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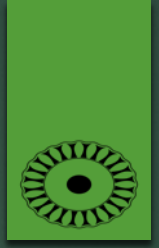
# Building Electrification & Reducing Natural Gas Use

UTILITIES & ENVIRONMENTAL SERVICES

Erik Pearson  
Environmental Services Manager

July 16, 2018

# General Plan/Climate Action Plan Goals

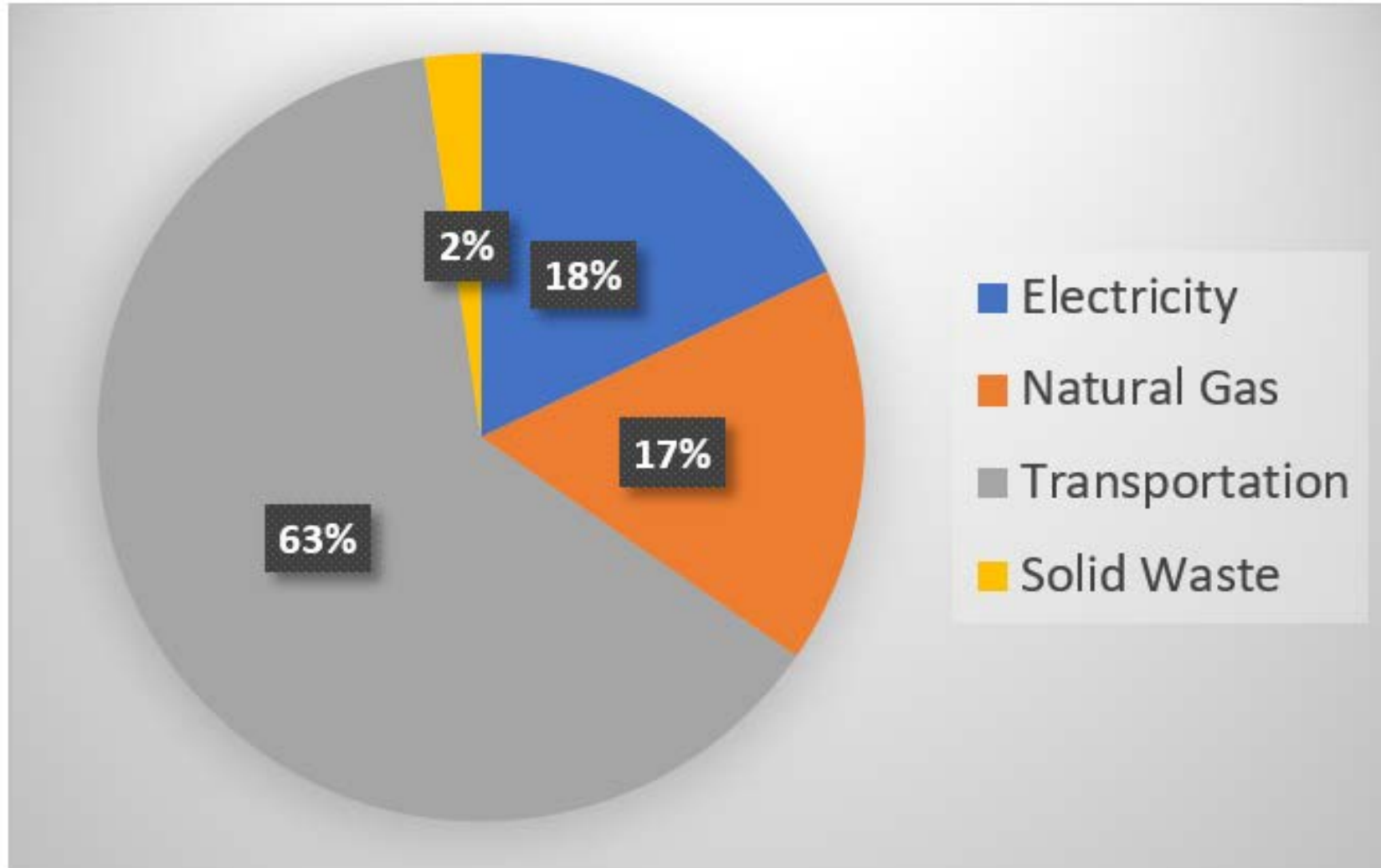
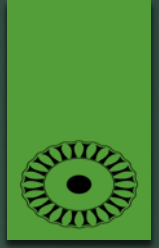


Reduce GHG emissions by:

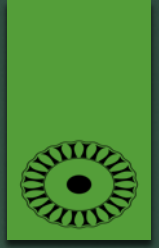
- ▶ 20% below 2005 baseline levels by 2020
- ▶ 61.7% by 2040
- ▶ 82.5% by 2050

Original CAP (2009): Reduce natural gas consumption to 50% below emissions projections by 2050

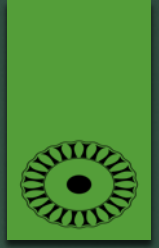
# 2015 GHG Inventory



# Decarbonization



# East Bay Community Energy

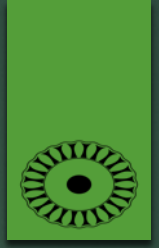


Local Development Business Plan recommendations include:

- Support building electrification incentives.
- Include fuel switching strategies and electric heat pump technologies in workforce training initiatives
- Evaluate opportunities for electrification strategies, such as the potential to provide a premium opt-in natural gas service



# Alternatives to Natural Gas



Induction Cooking



Heat Pump Space Heating



Heat Pump Water Heating



# Building Electrification



The screenshot shows the City of Palo Alto website. The header includes the city logo, navigation links (Visiting, Doing Business, Government, Services, Community Partners, I Want To), and utility links (Pay My Bill, Rebates, Programs, Projects, Safety, Outages). The main content area features a large image of a child's hands under a showerhead with the text "HEAT PUMP WATER HEATERS" and "What is the carbon footprint of your hot water?". Below this is an "Overview" section with text about the HPWH Pilot Program and a video player titled "Introduction to Heat Pump Water Heaters".

## FOSSIL FREE HOMES



### A GUIDE TO THE ALL-ELECTRIC, LOW-CARBON, CLEAN HOME

By Carmelle Cabaron Millar for Menlo Spark

#### Ever wondered if you could eliminate fossil fuel use in your home?

This guide can help you replace natural gas heating, water heating and appliances to go low- or zero-carbon in your home, and you don't necessarily need solar panels to do it. Natural gas used to be much cleaner and cheaper than electricity, but now our power is transitioning away from dirty fossil fuels like coal and gas to an increasing share of renewables and clean power sources. Alternatives to natural gas are becoming more popular, as climate-conscious people try to reduce their fossil fuel use, avoid natural gas produced by "fracking" and all the risks that come with it, and limit the safety hazards of gas leaks like the major incident in Aliso Canyon outside of Los Angeles and the pipeline explosion in San Bruno.<sup>1</sup>



A natural gas pipeline in Colorado. Credit: Kevin Moloney, NYT. <http://bit.ly/22jNeDb>

Fortunately, there are many affordable choices for alternatives to natural gas in homes that are widely available and compatible in most homes with some advance planning.

*Natural gas* is the most common source of home heating and water heating in the Bay Area. Although the



## MARIN COUNTY GREEN BUILDING CHECKLIST SINGLE FAMILY RESIDENTIAL: NEW CONSTRUCTION<sup>1</sup>

### STEP 1: FOR ALL PROJECTS, SELECT ONE GREEN BUILDING REQUIREMENT

COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> CALGREEN TIER 1	Develop the proposed home to CALGreen Tier 1	CALGreen Inspector
<input type="checkbox"/> GREEN POINT RATED	Achieve Silver Certification Level	Green Point Rater
<input type="checkbox"/> LEED FOR HOMES	Achieve LEED for Homes Silver	LEED AP

### STEP 2A (FOR HOMES <4,000 SQUARE FEET): SELECT ONE ENERGY EFFICIENCY METHOD<sup>2</sup>

COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> PROJECT WITHOUT SOLAR	If a photovoltaic system is <u>not</u> installed, demonstrate <sup>3</sup> that the energy use of the proposed home is 15% more efficient than the 2016 State Energy Code.	HERS Rater, where verification is required <sup>4</sup>
<input type="checkbox"/> PROJECT WITH SOLAR	If a photovoltaic system is installed, demonstrate <sup>3</sup> that the energy use of the proposed home is 20% more efficient than the 2016 State Energy Code.	
<input type="checkbox"/> ALL-ELECTRIC	Demonstrate that the proposed home will be all electric <sup>5</sup>	

### STEP 2B (FOR HOMES ≥4,000 SQUARE FEET): SELECT ONE ENERGY EFFICIENCY METHOD<sup>2</sup>

COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> ZERO NET ELECTRICITY	Demonstrate <sup>3</sup> that the proposed mixed-fuel <sup>6</sup> home: <ul style="list-style-type: none"> <li>• is 35% more efficient than the 2016 State Energy Code</li> <li>• will generate as much electricity on-site as it is expected to use in a year, equivalent to an energy design rating (EDR) of 20 or less.</li> </ul>	HERS Rater, where verification is required <sup>4</sup>
<input type="checkbox"/> ALL-ELECTRIC ALTERNATIVE	Demonstrate <sup>3</sup> that the proposed all-electric <sup>5</sup> home: <ul style="list-style-type: none"> <li>• is 20% more efficient than the 2016 State Energy Code</li> <li>• includes at least 2.5 kW of solar.</li> </ul>	
<input type="checkbox"/> PASSIVE HOUSE	Develop the proposed home to Passive House Institute US (PHIUS) Standards.	PHIUS Rater

### STEP 3: FOR ALL PROJECTS, ACHIEVE ELECTRIC VEHICLE (EV) READINESS REQUIREMENT

COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> DEDICATED 208 / 240-VOLT BRANCH CIRCUIT	Comply with CALGreen Measure A4.106.8.1	Verifier from Step 1

<sup>1</sup> Removal or substantial modification of more than 75 percent of the linear sum of a building's exterior walls for each story shall be considered demolition of the building (County of Marin Development Code Chapter 22.130.030), triggering new construction requirements.

<sup>2</sup> All new homes must comply with mandatory elements of Title 24, Part 6 (California Energy Code)

<sup>3</sup> Energy savings demonstrated via Title 24 Energy Calculations (Registered Certificate of Compliance: CF1R-PRF)

<sup>4</sup> HERS Verification requirements are summarized in Residential Appendix RA2, published by the California Energy Commission.

<sup>5</sup> Construction considered 'all-electric' if electricity is the only permanent source of energy for water-heating, space-heating, space cooling, cooking and clothes-drying and there is no gas meter connection.

<sup>6</sup> A mixed-fuel home is a home where both natural gas and/or propane and electricity are used.

# Marin County



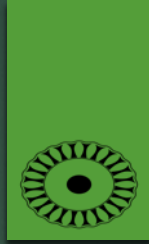
## Incorporated All-Electric Construction in Green Building Standards





**MARIN COUNTY GREEN BUILDING CHECKLIST  
SINGLE FAMILY RESIDENTIAL: NEW CONSTRUCTION<sup>1</sup>**

# Marin County



STEP 1: FOR ALL PROJECTS, SELECT ONE GREEN BUILDING REQUIREMENT

COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> CALGREEN	Develop the proposed home to CALGreen	CALGreen Verifier

**STEP 2A (FOR HOMES <4,000 SQUARE FEET): SELECT ONE ENERGY EFFICIENCY METHOD<sup>2</sup>**

STEP COM ME	COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> PROJECT WITHOUT SOLAR		If a photovoltaic system is <u>not</u> installed, demonstrate <sup>3</sup> that the energy use of the proposed home is 15% more efficient than the 2016 State Energy Code.	HERS Rater, where verification is required <sup>4</sup>
<input type="checkbox"/> PROJECT WITH SOLAR		If a photovoltaic system is installed, demonstrate <sup>3</sup> that the energy use of the proposed home is 20% more efficient than the 2016 State Energy Code.	
<input type="checkbox"/> ALL-ELECTRIC		Demonstrate that the proposed home will be all electric <sup>5</sup>	
<input type="checkbox"/> PASSIVE HOUSE	Develop the proposed home to Passive House Institute US (PHIUS) Standards.	PHIUS Rater	

STEP 3: FOR ALL PROJECTS, ACHIEVE ELECTRIC VEHICLE (EV) READINESS REQUIREMENT

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<input type="checkbox"/> DEDICATED 208/240-VOLT BRANCH CIRCUIT	Comply with CALGreen Measure A4.106.8.1	Verifier from Step 1

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**MARIN COUNTY GREEN BUILDING CHECKLIST  
SINGLE FAMILY RESIDENTIAL: NEW CONSTRUCTION<sup>1</sup>**

# Marin County



STEP 1: FOR ALL PROJECTS, SELECT ONE GREEN BUILDING REQUIREMENT

COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> C	Develop the proposed home to CALGreen	

**STEP 2A (FOR HOMES <4,000 SQUARE FEET): SELECT ONE ENERGY EFFICIENCY METHOD<sup>2</sup>**

STEP COME	COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> P W I S O	<input type="checkbox"/> PROJECT WITHOUT	If a photovoltaic system is <u>not</u> installed, demonstrate <sup>3</sup> that the energy use of the proposed home is 15% more	

**STEP 2B (FOR HOMES ≥4,000 SQUARE FEET): SELECT ONE ENERGY EFFICIENCY METHOD<sup>2</sup>**

COMPLIANCE METHOD:	REQUIREMENT:	FIELD VERIFIER:
<input type="checkbox"/> ZERO NET ELECTRICITY	Demonstrate <sup>3</sup> that the proposed mixed-fuel <sup>6</sup> home: <ul style="list-style-type: none"> <li>• is 35% more efficient than the 2016 State Energy Code</li> <li>• will generate as much electricity on-site as it is expected to use in a year, equivalent to an energy design rating (EDR) of 20 or less.</li> </ul>	HERS Rater, where verification is required <sup>4</sup>
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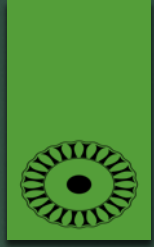
# Sacramento Utility Pushes All-Electric Homes: 'California Is Wasting Money to Build Homes With Gas'

greentechmedia.com/articles/read/sacramento-utility-pushes-all-electric-homes

## Utilities

The Sacramento Municipal Utility District offers electrification rebates worth up to \$5,000 for new homes and up to \$13,750 for existing homes.

Justin Gerdes June 27, 2018



- ▶ “When we install gas infrastructure in new homes, we know that we’re going to have to take that out at some point,” said Howlett. “Putting gas pipes in the ground in 2018 doesn’t make any sense.”
- ▶ He added, “California is wasting money every day by continuing to build homes with gas infrastructure that will have to be retrofitted.”

# Policy Options



1. Work with EBCE to offer incentives
2. Electrify City buildings
3. Promote Switching from Natural Gas to Electricity or Solar Thermal Energy
4. Require Building Electrification – particularly for new construction
5. Require panel upgrades at time of major remodel or solar installation
6. Advocate for Building Electrification at Regional and State Levels
7. Collaborate with others to Communicate and Educate Business and Professional Audiences about Building Electrification
8. Collaborate with other to Communicate and Educate Residential/Homeowner Audiences about Building Electrification

# Questions & Discussion

