



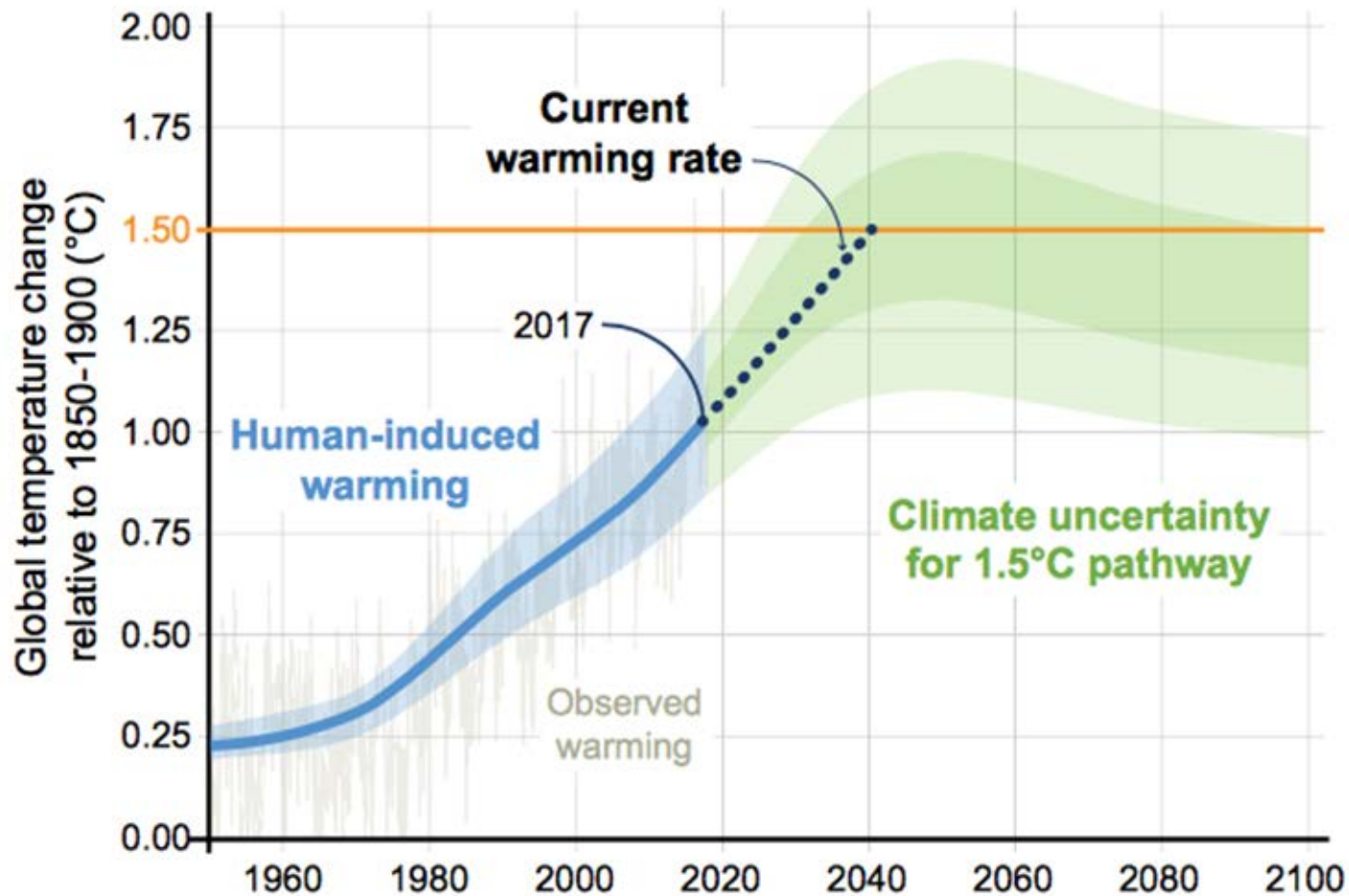
IDEAS Z2 Design Facility, San Jose (Credit: David Wakely)

# San José Building Reach Code

**Transportation and Environment Committee**  
**September 9, 2019**



# Global Temperatures are Rising



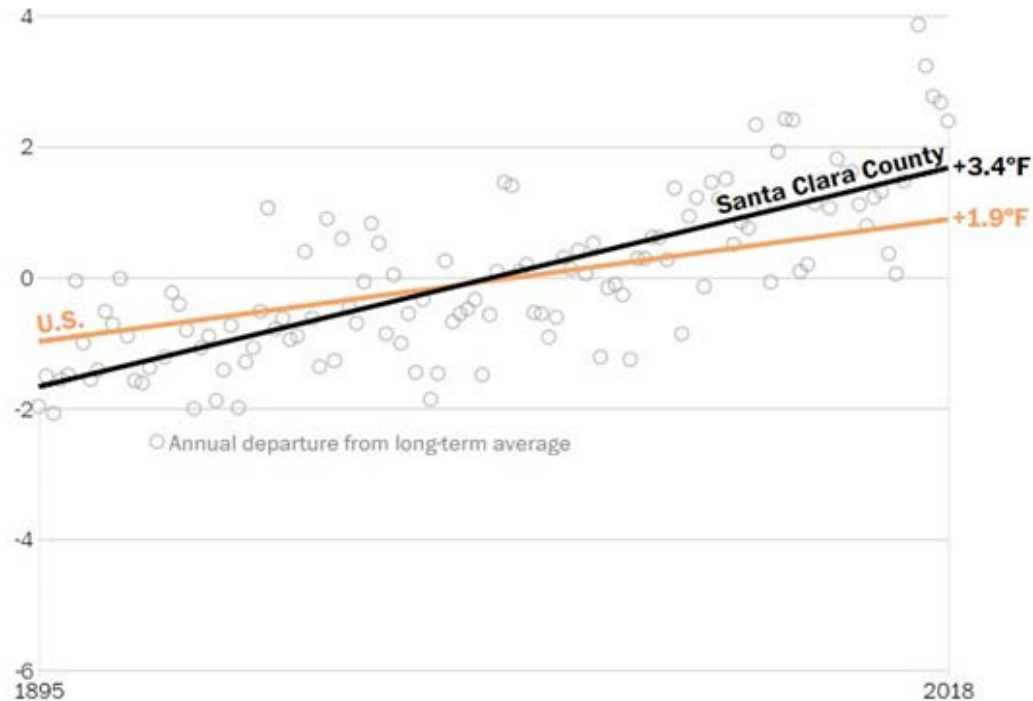
# Local Temperatures are Rising

Santa Clara County, California

+3.4° Fahrenheit

Annual temperature change, 1895-2018

6°F above long-term average  
county temperature



# San José is a Committed Leader

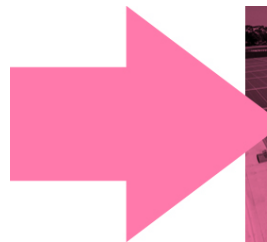
## CLIMATE SMART SAN JOSE

A People-Centered Plan for a  
Low-Carbon City



## AMERICAN CITIES CLIMATE CHALLENGE

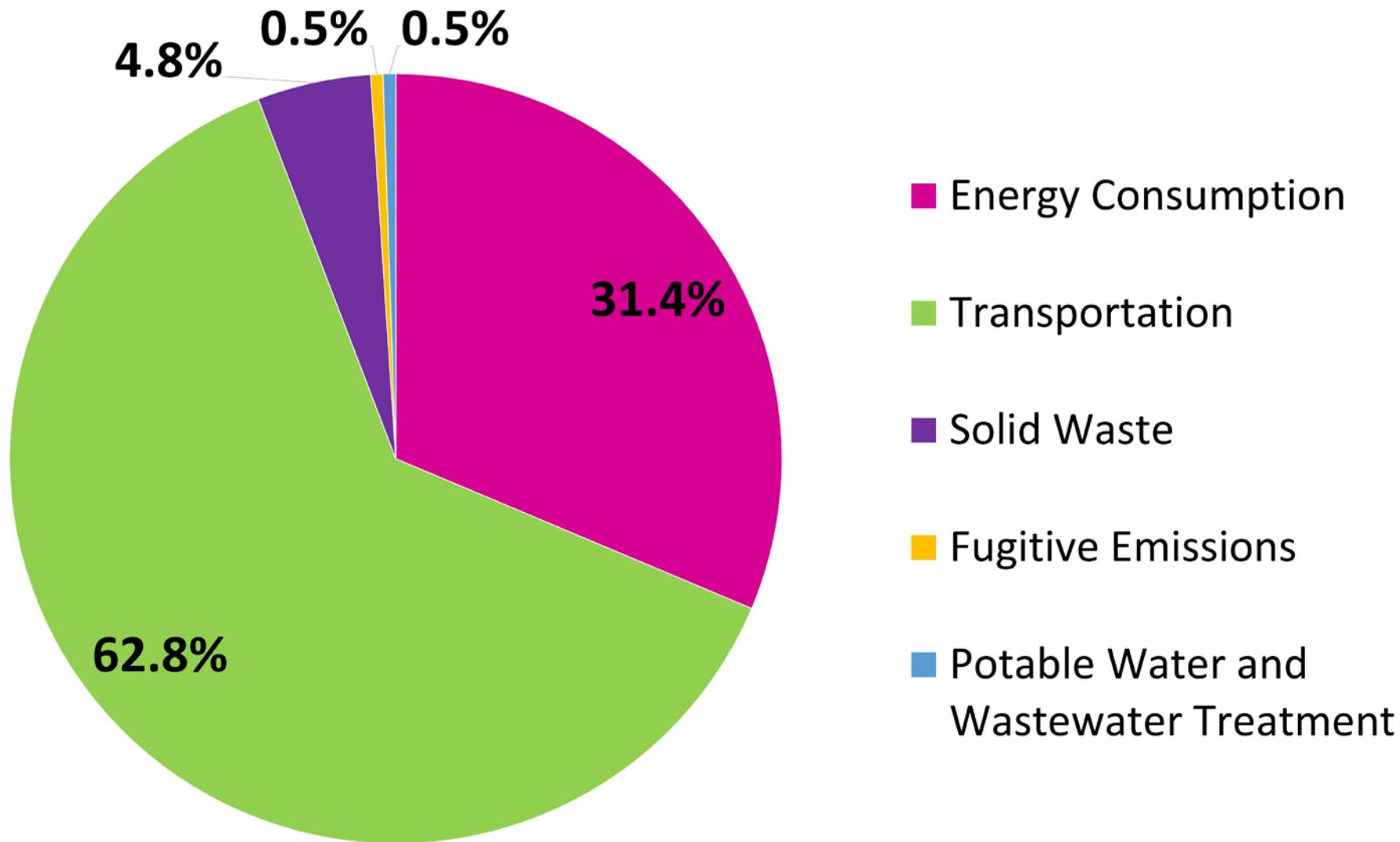
HELPING AMERICA'S LEADING  
CLIMATE CITIES **GO THE DISTANCE**



**The Net Zero Carbon  
Buildings Declaration**

**C40  
CITIES**

# San José 2017 GHG Emissions Profile



# GHG Impacts

Significant growth expected in the San José building stock in 2020 alone:

- 350 single-family units
- 2400 multi-family units
- 2.4M sq. ft. of commercial/ industrial

**Represents over 300,000 metric tons of CO<sub>2</sub> over building lifetime.**

# Base Code

- 2019 California Building Energy Efficiency Standards
- 2019 California Green Building Standards
- Sets minimum levels of efficiency for building design and construction
- Increasingly stringent in each iteration (every 3 yrs.)
- 2019 California Code in effect January 1, 2020
- Adoption of overall 2019 California Codes in October, 2019



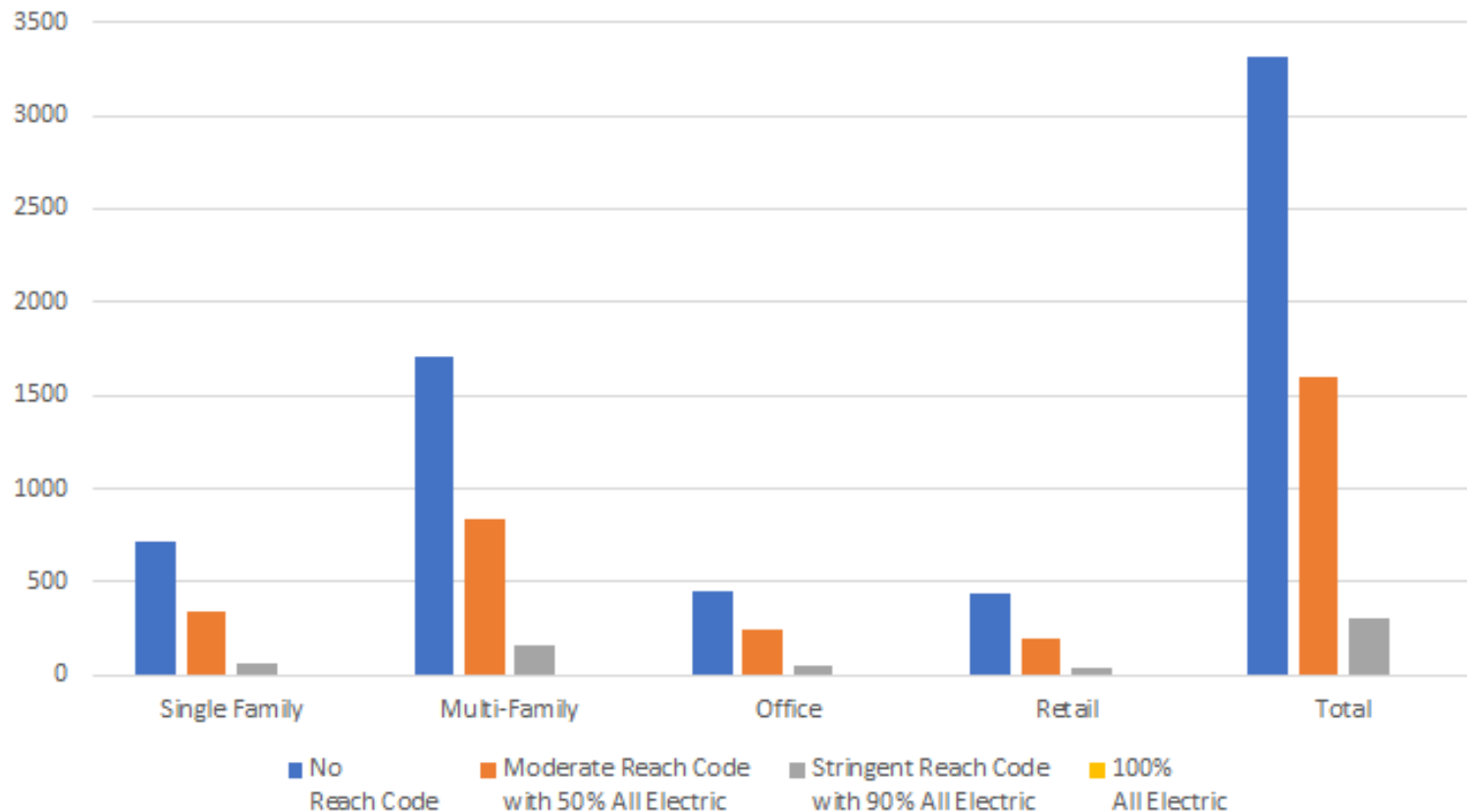
# Reach Code

- Local amendment to include additional requirements
  - Building energy efficiency
  - Building electrification
  - Solar PV readiness
  - Green building
  - Electric Vehicle Charging Infrastructure (EVCI)
- Must be approved by CEC
  - Meet cost effectiveness requirement
  - 60-day comment period



# Electrification-focused Reach Code as a Solution

Annual Emissions of Projected New Construction with a San José Carbon-Free Grid (MTCO<sub>2</sub>e/yr - SJCE in 2021)



# Financial Benefits

- All-electric buildings are low-cost construction option

Many are already being built in California...



Quetzal Gardens, San Jose



Plaza Point, Arcata



The Grove, Scotts Valley



Valley Glen, Dixon

Santana Row, San Jose



Sol Lux Alpha, San Francisco

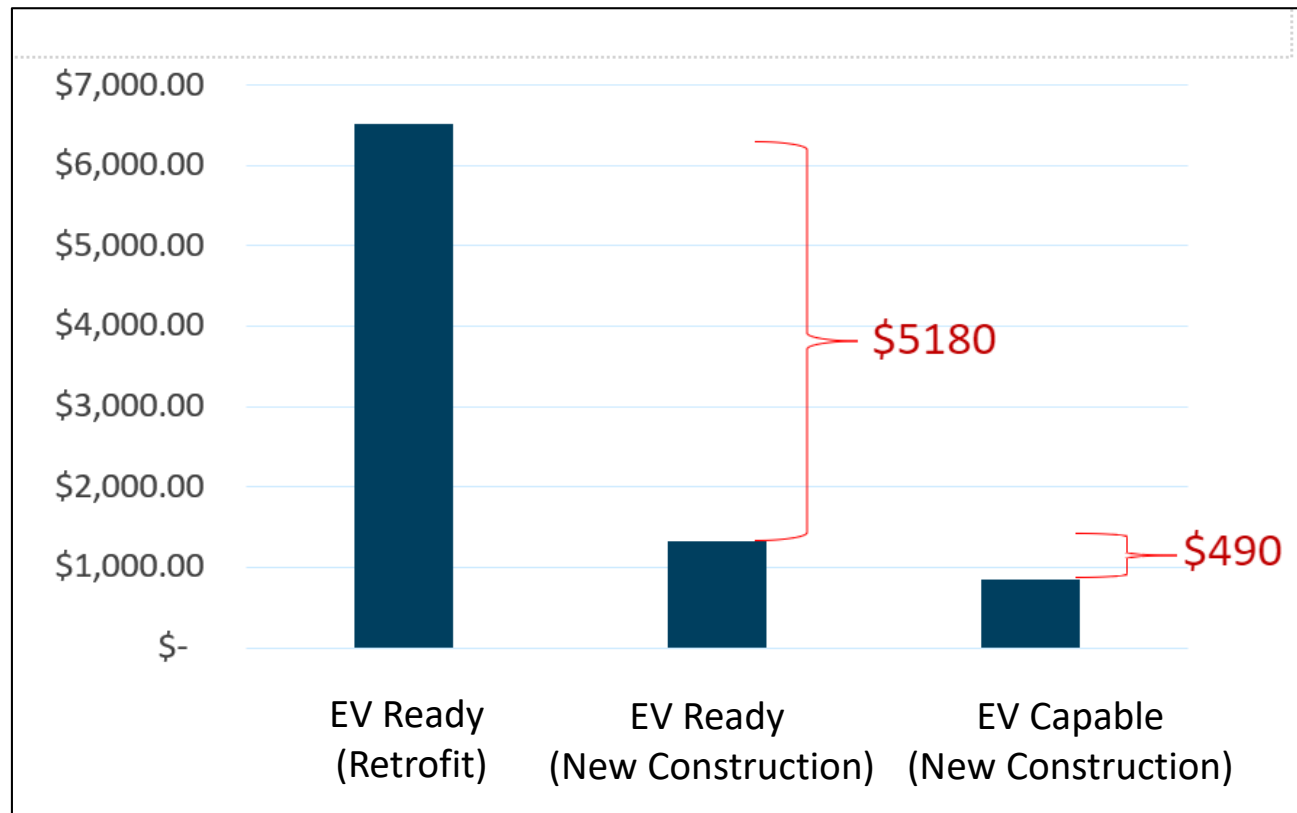


Linda Vista, Mountain View



# Financial Benefits (cont'd)

- Cheaper at time of construction vs. retrofit



- Lower operational cost for EVs

# Health & Safety Benefits



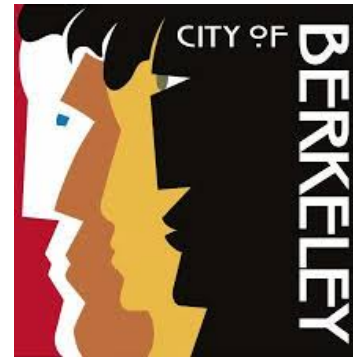
Credit: Inaglor, Broken <https://commons.wikimedia.org/w/index.php?curid=11488373>



Credit: MisterOh <https://commons.wikimedia.org/w/index.php?curid=11409838>



# Regional Reach Code Efforts



# Stakeholder Engagement Summary

- City reach code webpage
- Over 65 stakeholders and 200 Neighborhood Associations included in outreach efforts
- Four stakeholder engagement workshops (May-July 2019)
- Four additional public presentations
- Several individual meetings, as requested



# Stakeholder Input on Draft Reach Code

## Requests to Do More

- Electrification-ready
- Battery storage
- Require all-electric
- More EV Ready spaces (multi-family focus)
- Provide incentives for EVCI

## Concerns Over

- Ability of the grid infrastructure to handle electrification
- Using highest Energy Design Rating/Compliance Margins for mixed fuel buildings
- Cost of all-electric building and EVCI



# Proposed Reach Code Components

| Occupancy Type                                                                                                          | Reach Code Compliance Pathways*                                     |                                                                                                                                                                       |                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                         | All-Electric<br>(Draft/Proposed)                                    | Mixed Fuel<br>(Draft)                                                                                                                                                 | Mixed Fuel<br>(Proposed)                                                                                                                                                                                                         |
| Single-family & Low-rise Multi-family  | <b>Efficiency:</b> To code<br><br><b>EVCI:</b> Same as mixed fuel   | <b>Efficiency:</b> Energy Design Rating (EDR) $\leq 10$<br><br><b>EVCI:</b> 1 EV Ready (Single-family); 0% EVSE, 50% EV Ready, 50% EV Capable (Low-rise Multi-family) | <b>Efficiency:</b> EDR $\leq 10$ , <b>electrification-ready</b><br><br><b>EVCI:</b> 1 EV Ready (Single-family); <b>10%</b> EVSE; <b>0%</b> EV Ready, 50% EV Capable (Low-rise Multi-family)                                      |
| High-rise Multi-family & Hotel         | <b>Efficiency**:</b> To code<br><br><b>EVCI:</b> Same as mixed fuel | <b>Efficiency**:</b> 7%<br><br><b>EVCI:</b> 0% EVSE, 50% EV Ready, 50% EV Capable                                                                                     | <b>Efficiency**:</b> <b>5%</b> ; <b>electrification-ready</b><br><br><b>EVCI:</b> <b>10%</b> EVSE; <b>0%</b> EV Ready, 50% EV Capable                                                                                            |
| Non-residential                      | <b>Efficiency**:</b> To code<br><br><b>EVCI:</b> Same as mixed fuel | <b>Efficiency**:</b> Office 14%, Retail: 15%, All other occupancies: 7%<br><br><b>EVCI:</b> 10% EVSE, 40% EV Capable                                                  | <b>Efficiency**:</b> Office & Retail: <b>10%</b> , <b>electrification-ready</b> ; <b>Industrial/Warehouse: 0%</b> ; All other occupancies: <b>5%</b> ; <b>electrification-ready</b><br><br><b>EVCI:</b> 10% EVSE, 40% EV Capable |

\*Solar-readiness required for all buildings.

\*\* Efficiency for non-residential occupancies refers to an energy performance requirement or “compliance margin” (%) above the 2019 Building Energy Code.

# Reach Code Building Costs vs. 2019 Base Code

|                                                                                                                                                                                                     | Costs <sup>1</sup> of a Reach Code All-Electric Building over 2019 Base Code |                |                         | Costs <sup>1</sup> of a Reach Code Mixed Fuel Building over 2019 Base Code |                |                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------|-------------------------|----------------------------------------------------------------------------|----------------|-------------------------|
|                                                                                                                                                                                                     | First Cost                                                                   | Annual Utility | Life-Cycle <sup>2</sup> | First Cost                                                                 | Annual Utility | Life-Cycle <sup>2</sup> |
| Single-family                                                                                                                                                                                       | \$0/unit                                                                     | \$0/unit       | \$0/unit                | +\$5,434/unit                                                              | -\$17.43/unit  | +\$4,911/unit           |
| Low-rise Multi-family                                                                                                                                                                               | \$0/unit                                                                     | \$0/unit       | \$0/unit                | +\$2,429/unit                                                              | -\$9.60/unit   | +\$2,141/unit           |
| Office                                                                                                                                                                                              | \$0/sf                                                                       | \$0/sf         | \$0/sf                  | +1.24/sf                                                                   | -\$0.10/sf     | -\$1.78/sf              |
| Retail                                                                                                                                                                                              | \$0/sf                                                                       | \$0/sf         | \$0/sf                  | +\$0.23/sf                                                                 | -\$0.10/sf     | -\$2.85/sf              |
| Small Hotel                                                                                                                                                                                         | \$0/sf                                                                       | \$0/sf         | \$0/sf                  | +\$0.51/sf                                                                 | -\$0.02/sf     | -\$0.06/sf              |
| 1. Utility & Life Cycle Costs do not reflect anticipated gas rate increases and infrastructure costs<br>2. Lifecycle Costs include factors in addition to just first costs and annual energy costs. |                                                                              |                |                         |                                                                            |                |                         |

# Base Code All-Electric vs. Mixed Fuel

|                                                                                                                                                                                                     | Cost <sup>1</sup> of an All-Electric Building vs. Mixed-Fuel Building under 2019 Base Code |                |                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------|-------------------------|
|                                                                                                                                                                                                     | First Cost                                                                                 | Annual Utility | Life-Cycle <sup>2</sup> |
| Single-family                                                                                                                                                                                       | -\$6,171/unit                                                                              | +\$322/unit    | +\$4,322/unit           |
| Low-rise Multi-family                                                                                                                                                                               | -\$3,361/unit                                                                              | +\$120/unit    | +\$1,258/unit           |
| Office                                                                                                                                                                                              | -\$1.29/sf                                                                                 | +\$0.06/sf     | +\$0.40/sf              |
| Retail                                                                                                                                                                                              | -\$0.93/sf                                                                                 | +\$0.01/sf     | -\$0.57/sf              |
| Small Hotel                                                                                                                                                                                         | -\$30.54/sf                                                                                | +\$0.18/sf     | -\$25.25/sf             |
| 1. Utility & Life Cycle Costs do not reflect anticipated gas rate increases and infrastructure costs<br>2. Lifecycle Costs include factors in addition to just first costs and annual energy costs. |                                                                                            |                |                         |

# Base Code All-Electric vs. Mixed Fuel

BIZ & TECH // BUSINESS

## PG&E gas bills could rise in 2019



David R. Baker

Nov. 17, 2017

Updated: Nov. 17, 2017 4:06 p.m.

Building

Cycle<sup>2</sup>

Single-family

Low-rise Multi-Family

Office

Retail

## The PG&E Rate Increase of 2019: What you Need to Know

By Tim Henderson

Last Updated on June 26, 2019

-\$0.93/SF

+\$0.01/SF

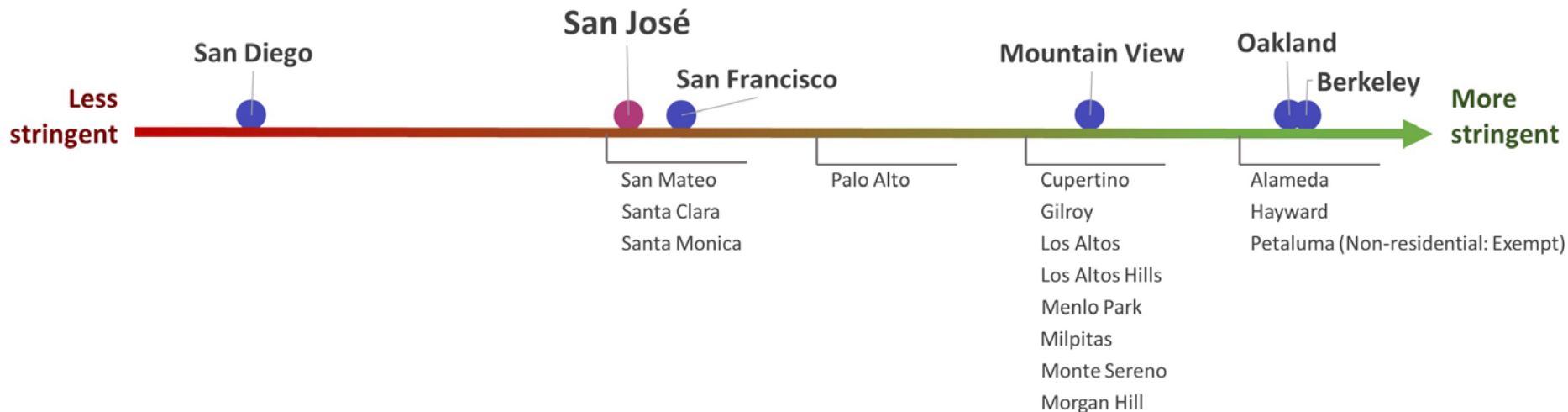
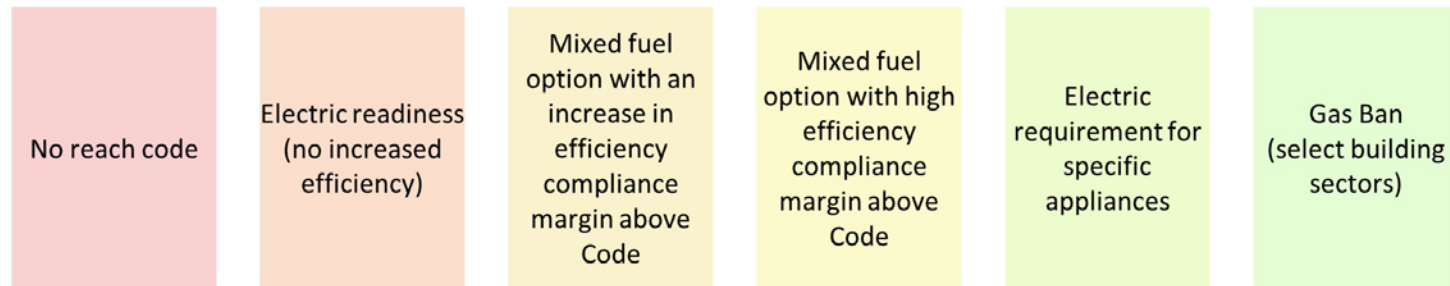
-\$0.57/SF

## PG&E seeking residential rate increase to support pipeline, storage upgrades in 2019

Published on November 22, 2017 by [Aaron Martin](#)

# San José Reach vs. Other Cities: Building Electrification

## City Reach Codes - Building Electrification



Note: All information in this chart is tentative, based on information obtained to date.

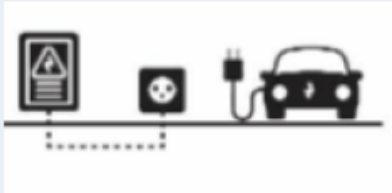
# Proposed Reach Code Components

|                                          |                                                                                     | Reach Code Compliance Pathways*                                     |                                                                                                                                                                       |                                                                                                                                                                                                                                  |
|------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Occupancy Type                           |                                                                                     | All-Electric<br>(Draft/Proposed)                                    | Mixed Fuel<br>(Draft)                                                                                                                                                 | Mixed Fuel<br>(Proposed)                                                                                                                                                                                                         |
| Single-family &<br>Low-rise Multi-family |    | <b>Efficiency:</b> To code<br><br><b>EVCI:</b> Same as mixed fuel   | <b>Efficiency:</b> Energy Design Rating (EDR) $\leq 10$<br><br><b>EVCI:</b> 1 EV Ready (Single-family); 0% EVSE, 50% EV Ready, 50% EV Capable (Low-rise Multi-family) | <b>Efficiency:</b> EDR $\leq 10$ , <b>electrification-ready</b><br><br><b>EVCI:</b> 1 EV Ready (Single-family); <b>10%</b> EVSE; <b>0%</b> EV Ready, 50% EV Capable (Low-rise Multi-family)                                      |
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\*\* Efficiency for non-residential occupancies refers to an energy performance requirement or “compliance margin” (%) above the 2019 Building Energy Code.

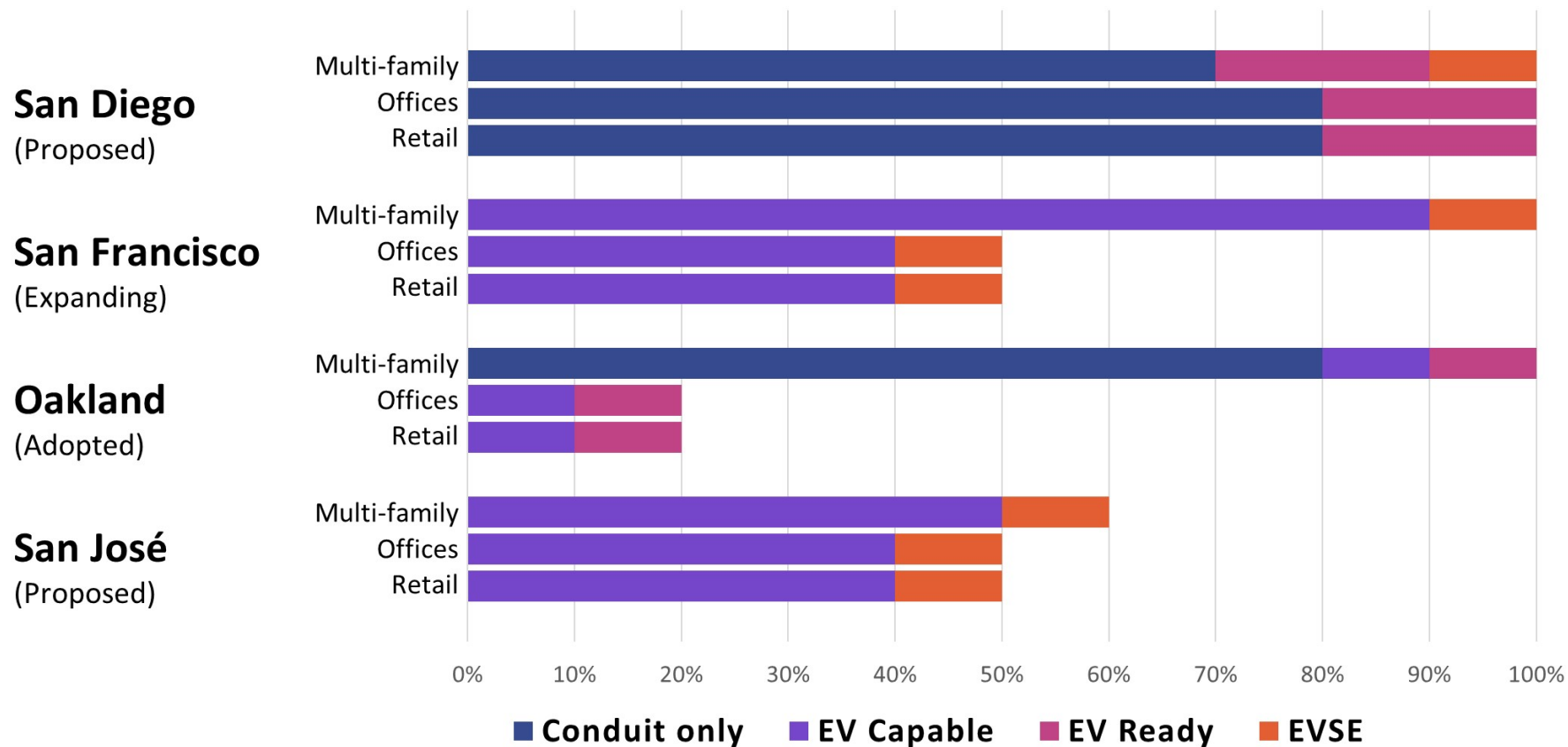
# EVCI Definitions

|                                                                  |                                                                                    |                                                                                                                     |
|------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| EV Capable<br><i>(Some assembly required)</i>                    |   | Raceway (conduit), electrical capacity (breaker space)                                                              |
| EV Ready<br><i>(Plug &amp; Play)</i>                             |   | Raceway (conduit), electrical service capacity, overcurrent protection devices, wire and outlet (i.e. full circuit) |
| EV Supply Equipment (EVSE) Installed<br><i>(Level 2 Charge!)</i> |  | All the equipment needed to deliver electrical energy from an electricity source to the EV                          |

# EV Charging Infrastructure Costs

|                                                       | Multi-family<br>2019 Base Code | Multi-family<br>Reach Code | Non-Res<br>2019 Base Code | Non-Res<br>Reach Code |
|-------------------------------------------------------|--------------------------------|----------------------------|---------------------------|-----------------------|
| EV Capable Spaces                                     | 0                              | 50                         | 0                         | 40                    |
| EV Ready Spaces                                       | 10                             | 0                          | 10                        | 0                     |
| EVSE Spaces                                           | 0                              | 10                         | 0                         | 10                    |
| Total Cost of EV Capable<br>(w/8A capacity)           | \$ -                           | \$ 49,500                  | \$ -                      | \$ 39,600             |
| Total Cost of EV Ready                                | \$ 13,300                      | \$ -                       | \$ 13,300                 | \$ -                  |
| Total Cost of EVSE                                    | \$ -                           | \$ 23,300                  | \$ -                      | \$ 23,300             |
| Total EVCI Cost                                       | \$ 13,300                      | \$ 72,800                  | \$ 13,300                 | \$ 62,900             |
| Total Project Cost                                    |                                | \$ 23,000,000              |                           | \$ 30,000,000         |
| Incremental Cost of Reach<br>Code over 2019 Base Code |                                | 0.26%                      |                           | 0.17%                 |

# San José Reach vs. Other Cities: EVCI



Note: All information in this chart is tentative, based on information obtained to date.

# Proposed Reach Code: Solar-readiness

- “Solar-readiness” includes:
  - Identification of solar ready zone
  - Documentation of structural load including solar
  - Interconnection pathway
- 2019 Code includes solar-readiness for most building types
- Proposed reach code extends solar-readiness requirement to excluded non-residential buildings
- Solar-ready saves about 10% of the total installed cost of a system versus non-solar-ready
- Nominal associated design and construction costs



# Why This Reach Code? Why Now?

- Proposed reach code:
  - Responds to stakeholder support and concerns
  - Seizes the opportunity to electrify buildings and transportation at a lower cost than retrofit
  - Maintains a significant reduction in GHG emissions
- Timing ensures:
  - Alignment with 2019 California Code effective date of January 1, 2020
  - Maximum impact due to implementation date
  - Progress on Climate Smart and American Cities Climate Challenge goals

“There is a growing consensus that building electrification is the most viable and predictable path to zero-emission buildings.”

California Energy  
Commission

*2018 Integrated Energy Policy  
Report Update (Jan. 2019)*

# Reach Code Implementation

## *Next Steps*

- Submit reach code to the CEC for approval
- Provide trainings and resources for City staff and the public
- Implement San José's reach code starting January 1, 2020
- Pursue funding opportunities to incentivize all-electric buildings, EVs, and EVCI in San José
- Collect and report data on the reach code impact



# Questions?

