



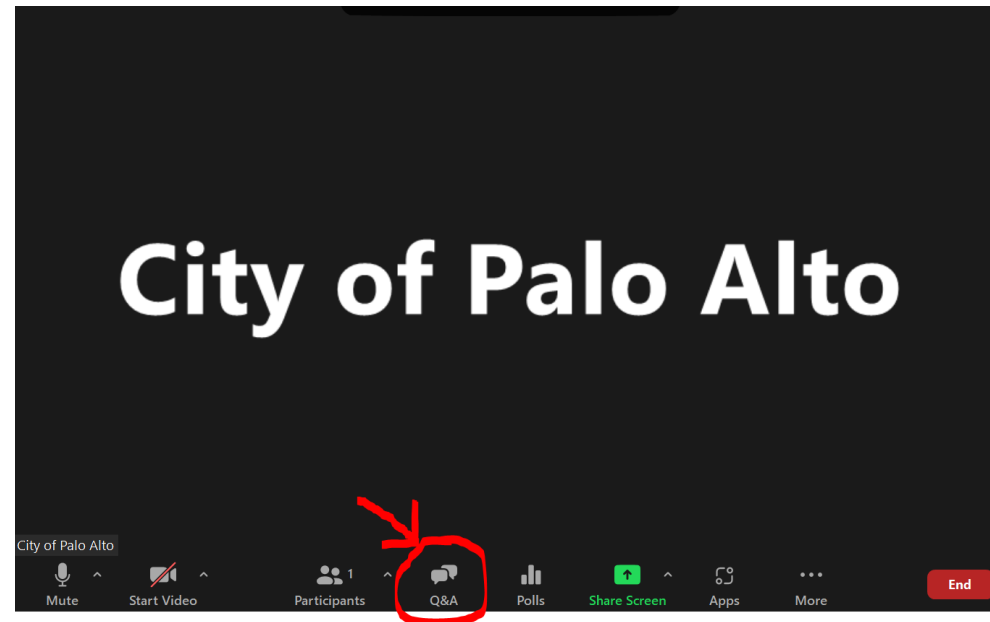
# Overview of City of Palo Alto's Proposed 2022 Green Building and Local Energy Code Requirements

August 2022

# Kickoff

---

- Welcome by City Staff
- Please use the Q&A box to submit questions



# Agenda

---

- Background on State/Local Code Adoption (5 min)
- Review Proposed CPA Amendments (75 min total)
  - Water (10 min)
  - Materials Conservation (10 min)
  - Environmental Quality (5 min)
  - Energy + Building Electrification (30 min)
  - EV Infrastructure (20 min)
- Process + Timeline (5 min)
- Discussion (35 min)

# State Building Codes & Local Adoption/Amendments

**California Building Standards (Title 24)** is updated every three years. Current code cycle covers January 2020 through December 2022.

- Title 24 is organized into 12 parts (Part 6: CA Energy Code, Part 11: CA Green Building Standards Code (**CALGreen**))
- Cities can follow the State Codes OR adopt local amendments that address the local conditions and exceed the state requirements
- Local energy reach code\*\* must meet the following criteria:
  - More stringent than state requirements (use less energy)
  - Must be cost-effective (values of benefits>costs (b/c>1))
  - Must not preempt federal appliance efficiency standard
  - Must be approved by CEC and filed with BSC



No recommendations for 2022 code cycle require cost effectiveness test

# Palo Alto Reach Code

---

- Palo Alto has adopted **Green Building regulations and Energy Reach Code** since 2008.
  - 2010 CALGreen amended/adopted
  - Mandatory, Tier 1 and 2 compliance\*\*
- **Green Building regulations** cover the following areas:
  - Water Conservation
  - Material Conservation
  - Environmental Quality
  - Energy
  - EV Infrastructure

# Water

# Current CPA Water Conservation Reach Code Requirements

---

- 20% reduction in indoor water use from the CALGreen baseline for nonresidential new construction projects
- Dual plumbing for:
  - new nonresidential projects ( > 10,000 sf or >= 25 toilets/urinals) if recycled water service is available &
  - new nonresidential projects (> 50,000 sf or >= 50 toilets/urinals) if recycled water is not available

# Water Conservation – Pools and Spas



POOL COVER

## PROPOSED REACH CODE FOR ALL NEW POOLS

### **Objective: Reduce evaporation loss of heated water**

**[Existing PAMC]:** Heated pools and outdoor spas shall be provided with a vapor retardant cover. *(Exception: Where pools or spas deriving at least 60 percent of the annual heating energy from site solar or recovered energy.)*

**CALGreen: Not covered**

**PAMC: 16.18.130 (301.3, 2018 ISPSC), 303.1.3 per 2021 ISPSC )**

### **Recommendation:**

**Amend to all pools and spas (heated or not) and remove exception for solar heated pools**

*Aligned with MWENDO recommendations*



# Water Conservation – Cooling Towers



COOLING TOWER

## PROPOSED REACH CODE FOR HIGH-RISE RESIDENTIAL & NON-RESIDENTIAL

### **Objective: Conserve water used in cooling towers**

Cooling towers are primarily used for non-residential projects and large multifamily projects, which are rare in Palo Alto. However, they use large amounts of water and this measure would ensure water use reduction when they are installed.

**CALGreen: Not a mandatory measure or elective**

**PAMC: Prohibits single pass cooling tower (16.08.100)**

### **Recommendation:**

All newly constructed cooling towers shall achieve maximum number of cycles without affecting operation of condenser water system.

- *LEED v4.1 Credit – Optimize Process Water Use*
- *Aligns with MWENDO recommendations*

*This is achieved by water treatment and/or maintenance of condenser or make-up water systems.*

# Materials Conservation

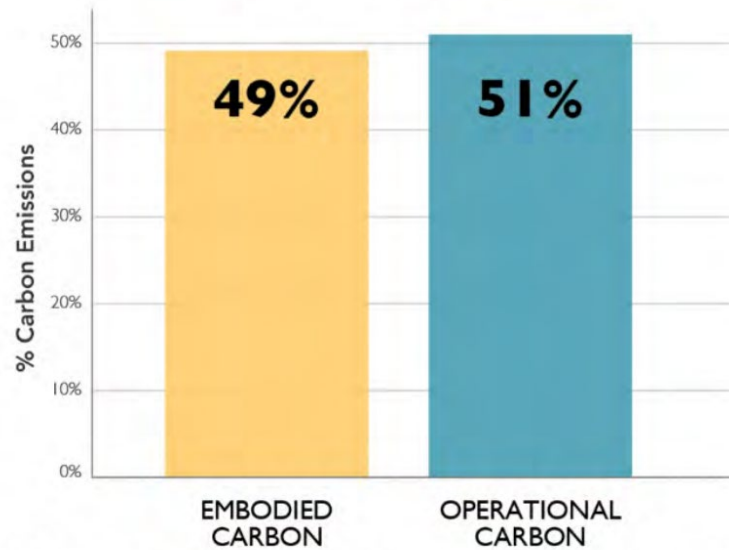
# Current Material Conservation Reach Code Requirements

---

- **80% diversion rate in Construction Waste** for projects \$25,000 or more and 65% diversion rate for projects less than \$25,000.
- Reuse of materials is a CALGreen Elective; Salvage Audit required by PAMC 5.24.040

# Embodied Carbon –Concrete

Total Carbon Emissions of Global New Construction  
from 2020-2050  
Business as Usual Projection



© 2018 2030, Inc. / Architecture 2030. All Rights Reserved. Data Sources: UN Environment Global Status Report 2017; EIA International Energy Outlook 2017

## CARBON EMISSIONS OVER A BUILDING'S LIFECYCLE

### PROPOSED REACH CODE FOR RESIDENTIAL & NON-RESIDENTIAL

#### Objective: Reduce Cement Use

[Existing CALGreen elective for Residential projects' foundation mix design]

- Tier 1. Minimum 20 percent reduction in cement use.
- Tier 2. Minimum 25 percent reduction in cement use.

**CALGreen:** Elective

**PAMC:** 16.14.250 – A4.403.2: Adopted as an Elective

#### Recommendation:

Replace CALGreen elective with Low Carbon Concrete code for all projects as mandatory.

- Prescriptive pathway: limit cement content of concrete
- Performance pathway: mandate embodied carbon limits for concrete mixes (kg CO<sub>2</sub>e/cu m of concrete)

# Embodied Carbon – Cement & Concrete

**Table 19.07.050** Cement and Embodied Carbon Limit Pathways

	<b>Cement limits</b> for use with any compliance method 19.07.050.2 through 19.07.050.5	<b>Embodied Carbon limits</b> for use with any compliance method 19.07.050.2 through 19.07.050.5
Minimum specified compressive strength $f'_c$ , psi (1)	Maximum ordinary Portland cement content, lbs/yd <sup>3</sup> (2)	Maximum embodied carbon kg CO <sub>2</sub> e/m <sup>3</sup> , per EPD
up to 2500	362	260
3000	410	289
4000	456	313
5000	503	338
6000	531	356
7000	594	394
7001 and higher	657	433
up to 3000 light weight	512	578
4000 light weight	571	626
5000 light weight	629	675
<b>Notes</b> (1) For concrete strengths between the stated values, use linear interpolation to determine cement and/or embodied carbon limits. (2) Portland cement of any type per ASTM C150.		

## CEMENT & EMBODIED CARBON LIMITS

# Environmental Quality

# Current Indoor Air Quality Reach Code Requirements

---

- MERV 13 filtration media is required in new non-residential buildings (5.504.5.3)
- Indoor Air Quality Management Plan required for commercial and multi-family projects (PAMC 16.14.410)
- Carbon dioxide (CO<sub>2</sub>) monitoring required by California Energy code

# Energy + Building Electrification



# Current Energy Reach Code Electrification Requirements

---

- **All-electric mandate** for new **low-rise** residential buildings (exemption for new detached Accessory Dwelling Units (ADUs))
- Increased energy efficiency requirements for new mixed-fuel nonresidential buildings
  - Additional 12% efficiency savings for new Office/Retail buildings, 5% for hotels/motels/high-rise multifamily buildings for performance approach and requiring more efficient windows, reduce lighting density, economizer.
  - \*\* These will be revised based on a forthcoming statewide study on reach code cost-effectiveness

# Energy – Electrification Buildings



## PROPOSED REACH CODE FOR ALL NEW PROJECTS

### Objective: Reduce Fossil Fuel Use

CPA currently requires new residential construction to be all-electric but allows an exemption for ADUs.

**CALGreen: TBD**

**PAMC: TBD**

### Recommendation:

Remove electrification exemption for ADUs

Require all-electric for new Residential (SFD, ADU, MF) and Non-Residential (COML) Buildings



# Proposed Definition of Substantial Remodel

---

“For the purposes of electrification, substantial remodel shall mean the alteration of any structure, including any cumulative project or additions to the existing structure within any *three (3) year period\**, that affects the removal or replacement of the following:

- 50% or more of the linear length of the existing exterior walls of the building,
- 50% or more of the linear length of the existing exterior wall plate height is raised,
- and/or 50% or more of the roof structural framing area.

All substantial remodels shall meet the all-electric building requirements. The Chief Building Official, or their designee, shall make the final determination regarding the application if conflict occurs.”

\* The 3-year period is measured between the first building permit issuance to the submittal of the next building permit application for any remodel or building addition from code adoption.

# Energy – Electrification Buildings



Electrification

## PROPOSED REACH CODE FOR ALTERATIONS OR ADDITION

### **Objective: Reduce Fossil Fuel Use**

CPA currently requires new residential construction to be all-electric but allows an exemption for ADUs. This measure would begin to address electrification in existing buildings during renovations and remodels and other projects.

**CALGreen: No requirement**

**PAMC: No requirement**

### **Recommendation:**

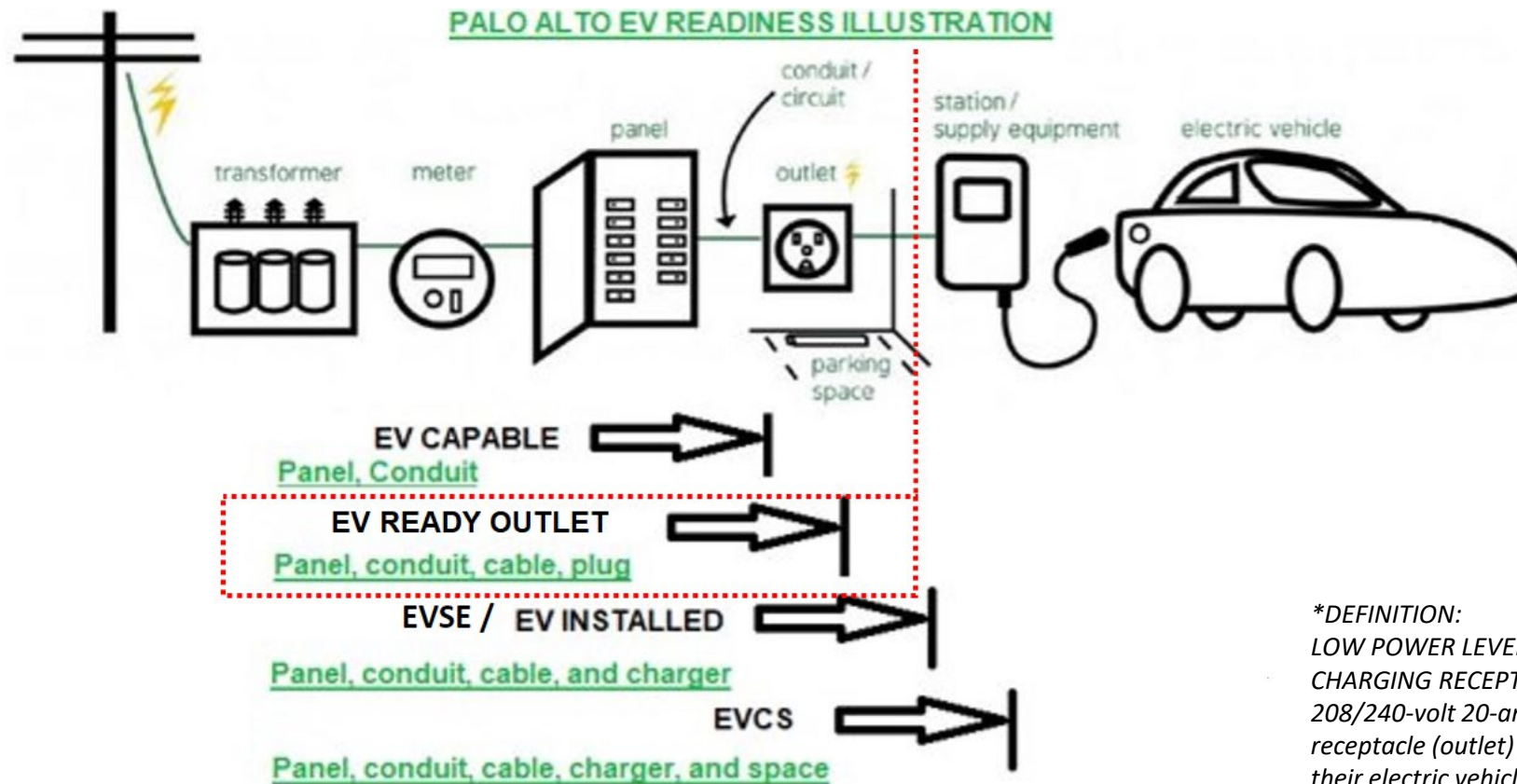
Require heat pump water heater when gas water heaters are replaced as part of an alteration or addition.

Does not apply to burnout/standalone WH replacement.

Prohibit new gas infrastructure for outdoor equipment like BBQ grills, pools, spas.

# EV Infrastructure

# Current EV Infrastructure Requirements



*\*DEFINITION:*

*LOW POWER LEVEL 2 ELECTRIC VEHICLE (EV)*

*CHARGING RECEPTACLE:*

*208/240-volt 20-ampere minimum branch circuit and a receptacle (outlet) for use by an EV driver to charge their electric vehicle or hybrid electric vehicle.*

# Current EV Infrastructure Requirements

BUILDING TYPES	EV INFRASTRUCTURE	
New Single-Family Homes/Duplexes	1 EV Capable, EV Ready Outlet or EVSE Installed per dwelling unit	
New Multifamily Buildings	<div>100% resident parking</div> <div>25% guest parking</div>	Level 2 EV Ready Outlet or EVSE Installed  Level 2 EV Capable, Ready Outlet or EVSE Installed Minimum 5% EVSE installed
New Hotels/Motels	<div>30% parking</div>	30% Level 2 EV Capable, EV Ready Outlet, or EVSE installed (at least 10% EVSE installed)
New Non-Residential Buildings	<div>25% parking</div>	25% Level 2 EV Capable, EV Ready Outlet, or EVSE installed (at least 5% EVSE installed)

# EV Infrastructure – New Single-Family Homes/Duplexes

---




	Current PAMC	2022 California State Code	Proposed 2022 PAMC
1 EV Capable, EV Ready Outlet, or EVSE Installed per dwelling unit	✓		
1 EV Capable per dwelling unit		✓	
1 EV Ready Outlet or EVSE Installed per dwelling unit ( <b>low power*</b> Level 2 OK) - Not applicable to ADU			✓





# EV Infrastructure – New Multifamily Residential Buildings

		Current PAMC	2022 California State Code	Proposed 2022 PAMC
100% resident parking	Level 2 EV Ready Outlet or EVSE Installed	✓		
25% guest parking	Level 2 EV Capable, EV Ready Outlet or EVSE Installed Minimum 5% EVSE installed			
35%	10% Level 2 EV Capable 25% Level 2 EV Ready ( <u>low power</u> ) (incl 5% Level 2 EVCS for buildings with 20+ units)		✓	
100% resident parking	<b>Low Power*</b> Level 2 EV Ready Outlet or EVSE Installed			✓
25% guest parking	Level 2 EV Capable, EV Ready Outlet or EVSE Installed Minimum 5% EVSE installed			
FOR EXISTING FACILITIES: 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, 10% of the total number of parking spaces added or altered, shall be EV capable.			✓	✓

# EV Infrastructure – New Hotels/Motels

			Current PAMC	2022 California State Code	Proposed 2022 PAMC
	30%	30% Level 2 EV Capable, EV Ready Outlet, or EVSE installed (at least 10% EVSE installed)	✓		
	35%	10% Level 2 EV Capable 25% Level 2 EV Ready Outlet (low power) (incl 5% Level 2 EVCS for buildings with 20+ units)		✓	
	35%	35% Level 2 EV Capable, EV Ready Outlet, or EVSE installed (at least 10% EVSE installed)			✓

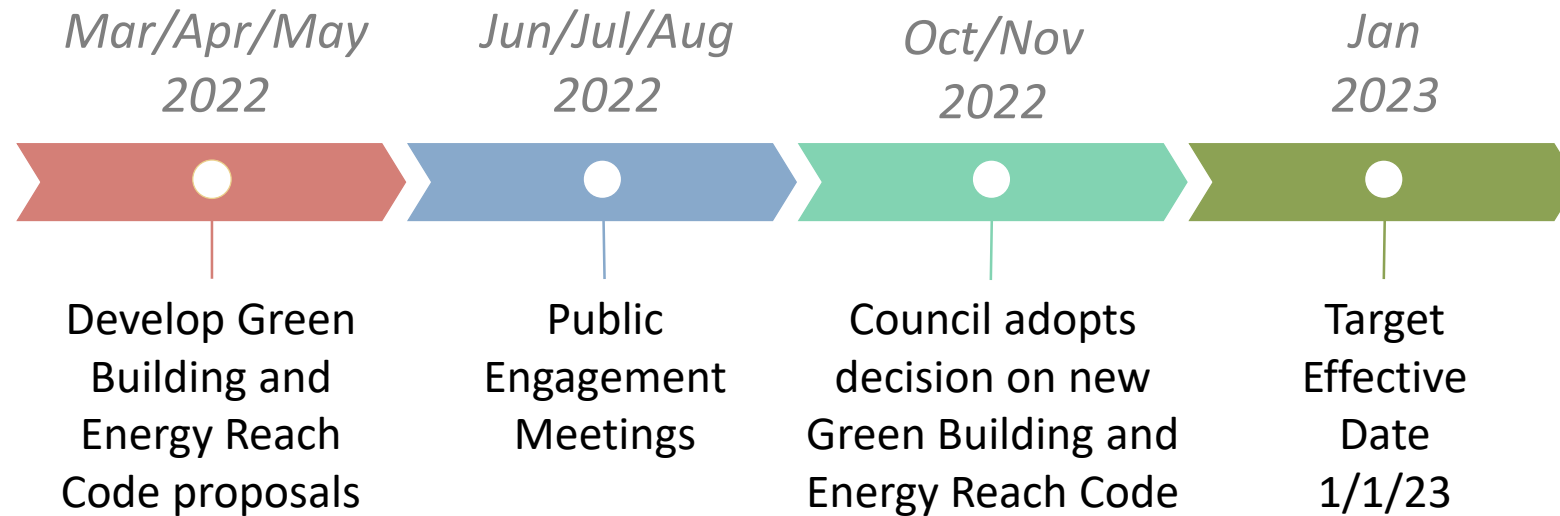
# EV Infrastructure – New Nonresidential Buildings

		Current PAMC	2022 California State Code	Proposed 2022 PAMC
	25%	25% Level 2 EV Capable, EV Ready Outlet, or EVSE installed (at least 5% EVSE installed)	✓	
Requirements vary depending on building type (~10% Level 2 EV Capable)			✓	
	30%	30% Level 2 EV Capable, EV Ready Outlet, or EVSE installed (at least 15% EVCS)		✓

# Process and Timeline

# Code Development Process and Timeline

---





CITY OF  
**PALO  
ALTO**

For more information, contact:

2022 Reach Codes

<https://www.cityofpaloalto.org/2022reachcodes>

David Chung

Assistant Building Official

[david.chung@cityofpaloalto.org](mailto:david.chung@cityofpaloalto.org)

Christine Tam

Senior Resource Planner

[christine.tam@cityofpaloalto.org](mailto:christine.tam@cityofpaloalto.org)