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<th><strong>Docket Number:</strong></th>
<th>21-IEPR-06</th>
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<tr>
<td><strong>Project Title:</strong></td>
<td>Building Decarbonization and Energy Efficiency</td>
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<tr>
<td><strong>TN #:</strong></td>
<td>238440</td>
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<tr>
<td><strong>Document Title:</strong></td>
<td>Presentation - Building Decarbonization Barrier Busting</td>
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<tr>
<td><strong>Description:</strong></td>
<td>Presentation by Panama Bartholomy, Executive Director, Building Decarbonization Coalition</td>
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<tr>
<td><strong>Filer:</strong></td>
<td>Raquel Kravitz</td>
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<tr>
<td><strong>Organization:</strong></td>
<td>Building Decarbonization Coalition</td>
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<td><strong>Submitter Role:</strong></td>
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<td><strong>Submission Date:</strong></td>
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<td><strong>Docketed Date:</strong></td>
<td>6/22/2021</td>
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Building Decarbonization
Barrier Busting

Panama Bartholomy
Building Decarbonization – Scale, Equipment, and Emerging Solutions Workshop
June 22, 2021
California’s GHG emissions today – Buildings 24%
Outdoor Air Quality:
Burning Fossil Fuels in Buildings is a Big Part of California’s Ozone/PM2.5 Problem

Nitrogen Oxides (NO₅) in California, 2020 forecast

Source: CARB’s Standard Emission Tool Emissions Projections, 2020 forecasted data
"..electric appliances have similar or lower costs than natural gas appliances.." Pg. IV
Heat pumps save energy costs in all modeled retrofit homes

Consumer Bill Impacts of Building Electrification

Figure 3-17  Average consumer bill impacts of electrifying multiple end uses, using base case assumptions

Source: E3
The Case for Building Electrification

There is a growing consensus that building electrification is the most viable and predictable path to zero-emission buildings. This consensus is due to the availability of off-the-shelf, highly efficient electric technologies (such as heat pumps) and the continued reduction of emission intensities in the electricity sector.
California prepares to shift away from natural gas, while keeping power reliable and affordable

By Liane Randolph, Special to CalMatters
Figure 3.

Home Heating Fuel by Decade Home Was Built

- Pre-1920
- 1920-29
- 1930-39
- 1940-49
- 1950-59
- 1960-69
- 1970-79
- 1980-89
- 1990-99
- 2000-09
- 2010-17

Legend:
- Electricity
- Natural gas
- LP gas
- Fuel oil
- Other fuels
- No heating equipment

American Housing Survey Report 2019
Figure 5. 
**Water Heating Fuel by Decade Home Was Built**

![Chart showing water heating fuel by decade home was built.](chart-image)

**Legend:**
- Electricity
- Natural gas
- LP gas
- Fuel oil
- Other fuels
- No hot water

**Decades:**
- Pre-1920
- 1920-29
- 1930-39
- 1940-49
- 1950-59
- 1960-69
- 1970-79
- 1980-89
- 1990-99
- 2000-09
- 2010-17

**Percent**

---

*American Housing Survey Report 2019*
NATURAL GAS USE IN HOMES (% SITE ENERGY)

- Clothes Drying: 51%
- Cooking: 75%
- Water Heating: 95%
- Heating: 96%
Space Heating

Increase the share of high efficiency heat pumps for space heating from 5% of sales in 2018, to 50% in 2025 and 100% in 2030.
September 18th, 2018: Kick-off!
Roadmap

• Meetings
  • September 2018
  • November 2018
  • January 2019
• Finished January 2019
Roadmap

- Meetings
  - September 2018
  - November 2018
  - January 2019
- Finished January 2019

<table>
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<tr>
<th>Figure 1: Decarbonization Targets Within the Building Sector</th>
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<tbody>
<tr>
<td>Residential</td>
</tr>
<tr>
<td>Retrofits</td>
</tr>
</tbody>
</table>

- Increase the share of high efficiency heat pumps for space heating from 5% of sales in 2018, to 50% in 2025 and 100% in 2030.
- Increase the share of high efficiency heat pumps for water heating from 1% of sales in 2018, to 50% in 2025 and 100% in 2030.
Phasing

PHASE 1

Market Readiness: Today demand for and supply of building decarbonization measures is minimal. To ready the market, reverse these conditions through ambitious targets, policy alignment, coordinated marketing, retail price reductions, clear signals to suppliers and coalition building.
Phasing

PHASE 1

Market Readiness: Today demand for and supply of building decarbonization measures is minimal. To ready the market, reverse these conditions through ambitious targets, policy alignment, coordinated marketing, retail price reductions, clear signals to suppliers and coalition building.

PHASE 2

Market Deployment: Once readied, deployment of building decarbonization measures can be accelerated through support of the full-supply chain via mid- and upstream incentives to manufacturers and builders and financing solutions ready to reach all customers, including underserved communities.
Phasing

PHASE 1

Market Readiness: Today demand for and supply of building decarbonization measures is minimal. To ready the market, reverse these conditions through ambitious targets, policy alignment, coordinated marketing, retail price reductions, clear signals to suppliers and coalition building.

PHASE 2

Market Deployment: Once readied, deployment of building decarbonization measures can be accelerated through support of the full-supply chain via mid- and upstream incentives to manufacturers and builders and financing solutions ready to reach all customers, including underserved communities.

PHASE 3

Scaling the Market: Leverage the success of Phases 1 and 2 to reach scale through downstream incentives, grid integration, and targeted solutions for hard to reach customers.
Barriers to Electrification

- Low Awareness and Interest
- Low Perceived Customer Value
- Low Perceived Contractor and Builder Value
- Low Availability
- Misaligned Policy
Roadmap Goals

Goal 1: Build customer, builder, contractor and policy-maker awareness and interest in decarbonization.

Goal 2: Ensure that customers receive a good value from adopting building decarbonization measures.

Goal 3: Ensure that building decarbonization provides a better value to builders and contractors than fossil-fuel heating.

Goal 4: Prepare supply-chains and delivery agents to meet rising demand for emission-free building technologies with a quality product.

Goal 5: Align Policy to meet other goals.
How We Decarbonize Buildings
How We Decarbonize Buildings

Stop The Expansion of the Gas Network
How We Decarbonize Buildings

Stop The Expansion of the Gas Network

Set a Date for Phase-out of Fossil Fuel Appliance Sales
How We Decarbonize Buildings

- Stop The Expansion of the Gas Network
- Building Decarbonization Market Development
- Set a Date for Phase-out of Fossil Fuel Appliance Sales
How We Decarbonize Buildings

Stop The Expansion of the Gas Network

Building Decarbonization Market Development

Set a Date for Phase-out of Fossil Fuel Appliance Sales
Rising Gas Costs Lead to Downward Spiral of Gas System

Aging gas infrastructure and rising gas commodity costs

Higher gas rates

Economic building electrification

Gas demand falls

Fixed costs allocated to fewer customers

Lower cost renewables, increasing electric demand, and better heat pumps

Climate policies
The right technologies are available, but the political environment creates unfavorable market conditions.

- Local policies are fracturing the market
- Gas is still heavily subsidized
- State decarbonization policy is not coordinated across departments
<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Barrier</th>
<th>Solution</th>
<th>GHG Mitigation Potential</th>
<th>Economic Impact</th>
<th>Distributional Equity</th>
<th>Political Barriers to Adoption</th>
<th>Legal Barriers to Adoption</th>
<th>Implementation Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establish targets for state agencies to achieve deep GHG reductions in homes and buildings across California</td>
<td>CEC and CPUC are not prioritizing emerging decarbonization strategies enough because they do not have sufficient GHG targets.</td>
<td>CEC, CPUC, and CARB should be responsible for achieving specific GHG mitigation goals in buildings that are aligned with the state's broader climate goals.</td>
<td>Very high</td>
<td>Net benefits</td>
<td>Uniform</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>2. Establish rates that encourage beneficial electrification</td>
<td>Existing rates structures do not do enough to encourage electrification</td>
<td>CPUC can require utilities to offer electrification-encouraging rates to customers.</td>
<td>High</td>
<td>Net benefits</td>
<td>Uniform</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>3. Increase investment in equitable electrification programs to benefit underserved communities</td>
<td>Low-income Californians have the highest energy burden and are at-risk for higher costs if left behind from electrification.</td>
<td>CPUC should modify existing low-income energy assistance programs and launch new low-income programs to encourage beneficial electrification.</td>
<td>Low</td>
<td>TBD*</td>
<td>Progressive</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
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<tr>
<td>4. Update the state building code to require all-electric new construction</td>
<td>Continuing to connect new buildings to gas makes it much harder and costlier to convert them to electricity later.</td>
<td>CEC should adopt requirements for all-electric new construction for both residential and commercial buildings.</td>
<td>Medium</td>
<td>Net benefits</td>
<td>Uniform</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
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<tr>
<td>5. Eliminate subsidies for new fossil fuel infrastructure</td>
<td>Current gas line extension policy encourages the expansion of natural gas infrastructure in new construction, through line extension allowances, skewing the market towards gas.</td>
<td>CEC should eliminate any subsidization from existing rate-base towards new gas customers (line extensions).</td>
<td>Medium</td>
<td>Net benefits</td>
<td>Uniform</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>6. Include the social cost of air pollution in state agency analyses</td>
<td>CEC and CPUC’s cost-effectiveness tests do not adequately account for the social cost of pollution.</td>
<td>CEC and CPUC should consistently account for the social cost of both climate pollution and local air pollution.</td>
<td>High</td>
<td>Net benefits</td>
<td>TBD*</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>7. Direct state agencies to purchase high-efficiency, electric appliances</td>
<td>State buildings do not have guidance or technical support to pursue electric-only appliance procurement.</td>
<td>The Governor should direct DGS, CEC, and CARB to develop action plans and a process to facilitate electric-only procurement.</td>
<td>Low</td>
<td>Net benefits</td>
<td>Uniform</td>
<td>Low</td>
<td>Very low</td>
<td>Medium</td>
</tr>
<tr>
<td>8. Establish pollution limits for appliances</td>
<td>CARB has identified untended and malfunctioning gas appliances as a major source of indoor air pollutants. Additionally, DOE blocks CEC from setting energy efficiency appliance standards for gas appliances.</td>
<td>CARB should set statewide limits for local air pollution emitted by gas appliances.</td>
<td>High</td>
<td>Net benefits</td>
<td>Uniform</td>
<td>High</td>
<td>High</td>
<td>High</td>
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<tr>
<td>9. Develop a plan for phasing out utility gas infrastructure</td>
<td>Long-range gas infrastructure planning and investment are not aligned with state climate neutrality goals.</td>
<td>CPUC should direct utilities to conduct comprehensive long-range planning to facilitate equitable decommissioning of much of the state’s gas infrastructure.</td>
<td>High</td>
<td>TBD*</td>
<td>TBD*</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
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<tr>
<td>10. Stop state support for fossil fuel infrastructure expansion</td>
<td>California’s new construction financing programs and policies are not aligned with the state’s climate neutrality goals.</td>
<td>The Governor can require State-funded financing for new construction to phase in all-electric requirements.</td>
<td>Low</td>
<td>Net benefits</td>
<td>Uniform</td>
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<tr>
<td>Establish targets for state</td>
<td>Very high</td>
<td>Net benefits</td>
<td>Uniform</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
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<tr>
<td>CEQ and CPUC should be responsible</td>
<td>High</td>
<td>Net benefits</td>
<td>Uniform</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td></td>
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<td>Low</td>
<td>TBD*</td>
<td>Progressive</td>
<td>Low</td>
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<td>Low</td>
<td>Low</td>
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<td>The Governor can require State-funded financing for new construction to phase in all-electric requirements.</td>
<td></td>
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<td></td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
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</table>
Top Ten

1. Establish targets for state agencies to achieve deep GHG reductions in homes and buildings across California
2. Establish utility rate structures that encourage beneficial electrification
3. Increase investment in equitable electrification programs to benefit underserved communities
4. Update the state building code to require all-electric new construction
5. Eliminate subsidies for new fossil fuel infrastructure
6. Include the social cost of air pollution in state agency analyses
7. Direct state agencies to purchase high-efficiency, electric appliances
8. Set Phase-out date for fossil fuel appliances
9. Develop a plan for phasing out utility gas infrastructure
10. End state support for fossil fuel infrastructure expansion
Establish targets for state agencies to achieve deep GHG reductions in homes and buildings across California
Promote utility rate designs that encourage beneficial electrification
Increase investment in equitable electrification programs to benefit underserved communities
Update the state building code to require all-electric new construction
Eliminate subsidies for new fossil fuel infrastructure
Include the social cost of air pollution in state agency analyses
Direct state agencies to purchase high-efficiency, electric appliances
Set a phase-out date for fossil fuel appliances
Develop a plan for phasing out utility gas infrastructure
Stop state support for fossil fuel infrastructure expansion
Carbon Neutral Buildings Roadmap

Achieving a carbon neutral building stock in New York State by 2050

Public Webinars – Day 1
June 15, 2021

NEW YORK STATE OF OPPORTUNITY.

NYSERDA
**Advanced Codes for new construction built to a resilient and highly efficient, zero emission standard**

- **ASAP:** Adopt highly efficient State Energy Code for all new construction in next code cycle
  - Scale up building decarbonization requirements in affordable housing and state supported economic development projects

- **2023:** State building code requires solar PV, electrification-readiness, grid-interactive capability, battery readiness, and electric vehicle readiness

- **2025:** Adopt all-electric (and highly efficient) State code for homes and low-rise residential

- **2030:** Adopt all-electric (and highly efficient) State code for multifamily and commercial
Prohibit replacement of fossil-fuel heating and hot water equipment; phased out at the end-of-useful life

- **2030**: Zero emission standards prohibiting gas/oil replacements of heating, cooling and domestic hot water equipment in homes

- **2035**: Zero emission standards prohibiting gas/oil replacements of heating, cooling and domestic hot water equipment in multifamily and commercial buildings

  Zero emission standards prohibiting replacement of gas cooking and dryers in residential buildings
Regulations with dates certain send clear market signals

- Statewide Stretch Energy Code
- Codes for PV and electric readiness
- Benchmarking

- All-electric code for low-rise residential
- Point-of-sale energy disclosures
- Energy audits, lighting upgrades, submetering

- All-electric code for commercial/multifamily
- Prohibit gas replacement heat/hotwater in homes
- Building Performance Standard for large properties

- Prohibit replacement of fossil heat/hot water appliances in commercial and multifamily
- Prohibit gas replacement cooking/laundry in residential

Ch 10: Options for Decarbonization
In Summary

• Building electrification is the only way we meet our clean air and clean energy goals
• The technology is available, is cheaper to build and can save consumers money on their bills
• The State must send a clear signal about timelines and targets so market can respond
  • Must address low-income household costs as a priority