Moving to 100% clean energy: the role of local governments in electrifying buildings

Local Government Commission
Yosemite Policymaker’s Conference
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Today’s presentation

1) Basics – what’s building electrification?

2) Why building electrification is critical to a stable climate, clean air, clean energy

3) Challenges and strategies to move the buildings sector from gas to 100% clean energy

4) How local governments can lead the way
MyGeneration Campaign

- Equitable transition to 100% clean energy in CA
- Fully electrified economy (transportation + buildings)
What’s building electrification?

Household Gas Consumption in CA and clean electric alternatives

- Water heater: 49%
- Space heating: 37%
- Stove: 7%
- Pools, spas, misc.: 4%
- Clothes dryer: 3%

Source: CA Residential Appliance Saturation Study 2010
What’s a heat pump?

How Does it Work?

By **transferring heat** rather than creating it, heat pumps deliver hot water **3-4 times more efficiently** than conventional water heaters.

1. The heat pump pulls warmth from the air, even if the air is cool.
2. Warm air is compressed, increasing its temperature.
3. Heat flows through condenser coils that transfer heat to the water.
3 take-aways from today

1. Building-related emissions are ~2\textsuperscript{nd} largest source of GHGs in California (and most cities here today!) – roughly 25% of California’s GHGs are from buildings.

2. Gas appliances in buildings contribute to outdoor + indoor air pollution, and exacerbate fire hazards.

3. We need local governments to play leading role in decarbonizing CA’s 13 million homes and buildings.

Sources: CARB- includes emissions from electricity use and fugitive methane emissions; Jones C., Kammen D., Bay Area Consumption-Based GHG Emissions Inventory, Jan. 2016
Gas responsible for \( \frac{1}{2} \) of CO2 in homes

Many policies to cut GHGs from electricity, including RPS, EE, ZNE

Need policy action to achieve GHG goals

Natural Gas Consumption in CA’s Buildings

- Residential Natural Gas Consumption
- Commercial Natural Gas Use
- Total Building Natural Gas Use

X Target to align w/ GHG Goals

Source: EIA Gas Consumption [https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm]
Electrification – clean air strategy

Outdoor + indoor air pollution from gas appliances:

- Gas appliances in buildings responsible for 1/4 of NOx from gas in CA
- Criteria pollutants from incomplete combustion byproducts (CO, formaldehydes, SO2, NO2, particulates) – especially from gas stoves

Sources: Map from ALA State of the Air Report (2017); NOx data from CARB 2015
Benefits of electrification

Slashes GHGs, path to Zero Emissions Buildings

Air quality, health, safety, resiliency

Extend reach of renewables

Save energy and lower bills*

New jobs to retrofit buildings, install heat pumps

Polluters out of politics

* Depends on electricity tariffs and local conditions
Hurdles to building electrification

- Public awareness & interest
- Technology
- Costs
- Gas industry opposition
- Policy bias in favor of gas

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Cities, counties leading the way

- **Los Angeles** - plans to set electrification targets in line w/ GHG goals (60% x 2035)
- **Palo Alto/CPAU** - $1500 HPWH rebates, streamline permitting, education/outreach, green building code
- **Marin/MCE** - low-income multifamily electrification pilot, contractor training, rebates
- **Sonoma/SCP** - support all-electric ZNE rebuild after fires, rebates, consumer education, outreach to contractors
- **Sacramento/SMUD** - $1500 HPWH rebates
- **San Francisco + Oakland** - methane leakage research
- **New York City, NY** - binding fossil fuel caps x 2035, financing, tech support
- **Boulder, CO** - Roadmap to Renewable Living, fuel-switch target mapping, consumer education
- **Vancouver** - zero emission (new) buildings x 2030
- **Amsterdam** - gas free homes/buildings x 2050, no new gas
Opportunities for local govt leadership

Lead Locally

- Set binding building electrification targets
- Build interest among public
- Educate and train contractors
- Local reach codes
- “Time of sale” requirements
- Bulk buy programs
- Incentive and rebate programs

Leverage Political Influence

- Sign onto support letters (bills, proceedings)
- Participate and comment in public proceedings at CEC, CPUC, CARB, Air Districts
We’d love to work with you

Thank you!

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My son’s favorite book:
“All-Electric America”
Extra slides
Water heater CO2 emissions

As CA grid gets cleaner, HPWH offer pathway to near zero-GHG hot water

1) Not including fugitive methane emissions, which may roughly double GHG emissions from gas
2) With 45%-efficient combined cycle gas plant as long-run marginal resource

Source: NRDC