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

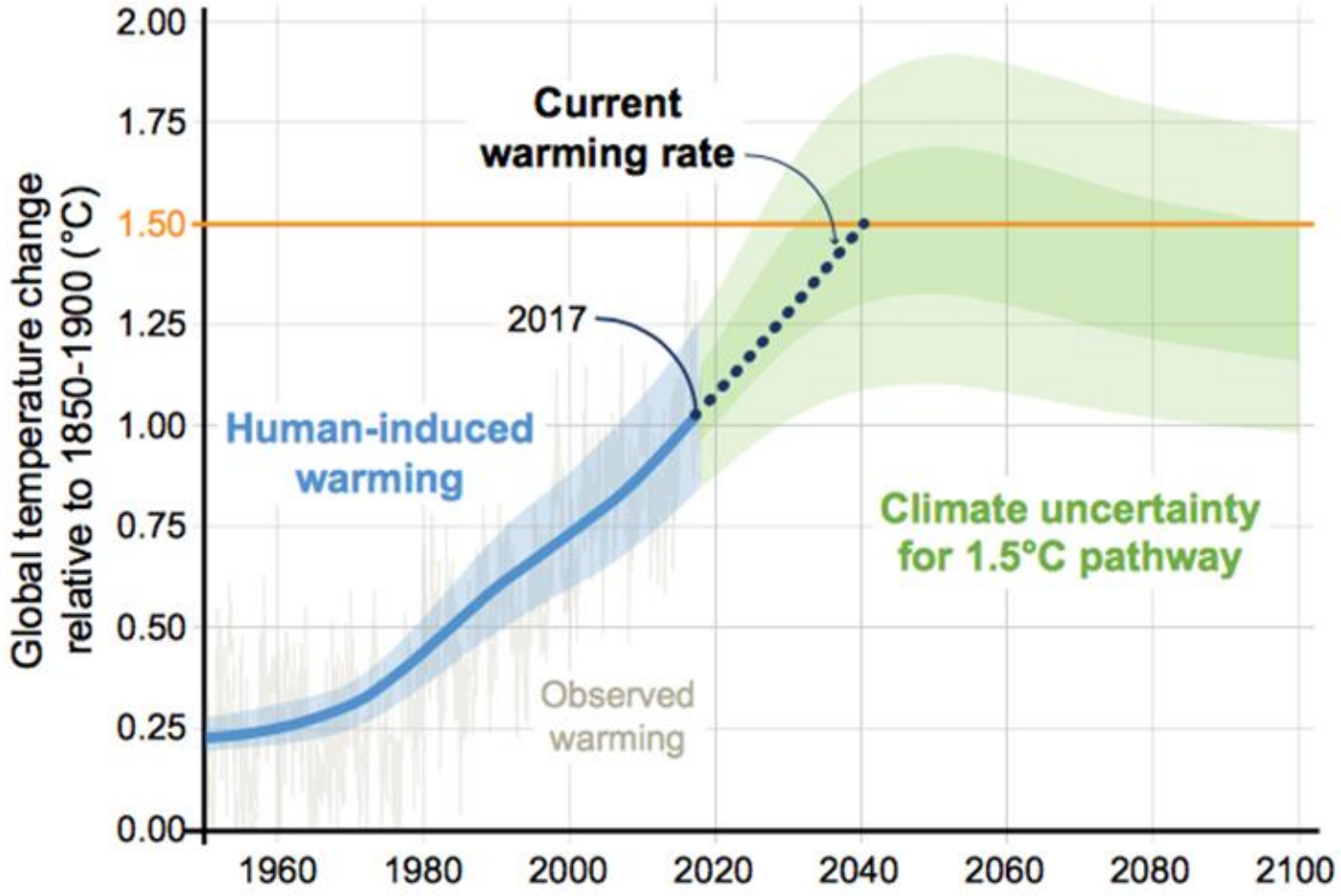
San José Building Reach Code

City Council Meeting, Item 7.2
September 17, 2019

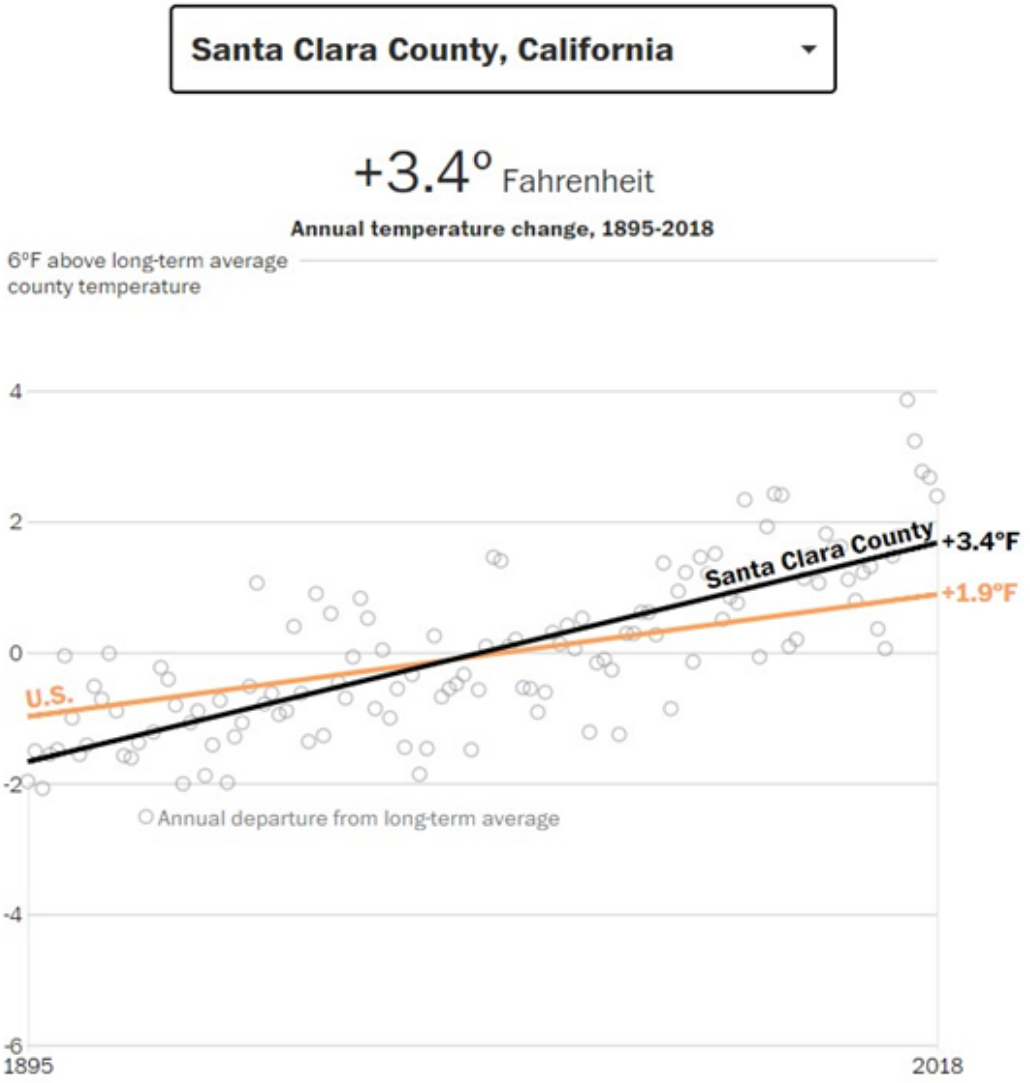
Presented by: Kerrie Romanow, ESD Director; Ken Davies, ESD Deputy Director; James Son, PBCE Deputy Director; Sean Denniston, New Buildings Institute

CLIMATE SMART
SAN JOSE
LIVING BETTER TODAY FOR TOMORROW

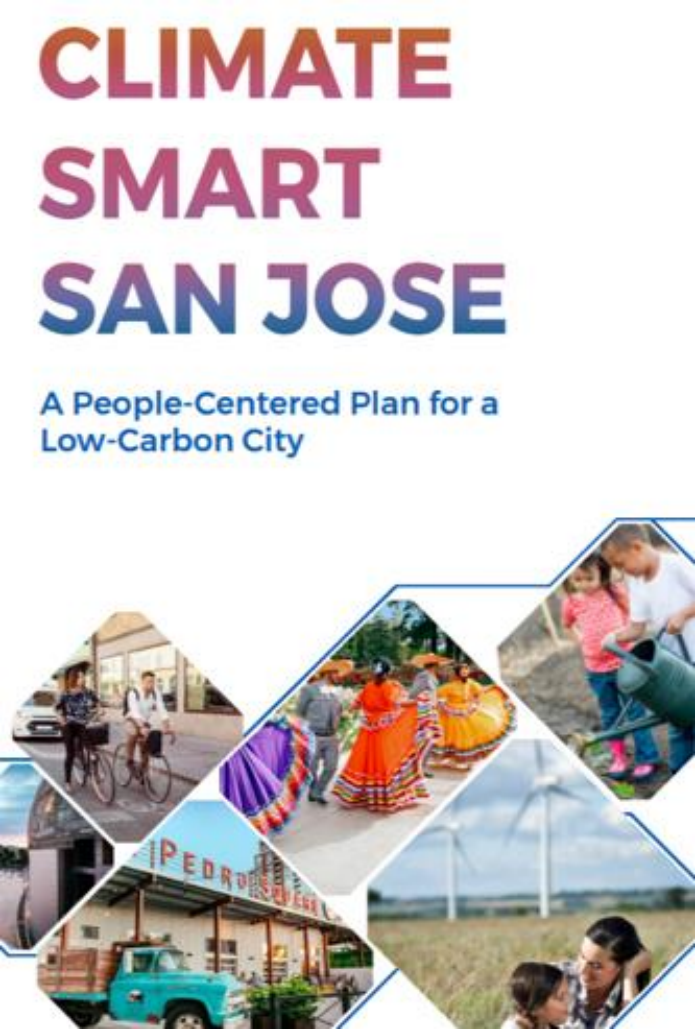
Global Temperatures are Rising



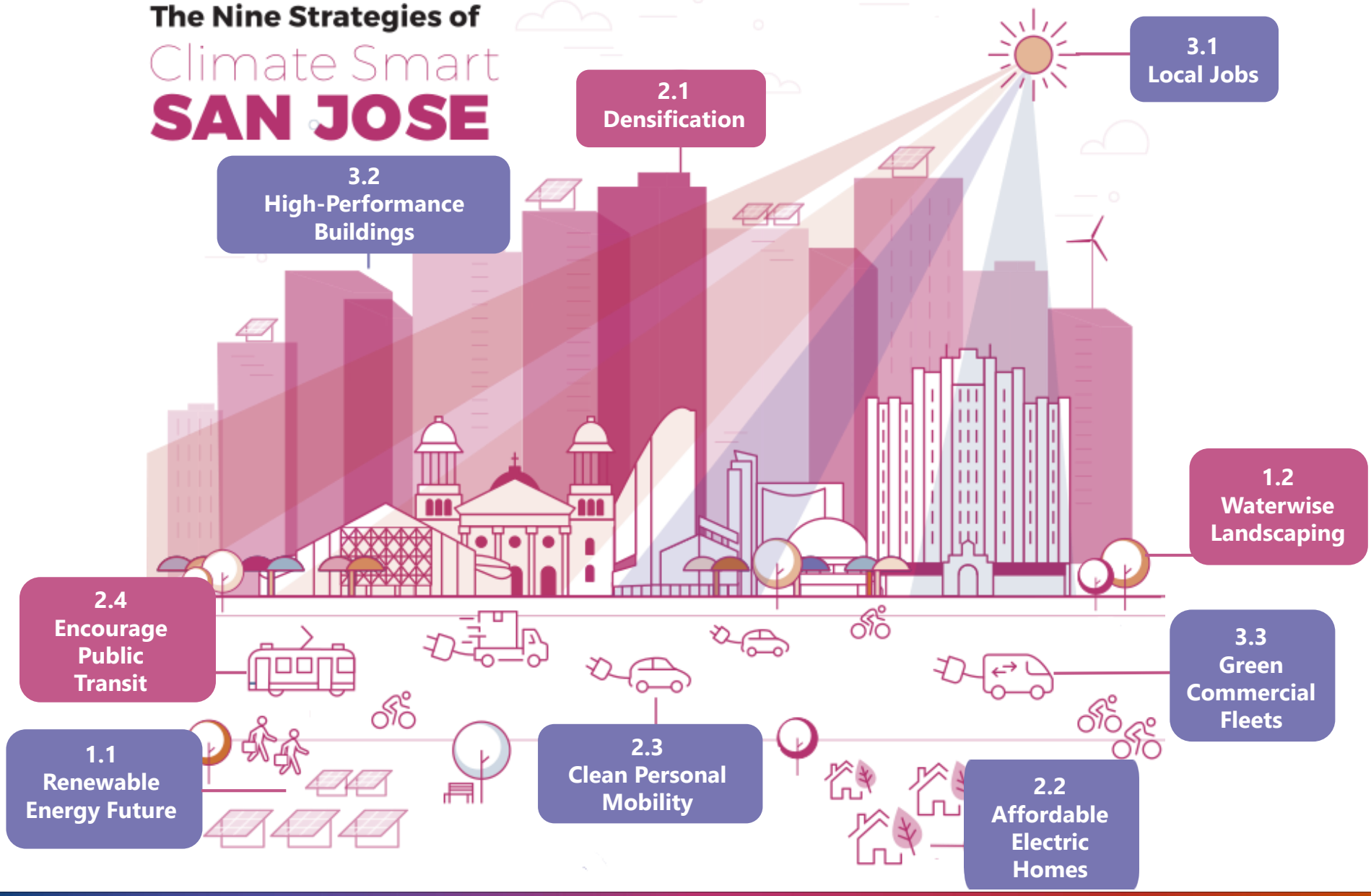
Local Temperatures are Rising



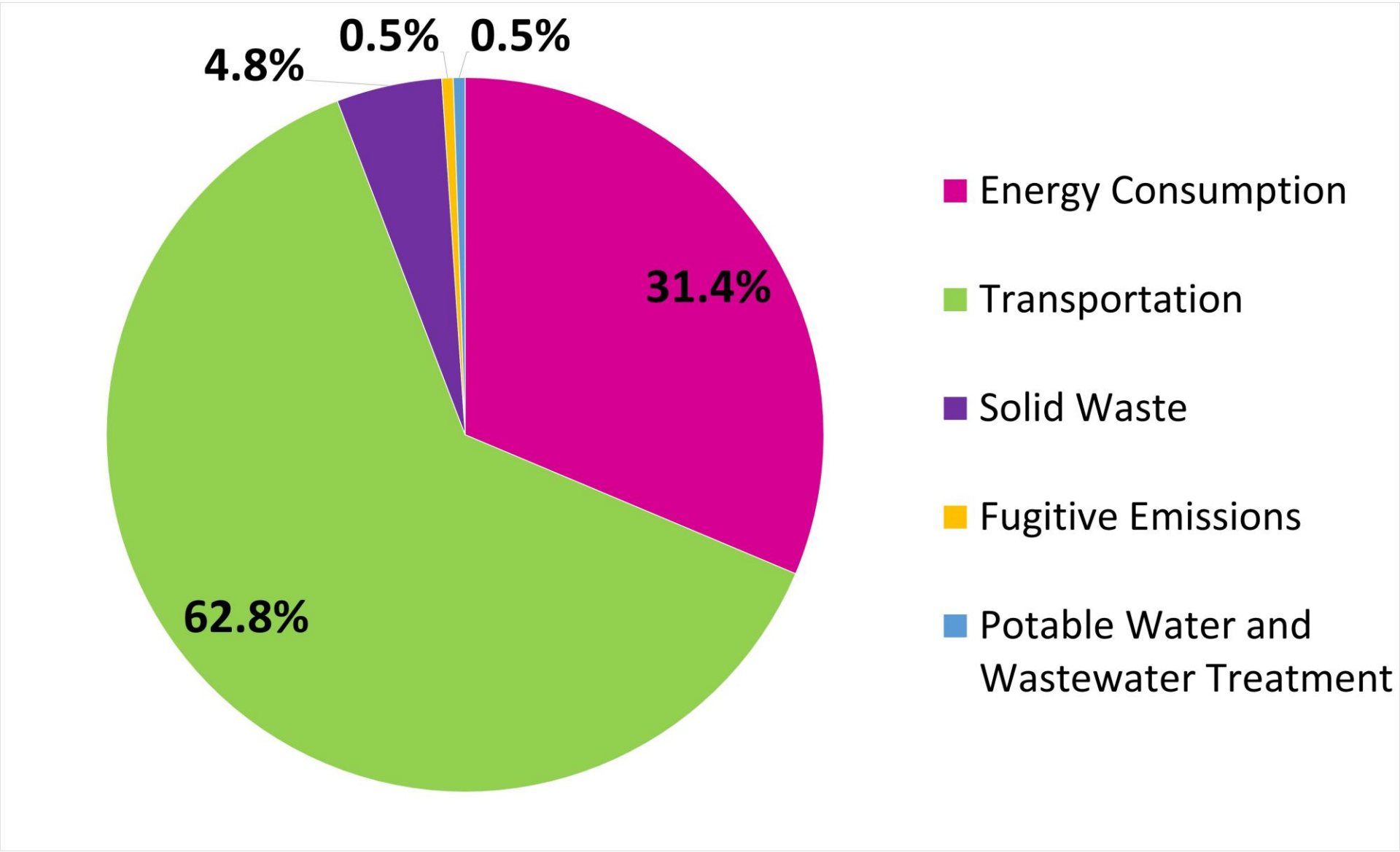
San José is a Committed Leader



A Reach Code is Integral to Climate Smart



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_2 over building lifetime.

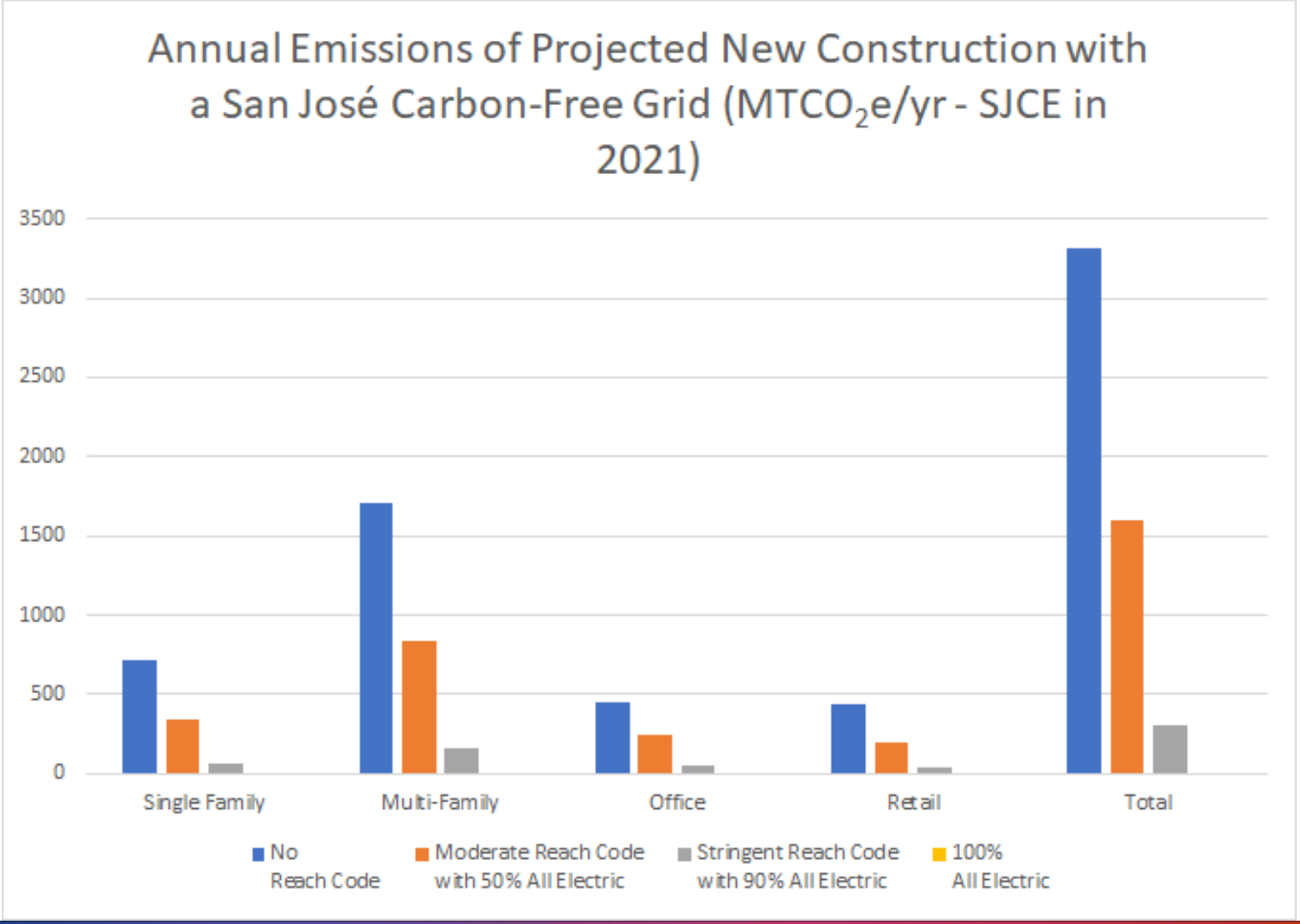
Base Code

- 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



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

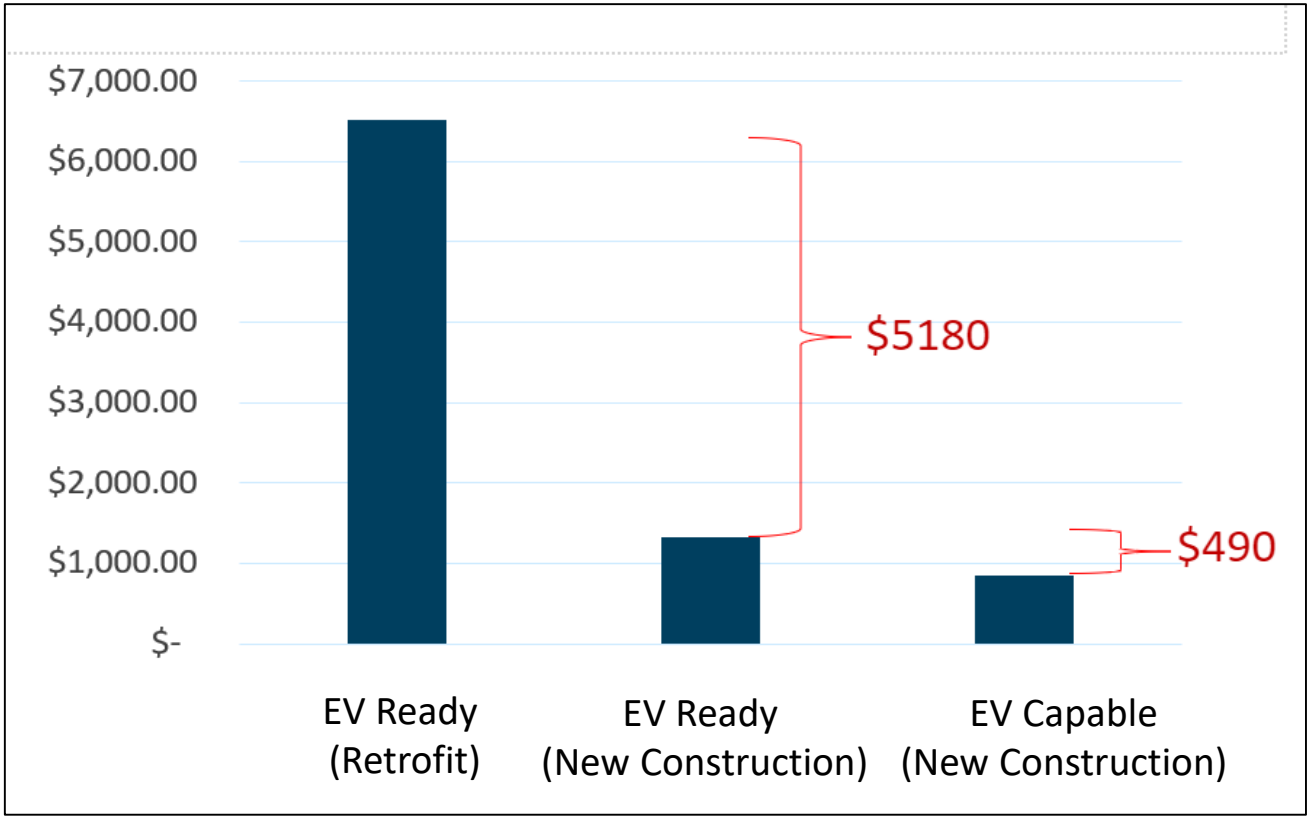
Santana Row, San Jose

Sol Lux Alpha, San Francisco

Linda Vista, Mountain View

Financial Benefits (cont'd)

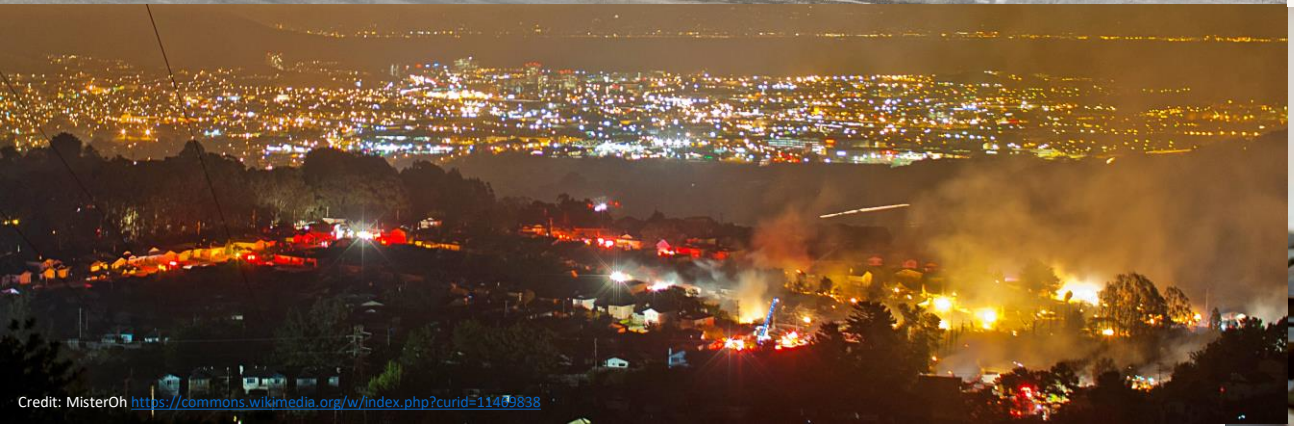
- Cheaper at time of construction vs. retrofit



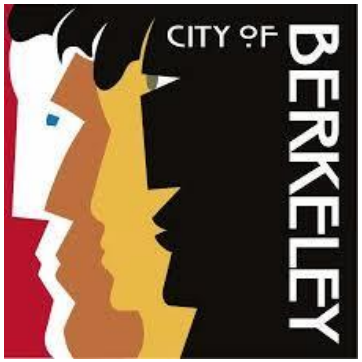
- Lower operational cost for EVs

Health & Safety Benefits


Credit: Inaglory, Brocken https://commons.wikimedia.org/w/index.php?curid=11488373


Credit: MisterOh https://commons.wikimedia.org/w/index.php?curid=11489838

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)
- Five 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

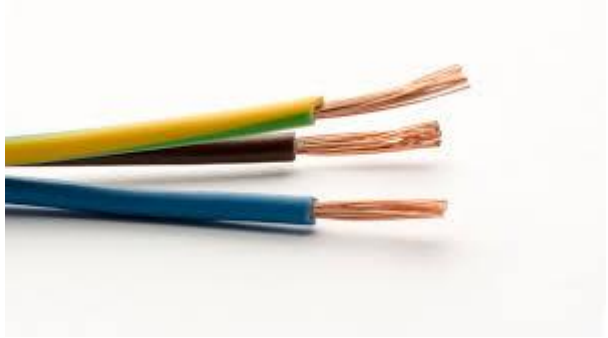
	Reach Code Compliance Pathways*		
Occupancy Type	**All-Electric (Draft/Proposed)**	**Mixed Fuel (Draft)**	**Mixed Fuel (Proposed)**
Single-family & Low-rise Multi-family 	**Efficiency:** To code **EVCI:** Same as mixed fuel	**Efficiency**: Energy Design Rating (EDR) = min. 10 point reduction **EVCI:**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

Electrification-readiness

- Electric infrastructure components to convert gas loads to electric in the future, such as:
  - Wiring
  - Plugs
  - Breakers
  - Panel Capacity
  - Raceways
- 2019 T24 includes electrification-readiness for residential water heaters



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

Reach Code Building Costs vs. 2019 Base Code

	Costs[1] of a Reach Code All-Electric Building over 2019 Base Code			Costs[1] of a Reach Code Mixed Fuel Building over 2019 Base Code		
	First Cost	Annual Utility	Life-Cycle[2]	First Cost	Annual Utility	Life-Cycle[2]
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 due to infrastructure costs
2. Lifecycle Costs include factors in addition to just first costs and annual energy costs.

Base Code All-Electric vs. Mixed Fuel

	Cost[1] of an All-Electric Building vs. Mixed-Fuel Building under 2019 Base Code		
	First Cost	**Annual Utility**	**Life-Cycle[2]**
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 due to infrastructure costs
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[2]

Single-fam

Low-rise M

Office

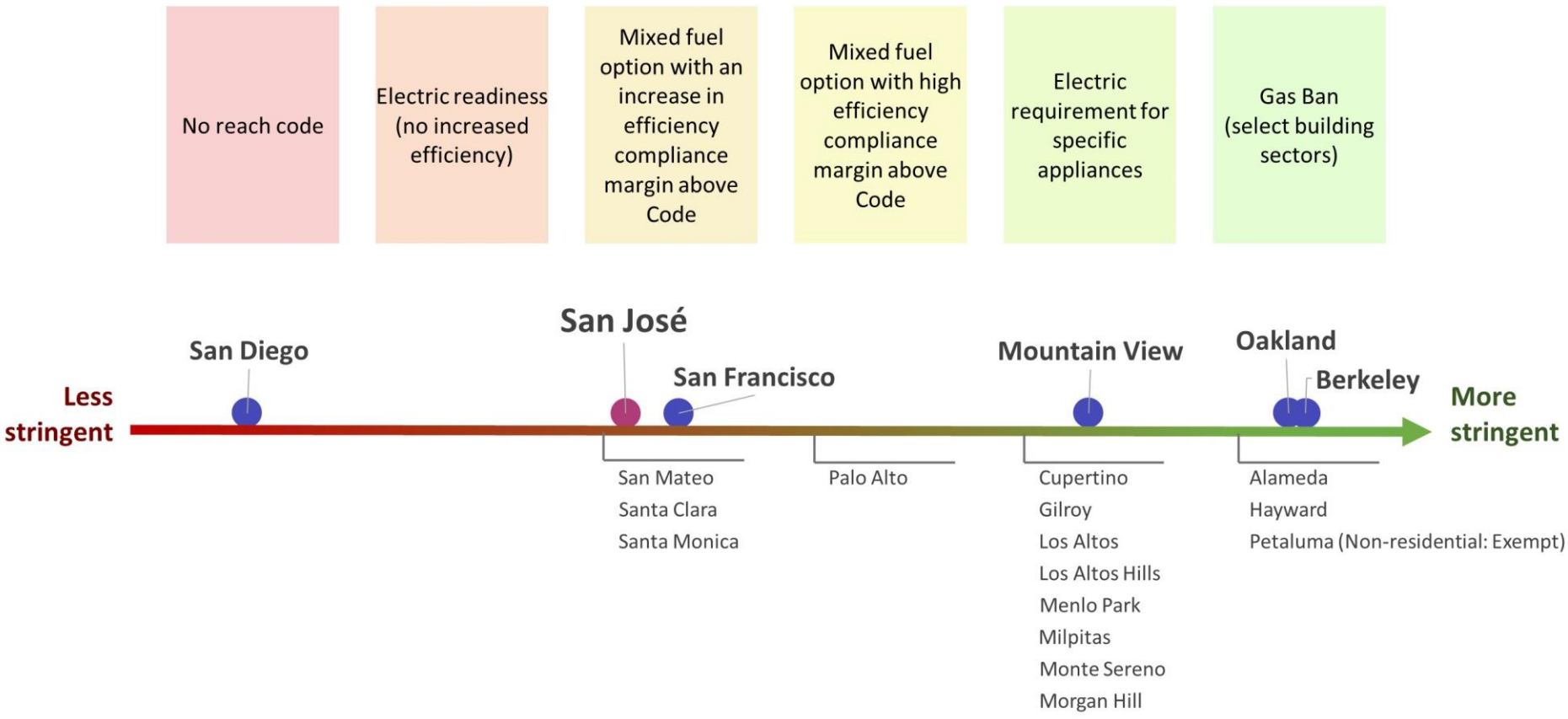
Retail

-$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



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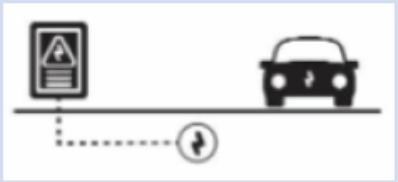
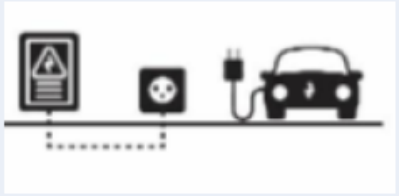
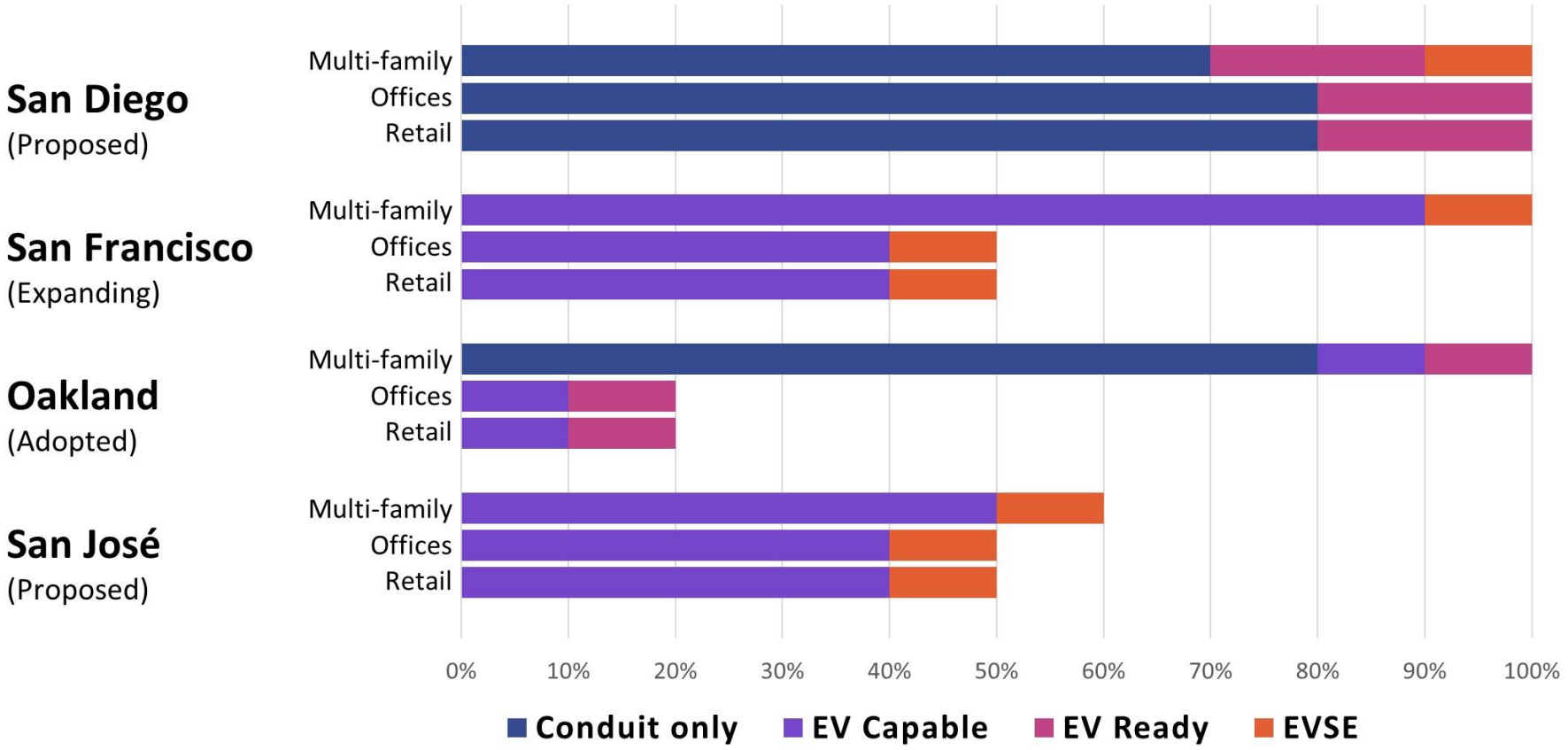
EVCI Definitions

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

EV Charging Infrastructure Costs

	Multi-family 2019 Base Code	Multi-family Reach Code	Non-Res 2019 Base Code	Non-Res 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 (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 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.

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
- Future City buildings will pursue Zero Net Carbon building design
- Continue building electrification efforts related to existing buildings

Questions?

Reach Code Highlights

- Significant reduction in GHG emissions
- Aggressive removal of fossil fuel from new construction
- Facilitates transition to electric vehicles
- Improves indoor and outdoor air quality
- Seamless transition with 2019 Building Codes on January 1, 2020

Presented by: Kerrie Romanow, ESD Director; Ken Davies, ESD Deputy Director; James Son, PBCE Deputy Director; Sean Denniston, New Buildings Institute