

# Possible Reach Code for Building & Vehicle Electrification

## Council Sustainability Committee

May 13, 2019



# Why Pass A Reach Code Now

- **Cost savings**
  - Lower first costs by not constructing natural gas infrastructure
  - Operational costs (dependent on many factors)
- **Emissions reductions**
  - CA Executive Order B-55-18 for Carbon Neutrality by 2045
  - Electricity grid getting cleaner every day with increased renewables
- **Lower-risk**
  - Natural Gas is dangerous in Earthquake Country
- **Healthier indoor air**
  - Eliminate indoor combustion

# EBCE Reach Code Campaign

- Supporting local development of ordinances and compliance alternatives to **increase electrification**
- Retained consultant, TRC Advanced Energy, to develop model codes and support adoption, training and implementation of new codes
- EBCE will provide a **\$10,000 grant** to cities which bring a reach code to their Council for passage

# Cost-effectiveness Studies

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California Energy Codes and Standards Program Released Two Studies:

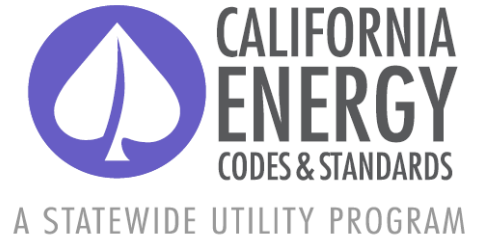
- Residential New Construction
- Non-residential New Construction

Studies Use Two Different Metrics:

- On-Bill
- Time Dependent Valuation (TDV)

Key occupancies covered

- Low-rise residential:  $\leq 3$  stories, single-family and multi-family
- High-rise residential:  $> 3$  stories, multi-family
- Non-residential: office, retail, hotels, etc...



Cost Effectiveness Studies available at:

<https://localenergycodes.com/content/2019-local-energy-ordinances/>

## 2019 Potential Reach Codes Opportunities

Scope / Measure	C/E Study Required?	Timing of Reach Code			Project Types				
		At Construction / Entitlement		Other Trigger (Time of Sale, Date-Certain...)	Single Family	Multifamily			Non-Residential
		New	Addition / Remodel / Renovation	Existing Building		Low-Rise (≤3)	Mid-Rise	High-Rise (4+)	
Efficiency and/or Renewables	<b>Whole Building (mixed-fuel and all-electric)</b>	Yes	X		X	X	X	X	X
	Solar PV	Yes	X	X	X		X	X	X
	Single Measures	Yes	X	X	X	X	X	X	X
	Rental Property	Yes		X	X		X	X	X
Energy Plus Water Efficiency	Hot Water Distribution	Yes	X	X		X	X	X	Some
	Indoor Water	No	X	X	X	X	X	X	X
	Outdoor Water	No	X	X	X	X	X	X	X
Process Loads (Equipment)	Commercial Kitchens	Maybe	X	X					X
	Elevators	Maybe	X	X			X	X	X
	Escalators	Maybe	X	X					X
Electric-Ready	<b>240 V Pre-wiring</b>	No	X	X		X	X	X	X
	<b>Panel Upgrade</b>	No	X	X		X	X	X	X
	<b>EV Readiness</b>	No	X	X		X	X	X	X
	<b>EV Charging</b>	No	X	X		X	X	X	X
Information Disclosure	Audits	No		X	X	X	X	X	X
	Benchmarking	No		X	X		X	X	X

NOTE: Items shown in bold indicate types of reach codes that one or more jurisdictions adopted during the 2016 Code Cycle.

# 2019 Code – Effective January 2020

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## Already included:

### Low-rise residential new construction

- Solar photovoltaics (PV) required (~2.5 kW)
- Panel capacity and wiring for future heat pump water heater
- All-electric compliance pathway

### Non-residential

- No solar PV required (or awarded performance credited)
- No all-electric compliance pathway

# Potential Code Requirements

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## Residential - Single Family - Performance

All residential units will include wiring and breakers for electric water heating, furnace, cooking and clothes drying.

**Mixed Fuel** – Compliance margin of 14-29% above Title 24 requirements.

- Exceed Title 24 by at least [pick a value between 14-29%]

**All-Electric** – Compliance margin of 0% above Title 24 requirements.

- Meet or exceed Title 24



# Potential Code Requirements: Single-Family Res.

	Electric Pathway	+	Mixed Fuel Pathway Option 1	or	Mixed Fuel Pathway Option 2 (Higher Efficiency)
Compliance Margin	0%		17% (CZ3) 14% (CZ4)		29% (CZ3) 25% (CZ4)
Estimated Increased* Construction Cost	\$0		\$ 6,800 (CZ3) \$ 6,800 (CZ4)		\$10,000 (CZ3) \$10,000 (CZ4)
Emissions Penalty	0%		+60% (CZ3) +70% (CZ4)		+50% (CZ3) +50% (CZ4)
Indoor Air Quality	Best		Worst		Modest
Equipment Utilized	All Electric appliances and systems, no CO monitor		Gas connection, gas meter, gas furnace and water heater. CO monitor required, enhanced energy efficiency. Plus electrical wiring to all gas appliances for future switch to electric		Same as Mixed Fuel Option 1, plus Batteries or Solar Thermal (or equivalent)


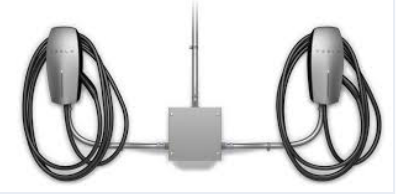

Select Option 1 or Option 2 to be paired with the Electric Pathway



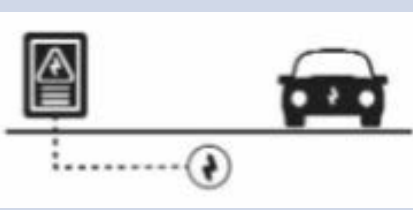
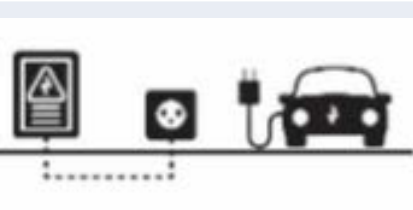

# Local Code Examples

Ordinance Type	Examples
Electric-preferred	<p><b>Marin County</b> and <b>Palo Alto</b> requirements for new buildings:</p> <ul style="list-style-type: none"><li>- Mixed-fuel required to be 10-15% more efficient than state code, or</li><li>- All-electric construction</li></ul> <p><b>Sunnyvale</b> allows for increases in building height or density, and tradeoffs with other green building elements</p>
Carbon Neutral	<p><b>Vancouver, BC</b> will require all new buildings to be carbon neutral by 2025</p>
Natural Gas Bans	<p><b>Arcata</b> and <b>Berkeley</b> have proposed ordinances banning natural gas piping in new buildings:</p> <ul style="list-style-type: none"><li>- No natural gas appliances installed</li><li>- Replace existing municipal natural gas equipment with electric</li></ul> <p><b>Amsterdam</b> plans to phase out natural gas by 2050</p>

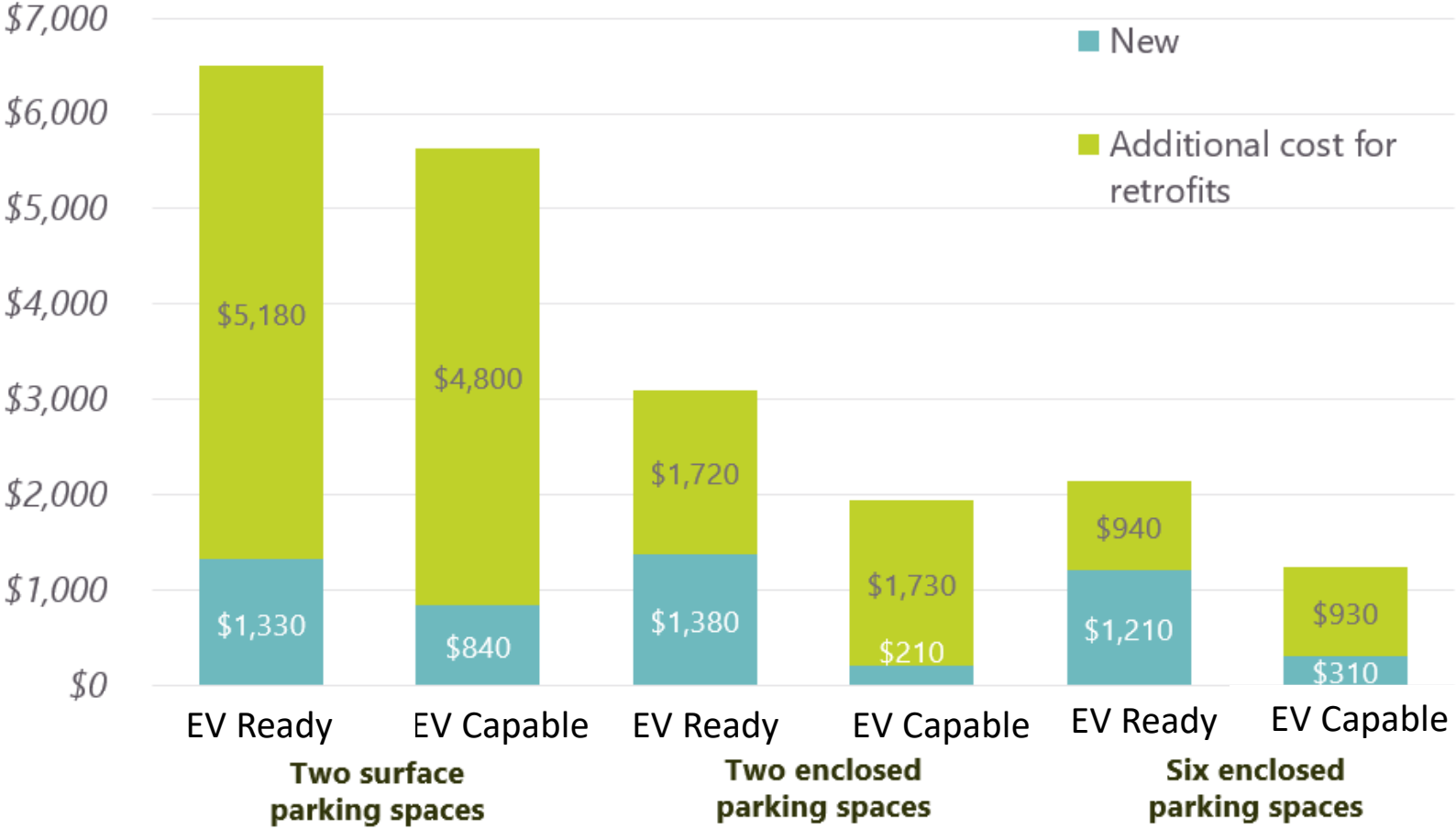
# Electric Vehicle Charger Types

Level 1		15-20 Amp, 120v AC (standard household outlet) Driving Distance provided: 3-4 miles/hour
Level 2		40+ Amp, 208/240v AC Driving Distance provided: 25-30 miles/hour
DC Fast Charge		80-400 Amp, 200-600v DC Driving Distance provided: 125-1000 miles/hour

# EV Parking Space Options

<p>EV Capable</p>		<p>Raceway (conduit), electrical capacity (breaker space)</p>
<p>EV Ready</p>		<p>EV Capable + overcurrent protection devices, wiring and outlet (i.e. full circuit)</p>
<p>EVCI (electric vehicle charger installed)</p>		<p>All equipment to deliver electricity to EV</p>

# EV Charging: Cost of New vs. Retrofit



# Local EV Ordinance Efforts

Building Sector	Baseline (2019 CALGreen Mandatory)	Bay Area Example Current ( 2016) Reach Codes
Single Family	(1) Level 2 <u>EV Capable</u> space	<b>Marin County, San Francisco, Fremont, Palo Alto:</b> (1) Level 2 <u>EV Ready</u> space
Multi Family	<u>EV Capable</u> for 10% of parking spaces	<p><b>San Francisco, Oakland:</b> 10% Level 2 <u>EV Ready</u>; remaining parking spaces EV Capable (including electrical capacity for an addition 50% of spaces assuming load sharing)</p> <p><b>Fremont:</b> 10% of new parking spaces to be <u>EV Ready</u></p> <p><b>Palo Alto and Menlo Park:</b> (1) Level 2 <u>EV Ready</u> space per dwelling unit, and EVSE installation at some spaces</p>
Non-Residential	<u>EV Capable</u> for 6% of parking spaces	<p><b>San Francisco, Oakland:</b> 10% Level 2 <u>EV Ready</u>; remaining spaces EV Capable (including electrical capacity for an addition 50% of spaces assuming load sharing)</p> <p><b>Fremont:</b> 10-20% of new parking spaces to be <u>EV Ready</u></p>

# Options for EV reach codes include:

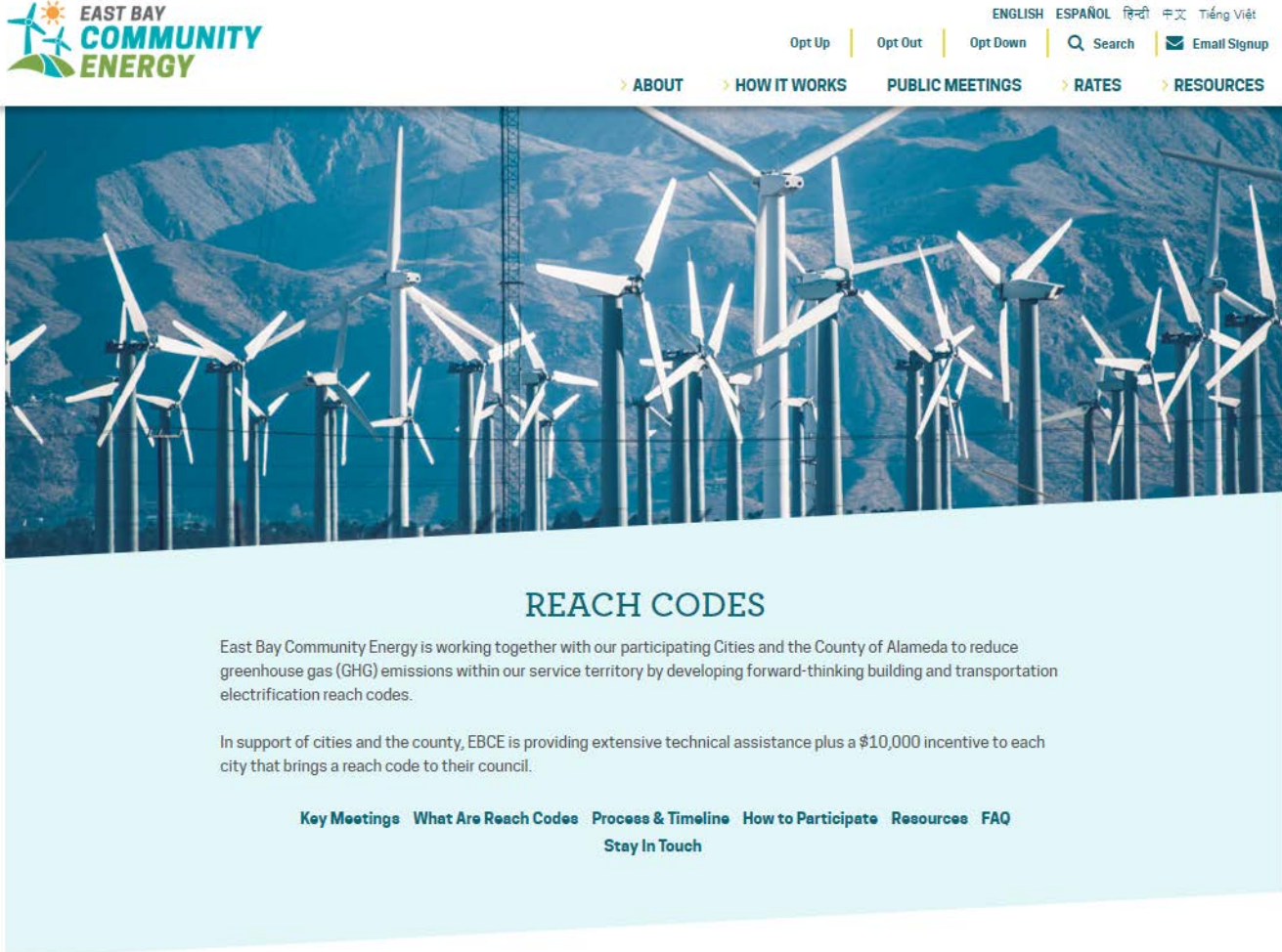
- Increase number of spaces
- Increase charging capability (Level 1 / 2)
- Increase readiness (Charger Installed vs Capable)
- Expanding to retrofits

# Public Contact

April 23 and 24, 2019:  
EBCE held four meetings in  
Fremont and Berkeley

May 3, 2019:  
Chamber of Commerce's  
Government Relations Council

<https://ebce.org/reach/>



The screenshot shows the East Bay Community Energy website. At the top left is the logo for East Bay Community Energy, featuring a stylized sun and wind turbine. To the right of the logo are language options: ENGLISH, ESPAÑOL, हिन्दी, 中文, and Tiếng Việt. Below these are links for 'Opt Up', 'Opt Out', and 'Opt Down', followed by a search icon and 'Search', and an email icon and 'Email Signup'. A navigation menu includes 'ABOUT', 'HOW IT WORKS', 'PUBLIC MEETINGS', 'RATES', and 'RESOURCES'. The main content area features a large image of a wind farm with mountains in the background. Below the image is the heading 'REACH CODES' in blue. The text below reads: 'East Bay Community Energy is working together with our participating Cities and the County of Alameda to reduce greenhouse gas (GHG) emissions within our service territory by developing forward-thinking building and transportation electrification reach codes. In support of cities and the county, EBCE is providing extensive technical assistance plus a \$10,000 incentive to each city that brings a reach code to their council.' At the bottom of the section is a horizontal menu with links: 'Key Meetings', 'What Are Reach Codes', 'Process & Timeline', 'How to Participate', 'Resources', 'FAQ', and 'Stay In Touch'.

## Key Meetings

There are a few key dates and events before the new building code takes effect on January 1, 2020.



# Timeline

May – August	Continue Stakeholder Engagement
June	Release of Draft Model Code
July	Present Model Code to Committee
September	Council Introduces & Adopts Ordinance
Late September	File Reach Code for CEC Approval
December	File with CA Building Standards Commission
January 1, 2020	Reach Code would be Effective

# Summary

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Staff is seeking the Committee's direction:

1. Allow for Two-Pathway Approach (all-electric and mixed-fuel)?
2. Mixed Fuel Pathway (select one)
  - xx% better than Title 24?
3. EV Charging
  - Ready (outlet) versus Capable (conduit)
  - # of spaces
4. Existing Buildings
  - Require panel upgrades? (threshold?)
  - Require EV Capable spaces? (threshold?)

# Questions

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