CPAreachcodes.org

CPA CLEAN POWER ALLIANCE

CPA Reach Codes Program

Advancing safer, healthier and more affordable buildings and vehicles

Slide Deck Library
CPA Reach Code

Program for Building and Transportation Electrification

Advancing safer, healthier and more affordable buildings and vehicles

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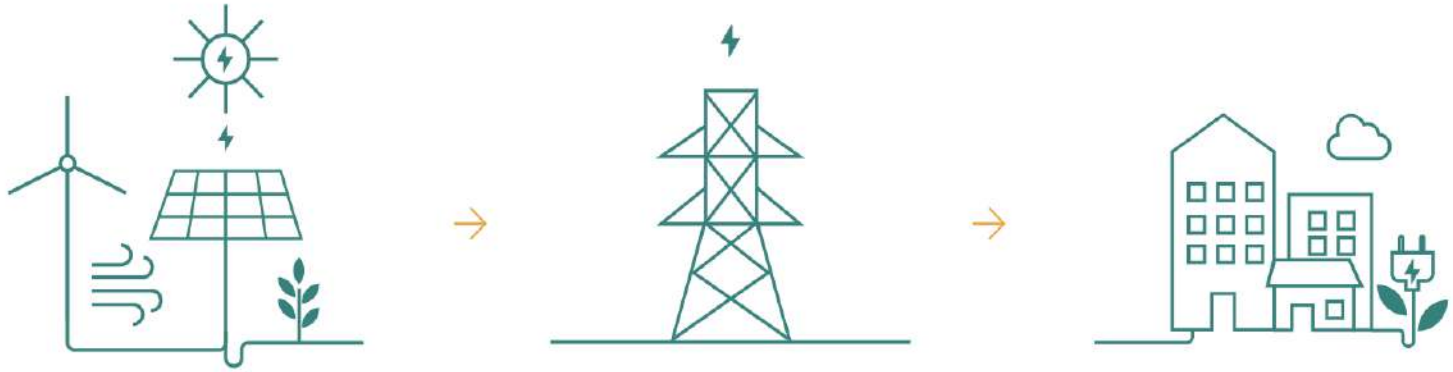
Version 2.4

Slide Deck Topics

- Clean Power Alliance Overview
- Program Overview
- California Energy Code
- Reach Codes 101
- Building Reach Code Examples
  - New Construction
  - Existing Building Retrofits
- Building Electrification
- Appliances and Technology
- Electric Vehicle Infrastructure (EVI)
- Common Concerns and FAQ

Clean Power Alliance

We work together to bring you access to the most sustainable energy available



Source

Clean Power Alliance

CPA acquires green energy supply (solar, wind, water) sourced locally and regionally

Delivery

SCE

SCE delivers the power, maintains the lines, and reads your meter

Customer

You

You benefit from more clean power options

- CPA purchases clean power and Southern California Edison (SCE) delivers it
- SCE sends the monthly bill, which includes SCE charges for electricity delivery and Clean Power Alliance charges for electricity supply/generation
- CPA charges are NOT an added fee; they simply replace the SCE supply/generation charges
- Revenues, after costs for power and operations plus financial reserve contribution, are pooled and invested into local programs

Clean Power Alliance Basics

CPA is a not-for-profit electricity supplier, offering clean, renewable energy at competitive rates.

- Public entity formed through a Joint Powers Authority (JPA)
- Comprised of 32 public agencies across Ventura and Los Angeles Counties (three additional in March 2024)
- Board members are locally elected officials who represent and serve our communities
- Approximately 1 million customer accounts, representing over 3 million residents and businesses
- 4th largest electricity provider in California
- More customers receiving 100% renewable energy than any utility in the country

Reach Codes Program Overview

- What is the purpose of the CPA Reach Codes Program?
- What is the program's service offering?
- What are the incentive requirements?

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Program Purpose

Increase Reach Codes	Support Member Agencies	Collaboration
Equitably decarbonize Los Angeles and Ventura regions	**Develop tools and templates**, leveraging what has been successfully used in other regions	**Collaborate with regional partners** (utilities, RENs, CCAs, building industry, advocates)
Improve community, **economic and environmental indicators**	Share **lessons learned** from other local governments	Streamline support and resources to member agencies
Support regional and State electrification goals	Offer financial assistance to offset municipal staff time	
	On-Call technical support	
	Outreach assistance	

Key Offerings

Templates and Tools

- Model ordinances and adoption resources developed through years of municipal support and stakeholder engagement
- Resource library, tools, templates, and presentations
- Streamlined delivery models based on lessons learned

Customization

- Diverse needs ≠ one size fits all
- Provide local research and specific tools to support municipal staff
- Interpret statewide CA code cost-effectiveness studies related to climate zones and goals
- Integrate feedback regarding unique building stock and community feedback

Adoption Support

- Technical assistance
- Present at City Council meetings
- Facilitate public workshops
- Provide financial support for members agencies

New Construction

Reach Code Development Support

- Regionally specific reach codes that promote electrification and decarbonization
- Compliance pathways included for both all-electric and mixed fuel buildings to avoid legal risk while increasing electric equipment readiness
- Can include EV Infrastructure

Technical Assistance and Resources

- On-Call Technical Assistance
- Educational Resources (PPT slides and FAQs)
- Adoption Templates (Checklists and Submittal Forms)

Building and EV Research & Design

- **Research:** Explore current programs, available funding opportunities and regulatory mechanisms that could drive building electrification and EV charging adoption

- **Focus areas:** Building incentives, appliance rebates, tools and resources, EV charging rebates, grants, including the Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA)

- **Interviews :** Research will include interviews with regional stakeholders, financing partners and gas station owners

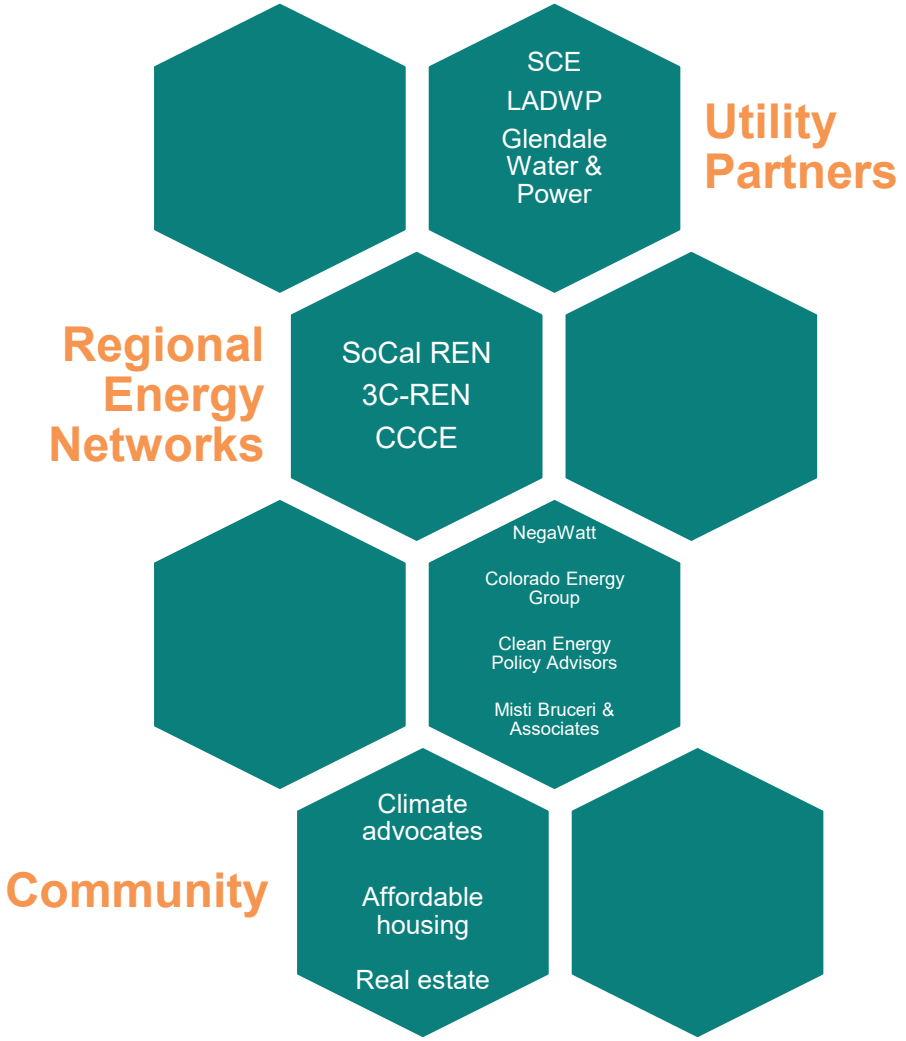
- **Final Report:** 3 potential program tracks outlining strategies that to drive electrification and EV adoption over a 3-year period and related impacts, GHG, cost, # of buildings

Findings will inform future CPA program design.

Source: Los Angeles Times

Regional Collaboration

- Ensures information sharing
- Drives collaboration among stakeholders
- Helps drive impactful change
- Aligns with other regional efforts, air quality, resiliency efforts, and climate planning
- Removes duplication of efforts



Financial Offerings

Award Type	Award Value	Requirements
New Construction: Prospective Adopter*	**$12,500**	• Executed Program Participation Agreement • Participant must submit a New Construction reach code to City Council or Board of Supervisors("BOS") for consideration during the Participation Agreement term. • Program Award Application after submittal of code to City Council or BOS for approval
Existing Building Pilot	**$25,000 total**	

	Milestone 1: $12,500	• Executed Program Participation Agreement
		• Applicant must obtain a directive from City Council or BOS committing Applicant to investigate Existing Building reach codes. Directives include:
		  • Letter of Intent approved by City Council or BOS - or -
		  • Resolution passed by City Council or BOS to evaluate Existing Building reach codes - or -
		  • Adopted Climate Action Plan**
		• Program Award Application

	Milestone 2: $12,500	• Executed Program Participation Agreement • Program Award Application • Applicant must submit an Existing Building reach code to City Council or BOS for consideration of adoption during Reach Code Program term

* New Construction: Prospective Adopter awardees are also eligible for the Existing Building Pilot award, subject to meeting all applicable award requirements
** A Climate Action Plan or similar document that has been adopted by City Council or BOS that includes an existing building reach code measure with a timeline of implementation that overlaps with CPA's 2-year Reach Code Program.

Participation Agreement

General Obligations:

- Must designate primary contacts
- Must engage with program team throughout process
- Primary contact or city/county representative must attend at least one model code workshop hosted by the program to help create new construction/existing building reach code templates.
- All tools, templates, and other resources generated by the program team during the development reach codes will be the intellectual property of CPA.
- Any adopted reach code may be posted on Reach Code Program websites by CPA.
- Participants who wish to receive a financial award must complete a Program Award Application and submit the required documentation.

- Participation does not obligate the jurisdiction to adopt the developed reach code
- Adoption of a reach code is done at the risk of the jurisdiction
- Participant agrees to conduct its own due diligence and review, including any technical or legal review of any proposed reach code it wishes to consider.

2022 CA Energy and Green Building Codes

- What are the current state codes?
- What are recent updates?

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CA Energy Code vs CALGreen

- CA Energy Codes live in two main sections of Title 24 of the California Code of Regulations, also known as the California Building Standards Code
- Contains the regulations that govern the construction of residential and non -residential buildings in California
- Updated every 3 years on a Triennial cycle, with an Intervening Code Adoption cycle happening after 18 months within that Triennial cycle

Part 6

The California Building Energy Code

- Regulates the energy efficiency for new residential and nonresidential buildings
- Regulated by the California Energy Commission (CEC)

Part 11

The CA Green Building Standards Code

- Regulates the use of electric vehicle charging, energy, water, and materials during and after construction
- Regulated by several state agencies including California Building Standards Commission (CBSC)and Housing and Community Development (HCD)
- Includes both Mandatory and Voluntary requirements

Resource: https://www.dgs.ca.gov/bsc

Title 24, Part 6 – 2022 CA Energy Code

- The Energy Code is a set of mandatory building requirements and containing energy, water efficiency, and indoor air quality requirements for newly constructed buildings, additions to existing buildings, and alterations to existing buildings.
- Governs things such as: the efficiency of window and doors, insulation, lighting, solar, HVAC, hot water heaters, electrical panels, faucets, and more.
- **Includes 2 options to comply:**
  - **Prescriptive option**, allowing builders to comply by using methods known to be efficient,
  - **Performance option**, allowing builders flexibility in their designs provided the building achieves the same overall energy 'budget' as an equivalent building following the prescriptive option

2022 Energy Code Benefits

- Increases on-site renewable energy generation from solar
- Increases electric load flexibility to support grid reliability
- Reduces emissions from newly constructed buildings
- Reduces air pollution for improved public health
- Encourages adoption of environmentally beneficial efficient electric technologies.

Find the CA Energy Codes here:
2022 Building Energy Efficiency Standards

Major 2022 Energy Code Updates

Heat Pumps: The New Standard

Heat pumps are an electric technology for water and space heating that increases efficiency, reduces GHGs, and enables load flexibility. It extracts heat and then transfers the heat to where it is or isn't needed.

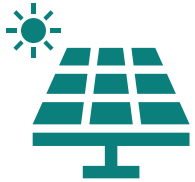
Standards include:

- Single-family and Multifamily homes — heat pump water or space standard.
- Businesses — heat pumps standard for schools, offices, banks, libraries, retail, grocery

New Homes to Be Electric-Ready

The standards require single-family homes to be electric-ready, including:

- Electrical circuits for space heating, water heating, cooking/ovens, and clothes dryers.
- Electrical panel, branch circuits, and transfer switch for battery storage.
- Dedicated circuits and panels to easily convert from natural gas to electric in the future.



Solar and Storage Use Expanded

The 2022 Energy Code extends solar and introduces battery storage standards to the following building types:

- High-rise multifamily (apartments and condos) Hotel-motel
- Tenant space
- Office, medical office, and clinics
- Retail and grocery stores
- Restaurants
- Schools
- Civic (theaters, auditoriums, and convention centers)

Source: 2022 Building Energy Efficiency Standards Summary

2022 Energy Code Updates

New Construction

Heat pumps are the prescriptive baseline

- Residential
  - Space heating in climate zones 3, 4, 13, 14
  - Water heating remaining climate zones
- Nonresidential – water- and/or space-heating for most building types
- Res and Nonres: Performance credit for all-electric design

Residential measures supporting electrification

- Pre-wiring required for gas appliances
- Higher ventilation rate for gas stoves
- Energy storage readiness

Nonresidential: Solar PV and Battery Storage required

Existing Buildings

- Restricts newly installed electric resistance heating
- Simplified language for heat pump retrofits

Title 24, Part 11 - 2022 CALGreen

CALGreen

(the California Green Building Standards Code)

- CALGreen is a set of mandatory minimum green building standards driven by California's goal to:
  - Reduce greenhouse gas emissions from buildings
  - Promote healthier environments
  - Prevent wastage of energy and water resources.
- Standards include cost-effective reductions to greenhouse gases
- Includes Electric Vehicle Infrastructure and charging

Voluntary Tiers

- Local governments may opt for more restrictive regulations to achieve higher degree of compliance with Green Building principles.
- This approach is adopted to achieve a further reduction in energy usage – surpassing the targets set through mandatory measures up to 15%.

Find CALGreen Codes here:
2022 CALGreen Code

CPA

Source: ICC Codes; Section A5.203.1.2.2 Tier 1 and Tier 2

Reach Codes 101

- What are they?
- Why should we implement them?
- What's the process?
- Who else has done it in our region?

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What are Reach Codes?

Local ordinances adopted by the local government that exceed and enhance the state's green building standards.

Types of Reach Codes:

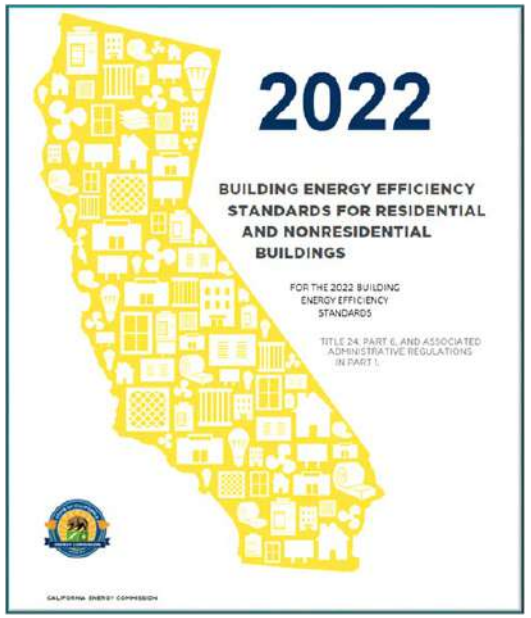
Building Decarbonization

New & Existing Buildings

Electric Vehicle Infrastructure (EVI)

What are the Types of Building Reach Codes?

2022 Energy Code

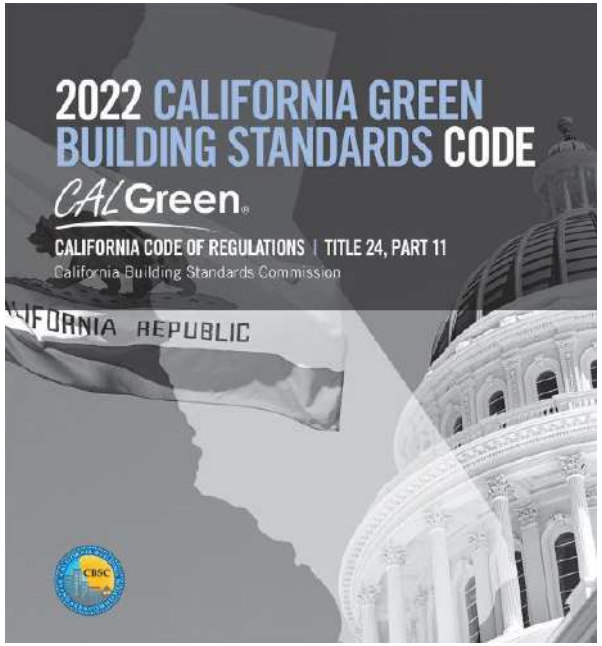


Other names:
- Title 24, Part 6
- "State Energy Code"

Scope:
- Energy efficiency
- Insulation, appliances, etc.
- Single Family, Multifamily, and Nonresidential

Pathways to amend:
- Mandatory
- Prescriptive
- Performance

2022 CALGreen Code



Other names:
- Title 24, Part 11
- "EV Code"

Scope:
- EVI, water use, waste, pollution, etc.
- Residential and Nonresidential

Pathways to amend:
- Mandatory
- Voluntary

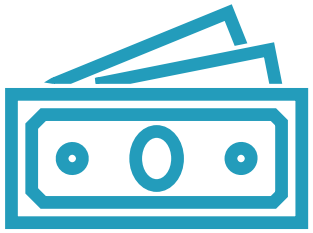
Prescriptive: Think "checklist". Require one or more specific energy efficiency or renewable energy measures.

Performance: Think "modeling". Require buildings to meet an energy budget/performance score through a custom design, allowing applicants flexibility.

Reach Code Requirements

Requirements

- **Must be at least as restrictive as the Energy Code**
- **Must be cost-effective** (when impacting energy efficiency/conservation)
- Local governments must make findings that the reach code is needed for local climatic, geological, topographical, or environmental reasons
- Must be approved by CEC (when cost-effectiveness required) and filed with BSC
- Can't require equipment that exceeds federal standards (federal preemption)



Key Points of Cost-Effectiveness

- Something is cost-effective when the value of benefits exceeds the costs
- Can be cost-effective on an on-bill or Time Dependent Valuation basis
- Can be used to assess policy impacts as well as to document legal compliance
- Can mean different things to different stakeholders (developers, building owners, tenants, society)
- Many studies available at Local Energy Codes and through the Cost-Effectiveness Explorer

What are Reach Codes?

Local ordinances adopted by the local government that exceed and enhance the state's green building standards.

Important Facts:

- Can be adopted at any time
- Improves economic and energy performance of buildings
- Reduces Greenhouse Gas (GHG) emissions, pollutants, and improves indoor air quality
- Helps to reduce energy use and improve grid resiliency
- Allows local governments to be leaders in climate solutions
- Helps to fulfill local Climate Action Plan, Energy Plan, or other policy goals

What are the types of Reach Codes?

Building Decarbonization (New Construction & Existing Buildings)

- **Goal:** to reduce the use of methane gas, ensure buildings are operating efficiently, and to prepare the market for statewide electrification goals

There are three reach codes pathways when amending the energy code:

- **Prescriptive Codes:** Require one or more specific energy efficiency or renewable energy measures.
- **Performance Codes:** Require buildings to meet an energy budget/performance score through a custom design, allowing applicants flexibility.

Electric Vehicle Infrastructure (EVI)

- **Goal:** to improve market readiness and increase equitable access to clean transportation EV charging stations

Why Establish Reach Codes?

- 100% Green Power (renewable clean energy) provided by CPA, can be the most beneficial to our communities when buildings and vehicles are electrified to only use that clean energy.

- Electrification transitions buildings and vehicles away from natural gas and gasoline— both of which are extremely harmful to the environment, health, and safety of our communities

- All-electric buildings are **cost effective**, especially when adopted at the new construction stage.

Why Establish Reach Codes?

Continuous Signal to the Market	• Avoid a progress gap for new construction from 2024-2026 • Send clear, continuous message to market • Avoid stranded asset cost of continued gas investment
Local Control	• Enables innovative approaches for cost-effective decarbonization policy • Ability to design customized exemptions • Jurisdictions with more progressive climate targets can pass more progressive reach codes
State and AQMD Codes Aren't Certain	• South Coast Air Quality Management District is considering proposals to go to zero NOx emissions limits for water heating and space heating in 2026 for new construction and 2028 for existing buildings
Local Reach Codes Influence the State	• Statewide electrification codes incorporate elements from local reach codes • Statewide EV charging codes have been inspired by San Mateo's EV Reach Codes • Smoother implementation of AQMD rulings if similar requirements are adopted beforehand
Allows More Action, Sooner	• Greenhouse gas emissions are cumulative, so earlier actions have exponential savings • Existing building policy is needed immediately to meet 2030, 2035, and 2040 climate goals

What are the Main Benefits?

By developing reach codes, cities and counties in CPA's service area can:

- Save energy and provide resiliency to communities
- Reduce the cost of new construction buildings and eliminate future retrofit costs
- Make progress toward Climate Action Plans
- Improve indoor air quality and reduce combustion fire risks
- Reduce greenhouse gas emissions and the negative effects of climate change

Now is the time.

- **Over 70 California municipalities** have adopted building electrification reach codes. Over 100 nationwide.
- Cities adopting building electrification codes, are also adopting EV infrastructure code.
- Electrification is the lowest-cost, lowest-risk pathway to decarbonization.
- Moving in advance of the State allows communities to:
  - Reduce sunk costs on gas infrastructure
  - Prepare the local market for electrification
  - Mitigate more greenhouse gas emissions
  - Improve the health and well-being of communities
  - Reach Climate Action Plan goals

How are Reach Codes Adopted?

- Every three years, cities and counties across the state can adopt local reach codes in line with the voluntary tiers of the latest CALGreen Code (aka Green Building Standards Code) surpassing the targets set through mandatory requirements up to **15%.**

- **Municipal reach code amendments can be adopted at any time, and are not tied to the three-year state code cycle**

Reach Code Adoption Process (Part 1)

Member Agency Reaches Out to CPA for Support

Email CPAReachCodes@cleanpoweralliance.org to start the process

Introductory Meeting with TRC and CPA (1-2 weeks)

High level discussions of member agency goals and program offerings

Member Agency Signs Participation Agreement

Kick-Off Meeting with Program Team and Essential Jurisdiction Staff

In-depth discussions of specific member agency goals, policies, support needed, and next steps

Research, Education, and Support for Council Approval (1-3 months)

CPA team researches relevant policies, local policies and stakeholders, and provides technical assistance to the city/county and education at stakeholder events

Council Study/Information Session

City/county staff presents the reach code topic to council for information only. TRC requests presenting duties at the study session. Council may direct staff to conduct further research and stakeholder engagement before presenting a reach code ordinance to council.

Develop Draft Code for Review (1-3 months)

TRC will deliver a first draft of the model code

Reach Code Adoption Process (Part 2)

Stakeholder Engagement (1-3+ months)

Solicit feedback from the community. TRC answers technical questions. Option for multiple meetings targeted at specific groups.

Customize Code (1-3 months)

TRC continues code edits based on feedback from city/county departments and local stakeholders

1st Council Reading (1+ month after study session)

City/county staff present the reach code ordinance to council. There is a public comment period and council vote to advance the reach code to a 2nd reading. TRC is available to answer technical questions.

2nd Council Reading (2 weeks after 1st reading)

Council votes to pass the reach code. Usually, this is on consent but may go through public comment if the item is pulled from the consent calendar. TRC is available to answer technical questions.

Submittal to the CBSC and/or CEC (up to 1-3 months)

Once the ordinance is approved, staff file it with the state so the code can take effect

Reach Code Goes Into Effect! (Total of ~ 4-8 months)

Reach Code Examples

- What are some examples of building reach codes?
- Who has implemented them?
- How did they perform?

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Member Agencies with adopted reach codes

Reflections on 2022 Reach Codes

Los Angeles County and Ventura County Cities

Jurisdiction	Type	Single	Multifamily	Nonresidential	EV Infrastructure	Exceptions
Agoura Hills	All-Electric CALGreen Amendment	X	X	X	X	Yes
Glendale	All-Electric CALGreen Amendment	X	X	X	X	No
Los Angeles (City)	All-Electric Municipal Code	X	X	X		Yes
Ojai	All-Electric Municipal Code	X	X	X		Infeasibility Only
Pasadena	All-Electric Municipal Code	X	X	X		Yes
Santa Monica	All-Electric Municipal Code	X	X	X	X	Yes
West Hollywood	EE, Cool Roofs Energy Ordinance	X	X	X		Yes
Ventura, County	All-Electric CALGreen Amendment	X	X	X		Yes

Source: Adopted Ordinances (localenergycodes.com))

New Construction Policy Comparison

Approach	Description	Pros	Cons	Who's done it?
Air Quality 	Regulates building or appliance emissions through CALGreen, Part 11.	• Uses Clean Air Act authority rather than Energy Policy and Conservation Act • Regulates all emitting equipment (cooking, fireplaces, dryers, etc.) • Likely to result in all-electric construction, which includes construction cost savings • Direct benefit to air quality / health • High impact on emissions reduction	• Legally untested • Potentially new enforcement approach	Los Altos Hills New York City
Energy Performance 	Requires a higher *Source Energy* compliance margin than what the state requires through the performance path of the Energy Code, Part 6.	• Mitigates legal risk by allowing methane gas pathways • Can provide an all-electric cost-effective pathway • Enforcement process is already in place, the compliance margin is increased	• Limited to regulating space heating/cooling and water heating • Likely lower carbon savings compared to all-electric only pathways	Santa Cruz San Jose San Luis Obispo Palo Alto East Palo Alto Encinitas

Existing Building Policy Comparison

	Description	Advantages	Challenges	Who's done it?
Time of Replacement	Require that property owners at the time of equipment replacement (upgrades or burnouts) abide by zero-NOx requirements and/or electric readiness requirements.	• Simple policy • Replacements occur more frequently than major renovations	• Emergency replacements • May result in some bypassing the permit process	San Mateo, Portola Valley, Marin County, Palo Alto
Time of Renovation	Require applicants that are already pulling a permit for a renovation project to abide by certain energy efficiency measures and/or electric readiness requirements.	• Customizable triggers • Unlikely to impact small or low-cost renovation projects • Unlikely to bypass the permit process	• More complex policy • Clarity of permit data • Low permit/renovation rates can increase time to make impact	San Mateo, Portola Valley, Piedmont, Marin County, San Luis Obispo
BPS	Require property owners to regularly report energy- or emissions- use intensity (EUI). In addition, the policies require incremental reductions in EUI over a set time horizon.	• Monitor building stock • Customizable triggers • Regular enforcement cycles	• Large administrative burden (cost/time)	**Cities:** Denver, Reno, Chula Vista, St. Louis, etc. **States:** Oregon, Washington, Maryland, Colorado
Time of Property Transfer	Leverage real estate transactions to disclose relevant information on, incentivize, or require, certain home improvements. *We do not recommend policies which inhibit or delay the sale of a property.*	• Leverages major financial transaction • Allows responsibility to be shared between buyer and seller	• Limited precedence for jurisdictional authority • Jurisdiction regulation of property transfer process • Low transfer rates can increase time to make impact	Piedmont, Berkeley, Davis

Ventura County Electrification Model Code

All-Electric New Construction Additions/Alterations

	Ordinance
Single Family, Multifamily, Non-Residential Additions/ Alterations	>50% of existing building is added, then all equipment in the building shall be all-electric. >50% of estimated value, then all equipment serving the alteration shall be all-electric.
Exceptions	**Residential:** fireplaces/ fire pits, outdoor grills, pool and spa equipment, emergency generators **Nonresidential:** fireplaces/ fire pits, outdoor grills, pool and spa equipment, emergency generators. Buildings with public kitchens or specialized industry may apply for an exemption.

CPA

Source: Adopted Ordinances

City of Los Angeles Electrification Model Code

All-Electric New Construction

	Ordinance
Single Family, Multifamily, Non-Residential	All new buildings will be constructed as all electric buildings.
Exceptions	**Residential:** Attached accessory dwelling units using existing gas piping systems in conjunction with the primary dwelling. **Nonresidential:** F and L occupancies. Cooking equipment contained within kitchens located in a public use area, such as restaurants, commissaries, cafeterias, and community kitchens.

Source: Adopted Ordinances

City of San Luis Obispo New Construction Electrification Model Code

Energy Performance Approach (Source Energy Margin)

	Ordinance
Single Family	Energy Performance Approach Compliance Margin/EDR1 of at least 6 relative to standard design EDR1*
Multifamily	Three or less habitable stories: Compliance Margin of at least 9 percent Four or more habitable stories: Compliance Margin of at least 3 percent
Non-Residential	Source Energy Compliance Margin of at least 7 percent
Exceptions	**Single Family:** A newly constructed building that does not require a PV system in accordance with section 150.1(c)14. **Nonresidential:** when nonresidential occupancies are designed with single zone space-conditioning systems complying with Section 140.4(a)2.

*The Energy Performance Approach is based on ***EDR1*** hourly source energy which establishes a carbon-based performance metric. Installing all-electric measures can result in a lower cost of construction while achieving compliance. Instead of regulating appliance fuel infrastructure, ***the Energy Performance Approach*** sets a target energy score using the *EDR1/Source Energy margin* (used in modeling software for CA building permits).

Source: Adopted Ordinances; CEC Hourly Source Energy Presentation

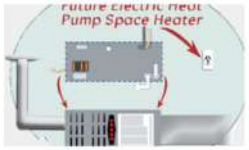
Model Code Examples

Energy Efficiency New Construction

	Ordinance
Carlsbad (Single Family)	All newly constructed buildings shall install a service water-heating system that provides 60% of the energy needed from on-site solar energy (PV or solar water-heating) or recovered energy. Additions/Alterations: permit value greater than $60,000 shall include prescriptive energy efficiency measures depending on building
El Monte (Non-Res)	New and Re-roof: Low-slope; 3 Year Aged Solar Reflectance > 0.65, Thermal Emittance > 0.85, SRI > 78
Marin County (Multifamily)	Additions/Alterations: A project greater than 750 square feet must include CALGreen Tier 1 measures. All newly constructed buildings must include CALGreen Tier 1 measures.

Source: Adopted Ordinances

Existing Building Electric-Readiness Reach Code

	Retrofit Category	Details
	**Heating, Ventilation and Air Conditioning**	For alterations and additions that include an HVAC system, the jurisdiction could require an outlet for a future electric heat pump.
	**Water heating**	For alterations and additions that include a water heating system, the jurisdiction could require an outlet for a future water heater heat pump.
	**Pool and Spas**	For alterations and additions that include pool or spa equipment, the jurisdiction could require an outlet for a future electric pool pump.
	**Installing 240V outlet when renovating the following areas:**	Laundry room (an outlet for a future electric clothes dryer) Kitchen (an outlet for future electric oven/stove)
	**Panel**	When planning an electrical panel replacement and electrical panel upgrade, the jurisdiction could require the electrical panel to include panel capacity and breaker space for future electrification of building systems.
In situations where as a result of these requirements, an increase in capacity for an electrical panel, feeders, transformer, or electrical service is needed (that is not part of the appliance upgrade scope), an exception can be offered.		

Photos: Energy Code Ace

California's Upcoming Electrification Changes

2026 | 2029 | 2030 | 2035 | 2045

Air Quality Management Specific Zero-NOx Requirements Begin

Tank-type gas water heaters and gas furnaces no longer sold in certain areas

South Coast Air Quality Management District (SCAQMD)

Bay Area Air Quality Management District (BAAQMD)

CARB Zero-Emission Appliance Standards

Gas water heaters and space heaters no longer sold, statewide

All new car sales are Zero Emission Vehicles (ZEV)

Gas vehicles no longer sold, statewide

California Achieves Carbon Neutrality

Statewide gas piping projected decommissioning date

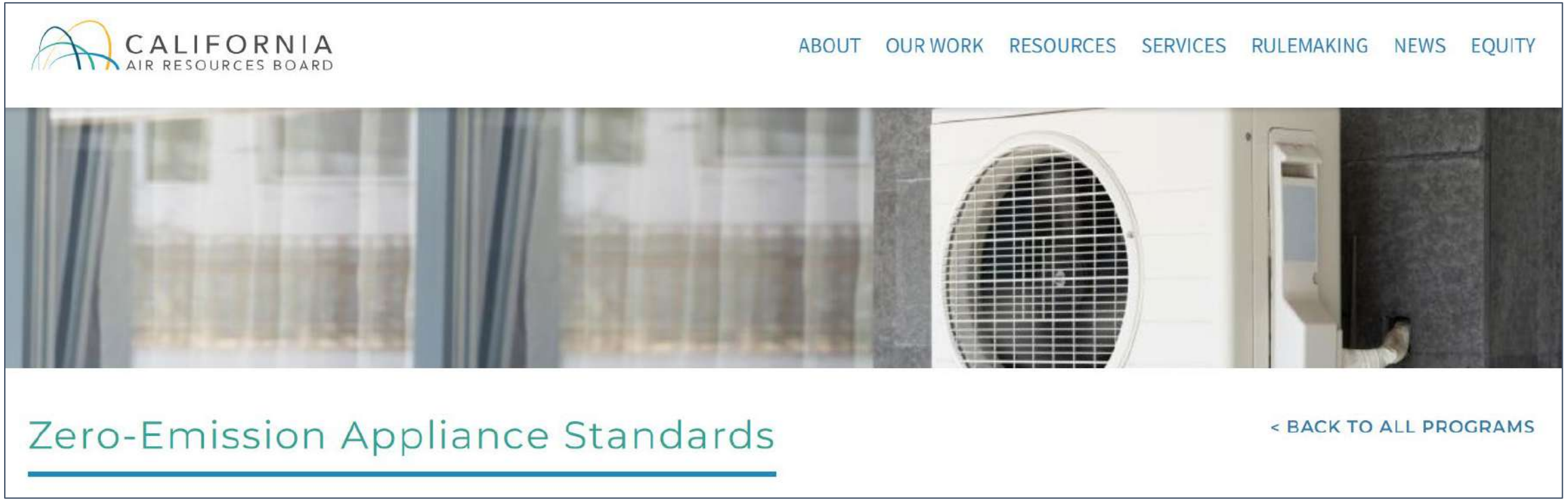
Regional

California

Anticipated State & Regional Zero Emission Appliance Regulations

Agency	Rule	Appliance	2026	2027	2028	2029	2030	2031	2033
CARB (State-wide); Regulating the sale	In-Process	Boilers and Water Heaters		< 75 kBtu/hr		< 400 kBtu/hr		< 2000 kBtu/hr	
		Tankless Water Heaters				< 200 kBtu/hr		< 2000 kBtu/hr	
		Other/ Specialty				Furnaces < 2000 kBtu/hr		Pool Heaters < 2000 kBtu/hr	High-temp Boilers < 2000 kBtu/hr
BAAQMD (Bay Area); Regulating the installation by manufacturing date	9-6 Adopted	Boilers and Water Heaters		< 75 kBtu/hr				< 2000 kBtu/hr	
	9-4 Adopted	Furnaces				< 175 kBtu/hr			
SCAQMD (South Coast); Regulating the sale and installation	1121 In-Process	Residential Water Heaters	**New Construction:** <75 kBtu/hr	**All Buildings (except mobile):** < 75 kBtu/hr			**Existing Mobile Homes:** < 75 kBtu/hr		
	1111 In-Process	Residential & Commercial Furnaces	**New Construction:** ≤ 2000 kBtu/hr		**All Buildings (except mobile):** ≤ 2000 kBtu/hr		**Existing Mobile Homes:** ≤ 2000 kBtu/hr		
	1146.2 Adopted	Large Water Heaters, Small Boilers and Process Heaters	**New Construction:** Boilers, Storage Water Heaters, and Process Heaters ≤ 400 kBtu/hr Tankless ≤200 kBtu/hr	**All Buildings (except mobile):** Storage Water Heaters	**New Construction:** Pool heaters, Boilers, Water Heaters, and Process Heaters ≤ 2000 kBtu/hr	**All Buildings:** Boilers, Storage Water Heaters, and Process Heaters ≤ 400 kBtu/hr Tankless ≤ 200 kBtu/hr **New Construction:** High-Temperature Boilers, Water Heaters, and Process Heaters ≤ 200 kBtu/hr	**Existing Mobile Homes:** Storage Water Heaters	**All Buildings:** Pool Heaters, Boilers, Water Heaters, and Process Heaters < 2000 kBtu/hr	**All Buildings:** High-Temperature Boilers, Water Heaters, and Process Heaters ≤ 2000 kBtu/hr

CARB's Zero-Emission Space and Water Heater Standards



CARB is exploring a regulation that would require that all new space and water heaters sold in California meet zero GHG emission standards by 2027-2030.

Source: CARB Zero-Emission Space and Water Heater Standards & May2024 CARB Workshop Update

CARB's Zero-Emission Space and Water Heater Standards

- Continue to focus on new sales of space and water heating.
- Staggered compliance dates based on technological feasibility
- Align with Bay Area (adopted) and South Coast Air District (Rule 1146.2 adopted) zero-NOx rules for implementation consistency

Effective Date	Equipment Type	Capacity/Size Limits
2027	Boilers and water heaters	< 75,000 Btu/hr
2029	~~Central~~ Furnaces	< 175,000 Btu/hr
2029	Boilers and water heaters	≤ 400,000 Btu/hr
2029	Instantaneous water heaters	≤ 200,000 Btu/hr
2029 ~~TBD~~	~~Central~~ Furnaces	≤ 2MM Btu/hr
2031	Boilers and water heaters	≤ 2MM Btu/hr
2031	Instantaneous water heaters	≤ 2MM Btu/hr
2031	Pool heaters	≤ ~~400,000~~ 2MM Btu/hr
2033	High temperature (>180°F) boilers and water heaters	≤ 2MM Btu/hr

Slide Provided By: Southern California Edison

CPA *Source:* May2024 CARB Workshop Update

SCAQMD Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters, Small Boilers and Process Heaters

- ~5.6 tons of NOx emissions reductions/day
- Applies to ~1,070,000 units
- New and existing buildings
- Adopted June 7, 2024

Equipment Category	Compliance Schedule Start Dates
Smaller Units	New Buildings **January 1, 2026**; All Buildings **January 1, 2029**
Larger Units and Pool Heaters	New Buildings **January 1, 2028**; All Buildings **January 1, 2031**
High Temperature Units	New Buildings **January 1, 2029**; All Buildings **January 1, 2033**

Source: SCAQMD Proposed Amended Rule 1146.2

SCAQMD Proposed Amended Rules 1111 & 1121 (vote in Q4 2024)

Rule 1111– Reduction Of NOx Emissions From Natural-Gas-Fired, Fan-Type Central Furnaces

Equipment Category	NOx Emission Limit (ng/J*)	Building Type	Compliance Date
Residential Fan-Type Central Furnace**	0	New	January 1, 2026
		Existing	January 1, 2028
Commercial Fan-Type Central Furnace	0	New	January 1, 2026
		Existing	January 1, 2028
Mobile Home Furnace	0	New	January 1, 2026
		Existing	January 1, 2030
Wall Furnaces, Floor Furnaces, and Others	0	New	January 1, 2026
		Existing	January 1, 2028

Rule 1121– Control of Nitrogen Oxides From Residential Type, Natural Gas-Fired Water Heaters

Equipment	Building Type	NOx limit (ng/J* or ppmv)	Compliance Date
Water Heater	New	0	January 1, 2026
	Existing	0	January 1, 2027
Mobile Home Water Heater	New	0	January 1, 2026
	Existing	0	January 1, 2030

* Nanograms per joule (ng/J) of NOx of Heat Output.

CPA *Source:* SCAQMD Proposed Amended Rule 1111 & 1121

SCAQMD Go Zero Rebate Program (vote in Q4 2024)

Proposed rebates for the single family and multifamily programs:

Proposed Single Family Rebate Amounts		
Community	Heat Pump HVAC	Heat Pump Water Heater
General (Any)	$1,500	$1,000
Overburdened	$3,000	$2,000

Proposed Multifamily Rebate Amounts*		
Community	Heat Pump HVAC	Heat Pump Water Heater
General (Any)	$1,500-$2,000	$1,000-$2,000
Overburdened	$3,000-$4,000	$2,000-$4,000

*Total cap for each property $300,000; or 30-50% of project cost

CPA *Source:* SCAQMD Go Zero Rebate Program

BAAQMD Amendments to Regulation 9: Inorganic Gaseous Pollutants

- Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fire Boilers and Water Heaters
- Rule 4: Nitrogen Oxides from Natural Gas-Fired Furnaces
- Both rules adopted by the Air District Board of Directors at a public hearing on March 15, 2023

Compliance Timeline

The rule amendments will apply only to new appliances, and do not mandate retrofitting of existing appliances.

2027 – only zero NOx water heaters can be sold or installed in the Bay Area.
2029 – only zero NOx furnaces can be sold or installed in the Bay Area.
2031 – only zero NOx large commercial water heaters can be sold or installed in the Bay Area.

Source: BAAQMD Rules 9-4 and 9-6 Building Appliances; BAAQMD Fact Sheet

Building Electrification

- What is it?
- Why should we implement Building Electrification Reach Codes?
- What are the benefits?

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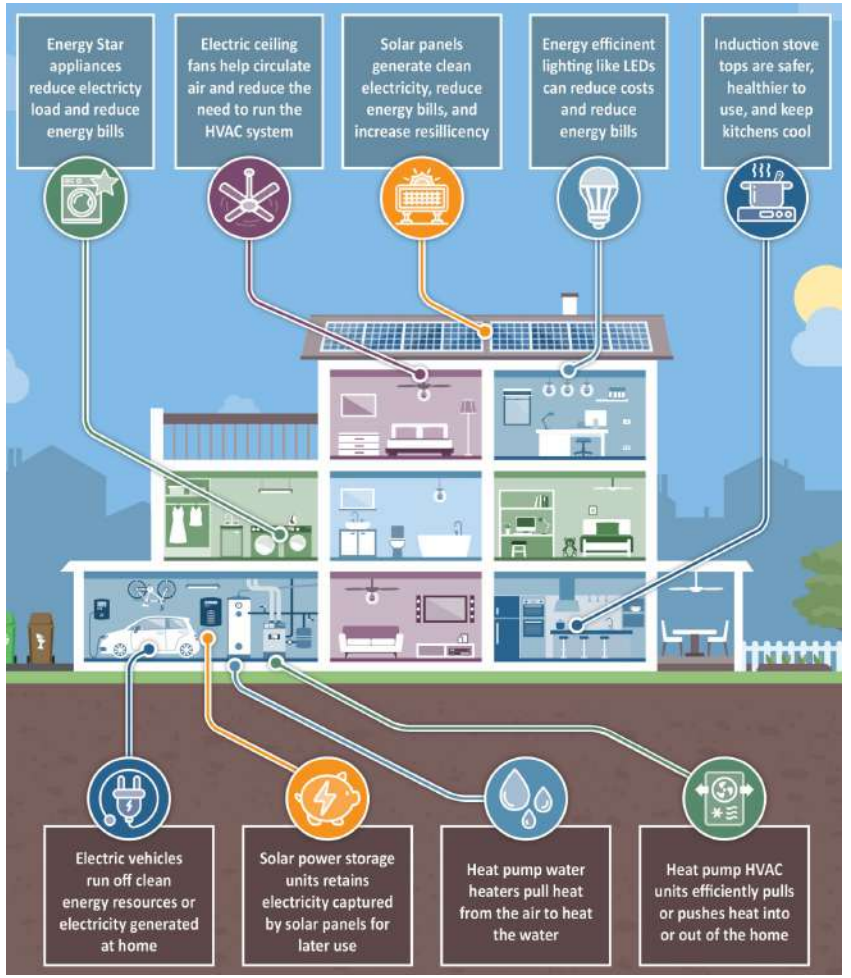
What is Building Electrification?

- Building electrification is the process of converting our buildings to use electric appliances and measures rather than ones that run on natural gas or other fossil fuels.

- **This includes the electrification of:**
  - Heating, Ventilation, and Air Conditioning
  - Hot water heater
  - Clothes dryers
  - Kitchen appliances
  - Vehicles

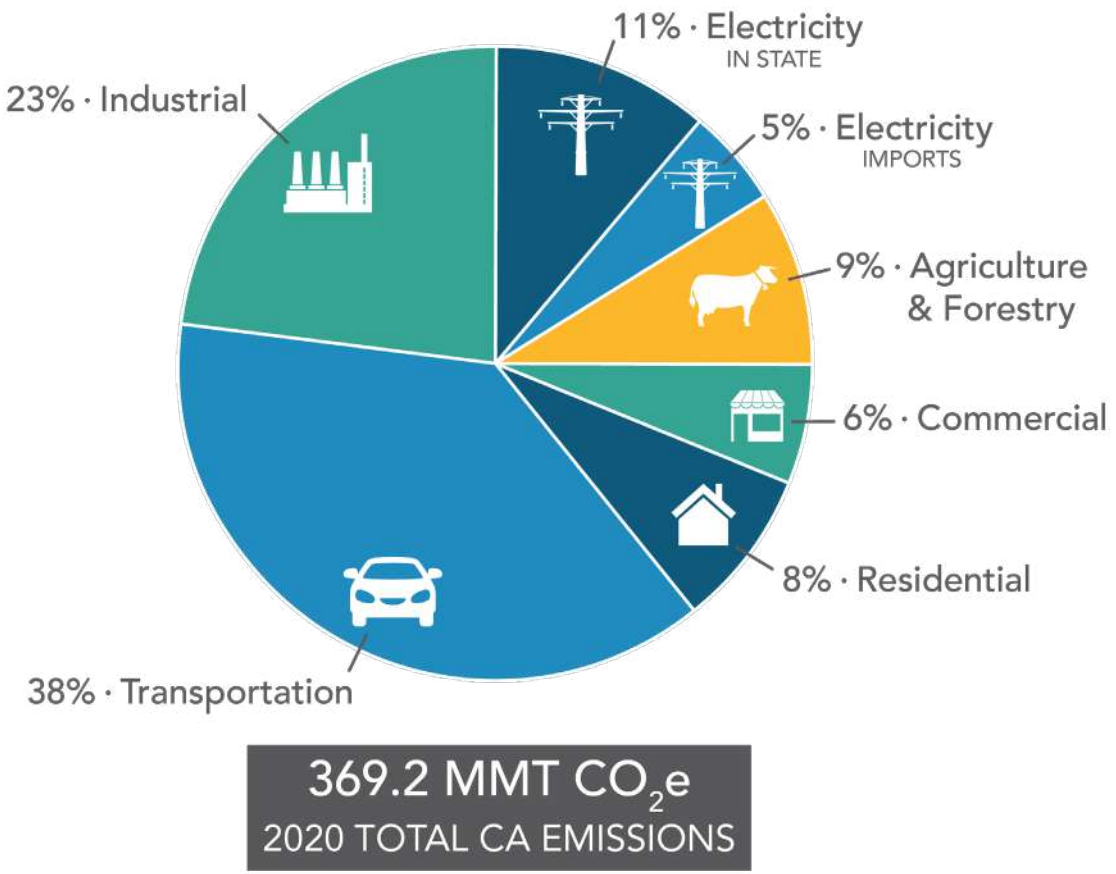


Source: Rincon Consultants

California Carbon Emissions by Economic Sector

- **Emissions from Transportation and Commercial and Residential buildings account for 52% of the CA inventory in 2020**
  - Mainly from the fossil fuel combustion
  - Nearly all gas appliances, except some high-temperature industrial applications, can be electrified.

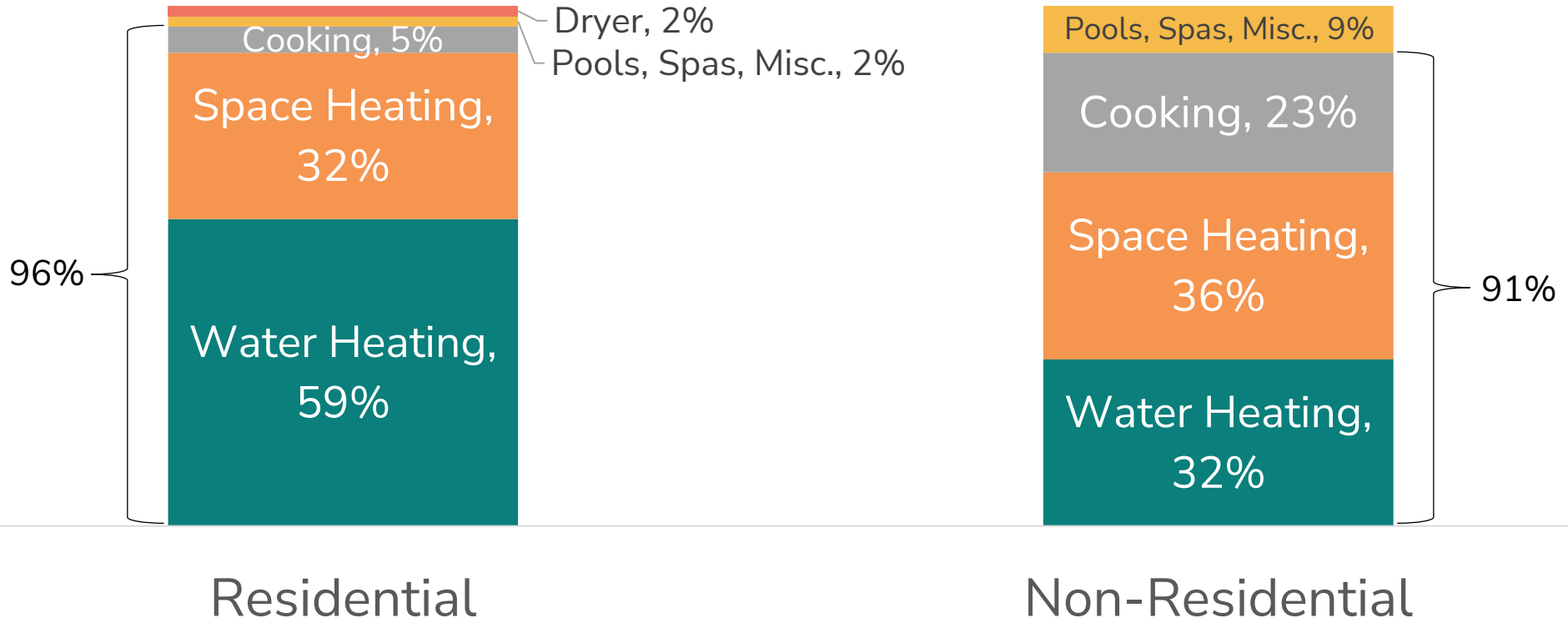
2022 California GHG Emission Inventory



Source: California Air Resources Board, 2022

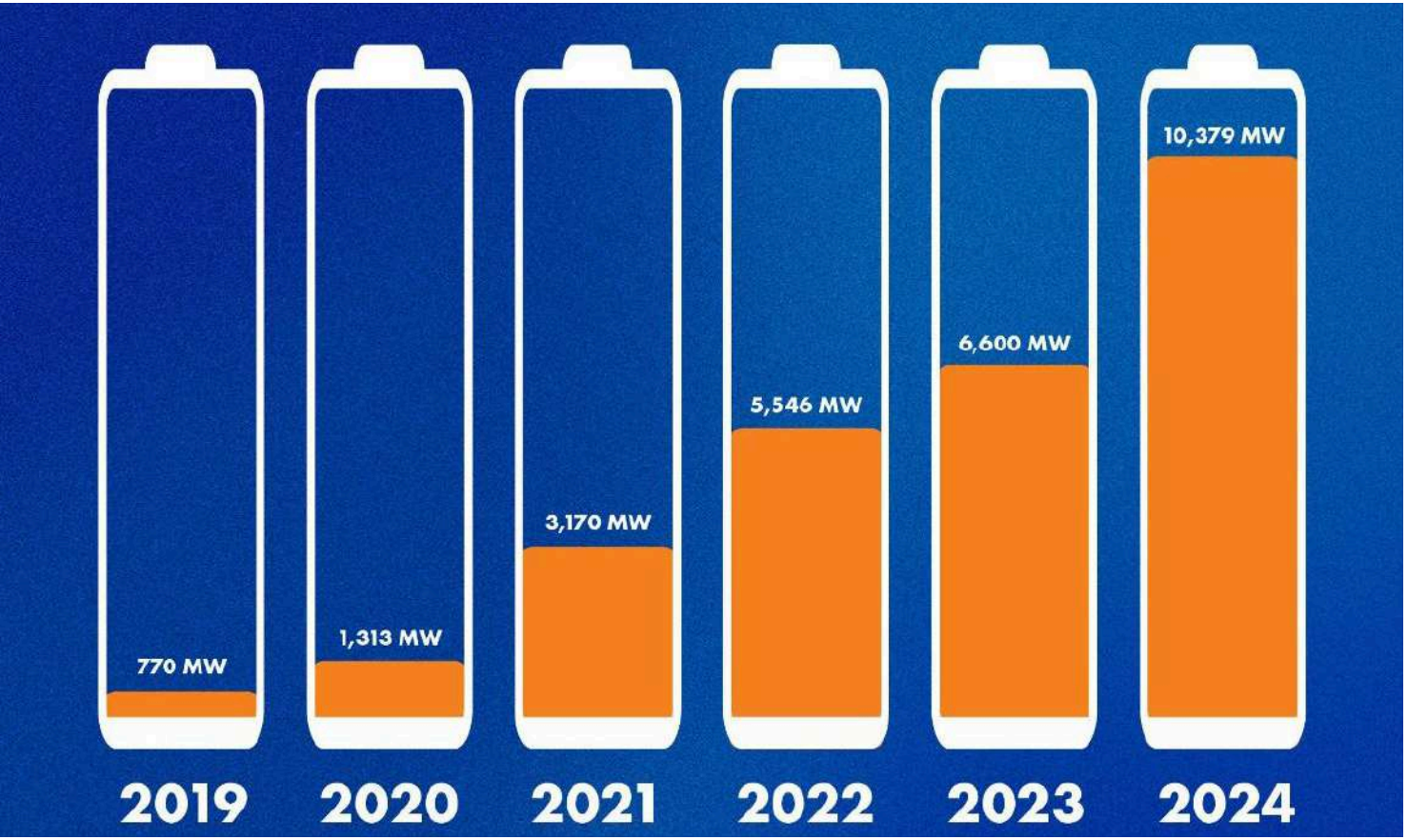
California Buildings Gas Usage

The combined gas usage for **cooking, water heating,** and **space heating** accounts for 96% in residential and 91% in non-residential sectors.



Sources: 2019 Residential Appliance Saturation Survey and California Building Decarbonization Assessment

California has increased its battery storage capacity tenfold since 2019



- Battery storage helps the state maintain a clean and reliable power grid.
- Battery storage allows energy from renewable sources (like solar) to be captured and used at other times of the day.

For example:

- Excess energy generated with solar during daylight hours can be stored in a battery.
- In the evening hours, this stored energy is utilized, alleviating demand on the grid.

Sources: California Achieves Major Clean Energy Victory: 10,000 Megawatts of Battery Storage

Electrification Benefits

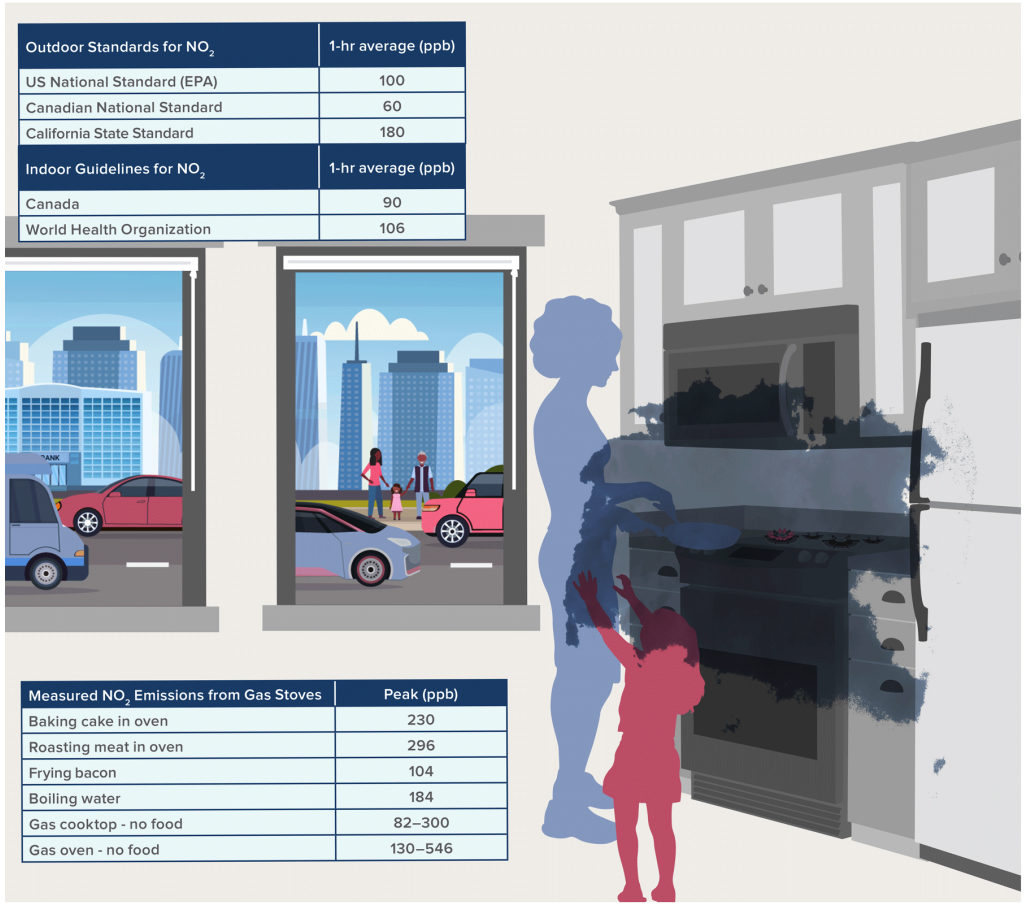
Healthier Indoor Air

- Electrification will eliminate the release of harmful pollutants indoors, leading to better air quality, fewer respiratory issues, and overall improved health.

"An analysis of 41 studies found that children living in homes with gas stoves had a 42% higher risk of experiencing asthma symptoms, and, over their lifetime, a 24% increase in the risk of being diagnosed with asthma."

Gas Stoves Can Emit Elevated Indoor Nitrogen Dioxide (NO_2) Levels Often Exceeding Indoor Guidelines and Outdoor Standards

Outdoor Standards for NO_2	1-hr average (ppb)
US National Standard (EPA)	100
Canadian National Standard	60
California State Standard	180
Indoor Guidelines for NO_2	**1-hr average (ppb)**
Canada	90
World Health Organization	106



Measured NO_2 Emissions from Gas Stoves	Peak (ppb)
Baking cake in oven	230
Roasting meat in oven	296
Frying bacon	104
Boiling water	184
Gas cooktop - no food	82–300
Gas oven - no food	130–546

Source: Rocky Mountain Institute, 2020, Slate 2020, John Hopkins, Lawrence Berkeley National Laboratory

Electrification Benefits

Reduced Greenhouse Gas Emissions

- Electrification, especially when energy sourced from a clean renewable energy from CPA, helps to reduce harmful greenhouse gas emissions and mitigate negative climate change effects.

Lowest-cost, lowest-risk pathway

- Electrification, especially when energy sourced from a clean renewable energy from CPA, helps to reduce harmful greenhouse gas emissions and mitigate negative climate change effects.
- Electrification is cost effective, particularly for New Construction.
- Gas infrastructure and fuel costs are highly volatile.

Additional Cost Effectiveness Resources:

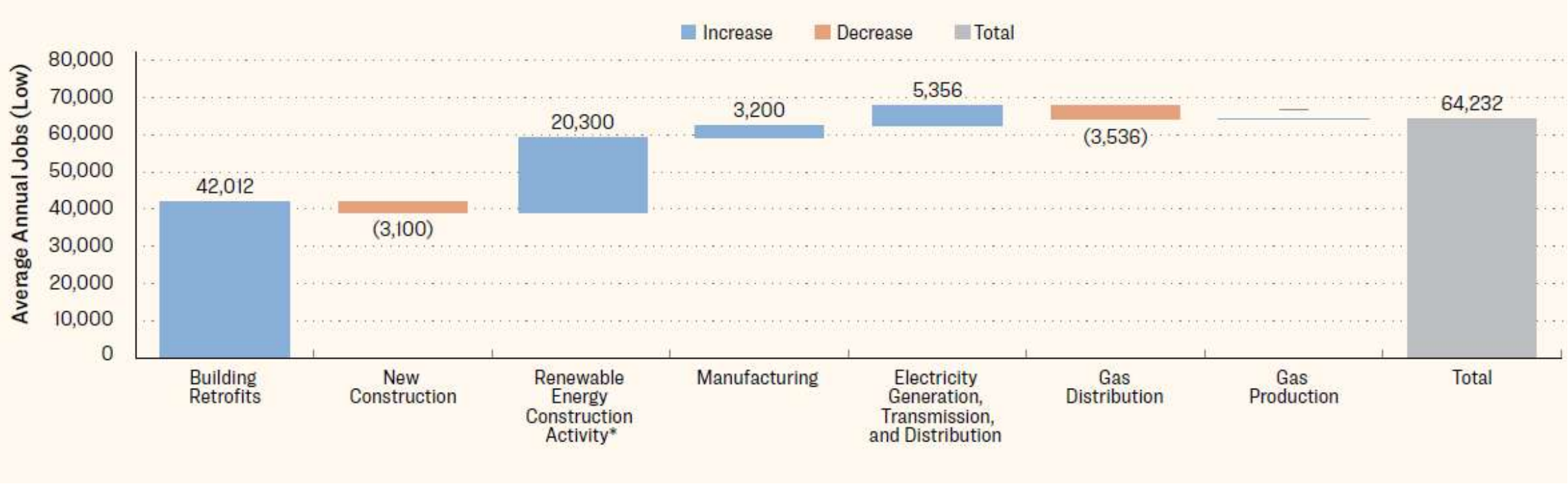
- 2022 Single Family New Construction Cost-effectiveness Study
- 2022 Multifamily New Construction Cost-effectiveness Study
- 2022 Nonresidential New Construction Cost-effectiveness Study
- Residential Building Electrification in California

Source: *Cost Study of the Decarbonization Code*; *The Challenge of Retail Gas in California's LowCarbon Future*

Electrification Benefits

Job Creation

- The shift towards electrification generates new employment opportunities in manufacturing, construction, and electricity generation, transmission and distribution.

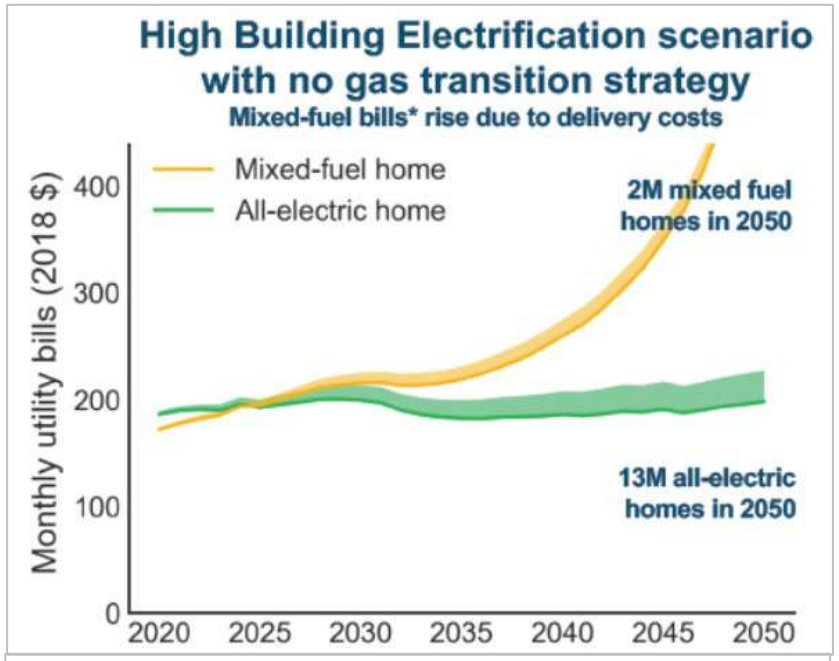


Sources: UCLA 2019, UMass 2021

Gas Issues: Natural Gas Costs Climbing

CA residential natural gas prices increased **5.2%** per year faster than electricity prices from 2019 to 2022

Trend expected to continue:

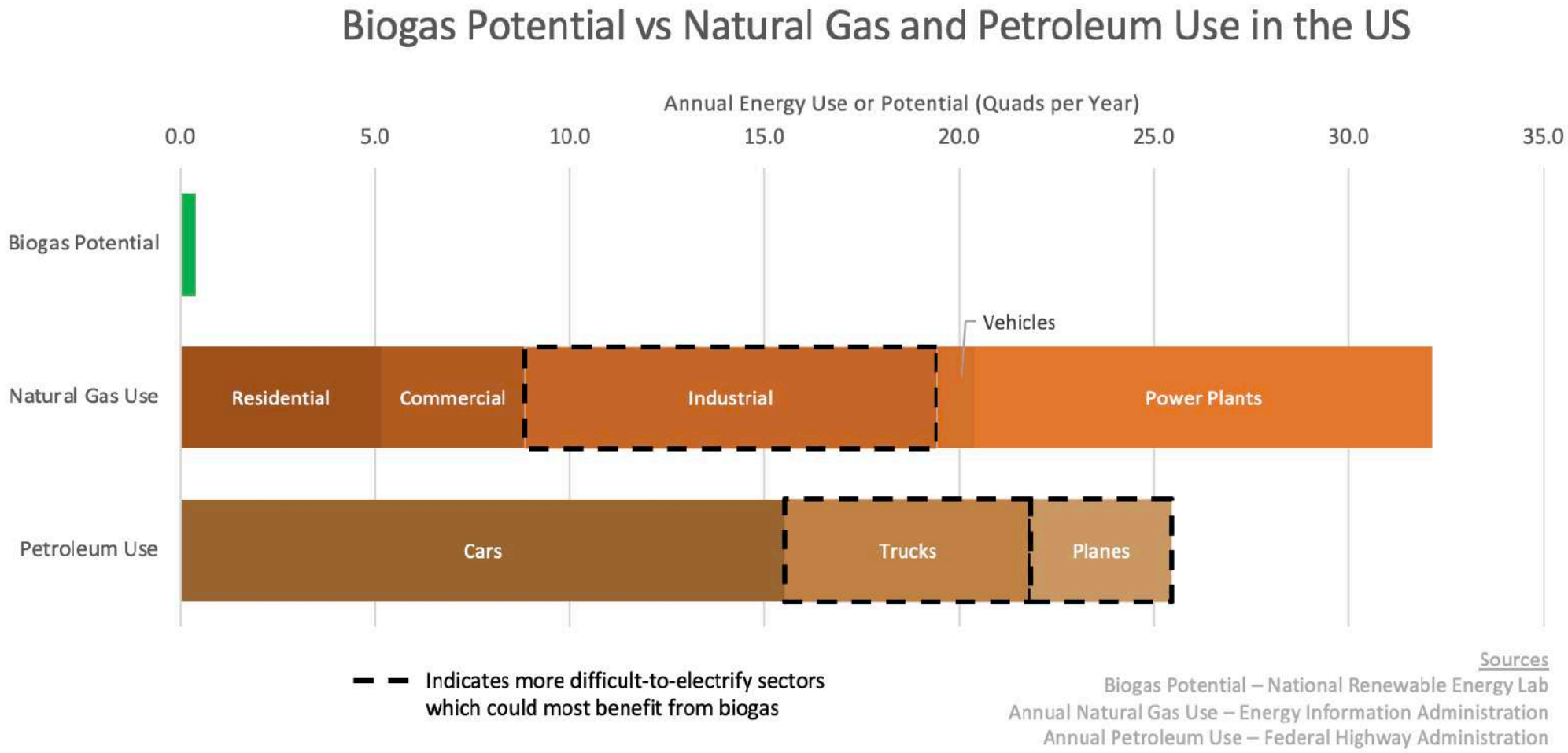


CEC Workshop June 6, 2019: Draft Results from E3 study on the Future of Natural Gas Distribution in California

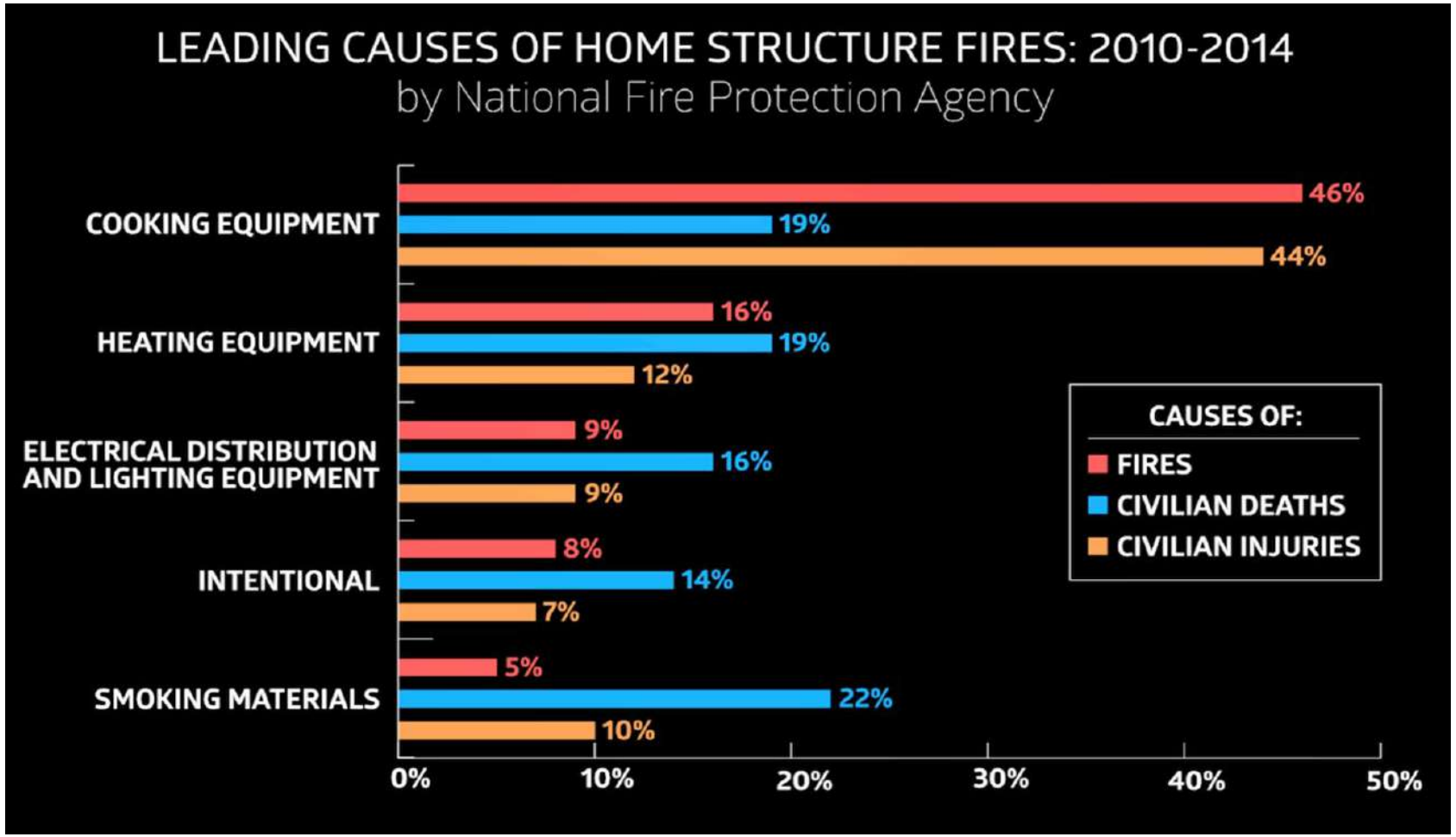
The AB3232 Report represents the most current CEC research supporting that *Aggressive Electrification* is the primary pathway to meeting GHG reduction targets.

Source: EIA
https://www.eia.gov/dnav/ng/hist/n3010ca3m.htm
https://www.eia.gov/electricity/data/state/

Gas Issues: BioGas Can't Get Us There



Gas Issues: Gas is a Fire Risk



Sources: https://drscleanup.com/2017/10/house-fire-causes-be-safe/
https://www.nfpa.org/News-and-Research/Data-research-and-tools/Building-and-Life-Safety/Home-Structure-Fires

Air Quality

What is it?

How does it work?

What are the benefits?

Who has done it?

CPA CLEAN POWER ALLIANCE

How Does an Air Quality Code Work?

What is it?

A regulation for building and/or appliance emissions.

The goal is to reduce negative health impacts caused by air pollutants.

How does it work?

Typically takes effect through amendments to CALGreen Title 24, Part 11.

Building applicants specify equipment that meets emissions criteria.

Enforcement is the same as for an all-electric reach code.

What support is available?

Technical Assistance

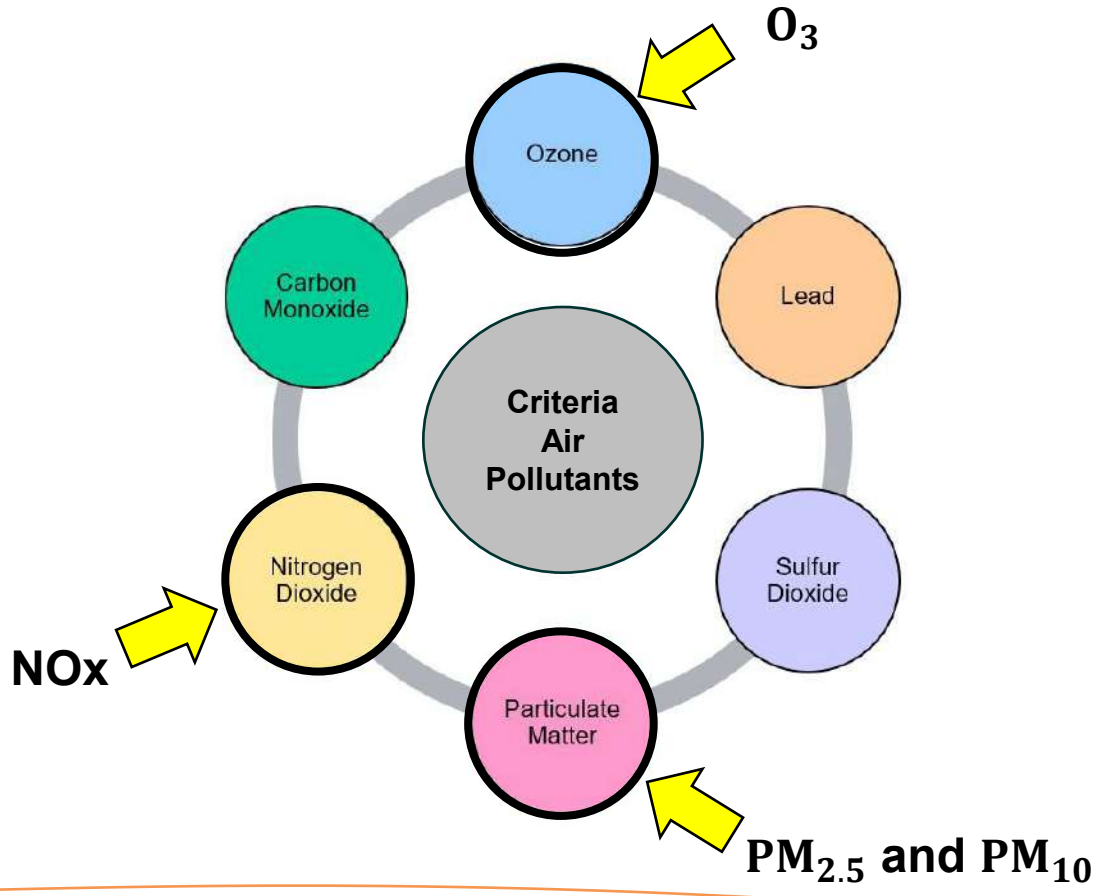
Model Code Language

Staff Report Templates

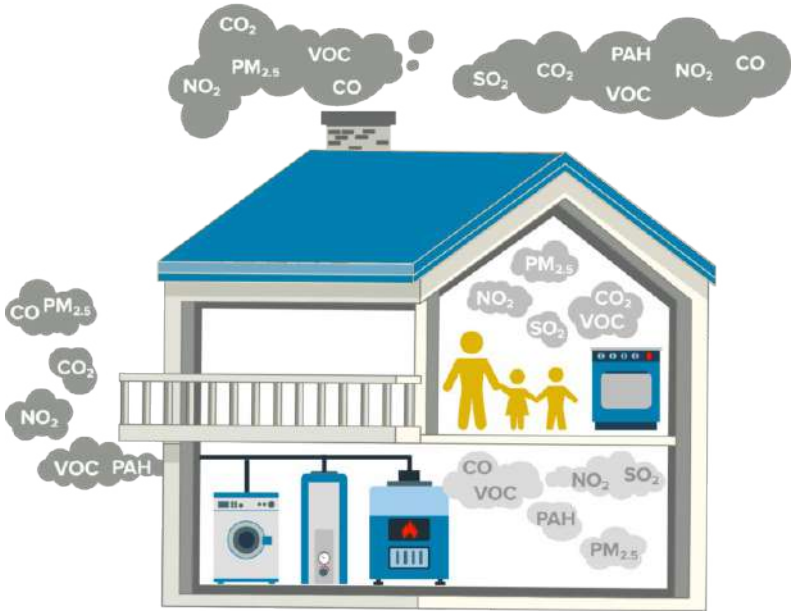
Council Meeting Support

Why Regulate Air Pollutants?

The Federal Clean Air Act requires the Environmental Protection Agency (EPA) to set air quality standards for **criteria air pollutants** because they can harm your health, the environment, and cause property damage.



Ozone (O_3), nitrogen dioxide (NOx), and particulate matter ($PM_{2.5}$ and PM_{10}) have been shown to have **negative respiratory effects and/or cause asthma.**



Source: EPA Criteria Air Pollutants

Does your area meet “Attainment status”?

If area is in "nonattainment" it means the area **does not meet*** the National Ambient Air Quality Standard (NAAQS) or California Ambient Air Quality Standard (CAAQS) and has a high level of criteria air pollutants which are harmful to the health of the community.

Pollutant	Standard	Federal or State	Area Name	Current Status
Ozone	8 Hour	Federal & State	Los Angeles – South Coast Air Basin	Nonattainment
Ozone	1 Hour	Federal & State	Los Angeles – South Coast Air Basin	Nonattainment
PM2.5	24 Hour	Federal	Los Angeles – South Coast Air Basin	Nonattainment
PM2.5	Annual	State	Los Angeles – South Coast Air Basin	Nonattainment
PM2.5	Annual	Federal	Los Angeles – South Coast Air Basin	Nonattainment
PM10	24 Hour	State	Los Angeles – South Coast Air Basin	Nonattainment
PM10	Annual	State	Los Angeles – South Coast Air Basin	Nonattainment

According to the EPA’s Green Book, the Los Angeles Area air quality impacts over **15 million people across 4 counties.**

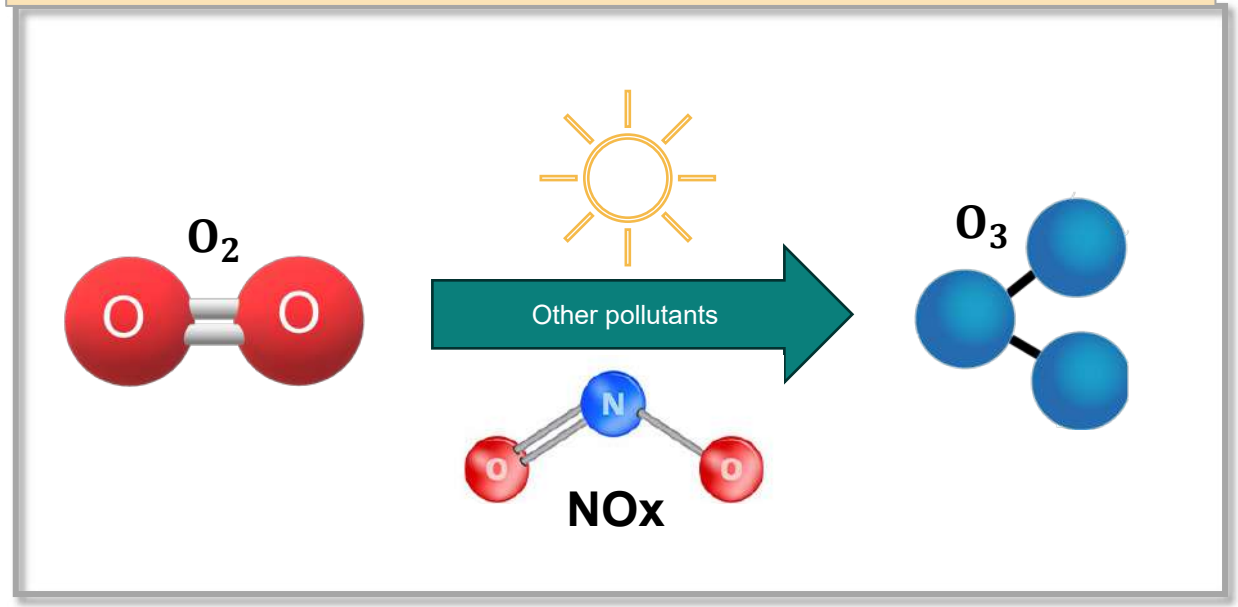
The Los Angeles Area is in nonattainment for ozone and particulate matter.

**or contributes to ambient air quality in a nearby area that does not meet*

Sources: EPA Green Book & South Coast AQMD 2022 Air Quality Management Plan

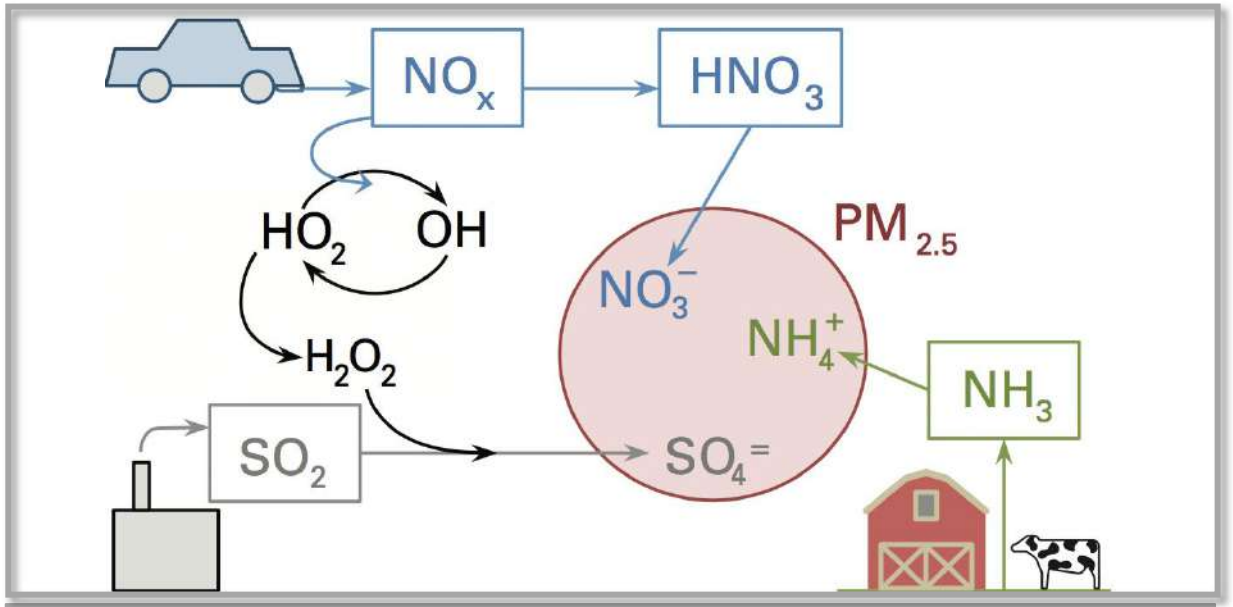
Why Regulate NOx?

NOx leads to O_3



NOx and VOCs act as catalysts in the presence of sunlight to create O_3

NOx leads to $PM_{2.5}$



NOx is a main contributor to the formation of secondary particulate matter ($PM_{2.5}$)

If an area is in nonattainment for NOx, O_3, or $PM_{2.5}$ limiting NOx in buildings is an effective strategy to reducing that criteria air pollutant.

Source: EPA: Nitrogen Oxides (NOx), Why and How They Are Controlled

Hierarchy of Air Quality Regulation

1

FEDERAL - Environmental Protection Agency (EPA):
The EPA sets National Ambient Air Quality Standards (NAAQS) which establish emissions limits for 6 criteria pollutants.

2

STATE – California Air Resource Board (CARB):
CARB sets California Ambient Air Quality Standards (CAAQS) which establish state emissions limits. CARB creates a State Implementation Plan (SIP) to comply with NAAQS (federal) by the applicable attainment deadline.

3

REGIONAL – Air Quality Management Districts:
Local agencies operate regionally to carry out implementation plans to control local air quality. This includes Bay Area Air Quality Management District (BAAQMD), South Coast Air Quality Management District (SCAQMD), etc.

4

LOCAL – Jurisdictions
Local and regional authorities are responsible for controlling air pollution from [non-mobile] sources. – California Clean Air Act

Can a jurisdiction regulate air quality?

LOCAL RESPONSIBILITY

WHEREAS, Congress finds that […] air pollution control at its source is the **primary responsibility of States and local governments.**

NONVEHICULAR

WHEREAS, pursuant to the California Clean Air Act Law, […] local and regional authorities are responsible for **controlling air pollution from [nonvehicular] sources.**

STRICTER STANDARDS

WHEREAS, Section 39002 of the California Health and Safety Code recognizes local authority **to set stricter standards** than those set forth by law or by the state board for nonvehicular sources.

NONATTAINMENT

WHEREAS, much of Southern California **remains a nonattainment area for ozone and particular matter** that does not meet the state or federal air quality standards established to protect public health.

EXPRESS FINDINGS

WHEREAS, California Health and Safety Code Sections 17958.5, 17958.7 and 18941.5 specifies that the City **may make changes or modifications to the building standards** […] **based upon express findings** that such changes or modifications are reasonably necessary because of local climatic, geological, or topographical conditions.

ENVIRONMENTAL CONDITIONS

WHEREAS, California Green Building Standards Code Section 101.7.1 provides that local climactic, geological, or topographical conditions **include environmental conditions** established by a city or county […] through findings.

Who has Done it?

- **Los Altos Hills** adopted a zero-NOx emissions reach code on February 15th, 2024.

- Air Quality codes are being pursued by:
  - California Air Resources Board (CARB)
  - Bay Area Air Quality Management District (BAAQMD)
  - South Coast Air Quality Management District (SCAQMD)

Maybe You!

- Does your municipality regulate wood-burning fireplaces?
- If so, then you are already implementing one form of an air quality code.

Example Ordinance: Los Altos Hills

ZERO-NOX EMISSION BUILDING. A building with zero NOx emissions that utilizes zero NOx equipment or appliances.

ZERO-NOX EMITTING EQUIPMENT. Any equipment or appliance that emits no more than 0.0 nanograms of nitrogen oxides (expressed as NOx) per joule of heat and/or light output. Equipment and appliance uses include, but are not limited to, space heating, water heating, cooking, clothes drying, and lighting.

(b) Chapter 4, **Residential Mandatory Measures**, is amended by amending the following sections to read:

DIVISION 4.1 PLANNING AND DESIGNSECTION

4.106 SITE DEVELOPMENT

4.106.5.1. New construction. All newly constructed buildings, newly constructed detached accessory dwelling units, and other newly constructed detached habitable structures shall be Zero-NOx Emission Buildings.

Exemptions:

1. Outdoor cooking equipment, outdoor fireplaces, portable space heaters, generators, and pool/spa heaters for residential building projects are exempt from the requirements of 4.106.5.1, or

2. Indoor cooking equipment for residential building projects is exempt from the requirements of 4.106.5.1. The applicant shall comply with Section 4.106.5.3.

Energy Performance Approach

- What is it?
- What are the benefits?
- How does it comply with the Energy Policy and Conservation Act (EPCA)?
- How do we implement Energy Performance Reach Codes?

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How Does an Energy Performance Approach Work?

What is it?

A stricter regulation of Source Energy which is a proxy for carbon emissions.

Source Energy is regulated in the current Energy Code through the performance path.

The goal is to reduce new building emissions and prepare buildings for future electrification.

How does it work?

Typically takes effect through amendments to the Energy Code, Title 24, Part 6.

Building applicants who use the performance path need to meet a stricter Source Energy target.

Enforcement is the same, except instead of meeting a value of “0 or greater”, the reach code target or greater is met.

What support is available?

Technical Assistance

Model Code Language

Staff Report Templates

Council Meeting Support

How does this approach meet the Energy Policy and Conservation Act (EPCA)?

EPCA Exemption and the 7-Factor Test	Energy Performance Approach Technical Considerations
Permit a builder to […] select items whose combined energy efficiency meet an overall building energy target.	Instead of regulating appliance fuel infrastructure, the Energy Performance Approach sets a target energy score using the EDR1/Source Energy margin (used in modeling software for CA building permits).
Not specifically require any EPCA-covered appliance to exceed federal standards.	This approach sets the target energy score assuming federally required minimum equipment efficiencies.
Offer options for compliance, on a 1-for-1 equivalent energy use or equivalent cost basis.	This approach sets a common target energy margin for both mixed-fuel and all-electric buildings.

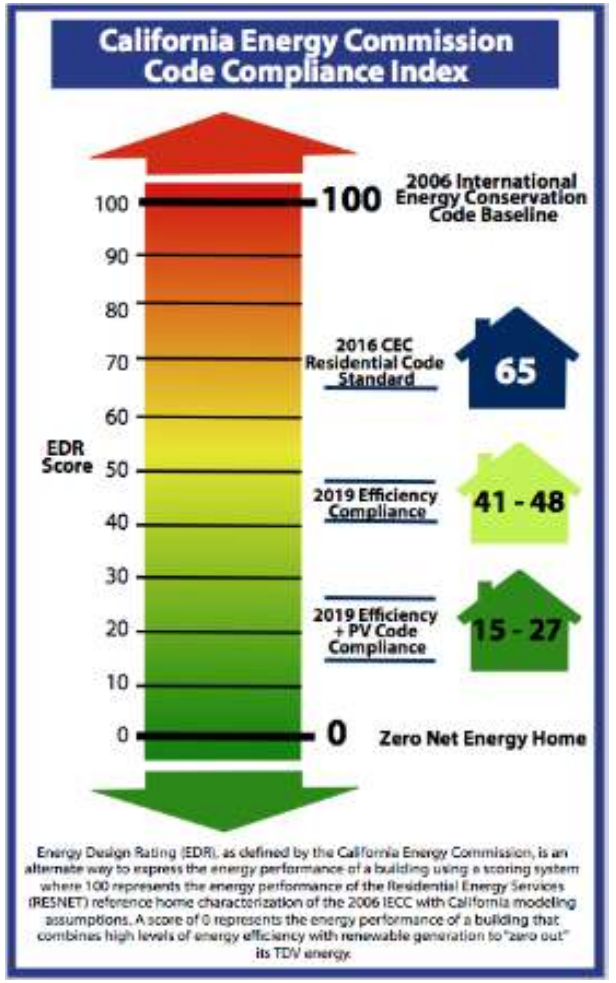
What is Source Energy?

- A rating system within the performance path that is used to regulate energy performance.
- Based on hourly source energy which establishes a carbon-based performance metric.
- For multifamily buildings, the metric is referred to as Source Energy.
- For single family homes, Source Energy is 1 of 3 Energy Design Rating (EDR) metrics, and is referred to as EDR1.

ENERGY DESIGN RATINGS						
	Energy Design Ratings			Compliance Margins		
	Source Energy (EDR1)	Efficiency[1] EDR (EDR2efficiency)	Total[2] EDR (EDR2total)	Source Energy (EDR1)	Efficiency[1] EDR (EDR2efficiency)	Total[2] EDR (EDR2total)
Standard Design	35.6	45.8	31.3			
Proposed Design	26.5	39.6	28.4	9.1	6.2	2.9
RESULT[3]: PASS						

[1]Efficiency EDR includes improvements like a better building envelope and more efficient equipment
[2]Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries
[3]Building complies when source energy, efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded

- Standard Design PV Capacity: 3.46 kWdc
- PV System resized to 3.46 kWdc (a factor of 3.459) to achieve 'Standard Design PV' PV scaling



Source: EnergyCodeAce

How Does Compliance Work?

A compliance margin of “x” or higher is required for Single Family, Multifamily (low & high rise) and Nonresidential buildings.

Single Family Example

ENERGY DESIGN RATINGS						
	Energy Design Ratings			Compliance Margins		
	Source Energy (EDR1)	Efficiency[1] EDR (EDR2efficiency)	Total[2] EDR (EDR2total)	Source Energy (EDR1)	Efficiency[1] EDR (EDR2efficiency)	Total[2] EDR (EDR2total)
Standard Design	35.6	45.8	31.3			
Proposed Design	26.5	39.6	28.4	x	6.2	2.9
RESULT[3]: PASS						

[1]Efficiency EDR includes improvements like a better building envelope and more efficient equipment
[2]Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries
[3]Building complies when source energy, efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded

- Standard Design PV Capacity: 3.46 kWdc
- PV System resized to 3.46 kWdc (a factor of 3.459) to achieve 'Standard Design PV' PV scaling

- EDR2efficiency & EDR2total do not change and still must achieve a score of “0” or higher to pass.

Summary of Approach – The Right to Choose

Climate Zone 6 Single Family Example

Homeowner/Developer (New construction)

All-Electric	Mixed-Fuel (Gas and Electric)	Mixed-Fuel (Gas and Electric)
• Electric space heating • Electric water heating	• Electric space heating • Gas water heating	• Electric space heating • Gas water heating • Increased efficiency • Solar and battery storage
EDR1 = 9	EDR1 = 0	EDR1 = 13

Which Appliances are Relevant?

What's included?

- Space heating/cooling
- Water heating

What's not included?

- Stoves
- Laundry
- Pools
- Fireplace/pit

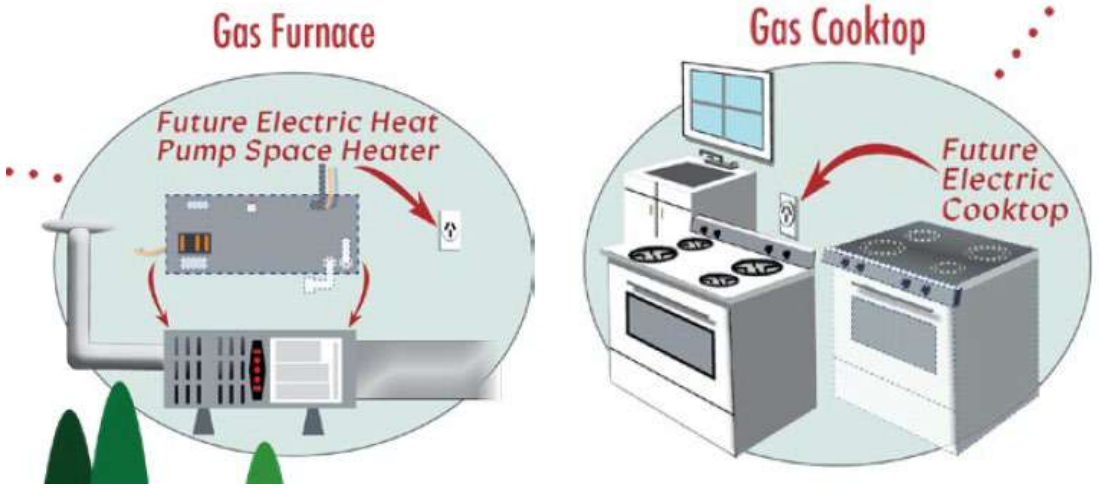
Expanded Electric Readiness

Multifamily Residential:

- Centralized water-heating systems
- Individual dwelling unit water-heating systems
- Building electrical system sizing

Nonresidential:

- Systems using gas or propane
- HVAC hot water design temperature
- Commercial kitchens

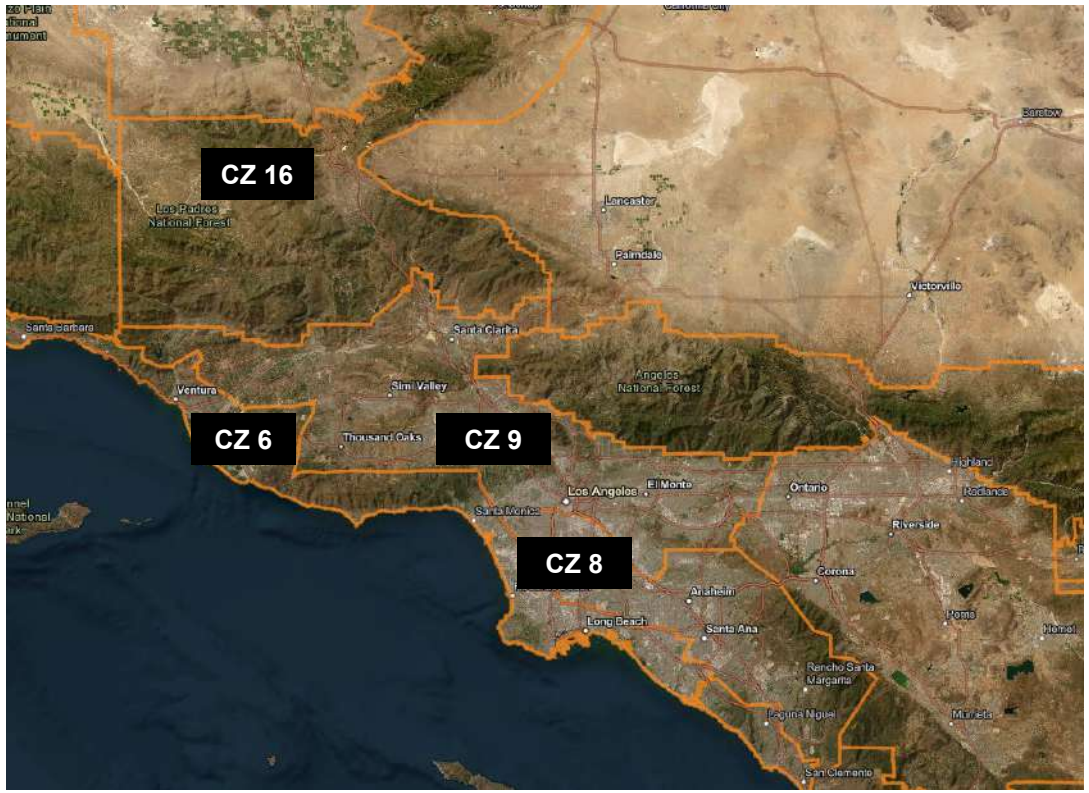


Typical requirements:

- **Dedicated wiring** installed within 3 ft of the gas-fired appliance.
- **Reserved electrical breaker space** provided for the future installation of these systems and appliances.
- A heat pump water heater also requires:
  - **Space** large enough to install it
  - **Plumbing** for a condensate drain and hot and cold water.

Source: Energy Code Ace

CPA Climate Zone Reference Map



Los Angeles County

- CZ 6, 8, 9 & 16

Ventura County

- CZ 6, 9 & 16

CZ 6

- Camarillo
- Carson
- Hermosa Beach
- Malibu
- Manhattan Beach
- Oxnard
- Redondo Beach
- Rolling Hills Estates
- Santa Monica
- Ventura

CZ 8

- Culver City
- Downey
- Hawaiian Gardens
- Hawthorne
- Paramount

CZ 9

- Agoura Hills
- Alhambra
- Arcadia
- Beverly Hills
- Calabasas
- Claremont
- Monrovia
- Moorpark
- Santa Paula
- Sierra Madre
- Simi Valley
- South Pasadena
- Temple City
- Thousand Oaks
- West Hollywood
- Westlake Village
- Whittier

CZ 16

- Ojai

Source: [EZ Building Climate Zone Finder]

Energy Performance Approach:
Single Family Cost Effectiveness

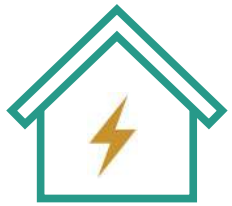
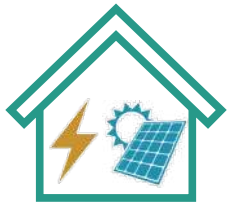
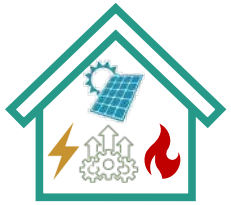
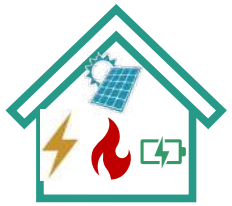
What packages are evaluated for cost impacts?

What is the difference in construction cost?

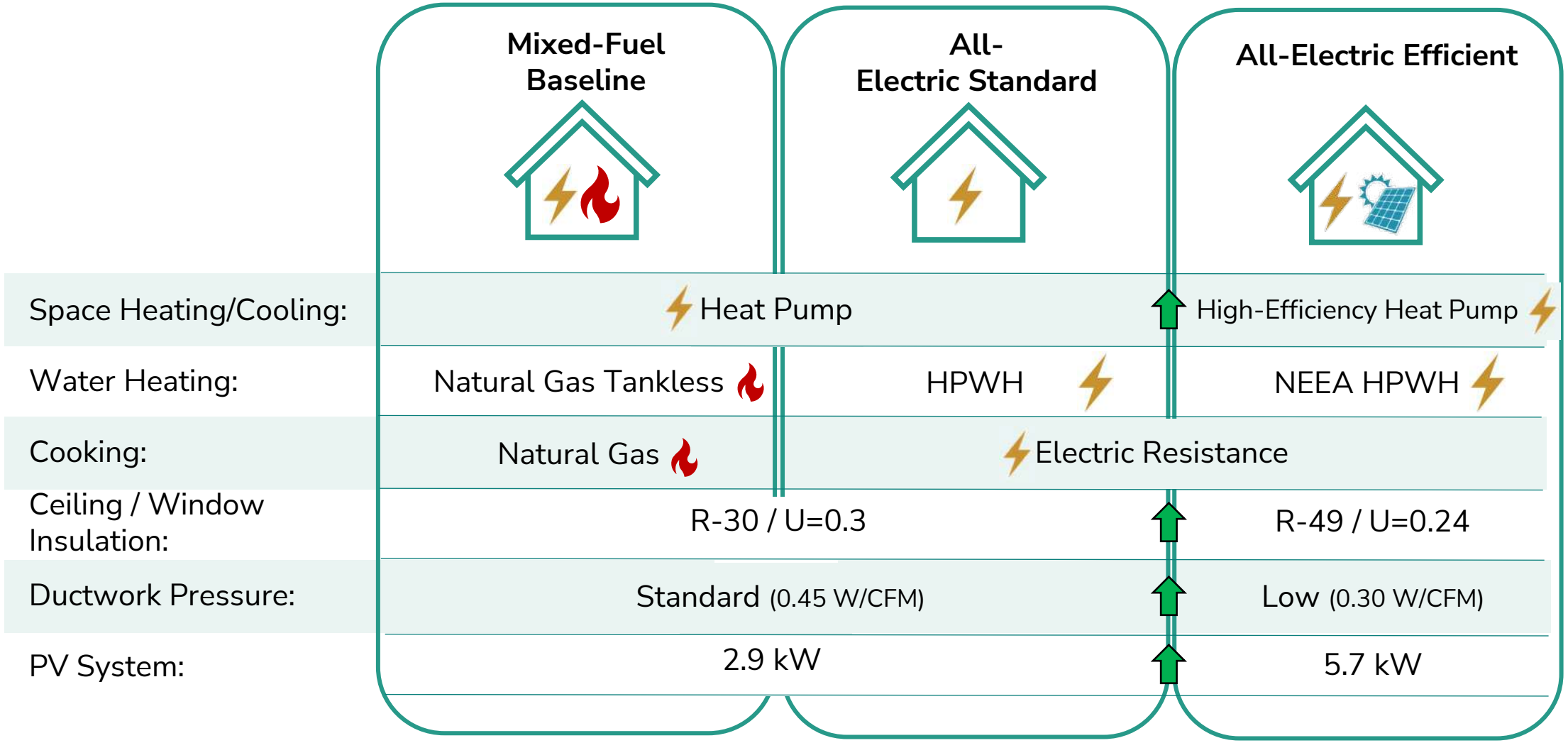
What is the impact to the utility bill?

CPA CLEAN POWER ALLIANCE

Package Definitions

All-Electric Standard:	All-Electric Efficient:	All-Electric Eff w/ PV:	Mixed-Fuel Eff w/ PV:	Mixed-Fuel Eff w/ PV & Battery:
				
All-Electric	All-Electric	All-Electric	Mixed Fuel	Mixed Fuel
Minimal efficiency	Expanded efficiency	Expanded efficiency	Expanded efficiency	Expanded efficiency
Minimal solar	Minimal solar	Optimal solar	Optimal solar	Optimal solar
No battery	No battery	No battery	No battery	Battery

Building Package Equipment Details



Energy Performance Approach Cost Impacts: Average of CZ

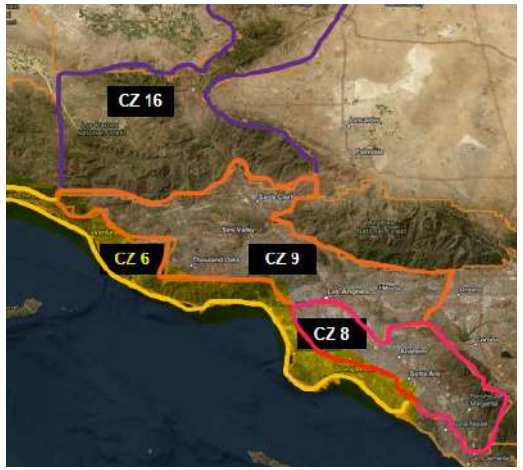
	All-Electric Standard:
Construction Cost*: (compared to mixed-fuel)	$3,300 - $5,300 **savings**
Bill Impact*: (compared to mixed-fuel)	$22 - $45/month **increase**
EDR1*	2 to 23
% CO2 Savings*:	17% - 49%

**Range of values depends on climate zone*

- All-Electric Standard Construction has a lower construction cost compared to the mixed-fuel baseline.
- Bill impacts slightly increase due to price differences between natural gas and electricity.
- EDR1 varies by climate zone.
- % CO2 savings demonstrates GHG emissions avoidance through electrification.

CPA *Source: 2022 Single Family NewCon Cost-eff Study*

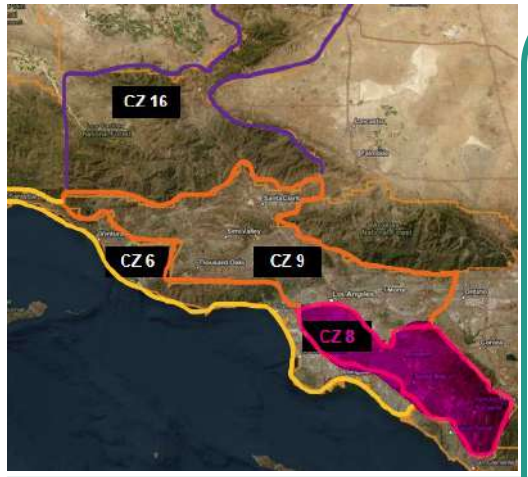
Energy Performance Approach Impacts: CZ6



	All-Electric Standard:	All-Electric Efficient:	All-Electric Eff w/ PV:	Mixed-Fuel Eff w/ PV:	Mixed-Fuel Eff w/ PV & Battery:
Construction Cost: (compared to mixed-fuel baseline)	$5,300 **savings**	$3,600 **savings**	$0	$3,000 **cost**	$8,100 **cost**
Bill Impact: (compared to mixed-fuel baseline)	$20/month **cost**	$15/month **cost**	$25/month **savings**	$20/month **savings**	$30/month **savings**
EDR1	4	6	8	3	18
% CO2 Savings:	22%	27%	32%	8%	46%

Source: *2022 Single Family NewCon Cost-eff Study*

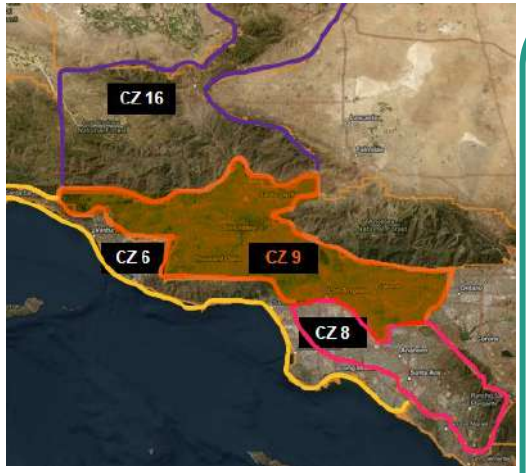
Energy Performance Approach Impacts: CZ8

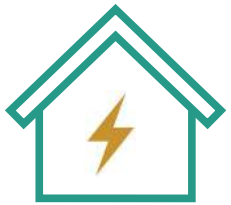
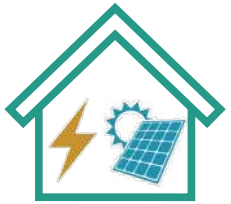
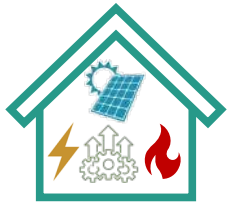
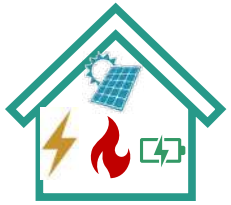


	All-Electric Standard:	All-Electric Efficient:	All-Electric Eff w/ PV:	Mixed-Fuel Eff w/ PV:	Mixed-Fuel Eff w/ PV & Battery:
Construction Cost: (compared to mixed-fuel baseline)	$5,300 **savings**	$4,100 **savings**	$700 **savings**	$2,400 **cost**	$7,500 **cost**
Bill Impact: (compared to mixed-fuel baseline)	$20/month **cost**	$15/month **cost**	$20/month **savings**	$15/month **savings**	$30/month **savings**
EDR1	2	4	5	2	17
% CO2 Savings:	17%	22%	27%	5%	46%

Source: 2022 Single Family NewCon Cost-eff Study

Energy Performance Approach Impacts: CZ9



	All-Electric Standard:	All-Electric Efficient:	All-Electric Eff w/ PV:	Mixed-Fuel Eff w/ PV:	Mixed-Fuel Eff w/ PV & Battery:
					
Construction Cost: (compared to mixed-fuel baseline)	$5,300 **savings**	$4,100 **savings**	$500 **savings**	$2,400 **cost**	$7,500 **cost**
Bill Impact: (compared to mixed-fuel baseline)	$20/month **cost**	$15/month **cost**	$20/month **savings**	$15/month **savings**	$30/month **savings**
EDR1	3	5	7	2	16
% CO2 Savings:	20%	25%	30%	6%	43%

Source: [2022 Single Family NewCon Cost-eff Study]

Energy Performance Approach Impacts: CZ16

	All-Electric Standard:	All-Electric Efficient:	All-Electric Eff w/ PV:	Mixed-Fuel Eff w/ PV:	Mixed-Fuel Eff w/ PV & Battery:
Construction Cost: (compared to mixed-fuel baseline)	$3,300 **savings**	$1,900 **savings**	$7,100 **cost**	$3,300 **cost**	$10,800 **cost**
Bill Impact: (compared to mixed-fuel baseline)	$45/month **cost**	$35/month **cost**	$90/month **savings**	$45/month **savings**	$45/month **savings**
EDR1	23	25	28	13	21
% CO2 Savings:	49%	52%	57%	24%	36%

Source: *2022 Single Family NewCon Cost-eff Study*

Energy Performance Approach:
Low-Rise Multifamily Cost Effectiveness

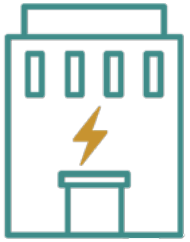
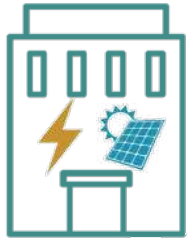
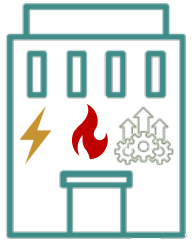
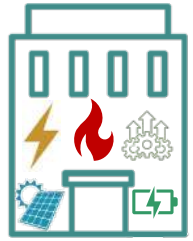
What packages are evaluated for cost impacts?

What is the difference in construction cost?

What is the impact to the utility bill?

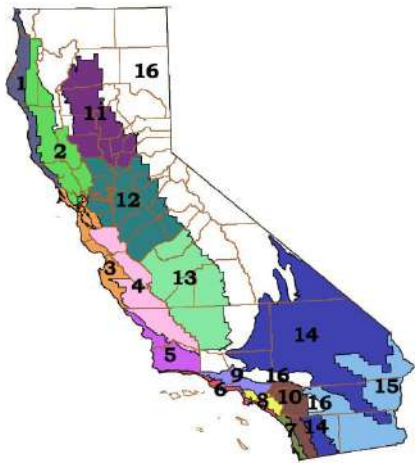
CPA CLEAN POWER ALLIANCE

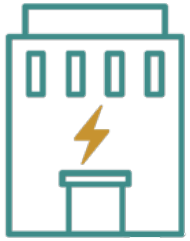
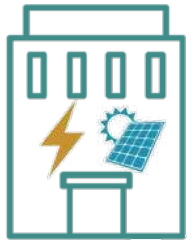
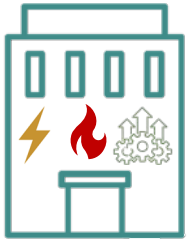
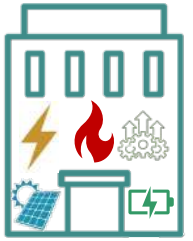
Package Definitions

All-Electric Standard:	All-Electric 100% PV:	Mixed-Fuel Eff:	Mixed-Fuel Eff w/ PV & Battery:
			
All-Electric	All-Electric	Mixed Fuel	Mixed Fuel
Minimal efficiency	Minimal efficiency	Expanded efficiency	Expanded efficiency
Minimal solar	100% solar offset	Minimal solar	100% solar offset
No battery	No battery	No battery	Battery

Source: 2022 Multifamily NewCon Cost-eff Study

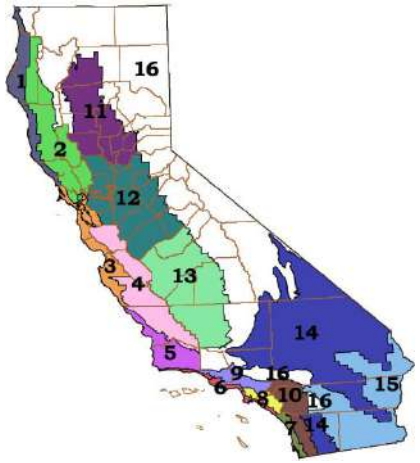
Energy Performance Approach Impacts: CZ6



	All-Electric Standard:	All-Electric 100% PV:	Mixed-Fuel Eff:	Mixed-Fuel Eff w/ PV & Battery:
				
Construction Cost:* (per Dwelling Unit)	$700 **cost**	$2,400 **cost**	$130 **cost**	$3,100 **cost**
Bill Impact:* (per Dwelling Unit)	$0	$30/month **savings**	$0	$20/month **savings**
Source Energy	7%	17%	0%	18%
% CO2 Savings:	41%	50%	0%	22%

*Compared to mixed-fuel baseline
Source: 2022 Multifamily NewCon Cost-eff Study

Energy Performance Approach Impacts: CZ8



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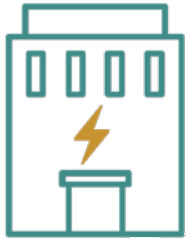
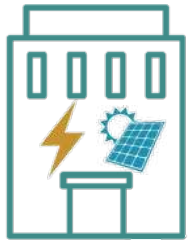
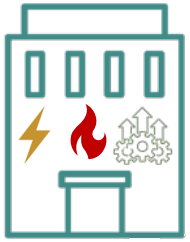
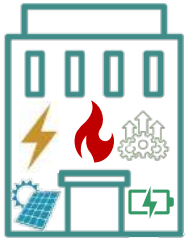
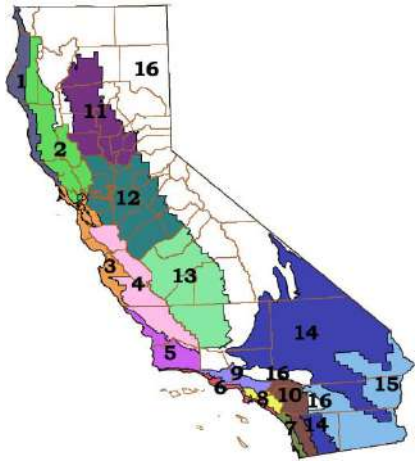
				
Construction Cost:* (per Dwelling Unit)	$700 **cost**	$2,600 **cost**	$130 **cost**	$3,300 **cost**
Bill Impact:* (per Dwelling Unit)	$0	$30/month **savings**	$0	$30/month **savings**
Source Energy	6%	17%	0%	18%
% CO2 Savings:	40%	48%	0%	22%

*Compared to mixed-fuel baseline
Source: 2022 Multifamily NewCon Cost-eff Study

Energy Performance Approach Impacts: CZ9



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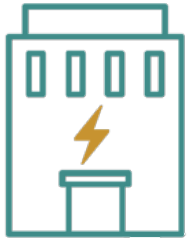
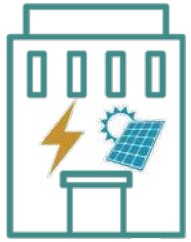
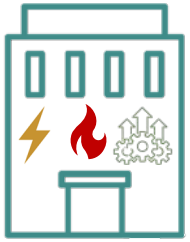
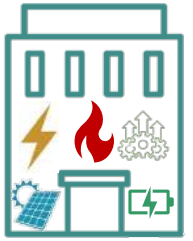
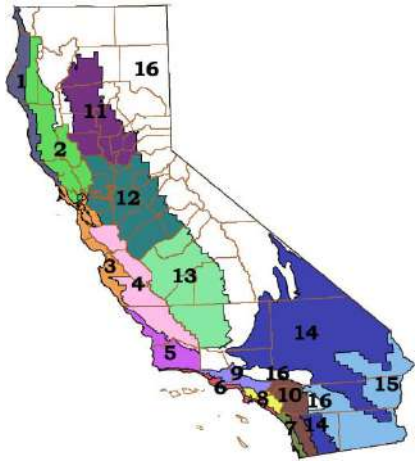
				
Construction Cost:* (per Dwelling Unit)	$700 **cost**	$2,300 **cost**	$150 **cost**	$3,100 **cost**
Bill Impact:* (per Dwelling Unit)	$0	$30/month **savings**	$0	$20/month **savings**
Source Energy	5%	15%	0%	17%
% CO2 Savings:	39%	47%	0%	21%

*Compared to mixed-fuel baseline
Source: 2022 Multifamily NewCon Cost-eff Study

Energy Performance Approach Impacts: CZ16



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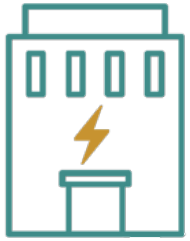
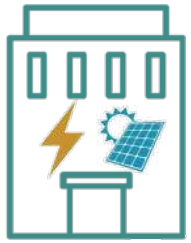
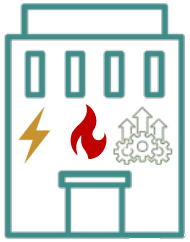
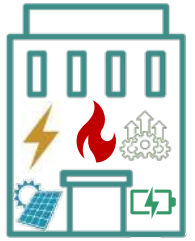
				
Construction Cost:* (per Dwelling Unit)	$4,000 **savings**	$1,100 **savings**	$700 **cost**	$3,900 **cost**
Bill Impact:* (per Dwelling Unit)	$10/month **cost**	$50/month **savings**	$0	$20/month **savings**
Source Energy	29%	38%	4%	17%
% CO2 Savings:	44%	54%	4%	20%

*Compared to mixed-fuel baseline
Source: 2022 Multifamily NewCon Cost-eff Study

Electric Appliances & Technology

- Electric appliance facts and benefits

CPA CLEAN POWER ALLIANCE

Electric Measures are Common

Of national new construction homes:[1]

56% use electric space heating

(40% of which are heat pumps) [2]

53% use electric water heating

52% use electric cooking

76% use electric clothes drying

Sources: 1 - 2019 American Housing Survey Report, 2 - 2017 IEA Heat Pump Conference Proceedings

Electric Cooking is Better in Every Way

Restaurateurs viewed coal more favorably than natural gas at beginning of 20th Century. Natural gas was better in every way – just like **electric** is now.

Older tech	Newer tech
More polluted	Healthier
Hotter	Cooler
Louder	Quieter
More maintenance	Less cleaning
Less productive	More productive

Sources: Physicians for Social Responsibility, Chris Galarza

Stoves: Consumer Reports Prefers Induction

- 6 of top 8 Ranges for 2020 were electric, top 2 were Induction
- Gas stove tops were priced higher than the induction

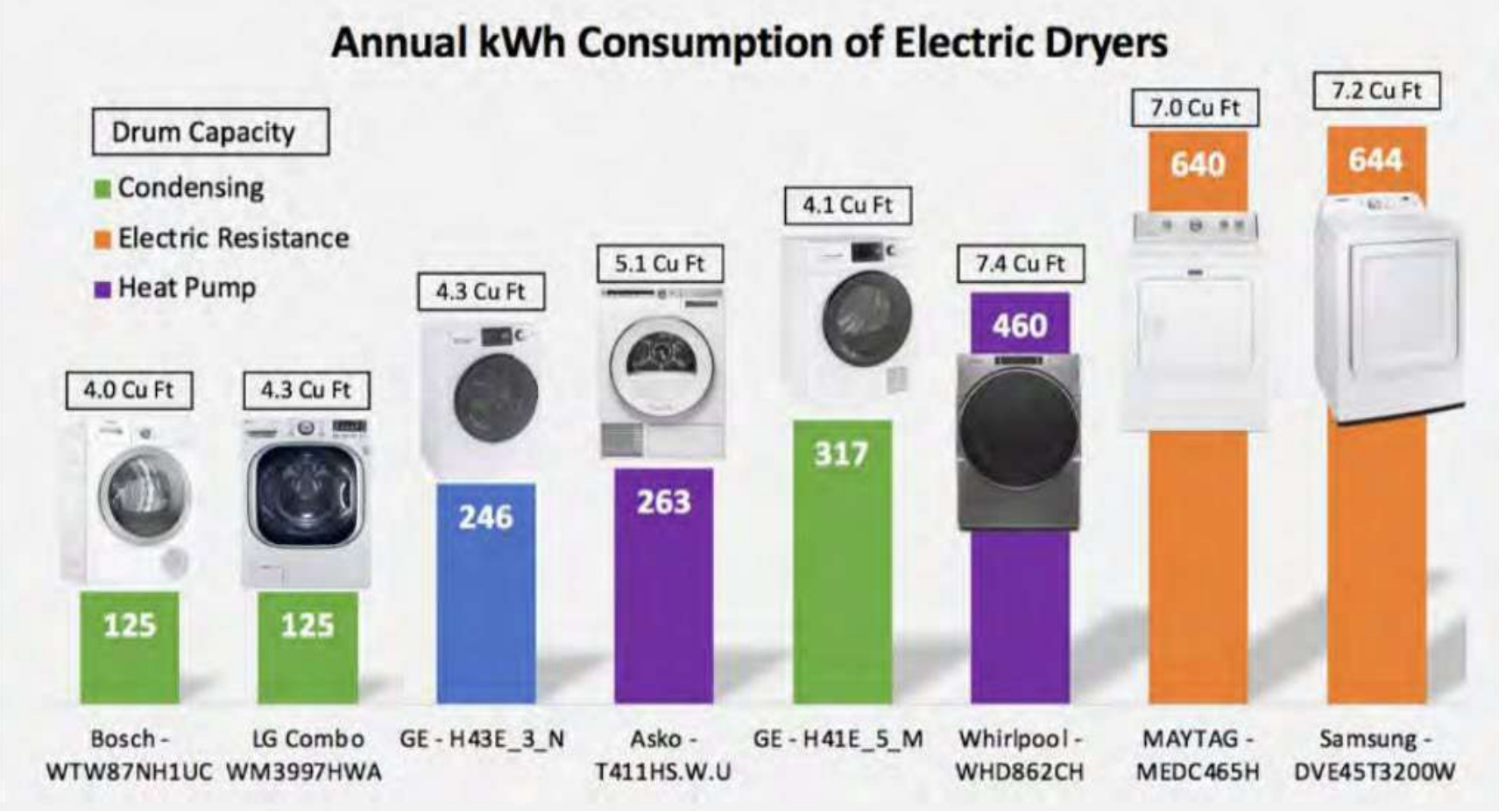
Fuel	Model	Consumer Reports Rating	Cost
Induction	GE Profile PHS930SLSS	86	$2,432
Induction	Kenmore Elite 95073	84	$1,525
Gas	LG Signature LUTD4919SN	84	$3,000
Induction	LG LSE4617ST	82	$2,500
Induction	LG LSE4616ST	82	$1,700
Smoothtop	Whirlpool WGE745c0FS	82	$1,000
Gas	Samsung NY58J9850WS	81	$2,725
Induction	Frigidaire Gallery FGIF3036TF	81	$1,035

Source: *A Pocket Guide to All Electric Retrofits of Single Family Homes*

Examples of Electric Appliances and Equipment

	Heat Pump Space Heating	Heat Pump Water Heating	Induction Cooking	Electric Clothes Drying
Residential				
Commercial				

Choosing Efficient Equipment is Important



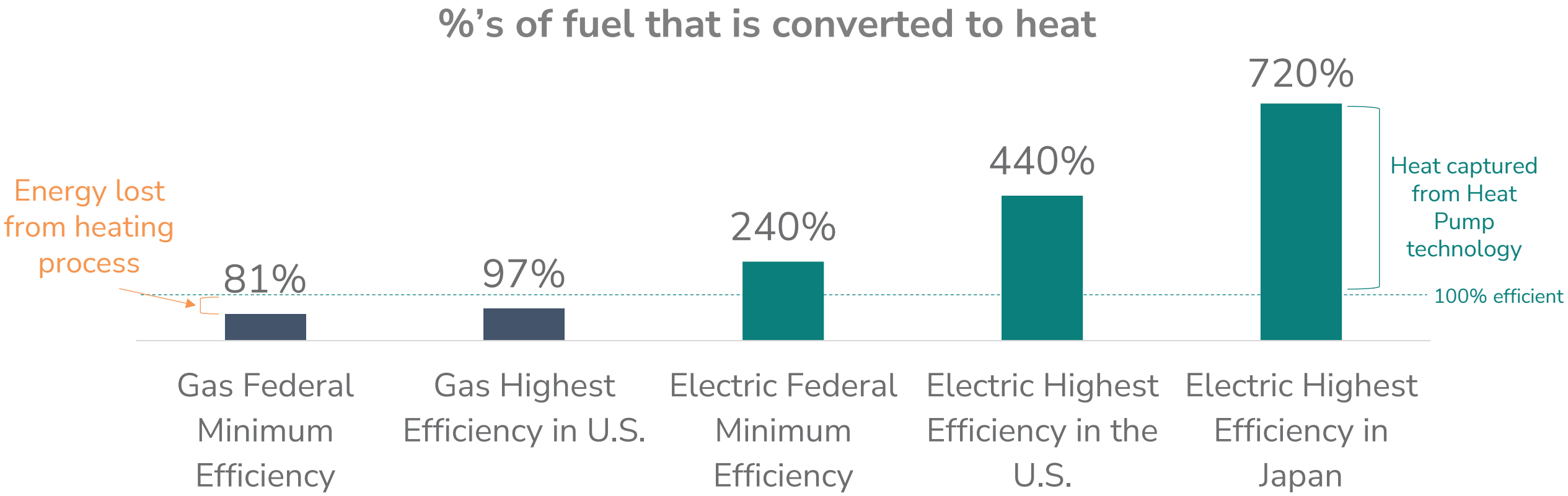
Condensing dryers and heat pump dryers use *roughly* **half the energy** of a standard electric resistance dryer.

Source: *Redwood Energy, 2022; Energy Star Product Finder*

Heat Pump Space Heating

- Cuts climate pollution from the average California home by more than half over the next 15 years compared to homes that burn gas.
- A heat pump is nearly identical to a central air conditioner with one small but important difference: a reversing valve that allows it to provide **heating and cooling.**
- **All-electric heat pumps are highly efficient and effective, even** in weather far colder than ours.

Electric HVAC Systems are Significantly More Efficient



Since electric systems, like Air Source Heat Pumps, can move existing heat from the air instead of generating it by burning fuel, these systems are more efficient than a traditional gas fueled space heater

Reference: Redwood Energy, 2022

Electric Vehicle Infrastructure (EVI)

- What is it?
- Why should we implement EVI Reach Codes?
- What are the benefits?

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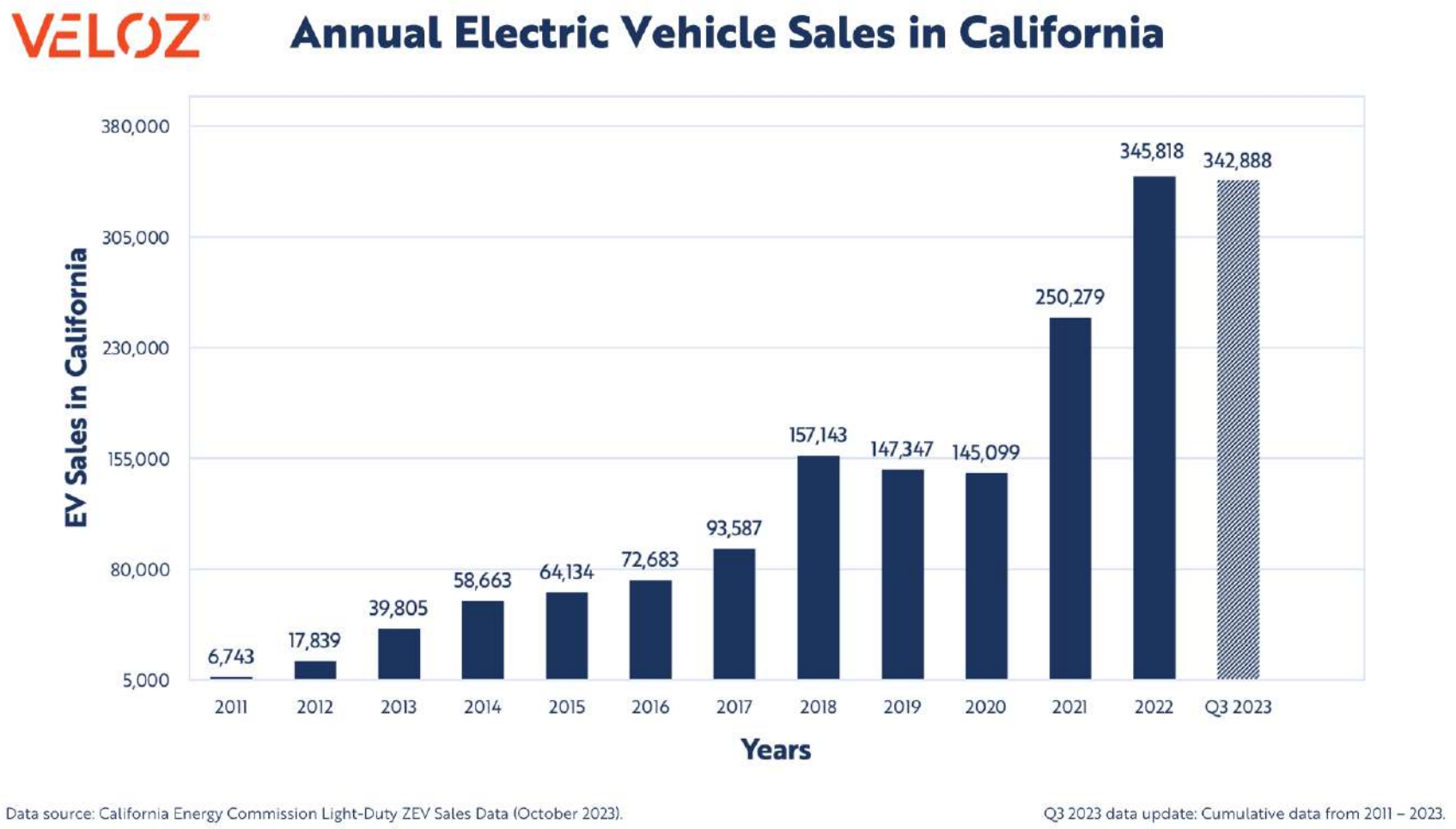
EV Charging Demand



Sources: [Veloz, 2023]

What is Electric Vehicle Infrastructure (EVI)?

- **The integral equipment and materials necessary to support Electric Vehicle (EV) charging.**

- **This includes:**
  - Electrical capacity (utility service, transformers, and feeders)
  - Panel space for EV dedicated breaker
  - Conduit/Raceway/Pathways for circuits
  - Wiring (circuits) for EV charger
  - EV dedicated receptacles
  - EV charging plug and cord
  - Energy management software

Benefits of installing EVI?

- Helps to meet market demand
- Improves market readiness
- Reduces GHG emissions
- Reduces harmful pollution in communities
- Enable future resiliency benefits (V2B or V2G)

Why Reach Codes for EV Charging?

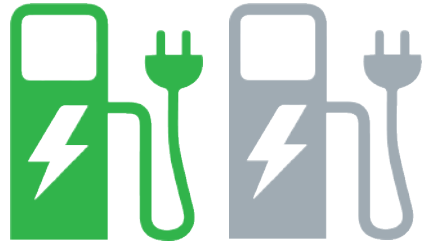
- Supports a clean transportation future
- Significantly reduces GHG emissions
- Reduces harmful pollution in communities
- Creates resiliency benefits to the grid
- Helps to meet Climate Action Plan goals

Lack of EV charging locations at residences and in the community is harmful to a quick transition

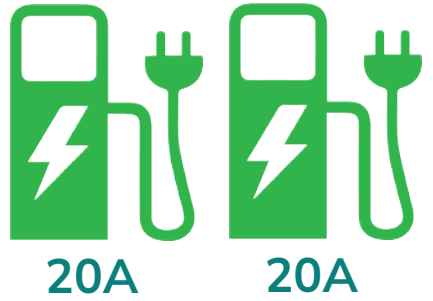
Dynamic Load Management or Circuit Sharing

Dual Head or Dual Port Charger

1 car charging



2 cars charging



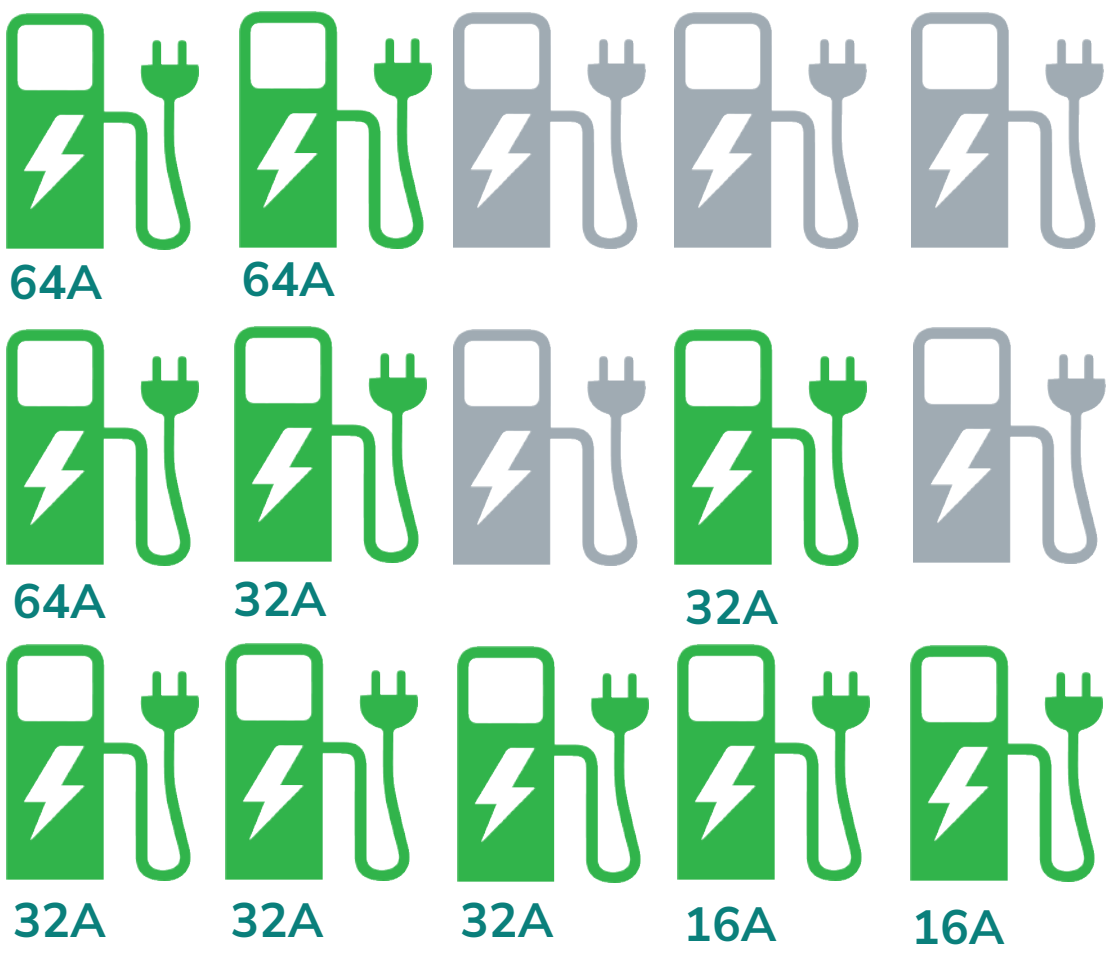
Source: Enphase

Automatic Load Management

2 cars charging

3 cars charging

5 cars charging



EV Reach Code Cost Impacts

EVI requirements in reach codes add less than 2% to total cost to developers:

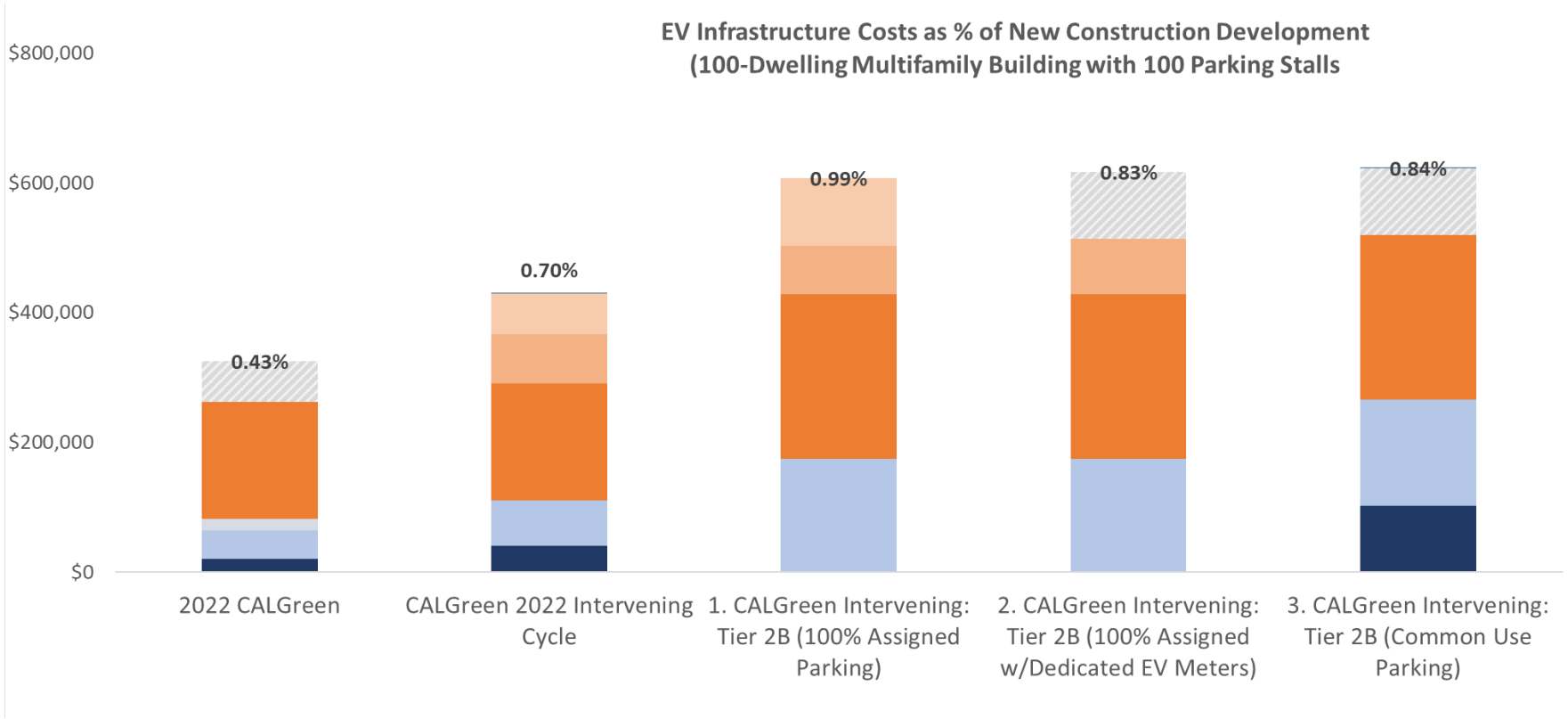
Greater electrical capacity for EV charging requires upsizing electrical utility service and equipment upstream of the utility meter, and more equipment to bring power to parking spaces downstream of the meter.

- **Upstream:** Utility Distribution Grid to Meter
  - Transformer & feeder
  - Joint trench
  - Switchgear sizing
  - Electrical room square footage
  - Direct billing & metering (if applicable)

- **Downstream:** Electrical Panel to Charging Station
  - Circuit breakers
  - Conduits
  - Wiring
  - Junction boxes (for EV capable)
  - Outlets (for EV ready)
  - Charging stations (for EVSE installed)

Use of Low-Power Level 2 EV Ready spaces in residential reach codes can allow for greater access to EV charging while minimizing cost impacts to developers

100% EV Access is achievable at minimal incremental cost from 2024 CALGreen base code



% of dwelling units with access				
40%	50%	100%	100%	100%

(*Cost covered by SCE due to Rule 29)

Each scenario is 1.15% – 1.35% of construction cost

Assumes $314/ft2 to build (dwelling and parking)
Sources: Turner and Townsend, 2023, Rider, Levett, Bucknall, 2023, Cumming Group, 2023

What Changed for EVI in the 2022 Intervening CALGreen Code?

Code Context

- The 2022 Intervening CALGreen Code was adopted in January. It will be effective on 7/1/2024.
- There will also be a 2025 CALGreen Triennial Cycle Update in 2025 (effective Jan. 1, 2026), which has proposed language (subject to change).

Increased Percentage Requirements

- Multifamily
- Hotel & Motel

Technical Requirement Changes

- “Direct Billing” in Multifamily projects requires EV charging circuits to be tied directly to each dwelling unit’s meter
- “Power Allocation Method” in non-residential projects adds flexibility for different levels of charging stations installed
- New requirements for medium/heavy duty charging capacity in Manufacturing and Office buildings
- New requirements for specific Nonresidential Alterations and Additions (LP L2 Receptacle)
- Receptacle type updates
- Other minor clarifications

EV Code Terminology

Speed

Level 1
3-4 miles per charging hour

Level 2
10-20 miles per charging hour

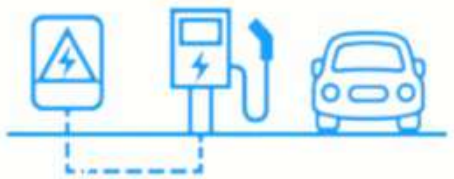
Level 3
150+ miles per charging hour

Readiness

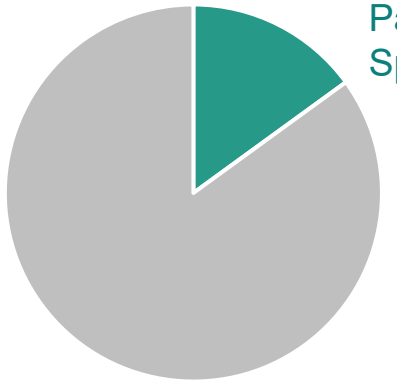
EV **Capable**

EV **Ready**

EV **Charging Station Installed**



Number



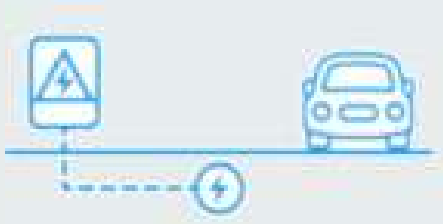
kVA Calculation

kVA = Voltage * Amperage / 1000

Total kVA =
L2 EV Capable +
LP L2 EV Ready +
L2 EV Ready +
L2 EVCS

Source: Cleanenergy.org EV Readiness

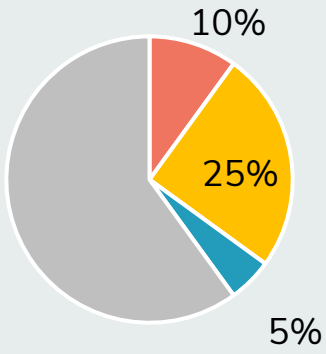
New Construction: Single Family Homes and Two-Family Townhomes

2022 CALGreen	2022 CALGreen Intervening (July 1st 2024)	Model Code
Mandatory	Mandatory	
(1) Level 2 EV Capable for one parking space per dwelling unit 		2 EV spaces total:  • 1 Level 2 EV Ready circuit  • 1 Level 1 EV Ready circuit 

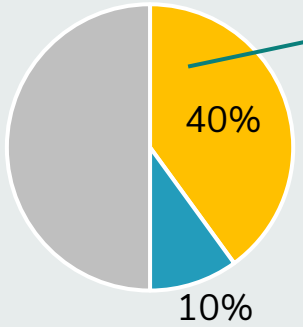
Takeaway: The model code modifies the L2 EV Capable requirement to be a L2 EV Ready circuit and adds 1 L1 EV Ready circuit (if there is a second parking space).

New Construction: Multifamily

2022 CALGreen	2022 CALGreen Intervening (July 1st 2024)	Model Code (*Proposed* 2025 CALGreen Mandatory)	
Mandatory	Mandatory		

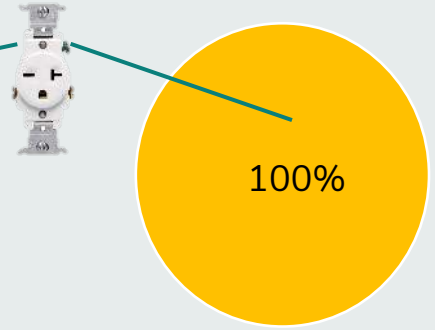


10% Level 2 EV Capable
25% Level 2 EV Ready (low-power)
5% Level 2 EVCS



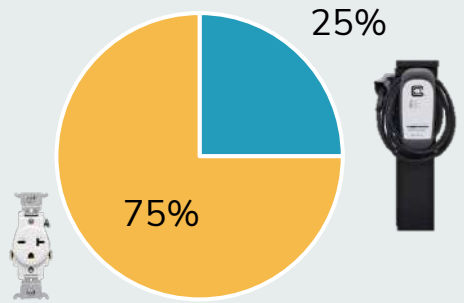
40% Level 2 EV Ready (low-power)
+ Direct Wiring
10% Level 2 EVCS

% of Parking Spaces



100% Level 2 (low-power) EV Ready
+ Direct Metering

% of Spaces for Residents



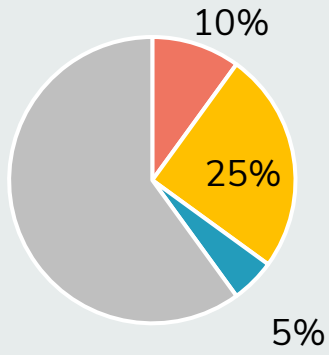
25% Level 2 EVCS
75% Level 2 (low-power)

% of Spaces for Common Use Parking

Takeaway: The model code increases the amount of LP L2 EV Ready (for resident spaces). The model code aligns with proposed 2025 CALGreen code.

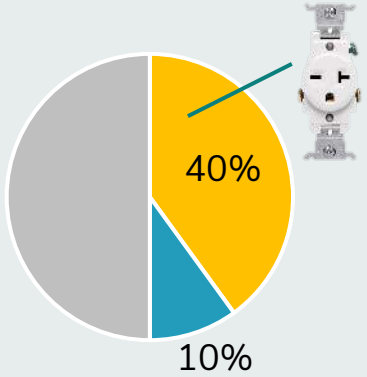
New Construction: Hotels & Motels

2022 CALGreen	2022 CALGreen Intervening (July 1st 2024)	Model Code (*Proposed* 2025 CALGreen Mandatory)
Mandatory	Mandatory	



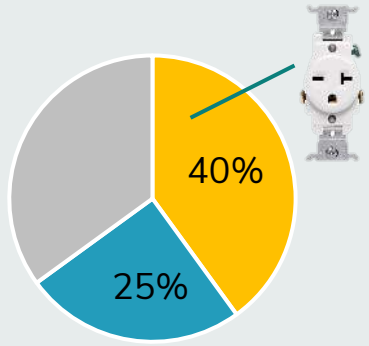
10% Level 2 EV Capable
25% Level 2 EV Ready (low-power)
5% Level 2 EVCS

% of Parking Spaces



40% Level 2 EV Ready (low-power)
10% Level 2 EVCS

% of Parking Spaces

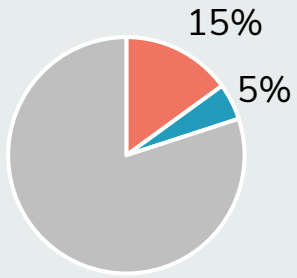
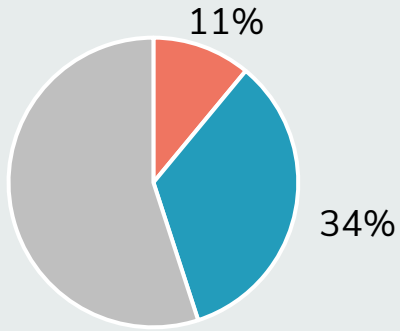
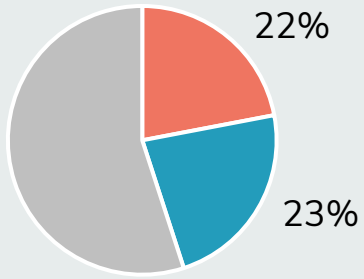


40% Level 2 EV Ready (low-power)
25% Level 2 EVCS

% of Parking Spaces

Takeaway: The model code increases the amount of EVCS, in alignment with the proposed 2025 CALGreen code.

New Construction: Nonresidential

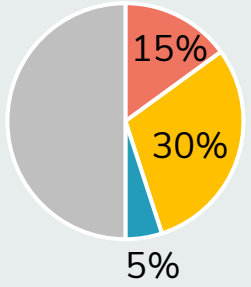
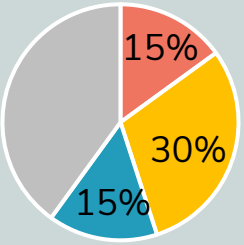
2022 CALGreen	2022 CALGreen Intervening (July 1st 2024)	Model Code (*Proposed* 2025 CALGreen Tier 2)	
Mandatory	Mandatory		
			
15% Level 2 EV Capable **5%** Level 2 EVCS		**Offices & Retail (45%):** **11%** Level 2 EV Capable **34%** Level 2 EVCS	**All Other (45%):** **22%** Level 2 EV Capable **23%** Level 2 EVCS
% of Parking Spaces			

Takeaway: The model code splits nonres into two categories with distinct requirements based on the proposed 2025 CALGreen code, Tier 2. Both of these categories reflect increases compared to the 2022 CALGreen Intervening code.

EVI Requirements for Alterations & Additions

CURRENT CODE	1 to 2 FAMILY	Meet new construction requirements for parking additions or electrical panel upgrades.
	MULTIFAMILY	When new parking facilities are added, or electrical systems or lighting of existing parking facilities are added/altered and the work requires a permit: 1. 10% of the total number of parking spaces added or altered shall be L2 EV Capable. 2. Identify reserved panel space for overcurrent device as “EV Capable”
	NON-RESIDENTIAL	Meet the new construction requirements under the following situations: 1. Increasing power supply as part of a parking facility addition or alteration. 2. Adding new PV added over existing parking. 3. Increasing power supply to an electric service panel.
MODEL	MODEL CODE CHANGES	• Increases percentages/EV requirements for new construction for all building types. • Utilizes the 3 triggers from non-residential alterations for multifamily. • Adds a breaking ground alteration/addition trigger. • Amends exception 1(c) to include maximum utility service cost of $4500/space.

LA County Adopted EV Reach Codes

Building Type	New Construction	EV Spaces
Single Family, Duplexes, and Townhouses	For each dwelling unit, install a listed raceway and a dedicated 208/240-volt branch circuit. (EV-Ready)	
Small Multifamily Projects (Less than 20 units)	• 15% of spaces Level 2 EV-Capable • 30% of spaces with Level 2 (Low Power) EV Ready • 5% of spaces with Level 2 EVCS (in addition to at least 1 common use EVCS)	
Large Multifamily Projects (20 units or more)	• 15% of spaces Level 2 EV-Capable • 30% of spaces with Level 2 (Low Power) EV Ready • 15% of spaces with Level 2 EVCS (in addition to at least 1 common use EVCS)	

Reference: 2022 Code Cycle – Electric Vehicle Ordinances in Los Angeles County

Frequently Asked Questions and Common Concerns

- Typical questions and concerns answered

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Common Concerns (1 of 2)

Concern	Response
Distribution grid upgrades are expensive	**Sometimes true**. Utilizing low amp or energy efficient equipment and circuit sharing solutions, combined with renewable energy strategies can help to avoid transformer upgrades. Costs are generally split between the developer and the utility depending on the type of project.
Resilience, power-shutoffs	**Real problem, but there are solutions available, and gas does not help and**. Gas appliance ignition is electric. In emergencies gas is also shut-off. CA battery installation has grown 10x from 2020 to '23 and initiatives such as demand response programs and load management strategies for EVs help to reduce load.
Uniformity issues, impact of Berkeley ruling	**Fair Concern, but not adopting ensures future risk**. Regional partners are encouraging consistency. Inaction locks in future cost (retrofits, rates) and risk (fire).
In multifamily, central heat pump water heating requires more design expertise and space than gas boilers.	**True, training is needed.** There are scores of working systems, and best practice guidance is available.

Common Concerns (2 of 2)

Concern	Response
All-Electric heating uses too much energy or can't work in our cool climate	**False. All-electric heat pumps are highly efficient and effective** in weather far colder than ours. DOE studies show heat pump space heaters as highly efficient at as little as 5 degrees Fahrenheit.
Energy is not clean	**False**. CPA GreenPower service is 100% GHG free today
Equipment is not available	**Mostly false**. Some scenarios for high-volume or steam applications are more challenging to address. Heat pumps and induction stoves have a long-established history, are widely adopted in other states, but market awareness needs to grow.

Will Electrification Reduce Resilience?

Most gas appliances already require the use of electricity to operate

Gas furnaces require electric fans (but fireplaces still work).

Space Heating

Gas water heaters require electronic ignition or pumps

Water Heating

Gas stoves will work without electricity, but can be unsafe due to lack of proper ventilation

Cooking

Gas dryers use electric motors to run tumbler

Clothes Drying

Can the Grid Handle the Load Increase?

- Reliability is a concern only during summer peak cooling times. Increases in cooling demand are **primarily due to climate change** increasing summer temperatures.

- California Energy Commission's AB3232 analysis indicates that *aggressive* electrification will result in **20 percent additional summer peak load** through 2030. Summer load will continue to be greater than winter peak load.*

- All-electric technologies can **draw power flexibly**. Electric vehicles can charge during off-peak periods, water heating tanks can increase temperature ahead of peak periods, thermostat setbacks can reduce space conditioning demand, and several other approaches will avoid power outages.

- **Over the long-term, utilities and local jurisdictions have opportunities to make upgrades and implement strategies to produce, store, and manage clean energy to provide grid resiliency**

**Represents PG&E territory. Assumes all-electric for 100% new construction, 90% replace on burnout, and 70% early retirement for remaining existing buildings.*

Source: 1) AB3232 Decarbonization Assessment 2021

Will the Grid be Reliable?

1. CEC has determined that **electrification is the lower cost, lower risk approach** to decarbonization, compared to all alternatives.

2. CA-ISO has performed a 20-year study and has recommended **over $30B in transmission investments** to account for increased renewables and decommissioned gas power plants

3. Utility-scale **battery power installation increased 10-fold** during heatwaves from 2020 to 2023. Having diversity in electrical power sources has already improved grid performance.

4. The electricity suppliers have a **service obligation** to meet your needs. "**PG&E fully expects to meet the needs** that all-electric buildings will require" -Robert S. Kenney, Vice President, PG&E

Sources: 1) CA Energy Commission 2018 2) CA-ISO 3) CAISO 4) 2) CPUC R1901011 2022

Reach Code Litigation
California Restaurant Association v. City of Berkeley

July 2019	Nov 2019	July 2021	April 2023	May 2023	January 2024
The City of Berkeley adopts a municipal gas ban/all-electric Ordinance. The Ordinance prohibits, with some exceptions, natural gas infrastructure in newly constructed buildings.	**The California Restaurant Association sued the City of Berkeley…** …on the grounds that the Ordinance was preempted by the federal Energy Policy and Conservation Act (EPCA).	**The District Court originally rejected the CRA challenge…** …because the ordinance does not directly regulate either energy use or energy efficiency of covered appliances. The CRA appealed that decision.	**The Ninth Circuit reversed the District Court decision, concluding that EPCA preempted Berkeley's ban…** …because it prohibited the onsite installation of natural gas infrastructure necessary to support covered natural gas appliances.	**The City of Berkeley filed a petition for an En Banc rehearing.**	**The Ninth Circuit denied an En Banc rehearing.** **Berkeley has decided to repealed their natural gas ban.** Some jurisdictions are evaluating new building reach code approaches.

Next Steps: For jurisdictions looking for an alternative reach code that could mitigate legal risk, there are several approaches available.

Source: Climate Case Charts, Columbia Law blog and Earthjustice blog; "Gloom Not Doom: The Latest in the Berkeley Decarbonization Case."

Moving Forward with Less Litigation Risk

Alternative Solutions

1. **Energy Performance Approach:** Requiring higher building performance scores that limit source GHG emissions (via the California Energy Commission's hourly source energy metric).
2. **Air Quality Code:** Limit on-site NOX emissions or GHG emissions, in alignment with New York City and air quality control agencies
3. Continue to educate jurisdictions and stakeholders on the benefits of electrification

Adopt codes explicitly **meeting the Energy Policy and Conservation Act (EPCA) requirements**

- **EPCA requirements** (excerpts) that building codes must
  1. Permit a builder to… select items whose combined energy efficiency meet an overall building energy target;
  2. Do not specifically require any EPCA-covered appliance to exceed federal standards
  3. Offer options for compliance, on a 1-for-1 equivalent energy use **or** equivalent cost basis

Additional Resources

To help you on your journey towards electrification

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Industry Resources

- Building and Home Energy Resource Hub -provided by the California Energy Commission. Includes a comprehensive list of information, guidance, and rebates
- LocalEnergyCodes.com - provides comprehensive list of adopted model codes and cost effectiveness studies
- Building Electrification Technology Roadmap - covers the technical capabilities of a variety of end-uses
- Ecosizer - guides engineers and energy consultants for proper design of central heat pump water heating systems
- Building Standards Commission Resources - Title 24 guidebooks for local jurisdictions
- California Air Resources Board 2022 Scoping Plan Appendix F Building Decarbonization - overview of efficient building decarbonization research, important benefits, cost and cost savings, and strategies
- Redwood Energy Electrification Guides and Research - a series of comprehensive guides ranging in electrification topics including construction, retrofits, electric transportation, appliances, and strategies
- The Switch Is On – developed by the Building Decarbonization Coalition (BDC), this website provides a wealth of educational resources for communities, contractors, and residents to understand the benefits, incentives, and contractor support available for electric appliances

Federal Policy: Inflation Reduction Act

Inflation Reduction Act includes $369 billion in clean energy & climate.

1. **Solar**
   - Extension of Investment Tax Credit (ITC) – 30% with prevailing wage, storage added
   - Direct pay option allows government agencies to secure ITC directly
2. **Electric Vehicles**
   - Continuation of $7,500 tax credit for new vehicles
     Vehicle cost up to $55k for cars and $80k for SUVs and trucks, lifting the manufacturer's cap, families earning under $300k/yr
   - $4,000 tax credit for used electric vehicle
     Cost up to $25k, families earning under $150k/yr
3. **Buildings**
   - $4.5B for up to $14,000 in rebates for electric appliances
     up to 50% of costs for moderate-income households and 100% for low-income households.
     $8,000 for heat pump HVAC, $1,750 for water heaters, $840 induction cooktop, $840 heat pump dryer, up to $9,100 for panels, wiring, insulation
   - Tax credits up to $2,000 for heat pumps
   - Energy efficiency up to 50% whole home retrofit or >80% for low/moderate income

CPA

Sources: American Progress - 5 Major Benefits of IRA/ NatLawReview - IRA Act Includes Expansive Tax Incentives

Questions

Contact Us

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Thank you!

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