Building Codes, Reach Codes, and Electric Only Construction

North Coast Builder’s Exchange
August 14, 2019
California Energy Code

- 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
Current Code (2016)

- Incandescent lighting largely-eliminated
- Lighting control requirements intensify (vacancy sensors & occupancy sensors)
- Prescriptive compliance makes 2 x 6 exterior wall construction common (R-19 wall insulation required)
- Roof/ceiling insulation requirements increase (minimum R-38)
- Houses must be PV-ready (Conduit to roof from panel – room in panel for circuit(s))
- Houses must be EV charging-ready (conduits and box installed in garage with room in panel for circuit)
- Window efficiencies increase 30+% 
- Increased HVAC & Water Heating Efficiencies – 3rd Party confirmation on nearly all HVAC installations and modifications
CALIFORNIA’S 2019 RESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS

CALIFORNIA ENERGY COMMISSION

The state’s energy efficiency standards for new buildings and appliances have saved consumers billions in lower electricity and natural gas bills. The 2010 Building Energy Efficiency Standards for residential buildings includes a first-in-the-nation requirement to install solar photovoltaic systems. Other features enable homes to reduce the electricity demand from the grid, helping to reduce energy bills and the carbon footprint.

**SOLAR PHOTOVOLTAIC SYSTEM**
Promote installing solar photovoltaic systems in newly constructed residential buildings. The systems include smart inverters with optional battery storage. This will increase the self-utilization of the electricity generated to power the home’s electricity loads including plug-in appliances. California is the first state in the nation to require smart systems on homes.

**HEALTHY INDOOR AIR QUALITY**
Enable using highly efficient filters that trap hazardous particulates from both outdoor air and cooking and improve kitchen ventilation systems. Moving air around and in and out of the home while filtering out allergens and other particles makes the home healthier.

**DEMAND RESPONSE COMPLIANCE OPTIONS**
Encourage battery storage and heat pump water heaters that shift the energy use of the house from peak periods to off-peak periods. Utilities moving to time-of-use pricing insist the grid to meet the state’s climate change goals and helps homes reduce energy bills.

**BUILDING ENVELOPE**
Strengthen insulation in attics, walls and windows to improve comfort and energy savings. Keeping the heat out during the summer and warm air during the winter makes a home more resilient to climate change.
What is a Reach Code?

• 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, which are known as reach codes.

• All energy efficiency-related reach codes must be proven to be cost effective.

• All reach codes must go through a public process for approval.

• All reach codes must be re-approved with each Energy Code update (~every 3 years)
## Currently Implemented Reach Codes

<table>
<thead>
<tr>
<th>Local Ordinances</th>
<th>Date Approved</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda County</td>
<td>July 11, 2018</td>
<td>Solar PV</td>
</tr>
<tr>
<td>Arcata, City of</td>
<td>December 10, 2018</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Brisbane, City of</td>
<td>July 12, 2017</td>
<td>Cool Roof, Solar PV</td>
</tr>
<tr>
<td>Chula Vista, City of</td>
<td>July 11, 2018</td>
<td>Outdoor Lighting</td>
</tr>
<tr>
<td>Del Mar, City of</td>
<td>September 21, 2018</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Davis, City of</td>
<td>December 13, 2017</td>
<td>Efficiency, Solar PV</td>
</tr>
<tr>
<td>Fremont, City of</td>
<td>July 12, 2017</td>
<td>Solar PV Lighting</td>
</tr>
<tr>
<td>Healdsburg, City of</td>
<td>July 12, 2017</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Lancaster, City of</td>
<td>October 11, 2017</td>
<td>Solar PV</td>
</tr>
</tbody>
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<tr>
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<th>Type</th>
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<tr>
<td>Marin County</td>
<td>June 13, 2018</td>
<td>Efficiency</td>
</tr>
<tr>
<td></td>
<td>March 8, 2017</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Mill Valley</td>
<td>April 27, 2017</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Novato, City of</td>
<td>April 27, 2017</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Palo Alto, City of</td>
<td>September 14, 2016</td>
<td>Efficiency, Solar PV</td>
</tr>
<tr>
<td>Portola Valley, Town of</td>
<td>July 12, 2017</td>
<td>Efficiency</td>
</tr>
<tr>
<td>San Francisco, City of</td>
<td>November 9, 2016</td>
<td>Solar PV or Solar Thermal</td>
</tr>
<tr>
<td>San Mateo, City of</td>
<td>September 14, 2016</td>
<td>Cool Roofs, Solar</td>
</tr>
<tr>
<td>Santa Monica, City of</td>
<td>March 8, 2017</td>
<td>Efficiency</td>
</tr>
<tr>
<td></td>
<td>March 8, 2017</td>
<td>Solar PV</td>
</tr>
</tbody>
</table>
## Popular Energy Reach Code Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Anticipated per home costs beyond 2020 Requirements</th>
<th>Anticipated GHG Impacts</th>
<th>Potential Barriers</th>
<th>Timeframe</th>
<th>Applies to</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adoption of 2019 Energy Code (Business as Usual)</td>
<td>$0</td>
<td>Assuming 500 homes are built over next three years, <strong>500 MT</strong> of CO2e annually</td>
<td>None</td>
<td>2019 Code Update Would Go into Effect Jan 1, 2020</td>
<td>All Buildings</td>
<td>Reduction of ~1 megaton (MT) of CO2e annually for standard 2,000 sq ft single family home.</td>
</tr>
<tr>
<td>All Electric Favored Reach Code</td>
<td>Unknown range of costs.</td>
<td>Assuming 1/3 of homes choose all-electric option, <strong>900 MT</strong> of CO2e annually</td>
<td>Need State approval</td>
<td>Could go into effect as soon as January 1, 2020</td>
<td>New construction single family and low-rise multifamily</td>
<td>Benefits would vary based on opt in to all-electric code option.</td>
</tr>
<tr>
<td>All Electric Reach Code</td>
<td>Savings of $6,171 (or $3,361 for multifamily unit) compared to a home using natural gas¹</td>
<td>Assuming 500 homes are built over next three years, <strong>1,700 MT</strong> of CO2e annually</td>
<td>Need State approval</td>
<td>Could go into effect as soon as January 1, 2020</td>
<td>New construction single family and low-rise multifamily</td>
<td>Reduction of 3.4 megatons (MT) of CO2e annually for standard 2,000 sq ft single family home.</td>
</tr>
<tr>
<td>Natural Gas Ban</td>
<td>Savings of $6,171 (or $3,361 for multifamily unit) compared to a home using natural gas¹</td>
<td>Assuming 500 homes are built over next three years, <strong>1,700 MT</strong> of CO2e annually</td>
<td>Relies on city’s police powers</td>
<td>Could go into affect at any time</td>
<td>All buildings</td>
<td>Reduction of 3.4 megatons (MT) of CO2e annually for standard 2,000 sq ft single family home.</td>
</tr>
</tbody>
</table>

¹ 2019 Energy Efficiency Cost Effectiveness Study, California Codes and Standards
Cities Interested in 2020 Electric Reach Codes

- Santa Rosa
- Petaluma
- Cloverdale
- Sebastopol
- County of Sonoma
- Fairfax
- County of Marin
- San Mateo
- Dublin
- Berkeley
- San Luis Obispo
- Hayward
- Emeryville
- Fremont
- Piedmont
- San Leandro
- Oakland
- San Francisco
- Santa Monica
- Brisbane
- Portola Valley
- San Mateo County
- Santa Barbara
- San Jose
- Dublin
- Arcata
- Los Angeles
- And many others!
Reach Code Process

- Decide Which Reach Codes to Pursue
- Complete Cost Effectiveness Study
- Prepare Ordinance Language
- Prepare Staff Reports/Public Meeting Documentation
- First Public Meeting
- Second Public Meeting
- Obtain CEC Approval
- File with CA Building Standards Commission and Implement
Why Electric?
Yearly Per Home Emissions (MT CO2e)

2019 Code Standard Home (Nat Gas + Elect)
2019 Code Efficient Home (Nat Gas + Elect)
2019 Code Standard Home (Elect Only)
“Cool Factor”

• Research\(^1\) shows that this generally applies to devices a customer can see (lighting, smart thermostats).

• Integration with phone apps and voice devices is exciting, especially for younger demographics.

• Can be a contributing factor to kitchen electrification.

• Generally customers might connect this with reducing costs, but not carbon.\(^1\)

\(^1\) School of Though Qualitative Research Report

“[The water heater is] all controllable with a phone app, which allows the user to select all-heat pump, conventional, or hybrid operation. They’re very happy.” – SCP customer

“Shiny and new appliances are more important than the fuel behind the appliances... Aesthetic matters more than fuel type.” – Stakeholder research on electrification
“Cool Factor”

Source: City Ventures https://www.cityventures.com/living-green/

SMART, INTEGRATED & BEST OF ALL — INCLUDED.

Your new City Ventures home comes standard with smart technology from the industry’s leading brands. From windows, to thermostats, faucets and more, enjoy the peace of mind that your smart new home is working hard to save energy, save costs, promote health and provide peace of mind. Welcome home.
Cost Savings and Energy Independence

• There is a lot of confusion around gas and electricity costs.
• Customers are not great about optimizing their rates.
• Customers generally still regard gas as the less expensive fuel **UNLESS**
  • Their gas option is propane
  • They have solar

![Survey Results]

Q: Do you agree or disagree with the statement: **Gas water heaters cost less to operate than electric water heaters for water heating.**

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>13%</td>
<td>13%</td>
<td>31%</td>
<td>25%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Q: Do you agree or disagree with the statement: **Gas furnaces cost less to operate than electric heat pumps for space heating.**

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>8%</td>
<td>20%</td>
<td>28%</td>
<td>24%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Cost Savings and Energy Independence

Source: De Young https://deyoungproperties.com/smart-home/energysmart/
“Love the temperature precision, quick response, no combustion fumes, freedom from worry about starting fires by forgetting flames are on, easy clean.” – SCP customer
Healthiness/Good Indoor Air/Safety

LIVE WITH BETTER HEALTH.

BECAUSE YOUR HOME HAS FRESHER AIR, FEWER ALLERGENS AND FEWER PESTS.

We know your home holds the people that matter most. That's why we include features that allow your nearest and dearest to breathe easier.

- Health-Promoting Barrier
- Healthier Building Materials
- High-Performance Air Filtration
- Fresh Air Management

Questions?

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https://sonomacleanpower.org/