
June 2021	\$0.21778	\$1.20019	\$1.68243	\$1.41797	\$1.90021
July 2021	\$0.19109	\$1.20019	\$1.68243	\$1.39128	\$1.87352
Aug 2021	\$0.22551	\$1.20019	\$1.68243	\$1.4257	\$1.90794
Sept 2021	\$0.44379	\$1.20019	\$1.68243	\$1.64398	\$2.12622
Oct 2021	\$0.68120	\$1.20019	\$1.68243	\$1.88139	\$2.36363
Nov 2021	\$0.81218	\$1.20019	\$1.68243	\$2.01237	\$2.49461
Dec 2021	\$0.82555	\$1.20019	\$1.68243	\$2.02574	\$2.50798

**Table 34: PG&E Monthly CARE (GL-1) Gas Rate (\$/therm)**

Month	CARE Discount		Total CARE Charge	
	Baseline	Excess	Baseline	Excess
Jan 2022	(\$0.41947)	(\$0.51139)	\$1.67790	\$2.04554
Feb 2022	(\$0.41362)	(\$0.50553)	\$1.65449	\$2.02214
Mar 2022	(\$0.39034)	(\$0.48226)	\$1.56138	\$1.92902
Apr 2021	(\$0.28372)	(\$0.38006)	\$1.13490	\$1.52022
May 2021	(\$0.28124)	(\$0.37757)	\$1.12497	\$1.51030
June 2021	(\$0.28297)	(\$0.37942)	\$1.13190	\$1.51769
July 2021	(\$0.27764)	(\$0.37408)	\$1.11054	\$1.49634
Aug 2021	(\$0.28452)	(\$0.38097)	\$1.13808	\$1.52387
Sept 2021	(\$0.32818)	(\$0.42462)	\$1.31270	\$1.69850
Oct 2021	(\$0.37566)	(\$0.47211)	\$1.50263	\$1.88842
Nov 2021	(\$0.40185)	(\$0.49830)	\$1.60742	\$1.99321
Dec 2021	(\$0.40453)	(\$0.50098)	\$1.61811	\$2.00390





**Pacific Gas and Electric Company**  
 U 39 San Francisco, California

Revised Cal. P.U.C. Sheet No. 35436-G  
 Cancelling Revised Cal. P.U.C. Sheet No. 34288-G

**GAS SCHEDULE G-1  
 RESIDENTIAL SERVICE**

Sheet 2

BASELINE QUANTITIES:

The delivered quantities of gas shown below are billed at the rates for baseline use.

Baseline Territories	BASELINE QUANTITIES (Therms Per Day Per Dwelling Unit)						(T)   (T)
	Summer (April-October)		Winter Off-Peak (Nov, Feb, Mar)		Winter On-Peak (Dec, Jan)		
	Effective Apr. 1, 2020		Effective Nov. 1, 2019		Effective Dec. 1, 2019		
***							
P	0.39	(R)	1.88	(R)	2.16	(I)	
Q	0.59	(R)	1.55	(R)	2.16	(I)	
R	0.36	(R)	1.28	(R)	1.97	(I)	
S	0.39	(R)	1.38	(R)	2.06	(I)	
T	0.59	(R)	1.38	(R)	1.81	(I)	
V	0.62	(R)	1.51	(R)	1.84	(I)	
W	0.39	(R)	1.18	(R)	1.84	(I)	
X	0.49	(R)	1.55	(R)	2.16	(I)	
Y	0.69	(R)	2.15	(R)	2.65	(I)	

SEASONAL CHANGES:

The summer season is April-October, the winter off-peak season is November, February and March, and the winter on-peak season is December and January. Baseline quantities for bills that include the April 1, November 1 and December 1 seasonal changeover dates will be calculated by multiplying the applicable daily baseline quantity for each season by the number of days in each season for the billing period.

**GAS SCHEDULE GL-1  
 RESIDENTIAL CARE PROGRAM SERVICE**

Sheet 2

BASELINE QUANTITIES:

The delivered quantities of gas shown below are billed at the rates for baseline use.

Baseline Territories	BASELINE QUANTITIES (Therms Per Day Per Dwelling Unit)						(T)   (T)
	Summer (April-October)		Winter Off-Peak (Nov, Feb, Mar)		Winter On-Peak (Dec, Jan)		
	Effective Apr. 1, 2020		Effective Nov. 1, 2019		Effective Dec. 1, 2019		
**							
P	0.39	(R)	1.88	(R)	2.16	(I)	
Q	0.59	(R)	1.55	(R)	2.16	(I)	
R	0.36	(R)	1.28	(R)	1.97	(I)	
S	0.39	(R)	1.38	(R)	2.06	(I)	
T	0.59	(R)	1.38	(R)	1.81	(I)	
V	0.62	(R)	1.51	(R)	1.84	(I)	
W	0.39	(R)	1.18	(R)	1.84	(I)	
X	0.49	(R)	1.55	(R)	2.16	(I)	
Y	0.69	(R)	2.15	(R)	2.65	(I)	

SEASONAL CHANGES:

The summer season is April-October, the winter off-peak season is November, February and March, and the winter on-peak season is December and January. Baseline quantities for bills that include the April 1, November 1 and December 1 seasonal changeover dates will be calculated by multiplying the applicable daily baseline quantity for each season by the number of days in each season for the billing period.



**Pacific Gas and Electric Company**

San Francisco, California

Cancelling Revised Cal. P.U.C. Sheet No. 52702-E  
 Revised Cal. P.U.C. Sheet No. 52397-E

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**ELECTRIC SCHEDULE E-TOU-C** Sheet 2  
 RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

RATES: **E-TOU-C TOTAL RATES**  
 (Cont'd.)

Total Energy Rates (\$ per kWh)	PEAK		OFF-PEAK	
<i>Summer</i>				
Total Usage	\$0.48814	(I)	\$0.42470	(I)
Baseline Credit (Applied to Baseline Usage Only)	(\$0.09018)	(R)	(\$0.09018)	(R)
<i>Winter</i>				
Total Usage	\$0.39106	(I)	\$0.37373	(I)
Baseline Credit (Applied to Baseline Usage Only)	(\$0.09018)	(R)	(\$0.09018)	(R)
Delivery Minimum Bill Amount (\$ per meter per day)	\$0.34810	(I)		
California Climate Credit (per household, per semi-annual payment occurring in the April and October bill cycles)	(\$39.30)	(R)		

Total bundled service charges shown on customer's bills are unbundled according to the component rates shown below. Where the delivery minimum bill amount applies, the customer's bill will equal the sum of (1) the delivery minimum bill amount plus (2) for bundled service, the generation rate times the number of kWh used. For revenue accounting purposes, the revenues from the delivery minimum bill amount will be assigned to the Transmission, Transmission Rate Adjustments, Reliability Services, Public Purpose Programs, Nuclear Decommissioning, Competition Transition Charges, Energy Cost Recovery Amount, Wildfire Fund Charge, and New System Generation Charges based on kWh usage times the corresponding unbundled rate component per kWh, with any residual revenue assigned to Distribution.

(Continued)

Advice Decision	6509-E-A	Issued by <b>Robert S. Kenney</b> Vice President, Regulatory Affairs	Submitted Effective Resolution	February 25, 2022 March 1, 2022
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**Pacific Gas and Electric Company**  
 San Francisco, California

Revised Cal. P.U.C. Sheet No. 46190-E  
 C Cancelling Revised Cal. P.U.C. Sheet No. 43414-E

**ELECTRIC SCHEDULE E-TOU-C** Sheet 4 (T)  
 RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

SPECIAL CONDITIONS: 1. **BASELINE (TIER 1) QUANTITIES:** The following quantities of electricity are to be used to define usage eligible for the baseline credit (also see Rule 19 for additional allowances for medical needs):

Baseline Territory*	BASELINE QUANTITIES (kWh PER DAY)			
	Code B - Basic Quantities		Code H - All-Electric Quantities	
	Summer	Winter	Summer	Winter
	Tier I	Tier I	Tier I	Tier I
P	14.2	12.0	16.0	27.4
Q	10.3	12.0	8.9	27.4
R	18.6	11.3	20.9	28.1
S	15.8	11.1	18.7	24.9
T	6.8	8.2	7.5	13.6
V	7.5	8.8	10.9	16.9
W	20.2	10.7	23.6	20.0
X	10.3	10.5	8.9	15.4
Y	11.0	12.1	12.6	25.3
Z	6.2	8.1	7.0	16.5

2. **TIME PERIODS FOR E-TOU-C:** Times of the year and times of the day are defined as follows: (T)

Summer (service from June 1 through September 30):  
 Peak: 4:00 p.m. to 9:00 p.m. All days  
 Off-Peak: All other times  
 Winter (service from October 1 through May 31):  
 Peak: 4:00 p.m. to 9:00 p.m. All days  
 Off-Peak: All other times

\* The applicable baseline territory is described in Part A of the Preliminary Statement

(Continued)

Advice	5759-E	Issued by	Submitted	February 14, 2020
Decision	D.19-07-004	<b>Robert S. Kenney</b>	Effective	March 1, 2020
		Vice President, Regulatory Affairs	Resolution	



Cancelling Revised Cal. P.U.C. Sheet No. 52659-E  
 Revised Cal. P.U.C. Sheet No. 52371-E

**ELECTRIC SCHEDULE E-1** Sheet 1  
**RESIDENTIAL SERVICES**

**APPLICABILITY:** This schedule is applicable to single-phase and polyphase residential service in single-family dwellings and in flats and apartments separately metered by PG&E; to single-phase and polyphase service in common areas in a multifamily complex (see Special Condition 8); and to all single-phase and polyphase farm service on the premises operated by the person whose residence is supplied through the same meter.

The provisions of Schedule S—Standby Service Special Conditions 1 through 6 shall also apply to customers whose premises are regularly supplied in part (but not in whole) by electric energy from a nonutility source of supply. These customers will pay monthly reservation charges as specified under Section 1 of Schedule S, in addition to all applicable Schedule E-1 charges. See Special Conditions 11 and 12 of this rate schedule for exemptions to standby charges.

**TERRITORY:** This rate schedule applies everywhere PG&E provides electric service.

**RATES:** Total bundled service charges are calculated using the total rates below. Customers on this schedule are subject to the delivery minimum bill amount shown below applied to the delivery portion of the bill (i.e. to all rate components other than the generation rate). In addition, total bundled charges will include applicable generation charges per kWh for all kWh usage.

Customers receiving a medical baseline allowance shall pay for all usage based on the rates shown below, and shall not pay the Wildfire Fund Charge. Customers receiving a medical baseline allowance shall also receive a 50 percent discount on the delivery minimum bill amount shown below.

Direct Access (DA) and Community Choice Aggregation (CCA) charges shall be calculated in accordance with the paragraph in this rate schedule titled Billing.

**TOTAL RATES**

Total Energy Rates (\$ per kWh)	
Baseline Usage	\$0.31465 (I)
101% - 400% of Baseline	\$0.39454 (I)
High Usage Over 400% of Baseline	\$0.49318 (I)
Delivery Minimum Bill Amount (\$ per meter per day)	\$0.34810 (I)
California Climate Credit (per household, per semi-annual payment occurring in the April and October bill cycles)	(\$39.30) (R)

(Continued)

<i>Advice</i>	6509-E-A	<i>Issued by</i>	<i>Submitted</i>	February 25, 2022
<i>Decision</i>		<b>Robert S. Kenney</b>	<i>Effective</i>	March 1, 2022
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



Cancelling Revised Cal. P.U.C. Sheet No. 53424-E  
 Revised Cal. P.U.C. Sheet No. 52653-E

**ELECTRIC SCHEDULE D-CARE** Sheet 1  
**LINE-ITEM DISCOUNT FOR CALIFORNIA ALTERNATE RATES FOR ENERGY (CARE)**  
**CUSTOMERS**

**APPLICABILITY:** This schedule is applicable to single-phase and polyphase residential service in single-family dwellings and in flats and apartments separately metered by PG&E and domestic submetered tenants residing in multifamily accommodations, mobilehome parks and to qualifying recreational vehicle parks and marinas and to farm service on the premises operated by the person whose residence is supplied through the same meter, where the applicant qualifies for California Alternate Rates for Energy (CARE) under the eligibility and certification criteria set forth in Electric Rule 19.1. CARE service is available on Schedules E-1, E-6, E-TOU-B, E-TOU-C, E-TOU-D, EV2, EM, ES, ESR, ET and EM-TOU.

**TERRITORY:** This rate schedule applies everywhere PG&E provides electric service.

**RATES:** Customers taking service on this rate schedule will receive a percentage discount ("A" below) on their total bundled charges on their otherwise applicable rate schedule (except for the California Climate Credit, which will not be discounted). In addition, customers will receive a percentage discount ("B" below) on the delivery minimum bill amount, if applicable. The CARE discount will be calculated for direct access and community choice aggregation customers based on the total charges as if they were subject to bundled service rates. Discounts will be applied as a residual reduction to distribution charges, after D-CARE customers are exempted from the Wildfire Fund Charge, Recovery Bond Charge, Recovery Bond Credit, and the CARE surcharge portion of the public purpose program charge used to fund the CARE discount. These conditions also apply to master-metered customers and to qualified sub-metered tenants where the master-meter customer is jointly served under PG&E's Rate Schedule D-CARE and either Schedule EM, ES, ESR, ET, or EM-TOU. (T)  
 (T)

For master-metered customers where one or more of the submetered tenants qualifies for CARE rates under the eligibility and certification criteria set forth in Rule 19.1, 19.2, or 19.3, the CARE discount is equal to a percentage ("C" below) of the total bundled charges, multiplied by the number of CARE units divided by the total number of units. In addition, master-metered customers eligible for D-CARE will receive a percentage discount ("D" below) on the delivery minimum bill amount, if applicable.

It is the responsibility of the master-metered customer to advise PG&E within 15 days following any change in the number of dwelling units and/or any decrease in the number of qualifying CARE applicants that results when such applicants move out of their submetered or non-submetered dwelling unit, or submetered permanent-residence RV or permanent-residence boat.

- A. D-CARE Discount: 34.947 % (Percent) (I)
- B. Delivery Minimum Bill Discount: 50.000 % (Percent)
- C. Master-Meter D-CARE Discount: 34.947 % (Percent) (I)
- D. Master-Meter Delivery Minimum Bill Discount: 50.000 % (Percent)

**SPECIAL CONDITIONS:** 1. OTHERWISE APPLICABLE SCHEDULE: The Special Conditions of the Customer's otherwise applicable rate schedule will apply to this schedule.

(Continued)

Advice	6603-E-A	Issued by	Submitted	May 31, 2022
Decision		<b>Robert S. Kenney</b>	Effective	June 1, 2022
		Vice President, Regulatory Affairs	Resolution	

### 7.2.2 Southern California Edison

The following pages provide details on are the SCE electricity tariffs applied in this study. Table 35 describes the baseline territories that were assumed for each climate zone. A net surplus compensation rate of \$0.03339 / kWh was



applied to any net annual electricity generation based on a one-year average of the rates between April 2021 and March 2022.

**Table 35: SCE Baseline Territory by Climate Zone**

	Baseline Territory
CZ06	6
CZ08	8
CZ09	9
CZ10	10
CZ14	14
CZ15	15

Summer Daily Allocations (June through September)

Baseline Region Number	Daily kWh Allocation	All-Electric Allocation
5	17.2	17.9
6	11.4	8.8
8	12.6	9.8
9	16.5	12.4
10	18.9	15.8
13	22.0	24.6
14	18.7	18.3
15	46.4	24.1
16	14.4	13.5

Winter Daily Allocations (October through May)

Baseline Region Number	Daily kWh Allocation	All-Electric Allocation
5	18.7	29.1
6	11.3	13.0
8	10.6	12.7
9	12.3	14.3
10	12.5	17.0
13	12.6	24.3
14	12.0	21.3
15	9.9	18.2
16	12.6	23.1

Schedule TOU-D  
 TIME-OF-USE  
 DOMESTIC  
 (Continued)

Sheet 12 (T)

**SPECIAL CONDITIONS**

1. Applicable rate time periods are defined as follows:

Option 4-9 PM, Option 4-9 PM-CPP, Option PRIME, Option PRIME-CPP :

(T)

TOU Period	Weekdays		Weekends and Holidays	
	Summer	Winter	Summer	Winter
On-Peak	4 p.m. - 9 p.m.	N/A	N/A	N/A
Mid-Peak	N/A	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.
Off-Peak	All other hours	9 p.m. - 8 a.m.	All other hours	9 p.m. - 8 a.m.
Super-Off-Peak	N/A	8 a.m. - 4 p.m.	N/A	8 a.m. - 4 p.m.
CPP Event Period	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	N/A	N/A



Southern California Edison  
 Rosemead, California (U 338-E)

Revised Cal. PUC Sheet No. 73153-E  
 Cancellling Revised Cal. PUC Sheet No. 72678-E

Schedule TOU-D		Sheet 2	
TIME-OF-USE			
DOMESTIC			
(Continued)			
<b>RATES</b>			
Customers receiving service under this Schedule will be charged the applicable rates under Option 4-9 PM, Option 4-9 PM-CPP, Option 5-8 PM, Option 5-8 PM-CPP, Option PRIME, Option PRIME-CPP Option A, Option A-CPP, Option B, or Option B-CPP, as listed below. CPP Event Charges will apply to all energy usage during CPP Event Energy Charge periods and CPP Non-Event Energy Credits will apply as a reduction on CPP Non-Event Energy Credit Periods during Summer Season weekdays, 4:00 p.m. to 9:00 p.m., as described in Special Conditions 1 and 3, below:			
	Delivery Service Total <sup>1</sup>	Generation <sup>2</sup>	
		UG <sup>3</sup>	DWRREC <sup>4</sup>
<b>Option 4-9 PM / Option 4-9 PM-CPP</b>			
Energy Charge - \$/kWh			
Summer Season - On-Peak	0.31186 (I)	0.21245 (I)	0.00000
Mid-Peak	0.31186 (I)	0.11358 (I)	0.00000
Off-Peak	0.24154 (I)	0.08653 (I)	0.00000
Winter Season - Mid-Peak	0.31186 (I)	0.14750 (I)	0.00000
Off-Peak	0.24154 (I)	0.10679 (I)	0.00000
Super-Off-Peak	0.23317 (I)	0.08321 (I)	0.00000
Baseline Credit**** - \$/kWh	(0.08844) (I)	0.00000	
Basic Charge - \$/day			
Single-Family Residence	0.031		
Multi-Family Residence	0.024		
Minimum Charge** - \$/day			
Single Family Residence	0.346		
Multi-Family Residence	0.346		
Minimum Charge (Medical Baseline)** - \$/day			
Single Family Residence	0.173		
Multi-Family Residence	0.173		
California Climate Credit <sup>10</sup>	(59.00) (I)		
California Alternate Rates for			
Energy Discount - %	100.00*		
Family Electric Rate Assistance Discount - %	100.00		
<b>Option 4-9 PM-CPP</b>			
CPP Event Energy Charge - \$/kWh		0.80000	
Summer CPP Non-Event Credit			
On-Peak Energy Credit - \$/kWh		(0.15170)	
Maximum Available Credit - \$/kWh****			
Summer Season		(0.68554) (R)	

\* Represents 100% of the discount percentage as shown in the applicable Special Condition of this Schedule.  
 \*\* The Minimum Charge is applicable when the Delivery Service Energy Charge, plus the applicable Basic Charge is less than the Minimum Charge.  
 \*\*\* The ongoing Competition Transition Charge CTC of (\$0.00020) per kWh is recovered in the UG component of Generation. (R)  
 \*\*\*\* The Baseline Credit applies up to 100% of the Baseline Allocation, regardless of Time of Use. The Baseline Allocation is set forth in Preliminary Statement, Part H.  
 \*\*\*\*\*The Maximum Available Credit is the capped credit amount for CPP Customers dual participating in other demand response programs.  
 1 Total = Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.  
 2 Generation = The Gen rates are applicable only to Bundled Service Customers. See Special Condition below for PCIA recovery.  
 3 DWRREC = Department of Water Resources (DWR) Energy Credit – For more information on the DWR Energy Credit, see the Billing Calculation Special Condition of this Schedule.  
 4 Applied on an equal basis, per household, semi-annually. See the Special Conditions of this Schedule for more information.

(Continued)

(To be inserted by utility)  
 Advice 4719-E  
 Decision \_\_\_\_\_  
 208

Issued by  
**Michael Backstrom**  
 Vice President

(To be inserted by Cal. PUC)  
 Date Submitted Feb 15, 2022  
 Effective Mar 1, 2022  
 Resolution \_\_\_\_\_





Southern California Edison  
 Rosemead, California (U 338-E)

Revised Cal. PUC Sheet No. 73148-E  
 Cancelling Revised Cal. PUC Sheet No. 72670-E

		Schedule D		Sheet 2	
		DOMESTIC SERVICE			
		(Continued)			
RATES					
		Delivery Service	Generation <sup>2</sup>		
		Total <sup>1</sup>	UG <sup>***</sup>	DWREC <sup>4</sup>	
Energy Charge- \$/kWh/Meter/Day					
Baseline Service					
	Summer	0.17154 (I)	0.11259 (I)	0.00000	
	Winter	0.17154 (I)	0.11259 (I)	0.00000	
Nonbaseline Service*					
101% - 400% of Baseline - Summer					
	Summer	0.25252 (I)	0.11259 (I)	0.00000	
	Winter	0.25252 (I)	0.11259 (I)	0.00000	
High Usage Charge					
(Over 400% of Baseline) - Summer					
	Summer	0.34380 (I)	0.11259 (I)	0.00000	
	- Winter	0.34380 (I)	0.11259 (I)	0.00000	
Basic Charge - \$/Meter/Day					
	Single-Family Accommodation	0.031			
	Multi-Family Accommodation	0.024			
Minimum Charge** - \$/Meter/Day					
	Single-Family Accommodation	0.346			
	Multi-Family Accommodation	0.346			
Minimum Charge (Medical Baseline)** - \$/Meter/Day					
	Single-Family Accommodation	0.173			
	Multi-Family Accommodation	0.173			
	California Climate Credit <sup>10</sup>	(59.00) (I)			

\* Nonbaseline Service includes all kWh in excess of applicable Baseline allocations as described in Preliminary Statement, Part H, Baseline Service.  
 \*\* The Minimum Charge is applicable when the Delivery Service Energy Charge, minus the DWRBC, plus the applicable Basic Charge is less than the Minimum Charge. The difference between these two amounts is the Balance of Minimum Charge and is included on a Customer's bill.  
 \*\*\* The ongoing Competition Transition Charge (CTC) of (\$0.00020) per kWh is recovered in the UG component of Generation. (R)  
 1 Total = Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.  
 2 Generation = The Generation rates are applicable only to Bundled Service Customers. See Special Condition below for PCIA recovery.  
 3 DWREC = Department of Water Resources (DWR) Energy Credit - For more information on the DWR Energy Credit, see the Billing Calculation Special Condition of this Schedule.  
 4 Applied on an equal basis, per household, semi-annually. See the Special Conditions of this Schedule for more information.

(Continued)

(To be inserted by utility)  
 Advice 4719-E  
 Decision \_\_\_\_\_

Issued by  
Michael Backstrom  
 Vice President

(To be inserted by Cal. PUC)  
 Date Submitted Feb 15, 2022  
 Effective Mar 1, 2022  
 Resolution \_\_\_\_\_

208



Southern California Edison  
 Rosemead, California (U 338-E)

Revised Cal. PUC Sheet No. 73151-E  
 Cancelling Revised Cal. PUC Sheet No. 72673-E

Schedule D-CARE Sheet 1

CALIFORNIA ALTERNATE RATES FOR ENERGY

DOMESTIC SERVICE

APPLICABILITY

Applicable to domestic service to CARE households residing in a permanent Single-Family Accommodation or Multifamily Accommodation where the customer meets all the Special Conditions of this Schedule. Customers enrolled in the CARE program are not eligible for the Family Electric Rate Assistance (FERA) program.

Pursuant to Special Condition 12 herein, customers receiving service under this Schedule are eligible to receive the California Climate Credit as shown in the Rates section below.

TERRITORY

Within the entire territory served.

RATES

The applicable charges set forth in Schedule D shall apply to Customers served under this Schedule.

CARE Discount:

A 28.5 percent discount is applied to a CARE Customer's bill prior to the application of the Public Utilities Commission Reimbursement Fee (PUCRF) and any applicable user fees, taxes, and late payment charges. CARE Customers are required to pay the PUCRF and any applicable user fees, taxes, and late payment charges in full. In addition, CARE Customers are exempt from paying the CARE Surcharge of \$0.01070 per kWh and the Department of Water Resources Bond Charge of \$0.00652 per kWh. The 28.5 percent discount (which includes the exemption of the Fixed Recovery Charge of \$0.00016 per kWh) in addition to these exemptions result in an average effective CARE Discount of 32.5 percent.

(Continued)

(To be inserted by utility)  
 Advice 4719-E  
 Decision \_\_\_\_\_

Issued by  
Michael Backstrom  
 Vice President

(To be inserted by Cal. PUC)  
 Date Submitted Feb 15, 2022  
 Effective Mar 1, 2022

### 7.2.3 Southern California Gas

Following are the SoCalGas natural gas tariffs applied in this study. Table 36 describes the baseline territories that were assumed for each climate zone.

**Table 36: SoCalGas Baseline Territory by Climate Zone**

	Baseline Territory
CZ05	2
CZ06	1
CZ08	1
CZ09	1
CZ10	1
CZ14	2
CZ15	1

The SoCalGas monthly gas rate in \$/therm was applied on a monthly basis for the 12-month period ending August 2021 according to the rates shown in Table 37. Historical natural gas rate data was only available for SoCalGas' procurement charges.<sup>16</sup> To estimate total costs by month, the baseline and excess transmission charges were assumed to be relatively consistent and applied for the entire year based on January 2021 and April 2021 costs. CARE rates reflect the 20 percent discount per the GR tariff.

**Table 37: SoCalGas Monthly Gas Rate (\$/therm)**

Month	Procurement Charge	Transportation Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2022	\$0.83569	\$0.82487	\$1.23877	\$1.66056	\$2.07446
Feb 2022	\$0.60655	\$0.82487	\$1.23877	\$1.43142	\$1.84532
Mar 2022	\$0.55921	\$0.82487	\$1.23877	\$1.38408	\$1.79798
Apr 2021	\$0.31373	\$0.80599	\$1.20562	\$1.11972	\$1.51935
May 2021	\$0.35684	\$0.80599	\$1.20562	\$1.16283	\$1.56246
June 2021	\$0.39460	\$0.80599	\$1.20562	\$1.20059	\$1.60022
July 2021	\$0.42622	\$0.80599	\$1.20562	\$1.23221	\$1.63184
Aug 2021	\$0.44599	\$0.80599	\$1.20562	\$1.25198	\$1.65161
Sept 2021	\$0.44425	\$0.82487	\$1.23877	\$1.26912	\$1.68302
Oct 2021	\$0.57580	\$0.82487	\$1.23877	\$1.40067	\$1.81457
Nov 2021	\$0.63799	\$0.82487	\$1.23877	\$1.46286	\$1.87676
Dec 2021	\$0.65129	\$0.82487	\$1.23877	\$1.47616	\$1.89006

<sup>16</sup> The SoCalGas procurement and transmission charges were obtained from the following site:  
<https://www.socalgas.com/for-your-business/energy-market-services/gas-prices>

SOUTHERN CALIFORNIA GAS COMPANY Revised CAL. P.U.C. SHEET NO. 59651-G  
 LOS ANGELES, CALIFORNIA CANCELING Revised CAL. P.U.C. SHEET NO. 59610-G

Schedule No. GR				Sheet 1
<u>RESIDENTIAL SERVICE</u>				
(Includes GR, GR-C and GT-R Rates)				
<u>APPLICABILITY</u>				
The GR rate is applicable to natural gas procurement service to individually metered residential customers.				
The GR-C, cross-over rate, is a core procurement option for individually metered residential core transportation customers with annual consumption over 50,000 therms, as set forth in Special Condition 10.				
The GT-R rate is applicable to Core Aggregation Transportation (CAT) service to individually metered residential customers, as set forth in Special Condition 11.				
The California Alternate Rates for Energy (CARE) discount of 20%, reflected as a separate line item on the bill, is applicable to income-qualified households that meet the requirements for the CARE program as set forth in Schedule No. G-CARE.				
<u>TERRITORY</u>				
Applicable throughout the service territory.				
<u>RATES</u>				
	<u>GR</u>	<u>GR-C</u>	<u>GT-R</u>	
Customer Charge, per meter per day:.....	16.438¢	16.438¢	16.438¢	
For "Space Heating Only" customers, a daily Customer Charge applies during the winter period from November 1 through April 30 <sup>1/</sup> :				
.....	33.149¢	33.149¢	33.149¢	

### 7.2.4 San Diego Gas & Electric

Following are the SDG&E electricity and natural gas tariffs applied in this study. Table 38 describes the baseline territories that were assumed for each climate zone. A net surplus compensation rate of \$0.04174 / kWh was applied to any net annual electricity generation based on a one-year average of the rates between April 2021 and March 2022.

**Table 38: SDG&E Baseline Territory by Climate Zone**

	Baseline Territory
CZ07	Coastal
CZ10	Inland
CZ14	Mountain

The SDG&E monthly gas rate in \$/therm was applied on a monthly basis for the 12-month period ending August 2021 according to the rates shown in Table 39. CARE rates reflect the 20 percent discount per the G-CARE tariff.

**Table 39: SDG&E Monthly Gas Rate (\$/therm)**

Month	Procurement Charge	Transportation Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2022	\$0.83668	\$1.43201	\$1.70577	\$2.26869	\$2.54245
Feb 2022	\$0.60727	\$1.43201	\$1.70577	\$2.03928	\$2.31304
Mar 2022	\$0.55988	\$1.43201	\$1.70577	\$1.99189	\$2.26565
Apr 2021	\$0.31401	\$1.44464	\$1.70732	\$1.75865	\$2.02133
May 2021	\$0.35719	\$1.44464	\$1.70732	\$1.80183	\$2.06451
June 2021	\$0.39498	\$1.44464	\$1.70732	\$1.83962	\$2.10230
July 2021	\$0.42663	\$1.44464	\$1.70732	\$1.87127	\$2.13395
Aug 2021	\$0.44642	\$1.44464	\$1.70732	\$1.89106	\$2.15374
Sept 2021	\$0.44468	\$1.44464	\$1.70732	\$1.88932	\$2.15200
Oct 2021	\$0.57637	\$1.38238	\$1.63573	\$1.95875	\$2.21210
Nov 2021	\$0.63862	\$1.38238	\$1.63573	\$2.02100	\$2.27435
Dec 2021	\$0.65194	\$1.38238	\$1.63573	\$2.03432	\$2.28767

**Baseline Usage:** The following quantities of gas used in individually metered residences are to be billed at the baseline rates:

All Customers:	Daily Therm Allowance
Summer (May 1 to October 31, inclusive)	0.493
Winter (November 1 to April 30, inclusive)	1.546



San Diego Gas & Electric Company  
 San Diego, California

Revised Cal. P.U.C. Sheet No. 24598-G

Canceling Revised Cal. P.U.C. Sheet No. 17396-G

**SCHEDULE G-CARE**

Sheet 1

CALIFORNIA ALTERNATE RATES FOR ENERGY (CARE) PROGRAM

APPLICABILITY

This schedule provides a California Alternate Rates for Energy (CARE) discount to each of the following types of customers listed below that meet the requirements for CARE eligibility as defined in Rule 1, Definitions, and herein, and is taken in conjunction with the customer's otherwise applicable service schedule.

- 1) Customers residing in a permanent single-family accommodation, separately metered by the Utility.
- 2) Multi-family dwelling units and mobile home parks supplied through one meter on a single premises where the individual unit is submetered.
- 3) Non-profit group living facilities.
- 4) Agricultural employee housing facilities.

TERRITORY

Within the entire territory served natural gas by the Utility.

DISCOUNT

The qualified customer will receive a 20% CARE discount on all customer, commodity, and transportation charges on their otherwise applicable service schedule. In addition, the customer will not pay the CARE portion of the Public Purpose Programs Surcharge as specified in Schedule G-PPPS.

SPECIAL CONDITIONS

ALL CUSTOMERS

- 1. Applicable Conditions. All special conditions contained in the customer's otherwise applicable schedule are applicable to service under this schedule.
- 2. Application and Eligibility Declaration.\* An application and eligibility declaration, on a form authorized by the Commission, is required for service under the CARE program unless otherwise authorized by the Commission. Renewal of a customer's eligibility declaration, also referred to as recertification, will be required at the request of the Utility. N
- 3. Commencement of CARE Discount. Eligible customers shall begin receiving the CARE discount no later than one billing period after receipt of a completed and approved application by the Utility or as may otherwise be authorized by the Commission.

\*Per SDG&E Advice Letter 3516-E-C/2854-G-C, submitted pursuant to Resolution M-4842, certain customer protections will be offered to eligible customers effective March 4, 2020 through April 16, 2021, or as otherwise extended. N  
N  
N

(Continued)

1C22	Issued by	Submitted	Jun 3, 2020
Advice Ltr. No. 2854-G-C	<b>Dan Skopec</b>	Effective	Mar 4, 2020
Decision No. M-4842	Vice President Regulatory Affairs	Resolution No.	





San Diego Gas & Electric Company  
San Diego, California

Revised Cal. P.U.C. Sheet No. 35747-E  
Canceling Revised Cal. P.U.C. Sheet No. 35358-E

**SCHEDULE TOU-DR1** Sheet 2  
**RESIDENTIAL TIME-OF-USE**

RATES

Total Rates:

Description – TOU DR1	UDC Total Rate	DWR BC + WF-NBC	EECC Rate + DWR Credit	Total Rate
<b>Summer:</b>				
On-Peak	0.25074	I 0.00652	I 0.43976	I 0.69702
Off-Peak	0.25074	I 0.00652	I 0.19788	I 0.45514
Super Off-Peak	0.25074	I 0.00652	I 0.07083	I 0.32809
<b>Winter:</b>				
On-Peak	0.39008	I 0.00652	I 0.14857	I 0.54517
Off-Peak	0.39008	I 0.00652	I 0.08335	I 0.47995
Super Off-Peak	0.39008	I 0.00652	I 0.06442	I 0.46102
Summer Baseline Adjustment Credit up to 130% of Baseline	(0.10159)	R		(0.10159) R
Winter Baseline Adjustment Credit up to 130% of Baseline	(0.10159)	R		(0.10159) R
Minimum Bill (\$/day)	0.350			0.350

T

Note:

- (1) Total Rates consist of UDC, Schedule DWR-BC (Department of Water Resources Bond Charge), and Schedule EECC (Electric Energy Commodity Cost) rates, with the EECC rates reflecting a DWR Credit.
- (2) Total Rates presented are for customers that receive commodity supply and delivery service from Utility.
- (3) DWR-BC charges do not apply to CARE customers.
- (4) As identified in the rates tables, customer bills will also include line-item summer and winter credits for usage up to 130% of baseline to provide the rate capping benefits adopted by Assembly Bill 1X and Senate Bill 695.

(Continued)

2C8 Issued by Submitted Mar 26, 2020  
 Advice Ltr. No. 3514-E **Dan Skopec** Effective Apr 1, 2020  
 Decision No. D.20-01-021 Vice President  
 Regulatory Affairs Resolution No. \_\_\_\_\_

Time Periods

All time periods listed are applicable to local time. The definition of time will be based upon the date service is rendered.

TOU Periods – Weekdays	Summer	Winter
On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
Off-Peak	6:00 a.m. – 4:00 p.m.; 9:00 p.m. - midnight	6:00 a.m. – 4:00 p.m. Excluding 10:00 a.m. – 2:00 p.m. in March and April; 9:00 p.m. - midnight
Super Off-Peak	Midnight – 6:00 a.m.	Midnight – 6:00 a.m. 10:00 a.m. – 2:00 p.m. in March and April
TOU Period – Weekends and Holidays	Summer	Winter
On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
Off-Peak	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - midnight	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - midnight
Super Off-Peak	Midnight – 2:00 p.m.	Midnight – 2:00 p.m.

Seasons: Summer June 1 – October 31  
 Winter November 1 – May 31



15. Baseline Usage: The following quantities of electricity are used to calculate the baseline adjustment credit.

	Baseline Allowance For Climatic Zones*			
	Coastal	Inland	Mountain	Desert
<b>Basic Allowance</b>				
Summer (June 1 to October 31)	9.0	10.4	13.6	15.9
Winter (November 1 to May 31)	9.2	9.6	12.9	10.9
<b>All Electric**</b>				
Summer (June 1 to October 31)	6.0	8.7	15.2	17.0
Winter (November 1 to May 31)	8.8	12.2	22.1	17.1

\* Climatic Zones are shown on the Territory Served, Map No. 1.

\*\* All Electric allowances are available upon application to those customers who have permanently installed space heating or who have electric water heating and receive no energy from another source.



San Diego Gas & Electric Company  
 San Diego, California

Revised Cal. P.U.C. Sheet No. 35702-E

Canceling Revised Cal. P.U.C. Sheet No. 35307-E

**SCHEDULE DR**

Sheet 1

RESIDENTIAL SERVICE  
 (Includes Rates for DR-LI)

APPLICABILITY

This Schedule is optionally available to domestic service for lighting, heating, cooking, water heating, and power, or combination thereof, in single family dwellings, flats, and apartments, separately metered by the utility; to service used in common for residential purposes by tenants in multi-family dwellings under Special Condition 8; to any approved combination of residential and nonresidential service on the same meter; and to incidental farm service under Special Condition 7.

This schedule is also applicable to customers qualifying for the California Alternate Rates for Energy (CARE) Program and/or Medical Baseline, residing in single-family accommodations, separately metered by the Utility, and may include Non-profit Group Living Facilities and Qualified Agricultural Employee Housing Facilities, if such facilities qualify to receive service under the terms and conditions of Schedule E-CARE. The rates for CARE and Medical Baseline customers are identified in the rates tables below as DR-LI and DR-MB rates, respectively.

Customers on this schedule may also qualify for a semi-annual California Climate Credit \$(64.17) per Schedule GHG-ARR.

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TERRITORY

Within the entire territory served by the Utility.

RATES

Total Rates:

Description - DR Rates	UDC Total Rate	DWR BC + WF-NBC	EECC Rate + DWR Credit	Total Rate
<b>Summer:</b>				
Up to 130% of Baseline Energy (\$/kWh)	0.14915	0.00652	0.23639	0.39206
131% - 400% of Baseline (\$/kWh)	0.25074	0.00652	0.23639	0.49365
Above 400% of Baseline (\$/kWh)	0.25074	0.00652	0.23639	0.49365
<b>Winter:</b>				
Up to 130% of Baseline Energy (\$/kWh)	0.28849	0.00652	0.09705	0.39206
131% - 400% of Baseline (\$/kWh)	0.39008	0.00652	0.09705	0.49365
Above 400% of Baseline (\$/kWh)	0.39008	0.00652	0.09705	0.49365
Minimum Bill (\$/day)	0.350			0.350

T

- Total Rates consist of UDC, Schedule DWR-BC (Department of Water Resources Bond Charge), and Schedule EECC (Electric Energy Commodity Cost) rates, with the EECC rates reflecting a DWR Credit of \$0.00000 that customers receive on their monthly bills.
- Total Rates presented are for customers that receive commodity supply and delivery service from Utility. Differences in total rates paid by Direct Access (DA) and Community Choice Aggregation (CCA) customers are identified in Schedule DA-CRS and CCA-CRS, respectively.
- DWR-BC charges do not apply to CARE or Medical Baseline customers.
- Total Effective CARE Rate is presented for illustrative purposes only, and reflects the average effective CARE discount CARE customers receive which consists of (a) exemptions from paying the CARE Surcharge, DWR-BC, California Solar Initiative (CSI) and Vehicle-Grid Integration (VGI) Costs; (b) a 50% minimum bill relative to Non-CARE; and (c) a separate line-item bill discount for all qualified residential CARE customers.
- Current DWR-BC as presented is now used for collecting the California Wildfire Fund Charge effective Oct 1, 2020 (See Schedule WF – NBC). DWR BC will be renamed at implementation of SDG&E’s new customer information system.



San Diego Gas & Electric Company  
 San Diego, California

Revised Cal. P.U.C. Sheet No. 35718-E

Canceling Revised Cal. P.U.C. Sheet No. 32576-E

**SCHEDULE E-CARE**

Sheet 1

CALIFORNIA ALTERNATE RATES FOR ENERGY

APPLICABILITY

This schedule provides a California Alternate Rates for Energy (CARE) discount to each of the following types of customers listed below that meet the requirements for CARE eligibility as defined in Rule 1, Definitions, and herein, and is taken in conjunction with the customer's otherwise applicable service schedule.

- 1) Customers residing in a permanent single-family accommodation, separately metered by the Utility.
- 2) Multi-family dwelling units and mobile home parks supplied through one meter on a single premises where the individual unit is submetered.
- 3) Non-profit group living facilities.
- 4) Agricultural employee housing facilities.

TERRITORY

Within the entire territory served by the Utility.

DISCOUNT

- 1) **Residential CARE:** Qualified residential CARE customers will receive a total effective discount according to the following:

	2015	2016	2017	2018	2019	2020 and beyond
<b>Effective Discount</b>	40%	39%	38%	38%	36% R	35%

Pursuant to Commission Decision (D.) 15-07-001, the average effective CARE discount for residential customers will decrease 1% each year until an average effective discount of 35% is reached in 2020.

The average effective CARE discount consists of: (a) exemptions from paying the CARE Surcharge, Department of Water Resources Bond Charge (DWR-BC), Vehicle-Grid Integration (VGI) costs, and California Solar Initiative (CSI); (b) a 50% minimum bill relative to Non-CARE; (c) the California Wildfire Fund Charge (WF-NBC) and (d) a separate line-item bill discount for all qualified residential CARE customers with the exclusion of CARE Medical Baseline customers taking service on tiered rates schedules. D.15-07-001 retained the rate subsidies in Non-CARE Medical Baseline tiered rates and thereby a separate line-item discount is provided for these CARE Medical Baseline customers

(Continued)

1C5

Advice Ltr. No. 3928-E

Issued by  
**Dan Skopec**  
 Vice President

Submitted Dec 30, 2021  
 Effective Jan 1, 2022

**7.2.5 City of Palo Alto Utilities**

Following are the CPAU electricity and natural gas tariffs applied in this study. The CPAU monthly gas rate in \$/therm was applied on a monthly basis for the 12-month period ending August 2021 according to the rates shown

in Table 40. The distribution charge was \$0.4835/therm for Tier 1 and \$1.0426/therm for Tier 2. The monthly service charge applied was \$10.94 per month per the G-1 tariff in effect at the time of the analysis.

**Table 40: CPAU Monthly Gas Rate (\$/therm)**

Effective Date	Commodity Rate	Cap and Trade Compliance Charge	Transportation Charge	Carbon Offset Charge	G1 Tier 1 Volumetric Totals	G1 Tier 2 Volumetric Totals
Jan 2022	\$0.77140	\$0.04860	\$0.15000	\$0.04000	\$1.53900	\$1.83144
Feb 2022	\$0.53600	\$0.04860	\$0.15000	\$0.04000	\$1.30360	\$1.81874
Mar 2022	\$0.53700	\$0.04860	\$0.15000	\$0.04000	\$1.30460	\$1.8565
Apr 2022	\$0.59750	\$0.07680	\$0.14404	\$0.04000	\$1.38734	\$1.8363
May 2021	\$0.39010	\$0.04860	\$0.12200	\$0.04000	\$1.10450	\$1.8889
June 2021	\$0.39820	\$0.04860	\$0.12214	\$0.04000	\$1.11274	\$1.89714
July 2021	\$0.48000	\$0.04860	\$0.12274	\$0.04000	\$1.22034	\$2.04394
Aug 2021	\$0.54920	\$0.04860	\$0.12274	\$0.04000	\$1.28954	\$2.11314
Sept 2021	\$0.52170	\$0.04860	\$0.12274	\$0.04000	\$1.26204	\$1.78012
Oct 2021	\$0.71750	\$0.04860	\$0.12274	\$0.04000	\$1.45784	\$1.83222
Nov 2021	\$0.75050	\$0.04860	\$0.12274	\$0.04000	\$1.49084	\$1.83472
Dec 2021	\$0.63210	\$0.04860	\$0.12274	\$0.04000	\$1.37244	\$1.80442

**RESIDENTIAL ELECTRIC SERVICE**

UTILITY RATE SCHEDULE E-1

**A. APPLICABILITY:**

This Rate Schedule applies to separately metered single-family residential dwellings receiving Electric Service from the City of Palo Alto Utilities.

**B. TERRITORY:**

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

**C. UNBUNDLED RATES:**

<u>Per kilowatt-hour (kWh)</u>	<u>Commodity</u>	<u>Distribution</u>	<u>Public Benefits</u>	<u>Total</u>
Tier 1 usage	\$0.08339	\$0.04971	\$0.00447	\$0.13757
Tier 2 usage				
Any usage over Tier 1	0.11569	0.07351	0.00447	0.19367
<u>Minimum Bill (\$/day)</u>				0.3283

## EXPORT ELECTRICITY COMPENSATION

### UTILITY RATE SCHEDULE E-EEC-1

**A. APPLICABILITY:**

This Rate Schedule applies in conjunction with the otherwise applicable Rate Schedules for each Customer class. This Rate Schedule may not apply in conjunction with any time-of-use Rate Schedule. This Rate Schedule applies to Customer-Generators as defined in Rule and Regulation 2 who are either not eligible for Net Energy Metering or who are eligible for Net Energy metering but elect to take Service under this Rate Schedule.

**B. TERRITORY:**

This Rate Schedule applies anywhere the City of Palo Alto provides Electric Service.

**C. RATE:**

The following buyback rate shall apply to all electricity exported to the grid.

	<u>Per kWh</u>
Export electricity compensation rate	\$0.1078

## 7.2.6 Sacramento Municipal Utilities District (Electric Only)

Following are the SMUD electricity tariffs applied in this study.

### Residential Time-of-Day Service Rate Schedule R-TOD

#### II. Firm Service Rates

##### A. Time-of-Day (5-8 p.m.) Rate

	Effective as of October 1, 2021	Effective as of March 1, 2022	Effective as of January 1, 2023
<b>Time-of-Day (5-8 p.m.) Rate (RT02)</b>			
<b>Non-Summer Season (October - May)</b>			
System Infrastructure Fixed Charge <i>per month per meter</i>	\$22.70	\$23.05	\$23.50
<b>Electricity Usage Charge</b>			
Peak <i>\$/kWh</i>	\$0.1494	\$0.1516	\$0.1547
Off-Peak <i>\$/kWh</i>	\$0.1082	\$0.1098	\$0.1120
<b>Summer Season (June - September)</b>			
System Infrastructure Fixed Charge <i>per month per meter</i>	n/a	\$23.05	\$23.50
<b>Electricity Usage Charge</b>			
Peak <i>\$/kWh</i>	n/a	\$0.3215	\$0.3279
Mid-Peak <i>\$/kWh</i>	n/a	\$0.1827	\$0.1864
Off-Peak <i>\$/kWh</i>	n/a	\$0.1323	\$0.1350

<b>Summer (Jun 1 - Sept 30)</b>	<b>Peak</b>	Weekdays between 5:00 p.m. and 8:00 p.m.
	<b>Mid-Peak</b>	Weekdays between noon and midnight except during the Peak hours.
	<b>Off-Peak</b>	All other hours, including weekends and holidays <sup>1</sup> .
<b>Non-Summer (Oct 1 - May 31)</b>	<b>Peak</b>	Weekdays between 5:00 p.m. and 8:00 p.m.
	<b>Off-Peak</b>	All other hours, including weekends and holidays <sup>1</sup> .

### 7.2.7 Fuel Escalation Assumptions

The average annual escalation rates in Table 41 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. No data was available to estimate electricity escalation rates for CPAU and SMUD, therefore electricity escalation rates for PG&E and statewide natural gas escalation rates were applied.

**Table 41: Real Utility Rate Escalation Rate Assumptions**

	Statewide Natural Gas Residential Average Rate (%/year, real)	Electric Residential Average Rate (%/year, real)		
		PG&E	SCE	SDG&E
2023	4.6%	1.8%	1.6%	2.8%
2024	4.6%	1.8%	1.6%	2.8%
2025	4.6%	1.8%	1.6%	2.8%
2026	4.6%	1.8%	1.6%	2.8%
2027	4.6%	1.8%	1.6%	2.8%
2028	4.6%	1.8%	1.6%	2.8%
2029	4.6%	1.8%	1.6%	2.8%
2030	4.6%	1.8%	1.6%	2.8%
2031	2.0%	0.6%	0.6%	0.6%
2032	2.4%	0.6%	0.6%	0.6%
2033	2.1%	0.6%	0.6%	0.6%
2034	1.9%	0.6%	0.6%	0.6%
2035	1.9%	0.6%	0.6%	0.6%
2036	1.8%	0.6%	0.6%	0.6%
2037	1.7%	0.6%	0.6%	0.6%
2038	1.6%	0.6%	0.6%	0.6%
2039	2.1%	0.6%	0.6%	0.6%
2040	1.6%	0.6%	0.6%	0.6%
2041	2.2%	0.6%	0.6%	0.6%
2042	2.2%	0.6%	0.6%	0.6%
2043	2.3%	0.6%	0.6%	0.6%
2044	2.4%	0.6%	0.6%	0.6%
2045	2.5%	0.6%	0.6%	0.6%
2046	1.5%	0.6%	0.6%	0.6%
2047	1.3%	0.6%	0.6%	0.6%
2048	1.6%	0.6%	0.6%	0.6%
2049	1.3%	0.6%	0.6%	0.6%
2050	1.5%	0.6%	0.6%	0.6%
2051	1.8%	0.6%	0.6%	0.6%
2052	1.8%	0.6%	0.6%	0.6%



### 7.3 Summary of Measures by Package

Table 42 provides the details of the measures in each of the efficiency package by climate zone and case. Table 43 presents the measures for all the single family efficiency + PV + battery packages. Table 44 presents the measures for all the ADU efficiency packages.

**Table 42: Single Family Efficiency Package Measures**

Climate Zone	3 ACH50	R-10 Slab	Attic	0.25 Roof Solar Reflectance	0.24 U-Factor / 0.50 SHGC Windows	0.35 W/cfm	Buried Ducts	Basic Compact Hot Water Credit
1		X	R-60 vs R-38				X	
2		X	R-60 vs R-38			X	X	X
3			R-60 vs R-30			X	X	X
4		X	R-60 vs R-38			X	X	X
5			R-49 vs R-30			X	X	X
6			R-60 vs R-30			X	X	X
7			R-49 vs R-30				X	X
8			R-60 vs R-38			X	X	X
9			R-60 vs R-38			X	X	X
10			R-60 vs R-38	X		X	X	X
11		X	R-60 vs R-38	X		X	X	X
12		X	R-60 vs R-38	X		X	X	X
13		X	R-60 vs R-38	X		X	X	X
14	X	X	R-60 vs R-38	X		X	X	X
15		X	R-60 vs R-38	X		X	X	X
16			R-60 vs R-38		X	X	X	

**Table 43: Single Family Mixed Fuel Efficiency + PV + Battery Package Measures**

Climate Zone	3 ACH50	R-10 Slab	Attic	0.25 Roof Solar Reflectance	0.24 U-Factor / 0.50 SHGC Windows	0.30 U-Factor / 0.50 SHGC Windows	0.35 W/cfm	Buried Ducts	Basic Compact Hot Water Credit
1		X				X		X	
2		X	R- 49 vs R-38				X	X	X
3			R-38 vs R-30			X		X	X
4		X	R-49 vs R-38				X	X	X
5			R-49 vs R-30			X		X	X
6			R- 49 vs R-30				X	X	X
7			R-49 vs R-30					X	X
8			R- 49 vs R-38				X	X	X
9			R- 49 vs R-38				X	X	X
10				X			X	X	X
11		X	R-49 vs R-38	X			X	X	X
12		X	R- 49 vs R-38	X			X	X	X
13		X	R- 49 vs R-38	X			X	X	X
14	X	X	R- 49 vs R-38	X			X	X	X
15		X	R- 49 vs R-38	X			X	X	X
16			R- 49 vs R-38		X		X	X	

**Table 44: ADU Efficiency Package Measures**

Climate Zone	3 ACH50	R-10 Slab	0.25 Roof Solar Reflectance	0.24 U-Factor / 0.50 SHGC Windows	Ductless VCHP	Basic Compact Hot Water Credit
1		X			X	
2		X			X	X
3					X	X
4		X			X	X
5					X	X
6					X	X
7					X	X
8					X	X
9					X	X
10			X		X	X
11		X	X		X	X
12		X	X		X	X
13		X	X		X	X
14	X	X	X		X	X
15		X	X		X	X
16				X	X	

The efficiency measures added to the All-Electric prescriptive package in Climate Zones that were not compliant are shown in Table 45 and

Table 46.

**Table 45: Single Family All-Electric Code Compliant Efficiency Measures**

Climate Zone	0.24 U-Factor / 0.50 SHGC Windows	Basic Compact Hot Water Credit
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		X
16	X	

**Table 46: ADU All-Electric Code Compliant Efficiency Measures**

Climate Zone	3 ACH50	R-49 vs R-38 Attic Insulation	0.30 U-Factor / 0.50 SHGC Windows	0.24 U-Factor / 0.50 SHGC Windows	Improved HVAC Fan Efficiency: 0.35 W/cfm	Basic Compact Hot Water Credit
1						
2						
3						
4						X
5			X			X
6						X
7						X
8					X	X
9					X	X
10					X	X
11						
12						
13						X
14					X	X
15					X	X
16	X	X		X	X	

### 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](http://LocalEnergyCodes.com) to access our resources and sign up for newsletters

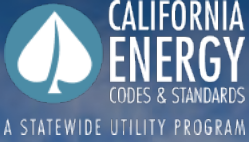


Contact [info@localenergycodes.com](mailto:info@localenergycodes.com) for no-charge assistance from expert Reach Code advisors



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Last modified: 2023/02/28  
Revision: 1.0

# 2022 Cost-Effectiveness Study: Multifamily New Construction



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## Acronym List

- 2023 PV\$ – Present value costs in 2023
- ACH50 – Air Changes per Hour at 50 pascals pressure differential
- ACM – Alternative Calculation Method
- ADU – Accessory Dwelling Unit
- AFUE – Annual Fuel Utilization Efficiency
- B/C – Lifecycle Benefit-to-Cost Ratio
- BEopt – Building Energy Optimization Tool
- BSC – Building Standards Commission
- CA IOUs – California Investor-Owned Utilities
- CASE – Codes and Standards Enhancement
- CBECC-Res – Computer program developed by the California Energy Commission for use in demonstrating compliance with the California Residential Building Energy Efficiency Standards
- CFI – California Flexible Installation
- CFM – Cubic Feet per Minute
- CO<sub>2</sub> – Carbon Dioxide
- CPAU – City of Palo Alto Utilities
- CPUC – California Public Utilities Commission
- CZ – California Climate Zone
- DHW – Domestic Hot Water
- DOE – Department of Energy
- DWHR – Drain Water Heat Recovery
- EDR – Energy Design Rating
- EER – Energy Efficiency Ratio
- EF – Energy Factor
- GHG – Greenhouse Gas



- HERS Rater – Home Energy Rating System Rater
- HPA – High Performance Attic
- HPWH – Heat Pump Water Heater
- HSPF – Heating Seasonal Performance Factor
- HVAC – Heating, Ventilation, and Air Conditioning
- IECC – International Energy Conservation Code
- IOU – Investor Owned Utility
- kBtu – kilo-British thermal unit
- kWh – Kilowatt Hour
- LBNL – *Lawrence Berkeley National Laboratory*
- LCC – Lifecycle Cost
- LLAHU – Low Leakage Air Handler Unit
- VLLDCS – Verified Low Leakage Ducts in Conditioned Space
- MF – Multifamily
- NEEA – Northwest Energy Efficiency Alliance
- NEM – Net Energy Metering
- NPV – Net Present Value
- NREL – *National Renewable Energy Laboratory*
- PG&E – Pacific Gas and Electric Company
- POU – Publicly-Owned-Utilities
- PV – Photovoltaic
- SCE – Southern California Edison
- SDG&E – San Diego Gas and Electric
- SEER – Seasonal Energy Efficiency Ratio
- SF – Single Family
- SMUD – Sacramento Municipal Utility District
- SoCalGas – Southern California Gas Company
- TDV – Time Dependent Valuation
- Therm – Unit for quantity of heat that equals 100,000 British thermal units
- Title 24 – Title 24, Part 6
- TOU – Time-Of-Use
- UEF – Uniform Energy Factor
- ZNE – Zero-net Energy



Summary of Revisions		
Date	Description	Reference (page or section)
2/28/2023	Original Release	N/A

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## Executive Summary

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 (GHG) 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.

This report documents cost-effective combinations of measures that exceed the minimum state requirements, the 2022 Building Energy Efficiency Standards (Title 24, Part 6 or Energy Code), effective January 1, 2023, for newly constructed multifamily buildings. The analysis considers low-rise and mid-rise multifamily building types and evaluates mixed fuel and all-electric package options in all sixteen California climate zones (CZs) Packages include a code compliant electrification package and a mixed fuel efficiency package, as well as the addition of above-code on-site solar photovoltaic (PV) capacity and battery energy storage. The 2022 Energy Code established electric heat pumps as the prescriptive baseline for space heating in most climate zones. As a result, this analysis primarily focuses on the electrification of central water heating. Space heating electrification was also evaluated where the prescriptive heat pump baseline didn't apply: In Climate Zone 16 for multifamily buildings three habitable stories or fewer, and Climate Zones 1 and 16 for multifamily buildings greater than three habitable stories.

This analysis used two different metrics to assess the cost-effectiveness of the proposed upgrades. Both methodologies require estimating and quantifying the incremental costs and energy savings associated with each energy efficiency measure over a 30-year analysis period. On-Bill cost-effectiveness is a customer-based lifecycle cost (LCC) approach that values energy based upon estimated site energy usage and customer utility bill savings using today's electricity and natural gas utility tariffs. Time Dependent Valuation (TDV) is the California Energy Commission's LCC methodology, which is intended to capture the long-term projected cost of energy including costs for providing energy during peak periods of demand, carbon emissions, grid transmission and distribution impacts. This is the methodology used by the Energy Commission in evaluating cost-effectiveness for efficiency measures in Title 24, Part 6.

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 following summarizes key results from the study:

- The Reach Codes Team found all-electric new construction to be feasible and cost-effective based on the California Energy Commission's Time Dependent Valuation (TDV) metric in all cases. In many cases all-electric prescriptive code construction results in an increase in utility costs and is not cost-effective On-Bill. Some exceptions include the SMUD and CPAU territories where lower electricity rates relative to gas rates result in lower overall utility bills.
- All-electric packages have lower GHG emissions than mixed fuel packages in all cases, due to the clean power sources currently available from California's power providers.
- The 2022 Energy Code's new source energy metric combined with the heat pump space heating baseline in most climate zones encourages all-electric construction. While the code does not include an electric baseline for water heating, the penalty for central electric water heating observed in the performance approach in past code cycles has been removed and a credit is provided for well-designed central heat pump water heaters in most cases.
- Electrification combined with increased PV capacity results in utility cost savings and was found to be On-Bill cost-effective in all cases.
- The results in this study are based on today's net energy metering (NEM 2.0) rules and do not account for recently approved changes to the NEM tariff (referred to as the net billing tariff). The net billing tariff decreases the value of PV to the consumer as compared to NEM 2.0. As a result, the cost-effectiveness of the packages that include above-code PV capacity is expected to be less under the net billing tariff. Conversely, the net

billing tariff is expected to increase On-Bill cost-effectiveness of the all-electric prescriptive code scenario. An all-electric home has better on-site utilization of generated electricity from PV than a mixed fuel home with a similar sized PV system, and as a result exports less electricity to the grid. Since the net-billing tariff values exports less than under NEM 2.0, the relative impact on annual utility costs to the mixed fuel baseline is greater.

- For jurisdictions interested in a reach code requiring all-electric buildings, this analysis does justify a modest reach based on either efficiency TDV or source energy. However, this may be challenging for some projects given the recent changes to which the industry must adapt, including the efficiency updates and multifamily restructuring in the 2022 Title 24, Part 6 code. While project compliance margins using a CO<sub>2</sub> refrigerant heat pump water heating system are high, the Reach Code Team found lower compliance margins using other heat pump water heater system designs. Focusing on supporting projects to electrify water heating is expected to support the market shift towards more central heat pump water heaters.
- For jurisdictions interested in a reach code that allows for mixed fuel buildings, a mixed fuel efficiency and PV package (and battery for the 3-story prototype) was found to be cost-effective based on TDV in all cases and cost-effective On-Bill in most climate zones. This path, referred to as “Electric-Preferred”, allows for mixed fuel buildings but requires a higher building performance than for all-electric buildings. The efficiency measures evaluated in this study did not provide significant compliance benefit. As a result, the Reach Codes Team recommends establishing a compliance margin target based on source energy or total TDV. This would allow for PV and battery above minimum code requirements to be used to meet the target.
- Jurisdictions interested in increasing affordable multifamily housing should know that applying the CARE rates has the overall impact of increasing utility cost savings for an all-electric building in most climate zones compared to a code compliant mixed fuel building, improving On-Bill cost-effectiveness.

Table ES-1 summarizes results for each prototype and depicts the efficiency TDV compliance margins achieved for each climate zone and package. All results presented in the table have a positive compliance margin (greater than zero percent). Cells highlighted in **green** depict cases with a positive compliance margin and cost-effective results using both On-Bill and TDV approaches. Cells highlighted in **yellow** depict cases with a positive compliance margin and cost-effective results using either the On-Bill or TDV approach. Cells **not highlighted** depict cases with a positive compliance margin but that were not cost-effective using either the On-Bill or TDV approach.



**Table ES-1. Summary of Efficiency TDV Compliance Margins and Cost-Effectiveness**

Climate Zone	Electric /Gas Utility	3-Story				5-Story			
		All-Electric Prescriptive Code	All-Electric + PV	Mixed Fuel Efficiency	Mixed Fuel Efficiency + PV + Battery	All-Electric Prescriptive Code	All-Electric + PV	Mixed Fuel Efficiency	Mixed Fuel Efficiency + PV
CZ01	PGE	26%	26%	1%	1%	14%	14%	0%	0%
CZ02	PGE	20%	20%	1%	1%	9%	9%	1%	1%
CZ03	PGE	21%	21%	1%	1%	11%	11%	0%	0%
CZ04	PGE	18%	18%	1%	1%	9%	9%	1%	1%
CZ04	CPAU	18%	18%	1%	1%	9%	9%	1%	1%
CZ05	PGE	23%	23%	1%	1%	12%	12%	0%	0%
CZ05	PGE/SCG	23%	23%	1%	1%	12%	12%	0%	0%
CZ06	SCE/SCG	18%	18%	1%	1%	9%	9%	0%	0%
CZ07	SDGE	20%	20%	0%	0%	11%	11%	0%	0%
CZ08	SCE/SCG	13%	13%	1%	1%	8%	8%	1%	1%
CZ09	SCE	13%	13%	1%	1%	7%	7%	1%	1%
CZ10	SCE/SCG	14%	14%	3%	3%	7%	7%	2%	2%
CZ10	SDGE	14%	14%	3%	3%	7%	7%	2%	2%
CZ11	PGE	14%	14%	3%	3%	8%	8%	2%	2%
CZ12	PGE	17%	17%	2%	2%	9%	9%	2%	2%
CZ12	SMUD/PGE	17%	17%	2%	2%	9%	9%	2%	2%
CZ13	PGE	13%	13%	4%	4%	7%	7%	2%	2%
CZ14	SCE/SCG	13%	13%	3%	3%	6%	6%	2%	2%
CZ14	SDGE	13%	13%	3%	3%	6%	6%	2%	2%
CZ15	SCE/SCG	5%	5%	5%	5%	3%	3%	3%	3%
CZ16	PG&E	24%	24%	5%	5%	9%	9%	2%	2%

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. For example, jurisdictions that only want to require all-electric construction may amend Part 11 instead of Part 6 of the CA Building Code, would file the ordinance with the BSC and not need to demonstrate its cost-effectiveness. Reach codes that amend Part 6 of the CA Building Code and require energy performance (including PV and storage) beyond state code minimums must demonstrate that the proposed changes are cost-effective and obtain approval from the Energy Commission prior to filing with the BSC.

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

# 1 Introduction

This report documents cost-effective combinations of measures that exceed the minimum state requirements, the 2022 Building Energy Efficiency Standards, effective January 1, 2023, for newly constructed multifamily buildings. This report was developed in coordination with the California Statewide Investor-Owned Utilities (CA IOUs) Codes and Standards Program, key consultants, and engaged cities—collectively known as the Reach Codes Team. The CA IOU Codes and Standards Program is comprised of IOUs representatives from Pacific Gas and Electric (PG&E), Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E) and two Publicly-Owned-Utilities (POUs) – Sacramento Municipal Utility District (SMUD) and City of Palo Alto Utilities (CPAU),

The analysis considers low-rise and mid-rise multifamily building types and evaluates mixed fuel and all-electric package options in all sixteen California climate zones (CZs)<sup>1</sup> Packages include combinations of efficiency measures, on-site renewable energy, and battery energy storage.

The California Building Energy Efficiency Standards Title 24, Part 6 (Energy Code) (California Energy Commission, 2022a) is maintained and updated every three years by two state agencies: the California Energy Commission (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 (California Energy Commission, 2022a)). 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.

The Department of Energy (DOE) sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act, including heating, cooling, and water heating equipment (E-CFR, 2020). Since state and local governments are prohibited from adopting higher minimum efficiencies than the federal standards require, the focus of this study is to identify and evaluate cost-effective packages that do not include high efficiency heating, cooling, and water heating equipment. High efficiency appliances are often the easiest and most affordable measures to increase energy performance. While federal preemption limits reach code mandatory requirements for covered appliances, in practice, builders may install any package of compliant measures to achieve the performance requirements.

---

<sup>1</sup> See Appendix 7.1 Map of California Climate Zones for a graphical depiction of climate zone locations.

## 2 Methodology and Assumptions

### 2.1 Analysis for Reach Codes

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

#### 2.1.1 Modeling

The Reach Codes Team performed energy simulations using software approved for 2022 Title 24 Code compliance analysis, CBECC 2022.2.0.

Using the 2022 baseline as the starting point, prospective energy efficiency measures were identified and modeled to determine the projected site energy (therm and kWh) and compliance impacts. Annual utility costs were calculated using hourly data output from CBECC, and electricity and natural gas tariffs for each of the investor-owned utilities (IOUs).

This analysis focused on residential apartments only (a prior study and report analyzed the cost-effectiveness of above code packages for nonresidential buildings (Statewide Reach Codes Team, 2022b). The Statewide Reach Codes Team selected measures for evaluation based on the single family 2022 reach code analysis (Statewide Reach Codes Team, 2022a) and the multifamily 2019 reach code analysis [ (Statewide Reach Codes Team, 2020), (Statewide Reach Codes Team, 2021)] as well as experience with and outreach to architects, builders, and engineers.

#### 2.1.2 Cost-Effectiveness

##### 2.1.2.1 Benefits

This analysis used two different metrics to assess the cost-effectiveness of the proposed upgrades. Both methodologies require estimating and quantifying the incremental costs and energy savings associated with each energy efficiency measure. The main difference between the methodologies is the manner in which they value energy and thus the cost savings of reduced or avoided energy use:

**Utility Bill Impacts (On-Bill):** This customer-based lifecycle cost (LCC) approach values energy based upon estimated site energy usage and customer utility bill savings using the latest electricity and natural gas utility tariffs available at the time of writing this report. Total savings are estimated over a 30-year duration and include discounting of future utility costs and energy cost inflation.

**Time Dependent Valuation (TDV):** This reflects the Energy Commission's current LCC methodology, which is intended to capture the total value or cost of energy use over 30 years. This method accounts for long-term projected costs, such as the cost of providing energy during peak periods of demand, costs for carbon emissions, and grid transmission and distribution impacts. This metric values energy use differently depending on the fuel source (natural 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 due to the less inefficient energy generation sources providing peak electricity (Horii, Cutter, Kapur, Arent, & Conotyannis, 2014). This is the methodology used by the Energy Commission in evaluating cost-effectiveness for efficiency measures in the 2022 Energy Code.

##### 2.1.2.2 Costs

The Reach Codes Team assessed the incremental costs of the measures and packages over a 30-year lifecycle. Incremental costs represent the equipment, installation, replacements, and maintenance costs of the proposed measure relative to the 2022 Energy Code minimum requirements or standard industry practices. Present value of replacement cost is included for measures with lifetimes less than the evaluation period.

##### 2.1.2.3 Metrics

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

**NPV:** The lifetime NPV is reported as a cost-effectiveness metric, Equation 1 demonstrates how this is calculated. If the NPV of a measure or package is positive, it is considered cost-effective. A negative values represent net costs.

**B/C Ratio:** This is the ratio of the present value (PV) of all benefits to the present value of all costs over 30 years (PV benefits divided by PV costs). The criteria benchmark for cost-effectiveness is a B/C ratio greater than one. A value of one indicates the NPV of the savings over the life of the measure is equivalent to the NPV of the lifetime incremental cost of that measure. A value greater than one represents a positive return on investment. The B/C ratio is calculated according to Equation 2.

### Equation 1

$$NPV = PV \text{ of lifetime benefit} - PV \text{ of lifetime cost}$$

### Equation 2

$$\text{Benefit} - \text{to} - \text{Cost Ratio} = \frac{PV \text{ of lifetime benefit}}{PV \text{ of lifetime cost}}$$

Improving the efficiency of a project often requires an initial incremental investment. In most cases the benefit is represented by annual On-Bill utility or TDV savings, and the cost is represented by incremental first cost and replacement costs. 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”.

The lifetime costs or benefits are calculated according to Equation 3.

### Equation 3

$$PV \text{ of lifetime cost or benefit} = \sum_{t=0}^n \frac{(Annual \text{ cost or benefit})_t}{(1 + r)^t}$$

Where:

- *n* = analysis term in years
- *r* = discount rate

The following summarizes the assumptions applied in this analysis to both methodologies.

- Analysis term of 30 years
- Real discount rate of three percent

TDV is a normalized monetary format and there is a unique procedure for calculating the present value benefit of TDV energy savings. The present value of the energy cost savings in dollars is calculated by multiplying the TDV savings (reported by the CBECC simulation software) by a NPV factor developed by the Energy Commission (see E3’s 2022 TDV report for details (Energy + Environmental Economics, 2020)). The 30-year residential NPV factor is \$0.173/kTDV for the 2022 Energy Code.

### Equation 4

$$TDV \text{ PV of lifetime benefit} = TDV \text{ energy savings} * NPV \text{ factor}$$

## 2.1.3 Utility Rates

In coordination with the CA IOU rate team (comprised of representatives from PG&E, SCE, SDG&E, SMUD, and CPAU), the Reach Codes Team determined appropriate utility rates for each climate zone in order to calculate utility costs and determine On-Bill cost-effectiveness for the proposed measures and packages. The utility tariffs, summarized in Table 1, were determined based on the most prevalent active rate in each territory. Utility rates were applied to each climate zone based on the predominant IOU serving the population of each zone, with a few climate zones evaluated multiple times under different utility scenarios. Climate Zones 10 and 14 were evaluated with both

SCE for electricity and Southern California Gas Company (SoCalGas) for gas and SDG&E tariffs for both electricity and gas since each utility has customers within these climate zones. Climate Zone 5 is evaluated under both PG&E and SoCalGas natural gas rates. Two POU or municipal utility rates were also evaluated: SMUD in Climate Zone 12 and CPAU in Climate Zone 4.

For the IOUs in-unit gas was evaluated under the G1 rate and central gas for water heating was evaluated under the relevant master metered gas tariff, GM. Electricity use for central water heating was evaluated using the residential TOU rates. The water heating utility bill was calculated separately from the in-unit electricity bill. Photovoltaic (PV) and battery energy storage benefits were applied according to virtual net energy metering (VNEM) rules.<sup>2</sup> 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 same approach was applied for CPAU and SMUD using the rates described in Table 1.

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.

First-year utility costs were calculated using hourly electricity and natural gas output from CBECC and applying the utility tariffs summarized in Table 1. Annual costs were also estimated for customers eligible for the CARE tariff discounts on both electricity and natural gas bills. The CARE tariff was only applied to the in-unit apartment meters. Appendix 7.2 Utility Rate Schedules includes details of each utility tariff.

For cases with PV generation, the approved NEM 2.0 tariffs were applied along with minimum daily use billing and mandatory non-bypassable charges. In December the California Public Utilities Commission (CPUC) issued a decision adopting a net billing tariff (NBT) as a successor to NEM 2.0 that will go into effect April of 2023<sup>3</sup> Given the recent timing of this decision there was not time to incorporate these changes into this analysis. The Reach Codes Team conducted a limited sensitivity analysis on the impacts of NBT relative to NEM 2.0 on utility bills. It was found that utility costs will increase for all homes with PV systems; however, the increase was less for an all-electric building compared to a mixed fuel building with a similarly sized PV system. As a result of better onsite utilization of PV generation and thus fewer exports to the grid, the Reach Codes Team expects the cost-effectiveness for the electrification scenarios for the all-electric home evaluated in this report to improve under NBT. Conversely, cost-effectiveness of increasing PV capacity is expected to be reduced under NBT.

<sup>2</sup> PG&E: [https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC\\_SCHEDS\\_NEM2V.pdf](https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_NEM2V.pdf)  
 SDG&E: [https://tariff.sdge.com/tm2/pdf/tariffs/ELEC\\_ELEC-SCHEDS\\_NEM-V-ST.pdf](https://tariff.sdge.com/tm2/pdf/tariffs/ELEC_ELEC-SCHEDS_NEM-V-ST.pdf)  
 SCE:

<https://edisonintl.sharepoint.com/teams/Public/TM2/Shared%20Documents/Forms/AllItems.aspx?ga=1&id=%2Fteams%2FPublic%2FTM2%2FShared%20Documents%2FPublic%2FRegulatory%2FTariff%2DSCE%20Tariff%20Books%2FElectric%2FSchedules%2FOther%20Rates%2FELECTRIC%5FSCHEDULES%5FNEM%2DV%2DST%2Epdf&parent=%2Fteams%2FPublic%2FTM2%2FShared%20Documents%2FPublic%2FRegulatory%2FTariff%2DSCE%20Tariff%20Books%2FElectric%2FSchedules%2FOther%20Rates>

<sup>3</sup> <https://www.cpuc.ca.gov/nemrevisit>

**Table 1. Utility Tariffs Used Based on Climate Zone**

Climate Zones	Electric / Gas Utility	Electricity	Natural Gas
<b>IOUs</b>			
1-5,11-13,16	PG&E / PG&E	E-TOU Option C	G1 (in-unit) & GM (central water heating) <sup>1</sup>
5	PG&E / SoCalGas	E-TOU Option C	GM
6, 8-10, 14, 15	SCE / SoCalGas	TOU-D Option 4-9	GM
7, 10, 14	SDG&E / SDG&E	TOU-DR-1	GM
<b>POUs</b>			
4	CPAU / CPAU	E-1 (in-unit) & E-2 (central water heating)	G-2
12	SMUD / PG&E	R-TOD, RT02 (in-unit) & RSMM (central water heating)	GM

<sup>1</sup>G1 rate applied to gas use within the apartment units, which only occurs in Climate Zones 1 and 16, see Section 3 for details. GM rate applied to gas use for central water heating.

Utility rates are assumed to escalate over time according to the 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. See Appendix 7.2.7 Fuel Escalation Assumptions for details.

## 2.2 2022 T24 Compliance Metrics

2022 Title 24, Part 6 Section 170.1 defines the energy budget of the building based on source energy and TDV energy for space-conditioning, indoor lighting, mechanical ventilation, PV and battery storage systems, service water heating and covered process loads. In 2022, the Energy Commission introduced the new compliance metric of source energy, which differs by fuel source (as does TDV) and is a reasonable proxy for greenhouse gas emissions. Additionally, for multifamily buildings four habitable stories and higher prescriptive requirements for PV and battery systems were also introduced. This led to the need to differentiate an efficiency compliance metric, which ensured that the building met minimum efficiency standards, and a total energy compliance metric which incorporated the PV and battery standards. In order to be compliant with the building code a building needs to comply with all three compliance metrics described below:

- **Efficiency TDV.** Efficiency TDV accounts for all regulated end-uses but does not include the impacts of PV and battery storage.
- **Total TDV.** Total TDV includes regulated end-uses and accounts for PV and battery storage contributions.
- **Source Energy.** Source energy is based on fuel used for power generation and distribution.

## 2.3 Greenhouse Gas Emissions

The analysis reports the greenhouse gas (GHG) emission estimates based on assumptions within CBECC. There are 8,760 hourly multipliers accounting for time dependent energy use and carbon based on source emissions, including renewable portfolio standard projections. There are two series of multipliers—one for Northern California climate zones, and another for Southern California climate zones.<sup>4</sup> GHG emissions are reported as average annual metric tons of CO<sub>2</sub> equivalent over the 30-year building lifetime.

<sup>4</sup> CBECC multipliers are the same for CZs 1-5 and 11-13 (Northern California), while there is another set of multipliers for CZs 6-10 and 14-16 (Southern California).



### 3 Prototypes, Measure Packages, and Costs

This section describes the prototypes, measures, costs, and the scope of analysis drawing from previous reach code research where appropriate.

#### 3.1 Prototype Characteristics

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 2. Prototype Characteristics**

Characteristic	3-Story Loaded Corridor	5-Story Mixed Use
Conditioned Floor Area	39,372 ft <sup>2</sup>	113,100 ft <sup>2</sup> total: 33,660 ft <sup>2</sup> nonresidential 79,440 ft <sup>2</sup> 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

The methodology used in the analyses for each of the prototypical building types begins with a design that precisely meets the minimum 2022 prescriptive requirements.<sup>5</sup> Table 170.2-A and 170.2-B in the 2022 Standards (California Energy Commission, 2022a) list the prescriptive measures that determine the baseline design in each climate zone. Other features are designed to meet, but not exceed, the minimum requirements and are consistent with the Standard Design in the ACM Reference Manual (California Energy Commission, 2022c). The analysis also assumed electric resistance cooking in the apartment units to reflect current market data. The 3-story building prototype includes a central laundry facility, and the 5-story assumes laundry in the units. Laundry equipment was assumed to be electric in all cases; electrification of laundry equipment was not addressed in this study. The nonresidential 2022 reach code analysis (Statewide Reach Codes Team, 2022b) did consider electrification of central laundry facilities within the small hotel prototype.

Table 3 describes characteristics as they were applied to the base case energy model in this analysis. In a shift from the 2019 Standards, the 2022 Standards define a prescriptive fuel source for space heating establishing an electric

<sup>5</sup>Due to planned software updates to how the prescriptive requirements are applied in the Standard Design and challenges for certain space types with sizing heating and cooling equipment the same in the Proposed Design as in the Standards, the results compliance margins for the base case models were not exactly zero percent..



heat pump baseline in all climate zones except 16 for multifamily buildings three habitable stories and fewer and 1 and 16 for multifamily buildings four habitable stories and greater.

**Table 3. Base Case Characteristics of the Prototypes**

Characteristic	3-Story Loaded Corridor	5-story Mixed Use
Space Heating/Cooling <sup>1</sup>	Individual split systems with ducts in conditioned space CZ 1-15: Heat pump CZ 16: Natural gas furnace with air conditioner	Individual split systems with ducts in conditioned space CZ2-15: Heat pump CZ1, 16: Dual-fuel heat pump with natural gas backup
Ventilation	Individual balanced fans, continuously operating	Individual balanced fans, continuously operating
Water Heater <sup>1</sup>	Natural gas central boiler with solar thermal sized to meet the prescriptive requirements by climate zone.	Natural gas central boiler with solar thermal sized to meet the prescriptive requirements by climate zone.
Hot Water Distribution	Central recirculation	Central recirculation
Cooking	Electric	Electric
Clothes Drying	Electric (central)	Electric (in-unit)
PV System	Sized according to the prescriptive requirements in Equation 170.2-C of the 2022 Title 24 Standards. Size differs by climate zone ranging from 1.60 kW to 2.90 kW per dwelling unit, see Table 4.	Sized according to the prescriptive requirements in Equation 170.2-D of the 2022 Title 24 Standards. Size differs by climate zone ranging from 2.26 kW to 3.34 kW per dwelling unit, see Table 4.
Battery System	None	None

<sup>1</sup> Equipment efficiencies are equal to minimum federal appliance efficiency standards.

Table 4 summarizes the PV capacities for the base case packages.

**Table 4. Base Package PV Capacities (kW-DC)**

Climate Zone	Base Package	
	3-Story	5-Story
CZ01	2.00	2.26
CZ02	1.79	2.68
CZ03	1.70	2.26
CZ04	1.75	2.68
CZ05	1.60	2.26
CZ06	1.77	2.68
CZ07	1.67	2.68
CZ08	1.91	2.68
CZ09	1.92	2.68
CZ10	1.98	2.68
CZ11	2.21	2.68
CZ12	1.96	2.68
CZ13	2.33	2.68
CZ14	1.94	2.68
CZ15	2.90	3.34
CZ16	1.76	2.26

## 3.2 Measure Definitions and Costs

Measures evaluated in this study fall into two categories: those associated with general efficiency, onsite generation, and demand flexibility and those associated with building electrification. The Reach Codes Team selected measures based on cost-effectiveness as well as decades of experience with residential architects, builders, and engineers along with general knowledge of the relative consumer acceptance of many measures. This analysis focused on measures that impacted the residential dwelling units only.

The following sections describe the details and incremental cost assumptions for each of the measures. Incremental costs represent the equipment, installation, replacement, and maintenance costs of the proposed measures relative to the base case. Replacement costs are applied for roofs, mechanical equipment, PV inverters and battery systems over the 30-year evaluation period. Incremental maintenance costs are estimated for PV systems, but not any other measures. Costs were estimated to reflect costs to the building owner. All costs are provided as present value in 2023 (2023 PV\$).

The Reach Codes Team obtained measure costs from distributors, contractors, literature review, and online sources such as Home Depot and RS Means. Contractor markups are incorporated. These are the Reach Codes Team best estimate of average costs statewide. Regional variation in costs is not accounted for, although it's recognized that local costs may differ. Cost increases due to recent high inflation rates and supply chain delays are not included.

### 3.2.1 Efficiency, Solar PV, and Batteries

The following are descriptions of each of the efficiency, PV, and battery measures evaluated under this analysis and applied in at least one of the packages presented in this report. Table 5 summarizes the incremental cost assumptions for each of these measures. These measures were evaluated for all climate zones but were ultimately adopted in a subset of climate zones based on cost-effectiveness outcomes.

**Lower U-Factor Fenestration:** Reduce window U-factor to 0.24. The prescriptive U-factor is 0.30 in all climate zones except Climate Zones 7 and 8 where it is 0.34. This measure is included in Climate Zone 16 only.

**Cool Roof:** Install a roofing product that's rated by the Cool Roof Rating Council to have an aged solar reflectance (ASR) equal to or greater than 0.70. Low-sloped roofs were assumed in all cases. The 2022 Title 24 specifies a prescriptive ASR of 0.63 for Climate Zones 9 through 11 and 13 through 15. This measure is included in Climate Zones 9 through 15.

**Low Pressure Drop Ducts:** Upgrade the duct distribution system to reduce external static pressure and meet a maximum fan efficacy of 0.35 Watts per cfm. This may involve upsizing ductwork, reducing the total effective length of ducts, and/or selecting low pressure drop components such as filters. Fan watt draw must be verified by a HERS rater according to the procedures outlined in the 2022 Reference Appendices RA3.3 (California Energy Commission, 2022b). This measure is included in Climate Zones 1 and 10 through 16.

**Verified Low Leakage Ducts in Conditioned Space:** Seal the ducts to achieve a measured leakage no greater than 25 cfm leakage to outside. This may be verified using a guarded blower door test to isolate leakage to outside. Alternatively, this can also be satisfied by demonstrating that total leakage is not greater than 25 cfm. Ducts are assumed to already be located in conditioned space in the baseline. This measure is included in all climate zones.

**Solar PV:** Installation of on-site PV is required in the 2022 residential code unless an exception is met. The PV sizing methodology in each package was developed to offset annual building electricity use and avoid oversizing which would violate net energy metering (NEM) rules.<sup>6</sup> In all cases, PV is evaluated in CBECC according to the California Flexible Installation (CFI) assumptions. This measure is included in all climate zones.

**Battery Energy Storage:** A battery system was evaluated in CBECC-Res with control type set to "Time-of-Use" and with default efficiencies of 95% for both charging and discharging. This control option assumes the battery system will

<sup>6</sup> NEM rules apply to the IOU territories only.

charge or discharge based on a utility tariff time-of use signal. To qualify, the battery system must meet the requirements outlined in the 2022 Reference Appendices JA12.2.3.2 (California Energy Commission, 2022b). This measure is included in all climate zones but only for the 3-story prototype. A 100kWh battery was applied following the battery sizing requirements for multifamily buildings more than three habitable stories per Equation 170.2-E of the 2022 Energy Code.

**Table 5. Incremental Cost Assumptions**

Measure	Performance Level	Incremental Cost per Dwelling Unit (2023 PV\$)		Source & Notes
		3-Story	5-Story	
<b>Non-Preempted Measures</b>				
Window U-factor	0.24 vs 0.30	\$536	\$489	\$4.23/ft <sup>2</sup> of window area based on analysis conducted for the 2019 and 2022 Title 24 cycles (Statewide CASE Team, 2018).
Low-Sloped Cool Roof Aged Solar Reflectance	0.63 vs 0.10	\$314	\$222	\$0.525/ft <sup>2</sup> of roof area first incremental cost based on the 2022 Residential Additions and Alterations CASE Report (Statewide CASE Team, 2020b). Total costs assume present value of replacement at year 15.
	0.70 vs 0.63	\$24	\$17	\$0.04/ft <sup>2</sup> of roof area first incremental cost based on the 2022 Nonresidential High Performance Envelope CASE Report (Statewide CASE Team, 2020a). Costs assume a blended average across roofing product types. Total costs assume present value of replacement at year 15.
Low Pressure Drop Ducts	0.35 vs 0.45 W/cfm	\$44	\$44	Costs assume half-hour labor per multifamily dwelling unit. Labor rate of \$88 per hour is from 2022 RS Means for sheet metal workers and includes a weighted average City Cost Index for labor for California.
Verified Low Leakage Ducts in Conditioned Space	≤25 cfm leakage to outside	\$132	\$132	Costs assume half-hour labor per multifamily dwelling unit and a \$100 HERS Rater fee. Labor rate of \$88 per hour is from 2022 RS Means for sheet metal workers and includes a weighted average City Cost Index for labor for California. Ducts are already assumed to be located in conditioned space and the incremental costs reflect additional sealing and testing only.
<b>PV + Battery</b>				
PV System	First Cost	\$1.47/W	\$1.47/W	First costs from LBNL’s Tracking the Sun 2022 costs (Barbose, Darghouth, O’Shaughnessy, & Forrester, 2022) and represent median costs in California in 2021 of \$2.10/WDC for nonresidential greater than 100kWDC systems. The first cost was reduced by the solar energy Investment Tax Credit (ITC) of 30%. <sup>1</sup> Costs are presented as the average of 2023, 2024, and 2025. Inverter replacement cost of \$0.14/WDC present value includes replacements at year 11 at \$0.15/WDC (nominal) and at year 21 at \$0.12/WDC (nominal) per the 2019 PV CASE Report (California Energy Commission, 2017). System maintenance costs of \$0.31/WDC present value assume \$0.02/WDC (nominal) annually per the 2019 PV CASE Report (California Energy Commission, 2017).
	Inverter replacement	\$0.14/W	\$0.14/W	
	Maintenance	\$0.31/W	\$0.31/W	

Measure	Performance Level	Incremental Cost per Dwelling Unit (2023 PV\$)		Source & Notes
		3-Story	5-Story	
Battery	First cost	\$700/kWh	n/a	First cost of \$1,000/kWh from LBNL's Tracking the Sun 2022 costs (Barbose, Darghouth, O'Shaughnessy, & Forrester, 2022) for residential systems > 30kWh. The report derived costs from California's Self-Generation Incentive Program (SGIP) residential participant cost data. First cost is reduced by the solar energy ITC of 30%. <sup>1</sup> No SGIP incentives are included. Costs are assumed to remain consistent at \$1,000/kWh through 2025 and then reduced by 7% annually based on SDG&E's Behind-the-Meter Battery Market Study (E-Source companies, 2020) over a 10 year period. Replacement is assumed at years 10 and 20. At year 10 the replacement cost is based on the average of expected 2033, 2034, and 2035 costs after applying the ITC for a future value cost of \$435. Replacement cost at year 20 is based on a future value cost of \$484 and does not include any ITC reduction.
	Replacement cost	\$564/kWh	n/a	

<sup>1</sup>As part of the Inflation Reduction Act in August 2022 the Section 25D Investment Tax Credit was extended and raised to 30% through 2032 with a step-down to 26% in 2033 and 22% in 2034. It's assumed that the ITC is not renewed and is 0% starting in 2035. <https://www.irs.gov/pub/taxpros/fs-2022-40.pdf>.

### 3.2.2 All-Electric

This analysis compared a code compliant mixed fuel prototype, which uses natural gas for water heating only in most climate zones, with a code compliant all-electric prototype. In these cases, the relative costs between natural gas and electric appliances and natural gas infrastructure and the associated infrastructure costs for not providing natural gas to the building were included.

To estimate costs the Reach Codes Team leveraged costs from the 2022 Multifamily All-Electric CASE Report (Statewide CASE Team, 2020c) and the 2019 reach code multifamily cost-effectiveness studies (Statewide Reach Codes Team, 2020), (Statewide Reach Codes Team, 2021)), and online equipment research. Present value replacement costs are included in the total lifetime incremental costs.

#### 3.2.2.1 Water Heating

Federal regulations establish minimum efficiency requirements for heat pump water heaters with rated storage volume less than 120 gallons. While some heat pump water heaters falling into this regulated category can be used in a central water heater design, they are not required and therefore this measure does not trigger federal preemption and heat pump equipment of any efficiency level may be used for this analysis to justify the basis of a reach code.

For the central heat pump water heating system in the 3-story prototype the system design was based on the 2022 All-Electric Multifamily CASE Report (Statewide CASE Team, 2020c) and used CO<sub>2</sub> refrigerant based heat pump water heaters (four Sanden GS3-45HPA-US units), 525 gallons of storage, and a 250 gallon electric resistance swing tank. The 2022 CASE work based the 5-story system design on Colmac R-134a refrigerant heat pump water heaters. While this is an acceptable design, R-134a or R-410a refrigerant heat pump water heaters were found to be less cost-effective for the prototypes evaluated in this analysis due to higher incremental costs and lower overall performance relative to CO<sub>2</sub> refrigerant products. As such, the Reach Codes Team evaluated a CO<sub>2</sub> refrigerant system for the 5-story prototype for this analysis. As part of the 2025 Energy Code update cycle, designs for both multifamily prototypes are being reexamined using CO<sub>2</sub> refrigerant heat pump water heaters. While full design and cost information was not yet available for this analysis, preliminary design data was used to inform sizing of a Sanden system for this prototype. The system used 10 heat pump water heaters (Sanden GS3-45HPA-US units), 800 gallons of storage, and a 200 gallon electric resistance swing tank.

Table 6 reports costs for the central heat pump water heating systems relative to a gas boiler system with solar thermal that meets the prescriptive requirements of 20% solar fraction in Climate Zones 1 through 9 and 35% solar fraction in Climate Zones 10 through 16. Costs include equipment and labor, gas piping within the building for the boiler system, and additional electrical service necessary for the heat pump system. Replacement costs are based on an effective useful life of 15 years for the water heaters and tanks, and 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. Additional details on cost assumptions are presented in Appendix 7.3 Cost Details.

**Table 6. Heat Pump Water Heater Incremental System Costs (Present Value (2023\$))**

Item		3-Story		5-Story		Source & Notes
		Central Gas Boiler	Central Heat Pump	Central Gas Boiler	Central Heat Pump	
First Cost	CZs 1-9	\$173,772	\$211,531	\$279,163	\$343,920	3-story costs directly from 2022 Multifamily All-Electric CASE Report. 5-story costs estimated based on component costs for the 3-story from the CASE report.
	CZs 10-16	\$182,810		\$300,883		
Replacement Cost	CZs 1-9	\$32,297	\$44,263	\$59,930	\$110,659	
	CZs 10-16	\$36,943		\$69,361		
<b>Total Incremental Cost</b>	<b>CZs 1-9</b>		<b>\$49,725</b>		<b>\$115,486</b>	
	<b>CZs 10-16</b>	n/a	<b>\$36,041</b>	n/a	<b>\$84,335</b>	
<b>Incremental Cost per Dwelling Unit</b>	<b>CZs 1-9</b>		<b>\$1,381</b>		<b>\$1,312</b>	
	<b>CZs 10-16</b>		<b>\$1,001</b>		<b>\$958</b>	

**3.2.2.2 Space Heating**

Table 7 presents the costs for heat pump space heater conversion from gas equipment. In most climate zones the baseline per the 2022 Energy Code is a heat pump space heater, so these costs are only applied in a couple of instances. For the 3-story prototype the baseline in Climate Zone 16 is a gas furnace and air conditioner. For the 5-story prototype the baseline in Climate Zones 1 and 16 is a dual fuel heat pump with a gas furnace as backup. Costs include equipment and labor, gas piping within the building for the boiler system, and additional electrical service necessary for the heat pump system. Most of the cost difference between the two systems is attributed to higher labor costs to install the gas system as a result of gas piping and venting. Additional details on cost assumptions are presented in Appendix 7.3 Cost Details.

**Table 7. Heat Pump Space Heater Costs per Dwelling Unit (Present Value (2023\$))**

Item	3-Story		5-Story		Source & Notes
	Furnace + Split AC	Heat Pump	Furnace + Split HP	Heat Pump	
First Cost	\$20,667	\$16,776	\$21,245	\$16,597	Costs largely based on the 2022 Multifamily All-Electric CASE Report with some updates to reflect online equipment cost research and labor cost alignments.
Replacement Cost	\$8,059	\$7,326	\$9,052	\$7,326	
Residual Value	(\$1,591)	\$0	\$0	\$0	See lifetimes referenced in Table 8. Residual value at the end of the 30-year analysis period was accounted for to represent the remaining life of any equipment.
<b>Total</b>	<b>\$27,135</b>	<b>\$24,102</b>	<b>\$30,296</b>	<b>\$23,924</b>	
<b>Incremental Cost</b>		<b>(\$3,032)</b>		<b>(\$6,373)</b>	

Equipment lifetimes applied in this analysis for the space conditioning measures are summarized in Table 8. The lifetime for the heat pump, furnace, and air conditioner are based on the Database for Energy Efficient Resources (DEER) (California Public Utilities Commission, 2021b). In DEER, heat pump and air conditioner measures are assigned an effective useful lifetime (EUL) of 15 years and a furnace an EUL of 20 years. The heating and cooling system components are typically replaced at the same time when one reaches the end of its life and the other is near



it. Therefore, it is assumed that both the furnace and air conditioner are replaced at the same time at year 17.5, halfway between 15 and 20 years. For HVAC system costing, air-conditioning is included in all cases in both the base case and proposed models.

**Table 8. Lifetime of Water Heating & Space Conditioning Equipment Measures**

Measure	Lifetime
Gas Furnace	17.5
Air Conditioner	17.5
Heat Pump	15
Dual Fuel Heat Pump	15

**3.2.2.3 Natural Gas Infrastructure**

Eliminating natural gas to a building saves costs associated with connecting a service line from the street main to the building, piping distribution within the building, and monthly meter customer charges from the utility. This section focuses on the first item, not connecting gas service to the building. The latter two are captured in the appliance costs and the utility bill analysis. Cost savings for removing natural gas infrastructure to a multifamily building in IOU territory are presented in Table 9 and Table 10. These costs are applied as cost savings for the all-electric case when compared to the mixed fuel baseline.

These costs are project dependent and may be significantly impacted by such factors as utility territory, site characteristics, distance to the nearest natural gas main and main location, joint trenching, whether work is conducted by the utility or a private contractor, and number of dwelling units per development. All gas utilities participating in this study were solicited for cost information.

**Service Extension:** Service extension costs to the building were taken from a PG&E memo dated December 5, 2019 to Energy Commission staff (see Appendix 7.4 PG&E Gas Infrastructure Cost Memo for a copy of the memo). The estimated cost of \$6,750 excludes costs for trenching and assumes nonresidential new construction within a developed area. For the 5-story building the cost is apportioned between the residential and nonresidential spaces in the building based on associated conditioned floor areas where 84 percent is residential. All of the spaces in the 3-story building are residential based.

Today, total costs are reduced to account for deductions per the Utility Gas Main Extensions rules.<sup>7</sup> These rules categorize distribution line extensions as “refundable” costs, which are offset or subsidized by all other ratepayers. The CPUC issued a Decision in September 2022 that eliminates the subsidies effective July 1, 2023 (California Public Utilities Commission, 2022). Since most of the development that will occur during the three-year 2022 code cycle (2023-2025) will not be subject to these deduction allowances they are not included in this analysis.

**Meter:** Cost per meter provided by PG&E of \$3,600 for a commercial meter to serve the central water heating and \$600 per multifamily dwelling unit. The \$600 dwelling unit meter is only applied in Climate Zone 16 for the 3-story prototype and Climate Zones 1 and 16 for the 5-story prototypes where gas is used either for primary or backup space heating. Two scenarios are presented in the tables. One is the case with electric space heating, no in-unit gas and the only residential gas use is to serve the central water heating system. The other case represents the scenario where there is in-unit gas to service space heating.

<sup>7</sup> PG&E Rule 15: [https://www.pge.com/tariffs/assets/pdf/tariffbook/GAS\\_RULES\\_15.pdf](https://www.pge.com/tariffs/assets/pdf/tariffbook/GAS_RULES_15.pdf).  
 SoCalGas Rule 20: <https://www.socalgas.com/regulatory/tariffs/tm2/pdf/20.pdf>.  
 SDG&E Rule 15: [https://tariff.sdge.com/tm2/pdf/GAS\\_GAS-RULES\\_GRULE15.pdf](https://tariff.sdge.com/tm2/pdf/GAS_GAS-RULES_GRULE15.pdf).

**Natural Gas Plan Review:** Total costs are based on TRC’s 2019 reach code analysis for Palo Alto (TRC, 2018 ). The cost for the 5-story prototype is apportioned between the residential and nonresidential spaces in the building in the same way as was done for the service extension costs.

**Table 9. IOU Natural Gas Infrastructure Cost Savings for All-Electric Building**

Item		3-Story	5-Story
Service Extension		\$6,750	\$5,695
Meter	No In-Unit Gas (Gas DHW only)	\$3,600	\$3,600
	In-Unit Gas	\$25,200	\$56,400
Plan Review		\$2,316	\$1,954

**Table 10. Multifamily IOU Total Natural Gas Infrastructure Costs**

Prototype	Scenario	Total Building	Per Dwelling Unit
3-Story	No In-Unit Gas	\$12,666	\$352
	In-Unit Gas	\$34,266	\$952
5-Story	No In-Unit Gas	\$11,248	\$128
	In-Unit Gas	\$64,048	\$728

CPAU provides gas service to its customers and therefore separate costs were evaluated based on CPAU gas service connection fees.<sup>8</sup> Table 11 presents the breakdown of gas infrastructure costs used in this analysis for CPAU. The same approach to apportioning the total building costs to the residential spaces as described in the IOU section was applied here for the service extension and plan review costs for the 5-story prototype. Meter costs were based on \$1,772 for an 800 cubic foot per hour commercial meter for the central water heating system.

**Table 11. Multifamily CPAU Total Natural Gas Infrastructure Costs**

Item	3-Story	5-Story
Service Extension	\$5,892	\$4,971
Meter	\$1,772	\$1,772
Plan Review	\$2,557	\$2,157

### 3.3 Measure Packages

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 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 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.

<sup>8</sup> CPAU Schedule G-5 effective 09-01-2019: <https://www.cityofpaloalto.org/files/assets/public/utilities/utilities-engineering/general-specifications/gas-service-connection-fees.pdf>

4. Mixed Fuel Efficiency + PV + Battery: Using the Efficiency Package as a starting point, PV capacity was added to offset 100 percent of the estimated annual electricity use. A battery system was also added. This package only applies to the 3-story prototype. The 5-story prototype includes a battery system in the baseline per the 2022 prescriptive requirements.
5. Mixed Fuel Efficiency + PV: Using the Efficiency Package as a starting point, PV capacity was added to offset 100 percent of the estimated annual electricity use. This package only applies to the 5-story prototype.

## 4 Results

Cost-effectiveness results are presented per prototype and measure packages described in Section 3.3. 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.

### 4.1 All-Electric Prescriptive Code

Table 12 and Table 13 shows results for the multifamily all-electric prescriptive code case compared to the 2022 baseline. For both prototypes this scenario is cost-effective based on TDV in all climate zones. This scenario is only On-Bill cost-effective in a few climate zones. The 3-story all-electric case is cost-effective On-Bill in Climate Zones 1 through 3, 4 in CPAU territory, 12 in SMUD territory, and 16. The 5-story all-electric case is cost-effective On-Bill in Climate Zones 1, 4, 12 in SMUD territory, and 16.

In most cases there is a small net increase in utility cost in the first year.

There is an incremental cost for the central heat pump water heater ranging from \$361 to \$697 per dwelling unit.

The all-electric packages applied to the 3-story prototype in Climate Zone 16 and the 5-story prototype in Climate Zones 1 and 16 incorporate both gas to electric water heating and gas to electric space heating measures. In these cases, there are significant cost savings due to the avoided first costs of installing a gas furnace as compared to a heat pump. As a result, these cases are On-Bill cost-effective.

These results reflect a CO<sub>2</sub> refrigerant based central heat pump water heating system. The 5-story prototype was also evaluated with a R-134a refrigerant based central heat pump water heater and these results are shown in Appendix 7.5 Central Heat Pump Water Heater Comparison.

Table 12. 3-Story Cost-Effectiveness Results per Dwelling Unit: All-Electric Prescriptive Code

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	26%	15%	-904	135	(\$19)	\$1,676	\$97	\$429	3.9	\$1,247	>1	\$4,158
CZ02	PGE	20%	11%	-801	115	(\$30)	\$1,061	\$697	\$1,029	1.0	\$32	9.9	\$2,998
CZ03	PGE	21%	10%	-789	115	(\$26)	\$1,148	\$697	\$1,029	1.1	\$119	9.9	\$2,990
CZ04	PGE	18%	9%	-759	109	(\$31)	\$922	\$697	\$1,029	0.9	(\$108)	9.2	\$2,767
CZ04	CPAU	18%	9%	-759	109	\$233	\$8,191	\$765	\$1,097	7.5	\$7,094	7.7	\$2,700
CZ05	PGE	23%	9%	-789	112	(\$30)	\$1,009	\$697	\$1,029	0.98	(\$21)	9.3	\$2,782
CZ05	PGE/SCG	23%	9%	-789	112	(\$79)	(\$515)	\$697	\$1,029	0.0	(\$1,545)	9.3	\$2,782
CZ06	SCE/SCG	18%	7%	-709	100	(\$61)	(\$226)	\$697	\$1,029	0.0	(\$1,255)	8.6	\$2,551
CZ07	SDGE	20%	8%	-704	102	(\$69)	(\$427)	\$697	\$1,029	0.0	(\$1,456)	9.1	\$2,712
CZ08	SCE/SCG	13%	6%	-689	96	(\$61)	(\$302)	\$697	\$1,029	0.0	(\$1,331)	8.2	\$2,432
CZ09	SCE	13%	5%	-698	96	(\$64)	(\$351)	\$697	\$1,029	0.0	(\$1,380)	8.0	\$2,363
CZ10	SCE/SCG	14%	7%	-701	83	(\$88)	(\$1,109)	\$446	\$649	0.0	(\$1,758)	>1	\$1,959
CZ10	SDGE	14%	7%	-701	83	(\$112)	(\$1,803)	\$446	\$649	0.0	(\$2,452)	>1	\$1,959
CZ11	PGE	14%	10%	-740	91	(\$64)	(\$177)	\$446	\$649	0.0	(\$826)	>1	\$2,212
CZ12	PGE	17%	11%	-755	94	(\$62)	(\$70)	\$446	\$649	0.0	(\$719)	>1	\$2,297
CZ12	SMUD/PGE	17%	11%	-755	94	\$68	\$2,942	\$446	\$649	4.5	\$2,293	>1	\$2,297
CZ13	PGE	13%	9%	-717	86	(\$65)	(\$291)	\$446	\$649	0.0	(\$940)	>1	\$2,050
CZ14	SCE/SCG	13%	7%	-748	83	(\$102)	(\$1,413)	\$446	\$649	0.0	(\$2,063)	>1	\$1,759
CZ14	SDGE	13%	7%	-748	83	(\$128)	(\$2,191)	\$446	\$649	0.0	(\$2,841)	>1	\$1,759
CZ15	SCE/SCG	5%	2%	-607	64	(\$89)	(\$1,403)	\$446	\$649	0.0	(\$2,053)	>1	\$1,305
CZ16	PG&E	24%	29%	-1,928	185	(\$178)	(\$1,066)	(\$4,045)	(\$2,983)	2.8	\$1,917	>1	\$4,352

**Table 13. 5-Story Cost-Effectiveness Results per Dwelling Unit: All-Electric Prescriptive Code**

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	14%	9%	-1,146	147	(\$49)	\$1,209	(\$4,639)	(\$5,788)	>1	\$6,998	>1	\$9,816
CZ02	PGE	9%	6%	-888	120	(\$45)	\$809	\$608	\$1,185	0.7	(\$375)	3.0	\$2,270
CZ03	PGE	11%	7%	-874	120	(\$46)	\$778	\$608	\$1,185	0.7	(\$407)	3.1	\$2,421
CZ04	PGE	9%	6%	-824	113	\$18	\$2,130	\$608	\$1,185	1.8	\$945	3.1	\$2,393
CZ04	CPAU	9%	6%	-824	113	\$230	\$8,205	\$635	\$1,211	6.8	\$6,994	3.0	\$2,367
CZ05	PGE	12%	6%	-871	117	(\$47)	\$706	\$608	\$1,185	0.6	(\$479)	2.8	\$2,065
CZ05	PGE/SCG	12%	6%	-871	117	(\$99)	(\$919)	\$608	\$1,185	0.0	(\$2,103)	2.8	\$2,065
CZ06	SCE/SCG	9%	5%	-739	104	(\$10)	\$986	\$608	\$1,185	0.8	(\$199)	2.9	\$2,183
CZ07	SDGE	11%	6%	-735	106	(\$74)	(\$500)	\$608	\$1,185	0.0	(\$1,685)	2.9	\$2,215
CZ08	SCE/SCG	8%	4%	-710	100	(\$79)	(\$644)	\$608	\$1,185	0.0	(\$1,829)	3.0	\$2,259
CZ09	SCE	7%	4%	-725	100	(\$53)	(\$51)	\$608	\$1,185	0.0	(\$1,236)	3.0	\$2,274
CZ10	SCE/SCG	7%	4%	-729	84	(\$111)	(\$1,615)	\$361	\$831	0.0	(\$2,445)	2.7	\$1,374
CZ10	SDGE	7%	4%	-729	84	(\$137)	(\$2,404)	\$361	\$831	0.0	(\$3,234)	2.7	\$1,374
CZ11	PGE	8%	5%	-790	92	(\$86)	(\$663)	\$361	\$831	0.0	(\$1,494)	3.1	\$1,656
CZ12	PGE	9%	6%	-809	96	(\$83)	(\$527)	\$361	\$831	0.0	(\$1,358)	3.0	\$1,620
CZ12	SMUD/PGE	9%	6%	-809	96	\$62	\$2,831	\$361	\$831	3.4	\$2,000	3.0	\$1,620
CZ13	PGE	7%	5%	-754	88	(\$83)	(\$686)	\$361	\$831	0.0	(\$1,517)	3.0	\$1,570
CZ14	SCE/SCG	6%	3%	-803	84	(\$131)	(\$2,085)	\$361	\$831	0.0	(\$2,916)	2.2	\$928
CZ14	SDGE	6%	3%	-803	84	(\$165)	(\$3,106)	\$361	\$831	0.0	(\$3,937)	2.2	\$928
CZ15	SCE/SCG	3%	1%	-602	65	(\$105)	(\$1,775)	\$361	\$831	0.0	(\$2,606)	1.9	\$695
CZ16	PG&E	9%	11%	-1,388	142	(\$127)	(\$675)	(\$4,886)	(\$6,142)	9.1	\$5,467	>1	\$6,704

## 4.2 All-Electric Plus PV

Table 14 and Table 15 present cost-effectiveness results for the all-electric plus PV packages for the 3-story and 5-story prototypes, respectively. All cases are cost-effective both On-Bill and based on TDV.

**Table 14. 3-Story Cost-Effectiveness Results per Dwelling Unit: All-Electric 100% PV**

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	26%	24%	2,127	135	\$782	\$20,242	\$3,638	\$5,034	4.0	\$15,208	3.2	\$9,448
CZ02	PGE	20%	20%	1,835	115	\$653	\$16,910	\$3,294	\$4,406	3.8	\$12,504	3.3	\$8,632
CZ03	PGE	21%	20%	1,711	115	\$614	\$15,998	\$3,076	\$4,123	3.9	\$11,875	3.4	\$8,209
CZ04	PGE	18%	18%	1,558	109	\$559	\$14,587	\$2,841	\$3,818	3.8	\$10,770	3.6	\$8,230
CZ04	CPAU	18%	18%	1,558	109	\$489	\$14,138	\$2,909	\$3,886	3.6	\$10,253	3.6	\$8,162
CZ05	PGE	23%	20%	1,604	112	\$579	\$15,137	\$2,826	\$3,798	4.0	\$11,338	3.6	\$8,026
CZ05	PGE/SCG	23%	20%	1,604	112	\$531	\$13,613	\$2,826	\$3,798	3.6	\$9,814	3.6	\$8,026
CZ06	SCE/SCG	18%	17%	1,207	100	\$378	\$9,795	\$2,364	\$3,197	3.1	\$6,598	3.8	\$7,092
CZ07	SDGE	20%	21%	1,528	102	\$723	\$19,318	\$2,777	\$3,734	5.2	\$15,584	3.5	\$7,623
CZ08	SCE/SCG	13%	17%	1,393	96	\$426	\$10,842	\$2,569	\$3,464	3.1	\$7,378	3.9	\$7,908
CZ09	SCE	13%	15%	1,204	96	\$379	\$9,756	\$2,335	\$3,160	3.1	\$6,596	3.9	\$7,158
CZ10	SCE/SCG	14%	18%	1,381	83	\$404	\$10,130	\$2,237	\$2,978	3.4	\$7,152	4.1	\$7,031
CZ10	SDGE	14%	18%	1,381	83	\$621	\$16,493	\$2,237	\$2,978	5.5	\$13,514	4.1	\$7,031
CZ11	PGE	14%	19%	1,843	91	\$625	\$15,782	\$2,940	\$3,893	4.1	\$11,889	3.4	\$7,748
CZ12	PGE	17%	19%	1,704	94	\$579	\$14,777	\$2,756	\$3,654	4.0	\$11,124	3.6	\$7,607
CZ12	SMUD/PGE	17%	19%	1,704	94	\$399	\$10,615	\$2,756	\$3,654	2.9	\$6,961	3.6	\$7,607
CZ13	PGE	13%	17%	1,572	86	\$544	\$13,822	\$2,567	\$3,408	4.1	\$10,415	3.6	\$7,148
CZ14	SCE/SCG	13%	18%	1,572	83	\$449	\$11,152	\$2,300	\$3,060	3.6	\$8,092	4.2	\$7,668
CZ14	SDGE	13%	18%	1,572	83	\$688	\$18,158	\$2,300	\$3,060	5.9	\$15,098	4.2	\$7,668
CZ15	SCE/SCG	5%	11%	1,163	64	\$330	\$8,164	\$1,966	\$2,626	3.1	\$5,539	3.9	\$5,567
CZ16	PG&E	24%	38%	1,371	185	\$700	\$19,307	(\$1,064)	\$894	21.6	\$18,412	58.9	\$11,596



**Table 15. 5-Story Cost-Effectiveness Results per Dwelling Unit: All-Electric 100% PV**

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	14%	21%	1,437	147	\$629	\$16,919	(\$1,574)	(\$1,803)	>1	\$18,721	>1	\$18,222
CZ02	PGE	9%	14%	428	120	\$262	\$7,918	\$1,930	\$2,904	2.7	\$5,015	4.0	\$8,679
CZ03	PGE	11%	16%	682	120	\$327	\$9,417	\$2,121	\$3,152	3.0	\$6,265	4.0	\$9,285
CZ04	PGE	9%	13%	92	113	\$207	\$6,524	\$1,476	\$2,313	2.8	\$4,211	4.1	\$7,054
CZ04	CPAU	9%	13%	92	113	\$337	\$10,667	\$1,502	\$2,340	4.6	\$8,327	4.0	\$7,027
CZ05	PGE	12%	16%	451	117	\$259	\$7,806	\$1,815	\$2,754	2.8	\$5,052	4.0	\$8,096
CZ05	PGE/SCG	12%	16%	451	117	\$207	\$6,182	\$1,815	\$2,754	2.2	\$3,427	4.0	\$8,096
CZ06	SCE/SCG	9%	12%	-163	104	\$98	\$3,449	\$1,127	\$1,859	1.9	\$1,590	3.8	\$5,035
CZ07	SDGE	11%	15%	74	106	\$192	\$6,131	\$1,387	\$2,198	2.8	\$3,934	3.9	\$6,204
CZ08	SCE/SCG	8%	14%	265	100	\$154	\$4,666	\$1,516	\$2,365	2.0	\$2,301	4.0	\$7,053
CZ09	SCE	7%	12%	60	100	\$122	\$3,930	\$1,307	\$2,093	1.9	\$1,837	3.7	\$5,636
CZ10	SCE/SCG	7%	13%	289	84	\$131	\$3,912	\$1,266	\$2,007	1.9	\$1,905	3.9	\$5,749
CZ10	SDGE	7%	13%	289	84	\$238	\$6,951	\$1,266	\$2,007	3.5	\$4,945	3.9	\$5,749
CZ11	PGE	8%	17%	1,091	92	\$417	\$10,990	\$2,226	\$3,256	3.4	\$7,734	4.2	\$10,472
CZ12	PGE	9%	16%	594	96	\$263	\$7,487	\$1,712	\$2,587	2.9	\$4,901	4.3	\$8,544
CZ12	SMUD/PGE	9%	16%	594	96	\$260	\$7,419	\$1,712	\$2,587	2.9	\$4,889	4.3	\$8,544
CZ13	PGE	7%	17%	1,036	88	\$398	\$10,479	\$2,064	\$3,045	3.4	\$7,434	4.2	\$9,715
CZ14	SCE/SCG	6%	11%	182	84	\$102	\$3,250	\$1,170	\$1,883	1.7	\$1,368	4.0	\$5,515
CZ14	SDGE	6%	11%	182	84	\$194	\$5,858	\$1,170	\$1,883	3.1	\$3,975	4.0	\$5,515
CZ15	SCE/SCG	3%	10%	387	65	\$153	\$4,119	\$1,238	\$1,971	2.1	\$2,148	3.6	\$4,998
CZ16	PG&E	9%	23%	1,007	142	\$501	\$13,864	(\$2,682)	(\$3,275)	>1	\$17,139	>1	\$16,140

### 4.3 Mixed Fuel Efficiency

Table 16 and Table 17 show results for the Mixed Fuel Efficiency packages. The packages are cost-effective based on at least one of the two metrics in Climate Zones 1, 2, 4, and 8 through 16 for the 3-story prototype and in Climate Zones 2, 4, 6, and 8 through 15 for the 5-story prototype. In all cases the NPV values, whether negative or positive, are small. The compliance impacts are also small.

A summary of measures included in each package is provided in Appendix 7.6 Summary of Measures by Package.

**Table 16. 3-Story Cost-Effectiveness Results per Dwelling Unit: Mixed Fuel Efficiency**

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	1%	1%	41	0	\$12	\$273	\$176	\$176	1.6	\$98	1.2	\$38
CZ02	PGE	1%	0%	24	0	\$7	\$162	\$132	\$132	1.2	\$30	1.5	\$62
CZ03	PGE	1%	0%	17	0	\$5	\$111	\$132	\$132	0.8	(\$21)	0.8	(\$27)
CZ04	PGE	1%	0%	21	0	\$6	\$141	\$132	\$132	1.1	\$9	1.3	\$46
CZ04	CPAU	1%	0%	21	0	\$3	\$74	\$132	\$132	0.6	(\$58)	1.3	\$46
CZ05	PGE	1%	0%	19	0	\$5	\$123	\$132	\$132	0.9	(\$9)	0.8	(\$32)
CZ05	PGE/SCG	1%	0%	19	0	\$5	\$123	\$132	\$132	0.9	(\$9)	0.8	(\$32)
CZ06	SCE/SCG	1%	0%	9	0	\$2	\$56	\$132	\$132	0.4	(\$75)	0.7	(\$44)
CZ07	SDGE	0%	0%	7	0	\$3	\$72	\$132	\$132	0.5	(\$60)	0.4	(\$81)
CZ08	SCE/SCG	1%	0%	20	0	\$6	\$140	\$132	\$132	1.1	\$9	1.5	\$59
CZ09	SCE	1%	0%	28	0	\$8	\$192	\$146	\$156	1.2	\$36	1.6	\$88
CZ10	SCE/SCG	3%	1%	65	0	\$20	\$447	\$190	\$199	2.2	\$247	2.4	\$277
CZ10	SDGE	3%	1%	65	0	\$27	\$683	\$190	\$199	3.4	\$484	2.4	\$277
CZ11	PGE	3%	1%	91	0	\$30	\$699	\$190	\$199	3.5	\$499	3.5	\$489
CZ12	PGE	2%	0%	98	0	\$33	\$766	\$381	\$514	1.5	\$252	1.5	\$273
CZ12	SMUD/PGE	2%	0%	98	0	\$17	\$396	\$381	\$514	0.8	(\$118)	1.5	\$273
CZ13	PGE	4%	1%	99	0	\$33	\$765	\$190	\$199	3.8	\$566	3.9	\$574
CZ14	SCE/SCG	3%	1%	88	0	\$26	\$585	\$190	\$199	2.9	\$385	3.1	\$427
CZ14	SDGE	3%	1%	88	0	\$36	\$886	\$190	\$199	4.4	\$686	3.1	\$427
CZ15	SCE/SCG	5%	2%	182	0	\$54	\$1,226	\$190	\$199	6.1	\$1,026	5.8	\$957
CZ16	PG&E	5%	4%	16	12	\$34	\$1,012	\$712	\$712	1.4	\$300	1.3	\$184

Table 17. 5-Story Cost-Effectiveness Results per Dwelling Unit: Mixed Fuel Efficiency

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	0%	0%	5	0	\$2	\$39	\$176	\$176	0.2	(\$137)	0.2	(\$136)
CZ02	PGE	1%	0%	11	0	\$2	\$38	\$132	\$132	0.3	(\$94)	1.9	\$118
CZ03	PGE	0%	0%	7	0	\$2	\$46	\$132	\$132	0.3	(\$86)	0.8	(\$23)
CZ04	PGE	1%	0%	12	0	\$2	\$40	\$132	\$132	0.3	(\$92)	1.9	\$114
CZ04	CPAU	1%	0%	12	0	\$2	\$39	\$132	\$132	0.3	(\$93)	1.9	\$114
CZ05	PGE	0%	0%	6	0	\$1	\$17	\$132	\$132	0.1	(\$114)	0.4	(\$73)
CZ05	PGE/SCG	0%	0%	6	0	\$1	\$17	\$132	\$132	0.1	(\$114)	0.4	(\$73)
CZ06	SCE/SCG	0%	0%	12	0	\$2	\$51	\$132	\$132	0.4	(\$81)	1.4	\$49
CZ07	SDGE	0%	0%	10	0	\$0	\$0	\$132	\$132	0.0	(\$132)	0.9	(\$7)
CZ08	SCE/SCG	1%	0%	24	0	\$8	\$184	\$132	\$132	1.4	\$53	2.2	\$152
CZ09	SCE	1%	0%	28	0	\$4	\$96	\$142	\$149	0.6	(\$52)	2.1	\$163
CZ10	SCE/SCG	2%	1%	66	0	\$21	\$491	\$186	\$192	2.6	\$298	3.2	\$425
CZ10	SDGE	2%	1%	66	0	\$30	\$751	\$186	\$192	3.9	\$558	3.2	\$425
CZ11	PGE	2%	1%	83	0	\$29	\$665	\$186	\$192	3.5	\$473	4.2	\$621
CZ12	PGE	2%	0%	84	0	\$29	\$681	\$321	\$414	1.6	\$267	2.3	\$546
CZ12	SMUD/PGE	2%	0%	84	0	\$16	\$372	\$321	\$414	0.9	(\$42)	2.3	\$546
CZ13	PGE	2%	1%	95	0	\$33	\$765	\$186	\$192	4.0	\$573	4.9	\$742
CZ14	SCE/SCG	2%	1%	75	0	\$11	\$246	\$186	\$192	1.3	\$54	3.9	\$561
CZ14	SDGE	2%	1%	75	0	\$34	\$847	\$186	\$192	4.4	\$654	3.9	\$561
CZ15	SCE/SCG	3%	2%	172	0	\$55	\$1,257	\$186	\$192	6.5	\$1,065	7.3	\$1,212
CZ16	PG&E	2%	2%	40	4	\$23	\$616	\$665	\$665	0.9	(\$49)	0.999	(\$0)

#### 4.4 Mixed Fuel Plus PV (Plus Battery for the 3-Story Prototype)

Table 18 presents the Mixed Fuel Efficiency + PV + Battery package for the 3-story prototype. The battery system is a 100kWh battery. This scenario is cost-effective for all climate zones and under both metrics except for On-Bill in Climate Zone 4 in CPAU territory. Table 19 presents the Mixed Fuel Efficiency + PV package for the 5-story prototype. This package is cost-effective under TDV in all climate zones and cost-effective On-Bill everywhere except in Climate Zones 6 and 7. In the cases where it is not cost-effective, it is very close to being so with small negative NPV. In Climate Zone 6 in the 5-story prototype there is no upgrade to the PV system capacity as the prescriptive PV system already offset all of the estimated electricity use.

Table 18. 3-Story Cost-Effectiveness Results per Dwelling Unit: Mixed Fuel Efficiency + PV + Battery

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	1%	16%	2,068	0	\$543	\$12,588	\$4,603	\$6,917	1.8	\$5,671	1.5	\$3,724
CZ02	PGE	1%	16%	1,757	0	\$462	\$10,718	\$3,881	\$5,990	1.8	\$4,728	1.6	\$3,820
CZ03	PGE	1%	17%	1,624	0	\$423	\$9,797	\$3,700	\$5,754	1.7	\$4,043	1.5	\$3,157
CZ04	PGE	1%	17%	1,476	0	\$383	\$8,878	\$3,518	\$5,518	1.6	\$3,360	1.6	\$3,067
CZ04	CPAU	1%	17%	1,476	0	\$171	\$3,967	\$3,518	\$5,518	0.7	(\$1,551)	1.6	\$3,067
CZ05	PGE	1%	18%	1,520	0	\$393	\$9,107	\$3,503	\$5,498	1.7	\$3,609	1.6	\$3,526
CZ05	PGE/SCG	1%	18%	1,520	0	\$393	\$9,107	\$3,503	\$5,498	1.7	\$3,609	1.6	\$3,526
CZ06	SCE/SCG	1%	18%	1,112	0	\$336	\$7,677	\$3,127	\$5,009	1.5	\$2,668	1.4	\$1,917
CZ07	SDGE	0%	20%	1,431	0	\$550	\$13,713	\$3,498	\$5,493	2.5	\$8,220	1.6	\$3,159
CZ08	SCE/SCG	1%	18%	1,311	0	\$413	\$9,427	\$3,328	\$5,270	1.8	\$4,156	1.4	\$2,277
CZ09	SCE	1%	17%	1,129	0	\$367	\$8,375	\$3,129	\$5,017	1.7	\$3,359	1.4	\$1,937
CZ10	SCE/SCG	3%	19%	1,342	0	\$420	\$9,584	\$3,321	\$5,254	1.8	\$4,331	1.5	\$2,588
CZ10	SDGE	3%	19%	1,342	0	\$533	\$13,303	\$3,321	\$5,254	2.5	\$8,049	1.5	\$2,588
CZ11	PGE	3%	17%	1,833	0	\$500	\$11,587	\$3,914	\$6,025	1.9	\$5,562	1.6	\$3,852
CZ12	PGE	2%	17%	1,701	0	\$442	\$10,239	\$3,926	\$6,105	1.7	\$4,133	1.6	\$3,583
CZ12	SMUD/PGE	2%	17%	1,701	0	\$285	\$6,609	\$3,926	\$6,105	1.1	\$503	1.6	\$3,583
CZ13	PGE	4%	17%	1,568	0	\$431	\$9,983	\$3,594	\$5,609	1.8	\$4,374	1.7	\$3,944
CZ14	SCE/SCG	3%	19%	1,556	0	\$477	\$10,886	\$3,388	\$5,341	2.0	\$5,545	1.6	\$3,434
CZ14	SDGE	3%	19%	1,556	0	\$607	\$15,155	\$3,388	\$5,341	2.8	\$9,815	1.6	\$3,434
CZ15	SCE/SCG	5%	19%	1,241	0	\$421	\$9,616	\$3,136	\$5,013	1.9	\$4,603	1.6	\$3,076
CZ16	PG&E	5%	17%	1,286	12	\$357	\$8,508	\$3,894	\$5,833	1.5	\$2,674	1.6	\$3,219

Table 19. 5-Story Cost-Effectiveness Results per Dwelling Unit: Mixed Fuel Efficiency + PV

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	0%	5%	1,446	0	\$341	\$7,917	\$1,889	\$2,403	3.3	\$5,514	3.0	\$4,757
CZ02	PGE	1%	2%	444	0	\$55	\$1,275	\$567	\$697	1.8	\$578	4.4	\$2,365
CZ03	PGE	0%	4%	693	0	\$119	\$2,766	\$801	\$1,002	2.8	\$1,764	4.4	\$3,423
CZ04	PGE	1%	1%	112	0	\$14	\$324	\$226	\$254	1.3	\$69	3.5	\$632
CZ04	CPAU	1%	1%	112	0	\$13	\$307	\$226	\$254	1.2	\$53	3.5	\$632
CZ05	PGE	0%	3%	464	0	\$56	\$1,310	\$550	\$676	1.9	\$634	4.2	\$2,165
CZ05	PGE/SCG	0%	3%	464	0	\$56	\$1,310	\$550	\$676	1.9	\$634	4.2	\$2,165
CZ06	SCE/SCG	0%	0%	12	0	\$2	\$51	\$132	\$132	0.4	(\$81)	1.4	\$49
CZ07	SDGE	0%	1%	95	0	\$0	\$0	\$212	\$237	0.0	(\$237)	2.8	\$423
CZ08	SCE/SCG	1%	3%	299	0	\$42	\$968	\$388	\$465	2.1	\$504	4.3	\$1,527
CZ09	SCE	1%	1%	99	0	\$12	\$284	\$204	\$230	1.2	\$54	3.0	\$465
CZ10	SCE/SCG	2%	3%	364	0	\$57	\$1,296	\$450	\$536	2.4	\$759	4.2	\$1,720
CZ10	SDGE	2%	3%	364	0	\$103	\$2,566	\$450	\$536	4.8	\$2,030	4.2	\$1,720
CZ11	PGE	2%	7%	1,178	0	\$281	\$6,521	\$1,276	\$1,610	4.1	\$4,911	4.8	\$6,162
CZ12	PGE	2%	4%	683	0	\$120	\$2,791	\$898	\$1,164	2.4	\$1,627	4.2	\$3,716
CZ12	SMUD/PGE	2%	4%	683	0	\$102	\$2,362	\$898	\$1,164	2.0	\$1,198	4.2	\$3,716
CZ13	PGE	2%	7%	1,137	0	\$274	\$6,347	\$1,179	\$1,484	4.3	\$4,863	4.8	\$5,599
CZ14	SCE/SCG	2%	2%	266	0	\$33	\$748	\$342	\$395	1.9	\$353	4.7	\$1,447
CZ14	SDGE	2%	2%	266	0	\$62	\$1,554	\$342	\$395	3.9	\$1,158	4.7	\$1,447
CZ15	SCE/SCG	3%	5%	567	0	\$125	\$2,851	\$535	\$646	4.4	\$2,204	5.6	\$2,994
CZ16	PG&E	2%	6%	1,051	4	\$237	\$5,569	\$1,601	\$1,883	3.0	\$3,686	3.1	\$4,011

### 4.5 CARE Rate Comparison

Table 20 presents a comparison of On-Bill cost-effectiveness results for CARE tariffs relative to standard tariffs for the all-electric prescriptive code case. The CARE rates apply to the apartment meters only and don't impact the central water heating utility costs. Applying the CARE rates lowers both electric and gas utility bills for the consumer and the net impact for an all-electric building in most climate zones is lower overall bills and improved cost-effectiveness relative to the standard tariffs. Although not presented here, the all-electric + PV packages are all still On-Bill cost-effective using the CARE tariffs.

**Table 20. On-Bill IOU Cost-Effectiveness Comparison with CARE Tariffs, Results per Dwelling Unit: All-Electric Prescriptive Code**

Climate Zone	Electric /Gas Utility	3-Story				5-Story			
		Standard		CARE		Standard		CARE	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	3.9	\$1,247	9.5	\$3,637	>1	\$6,998	>1	\$10,045
CZ02	PGE	1.0	\$32	3.1	\$2,139	0.7	(\$375)	2.5	\$1,831
CZ03	PGE	1.1	\$119	3.1	\$2,187	0.7	(\$407)	2.6	\$1,901
CZ04	PGE	0.9	(\$108)	2.8	\$1,884	1.8	\$945	2.9	\$2,218
CZ05	PGE	0.98	(\$21)	3.0	\$2,041	0.6	(\$479)	2.5	\$1,773
CZ05	PGE/SCG	0.0	(\$1,545)	1.5	\$517	0.0	(\$2,103)	1.1	\$148
CZ06	SCE/SCG	0.0	(\$1,255)	0.9	(\$57)	0.8	(\$199)	2.1	\$1,349
CZ07	SDGE	0.0	(\$1,456)	1.8	\$856	0.0	(\$1,685)	1.3	\$343
CZ08	SCE/SCG	0.0	(\$1,331)	0.8	(\$165)	0.0	(\$1,829)	1.2	\$271
CZ09	SCE	0.0	(\$1,380)	0.8	(\$204)	0.0	(\$1,236)	1.6	\$750
CZ10	SCE/SCG	0.0	(\$1,758)	0.1	(\$574)	0.0	(\$2,445)	0.5	(\$447)
CZ10	SDGE	0.0	(\$2,452)	0.8	(\$162)	0.0	(\$3,234)	0.0	(\$1,590)
CZ11	PGE	0.0	(\$826)	2.7	\$1,119	0.0	(\$1,494)	1.7	\$616
CZ12	PGE	0.0	(\$719)	2.9	\$1,263	0.0	(\$1,358)	2.0	\$793
CZ13	PGE	0.0	(\$940)	2.4	\$936	0.0	(\$1,517)	1.6	\$491
CZ14	SCE/SCG	0.0	(\$2,063)	0.0	(\$803)	0.0	(\$2,916)	0.3	(\$613)
CZ14	SDGE	0.0	(\$2,841)	0.0	(\$3,407)	0.0	(\$3,937)	1.1	\$61
CZ15	SCE/SCG	0.0	(\$2,053)	0.0	(\$1,036)	0.0	(\$2,606)	0.0	(\$1,452)
CZ16	PG&E	2.8	\$1,917	>1	\$5,527	9.1	\$5,467	>1	\$8,557

Table 21 presents the comparison for the mixed fuel efficiency and PV packages. Generally, the opposite trend occurs here for the mixed fuel packages where the CARE rate lowers utility cost savings and the benefit-to-cost ratios decline.

**Table 21. On-Bill IOU Cost-Effectiveness Comparison with CARE Tariffs, Results per Dwelling Unit: Mixed Fuel Packages**

Climate Zone	Electric /Gas Utility	3-Story (Efficiency + PV + Battery)				5-Story (Efficiency + PV)			
		Standard		CARE		Standard		CARE	
		B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	1.8	\$5,671	1.2	\$1,113	3.3	\$5,514	2.2	\$2,765
CZ02	PGE	1.8	\$4,728	1.2	\$907	1.8	\$578	1.5	\$337
CZ03	PGE	1.7	\$4,043	1.1	\$579	2.8	\$1,764	2.0	\$1,028
CZ04	PGE	1.6	\$3,360	1.0	\$259	1.3	\$69	0.8	(\$44)
CZ05	PGE	1.7	\$3,609	1.1	\$414	1.9	\$634	1.7	\$442
CZ05	PGE/SCG	1.7	\$3,609	1.1	\$414	1.9	\$634	1.7	\$442
CZ06	SCE/SCG	1.5	\$2,668	0.9	(\$515)	0.4	(\$81)	0.3	(\$92)
CZ07	SDGE	2.5	\$8,220	1.7	\$4,106	0.0	(\$237)	0.0	(\$237)
CZ08	SCE/SCG	1.8	\$4,156	1.1	\$446	2.1	\$504	1.3	\$137
CZ09	SCE	1.7	\$3,359	0.99	(\$26)	1.2	\$54	0.9	(\$28)
CZ10	SCE/SCG	1.8	\$4,331	1.1	\$577	2.4	\$759	1.3	\$180
CZ10	SDGE	2.5	\$8,049	1.8	\$4,180	4.8	\$2,030	0.0	(\$536)
CZ11	PGE	1.9	\$5,562	1.2	\$1,435	4.1	\$4,911	2.7	\$2,744
CZ12	PGE	1.7	\$4,133	1.1	\$517	2.4	\$1,627	1.8	\$905
CZ13	PGE	1.8	\$4,374	1.2	\$883	4.3	\$4,863	2.9	\$2,777
CZ14	SCE/SCG	2.0	\$5,545	1.3	\$1,395	1.9	\$353	1.3	\$136
CZ14	SDGE	2.8	\$9,815	1.4	\$2,292	3.9	\$1,158	0.0	(\$395)
CZ15	SCE/SCG	1.9	\$4,603	1.2	\$887	4.4	\$2,204	1.9	\$586
CZ16	PG&E	1.5	\$2,674	0.97	(\$162)	3.0	\$3,686	2.0	\$1,908

#### 4.6 Greenhouse Gas Reductions

Figure 1 and Figure 2 compare greenhouse gas reductions across all the packages for the multifamily 3-story and 5-story prototypes, respectively. Savings represent average annual savings per dwelling unit over the 30-year lifetime of the analysis. Electrification of gas uses represents the greatest greenhouse gas reductions, followed by PV. Greenhouse gas reductions are greatest for the all-electric + PV package.



Figure 1. 3-Story greenhouse gas reductions (metric tons) per dwelling unit

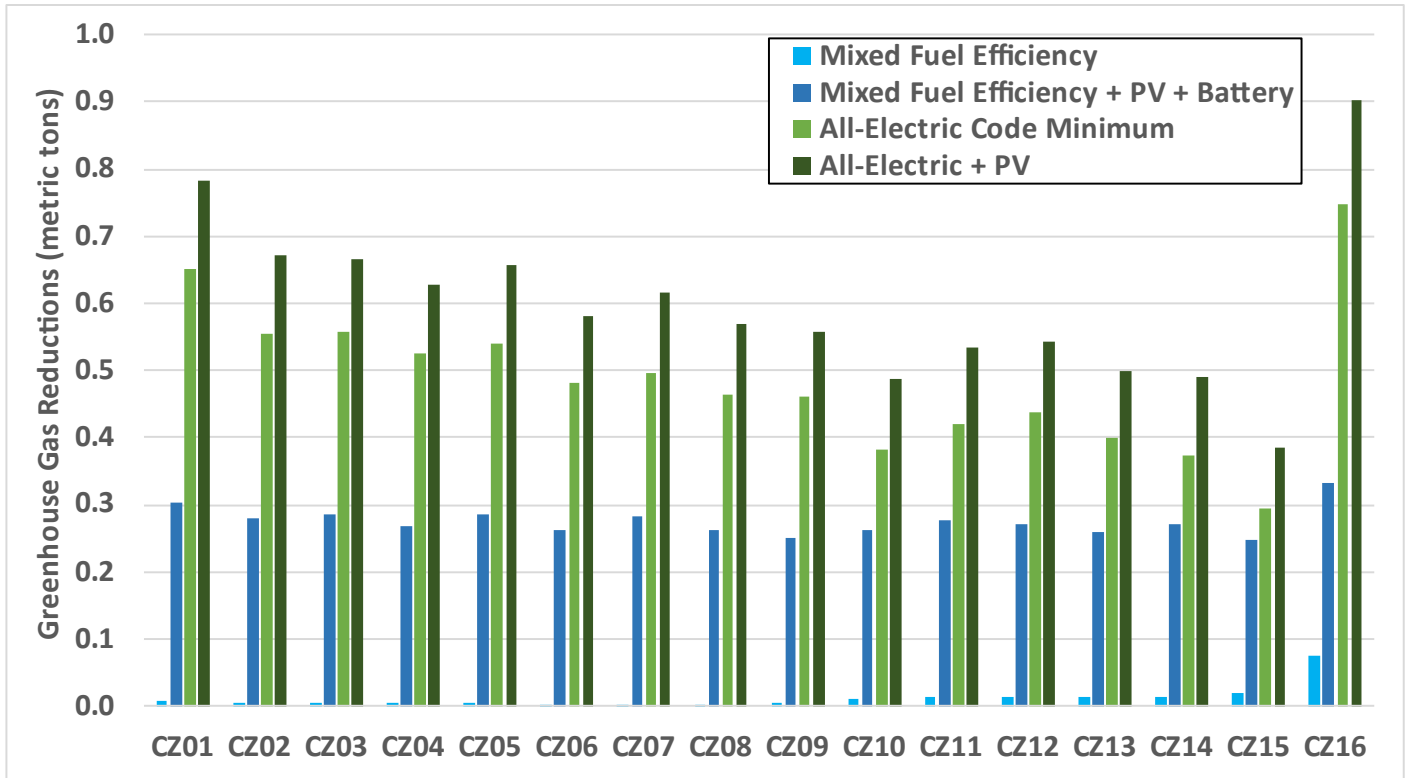
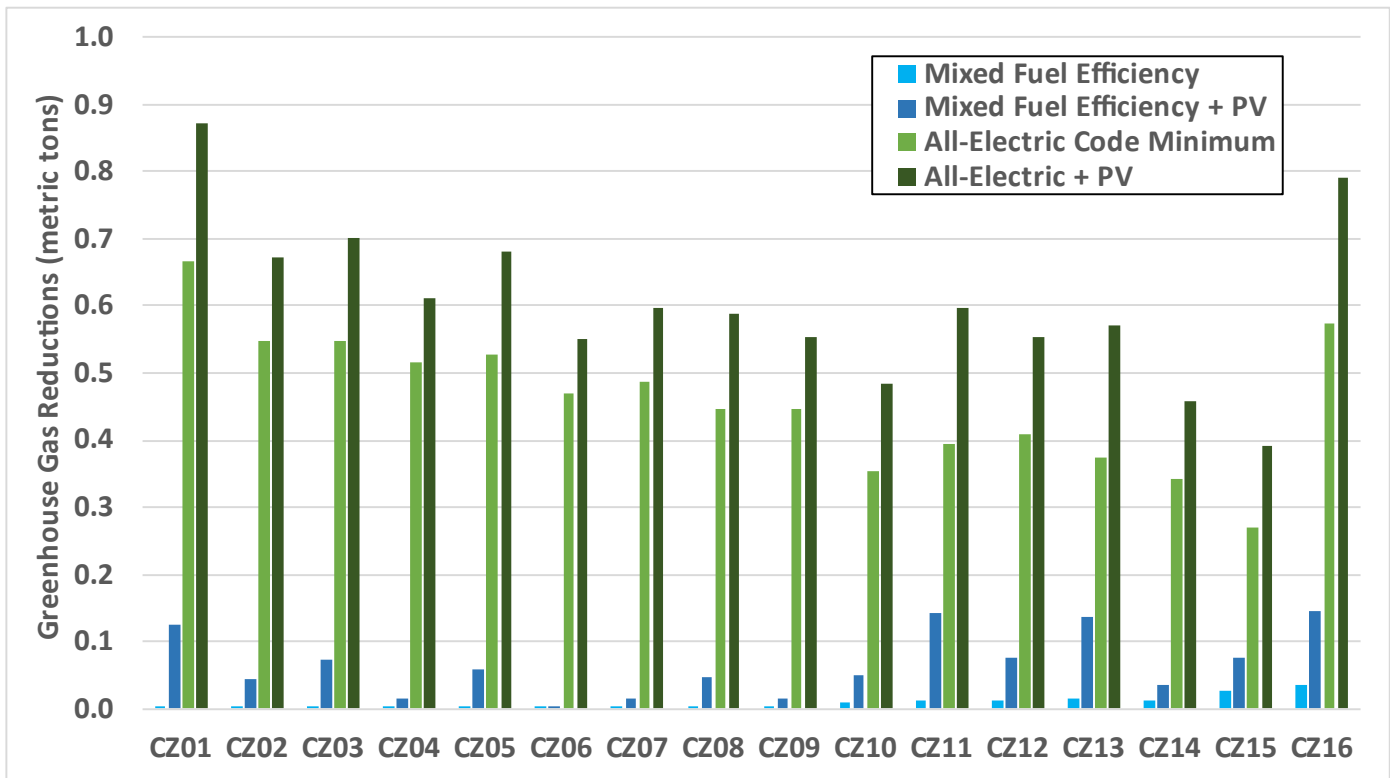


Figure 2. 5-Story greenhouse gas savings (metric tons) per dwelling unit



## 5 Summary

The Reach Codes Team identified packages of electrification and energy efficiency measures as well as packages combining these measures with solar PV generation and battery storage, simulated them using 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 22 summarizes results for each prototype and depicts the efficiency TDV compliance margins achieved for each climate zone and 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 cases with a positive compliance margin and cost-effective results using both On-Bill and TDV approaches.
- Cells highlighted in **yellow** depict cases with a positive compliance margin and cost-effective results using either the On-Bill or TDV approach.
- Cells **not highlighted** depict cases with a positive compliance margin but that were not cost-effective using either the On-Bill or TDV approach.

Following are key takeaways and recommendations from the analysis.

- The Reach Codes Team found all-electric new construction to be feasible and cost-effective based on the California Energy Commission's Time Dependent Valuation (TDV) metric in all cases. In many cases all-electric prescriptive code construction results in an increase in utility costs and is not cost-effective On-Bill. Some exceptions include the SMUD and CPAU territories where lower electricity rates relative to gas rates result in lower overall utility bills.
- All-electric packages have lower GHG emissions than mixed fuel packages in all cases, due to the clean power sources currently available from California's power providers.
- The 2022 Energy Code's new source energy metric combined with the heat pump space heating baseline in most climate zones encourages all-electric construction. While the code does not include an electric baseline for water heating, the penalty for central electric water heating observed in the performance approach in past code cycles has been removed and a credit is provided for well-designed central heat pump water heaters in most cases.
- Electrification combined with increased PV capacity results in utility cost savings and was found to be On-Bill cost-effective in all cases.
- The results in this study are based on today's net energy metering (NEM 2.0) rules and do not account for recently approved changes to the NEM tariff (referred to as the net billing tariff). The net billing tariff decreases the value of PV to the consumer as compared to NEM 2.0. As a result, the cost-effectiveness of the packages that include above-code PV capacity is expected to be less under the net billing tariff. Conversely, the net billing tariff is expected to increase On-Bill cost-effectiveness of the all-electric prescriptive code scenario. An all-electric home has better on-site utilization of generated electricity from PV than a mixed fuel home with a similar sized PV system, and as a result exports less electricity to the grid. Since the net-billing tariff values exports less than under NEM 2.0, the relative impact on annual utility costs to the mixed fuel baseline is greater.
- For jurisdictions interested in a reach code requiring all-electric buildings, this analysis does justify a modest reach based on either efficiency TDV or source energy. However, this may be challenging for some projects given the recent changes to which the industry must adapt, including the efficiency updates and multifamily restructuring in the 2022 Title 24, Part 6 code. While project compliance margins using a CO<sub>2</sub> refrigerant heat pump water heating system are high, the Reach Code Team found lower compliance margins using other he

pump water heater system designs. Focusing on supporting projects to electrify water heating is expected to support the market shift towards more central heat pump water heaters.

- For jurisdictions interested in a reach code that allows for mixed fuel buildings, a mixed fuel efficiency and PV package (and battery for the 3-story prototype) was found to be cost-effective based on TDV in all cases and cost-effective On-Bill in most climate zones. This path, referred to as “Electric-Preferred”, allows for mixed fuel buildings but requires a higher building performance than for all-electric buildings. The efficiency measures evaluated in this study did not provide significant compliance benefit. As a result, the Reach Codes Team recommends establishing a compliance margin target based on source energy or total TDV. This would allow for PV and battery above minimum code requirements to be used to meet the target.
- Jurisdictions interested in increasing affordable multifamily housing should know that applying the CARE rates has the overall impact of increasing utility cost savings for an all-electric building in most climate zones compared to a code compliant mixed fuel building, improving On-Bill cost-effectiveness.

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. For example, jurisdictions that only want to require all-electric construction may amend Part 11 instead of Part 6 of the California Building Code requiring filing with the BSC but not review and approval by the Energy Commission. Reach codes that amend Part 6 of the California Building Code and require energy performance beyond state code minimums must demonstrate the proposed changes are cost-effective and obtain approval from the Energy Commission.

**Table 22. Summary of Efficiency TDV Compliance Margins and Cost-Effectiveness**

Climate Zone	Electric /Gas Utility	3-Story				5-Story			
		All-Electric Prescriptive Code	All-Electric + PV	Mixed Fuel Efficiency	Mixed Fuel Efficiency + PV + Battery	All-Electric Prescriptive Code	All-Electric + PV	Mixed Fuel Efficiency	Mixed Fuel Efficiency + PV
CZ01	PGE	26%	26%	1%	1%	14%	14%	0%	0%
CZ02	PGE	20%	20%	1%	1%	9%	9%	1%	1%
CZ03	PGE	21%	21%	1%	1%	11%	11%	0%	0%
CZ04	PGE	18%	18%	1%	1%	9%	9%	1%	1%
CZ04	CPAU	18%	18%	1%	1%	9%	9%	1%	1%
CZ05	PGE	23%	23%	1%	1%	12%	12%	0%	0%
CZ05	PGE/SCG	23%	23%	1%	1%	12%	12%	0%	0%
CZ06	SCE/SCG	18%	18%	1%	1%	9%	9%	0%	0%
CZ07	SDGE	20%	20%	0%	0%	11%	11%	0%	0%
CZ08	SCE/SCG	13%	13%	1%	1%	8%	8%	1%	1%
CZ09	SCE	13%	13%	1%	1%	7%	7%	1%	1%
CZ10	SCE/SCG	14%	14%	3%	3%	7%	7%	2%	2%
CZ10	SDGE	14%	14%	3%	3%	7%	7%	2%	2%
CZ11	PGE	14%	14%	3%	3%	8%	8%	2%	2%
CZ12	PGE	17%	17%	2%	2%	9%	9%	2%	2%
CZ12	SMUD/PGE	17%	17%	2%	2%	9%	9%	2%	2%
CZ13	PGE	13%	13%	4%	4%	7%	7%	2%	2%
CZ14	SCE/SCG	13%	13%	3%	3%	6%	6%	2%	2%
CZ14	SDGE	13%	13%	3%	3%	6%	6%	2%	2%
CZ15	SCE/SCG	5%	5%	5%	5%	3%	3%	3%	3%
CZ16	PG&E	24%	24%	5%	5%	9%	9%	2%	2%

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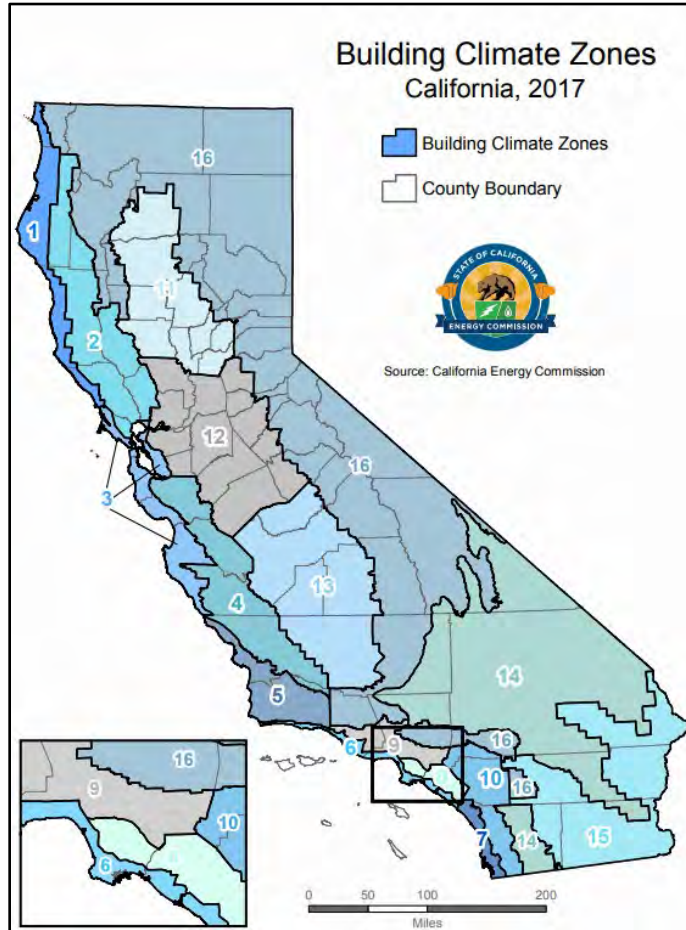
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## 7 Appendices

### 7.1 Map of California Climate Zones

Climate zone geographical boundaries are depicted in Figure 3. The map in Figure 3 along with a zip-code search directory is available at: [https://ww2.energy.ca.gov/maps/renewable/building\\_climate\\_zones.html](https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html)

Figure 3. Map of California climate zones.





## 7.2 Utility Rate Schedules

The Reach Codes Team used the CA IOU and POU rate tariffs detailed below to determine the On-Bill savings for each package. The California Climate Credit was applied for both electricity and natural gas service for the IOUs using the 2022 credits shows below.<sup>9</sup> The credits were applied to reduce the total calculated annual bill, including any fixed fees or minimum bill amounts.

### 2022 Electric California Climate Credit Schedule

	April	May	June	July	Aug	Sept	Oct
<b>PG&amp;E</b>	\$39.30						\$39.30
<b>SCE</b>	\$59.00						\$59.00
<b>SDG&amp;E</b>					\$64.17	\$64.17	

## Residential Natural Gas California Climate Credit

The 2022 Natural Gas California Climate Credit is distributed in April.

	2018 <sup>†</sup>	2019	2020	2021	2022	Total Value Received Per Household 2018-2022
<b>PG&amp;E</b>	\$30	\$25	\$27	\$25	\$47.83	<b>\$154</b>
<b>SDG&amp;E</b>	*	\$34	\$21	\$18	\$43.06	<b>\$116</b>
<b>Southwest Gas</b>	\$22	\$25	\$27	\$28	\$49.44	<b>\$150</b>
<b>SoCalGas</b>	*	\$50	\$26	\$22	\$44.17	<b>\$142</b>

Electricity rates reflect the most recent approved tariffs. Monthly gas rates were estimated based on the latest available gas rate (December 2022) and a curve to reflect how natural gas prices fluctuate with seasonal supply and demand. The seasonal curve was estimated from monthly residential tariffs between 2012 and 2022 (between 2020 and 2022 for CPAU). 12-month curves were created from monthly gas rates for each of the eleven years (three years for CPAU). These annual curves were then averaged to arrive at an average normalized annual curve. This was conducted separately for baseline and excess energy rates. Costs used in this analysis were then derived by establishing the most recent baseline and excess rate from the latest tariff as a reference point (December 2022), and then using the normalized curve to estimate the cost for the remaining months relative to the reference point rate.

<sup>9</sup> <https://www.cpuc.ca.gov/industries-and-topics/natural-gas/greenhouse-gas-cap-and-trade-program/california-climate-credit>



### 7.2.1 Pacific Gas & Electric

The following pages provide details on the PG&E electricity and natural gas tariffs applied in this study. Table 23 describes the baseline territories that were assumed for each climate zone. A net surplus compensation rate of \$0.0474/ kWh was applied to any net annual electricity generation based on a one-year average of the rates between November 2021 and October 2022.

**Table 23. PG&E Baseline Territory by Climate Zone**

Climate Zone	Baseline Territory
CZ01	V
CZ02	X
CZ03	T
CZ04	X
CZ05	T
CZ11	R
CZ12	S
CZ13	R
CZ16	Y

The PG&E monthly gas rate in \$/therm was applied on a monthly basis according to the rates shown in Table 24. These are applied to both the G-1 and GM rates. These rates are based on applying a normalization curve to the December 2022 tariff based on eleven years of historical gas data. See the beginning of Section 7.2 Utility Rate Schedules for further details. The corresponding CARE rates are shown in Table 25 and reflect the 20 percent discount per the GL-1 tariff. The GM master metered wather heating baseline quantity of 0.43 therms per dwelling unit per day in all baseline territories and in both seasons was applied to the centrally metered gas water heating.

**Table 24. PG&E Monthly Gas Rate (\$/therm)**

Month	Total Charge	
	Baseline	Excess
January	\$2.20579	\$2.66008
February	\$2.24291	\$2.69637
March	\$2.11750	\$2.58278
April	\$2.08101	\$2.55500
May	\$2.08062	\$2.55844
June	\$2.09104	\$2.56928
July	\$2.10404	\$2.58189
August	\$2.15162	\$2.63251
September	\$2.18718	\$2.67910
October	\$2.23153	\$2.71934
November	\$2.32121	\$2.79158
December	\$2.34123	\$2.80922

**Table 25. PG&E Monthly CARE (GL-1) Gas Rate (\$/therm)**

Month	Total CARE Charge	
	Baseline	Excess
January	\$1.76463	\$2.12806
February	\$1.79433	\$2.15710
March	\$1.69400	\$2.06622
April	\$1.66480	\$2.04400
May	\$1.66449	\$2.04675
June	\$1.67283	\$2.05543
July	\$1.68323	\$2.06551
August	\$1.72129	\$2.10601
September	\$1.74974	\$2.14328
October	\$1.78523	\$2.17547
November	\$1.85697	\$2.23327
December	\$1.87298	\$2.24738

**Residential  
 GAS**

**Baseline Territories and Quantities <sup>1/</sup>**

**Effective April 1, 2022 - Present**

BASELINE QUANTITIES (Therms Per Day Per Dwelling Unit)

Individually Metered			
Baseline Territories	Summer (April-October) Effective Apr. 1, 2022	Winter Off-Peak (Nov, Feb, Mar) Effective Nov. 1, 2022	Winter On-Peak (Dec, Jan) Effective Dec. 1, 2022
P	0.39	1.88	2.19
Q	0.56	1.48	2.00
R	0.36	1.24	1.81
S	0.39	1.38	1.94
T	0.56	1.31	1.68
V	0.59	1.51	1.71
W	0.39	1.14	1.68
X	0.49	1.48	2.00
Y	0.72	2.22	2.58

Master Metered			
Baseline Territories	Summer (April-October) Effective Apr. 1, 2022	Winter Off-Peak (Nov, Feb, Mar) Effective Nov. 1, 2022	Winter On-Peak (Dec, Jan) Effective Dec. 1, 2022
P	0.29	1.01	1.13
Q	0.56	0.67	0.77
R	0.33	0.87	1.16
S	0.29	0.61	0.65
T	0.56	1.01	1.10
V	0.59	1.28	1.32
W	0.26	0.71	0.87
X	0.33	0.67	0.77
Y	0.52	1.01	1.13

Summer Season: Apr-Oct  
 Winter Off-Peak: Nov, Feb, Mar  
 Winter On-Peak: Dec, Jan

Advice Letter: 4589-G  
 Decision 21-11-016  
 GRC 2020 Ph II [Application 19-11-019]  
 Filed: Nov 22, 2019



**Pacific Gas and Electric Company**

U 39 San Francisco, California

Cancelling Revised Cal. P.U.C. Sheet No. 53472-E  
 Revised Cal. P.U.C. Sheet No. 52702-E

**ELECTRIC SCHEDULE E-TOU-C** Sheet 2  
 RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

RATES: (Cont'd.) **E-TOU-C TOTAL BUNDLED RATES** (T)

Total Energy Rates (\$ per kWh)	PEAK		OFF-PEAK	
<i>Summer</i>				
Total Usage	\$0.48902	(I)	\$0.42558	(I)
Baseline Credit (Applied to Baseline Usage Only)	(\$0.09054)	(R)	(\$0.09054)	(R)
<i>Winter</i>				
Total Usage	\$0.39193	(I)	\$0.37460	(I)
Baseline Credit (Applied to Baseline Usage Only)	(\$0.09054)	(R)	(\$0.09054)	(R)
Delivery Minimum Bill Amount (\$ per meter per day)	\$0.34810			
California Climate Credit (per household, per semi-annual payment occurring in the April and October bill cycles)	(\$39.30)			

Total bundled service charges shown on customer's bills are unbundled according to the component rates shown below. Where the delivery minimum bill amount applies, the customer's bill will equal the sum of (1) the delivery minimum bill amount plus (2) for bundled service, the generation rate times the number of kWh used. For revenue accounting purposes, the revenues from the delivery minimum bill amount will be assigned to the Transmission, Transmission Rate Adjustments, Reliability Services, Public Purpose Programs, Nuclear Decommissioning, Competition Transition Charges, Energy Cost Recovery Amount, Wildfire Fund Charge, and New System Generation Charges based on kWh usage times the corresponding unbundled rate component per kWh, with any residual revenue assigned to Distribution.

(Continued)

Advice Decision	6603-E-A	Issued by <b>Robert S. Kenney</b> Vice President, Regulatory Affairs	Submitted Effective Resolution	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">May 31, 2022</td> </tr> <tr> <td style="text-align: center;">June 1, 2022</td> </tr> <tr> <td style="text-align: center;"> </td> </tr> </table>	May 31, 2022	June 1, 2022	
May 31, 2022							
June 1, 2022							



Revised Revised Cal. P.U.C. Sheet No. 53474-E  
 Cancelling Revised Cal. P.U.C. Sheet No. 50175-E

**ELECTRIC SCHEDULE E-TOU-C** Sheet 4  
 RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

SPECIAL CONDITIONS: 1. **BASELINE (TIER 1) QUANTITIES:** The following quantities of electricity are to be used to define usage eligible for the baseline credit:

**BASELINE QUANTITIES (kWh PER DAY)**

Baseline Territory*	Code B - Basic Quantities		Code H - All-Electric Quantities			
	Summer	Winter	Summer		Winter	
	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
P	13.5	(R) 11.0	(R) 15.2	(R) 26.0	(R) 26.0	(R) 26.0
Q	9.8	(R) 11.0	(R) 8.5	(R) 26.0	(R) 26.0	(R) 26.0
R	17.7	(R) 10.4	(R) 19.9	(R) 26.7	(R) 26.7	(R) 26.7
S	15.0	(R) 10.2	(R) 17.8	(R) 23.7	(R) 23.7	(R) 23.7
T	6.5	(R) 7.5	(R) 7.1	(R) 12.9	(R) 12.9	(R) 12.9
V	7.1	(R) 8.1	(R) 10.4	(R) 19.1	(R) 19.1	(R) 19.1
W	19.2	(R) 9.8	(R) 22.4	(R) 19.0	(R) 19.0	(R) 19.0
X	9.8	(R) 9.7	(R) 8.5	(R) 14.6	(R) 14.6	(R) 14.6
Y	10.5	(R) 11.1	(R) 12.0	(R) 24.0	(R) 24.0	(R) 24.0
Z	5.9	(R) 7.8	(R) 6.7	(R) 15.7	(R) 15.7	(R) 15.7

2. **TIME PERIODS FOR E-TOU-C:** Times of the year and times of the day are defined as follows:

Summer (service from June 1 through September 30):

Peak: 4:00 p.m. to 9:00 p.m. All days

Off-Peak: All other times

Winter (service from October 1 through May 31):

Peak: 4:00 p.m. to 9:00 p.m. All days

Off-Peak: All other times

\* The applicable baseline territory is described in Part A of the Preliminary Statement

(Continued)

Advice	6603-E-A	Issued by	Submitted	May 31, 2022
Decision		<b>Robert S. Kenney</b>	Effective	June 1, 2022
		Vice President, Regulatory Affairs	Resolution	





**Pacific Gas and Electric Company**  
 U 39 San Francisco, California

Revised Cal. P.U.C. Sheet No. 53424-E  
 Cancelling Revised Cal. P.U.C. Sheet No. 52653-E

**ELECTRIC SCHEDULE D-CARE** Sheet 1  
 LINE-ITEM DISCOUNT FOR CALIFORNIA ALTERNATE RATES FOR ENERGY (CARE)  
 CUSTOMERS

**APPLICABILITY:** This schedule is applicable to single-phase and polyphase residential service in single-family dwellings and in flats and apartments separately metered by PG&E and domestic submetered tenants residing in multifamily accommodations, mobilehome parks and to qualifying recreational vehicle parks and marinas and to farm service on the premises operated by the person whose residence is supplied through the same meter, where the applicant qualifies for California Alternate Rates for Energy (CARE) under the eligibility and certification criteria set forth in Electric Rule 19.1. CARE service is available on Schedules E-1, E-6, E-TOU-B, E-TOU-C, E-TOU-D, EV2, EM, ES, ESR, ET and EM-TOU.

**TERRITORY:** This rate schedule applies everywhere PG&E provides electric service.

**RATES:** Customers taking service on this rate schedule will receive a percentage discount ("A" below) on their total bundled charges on their otherwise applicable rate schedule (except for the California Climate Credit, which will not be discounted). In addition, customers will receive a percentage discount ("B" below) on the delivery minimum bill amount, if applicable. The CARE discount will be calculated for direct access and community choice aggregation customers based on the total charges as if they were subject to bundled service rates. Discounts will be applied as a residual reduction to distribution charges, after D-CARE customers are exempted from the Wildfire Fund Charge, Recovery Bond Charge, Recovery Bond Credit, and the CARE surcharge portion of the public purpose program charge used to fund the CARE discount. These conditions also apply to master-metered customers and to qualified sub-metered tenants where the master-meter customer is jointly served under PG&E's Rate Schedule D-CARE and either Schedule EM, ES, ESR, ET, or EM-TOU.

(T)  
(T)

For master-metered customers where one or more of the submetered tenants qualifies for CARE rates under the eligibility and certification criteria set forth in Rule 19.1, 19.2, or 19.3, the CARE discount is equal to a percentage ("C" below) of the total bundled charges, multiplied by the number of CARE units divided by the total number of units. In addition, master-metered customers eligible for D-CARE will receive a percentage discount ("D" below) on the delivery minimum bill amount, if applicable.

It is the responsibility of the master-metered customer to advise PG&E within 15 days following any change in the number of dwelling units and/or any decrease in the number of qualifying CARE applicants that results when such applicants move out of their submetered or non-submetered dwelling unit, or submetered permanent-residence RV or permanent-residence boat.

- A. D-CARE Discount: 34.947 % (Percent) (I)
- B. Delivery Minimum Bill Discount: 50.000 % (Percent)
- C. Master-Meter D-CARE Discount: 34.947 % (Percent) (I)
- D. Master-Meter Delivery Minimum Bill Discount: 50.000 % (Percent)

**SPECIAL CONDITIONS:** 1. OTHERWISE APPLICABLE SCHEDULE: The Special Conditions of the Customer's otherwise applicable rate schedule will apply to this schedule.

(Continued)

Advice	6603-E-A	Issued by	Submitted	May 31, 2022
Decision		<b>Robert S. Kenney</b>	Effective	June 1, 2022
		Vice President, Regulatory Affairs	Resolution	

### 7.2.2 Southern California Edison

The following pages provide details on are the SCE electricity tariffs applied in this study. Table 26 describes the baseline territories that were assumed for each climate zone. A net surplus compensation rate of \$ 0.04361/ kWh was applied to any net annual electricity generation based on a one-year average of the rates between November 2021 and October 2022

**Table 26: SCE Baseline Territory by Climate Zone**

Climate Zone	Baseline Territory
CZ06	6
CZ08	8
CZ09	9
CZ10	10
CZ14	14
CZ15	15

Summer Daily Allocations (June through September)

Baseline Region Number	Daily kWh Allocation	All-Electric Allocation
5	17.2	17.9
6	11.4	8.8
8	12.6	9.8
9	16.5	12.4
10	18.9	15.8
13	22.0	24.6
14	18.7	18.3
15	46.4	24.1
16	14.4	13.5

Winter Daily Allocations (October through May)

Baseline Region Number	Daily kWh Allocation	All-Electric Allocation
5	18.7	29.1
6	11.3	13.0
8	10.6	12.7
9	12.3	14.3
10	12.5	17.0
13	12.6	24.3
14	12.0	21.3
15	9.9	18.2
16	12.6	23.1

Schedule TOU-D  
 TIME-OF-USE  
 DOMESTIC  
 (Continued)

Sheet 12 (T)

**SPECIAL CONDITIONS**

1. Applicable rate time periods are defined as follows:

Option 4-9 PM, Option 4-9 PM-CPP, Option PRIME, Option PRIME-CPP :

TOU Period	Weekdays		Weekends and Holidays	
	Summer	Winter	Summer	Winter
On-Peak	4 p.m. - 9 p.m.	N/A	N/A	N/A
Mid-Peak	N/A	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.
Off-Peak	All other hours	9 p.m. - 8 a.m.	All other hours	9 p.m. - 8 a.m.
Super-Off-Peak	N/A	8 a.m. - 4 p.m.	N/A	8 a.m. - 4 p.m.
CPP Event Period	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	N/A	N/A

(T)



Southern California Edison  
 Rosemead, California (U 338-E)

Revised  
 Revised  
 Cancelling

Cal. PUC Sheet No. 74502-E  
 Cal. PUC Sheet No. 73968-E

Schedule TOU-D  
 TIME-OF-USE  
 DOMESTIC  
 (Continued)

Sheet 2

RATES

Customers receiving service under this Schedule will be charged the applicable rates under Option 4-9 PM, Option 4-9 PM-CPP, Option 5-8 PM, Option 5-8 PM-CPP, Option PRIME, Option PRIME-CPP Option A, Option A-CPP, Option B, or Option B-CPP, as listed below. CPP Event Charges will apply to all energy usage during CPP Event Energy Charge periods and CPP Non-Event Energy Credits will apply as a reduction on CPP Non-Event Energy Credit Periods during Summer Season days, 4:00 p.m. to 9:00 p.m., as described in Special Conditions 1 and 3, below:

Option 4-9 PM / Option 4-9 PM-CPP Energy Charge - \$/kWh	Delivery Service Total <sup>1</sup>	Generation <sup>2</sup>	
		UG <sup>3</sup>	DWREC <sup>4</sup>
Summer Season - On-Peak	0.29820 (R)	0.23706 (I)	0.00000
Mid-Peak	0.29820 (R)	0.13648 (I)	0.00000
Off-Peak	0.25471 (I)	0.07939 (R)	0.00000
Winter Season - Mid-Peak	0.29820 (R)	0.17235 (I)	0.00000
Off-Peak	0.25471 (I)	0.10198 (R)	0.00000
Super-Off-Peak	0.23907 (I)	0.08508 (I)	0.00000
Baseline Credit <sup>4</sup> - \$/kWh	(0.09086) (I)	0.00000	
Fixed Recovery Charge - \$/kWh	0.00117 (I)		
Basic Charge - \$/day			
Single-Family Residence	0.031		
Multi-Family Residence	0.024		
Minimum Charge <sup>2</sup> - \$/day			
Single Family Residence	0.346		
Multi-Family Residence	0.346		
Minimum Charge (Medical Baseline) <sup>2</sup> - \$/day			
Single Family Residence	0.173		
Multi-Family Residence	0.173		
California Climate Credit <sup>5</sup>	(59.00)		
California Alternate Rates for Energy Discount - %	100.00 <sup>6</sup>		
Family Electric Rate Assistance Discount -	100.00		
Option 4-9 PM-CPP			
CPP Event Energy Charge - \$/kWh		0.80000	
Summer CPP Non-Event Credit			
On-Peak Energy Credit - \$/kWh		(0.15170)	
Maximum Available Credit - \$/kWh <sup>4</sup>			
Summer Season		(0.50662) (I)	

\* Represents 100% of the discount percentage as shown in the applicable Special Condition of this Schedule.  
<sup>1</sup> The Minimum Charge is applicable when the Delivery Service Energy Charge, plus the applicable Basic Charge is less than the Minimum Charge.  
<sup>2</sup> The ongoing Competition Transition Charge (CTC) of (\$0.00019) per kWh is recovered in the UG component of Generation. (R)  
<sup>3</sup> The Baseline Credit applies up to 100% of the Baseline Allocation, regardless of Time-of-Use time period. Additional Baseline Allocations apply for Customers with Heat Pump Water Heaters served under this Option. The Baseline Allocations are set forth in Preliminary Statement, Part H. (T)  
<sup>4</sup> The Maximum Available Credit is the capped credit amount for CPP Customers dual participating in other demand response programs. (T)  
 1 Total = Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRB or Schedule CCA-CRB.  
 2 Generation = The Gen rates are applicable only to Bundled Service Customers. See Special Condition below for POIA recovery.  
 3 DWREC = Department of Water Resources (DWR) Energy Credit - For more information on the DWR Energy Credit, see the Billing Calculation Special Condition of this Schedule.  
 4 Applied on an equal basis, per household, semi-annually. See the Special Conditions of this Schedule for more information.

(Continued)

(To be inserted by utility)  
 Advice 4864-E  
 Decision 22-08-001

Issued by  
Michael Backstrom  
 Vice President

(To be inserted by Cal. PUC)  
 Date Submitted Sep 15, 2022  
 Effective Oct 1, 2022  
 Resolution \_\_\_\_\_

2017





Southern California Edison  
Rosemead, California (U 338-E)

Revised Cal. PUC Sheet No. 74493-E  
Revised Cal. PUC Sheet No. 73964-E  
Cancelling

Schedule D-CARE  
CALIFORNIA ALTERNATE RATES FOR ENERGY  
DOMESTIC SERVICE

Sheet 1

APPLICABILITY

Applicable to domestic service to CARE households residing in a permanent Single-Family Accommodation or Multifamily Accommodation where the customer meets all the Special Conditions of this Schedule. Customers enrolled in the CARE program are not eligible for the Family Electric Rate Assistance (FERA) program.

Pursuant to Special Condition 12 herein, customers receiving service under this Schedule are eligible to receive the California Climate Credit as shown in the Rates section below.

TERRITORY

Within the entire territory served.

RATES

The applicable charges set forth in Schedule D shall apply to Customers served under this Schedule.

CARE Discount:

A 28.9 percent discount is applied to a CARE Customer's bill prior to the application of the Public Utilities Commission Reimbursement Fee (PUCRF) and any applicable user fees, taxes, and late payment charges. CARE Customers are required to pay the PUCRF and any applicable user fees, taxes, and late payment charges in full. In addition, CARE Customers are exempt from paying the CARE Surcharge of \$0.00931 per kWh and the Wildfire Fund Non-Bypassable Charge of \$0.00652 per kWh. The 28.9 percent discount, in addition to these exemptions result in an average effective CARE Discount of 32.5 percent.

(Continued)

(To be inserted by utility)  
Advice 4864-E  
Decision 22-08-001

Issued by  
Michael Backstrom  
Vice President

(To be inserted by Cal. PUC)  
Date Submitted Sep 15, 2022  
Effective Oct 1, 2022  
Resolution \_\_\_\_\_

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### 7.2.3 Southern California Gas

Following are the SoCalGas natural gas tariffs applied in this study. Table 27 describes the baseline territories that were assumed for each climate zone.

**Table 27. SoCalGas Baseline Territory by Climate Zone**

Climate Zone	Baseline Territory
CZ05	2
CZ06	1
CZ08	1
CZ09	1
CZ10	1
CZ14	2
CZ15	1

The SoCalGas monthly gas rate in \$/therm was applied on a monthly basis according to the rates shown in Table 28. These rates are based on applying a normalization curve to the December 2022 tariff based on eleven years of historical gas data. See the beginning of Section 7.2 Utility Rate Schedules for further details. Long-term historical natural gas rate data was only available for SoCalGas’ procurement charges.<sup>10</sup> 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 2022 rates. CARE rates reflect the 20 percent discount per the GR tariff.

**Table 28. SoCalGas Monthly Gas Rate (\$/therm)**

Month	Procurement Charge	Transportation Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
January	\$0.90581	\$0.82487	\$1.23877	\$1.73068	\$2.14458
February	\$0.83669	\$0.82487	\$1.23877	\$1.66156	\$1.84967
March	\$0.80596	\$0.82487	\$1.23877	\$1.63083	\$1.82938
April	\$0.71941	\$0.82487	\$1.23877	\$1.54428	\$1.75890
May	\$0.77049	\$0.82487	\$1.23877	\$1.59536	\$1.78548
June	\$0.86253	\$0.82487	\$1.23877	\$1.68740	\$1.83337
July	\$0.87687	\$0.82487	\$1.23877	\$1.70174	\$1.86833
August	\$0.95391	\$0.82487	\$1.23877	\$1.77878	\$1.91089
September	\$0.85896	\$0.82487	\$1.23877	\$1.68383	\$1.83611
October	\$0.84147	\$0.82487	\$1.23877	\$1.66634	\$1.84936
November	\$0.89018	\$0.82487	\$1.23877	\$1.71505	\$1.88836
December	\$1.05329	\$0.82487	\$1.23877	\$1.87816	\$1.98294

<sup>10</sup> The SoCalGas procurement and transmission charges were obtained from the following site:  
<https://www.socalgas.com/for-your-business/energy-market-services/gas-prices>

Schedule No. GM	Sheet 2		
<b>MULTI-FAMILY SERVICE</b>			
(Includes GM-E, GM-C, GM-EC, GM-CC, GT-ME, GT-MC and all GMB Rates)			
(Continued)			
<b>APPLICABILITY</b> (Continued)			
Multi-family Accommodations built prior to December 15, 1981 and currently served under this schedule may also be eligible for service under Schedule No. GS. If an eligible Multi-family Accommodation served under this schedule converts to an applicable submetered tariff, the tenant rental charges shall be revised for the duration of the lease to reflect removal of the energy related charges.			
Eligibility for service hereunder is subject to verification by the Utility.			
<b>TERRITORY</b>			
Applicable throughout the service territory.			
<b>RATES</b>			
<u>Customer Charge</u> , per meter, per day: .....	<u>GM/GT-M</u> 16.438¢	<u>GMB/GT-MB</u> \$19.792	
For "Space Heating Only" customers, a daily Customer Charge applies during the winter period from November 1 through April 30 <sup>1/2</sup> : .....			
	33.149¢		
<b>GM</b>			
<u>Baseline Rate</u> , per therm (baseline usage defined per Special Conditions 3 and 4):	<u>GM-E</u>	<u>GM-EC<sup>3/</sup></u>	<u>GT-ME</u>
<u>Procurement Charge:</u> <sup>2/</sup> .....	110.870¢	110.870¢	N/A
<u>Transmission Charge:</u> .....	90.256¢	90.256¢	90.256¢
<u>Total Baseline Charge</u> (all usage): .....	201.126¢	201.126¢	90.256¢
<u>Non-Baseline Rate</u> , per therm (usage in excess of baseline usage):			
<u>Procurement Charge:</u> <sup>2/</sup> .....	110.870¢	110.870¢	N/A
<u>Transmission Charge:</u> .....	135.367¢	135.367¢	135.367¢
<u>Total Non Baseline Charge</u> (all usage): .....	246.237¢	246.237¢	135.367¢

3. **Baseline Usage:** The following usage is to be billed at the Baseline rate for Multi-family Accommodation units. Usage in excess of applicable Baseline allowances will be billed at the Non-Baseline rate.

<u>Per Residence</u>	<u>Daily Therm Allowance for Climate Zones*</u>		
	<u>1</u>	<u>2</u>	<u>3</u>
Summer (May 1- Oct.31)	0.424	0.424	0.424
Winter On-Peak (Dec., Jan., and Feb.)	1.600	1.867	2.600
Winter Off-Peak (Nov., Mar., and Apr.)	0.874	0.923	1.714

### 7.2.4 San Diego Gas & Electric

Following are the SDG&E electricity and natural gas tariffs applied in this study. Table 29 describes the baseline territories that were assumed for each climate zone. A net surplus compensation rate of \$0.04174 / kWh was applied to any net annual electricity generation based on a one-year average of the rates between January 2022 and December 2022.

**Table 29. SDG&E Baseline Territory by Climate Zone**

Climate Zone	Baseline Territory
CZ07	Coastal
CZ10	Inland
CZ14	Mountain

The SDG&E monthly gas rate in \$/therm was applied on a monthly basis according to the rates shown in Table 30. These rates are based on applying a normalization curve to the December 2022 tariff based on eleven years of historical gas data. See the beginning of Section 7.2 Utility Rate Schedules for further details. CARE rates reflect the 20 percent discount per the G-CARE tariff.

**Table 30. SDG&E Monthly Gas Rate (\$/therm)**

Month	Total Charge	
	Baseline	Excess
January	\$2.33762	\$2.34748
February	\$2.26751	\$2.28440
March	\$2.25119	\$2.27016
April	\$2.20192	\$2.22744
May	\$2.24252	\$2.26403
June	\$2.31819	\$2.33060
July	\$2.32406	\$2.33630
August	\$2.37527	\$2.38090
September	\$2.33542	\$2.34971
October	\$2.30366	\$2.32151
November	\$2.31722	\$2.33381
December	\$2.45653	\$2.73517

**Baseline Usage:** The following quantities of gas used in individually metered residences are to be billed at the baseline rates:

<u>All Customers:</u>	<u>Daily Therm Allowance</u>
Summer (May to Oct)	0.359
Winter On-Peak (Dec, Jan & Feb)	1.233
Winter Off-Peak (Nov, Mar, & Apr)	0.692



<b>SCHEDULE GM</b>				Sheet 2
<b>MULTI-FAMILY NATURAL GAS SERVICE</b>				
<b>(Includes Rates for GM, GM-C and GTC/GTCA)</b>				
<b>RATES</b>				
	GM	GM-C	GTC/GTCA <sup>1</sup>	
<b>Baseline Rate, per therm (baseline usage defined in Special Condition 4)</b>				
Procurement Charge <sup>2</sup> .....	\$1.05454	\$1.42421	I	N/A
Transmission Charge.....	\$1.40199	\$1.40199		\$1.40201
<b>Total Baseline Charge.....</b>	<b>\$2.45653</b>	<b>\$2.82620</b>	<b>I</b>	<b>\$1.40201</b>
<b>Non-Baseline Rate (usage in excess of baseline usage)</b>				
Procurement Charge <sup>2</sup> .....	\$1.05454	\$1.42421	I	N/A
Transmission Charge.....	\$1.68063	\$1.68063		\$1.68065
<b>Total Non-Baseline Charge.....</b>	<b>\$2.73517</b>	<b>\$3.10484</b>	<b>I</b>	<b>\$1.68065</b>
<b>Minimum Bill, per day<sup>3</sup></b>				
Non-CARE customers.....	\$0.13151	\$0.13151		\$0.13151
CARE customers.....	\$0.10521	\$0.10521		\$0.10521
<b>Franchise Fee Differential:</b>				
<p>A Franchise Fee Differential of 1.03% will be applied to the monthly billings calculated under this schedule for all customers within the corporate limits of the City of San Diego. Such Franchise Fee Differential shall be so indicated and added as a separate item to bills rendered to such customers.</p>				
<b>Additional Charges</b>				
<p>Rates may be adjusted to reflect any applicable taxes, franchise fees or other fees, regulatory surcharges, and interstate or intrastate pipeline charges that may occur.</p>				
<b>SPECIAL CONDITIONS</b>				
<p>1. <b>Definitions.</b> The definitions of principal terms used in this schedule are found either herein or in Rule 1, Definitions.</p>				
<p>2. <b>Number of Therms.</b> The number of therms to be billed shall be determined in accordance with Rule 2. The daily therm allowance in the Baseline Usage, shown in Special Condition 4, shall be multiplied by the number of qualified residential units. It is the responsibility of the customer to advise the Utility within 15 days following any change in the submetering arrangements or the number of dwelling units or Mobilehome Park spaces provided gas service. The number of qualifying units is subject to verification by the Utility.</p>				
<p>3. <b>Exclusions.</b> Gas service for non-domestic enterprises such as rooming houses, boarding houses, dormitories, rest homes, military barracks, transient trailer parks, stores, restaurants, service stations, and other similar establishments will be separately metered and billed under the applicable schedules.</p>				
<p><sup>1</sup> The rates for core transportation-only customers, with the exception of customers taking service under Schedule GT-NGV, include any FERC Settlement Proceeds Memorandum Account (FSPMA) credit adjustments.</p>				
<p><sup>2</sup> This charge is applicable to Utility Procurement Customers and includes the GPC and GPC-A Procurement Charges shown in Schedule GPC which are subject to change monthly as set forth in Special Condition 7.</p>				
<p><sup>3</sup> Effective starting May 1, 2020, the minimum bill is calculated as the minimum bill charge of \$0.13151 per day times the number of days in the billing cycle (approximately \$4 per month) with a 20% discount applied for CARE customer resulting in a minimum bill charge of \$0.10521 per day (approximately \$3.20 per month).</p>				

(Continued)

2H7	Issued by	Submitted	Dec 9, 2022
Advice Ltr. No. <u>3145-G</u>		Effective	Dec 10, 2022



San Diego Gas & Electric Company  
 San Diego, California

Revised Cal. P.U.C. Sheet No. 36337-E

Canceling Revised Cal. P.U.C. Sheet No. 35747-E

**SCHEDULE TOU-DR1**  
**RESIDENTIAL TIME-OF-USE**

Sheet 2

RATES

Total Rates:

Description – TOU DR1	UDC Total Rate	DWR BC + WF-NBC	EECC Rate + DWR Credit	Total Rate
<b>Summer:</b>				
On-Peak	0.26467	I 0.00309 R	0.42232 R	0.69008 R
Off-Peak	0.26467	I 0.00309 R	0.19003 R	0.45779 I
Super Off-Peak	0.26467	I 0.00309 R	0.06802 R	0.33578 I
<b>Winter:</b>				
On-Peak	0.39848	I 0.00309 R	0.14268 R	0.54425 R
Off-Peak	0.39848	I 0.00309 R	0.08004 R	0.48161 I
Super Off-Peak	0.39848	I 0.00309 R	0.06187 R	0.46344 I
Summer Baseline Adjustment Credit up to 130% of Baseline	(0.10182)	R		(0.10182) R
Winter Baseline Adjustment Credit up to 130% of Baseline	(0.10182)	R		(0.10182) R
Minimum Bill (\$/day)	0.350			0.350

Note:

- (1) Total Rates consist of UDC, Schedule DWR-BC (Department of Water Resources Bond Charge), Schedule WF-NBC (CA Wildfire Fund charge) and Schedule EECC (Electric Energy Commodity Cost) rates, with the EECC rates reflecting a DWR Credit. EECC rates are applicable to bundled customers only. See Special Condition 16 for PCIA (Power Charge Indifference Adjustment) recovery.
- (2) Total Rates presented are for customers that receive commodity supply and delivery service from Utility.
- (3) DWR-BC and WF-NBC charges do not apply to CARE customers.
- (4) As identified in the rates tables, customer bills will also include line-item summer and winter credits for usage up to 130% of baseline to provide the rate capping benefits adopted by Assembly Bill 1X and Senate Bill 695.
- (5) WF-NBC rate is 0.00652 + DWR-BC Bond Charge is (0.00343).

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(Continued)

2C10

Advice Ltr. No. 4004-E

Decision No. 22-03-003

Issued by  
**Dan Skopec**  
 Vice President  
 Regulatory Affairs

Submitted May 16, 2022

Effective Jun 1, 2022

Resolution No. \_\_\_\_\_



Time Periods

All time periods listed are applicable to local time. The definition of time will be based upon the date service is rendered.

TOU Periods – Weekdays	Summer	Winter
On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
Off-Peak	6:00 a.m. – 4:00 p.m.; 9:00 p.m. - midnight	6:00 a.m. – 4:00 p.m. Excluding 10:00 a.m. – 2:00 p.m. in March and April; 9:00 p.m. - midnight
Super Off-Peak	Midnight – 6:00 a.m.	Midnight – 6:00 a.m. 10:00 a.m. – 2:00 p.m. in March and April
TOU Period – Weekends and Holidays	Summer	Winter
On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
Off-Peak	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - midnight	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - midnight
Super Off-Peak	Midnight – 2:00 p.m.	Midnight – 2:00 p.m.

Seasons:        Summer        June 1 – October 31  
                   Winter         November 1 – May 31

15. Baseline Usage: The following quantities of electricity are used to calculate the baseline adjustment credit.

	Baseline Allowance For Climatic Zones*			
	Coastal	Inland	Mountain	Desert
<b>Basic Allowance</b>				
Summer (June 1 to October 31)	9.0	10.4	13.6	15.9
Winter (November 1 to May 31)	9.2	9.6	12.9	10.9
<b>All Electric**</b>				
Summer (June 1 to October 31)	6.0	8.7	15.2	17.0
Winter (November 1 to May 31)	8.8	12.2	22.1	17.1

\* Climatic Zones are shown on the Territory Served, Map No. 1.  
 \*\* All Electric allowances are available upon application to those customers who have permanently installed space heating or who have electric water heating and receive no energy from another source.

- (1) Total Rates consist of UDC, Schedule DWR-BC (Department of Water Resources Bond Charge), and Schedule EECC (Electric Energy Commodity Cost) rates, with the EECC rates reflecting a DWR Credit of \$0.00000 that customers receive on their monthly bills.
- (2) Total Rates presented are for customers that receive commodity supply and delivery service from Utility. Differences in total rates paid by Direct Access (DA) and Community Choice Aggregation (CCA) customers are identified in Schedule DA-CRS and CCA-CRS, respectively.
- (3) DWR-BC charges do not apply to CARE or Medical Baseline customers.
- (4) Total Effective CARE Rate is presented for illustrative purposes only, and reflects the average effective CARE discount CARE customers receive which consists of (a) exemptions from paying the CARE Surcharge, DWR-BC, California Solar Initiative (CSI) and Vehicle-Grid Integration (VGI) Costs; (b) a 50% minimum bill relative to Non-CARE; and (c) a separate line-item bill discount for all qualified residential CARE customers.
- (5) Current DWR-BC as presented is now used for collecting the California Wildfire Fund Charge effective Oct 1, 2020 (See Schedule WF – NBC). DWR BC will be renamed at implementation of SDG&E’s new customer information system.





San Diego Gas & Electric Company  
 San Diego, California

Revised Cal. P.U.C. Sheet No. 35718-E

Canceling Revised Cal. P.U.C. Sheet No. 32576-E

**SCHEDULE E-CARE**

Sheet 1

CALIFORNIA ALTERNATE RATES FOR ENERGY

APPLICABILITY

This schedule provides a California Alternate Rates for Energy (CARE) discount to each of the following types of customers listed below that meet the requirements for CARE eligibility as defined in Rule 1, Definitions, and herein, and is taken in conjunction with the customer's otherwise applicable service schedule.

- 1) Customers residing in a permanent single-family accommodation, separately metered by the Utility.
- 2) Multi-family dwelling units and mobile home parks supplied through one meter on a single premises where the individual unit is submetered.
- 3) Non-profit group living facilities.
- 4) Agricultural employee housing facilities.

TERRITORY

Within the entire territory served by the Utility.

DISCOUNT

- 1) **Residential CARE:** Qualified residential CARE customers will receive a total effective discount according to the following:

	2015	2016	2017	2018	2019	2020 and beyond
<b>Effective Discount</b>	40%	39%	38%	38%	36% R	35%

Pursuant to Commission Decision (D.) 15-07-001, the average effective CARE discount for residential customers will decrease 1% each year until an average effective discount of 35% is reached in 2020.

The average effective CARE discount consists of: (a) exemptions from paying the CARE Surcharge, Department of Water Resources Bond Charge (DWR-BC), Vehicle-Grid Integration (VGI) costs, and California Solar Initiative (CSI); (b) a 50% minimum bill relative to Non-CARE; (c) the California Wildfire Fund Charge (WF-NBC) and (d) a separate line-item bill discount for all qualified residential CARE customers with the exclusion of CARE Medical Baseline customers taking service on tiered rates schedules. D.15-07-001 retained the rate subsidies in Non-CARE Medical Baseline tiered rates and thereby a separate line-item discount is provided for these CARE Medical Baseline customers

(Continued)

ICS

Advice Ltr. No. 3928-E

Issued by  
**Dan Skopec**  
 Vice President

Submitted Dec 30, 2021  
 Effective Jan 1, 2022

### 7.2.5 City of Palo Alto Utilities

Following are the CPAU electricity and natural gas tariffs applied in this study. The CPAU monthly gas rate in \$/therm was applied on a monthly basis according to the rates shown in Table 31. These rates are based on applying a normalization curve to the December 2022 tariff based on three years of historical gas data. See the beginning of Section 7.2 Utility Rate Schedules for further details. The monthly service charge applied was \$106.90 per month per the December 2022 G-2 tariff.

**Table 31. CPAU Monthly Gas Rate (\$/therm)**

Month	G2 Volumetric Totals
January	\$1.80964
February	\$1.67009
March	\$1.68480
April	\$1.68698
May	\$1.78478
June	\$1.88288
July	\$1.88355
August	\$2.06943
September	\$2.06798
October	\$2.08553
November	\$2.09681
December	\$2.45700

### RESIDENTIAL ELECTRIC SERVICE

#### UTILITY RATE SCHEDULE E-1

**A. APPLICABILITY:**

This Rate Schedule applies to separately metered single-family residential dwellings receiving Electric Service from the City of Palo Alto Utilities.

**B. TERRITORY:**

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

**C. UNBUNDLED RATES:**

<u>Per kilowatt-hour (kWh)</u>	<u>Commodity</u>	<u>Distribution</u>	<u>Public Benefits</u>	<u>Total</u>
Tier 1 usage				
	\$0.08547	\$0.05429	\$0.00469	\$0.14445
Tier 2 usage Any usage over Tier 1				
	0.11858	0.08008	0.00469	0.20335
<u>Minimum Bill (\$/day)</u>				0.3447

**RESIDENTIAL MASTER-METERED AND SMALL NON-RESIDENTIAL ELECTRIC SERVICE**

UTILITY RATE SCHEDULE E-2

**A. APPLICABILITY:**

This Rate Schedule applies to the following Customers receiving Electric Service from the City of Palo Alto Utilities:

1. Small non-residential Customers receiving Non-Demand Metered Electric Service; and
2. Customers with Accounts at Master-Metered multi-family facilities.

**B. TERRITORY:**

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

**C. UNBUNDLED RATES:**

<u>Per kilowatt-hour (kWh)</u>	<u>Commodity</u>	<u>Distribution</u>	<u>Public Benefits</u>	<u>Total</u>
Summer Period	\$0.12151	\$0.09276	\$0.00469	\$0.21896
Winter Period	0.08715	0.06171	0.00469	0.15355
<u>Minimum Bill (\$/day)</u>				0.8777

**EXPORT ELECTRICITY COMPENSATION**

UTILITY RATE SCHEDULE E-EEC-1

**A. APPLICABILITY:**

This Rate Schedule applies in conjunction with the otherwise applicable Rate Schedules for each Customer class. This Rate Schedule may not apply in conjunction with any time-of-use Rate Schedule. This Rate Schedule applies to Customer-Generators as defined in Rule and Regulation 2 who are either not eligible for Net Energy Metering or who are eligible for Net Energy metering but elect to take Service under this Rate Schedule.

**B. TERRITORY:**

Applies to locations within the service area of the City of Palo Alto.

**C. RATE:**

The following buyback rate shall apply to all electricity exported to the grid.

	<u>Per kWh</u>
Export electricity compensation rate	\$0.1045



## 7.2.6 Sacramento Municipal Utilities District (Electric Only)

Following are the SMUD electricity tariffs applied in this study. The rates effective January 2023 were used.

### Residential Time-of-Day Service Rate Schedule R-TOD

#### II. Firm Service Rates

##### A. Time-of-Day (5-8 p.m.) Rate

	Effective as of October 1, 2021	Effective as of March 1, 2022	Effective as of January 1, 2023
<b>Time-of-Day (5-8 p.m.) Rate (RT02)</b>			
<b>Non-Summer Season (October - May)</b>			
System Infrastructure Fixed Charge <i>per month per meter</i>	\$22.70	\$23.05	\$23.50
Electricity Usage Charge			
Peak <i>\$/kWh</i>	\$0.1494	\$0.1516	\$0.1547
Off-Peak <i>\$/kWh</i>	\$0.1082	\$0.1098	\$0.1120
<b>Summer Season (June - September)</b>			
System Infrastructure Fixed Charge <i>per month per meter</i>	n/a	\$23.05	\$23.50
Electricity Usage Charge			
Peak <i>\$/kWh</i>	n/a	\$0.3215	\$0.3279
Mid-Peak <i>\$/kWh</i>	n/a	\$0.1827	\$0.1864
Off-Peak <i>\$/kWh</i>	n/a	\$0.1323	\$0.1350

##### A. Time-of-Day (5-8 p.m.) Rate (rate category RT02)

1. The TOD (5-8 p.m.) Rate is the standard rate for SMUD's residential customers. Eligible customers can elect the Fixed Rate under Rate Schedule R as an alternative rate.
2. The TOD (5-8 p.m.) Rate is an optional rate for customers who have an eligible renewable electrical generation facility under Rate Schedule NEM1 that was approved for installation by SMUD prior to January 1, 2018.
3. This rate has five kilowatt-hour (kWh) prices, depending on the time-of-day and season as shown below. Holidays are detailed in Section V. Conditions of Service.

<b>Summer (Jun 1 - Sept 30)</b>	<b>Peak</b>	Weekdays between 5:00 p.m. and 8:00 p.m.
	<b>Mid-Peak</b>	Weekdays between noon and midnight except during the Peak hours.
	<b>Off-Peak</b>	All other hours, including weekends and holidays <sup>1</sup> .
<b>Non-Summer (Oct 1 - May 31)</b>	<b>Peak</b>	Weekdays between 5:00 p.m. and 8:00 p.m.
	<b>Off-Peak</b>	All other hours, including weekends and holidays <sup>1</sup> .

<sup>1</sup> See Section V. Conditions of Service

**C. Master-Metered Multifamily Accommodation and Mobile Home Park Billing (Rate Category RSMM) Closed**

	Effective as of October 1, 2021	Effective as of March 1, 2022	Effective as of January 1, 2023
<b>Master Metered Multifamily and Mobile Home Park Billing (Closed)</b>			
<b>Non-Summer Season (October - May)</b>			
System Infrastructure Fixed Charge <i>per month per meter</i>	\$22.70	\$23.05	\$23.50
Electricity Usage Charge			
All kWh usage per month <i>\$/kWh</i>	\$0.1279	\$0.1298	\$0.1324
<b>Summer Season (June - September)</b>			
System Infrastructure Fixed Charge <i>per month per meter</i>	n/a	\$23.05	\$23.50
Electricity Usage Charge			
All kWh usage per month <i>\$/kWh</i>	n/a	\$0.1486	\$0.1516

### 7.2.7 Fuel Escalation Assumptions

The average annual escalation rates in Table 32 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. No data was available to estimate electricity escalation rates for CPAU and SMUD, therefore electricity escalation rates for PG&E and statewide natural gas escalation rates were applied.

**Table 32: Real Utility Rate Escalation Rate Assumptions**

	Statewide Natural Gas Residential Average Rate (%/year, real)	Electric Residential Average Rate (%/year, real)		
		PG&E	SCE	SDG&E
2023	4.6%	1.8%	1.6%	2.8%
2024	4.6%	1.8%	1.6%	2.8%
2025	4.6%	1.8%	1.6%	2.8%
2026	4.6%	1.8%	1.6%	2.8%
2027	4.6%	1.8%	1.6%	2.8%
2028	4.6%	1.8%	1.6%	2.8%
2029	4.6%	1.8%	1.6%	2.8%
2030	4.6%	1.8%	1.6%	2.8%
2031	2.0%	0.6%	0.6%	0.6%
2032	2.4%	0.6%	0.6%	0.6%
2033	2.1%	0.6%	0.6%	0.6%
2034	1.9%	0.6%	0.6%	0.6%
2035	1.9%	0.6%	0.6%	0.6%
2036	1.8%	0.6%	0.6%	0.6%
2037	1.7%	0.6%	0.6%	0.6%
2038	1.6%	0.6%	0.6%	0.6%
2039	2.1%	0.6%	0.6%	0.6%
2040	1.6%	0.6%	0.6%	0.6%
2041	2.2%	0.6%	0.6%	0.6%
2042	2.2%	0.6%	0.6%	0.6%
2043	2.3%	0.6%	0.6%	0.6%
2044	2.4%	0.6%	0.6%	0.6%
2045	2.5%	0.6%	0.6%	0.6%
2046	1.5%	0.6%	0.6%	0.6%
2047	1.3%	0.6%	0.6%	0.6%
2048	1.6%	0.6%	0.6%	0.6%
2049	1.3%	0.6%	0.6%	0.6%
2050	1.5%	0.6%	0.6%	0.6%
2051	1.8%	0.6%	0.6%	0.6%
2052	1.8%	0.6%	0.6%	0.6%

### 7.3 Cost Details

Table 33 presents additional detail on the first cost assumptions for the central water heating systems. For the 5-story prototype costs are provided both for a CO<sub>2</sub> refrigerant Sanden-based and R-134a refrigerant Colmac-based heat pump water heater designs. The results presented in the main body of this report are based on the Sanden design. A sensitivity analysis was also conducted for a Colmac design (see Appendix 7.5 Central Heat Pump Water Heater Comparison) and the cost comparison is presented here. All costs are based on data from the 2022 Multifamily All-Electric CASE Report (Statewide CASE Team, 2020c).

**Table 33. Heat Pump Water Heater First Costs per Building (Present Value (2023\$))**

Item	3-Story (36-units)			5-Story (88-units)			
	Gas Boiler (CZs 1-9)	Gas Boiler (CZs 10-16)	Heat Pump	Gas Boiler (CZs 1-9)	Gas Boiler (CZs 10-16)	Heat Pump (Sanden)	Heat Pump (Colmac)
Water Heating Equipment	\$87,602	\$87,602	\$140,907	\$135,146	\$135,146	\$244,742	\$319,485
Solar Thermal Collector	\$39,800	\$46,888	n/a	\$74,740	\$91,776	n/a	n/a
Gas Piping	\$8,890	\$8,890	n/a	\$9,065	\$9,065	n/a	n/a
Electrical Circuits	n/a	n/a	\$25,000	n/a	n/a	\$25,000	\$25,000
Overhead & Markup	\$37,480	\$39,430	\$45,624	\$60,212	\$64,896	\$74,179	\$94,733
<b>Total</b>	<b>\$173,772</b>	<b>\$182,810</b>	<b>\$211,531</b>	<b>\$279,163</b>	<b>\$300,883</b>	<b>\$343,920</b>	<b>\$439,218</b>

Table 34 presents additional detail on the first cost assumptions for the space heating systems.

**Table 34. Heat Pump Space Heater First Costs per Dwelling Unit (Present Value (2023\$))**

Item	3-Story		5-Story		Source & Notes
	Furnace + Split AC	Heat Pump	Furnace + Split HP	Heat Pump	
Dwelling Unit HVAC	\$5,651	\$5,460	\$6,109	\$5,460	Gas system costs based on 2022 Multifamily All-Electric CASE Report. Heat pump costs based on online equipment research indicating a 2-ton HP is \$191 less than a furnace/AC of the same size.
Refrigerant Piping	\$563	\$563	\$423	\$423	2022 Multifamily All-Electric CASE Report.
Gas Piping	\$92	\$0	\$227	\$0	
Electrical Circuits	\$0	\$150	\$0	\$150	
Labor	\$9,904	\$6,985	\$9,904	\$6,985	Based on the 2022 Multifamily All-Electric CASE Report with adjustments to align with updated equipment costs.
Overhead & Markup	\$4,457	\$3,618	\$4,582	\$3,579	Based on a 27% markup
<b>Total</b>	<b>\$20,667</b>	<b>\$16,776</b>	<b>\$21,245</b>	<b>\$16,597</b>	
<b>Incremental Cost</b>		<b>(\$3,891)</b>		<b>(\$4,647)</b>	



## 7.4 PG&E Gas Infrastructure Cost Memo



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December 5, 2019

Energy Commission Staff:

On March 2, 2018, PG&E provided gas extension cost estimates for residential existing and new subdivisions (see attached memo). We have recently updated our estimates and are therefore providing an updated memo.

In addition to mainline and service extension costs, we are also providing estimates of the cost of gas meters for different building types including both residential and commercial customers. These estimates are based on PG&E historical jobs.

Developing gas extension cost estimates is complex and the actual costs are project dependent. Costs vary widely with location, terrain, distance to the nearest main, joint trenching, materials, number of dwellings per development, and several other site and job-specific conditions. For these reasons, it is not practical to come up with estimates that represent every case. Instead we are including estimates based on historical averages taken from projects within PG&E's territory. It is not recommended to compare specific project costs to these estimates as any number of factors could lead to higher or lower costs than these averages are representing.

We are also including estimates for in-house gas infrastructure costs and specific plan review costs. These estimates are from external sources, and are not based on PG&E data, but have been provided for the sake of completeness and for use in energy efficiency analysis.

To further anchor the estimates, several assumptions have been made:

1. It is assumed that during new construction, gas infrastructure will likely be joint trenched with electric infrastructure. As a result, the incremental cost of trenching associated with the gas infrastructure alone is minimal. Therefore, all mainline cost estimates exclude trench costs. Service extension cost estimates include both estimates with and without trench costs. In the case where new construction would require overhead electric and underground gas infrastructure, the estimates with trench costs included for service extensions should be utilized.
2. It is assumed that new construction in an existing subdivision would not generally require a mainline extension. In cases where a mainline extension would be required to an existing subdivision, the costs are highly dependent on the location, terrain, and distance to the nearest main.



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- 1. These estimates are for total costs. The cost estimates have not been reduced to account for the portion of the costs paid by all customers due to application of Rule 15<sup>1</sup> and Rule 16<sup>2</sup> allowances. Hence, costs to the specific customer may be lower than the estimates below, as the specific customer benefits from the Rule 15 and Rule 16 allowances.

Table 1: PG&E Gas Infrastructure Cost Estimates

	Existing Subdivision/Development	New Greenfield Subdivision/Development
Mainline Extension	N/A <sup>3</sup>	<u>Single-Family</u> \$17/ft <sup>4</sup>  <u>Multi-Family</u> \$11/ft <sup>4</sup>
Service Extension (Typically 1" pipe from mainline to the meter)	\$6750 per service/building <sup>4</sup> (excludes trench costs)  \$9200 per service/building <sup>4</sup> (includes trench costs)	\$1300 per service/building <sup>4</sup> (includes mainline extension costs within the subdivision; excludes trench costs)  \$1850 per service/building <sup>4</sup> (includes mainline extension costs within the subdivision; includes trench costs)
Meter	<u>Residential Single Family</u> \$300 per meter <sup>5</sup>  <u>Residential Multi-Family</u> \$300 per meter + \$300 per meter manifold outlet <sup>5</sup>  <u>Small/Medium Commercial</u> \$3600 per meter <sup>6</sup>	<u>Residential Single Family</u> \$300 per meter <sup>5</sup>  <u>Residential Multi-Family</u> \$300 per meter + \$300 per meter manifold outlet <sup>5</sup>  <u>Small/Medium Commercial</u> \$3600 per meter <sup>6</sup>

<sup>1</sup> [https://www.pge.com/tariffs/tm2/pdf/ELEC\\_RULES\\_15.pdf](https://www.pge.com/tariffs/tm2/pdf/ELEC_RULES_15.pdf)  
<sup>2</sup> [https://www.pge.com/tariffs/tm2/pdf/ELEC\\_RULES\\_16.pdf](https://www.pge.com/tariffs/tm2/pdf/ELEC_RULES_16.pdf)  
<sup>3</sup> It is assumed that new construction in an existing subdivision would not require a main extension.  
<sup>4</sup> Estimates based on PG&E jobs from Jan 2016 - Dec 2017 from PG&E's Service Planning team.  
<sup>5</sup> Estimates from PG&E's Dedicated Estimating Team. For Multi-Family units, the costs of \$300 per meter and \$300 per meter manifold outlet should be combined for a total of \$600 per meter.  
<sup>6</sup> PG&E Marginal-Customer Access Cost Estimates presented in the 2019 Gas Cost Allocation Proceedings (GCAP), A.17-09-006, Exhibit PG&E-2, Appendix A, Section A, Table A-1. The Average Connection Cost per Customer values were included in the MCAC worksheet that accompanied the GCAP testimony.



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	<u>Large Commercial</u> \$32,000 per meter <sup>5</sup>	<u>Large Commercial</u> \$32,000 per meter <sup>5</sup>
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Note: Service extension cost estimates for New Greenfield Subdivisions include mainline extension costs as well. Therefore, mainline cost estimates can be ignored for the purpose of estimating total project costs.

Table 2: Gas Infrastructure Cost Estimates from Other Sources

	Existing Subdivision/Development	New Greenfield Subdivision/Development
In-House Infrastructure	<u>Single-Family</u> \$800 <sup>7</sup>	<u>Single-Family</u> \$800 <sup>7</sup>
	<u>Multi-Family</u> \$600 per unit <sup>7</sup>	<u>Multi-Family</u> \$600 per unit <sup>7</sup>
	<u>Medium Office</u> \$600-4500 <sup>7,8</sup>	<u>Medium Office</u> \$600-4500 <sup>7,8</sup>
	<u>Medium Retail</u> \$10,000 <sup>8</sup>	<u>Medium Retail</u> \$10,000 <sup>8</sup>
Plan Review (Will vary by city and often not a fixed fee)	<u>Residential</u> Palo Alto - \$850 <sup>9</sup>	<u>Residential</u> Palo Alto - \$850 <sup>9</sup>
	<u>Nonresidential</u> Palo Alto - \$2316 <sup>9</sup>	<u>Nonresidential</u> Palo Alto - \$2316 <sup>9</sup>

Please let us know if there are any follow-up questions or clarifications.

Best regards,

<sup>7</sup> Frontier Energy, Inc., Misti Bruneri & Associates, LLC. 2019. "2019 Cost-effectiveness Study: Low Rise Residential New Construction." Available at: <https://localenergycodes.com/content/performance-ordinances>

<sup>8</sup> TRC, EnergySuff. 2019. "2019 Nonresidential New Construction Reach Code Cost Effectiveness Study." Available at: <https://localenergycodes.com/content/performance-ordinances>

<sup>9</sup> TRC. 2018. "City of Palo Alto 2019 Title 24 Energy Reach Code Cost Effectiveness Analysis Draft." Available at: <http://cityofpaloalto.org/civicax/filebank/documents/66742>

## 7.5 Central Heat Pump Water Heater Comparison

Table 35 presents energy and cost-effectiveness results for a R-134a refrigerant based system design using a Colmac central heat pump water heater in the 5-story prototype. This was only found to be cost-effective based on at least one of the two metrics in Climate Zones 1, 4 in CPAU territory, and 16.

**Table 35. 5-Story Cost-Effectiveness: All-Electric Prescriptive Code with R-134a Heat Pump Water Heater**

Climate Zone	Electric /Gas Utility	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
CZ01	PGE	6%	6%	-1,496	147	(\$155)	(\$1,240)	(\$3,556)	(\$4,223)	3.4	\$2,984	>1	\$5,870
CZ02	PGE	4%	2%	-1,197	120	(\$145)	(\$1,513)	\$1,691	\$2,749	0.0	(\$4,262)	0.5	(\$1,287)
CZ03	PGE	6%	3%	-1,166	120	(\$138)	(\$1,360)	\$1,691	\$2,749	0.0	(\$4,109)	0.8	(\$523)
CZ04	PGE	4%	2%	-1,116	113	(\$76)	(\$49)	\$1,691	\$2,749	0.0	(\$2,798)	0.7	(\$949)
CZ04	CPAU	4%	2%	-1,116	113	\$185	\$7,144	\$1,718	\$2,776	2.6	\$4,368	0.6	(\$976)
CZ05	PGE	5%	2%	-1,161	117	(\$137)	(\$1,391)	\$1,691	\$2,749	0.0	(\$4,140)	0.5	(\$1,412)
CZ05	PGE/SCG	5%	2%	-1,161	117	(\$189)	(\$3,016)	\$1,691	\$2,749	0.0	(\$5,765)	0.5	(\$1,412)
CZ06	SCE/SCG	4%	1%	-1,000	104	(\$92)	(\$879)	\$1,691	\$2,749	0.0	(\$3,628)	0.6	(\$1,013)
CZ07	SDGE	5%	2%	-996	106	(\$183)	(\$3,216)	\$1,691	\$2,749	0.0	(\$5,965)	0.7	(\$936)
CZ08	SCE/SCG	3%	1%	-948	100	(\$156)	(\$2,413)	\$1,691	\$2,749	0.0	(\$5,162)	0.7	(\$695)
CZ09	SCE	3%	0%	-966	100	(\$132)	(\$1,863)	\$1,691	\$2,749	0.0	(\$4,612)	0.7	(\$738)
CZ10	SCE/SCG	3%	1%	-962	84	(\$188)	(\$3,375)	\$1,444	\$2,395	0.0	(\$5,770)	0.3	(\$1,596)
CZ10	SDGE	3%	1%	-962	84	(\$239)	(\$4,959)	\$1,444	\$2,395	0.0	(\$7,354)	0.3	(\$1,596)
CZ11	PGE	4%	3%	-1,029	92	(\$165)	(\$2,487)	\$1,444	\$2,395	0.0	(\$4,882)	0.4	(\$1,367)
CZ12	PGE	4%	3%	-1,081	96	(\$172)	(\$2,591)	\$1,444	\$2,395	0.0	(\$4,986)	0.3	(\$1,667)
CZ12	SMUD/PGE	4%	3%	-1,081	96	\$26	\$1,988	\$1,444	\$2,395	0.8	(\$407)	0.3	(\$1,667)
CZ13	PGE	3%	2%	-976	88	(\$156)	(\$2,361)	\$1,444	\$2,395	0.0	(\$4,756)	0.4	(\$1,452)
CZ14	SCE/SCG	2%	-1%	-1,045	84	(\$210)	(\$3,880)	\$1,444	\$2,395	0.0	(\$6,275)	0.1	(\$2,056)
CZ14	SDGE	2%	-1%	-1,045	84	(\$270)	(\$5,725)	\$1,444	\$2,395	0.0	(\$8,120)	0.1	(\$2,056)
CZ15	SCE/SCG	2%	-1%	-718	65	(\$146)	(\$2,713)	\$1,444	\$2,395	0.0	(\$5,108)	0.3	(\$1,564)
CZ16	PG&E	-5%	6%	-1,913	142	(\$276)	(\$4,142)	(\$3,803)	(\$4,577)	1.1	\$435	1.2	\$746

## 7.6 Summary of Measures by Package

Table 36 provides the details of the measures in each of the efficiency package by climate zone. The measures are the same for the 3-story and 5-story prototypes. Table 37 presents the PV capacities per dwelling unit in the upgrade packages. In Climate Zone 6 for the mixed fuel case in the 5-story prototype there is no upgrade to the PV system capacity as the prescriptive PV system already offset all of the estimated electricity use.

**Table 36. Mixed Fuel Efficiency Package Measures**

Climate Zone	0.70 Roof Solar Reflectance	0.24 U-Factor Windows	0.35 W/cfm	Verified Low Leakage Ducts in Conditioned Space
1			X	X
2				X
3				X
4				X
5				X
6				X
7				X
8				X
9	X			X
10	X		X	X
11	X		X	X
12	X		X	X
13	X		X	X
14	X		X	X
15	X		X	X
16		X	X	X

**Table 37. Upgrade Package PV Capacities (kW-DC)**

Climate Zone	All-Electric + PV		Mixed Fuel + PV	
	3-Story	5-Story	3-Story	5-Story
CZ01	4.41	4.35	3.69	3.43
CZ02	3.56	3.58	3.02	2.98
CZ03	3.31	3.29	2.80	2.72
CZ04	3.21	3.27	2.73	2.75
CZ05	3.04	3.08	2.57	2.55
CZ06	2.91	3.04	2.49	2.68
CZ07	3.09	3.21	2.64	2.74
CZ08	3.18	3.30	2.76	2.86
CZ09	3.04	3.16	2.63	2.73
CZ10	3.20	3.30	2.79	2.86
CZ11	3.90	3.95	3.42	3.43
CZ12	3.53	3.60	3.05	3.08
CZ13	3.77	3.84	3.32	3.36
CZ14	3.20	3.23	2.79	2.79
CZ15	3.93	3.94	3.58	3.58
CZ16	3.79	3.76	2.60	2.90



## 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](https://LocalEnergyCodes.com) to access our resources and sign up for newsletters



Contact [info@localenergycodes.com](mailto:info@localenergycodes.com) for no-charge assistance from expert Reach Code advisors



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## Building Electrification Reach Codes

Jurisdiction	Single Family	Multi Family	Nonresidential	Exceptions	50% Modification (or similar)
City of Campbell	All-electric new buildings	All-electric new buildings	All-electric new buildings with exceptions	Nonresidential: Emergency services, commercial cooking, specific case-use restaurants, industrial processes may be granted an exemption for gas use. Granted exceptions must pre-wire for future electric appliances.	75% >
City of Cupertino	All-electric new buildings	All-electric new buildings	All-electric new buildings with exceptions	Nonresidential: F, H, and L Occupancies, or other similar research & development, Essential Services. Buildings with for-profit restaurants may apply for an exemption. Hotels/motels with greater than 80 rooms may utilize fuel gas for on-site commercial clothes drying equipment. Granted exceptions must pre-wire for future electric appliances.	75% >
City of Menlo Park	All-electric new buildings with exceptions (Prohibition on conversion to Mixed-Fuel buildings.)	All-electric new buildings with exceptions (Prohibition on conversion to Mixed-Fuel buildings.)	All-electric new buildings with exceptions (Prohibition on conversion to Mixed-Fuel buildings.)	Residential: all buildings that are 3 stories or less may contain non-electric cooking appliances and fireplaces.  Nonresidential: Scientific laboratory buildings, emergency centers. For-profit restaurant or employee kitchens may apply for an exemption for gas use / must pre-wire for future electric appliances.	75% >
City of Mountain View	All-electric new buildings	All-electric new buildings	All-electric new buildings with exceptions	Nonresidential: F, H, and L Occupancies	Yes
City of Palo Alto	All-electric new buildings, including ADU's.	All-electric new buildings	All-electric new buildings	None	Yes
City of Redwood City	All-electric new buildings with exceptions	All-electric new buildings with exceptions	All-electric new buildings with exceptions	Residential and Non-residential: Technical Infeasibility	No

Jurisdiction	Single Family	Multi Family	Nonresidential	Exceptions	50% Modification (or similar)
City of San Carlos	All-electric new buildings with exceptions	All-electric new buildings	All-electric new buildings with exceptions	<p>Residential: residential buildings except multi-unit may contain non-electric indoor and outdoor cooking appliances and fireplaces.</p> <p>Non-Residential: Laboratory areas may contain non-electric Space Conditioning Systems; restaurants or commercial kitchens may apply for an exception.</p> <p>Residential and Non-Residential: Infeasibility; no all-electric compliance pathway</p> <p>Exceptions must pre-wire for future electric</p>	Yes
City of San Mateo	All-electric new buildings	All-electric new buildings	All-electric new buildings with exceptions	<p>Non-Residential: buildings containing kitchens located in a place of public accommodation may apply for an exception; laboratories may contain non-electric Space Conditioning Systems</p> <p>Residential and Non-Residential: no all-electric compliance pathway</p>	No
City of Santa Clara	All-electric new buildings	All-electric new buildings	All-electric new buildings with exceptions	<p>Non residential: F, H, and L Occupancies; public agency operated emergency centers; hotels with 80+ guestrooms may use natural gas in on-site laundry facilities; may not use gas unless establishes a non electric option is not available.</p> <p>Residential and Non-Residential: no all-electric compliance pathway</p>	Yes
City of Saratoga	All-electric new buildings with exceptions	All-electric new buildings with exceptions	All-electric new buildings with exceptions	<p>Residential: natural gas cooking appliances; prewire for future electrical appliances.</p> <p>Nonresidential: natural gas cooking appliances; prewire for future electrical appliances. Emergency centers are exempt.</p>	Yes

Jurisdiction	Single Family	Multi Family	Nonresidential	Exceptions	50% Modification (or similar)
City of Sunnyvale	All-electric new buildings	All-electric new buildings	All-electric new buildings with exceptions	<p>Nonresidential: F, H, L Occupancies; municipal emergency centers; non-residential kitchens if applicant establishes no all-electric option</p> <p>Residential and Nonresidential: generators; no all-electric prescriptive compliance pathway</p> <p>Exceptions must pre-wire for future electric</p>	Yes
Los Altos Hills	All-electric new buildings with exceptions	All-electric new buildings with exceptions	n/a	<p>Residential: Indoor and outdoor cooking, outdoor fireplaces, and pool/spa heating</p> <p>Indoor cooking combustion equipment must be pre-wired for future electric</p>	No
Town of Los Gatos	All-electric new buildings	All-electric new buildings	All-electric new buildings with exceptions	Nonresidential: buildings containing kitchens located in a place of public accommodation may apply for an exemption for commercial food heat-processing equipment served by fuel gas	Yes
Town of Portola Valley	All-electric new buildings	All-electric new buildings	All-electric new buildings with exceptions	Non-Residential: The Building Official may grant an exception for non-residential cooking needs or for newly constructed public agency buildings as needed for emergency services.	Yes

# Electric Vehicle Reach Codes

Jurisdiction	Single Family, Duplexes, Townhomes	Multi-Family	Hotel and Motel	Non-residential Office	Other Non-residential (retail and restaurants)
<b>City of Campbell</b>	(1) Level 2 EV Ready 2nd Space: (1) Level 1 EV Ready *including ADU's	40% Level 2 EVCS + 60% Level 1 EV Ready		20% Level 2 EVCS + 30% Level 2 EV- Capable	10% Level 2 EV-Ready + 10% Level 2 EV-Capable
<b>City of Cupertino</b>	(1) Level 2 Ready 2nd Space: (1) Level 1 EV Ready  Parking additions or electrical panel upgrades must have reserved breaker spaces and electrical capacity according to the requirements	40% Level 2 EVCS + 60% Level 1 EV Ready  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with Level 2 EV-Capable. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready. ALMS requirements.	5% Level 2 EVCS + 25% Low Power Level 2 EV-Ready + remaining 10% of spaces with Low Power Level 2 EV-Capable	20% Level 2 EVCS + 30% Level 2 EV- Capable	10% Level 2 EV-Ready + 10% Level 2 EV-Capable.  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with Level 2 EV-Capable. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready. ALMS requirements.
<b>Town of Los Gatos</b>	(1) Level 2 Ready 2nd Space: (1) Level 1 EV Ready	40% Level 2 EVCS + 60% Level 1 EV Ready  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with Level 2 EV-Capable. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready. ALMS requirements.	5% Level 2 EVCS + 25%Low Power Level 2 EV-Ready + remaining 10% of spaces with Low Power Level 2 EV-Capable  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with Level 2 EV-Capable. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready. ALMS requirements.	20% Level 2 EVCS + 30% Level 2 EV- Capable  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with Level 2 EV-Capable. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready. ALMS requirements.	10% Level 2 EV-Ready + 10% Level 2 EV-Capable  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with Level 2 EV-Capable. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready. ALMS requirements.
<b>City of Menlo Park</b>	(1) Level 2 Ready 2nd Space: (1) Level 1 EV Ready	15% Level 2 EVCS + 85% Low Power Level 2 EV Ready		CALGreen Tier 1  Additions/Alterations: shall provide EV spaces as required by Table 5.105.5.1	CALGreen Tier 1  Additions/Alterations: shall provide EV spaces as required by Table 5.105.5.1

Jurisdiction	Single Family, Duplexes, Townhomes	Multi-Family	Hotel and Motel	Non-residential Office	Other Non-residential (retail and restaurants)
<b>City of Mountain View</b>	(1) Level 2 EVCS 2nd Space: (1) Level 1 EV Ready  Additions: Parking additions or electrical panel upgrades must have reserved breaker spaces and electrical capacity to provide one Level 2 EVCS parking space and a Level 1 EV-Ready.	<b>3+ units:</b> 40% Level 2 EVCS + 60% Level 2 EV Ready <b>Every 100 Spaces:</b> Level 3/DC Fast Charger		CALGreen Tier 2  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with EVCS. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready.	CALGreen Tier 2  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with EVCS. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready.
<b>City of Palo Alto</b>	(1) Level 2 EV Ready	1 Level 2 EV Ready per parking space <b>OR</b> 60% Low Power Level 2 5% Level 2 EVSE 25% EV-Capable	10% Level 2 EVCS 30% EV Ready		<b>10-20 Spaces:</b> 20% Level EVSE + 20% Level 2 EV-Capable <b>20&gt; Spaces:</b> 15% Level 2 EVSE + 15% Level 2 EV-Capable
<b>City of Redwood City</b>	(1) Level 2 Ready 2nd Space: (1) Level 1 EV Ready	40% Level 2 EVCS + 60% Level 1 EV Ready	5% Level 2 EVCS + 25% Low Power Level 2 EV-Ready + remaining 10% of spaces with Low Power Level 2 EV-Capable	20% Level 2 EVCS + 10% Level 2 EV-Capable	10% Level 2 EV-Ready + 10% Level 2 EV-Capable
<b>City of San Carlos</b>	(1) Level 2 EV Ready 2nd Space: (1) Level 1 EV Ready *including ADU's	15% Level 2 EVCS + 85% Low Power Level 2 EV Ready	5% Level 2 EVCS + 25% Low Power Level 2 EV-Ready + remaining 10% of spaces with Low Power Level 2 EV-Capable	10% Level 2 EVCS + 10% Level 1 EV Ready + 30% Level 2 EV-Capable	10% Level 2 EV-Ready + 10% Level 2 EV-Capable

Jurisdiction	Single Family, Duplexes, Townhomes	Multi-Family	Hotel and Motel	Non-residential Office	Other Non-residential (retail and restaurants)
City of San Mateo	(1) Level 2 Ready 2nd Space: (1) Level 1 EV Ready	15% Level 2 EVCS + 85% Low Power Level 2 EV Ready  Existing buildings who add new parking facilities or electrical systems/lighting shall include 10% of new spaces with Level 2 EV-Capable.	<20 sleeping units: 15% Level 2 EVCS + 85% Low Power Level 2 EV Ready	20% Level 2 EVCS + 30% Level 2 EV- Capable	10% Level 2 EV-Ready + 10% Level 2 EV-Capable
City of Santa Clara	(1) Level 2 Ready 2nd Space: (1) Level 1 EV Ready  For parking spaces not assigned to a dwelling unit: 25% of the unassigned parking space(s) shall be Level 2 EV Ready spaces, 75% of the unassigned space(s) shall be Low Power Level 2 EV Ready spaces.	<20 units: 1 Level 2 EV Ready per parking space >20 units: 1 Level 2 EV Ready per parking space first 20 Additional unites: 25% Level 2 EV Ready + 75% one Low Power Level 2 EV Ready	<20 Sleeping Units: 1 Level 2 EV Ready per parking space >20 sleeping units: 10% Level 2 EVCS + 50% EV-Capable	35% Level 2 EVCS + 35% Level 1 EV-Capable	35% Level 2 EVCS + 35% Level 1 EV-Capable
City of Saratoga	(1) Level 2 Ready 2nd Space: (1) Level 1 EV Ready	40% Level 2 EVCS + 60% Level 1 EV Ready  Additions: new parking facilities or electrical systems/lighting shall include 10% of new spaces with EVCS. Existing EV Capable spaces shall be upgraded to a minimum of Level 1 EV Ready. ALMS requirements.	Based on total number of parking spaces (see CGBC Table 5.106.5.3.1)	Based on total number of parking spaces (see CGBC Table 5.106.5.3.1)	Based on total number of parking spaces (see CGBC Table 5.106.5.3.1)
City of Sunnyvale	(1) Level 2 Ready 2nd Space: (1) Level 1 EV Ready	30% Level 2 EV Ready + 70% Level 1 EV Ready	20% Level 2 EV Ready + 50% Level 1 EV-Capable	35% Level 2 EVCS + 35% Level 1 EV-Capable	35% Level 2 EVCS + 35% Level 1 EV-Capable <b>Every 100 spaces:</b> Level 3 EVCS



## PUBLIC CORRESPONDENCE

The following is public correspondence received by the City Clerk’s Office after the posting of the original agenda. Individual contact information has been redacted for privacy. This may *not* be a comprehensive collection of the public correspondence, but staff makes its best effort to include all correspondence received to date.

To send correspondence to the City Council, on matters listed on the agenda please email [PublicComment@losaltosca.gov](mailto:PublicComment@losaltosca.gov)



**From:** [Tom Kabat](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM: REACH CODES - April 11, 2023 Meeting  
**Date:** Wednesday, March 29, 2023 12:54:17 PM

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Dear Los Altos City Council,

I'm working in my community to pass the same type of Reach Codes 2.0 that are also being presented to you.

The IPCC and the IEA (international climate science and energy progress bodies) have both determined that the existing fleet of fossil fired machines (including gas water heaters and gas furnaces) will consume all available "tolerable climate space" under the 2 degree C Paris accord limit.

That means that from now on, every **replacement gas-fired** device is entirely over the top of the 2 degree warming limit from day one.

Please join the communities striving to show the needed leadership in pivoting toward a safe climate future by passing the Reach Codes 2.0 as presented by staff **without exceptions**.

We need your support as peers making progress together and building upon each others' good work!

Thank you for looking for ways our generation can leave its best legacy by demonstrating additional progress.

Best regards,

Tom Kabat

Energy Engineer, Environmental Engineer, Mechanical Engineer  
Menlo Park, CA

**From:** [Stephen Hams](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#); [cmiller1119@gmail.com](mailto:cmiller1119@gmail.com)  
**Subject:** PUBLIC COMMENT AGENDA ITEM: REACH CODES - April 11, 2023 Meeting  
**Date:** Wednesday, March 29, 2023 2:26:31 PM

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Dear Los Altos City Council members,

As a long time member of the nonpartisan Citizens' Climate Lobby (CCL,) I appreciate the climate conscious actions the Council has taken over the years. Now you have the opportunity to take another very significant step to help Los Altos towards a healthier climate future.

I support strong Reach Codes to do our part to curb CO2 emissions in Los Altos, and to keep our community safe and healthy. I am sure you are well aware of the health benefits that will accrue to current and future Los Altos residents under the new, stronger proposed Codes.

Therefore, I urge the Council to pass the Reach Codes 2.0 as presented by staff **without exceptions**.

Thank you very much.

Steve Hams  
25 year Los Altos resident (zip code 94022)

**From:** [Cheryl Okuno](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM: REACH CODES - April 11, 2023 Meeting  
**Date:** Wednesday, March 29, 2023 5:57:10 PM

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To Whom It may concern,

I support strong reach codes to do our part as a community to reduce our CO2 emissions for our future. It is important we take action NOW and not wait. We need to start being responsible for our actions and make changes today!

Aloha,  
Cheryl

*I have not, and will not, verify or investigate the information supplied by third parties.*

Compass  
**Cheryl Okuno**  
Broker Associate  
DRE#: 01051270  
[REDACTED] office  
167 S. San Antonio Road  
Los Altos, CA 94022

**From:** [Andrew Meyer](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM: REACH CODES - April 11, 2023 Meeting  
**Date:** Wednesday, March 29, 2023 8:25:04 PM

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Councilmembers - thank you for your ongoing hard work in support of Los Altos! A few years ago, we lost a cabin that had been in our family for 3 generations due to a previously unprecedented fire season that is unfortunately getting more and more common. While it's tempting to refer to this type of extreme weather - whether fires or atmospheric rivers - as "a once in 100 years storm", or more and more commonly "the new normal", even that actually undersells the impact: this isn't "the new normal", it's "the current normal" and has the potential to continue growing more and more extreme if we don't act now.

Every country, every state, every city, and every individual needs to do their part to protect our planet, and that includes the wonderful and kind people I see every week in downtown Los Altos (how lucky I am to have such fantastic neighbors!) - not only for ourselves, but for our beloved family members in younger generations. Methane is an incredibly potent gas - dozens of times more potent than CO2 on a per-unit basis, and the second most impactful climate warmer on an overall basis - and curbing its emission is an important piece of the wider climate solution. I support strong reach codes and urge the council to pass Reach Codes 2.0 as presented by staff without exceptions.

Thanks,  
Andrew Meyer, South Los Altos resident since 2016

**From:** [Kathy Battat](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM: REACH CODES - April 11, 2023 Meeting  
**Date:** Friday, March 31, 2023 11:18:10 AM

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Dear Los Altos City Council,

As a resident of neighboring city, the Town of Hillsborough, I would like to encourage your Council to pass Reach Codes 2.0 as presented by staff without exceptions.

Local jurisdictions of means like ours need to do whatever we can to push the envelope on reducing green house gases. Reach Codes are the best way to require change beyond what the state of California is able to enact state-wide. When cities show resolve to enact Reach Codes it gives the state cover to follow.

I have encouraged Hillsborough to do the same, and we have made progress with Reach Codes that include all electric requirements for water and area heating in major remodels and ADU's in addition to new construction. I encourage Los Altos to do the same. I support strong Reach Codes to curb CO2 emissions and to keep our communities safe and healthy.

Respectfully,

Kathy Battat

**From:** [Naomi](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM: REACH CODES—April 11, 2023 Meeting  
**Date:** Friday, March 31, 2023 12:29:15 PM

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I strongly urge the City Council to pass Reach Codes 2.0. As a high school senior, I'm extremely concerned about climate change—but even more concerned by inaction to curb it. I can confidently say that most people my age share my climate anxiety and support for reach codes. Passing stronger codes affirms that Los Altos cares about the future of its youth.

The recent power outages caused by extreme weather, which will worsen if we continue to burn methane in our homes, also indicate the necessity of reach codes. The only way to decelerate this weather pattern is to decarbonize.

Sincerely, Naomi Schulze

From: Jeffrey Mann
To: City Council
Cc: Public Comment
Subject: Public Comment Agenda Item: Reach Codes - April 11, 2023 Los Altos City Council meeting
Date: Monday, April 3, 2023 6:54:57 AM

Dear Los Altos City Council Members,

I represent San Francisco Bay Physicians for Social Responsibility (SF Bay PSR), a group of hundreds of health professionals in the Bay Area who seek to protect the health of our patients and communities who are threatened by the climate emergency that is destroying our life support system. SF Bay PSR seeks to rapidly advance policies and regulations in support of an equitable transition to all electric buildings. Switching from fossil-fuel appliances to all electric appliances will help protect health and the planet.

I write to urge you to approve the proposed Reach Codes 2.0 as presented by staff without exceptions at your April 11th City Council Meeting. It is essential that the city consider all reasonable measures to prevent new uses of gas and facilitate the necessary transition from fossil gas to address the air quality, health, and safety impacts of current fossil gas use in our homes and other buildings.

A rapid transition away from fossil fuel use is also critical to avoid the very worst and irreversible impacts of climate change. Preventing the continued use of fossil fuels, including "natural gas" (which is primarily methane, a gas that has 80 times the warming power of carbon dioxide), creates more affordable, cleaner, healthier, and more resilient housing and buildings for communities.

While the Intergovernmental Panel on Climate Change (IPCC) report revealed that sadly, a 1.5°C rise in planetary temperature is now unavoidable, the potential to limit warming to below 2°C—and avoid even more catastrophic climate impacts—is still possible if the world can achieve net-zero carbon emissions by 2050.[1] That means we need to begin phasing out fossil fuels right away, including methane gas used to heat and cook with.

1. Building electrification is a key strategy for addressing our climate emergency

"Greenhouse gas (GHG) emissions from California's building sector account for more than a quarter of the state's total emissions. Direct emissions from building fossil fuel use account for 10–15% of the total. These emissions result primarily from both the combustion of gas in buildings for cooking, heating, and water heating as well as from methane leaks throughout the gas distribution system." [2]

Building electrification (BE), defined as "replacing gas with efficient electric appliances in existing buildings and constructing new building as all-electric" is the primary approach to building decarbonization.

Phasing out gas use provides many benefits to community health, safety, and a stable climate future. Extending these benefits to existing homes and buildings is now urgently needed.

2. Building electrification prevents toxic exposures to air pollution from gas stoves and other gas appliances. These are some of the health effects of exposure to natural gas.

California has the highest percentage of gas stove use in the country. 88% of all California households (11.5 million in total) having natural gas service in 2020; typically, 70% of these households cook with a natural gas stove or oven. [3]

Natural gas throughout California contains numerous hazardous air pollutants that are linked to cancer, asthma, and the formation of smog. [4]

Scientists documented that even when gas stoves are off they can leak benzene (a known carcinogen) in concentrations such that indoor air concentrations are on a par with secondhand smoke.

Homes with gas stoves can emit nitrogen dioxide concentrations that are 50-400% higher than homes with electric stoves. Nitrogen dioxide causes direct damage to people's lungs, and is one of the primary causes of smog. [5]

Children in homes with gas stoves have a 42% increased risk of experiencing asthma symptoms, a 24% increased risk of ever being diagnosed with asthma by a doctor, and an overall 32% increased risk of both current and lifetime asthma. [5]

Chronic exposure to elevated fine particulate matter (also known as PM2.5) has the potential to damage human respiratory systems, the cardiovascular system, is harmful to pregnant women, and is one of the leading causes of premature death throughout the world. [5]

Improperly vented gas appliances lead to carbon monoxide poisoning that result in thousands of emergency room visits and several hundred deaths every year. [5]

3. Pollution from gas stoves disproportionately harms children in communities of color

African-American and Hispanic children with asthma are likely the most disproportionately burdened by indoor air pollution from gas stoves.

Poor people without adequate heating will often use gas stoves to heat their home which contributes to indoor air pollution.

Lower-income and communities of color are three times more likely to live in an area with poor outdoor air quality, which compounds indoor air pollution health harms. [5]

4. Other benefits of building electrification

Electrifying our building stock produces a new demand for skilled workers. A 2019 UCLA study [2] documented that building electrification in California could support an average of 64,200–104,100 jobs annually, after accounting for losses in the gas industry. The greatest increases in employment would be building retrofits and renewable energy construction, while the greatest decreases would be in gas distribution followed by labor-saving all-electric new construction. However, the negative labor impacts are much smaller than the positive impacts.

- All-Electric homes and buildings are more efficient. According to the California Energy Commission, a modern high-efficiency heat pump electric water heater (available at all major retailers) costs roughly one-third less on utility bills to operate than the most efficient gas water heater. [6] In addition, electric heat pump heating also provides air-conditioning, resulting in less equipment, reduced maintenance costs, and greater climate resilience.
Public Safety: Methane gas is highly flammable. In the past 10 years, 9,000 gas explosions in the U.S have killed more than 500 people, and gas leaks have displaced and sickened thousands of people. [7] Methane gas also caused half the fires after two major California earthquakes. [8]
Climate: All-electric buildings are a practical step forward to address the climate crisis, by breaking the cycle of fossil fuel dependency in buildings. This is the single biggest step that cities can take to address climate.
Resilience: Switching from gas to electric at the time of remodel or replacement helps avoid a complex, costly and likely inevitable switch to all-electric heating and appliances in the future, since gas prices are expected to rise sharply, and California is planning to eventually end gas distribution. The California Public Utilities Commission estimates that natural



gas rates will increase at twice the rate of electricity through the next 10 years.<sup>[6]</sup>

Thank you for considering our comments. We would be pleased to provide additional information or respond to any questions that might arise.

Jeffrey A. Mann, M.D.  
Lafayette, California  
for Physicians for Social Responsibility

References

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7. Joseph, George. "30 Years of Oil and Gas Pipeline Accidents, Mapped." Citylab. November 30, 2016
8. Los Angeles in 1994 and San Francisco in 1989, according to the California Seismic Safety Commission. (2002). "Improving Natural Gas Safety in Earthquakes." SSC-02-03

**From:** [Jeff Byron](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** Input from a former California Energy Commissioner on Reach Codes for April 11, 2023 Meeting  
**Date:** Tuesday, April 4, 2023 5:13:30 PM

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Dear Council Member,

My family has resided in Los Altos now for 40 years. I have also spent my entire career working on environmental and energy issues and was a California Energy Commissioner from 2005 to 2011. So, I'm familiar with building and efficiency standards as well as the state's long-term goals to reduce greenhouse gases and the impact on climate change. I'm also aware of the challenges that changing the status quo represents for local government leaders like yourselves. And it isn't stated nearly enough, how fortunate we Los Alto-lites are to have such committed public servants governing our city.

I understand the first reading of the ordinance to adopt Reach Codes 2.0 will likely be before the council next week —another complex issue for you to understand and decide. I urge you to vote in favor of the thoughtful staff recommendations. Your vote will demonstrate a conviction to address climate change for our city, ensure future residents will save money on their electricity bills, and provide the leadership that our children are counting on.

I would be happy to talk or meet with you about home electrification, energy policy, and answer your questions. I could also give you a brief tour of our retro-fitted all-electric home so you could see for yourself what this is all about.

Thank you for your consideration.

Best,  
Jeff Byron  


**From:** [Young, Michael](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM: REACH CODES - April 11, 2023 Meeting  
**Date:** Tuesday, April 4, 2023 11:21:01 PM

---

I am writing to express my strong support of Reach Codes without exceptions to keep our Los Altos community safe and healthy and to curb carbon dioxide emissions.

As a Los Altos resident with personal experience with chronic respiratory illness, I am asking that the city pass Reach Codes 2.0 to protect the health of me, my family, and my community. Not only would Reach Codes reduce outdoor air pollution, but they would also shield us from harmful substances in our own homes.

Moreover, Reach Codes 2.0 would significantly reduce our carbon dioxide emissions and aligns with Los Altos's Climate Action and Adaptation Plan, something I strongly support as well.

Sincerely,  
Michael Young  
Los Altos Resident  
Los Altos High School Student

**From:** [Cai, Grace](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM 6: REACH CODES - April 11th, 2023 Meeting  
**Date:** Wednesday, April 5, 2023 11:52:28 AM

---

I am writing to express my strong support of Reach Codes without exceptions to keep our Los Altos community safe and healthy and to curb carbon dioxide emissions.

As a Los Altos resident that cares about the health of my community, I am asking that the city pass Reach Codes 2.0 to reduce air pollution both indoors and outdoors.

Also, Reach Codes 2.0 would aid in decreasing carbon dioxide emissions, a goal in line with Los Altos's Climate Action and Adaptation Plan.

Sincerely,  
Grace Cai  
Los Altos Resident  
Los Altos High School Student  
Los Altos Rotary Interact Club Co-President

**From:** [Fenner, Ace](#)  
**To:** [City Council](#)  
**Cc:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM: REACH CODES - April 11, 2023 Meeting  
**Date:** Wednesday, April 5, 2023 1:01:41 PM

---

I am writing to express my strong support of Reach Codes without exceptions to keep our community safe and healthy.

Coming from a family of people with Asthma I am asking that the city pass Rach Codes 2.0 to protect my family and my community.

Sincerely,  
Ace Fenner  
Los Altos High School Student



## PUBLIC CORRESPONDENCE

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To send correspondence to the City Council, on matters listed on the agenda please email [PublicComment@losaltosca.gov](mailto:PublicComment@losaltosca.gov)

**From:** [Bill Hough](#)  
**To:** [City Council](#); [Public Comment](#)  
**Subject:** public comment regarding item #7 on 4/11/2023 agenda  
**Date:** Friday, April 7, 2023 7:37:12 PM

---

I strongly object to the Environmental Commission recommendations that all new residences and all major remodels (defined as 50% of structure OR if cost of remodel is \$250,000 or more) be required to be all electric with no exceptions. That means no gas stovetop or fireplace as currently allowed.

Most annoying and unreasonable is the proposal that if any existing gas appliances including gas furnaces and your gas cooking appliances break, you will be required to replace them with all electric appliances. This will place an undue burden on retired people on reduced incomes who are already getting hammered by massive inflation in this miserable economy.

We are constantly being warned about blackouts due to an over stressed electrical grid. Half the town lost power for several days last month. These "reach codes" will only make this matter worse. And all this virtue signaling will have no impact on global warming as long as China and India continue burning fossil fuels.

There is talk of a cost effectiveness study. This needs to factor in the expense to homeowners who will have to pay for these expensive retrofits. If the city is going to mandate us to get rid of gas appliances, they should reimburse residents for this unfunded mandate.

I'll believe global warming is a problem when the rich people who are telling me it is a problem start ACTING like it is a problem. They can start by getting rid their carbon-spewing private jets.

The bottom line is that I do NOT support ANY gas ban and I oppose adopting these codes.

Bill Hough  
Los Altos resident and taxpayer



Virus-free [www.avg.com](http://www.avg.com)



**From:** [Victoria Byrd](#)  
**To:** [Gabriel Engeland](#); [City Council](#); [Jonathan Weinberg](#); [Public Comment](#)  
**Subject:** Re: I oppose banning gas appliances.  
**Date:** Sunday, April 9, 2023 8:07:29 AM  
**Attachments:** [Outlook-wi2qjzt3.png](#)

Hi Gabriel and Jonathan, I oppose the requirement for all electric homes for newly constructed properties or when a property renovation/addition is equal to or greater than 50% of the total square footage of the structure or \$250,000 in value.

Victoria Byrd  
1516 Wistaria Ln, Los Altos, CA 94024  
650-810-5730

On Sat, Apr 8, 2023 at 10:39 AM Gabriel Engeland <[gengeland@losaltosca.gov](mailto:gengeland@losaltosca.gov)> wrote:

Thank you for the email, Ms Byrd. The Environmental Commission did not recommend a gas ban for appliances. The requirement for all electric homes is for newly constructed properties or when a property renovation/addition is equal to or greater than 50% of the total square footage of the structure or \$250,000 in value.

If you would like your email included in public comment, please forward it to "PublicComment@LosAltosCA.Gov"

I have copied the City Council on this email, but moved them to BCC.

Thanks,  
Gabe

*Latest Los Altos news at your fingertips: [Sign up for the City Manager Weekly Update.](#)*



Gabriel Engeland  
City Manager, City of Los Altos

(650) 947-2740 | [www.losaltosca.gov](http://www.losaltosca.gov)  
1 N. San Antonio Road | Los Altos, CA 94022

**From:** Victoria Byrd <[victoriabyrd@gmail.com](mailto:victoriabyrd@gmail.com)>  
**Sent:** Saturday, April 8, 2023 7:19 AM

**To:** [PublicComments@losaltosca.gov](mailto:PublicComments@losaltosca.gov) <[PublicComments@losaltosca.gov](mailto:PublicComments@losaltosca.gov)>; City Council  
<[council@losaltosca.gov](mailto:council@losaltosca.gov)>

**Subject:** I oppose banning gas appliances.

I oppose banning gas appliances.

Victoria Byrd  
1516 Wistaria Ln, Los Altos, CA 94024  
650-810-5730

**From:** [Victoria Byrd](#)  
**To:** [City Council](#); [Public Comment](#)  
**Subject:** proposed REACH codes  
**Date:** Sunday, April 9, 2023 8:14:10 AM

---

I oppose the current proposed REACH codes that would require all electric homes for newly constructed properties or when a property renovation/addition is equal to or greater than 50% of the total square footage of the structure or \$250,000 in value.

To clarify further, I oppose REACH codes or any city ordinance, requirement, rule or guideline that in any way restricts, inhibits, limits or otherwise impedes my ability to install or repair gas appliances in the future.

Victoria Byrd  
1516 Wistaria Ln, Los Altos, CA 94024  
650-810-5730

**From:** [Victoria Byrd](#)  
**To:** [Gabriel Engeland](#); [City Council](#); [Jonathan Weinberg](#); [Public Comment](#)  
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Gabe

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1 N. San Antonio Road | Los Altos, CA 94022

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<[council@losaltosca.gov](mailto:council@losaltosca.gov)>

**Subject:** I oppose banning gas appliances.

I oppose banning gas appliances.

Victoria Byrd  
1516 Wistaria Ln, Los Altos, CA 94024  
650-810-5730

**From:** [Victoria Byrd](#)  
**To:** [City Council](#); [Public Comment](#)  
**Subject:** proposed REACH codes  
**Date:** Sunday, April 9, 2023 8:14:10 AM

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Victoria Byrd  
1516 Wistaria Ln, Los Altos, CA 94024  
650-810-5730

**From:** [Couture, Terri](#)  
**To:** [Public Comment](#)  
**Subject:** los altos city council meeting public comment - April 11 Agenda item 7  
**Date:** Sunday, April 9, 2023 10:12:30 AM

---

Dear City Council members, City manager and Los Altos members

Restricting your community’s ability to seek multiple energy avenues infringes on local community rights. Many nations continue and even increase their dirty energy policies to the economic and health detriment of our State’s residents.

In the USA, 39% of our electricity is made from natural gas and 60% is made from fossil fuels. (see US Energy Admin report Feb 2023). California is the 4<sup>th</sup> largest producer of USA energy. Alternatively for instance, in China 70% of the electricity is made by burning coal. Those dirty air by products travel with winds and currents internationally, and 2 new coal burning plants are brought online internationally every week.

In many nations the US dollar is being devalued. There are many consequences.

You say, then let’s use solar! Solar isn’t 24 hours a day producer. The dirty manufacture of batteries and panels pollute the world, not to mention the abuse of young & poor workers. Furthermore the batteries and panels are not recyclable.

Where is the full disclosure study? Why are you not seeking the complete consequences to protect our community?

Sincerely, Fred Tuerk

**\*Wire Fraud is Real\*. Before wiring any money, call the intended recipient at a number you know is valid to confirm the instructions.** Additionally, please note that the sender does not have authority to bind a party to a real estate contract via written or verbal communication.



To L A Council Members -

Mon. 4/10/23

Agenda Item # 7.

Re: Ban on gas stoves being considered <sup>meeting</sup> on Tues 4/11-PM

I urge a "no" vote. Replacing appliances must remain an individual owner's choice. Everyone's circumstances and needs are different and it's a distinct overreach for Council to mandate their own preferences onto others. We're mainly an educated community and I believe we are each addressing the climate change situation/reality in a way best suited to each individual and their circumstances.

Jackie Stephens  
1535 Vineyard Dr. LA 94024  
ieee\_vts@sprynet.com



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To send correspondence to the City Council, on matters listed on the agenda please email [PublicComment@losaltosca.gov](mailto:PublicComment@losaltosca.gov)

**From:** [Maya Johnson](#)  
**To:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT AGENDA ITEM 7 - April 11, 2023  
**Date:** Monday, April 10, 2023 9:56:43 PM

---

To the Los Altos City Council,

Please pass the Reach Codes as proposed with no exceptions. I believe this will be beneficial to Los Altos residents, myself included, for a number of reasons.

For one, there are currently several rebates and tax credits residents can take advantage of for switching from gas to electric appliances. In fact, these incentives make it less expensive to switch from old gas to new electric appliances than old gas to new gas appliances. Our Silicon Valley Clean Energy Rebates can be seen [here](#). The Cost Effectiveness Studies did not include such incentives, and we should take them into consideration.

In addition, there are health benefits from reducing indoor air pollution when switching from gas to electric appliances. Looking ahead to the future regulation, the Bay Area Air Quality Management District made rulings to address indoor health risks. In March, the BAAQMD ruled to [ban most new gas water heaters after 2027 and gas furnaces after 2029](#). Passing the Reach Code now will help prepare Los Altos residents for this ruling. Rather than putting in an expensive gas line and investing in appliances that will become obsolete, they can invest in electric appliances now.

Finally, of course, there are the climate benefits. Please help pass the current Reach Code and start planning for a more aggressive one for the next cycle beginning in January 2026.

Sincerely,  
Maya Hardiman

**From:** [Ava Seto](#)  
**To:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT - AGENDA ITEM: REACH CODES - MEETING 4/11/23  
**Date:** Monday, April 10, 2023 10:40:08 PM

---

Dear Los Altos Council Members,

I support the passing of Reach Codes 2.0. Mandating the installation of electric furnaces will be cost-effective and sustainable. Page 18 of Attachment 3, Cost Effectiveness Studies, shows how an All-electric HVAC system can be \$200,000 less than a mixed fuel system. Since Los Altos has partnered with Silicon Valley Clean Energy, the source of the electricity is from renewable energy sources. Although an electric furnace installation may cost more than a gas furnace repair, the positive effects on successive future generations will outweigh the one-time cost. Thus, installing electric furnaces will be cost-efficient while still reducing emissions.

In addition, the installation of electric furnaces will reduce gas emissions and will ensure the safety and health of Los Altos residents. Gas emissions contribute to the atmosphere's ability to hold more moisture and to have extreme rainfalls and storms. These past few months we have witnessed the damage that these extreme storms can have on homeowners' properties and electricity supply.

Gas emissions also contribute to extreme temperatures in the summer that allow California to be vulnerable to wildfires which will pollute the air and can be hazardous to people's health especially those of young children and elderly people. Electric furnaces would reduce the intensity of the storms' and droughts' repercussions.

As a result, passing Reach Codes 2.0 will have economic, health, and safety benefits.

Thank you for your consideration,  
Ava  
High school student - MVLA School District

**From:** [Steve Smith](#)  
**To:** [Public Comment](#)  
**Subject:** April 11 City Council Meeting, item 7, REACH  
**Date:** Tuesday, April 11, 2023 8:24:34 AM

---

Dear City Council,

I wish to voice my concern over the definition of new construction within the proposed REACH codes. While I agree with the 50% rule, I find numerous issues with the \$250,000 rule.

Given our construction costs, \$250K buys a 300 - 400 square foot addition, which is way way less than 50% of the average Los Altos home's square footage.

More importantly, fixed numbers that are not indexed for inflation are extremely bad policy. Maybe I should ask the IRS to stop adjusting the tax brackets for inflation?????

I therefore request that you give serious consideration to one of the following improvements:

A) Remove the \$250,000 rule in its entirety.

OR

B) Do BOTH of the following:

1) Raise the \$250K to a number that approximates a smaller home's 50% remodel costs,

**AND**

2) Add an inflation clause to the effect of "compounded annually every Jan 1 based on \_\_\_\_\_" where you can use JUST ONE of the following ideas to fill in the blank:

a) A suitable local construction rate of inflation

OR

b) 150% of the CPI (construction costs inflate much more rapidly than CPI, do feel to come up with a slightly different percentage).

Thank you for your consideration of these improvements

Steve Smith

**From:** [Pat Marriot](#)  
**To:** [Public Comment](#)  
**Subject:** PUBLIC COMMENT ITEM #7 APRIL 11, 2023 REACH CODES  
**Date:** Tuesday, April 11, 2023 8:58:13 AM

---

Council Members:

Please do not ban gas stoves in remodels. There have been many long power outages recently, which are likely to continue in the future. A gas cooktop at least let people have warm food.

“California’s power grid operator says \$9.3 billion in new projects is needed over the next decade to support the state’s shift to renewable energy and plug-in cars. ... The transmission plan is based on state projections that California will need to add 40 gigawatts to 70 gigawatts of power generation over the next 10 years, depending on how quickly consumers switch to electric cars and electric home appliances. California’s highest-ever recorded power demand, set in September, was 52 gigawatts.” <https://financialpost.com/pmn/business-pmn/california-grid-needs-9-3-billion-upgrade-in-renewables-shift>

Also, \$250,000 does not buy much of a remodel these days. I think it would be best to leave square footage as a measure of remodel that requires conversion to electric.

Thanks for listening,

Pat Marriott

**From:** [Cathy Quinlan](#)  
**To:** [Public Comment](#)  
**Subject:** Gas v electric  
**Date:** Tuesday, April 11, 2023 10:27:24 AM

---

Hello public servants;

Gas vs. Electric; This should be OUR choice. After what we all went through this winter, with no electricity. I had to throw out my entire fridge/freezer! The people with GAS generators were able to function for the FOUR DAYS that we had no power. Unless you can let us in on a plan to solve that, please don't take away gas.

Thank you for listening.

Cathy Quinlan





### AGENDA REPORT SUMMARY

**Meeting Date:** April 11, 2023

**Subject:** Los Altos Council and Commissions Teleconference Policy

**Prepared by:** Anthony Carnesecca, Assistant to the City Manager

**Reviewed by:** Jon Maginot, Assistant City Manager

**Approved by:** Gabriel Engeland, City Manager

**Attachment(s):**

**Initiated by:**  
City Council

**Previous Council Consideration:**  
March 28, 2023

**Fiscal Impact:**  
None

**Environmental Review:**  
Not applicable

**Policy Question(s) for Council Consideration:**

- Does the City Council wish to amend the Council Norms & Procedures and Commission Handbook to allow teleconferencing under certain circumstances in accordance with state law?

**Summary:**

- City Council provided direction at the City Council meeting on March 28, 2023, for staff to bring back a policy allowing teleconferencing under certain circumstances in accordance with state law for Councilmembers and Commissioners.

**Staff Recommendation:**

- Add Section 11.13 Teleconferencing to the Council Norms & Procedures, which will allow Council members to teleconference under certain circumstances in accordance with state law.
- Amend the Commission Handbook section “Teleconferencing” to allow Commission members to teleconference under certain circumstances in accordance with state law.
- Direct staff to come back with an update on this policy in six months.

City Manager

GE

Reviewed By:

City Attorney

JH

Finance Director

JD



**Subject:** Los Altos Council and Commissions Teleconference Policy

---

**Purpose**

Allow City Councilmembers and Commission members to teleconference under certain circumstances in accordance with state law.

**Background**

The City Council Norms & Procedures does not have a section that outlines the rules for Council members teleconferencing into Council meetings.

The Commissioner Handbook has a section that clearly prohibits Commission members from teleconferencing into meetings.

City Council directed staff at their meeting on March 28, 2023 to bring back a policy that will allow City Councilmembers and Commission members to teleconference under certain circumstances in accordance with state law.

Furthermore, Council wanted to ensure that Councilmembers and Commissioners would have the same policy applied to the City Commissions as the City Council.

**Discussion/Analysis**

Staff recommends to add Section 11.13 Teleconferencing into the Council Norms & Procedures with the following language:

“City Council members may participate in meetings via teleconference in accordance with State law (Gov. Code sec. 54953 and AB 2449). Members participating via teleconferencing under AB 2449 (Just Cause or Emergency Circumstances) must participate via audio and visual methods. In all other circumstances, members participating via teleconferencing shall participate via audio and visual methods, when practical. Members may participate via teleconference in no more than 20% of meetings in a calendar year (January to December), whether utilizing provisions of the traditional Brown Act or Just Cause or Emergency Circumstances. All meetings of the City Council must have a majority of members present in the physical meeting location within the City.

At the beginning of a meeting in which a member is participating via teleconference, the Mayor, or the Vice Mayor if the Mayor is participating remotely, will ask the member(s) participating via teleconference to confirm the teleconference location was properly noticed according to State Law, the teleconference location is accessible to members of the public and whether anyone is present in the teleconference location besides the member.



**Subject:** Los Altos Council and Commissions Teleconference Policy

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Currently, the “Teleconferencing” section of the Commission Handbook states the following:

“Commission members shall not participate in meetings by teleconference.”

Staff recommends amending the “Teleconferencing” section of the Commission Handbook with the following language:

“Commission members may participate in meetings via teleconference in accordance with State law (Gov. Code sec. 54953 and AB 2449). Members participating via teleconferencing under AB 2449 (Just Cause or Emergency Circumstances) must participate via audio and visual methods. In all other circumstances, members participating via teleconferencing shall participate via audio and visual methods, when practical. Members may participate via teleconference in no more than 20% of meetings in a calendar year (January to December), whether utilizing provisions of the traditional Brown Act or Just Cause or Emergency Circumstances. All meetings of the Commission must have a majority of members present in the physical meeting location within the City.

At the beginning of a meeting in which a member is participating via teleconference, the Chair, or the Vice Chair if the Chair is participating remotely, will ask the member(s) participating via teleconference to confirm the teleconference location was properly noticed according to State Law, the teleconference location is accessible to members of the public and whether anyone is present in the teleconference location besides the member.”

This policy will go into effect immediately and staff will return to City Council with a report in six months on how this policy has impacted the Council and Commissions

**Staff Recommendation:**

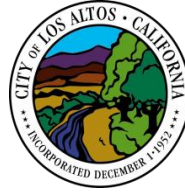
- Add Section 11.13 Teleconferencing to the Council Norms & Procedures, which will allow Council members to teleconference under certain circumstances in accordance with state law.
- Amend the Commission Handbook section “Teleconferencing” to allow Commission members to teleconference under certain circumstances in accordance with state law.
- Direct staff to come back with an update on this policy in six months.



**City of Los Altos 2023 Tentative Council Agenda Calendar**

All items and dates are tentative and subject to change unless a specific date has been noticed for a legally required Public Hearing. Items may be added or removed from the shown date at any time and for any reason prior to the publication of the agenda eight days prior to the next Council meeting.

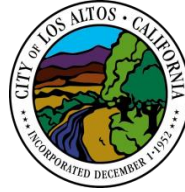
Date	Agenda Item (Date identified by Council)	Agenda Section (Consent, Discussion Item - note in red if Public Hearing)	Dept/ Date of request to add.
<b>APRIL 25, 2023</b>	<b>Study Session - Halsey House update –530 Start Time</b>	Info	Aida
	<b>REGULAR COUNCIL MEETING</b>		
	Treasury Report	Consent	June
	Noise Ordinance	Discussion	Nick
	Housing Element Update	Discussion	Nick
	POA MOU Ratification	Consent	Irene
	Reach Codes; 2 <sup>nd</sup> reading and adoption	Consent	ESUD
	CHAC Update	Discussion	Mayor
	HHW Amendment #2 with SCC	Consent	Aida
	License Plate readers	Discission	Angela
	Emergency Operations Report	Info	Angela
	Sewer Master Plans	Info	Aida
<b>May 9, 2023</b>	<b>Study Session Storm Water Master Plan</b>		Aida
<b>May 9, 2023</b>	<b>REGULAR COUNCIL MEETING</b>		
	3rd Quarter Report		
	Review Council Norms and Procedures	Discussion	Gabe
	Solid Waste Rates	Discission	Aida
	Approval of Final Map of 140 Lyell St	Consent	Jim
	Gas Powered Leaf Blowers	Discussion	Nick
	Adopt by reference the IBC Property Maintenance Code	Public Hearing	Nick
	Resolution for approval of guidelines for Prop 218	Consent	Aida



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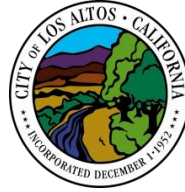
Date	Agenda Item (Date identified by Council)	Agenda Section (Consent, Discussion Item - note in red if Public Hearing)	Dept.
May 23, 2023	<b>FY23-24 Budget Study Session</b>		June
May 23, 2023	<b>REGULAR COUNCIL MEETING</b>		
	1 <sup>st</sup> Amendment to Agreement with CO+ED Architecture	Consent	Jim
	Treasury Report	Consent	June
	Council Non-Profit Civic Organization Contribution	Discussion	Anthony
June 13, 2023	<b>REGULAR COUNCIL MEETING</b>		
	Adopt Resolution No. 2022-XX approving the Report of Sewer Service Charges and directing the Filing of Charges for Collection by the Tax Collector	<b>2 Printed Public Hearing - - not less than 10 days - published once a week for two consecutive weeks 5/11/2022 &amp; 5/18/2022</b>	
	Present 2023/24 Budget	<b>Public Hearing</b>	June
June 27, 2023	<b>REGULAR COUNCIL MEETING</b>		
	Treasury Report	Consent	June
	Adopt 2023/24 Budget	Consent	June
	MidPen Board Member Presentation	Special Item	Mayor
July 11, 2023	<b>REGULAR COUNCIL MEETING</b>		
August 22, 2023	<b>REGULAR COUNCIL MEETING</b>		



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Date	Agenda Item (Date identified by Council)	Agenda Section (Consent, Discussion Item - note in red if Public Hearing)	Dept.
	Treasury Report	Consent	June
<b>September 12, 2023</b>	<b>REGULAR COUNCIL MEETING</b>		
<b>September 26, 2023</b>	REGULAR COUNCIL MEETING		
	Year End tentative report – September (if needed)		
	Treasury Report	Consent	June
<b>October 10, 2023</b>	<b>REGULAR COUNCIL MEETING</b>		
<b>October 24, 2023</b>	<b>REGULAR COUNCIL MEETING</b>		
	Treasury Report	Consent	June
<b>November 14, 2023</b>	<b>REGULAR COUNCIL MEETING</b>		
	1st Quarter report FY 2021/2022		
<b>November 28, 2023</b>	<b>REGULAR COUNCIL MEETING</b>		
	Treasury Report	Consent	June
<b>December 5, 2023</b>	<b>Council Reorganization</b>		
<b>December 12, 2023</b>	<b>REGULAR COUNCIL MEETING</b>		
	(ACFR)and Year End – 1st meeting December		



City of Los Altos Tentative Council Agenda Calendar

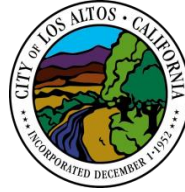
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Future Agenda Topics To Be Scheduled....

May is Bike Month Proclamation	Special Item	Mayor
Comprehensive multi-modal traffic study (analysis of recent projects projected parking, trip generation, & traffic impacts to actuals; ECR impacts should include adjacent streets) – Jim		ES
PCI Report – Jim		
MWENDO – Council (with Env Commission)		
Dark Skies Ordinance (LLE/JW/NF/ 2/21/2023)		
Update to personnel rules– HR	Consent	HR
Cities Association JPA – Council	Discussion	Angel
Future Agenda Item Policy Update	Discussion	Anthony
Acceptance of the CCTV Video Inspection; Project WW01011	Consent	Aida
Flag Policy Pilot, 2 <sup>nd</sup> Nov Meeting 2023	Discussion	Council
SB 423 – Support or Oppose	Discussion	NF
SVCE Electrification Grant	Consent	Aida
Bicycle parking ratio ordinance (HEU)	Discussion	Nick
Acceptance of the Council Chamber AV project	Consent	Aida





City of Los Altos Tentative Council Agenda Calendar

All items and dates are tentative and subject to change unless a specific date has been noticed for a legally required Public Hearing. Items may be added or removed from the shown date at any time and for any reason prior to the publication of the agenda eight days prior to the next Council meeting.

Date	Agenda Item (Date identified by Council)	Agenda Section (Consent, Discussion Item - note in red if Public Hearing)	Dept.
	City wide parking analysis – (HEU)	Study Session	Nick
	Design Contract for S 1 <sup>st</sup> Street scape	Consent	Jim

PROGRAM	SUB PROJECT	INITIATION DATE	HEU COMPLETION DATE	STATUS
Program 2.D: Encourage and streamline Accessory Dwelling Units (ADUs).	Budget & Hire Planning Technician		December 31, 2022	COMPLETED
Program 2.D: Encourage and streamline Accessory Dwelling Units (ADUs).	Amend ADU Ordinance based upon HCD's letter		6 months or less	
Program 3.H: Amend design review process and requirements.	Eliminate 3rd Party Architectural Review		February 28, 2023	COMPLETED
Program 3.H: Amend design review process and requirements.	Dismiss Design Review Commission		February 28, 2023	COMPLETED
Program 3.L: Eliminate the requirement of story poles.			March 31, 2023	COMPLETED
Program 2.E: Conduct annual ADU rental income surveys.	Budget & Hire Housing	March 31, 2023		BUDGET DEPENDENT
Program 4.J: Facilitate alternate modes of transportation for	Adopt VMT Policy &		June 30, 2023	COMPLETED
Program 2.D: Encourage and streamline Accessory Dwelling Units (ADUs).	RFP-Permit Ready ADU Plans		July 31, 2023	DEVELOPING RFP
Program 1.H: Facilitate housing on City-owned sites.	Financial Analysis	July 1, 2023	December 31, 2023	DEVELOPING RFP
Program 3.D: Evaluate and adjust impact fees.		August 1, 2023	December 31, 2024	RFP RELEASED 4/10/23
Program 1.H: Facilitate housing on City-owned sites.	Release RFP	December 31, 2023		
Program 6.C: Target housing development in highest resource areas.	Initial Outreach		September 31, 2023	
Program 6.D: Promote Housing Choice (Section 8) rental assistance program.			September 31, 2023	
Program 2.A: Continue to implement and enhance inclusionary housing requirements.			December 31, 2023	IN-PROGRESS
Program 2.B: Establish an affordable housing in-lieu fee and commercial linkage fee.	Housing in-lieu fee.		December 31, 2023	IN-PROGRESS
Program 2.F: Water and Sewer Service Providers.			December 31, 2023	
Program 3.B: Modify building height in mixed-use zoning districts.	Downtown Districts		December 31, 2023	
Program 3.E: Ensure that the density bonus ordinance remains consistent with State law.			December 31, 2023	ONGOING
Program 3.H: Amend design review process and requirements.	Code Amendments		December 31, 2023	COMPLETED

Program 3.K: Standardize multimodal transportation requirements.	Bicycle Storage and Charging Regulations		December 31, 2023	<b>IN-PROGRESS</b>
Program 3.K: Standardize multimodal transportation requirements.	Remove CSC Review of Housing Developments		December 31, 2023	<b>COMPLETED</b>
Program 4.C: Allow Low Barrier Navigation Centers consistent with AB 101.			December 31, 2023	
Program 4.D: Allow transitional and supportive housing consistent with State law.			December 31, 2023	
Program 4.E: Allow employee/farmworker housing consistent with State law.			December 31, 2023	
Program 4.F: Reasonably accommodate disabled persons' housing needs.			December 31, 2023	
Program 6.B: Maintain and expand an inventory of affordable housing funding sources.	Prepare Inventory.		December 31, 2023	
Program 6.E: Prepare and distribute anti-displacement information.			December 31, 2023	
Program 1.A: Rezone for RHNA shortfall.			January 31, 2024	
Program 1.G: Rezone housing sites from previous Housing Elements.			January 31, 2024	
Program 3.G: Amend Conditional Use Permits findings applicable to housing developments.			March 31, 2024	
Program 3.I: Allow residential care facilities consistent with State law.			March 31, 2024	
Program 3.J: Explicitly allow manufactured homes consistent with State law.			March 31, 2024	
Program 3.F: Reduce Conditional Use Permit requirement for residential mixed-use and multi-family.			September 31, 2024	
Program 1.B: Facilitate higher density housing in the Commercial Thoroughfare (CT) District.			December 31, 2024	
Program 1.C: Allow housing in the Office Administrative (OA) District.			December 31, 2024	
Program 1.E: Update the Loyola Corners Specific Plan.			December 31, 2024	

Program 2.D: Encourage and streamline Accessory Dwelling Units (ADUs).	Adopt-Permit Ready ADU Plans		December 31, 2024	
Program 3.A: Prepare a Downtown parking plan and update citywide parking requirements.			December 31, 2024	<b>DEVELOPING RFP</b>
Program 3.B: Modify building height in mixed-use zoning districts.	Neighborhood (CN) District		December 31, 2024	
Program 3.C: Remove floor-to-area ratio (FAR) restriction at Rancho Shopping Center and Woodland Plaza.			December 31, 2024	
Program 3.M: Modify parking requirements for emergency shelters consistent with State law.			December 31, 2024	
Program 2.B: Establish an affordable housing in-lieu fee and commercial linkage fee.	Commercial linkage fee.	December 31, 2025		
Program 1.D: Allow housing on certain Public and Community Facilities District sites and facilitate housing on religious institution properties.			December 31, 2025	
Program 1.F: Rezone Village Court parcel.			December 31, 2025	
Program 4.H: Provide additional density bonuses and incentives for housing that accommodates special needs groups.			December 31, 2025	
Program 4.I: Allow senior housing with extended care facilities in multi-family and mixed-use zoning districts.			December 31, 2025	
Program 1.I: Incentivize Downtown lot consolidation.			July 31, 2026	
Program 4.G: Assist seniors to maintain and rehabilitate their homes.			July 31, 2026	
Program 6.C: Target housing development in highest resource areas.	Follow-up Outreach		September 31, 2026	
Program 1.H: Facilitate housing on City-owned sites.	Entitlement Review		December 31, 2026	
Program 3.N: Modify standards in the R3 zoning districts.			December 31, 2026	

Program 4.J: Facilitate alternate modes of transportation for residents.	Capital Improvement Project for above head pedestrian crossing signals on San Antonio Road near Downtown Los Altos		December 31, 2027	
Program 5.F: Incentivize the creation of play areas for multi-family housing projects.			December 31, 2027	
Program 1.K: Participate in regional housing needs planning efforts.			Ongoing	
Program 1.L: General Plan amendments.			Ongoing	
Program 1.M: SB 9 implementation.			Ongoing	
Program 1.N: Facilitate and monitor pipeline housing projects.			Ongoing	
Program 2.C: Assist in securing funding for affordable housing projects.			Ongoing	
Program 2.D: Encourage and streamline Accessory Dwelling Units (ADUs).			Ongoing	
Program 2.E: Conduct annual ADU rental income surveys.	Annual Survey		Annually	
Program 4.A: Support efforts to fund homeless services.			Ongoing	
Program 4.B: Continue to participate in local and regional forums for homelessness, supportive, and transitional housing.			Ongoing	
Program 5.A: Monitor condominium conversions.			Ongoing	
Program 5.B: Continue to administer the City's affordable housing programs.			Ongoing	
Program 5.C: Restrict commercial uses from displacing residential neighborhoods.			Ongoing	
Program 5.D: Implement voluntary code inspection program.			Ongoing	
Program 5.E: Help secure funding for housing rehabilitation and assistance programs.			Ongoing	

Program 6.A: Assist residents with housing discrimination and landlord-tenant complaints.			Ongoing	
Program 6.B: Maintain and expand an inventory of affordable housing funding sources.	Inform, Evaluate Apply/Submit		Ongoing	
Program 6.F: Affirmatively market physically accessible units.			Ongoing	
Program 7.A: Promote energy and water conservation and greenhouse gas reduction through education and awareness campaigns.			Ongoing	
Program 7.B: Monitor and implement thresholds and statutory requirements of climate change legislation.			Ongoing	