# ENERGY, SUSTAINABILITY & BUILDINGS WORKSHOP

Sept 24, 2019

# Intentions & Guiding Principles

What types of buildings should we build with respect to economics, equity, and the environment.

Guiding principles:

Preserve low cost compliance options to minimize impact on construction costs

Encourage development of healthier, safer, lower emissions buildings

Reflect the values of our community

- leaders in sustainability

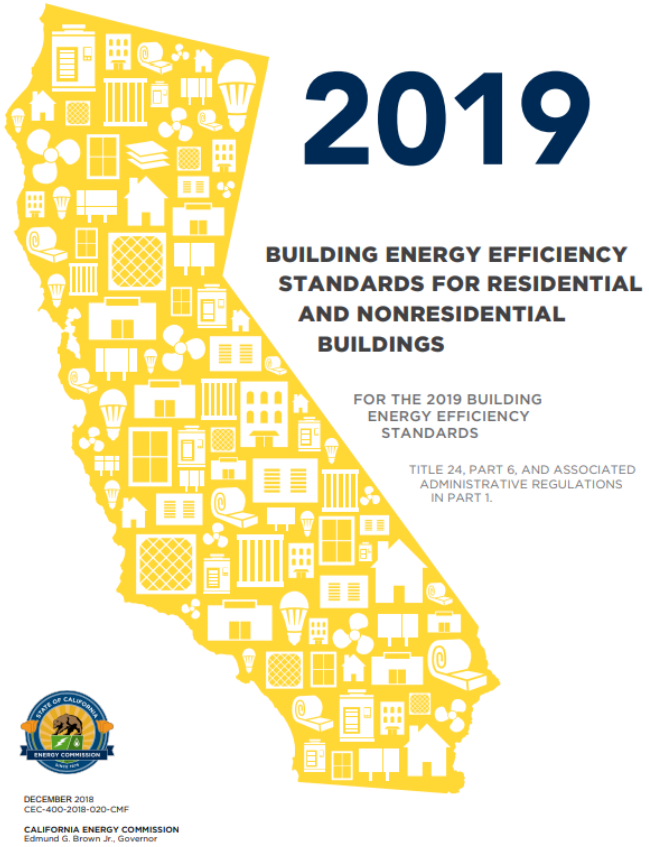
# Today's Objectives

- Define and detail reach code options
- Review energy efficient technology
- Review cost effectiveness of reach code options
- Hear your voice

# CA Building Standards

California Building Standards Code is updated and published every 3 years. The next code cycle goes into effect on Jan 1, 2020.

- Part 1 - California Building Standards Admin Code
- Part 2 - California Building Code
- Part 3 - California Electrical Code
- Part 4 - California Mechanical Code
- Part 5 - California Plumbing Code
- **Part 6 - California Energy Code**
- Part 7 - California Elevator Safety Construction Code
- Part 8 - California Historical Building Code
- Part 9 - California Fire Code
- Part 10 - California Code for Building Conservation
- Part 11 – California Green Building Standard



# 2019 Energy Code Changes

Solar Photovoltaic System

- Increase self-utilization of electricity to power the home's electricity loads
- CA is first State in the nation to require PV on homes

Pre-Wiring for Electric Water Heaters

- New homes that install gas water heaters must pre-wire to allow for future upgrades to electric water heaters

Building Envelope

- Strengthen insulation in attic, windows and walls to improve comfort and energy savings.

# Energy Reach Codes - Defined

In California, Title 24 of the Code of Regulations sets the building code standards for all jurisdictions statewide.

However, local governments can **adopt more stringent requirements** (i.e. higher efficiency or more environmentally sustainable), which are known as reach codes. Reach codes must meet the following criteria:

- All energy efficiency-related reach codes must be proven to be **cost effective**.
- All reach codes must be **re-approved with each Energy Code update** (every 3 years)
- Require **two public hearings** prior to adoption

# California Climate Change goals

- 40% GHG reduction by 2030

SB 32 (2016)

Electric sector:
- 60% renewable / 2030
- 100% carbon-free / 2045

SB 100 (2018)

- Carbon neutrality by 2045

Gov. Exec Order (2018)

- 40% GHG reductions in buildings / 2030 (assessment)

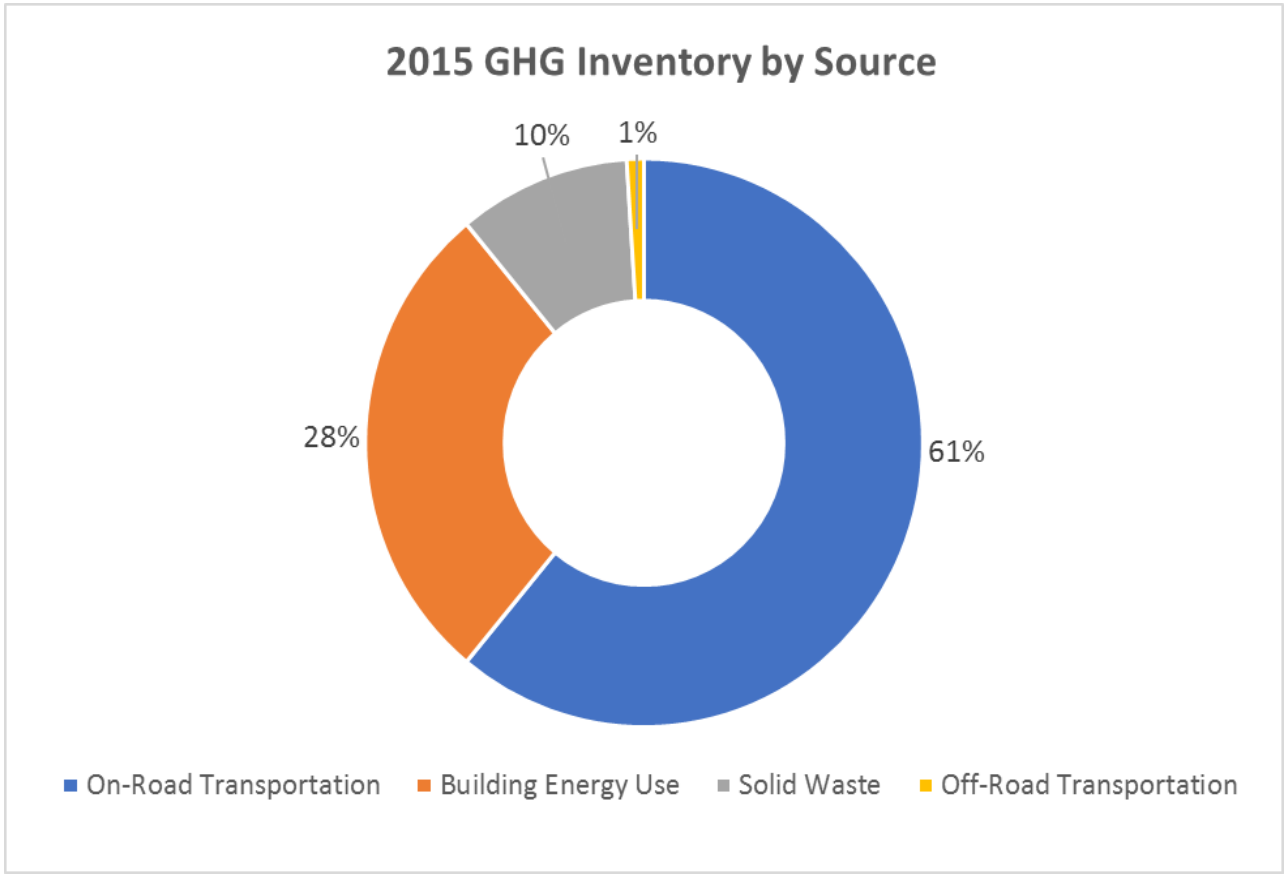
AB 3232

- $200M incentives for low-emissions buildings and equipment

SB 1477

# GHG Emissions in Healdsburg

28% of Healdsburg emissions were from building energy use in 2015




Source: RCPA Greenhouse Gas Inventory (https://rcpa.ca.gov/data-and-reports/sonoma-county-greenhouse-gas-inventory/)

# Power Content Label

| 2018 POWER CONTENT LABEL | | | |
|---|---|---|---|
| Healdsburg Electric Department | | | |
| www.ci.healdsburg.ca.us | | | |
| **ENERGY RESOURCES** | **Healdsburg's Standard Rate** | **Healdsburg's Green Rate** | **2018 CA Power Mix**** |
| **Eligible Renewable** | **42%** | **100%** | **31%** |
| Biomass & Biowaste | 0% | 0% | 2% |
| Geothermal | 41% | 100% | 5% |
| Eligible Hydroelectric | 1% | 0% | 2% |
| Solar | 0% | 0% | 11% |
| Wind | 0% | 0% | 11% |
| **Coal** | **0%** | **0%** | **3%** |
| **Large Hydroelectric** | **17%** | **0%** | **11%** |
| **Natural Gas** | **33%** | **0%** | **35%** |
| **Nuclear** | **0%** | **0%** | **9%** |
| **Other** | **0%** | **0%** | **<1%** |
| **Unspecified sources of power*** | **9%** | **0%** | **11%** |
| **TOTAL** | **100%** | **100%** | **100%** |

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.
** Percentages are estimated annually by the California Energy Commission based on the electricity generated in California and net imports as reported to the Quarterly Fuel and Energy Report database and the Power Source Disclosure program.

| | |
|---|---|
| For specific information about this electricity product, contact: | **Healdsburg Electric Department**<br>**707-431-3346** |
| For general information about the Power Content Label, please visit: | http://www.energy.ca.gov/pcl/ |
| For additional questions, please contact the California Energy Commission at: | Toll-free in California: 844-454-2906<br>Outside California: 916-653-0237 |

**GHG Emissions of Energy Types:**

Healdsburg's Standard Electric
**376 lbs of CO2/MWh**

Natural Gas
**798 lbs of CO2/MWH**

# Energy Reach Code Options for Public Input

1. **Mixed Fuel:** This reach code creates two options for an applicant; **(1)** a building that has natural gas and electric fuel sources must exceed the state building energy efficiency requirements by 15 percent or **(2)** build an all-electric building.

2. **Electric space and water heating:** This option would install electric heating appliances (i.e. heat pump water heaters) but allow gas cooking and fireplaces

3. **All-electric:** This option eliminates the natural gas pipeline inside a newly constructed buildings to encourage all electric buildings. This option will guarantee that all new buildings are all electric.

# Energy Reach Codes – Building Types

An energy reach code could apply to:

**New Construction Low-Rise Residential**

- new construction single family residential
- new construction of an accessory dwelling unit
- multifamily residential properties under 4 stories in height

**New construction Commercial Buildings**

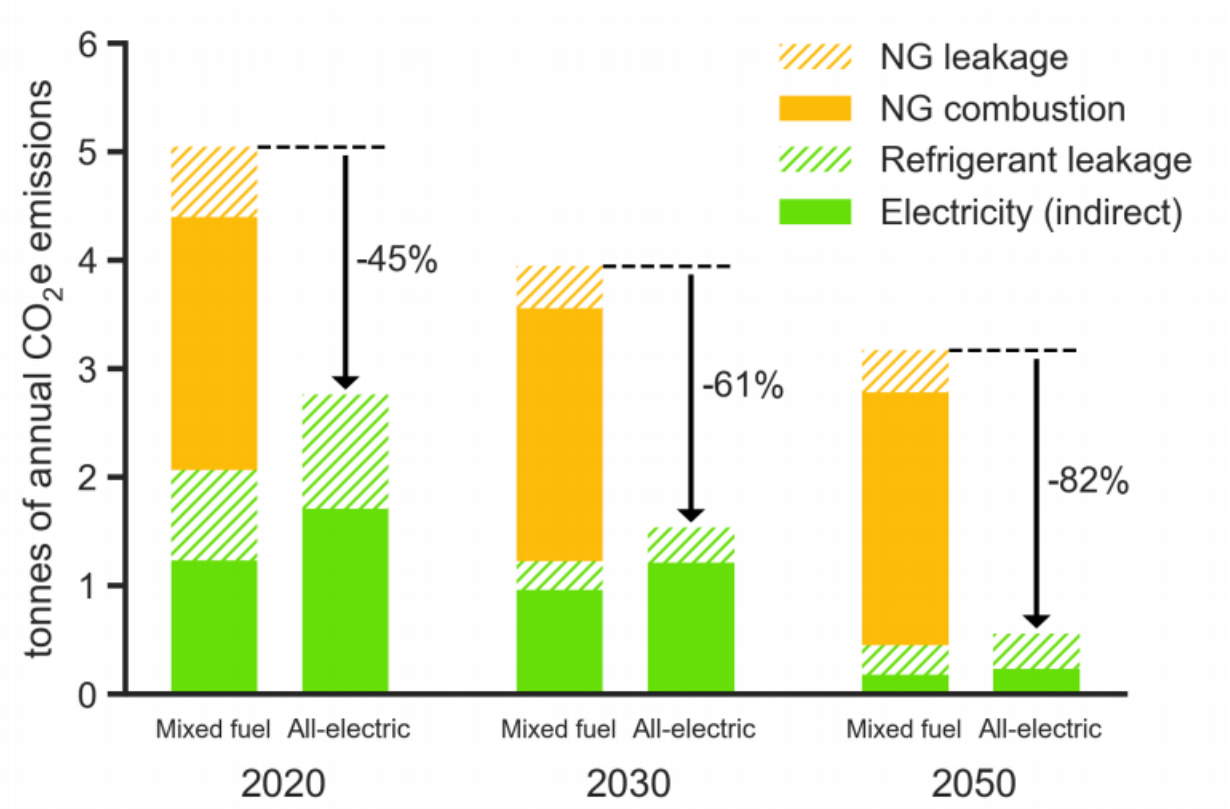
- Could be limited to retail, warehouses, and offices

**Major Renovations and Significant Remodels**

- Defined as 75% of conditioned space

# GHG Emissions of Mixed Fuel v. All-Electric

**Figure 1-1: Annual GHG emissions from a mixed-fuel and all-electric 1990s vintage home in Sacramento**




Electricity emissions are based on the High Electrification scenario consistent with SB 100; see the greenhouse gas methodology section for more details. The 2030 and 2050 bars assume that the next generation of low-GWP refrigerants are used in all applicable heat pump systems modeled, including air conditioners, HVAC heat pumps, heat pump water heaters, and heat pump clothes dryers. We do not estimate refrigerant leakage from refrigerators and freezers, but these fugitive emissions would be the same in both electric and natural gas homes. We assume that by 2030, fugitive methane emissions are reduced by 40%, as mandated by the CARB Short-Lived Climate Pollutant Strategy and as previously set as a goal by the Obama administration. We based our calculations of fugitive refrigerant emissions on CARB data as described further in Appendix C.

# Energy Cost Comparison by BTU & Appliance Efficiency

| Fuel Type | Average Price / Unit | Heat Content (BTU) | Price / Million BTU | Space Heating Fuel Type | System Efficiency | Price / Million BTU |
|---|---|---|---|---|---|---|
| **Healdsburg Electric*** ($/kWh) | $ 0.1797 | 3412.14 | $ 52.66 | Heat Pump | 250% | $ 21.07 |
| Roof Top Solar ($/kWh) | $ 0.1562 | 3412.14 | $ 45.78 | Heat Pump | 250% | $ 18.31 |
| PG&E Natural Gas ($/Therm) | $ 1.6200 | 100,000 | $ 16.20 | Gas Furnace | 80% | $ 20.25 |

*Healdsburg Electric average price / unit is a blended tier rate based on residential averages.