

# Energy Performance Approach Reach Code

- 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?

# 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

Permit a builder to [...] select items whose combined energy efficiency meet an overall building energy target.

Not specifically require any EPCA-covered appliance to exceed federal standards.

Offer options for compliance, on a 1-for-1 equivalent energy use or equivalent cost basis.

## Energy Performance Approach Technical Considerations

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).

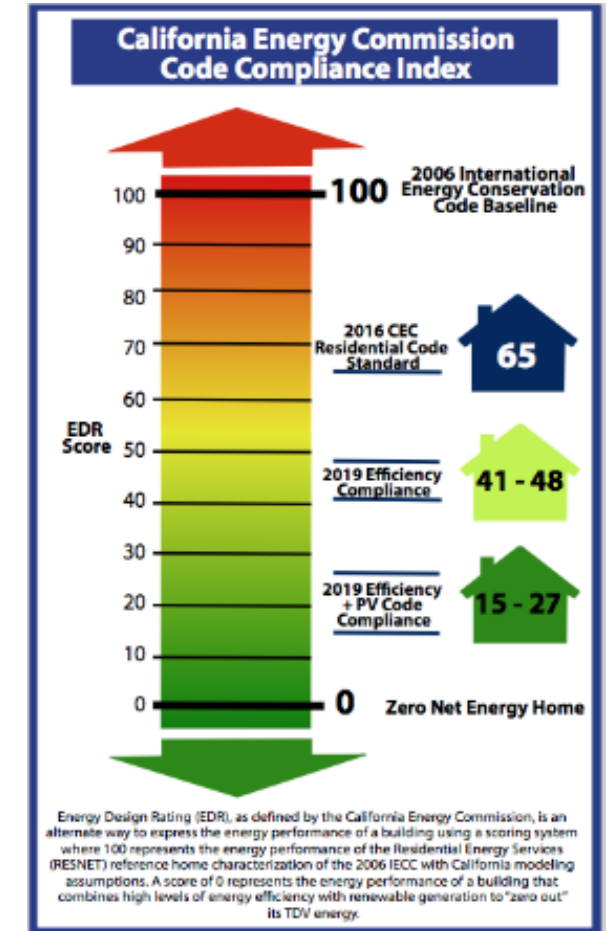
This approach sets the target energy score assuming federally required minimum equipment efficiencies.

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 <sup>1</sup> EDR (EDR2efficiency)	Total <sup>2</sup> EDR (EDR2total)	Source Energy (EDR1)	Efficiency <sup>1</sup> EDR (EDR2efficiency)	Total <sup>2</sup> 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 <sup>3</sup> : PASS						
<sup>1</sup> Efficiency EDR includes improvements like a better building envelope and more efficient equipment <sup>2</sup> Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries <sup>3</sup> 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						
<ul style="list-style-type: none"> <li>• Standard Design PV Capacity: 3.46 kWdc</li> <li>• PV System resized to 3.46 kWdc (a factor of 3.459) to achieve 'Standard Design PV' PV scaling</li> </ul>						



Source: [EnergyCodeAce](https://www.energycodeace.com)

# How Does Compliance Work?



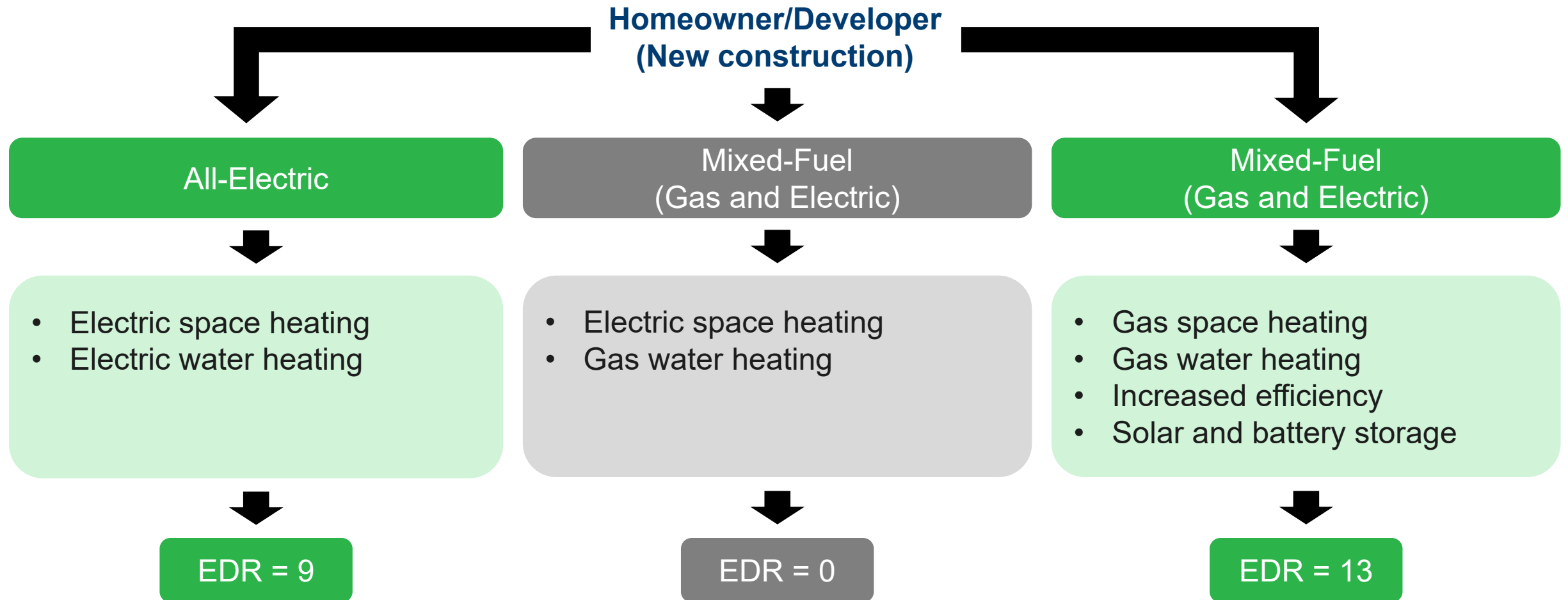
A compliance margin of “x” or higher is required for Single Family, Multifamily (low & high rise) and Nonresidential buildings.

## Single Family Example:

ENERGY DESIGN RATINGS						
	Energy Design Ratings			Compliance Margins		
	Source Energy (EDR1)	Efficiency <sup>1</sup> EDR (EDR2efficiency)	Total <sup>2</sup> EDR (EDR2total)	Source Energy (EDR1)	Efficiency <sup>1</sup> EDR (EDR2efficiency)	Total <sup>2</sup> EDR (EDR2total)
Standard Design	35.6	45.8	31.3			
Proposed Design	26.5	39.6	28.4	x	6.2	2.9
RESULT <sup>3</sup> : PASS						
<sup>1</sup> Efficiency EDR includes improvements like a better building envelope and more efficient equipment <sup>2</sup> Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries <sup>3</sup> 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						

- EDR2efficiency & EDR2total must achieve a score of “0” or higher to pass (per 2022 Title 24, Part 6).

# The Right to Choose - Summary of Approach Options



# Which Appliances are Relevant?

## What's included?

- Space heating/cooling
- Water heating



## What's not included?

- Stoves
- Laundry
- Pools
- Fireplace/pit





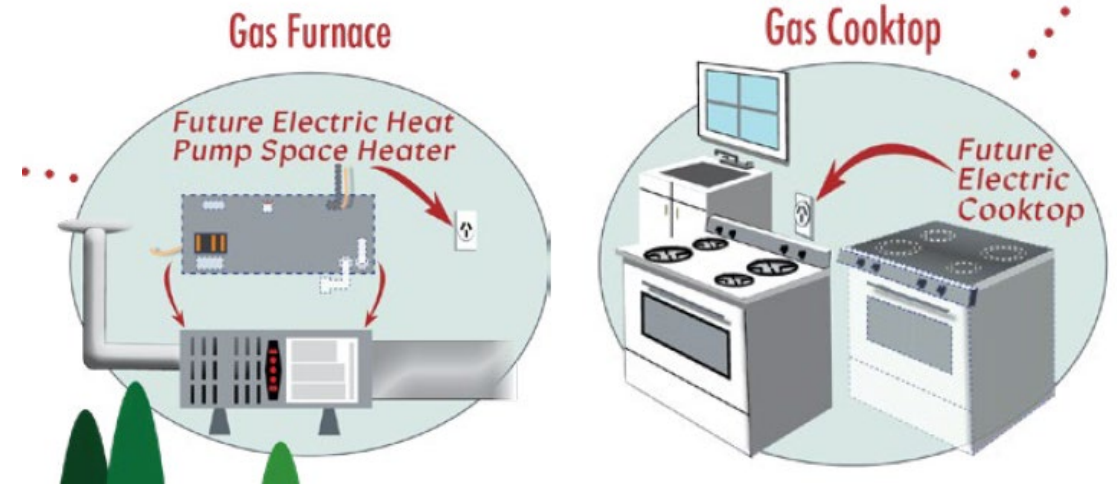
## Electric Readiness Measures

### Multifamily Residential:

- Gas fueled space heater
- Water heater, clothes dryer
- Cooktop
- Centralized water-heating systems
- Individual dwelling unit water-heating systems

### Nonresidential:

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



### Typical requirements:

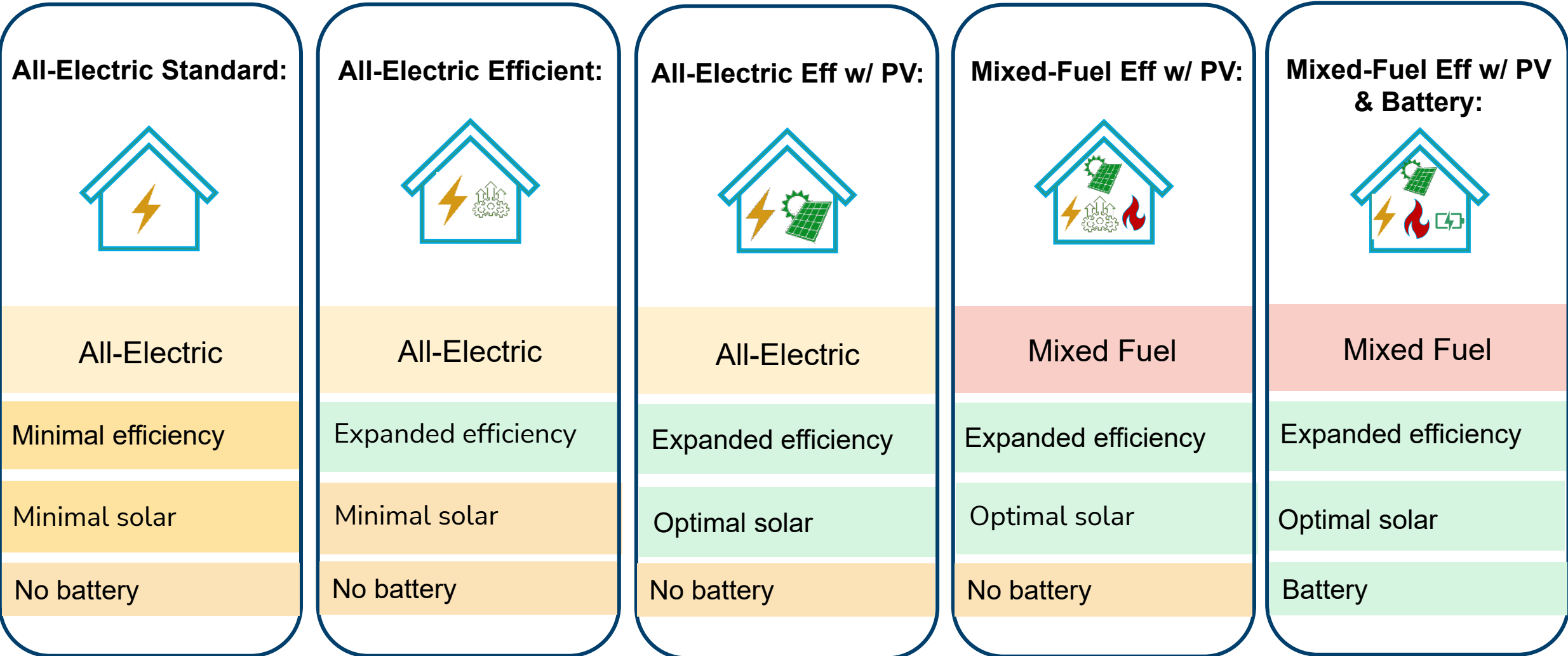
- **Dedicated wiring** installed within 3 ft of the gas-fired appliance.
- **Reserved electrical breaker space** provided for the future installation of these systems and appliances.
- A heat pump water heater also requires:
  - **Space** large enough to install it
  - **Plumbing** for a condensate drain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



# Energy Performance Approach: Single Family Cost Effectiveness

- What packages are evaluated for cost impacts?
- What is the difference in construction cost?

# Package Definitions

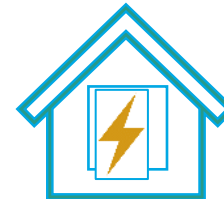


# Package Details

## Mixed-Fuel Home



## All-Electric Standard



## All-Electric Efficient



Space Heating/Cooling:

⚡ Heat Pump

↑ High-Efficiency Heat Pump ⚡

Water Heating:

Natural Gas Tankless 🔥

HPWH ⚡

NEEA HPWH ⚡

Cooking:

Natural Gas 🔥

⚡ Electric Resistance

Ceiling / Window Insulation:

R-30 / U=0.3

↑ R-49 / U=0.24

Ductwork Pressure:

Standard (0.45 W/CFM)

↑ Low (0.30 W/CFM)

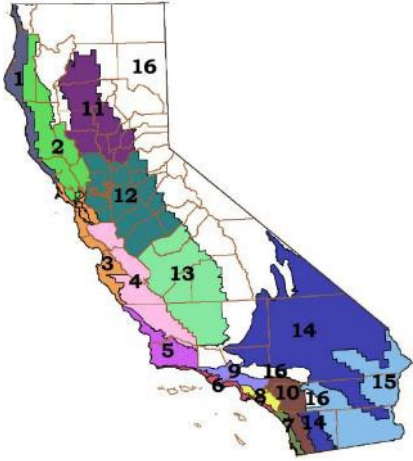
PV System:

2.9 kW

↑ 5.7 kW

# Energy Performance Approach

## Impacts: CZ3

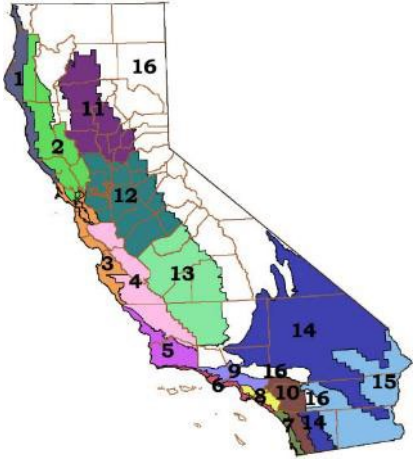


	All-Electric Standard:	All-Electric Efficient:	All-Electric Eff w/ PV:	Mixed-Fuel Eff w/ PV:	Mixed-Fuel Eff w/ PV & Battery:
Construction Cost: (compared to mixed-fuel baseline)	\$5,100 savings	\$3,500 savings	\$2,200 cost	\$3,500 cost	\$7,700 cost
EDR1	8	11	13	3	14
% CO2 Savings:					

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

# Energy Performance Approach

## Impacts: CZ4



	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)	\$5,100 savings	\$3,400 savings	\$1,600 cost	\$3,400 cost	\$8,100 cost
EDR1	8	11	12	3	13
% CO2 Savings:					

# Energy Performance Approach: Low-Rise Multifamily Cost Effectiveness

- What packages are evaluated for cost impacts?
- What is the difference in construction cost?

# Package Definitions

## All-Electric Standard:



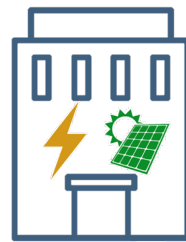
All-Electric

Minimal efficiency

Minimal solar

No battery

## All-Electric 100% PV:



All-Electric

Minimal efficiency

100% solar offset

No battery

## Mixed-Fuel Eff:



Mixed Fuel

Expanded efficiency

Minimal solar

No battery

## Mixed-Fuel Eff w/ PV & Battery:



Mixed Fuel

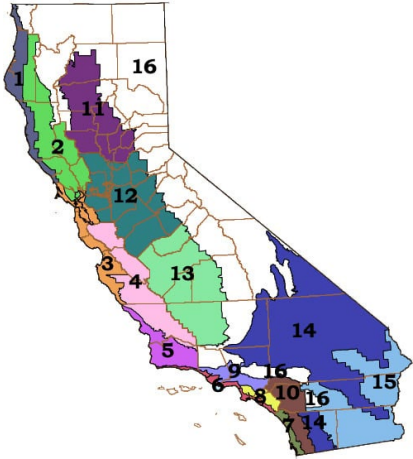
Expanded efficiency

100% solar offset

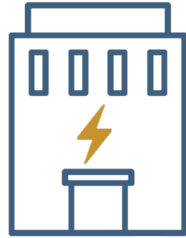
Battery

# Energy Performance Approach

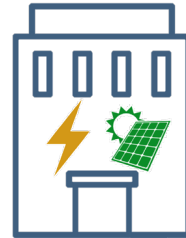
## Impacts: CZ3



All-Electric Standard:



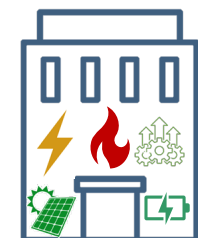
All-Electric 100% PV:



Mixed-Fuel Eff:



Mixed-Fuel Eff w/ PV & Battery:



Construction Cost:\*(  
per Dwelling Unit)

\$700  
cost

\$3,100  
cost

\$130  
cost

\$3,700  
cost

Source Energy

10%

20%

0%

17%

% CO2 Savings:

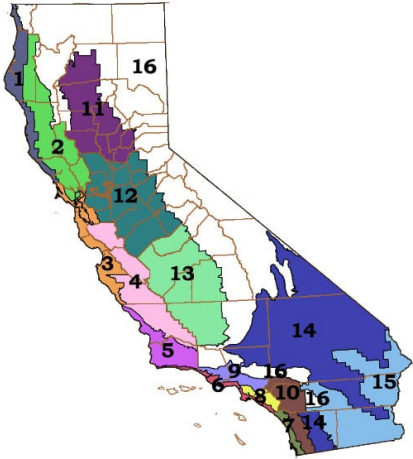


\*Compared to mixed-fuel baseline  
Source: [2022 Multifamily NewCon Cost-eff Study](#)

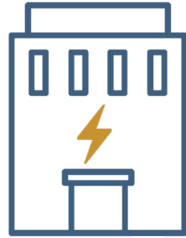


# Energy Performance Approach

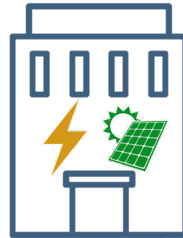
## Impacts: CZ4



All-Electric Standard:



All-Electric 100% PV:



Mixed-Fuel Eff:



Mixed-Fuel Eff w/ PV & Battery:



Construction Cost:\*(  
per Dwelling Unit)

\$700  
cost

\$2,800  
cost

\$130  
cost

\$3,500  
cost

Source Energy

9%

18%

0%

17%

% CO2 Savings:



\*Compared to mixed-fuel baseline  
Source: [2022 Multifamily NewCon Cost-eff Study](#)

# Reach Codes 101

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

# 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

## Building Electrification (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 two main 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

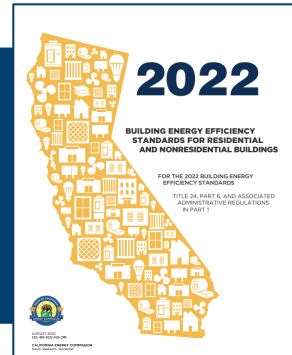
## Electric Vehicle Infrastructure (EVI)

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



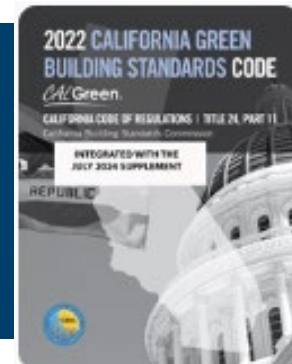
## Building Electrification (New Construction & Existing Buildings)

**Recent Context:** Due to the [latest decision for the CRA v Berkeley Ruling](#), some jurisdictions are re-assessing their approach to building electrification reach codes to mitigate the risk of litigation.



## Electric Vehicle Infrastructure (EVI)

**Recent Context:** The CALGreen EV code goes through triennial updates (2022, 2025, etc.) and intervening updates at the mid point between triennial updates. Currently, the CALGreen EV code has intervening updates to the 2022 code that will be in effect on July 1, 2024. Jurisdictions may want to update their reach code according to the new baselines.



# What are the Main Benefits?



**Reduce Greenhouse Gas Emission** in line with state/agency goals and Climate Action Plans.



**Provide Financial Benefits** related to lower-cost electric construction.



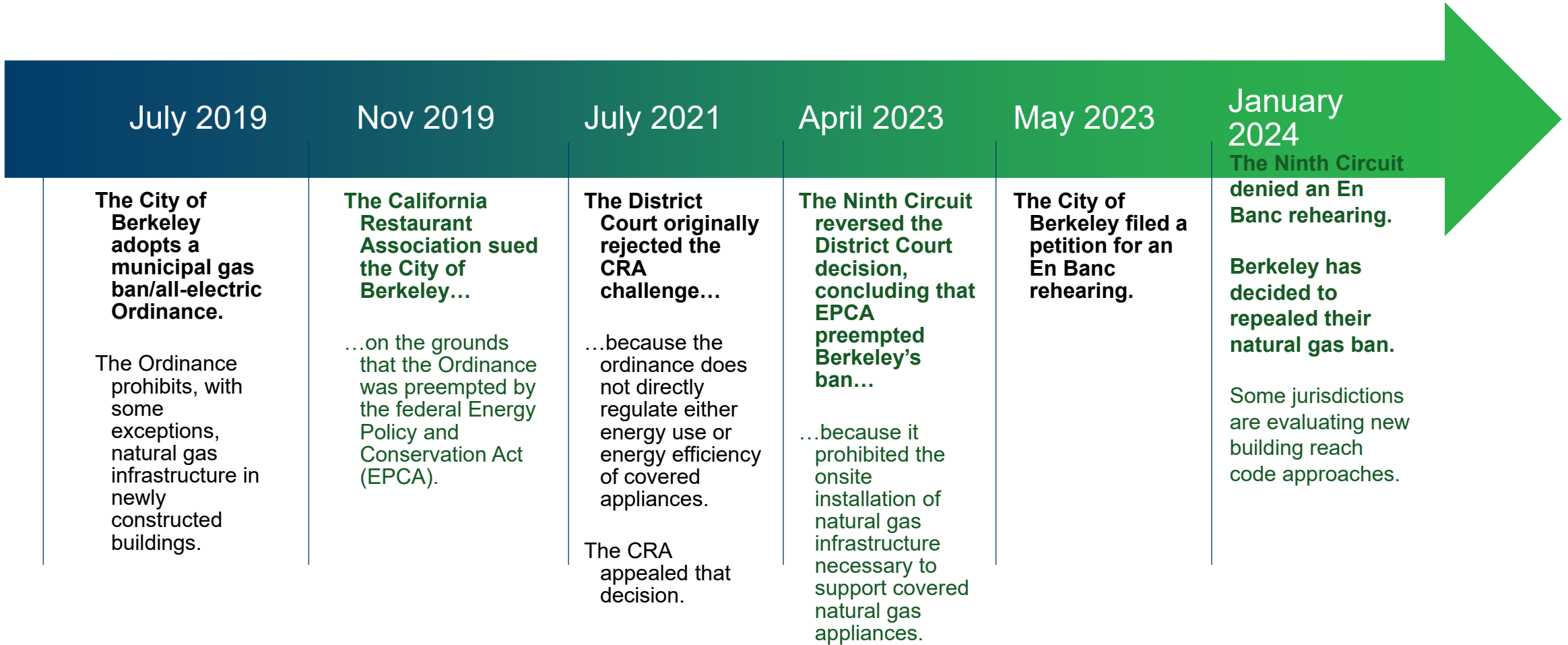
**Support Public Health** by improving indoor air quality and decreasing air pollution emissions.



**Mitigate Legal Risk** by providing compliance pathways for all-electric and mixed-fuel buildings.

# Reach Code Litigation

California Restaurant Association v. City of Berkeley



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

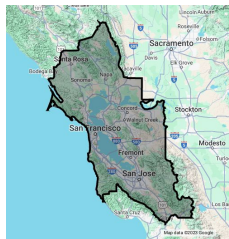
# The Bay Area and California's Upcoming Electrification Changes



2027

## BAAQMD Low NOx water heater requirements

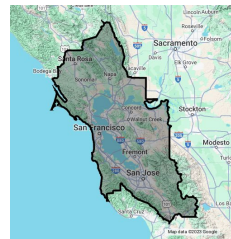
Tank-type gas water heaters no longer sold in Bay Area



2029

## BAAQMD Low NOx space heater requirements

Gas furnaces no longer sold in Bay Area



2030

## CARB Zero-Emission Appliance Standards

Gas water heaters and space heaters no longer sold, statewide



2045

## California Achieves Carbon Neutrality

Statewide gas piping projected decommissioning date





# Why We Need 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 BAAQMD Codes are Limited

- Lacks specific existing building measures
- Cannot regulate remodels or other types of triggers for cost-effective building electrification
- Ignores many methane appliances

## 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 BAAQMD ruling if similar requirements are adopted before 2027



## 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

# Reach Code Options





- What choices are there for new construction?
- What choices are there for existing construction?
- What are the pros and cons?

# New Construction Policy Comparison

Approach	Description	Advantages	Challenges	Who's done it?
<b>Air Quality</b> 	Regulates building or appliance emissions through CALGreen, Part 11.	<ul style="list-style-type: none"> <li>• Uses Clean Air Act authority rather than Energy Policy and Conservation Act</li> <li>• Regulates all emitting equipment (cooking, fireplaces, dryers, etc.)</li> <li>• Likely to result in all-electric construction, which includes construction cost savings</li> <li>• Direct benefit to air quality / health</li> <li>• High impact on emissions reduction</li> </ul>	<ul style="list-style-type: none"> <li>• Legally untested</li> <li>• Potentially new enforcement approach</li> </ul>	Los Altos Hills New York City
<b>Energy Performance</b> 	Requires a higher <i>Source Energy</i> compliance margin than what the state requires through the performance path of the Energy Code, Part 6.	<ul style="list-style-type: none"> <li>• Mitigates legal risk by allowing methane gas pathways</li> <li>• Can provide an all-electric cost-effective pathway</li> <li>• Enforcement process is already in place, the compliance margin is increased</li> </ul>	<ul style="list-style-type: none"> <li>• Limited to regulating space heating/cooling and water heating</li> <li>• Likely lower carbon savings compared to all-electric only pathways</li> </ul>	Santa Cruz San Jose San Luis Obispo Palo Alto East Palo Alto Encinitas

# Existing Building Decarbonization Policy Comparison



	Description	Advantages	Challenges	Who's done it?
<b>Time of Replacement</b> 	Require that property owners at the time of equipment replacement (upgrades or burnouts) abide by zero-NOx requirements and/or electric readiness requirements.	<ul style="list-style-type: none"> <li>• Simple policy</li> <li>• Replacements occur more frequently than major renovations</li> </ul>	<ul style="list-style-type: none"> <li>• Emergency replacements</li> <li>• May result in some bypassing the permit process</li> </ul>	San Mateo, Portola Valley, Marin County, Palo Alto
<b>Time of Renovation</b> 	Require applicants that are already pulling a permit for a renovation project to abide by certain energy efficiency measures and/or electric readiness requirements.	<ul style="list-style-type: none"> <li>• Customizable triggers</li> <li>• Unlikely to impact small or low-cost renovation projects</li> <li>• Unlikely to bypass the permit process</li> </ul>	<ul style="list-style-type: none"> <li>• More complex policy</li> <li>• Clarity of permit data</li> <li>• Low permit/renovation rates can increase time to make impact</li> </ul>	San Mateo, Portola Valley, Piedmont, Marin County, San Luis Obispo
<b>BPS</b> 	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.	<ul style="list-style-type: none"> <li>• Monitor building stock</li> <li>• Customizable triggers</li> <li>• Regular enforcement cycles</li> </ul>	<ul style="list-style-type: none"> <li>• Large administrative burden (cost/time)</li> </ul>	<b>Cities:</b> Denver, Reno, Chula Vista, St. Louis, etc.  <b>States:</b> Oregon, Washington, Maryland, Colorado
<b>Time of Property Transfer</b> 	Leverage real estate transactions to disclose relevant information on, incentivize, or require, certain home improvements.  <i>We do not recommend policies which inhibit or delay the sale of a property.</i>	<ul style="list-style-type: none"> <li>• Leverages major financial transaction</li> <li>• Allows responsibility to be shared between buyer and seller</li> </ul>	<ul style="list-style-type: none"> <li>• Limited precedence for jurisdictional authority</li> <li>• Jurisdiction regulation of property transfer process</li> <li>• Low transfer rates can increase time to make impact</li> </ul>	Piedmont, Berkeley, Davis