

MEMORANDUM

TO: Viri Nguyen-Santoyo, City of San Jose

FROM: Bryce Seymour, Project Manager, New Buildings Institute (NBI)

DATE: October 7, 2022

SUBJECT: Final Memo: Analysis of Barriers and Solutions and Peer City Examples for “Replace-at-Burnout Ordinance”

---

The City of San Jose has retained New Buildings Institute (NBI) to provide research and analysis support for ongoing efforts to analyze a “Replace-at-Burnout Ordinance”. This memo summarizes NBI’s qualitative research approach and findings.

To undertake this work, NBI first researched other cities and the initiatives and programs they have in place to promote the electrification of space heating, water heating, and other end uses of fossil fuels. At the direction of San Jose, NBI limited its research to cities within California. Many cities have programs and initiatives to assist residents with the transition to all-electric buildings. In California, 60 municipalities (cities and counties) have adopted building codes to reduce their reliance on natural gas.<sup>1</sup> NBI summarized the programs and policies from peer cities that are most directly applicable to the City’s Replacement-at-Burnout program goals.

Next, NBI researched the key barriers associated with this type of policy and summarized key considerations for single-family residential, multifamily residential, and commercial building types. Since mobile homes were of specific interest to the City NBI looked into the technical feasibility of decarbonization within mobile homes. The Project Team then identified potential solutions to overcome the barriers for all building types that the City can implement. This memo summarizes findings, and provides recommendations and guidance for the City of San Jose to successfully and equitably implement decarbonization strategies.

## Peer Cities

### City of Berkeley

In April 2021, the City of Berkeley, in collaboration with Rocky Mountain Institute (RMI), released a plan for existing building decarbonization (“The Plan”).<sup>2</sup> The Plan’s recommendations revolve around four points of intervention:

- Time of Replacement and Renovation

---

<sup>1</sup> <https://www.sierraclub.org/articles/2021/07/californias-cities-lead-way-pollution-free-homes-and-buildings>

<sup>2</sup> <https://berkeleyca.gov/sites/default/files/2022-01/Berkeley-Existing-Buildings-Electrification-Strategy.pdf>

- Time of Sale
- Building Performance Standards
- Neighborhood Electrification and Natural Gas Pruning

These intervention points are tied to “three pillars” that must be built up for implementation: education, accessible funding and financing, and regulatory changes. In addition, the policies must meet or exceed the “equity guardrails” defined by the Greenlining Institute’s Equitable Building Electrification Framework.<sup>3</sup>

The Plan identifies specific phasing for the Time of Replacement and Renovation intervention, which initially prioritizes education and workforce development efforts before prohibiting gas equipment. Based on their findings, Phase 1 of the policy strives for community engagement and education, development of incentive programs for electrification, collaboration with labor and workforce organizations to advance inclusive high road jobs, enhancement of tenant protections for communities at risk of displacement, and electrification of buildings owned and operated by the City of Berkeley. Phase 2 moves to expand the policy to require the installation of electric appliances and equipment at the time of replacement and renovation. After several years of education and employment of Phase 1 and Phase 2 actions, the City of Berkeley plans to further this policy by prohibiting the installation of gas equipment in buildings as part of Phase 3.

**Key Takeaways:** *Consider a phased approach to requiring electrification at equipment burnout, beginning with education and workforce development before mandating electrification. Ensure that contractor and consumer education and equitable financing are in place before instituting regulatory changes.*

### City of Palo Alto

The City of Palo Alto has begun updating their green building regulations and energy reach code with a target effective date of January 1, 2023. One of the proposed new code requirements is requiring the installation of heat pump water heaters when water heaters are replaced as part of a residential addition and/or alteration project.<sup>4</sup> This would not apply to burnout/standalone water heater replacements that are not part of an addition or alteration project. Palo Alto is currently engaging the community and stakeholders for input on the proposed regulations.

The City has also prioritized residential electrification and offers streamlined tools for residents to electrify their spaces. These include:

- Installing solar and managing the extra electricity through battery power

---

<sup>3</sup> [https://greenlining.org/wp-content/uploads/2019/10/Greenlining\\_EquitableElectrification\\_Report\\_2019\\_WEB.pdf](https://greenlining.org/wp-content/uploads/2019/10/Greenlining_EquitableElectrification_Report_2019_WEB.pdf)

<sup>4</sup> [https://www.cityofpaloalto.org/files/assets/public/sustainability/green-buildings/cpa\\_green-building-code-updates-july-2022.pdf](https://www.cityofpaloalto.org/files/assets/public/sustainability/green-buildings/cpa_green-building-code-updates-july-2022.pdf)

- Installing an electric vehicle charging
- Replacing a gas water heater with a heat pump water heater
- Replacing gas heating and cooling units with an air source heat pump

Palo Alto also offers the Home Efficiency Genie.<sup>5</sup> The Genie provides free over-the-phone energy and water efficiency advice for all Palo Alto residents. Additionally, more in-depth efficiency assessments can be completed virtually or in person for a fee. There is an assessment designed specifically for home electrification readiness and includes:

- An evaluation of the electric panel
- Examination of existing appliances and equipment
- Home Electrification Readiness Report

**Key Takeaways:** Consider providing free technical support for residents, which provides guidance on energy and water efficiency considerations and connection to vetted vendors.

### City of Piedmont

The City of Piedmont passed existing building reach codes in February 2021. The City Council adopted a Home Energy Assessment Policy in tandem with the reach code. The Home Energy Assessment Policy requires each person who sells a home in Piedmont to provide a Home Energy Score or a Home Energy Audit prepared in the past five years to prospective buyers and the city, in addition to all other disclosure documents.<sup>6</sup> The Home Energy Score or Home Energy Audit is not required if the home was constructed in the past ten years. The policy is intended to provide important information regarding the energy use and the costs associated with the energy use of the home(s) offered for sale.

Based on public outreach, the main barriers brought up associated with the existing building reach codes are:<sup>7</sup>

- Potential vulnerability of all-electric end uses during power outages
- Considerations for existing improvements underway
- Upfront cost
- Market confusion with new code
- Perception of government overreach
- Perception that policy restricts consumer choice

---

<sup>5</sup> <https://www.cityofpaloalto.org/Departments/Utilities/Residential/Home-Efficiency-Genie>

<sup>6</sup> <https://piedmont.ca.gov/common/pages/DisplayFile.aspx?itemId=17426430>

<sup>7</sup> <https://piedmont.ca.gov/common/pages/DisplayFile.aspx?itemId=17376920>

**Key Takeaways:** Consider requiring energy audits and energy performance disclosure at time of sale in order to provide key information to the market, and to highlight recently replaced equipment for prospective buyers.

### City of Alameda

Like the City of Berkeley, the City of Alameda released a report to provide insights into the character of the existing residential building stock in the City, analyze decarbonization strategies, and provide recommendations for the most cost-efficient and expedient decarbonization strategies.<sup>8</sup> One of the recommended points of intervention was at the time of equipment burnout. For this point of intervention, it was first recommended to increase education and outreach to the residents and contractors around electrical appliances. Similar to Berkeley, Alameda approached the policy with a phased plan, and burnout policy requirements would not be mandated until Phase 3 under the plan.

The report also recommended these four financing mechanisms:

- Split Utility User Tax: higher tax on natural gas vs. electrical power
- Inclusive Financing: allows for low-income families to electrify
- Refundable Electrification Transfer Tax: refunded if electrification/weatherization happens in the first year of sale
- Rebates: increase the number of rebates and available rebate options

**Key Takeaways:** Consider a phased approach requiring electrification. Consider innovative financing mechanisms to ensure that the tools are in place to offset any additional upfront cost to consumers

### City of Half Moon Bay

In 2021, the City of Half Moon Bay was developing an electrification ordinance that included a section requiring residential and commercial buildings to replace an existing gas appliance with an electric alternative when it stopped working.<sup>9</sup> The ordinance also was going to prohibit owners of existing residential buildings from adding gas lines. The Half Moon Bay City Council eliminated this section due to feedback and concerns around cost and equity.

**Key Takeaways:** Review feedback and concerns provided to Half Moon Bay City Council to ensure that cost and equity concerns are addressed in the City of San Jose's policy implementation.

---

<sup>8</sup> [https://www.alamedaca.gov/files/sharedassets/public/public-works/climate-action-page/electrifying-existing-residential-buildings-in-alameda\\_final.pdf](https://www.alamedaca.gov/files/sharedassets/public/public-works/climate-action-page/electrifying-existing-residential-buildings-in-alameda_final.pdf)

<sup>9</sup> <https://legistarweb-production.s3.amazonaws.com/uploads/attachment/pdf/1141350/ORDINANCE.pdf>

## Barriers & Solutions

NBI identified six key barriers associated with a Replacement-at-Burnout policy:

- **Economic Barriers:** Upfront costs competitiveness challenges, especially when comparing current electric rates and electric technology to current natural gas rates and natural gas technology
- **Awareness Barriers:** Low and limited customer and industry awareness inhibit widespread adoption.
- **Supply Chain Barriers:** The increase in electrification will require substantial growth within the existing workforce and expansion of equipment availability
- **Permitting Barriers:** Complexity and delays around permitting can deter adoption.
- **Decision-Making Barriers:** Building and homeowner priorities tend to inhibit adoption even when they are aware of the technology and understand the potential benefits
- **Location and Design Barriers:** Space constraints and upgrades needed to successfully allow for electrification

These barriers and potential solutions are described in more detail in the sections below. When considering these factors, note that the vast majority of installations, close to 80 percent, occur during “Normal Replacement” scenarios, meaning when the customer’s water heater has failed and they need a replacement as soon as possible.<sup>10</sup>

### Economic Barriers

Upfront cost is one of the main barriers to electrification. With electric appliances, there are disproportionately higher upfront costs. While appliances like heat pump HVAC and hot water heaters offer long-term savings and benefits like healthier air and built-in AC, upfront costs will be a significant hurdle for marginalized communities. In addition, there is often a slow accrual of operating cost savings due to low fossil fuel prices and/or high electricity prices. These factors can result in an inadequate return on investment if the investment window is short, which disincentivizes the replacement of conventional systems with electrification technologies. Additionally, electrification sometimes triggers additional supplemental/unforeseen costs (for example panel upgrades). Specific economic barriers for each building type are identified in Table 1, below.

**Table 1: Economic Barriers by Building Type**

Single family-specific economic barriers	<ul style="list-style-type: none"> <li>• Higher upfront costs</li> </ul>
Multifamily-specific economic barriers	<ul style="list-style-type: none"> <li>• Higher upfront costs for building owner</li> <li>• Benefits of electrification are typically seen by the tenant who pays utility not the owner of the building.</li> </ul>

<sup>10</sup> [https://www.bayren.org/sites/default/files/2022-02/hpwh\\_learnings\\_may\\_2021\\_bayren\\_1.pdf](https://www.bayren.org/sites/default/files/2022-02/hpwh_learnings_may_2021_bayren_1.pdf)

	<ul style="list-style-type: none"> <li>• Facility staff not properly trained with type of equipment and requires additional training and/or outside consultant to manage.</li> </ul>
Commercial-specific economic barriers	<ul style="list-style-type: none"> <li>• Higher upfront costs for developer/building owner.</li> <li>• Facility staff not properly trained with type of equipment and requires additional training and/or outside consultant.</li> <li>• Other upgrades are usually associated with system upgrades.</li> <li>• Building not properly designed for retrofit</li> </ul>

*Potential Solutions:*

1. Develop programs and incentives for purchasing heat pump water heaters and HVAC units with partners such as Pacific Gas and Electric (PG&E).
  - a. Where possible, have these directly tied into the permit. When an appliance like a hot water heater breaks, there is rarely time to conduct extensive research on the programs available. This action would tie these resources directly to the permit for the appliance. When a permit is pulled for a heat pump water heater, the incentive would be given directly to the installer.
    - i. Example Program: City of Palo Alto has a page on their website specifically for Heat Pump Water Heaters. Before you apply for a permit, it allows you to search rebates available and provides list of contractors that have already installed HPWHs in homes or businesses.<sup>11</sup>
2. The Inflation Reduction Act of 2022 offers financial incentives in the form of consumer rebates and tax credits to help alleviate costs.<sup>12</sup> It will be important for city staff to track these, and key sections are included below.
  - a. Bill Section 50122: state energy offices to develop and implement high-efficiency electric home rebate program. Specifically, calls out caps on appliance upgrades:
    - i. Not more than \$1,750 for HPWH
    - ii. Not more than \$8,000 for HP space heating/cooling
    - iii. Not more than \$840 for electric stove/cooktop/rang/oven
    - iv. Not more than \$840 for electric HP clothes dryer
    - v. Not more than \$4,000 for electric load service center upgrade
    - vi. Not more than \$2,500 for electric wiring
    - vii. Maximum rebate for entity is \$14,000
  - b. Bill Section 13303: tax credit for certain types of retrofits to commercial buildings.

<sup>11</sup> <https://www.cityofpaloalto.org/Departments/Utilities/Residential/Ways-to-Save/Heat-Pump-Water-Heaters>

<sup>12</sup> <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>

3. Provide financing mechanisms such as home improvement loans.
  - a. Example Program: Sustainable Home Improvement Loans: Sacramento Municipal Utility District (SMUD) collaborated with Five Star Bank and LoanGlide to offer these loans to help residential customers finance energy efficiency upgrades. Part of this includes converting from gas-to electric appliances and equipment.<sup>13</sup>
4. Partner with contractors and provide workforce development and trainings
  - a. Connecting homeowners with a vetted vendor list and connecting customers directly to contractors.
    - i. Example Program: NYC Accelerator provides resources, training, and one-on-one expert guidance to help building owners and industry professionals improve energy efficiency and reduce carbon emissions from buildings in NYC.<sup>14</sup>
    - ii. Example Program: Retrofit Accelerator Platform: Through the Los Angeles Better Buildings Challenge (LABBC) funded by the Department of Energy (DOE), the retrofit accelerator platform is a transparent project development model designed to deliver turnkey, “investment-grade” projects that meet financial and energy performance goals while shortening the procurement process and reducing performance risk.<sup>15</sup>
  - b. Providing workforce development and trainings to contractors to increase number of trained contractors and potentially lower labor costs for installations. Currently, many contractors charge a premium for installation. This will help ensure that trained workers are available to capitalize on efficiency investments.
    - i. Example Program: Steven Winter Associates, Inc. (SWA) has example training sessions for contractors from their Building Electrification Training Series.<sup>16</sup>

### **Awareness Barriers**

There is often a lack of knowledge around the options a consumer has related to new electric appliances. Oftentimes, when burnout of appliances occurs, homeowners pursue a like-for-like option because it is seen as the easiest and lowest-cost option and consumers are hesitant to trust a technology they are unfamiliar with. For larger buildings, there is also a disconnect between the familiarity of architects and developers with this technology. Specific awareness barriers for each building type are identified in Table 2, below.

---

<sup>13</sup> <https://www.smud.org/en/Rebates-and-Savings-Tips/Energy-Upgrade-Project-Financing>

<sup>14</sup> <https://accelerator.nyc/>

<sup>15</sup> <https://www.la-bbc.com/retrofit-accelerator>

<sup>16</sup> <https://www.swinter.com/electrification-training/>

**Table 2: Awareness Barriers by Building Type**

Single family-specific awareness barriers	<ul style="list-style-type: none"> <li>• Homeowner unaware of efficiency options</li> <li>• Homeowner unaware of lifespan of the equipment</li> <li>• Homeowner’s contractor not knowledgeable with type of technology or equipment</li> </ul>
Multifamily-specific awareness barriers	<ul style="list-style-type: none"> <li>• Building owner unaware of efficiency options.</li> <li>• Building owner unaware of the lifespan of the equipment.</li> <li>• Maintenance or facility staff not trained or knowledgeable of equipment or technology.</li> </ul>
Commercial-specific awareness barriers	<ul style="list-style-type: none"> <li>• Building owner/maintenance or facility staff unaware of efficiency options.</li> <li>• Building owner/maintenance or facility staff not trained or knowledgeable of equipment or technology.</li> </ul>

*Potential Solutions:*

1. Provide education for consumers around the cost, health, and resiliency benefits of electrifying appliances.
  - a. Example Program: PG&E offers electrification webinars and classes.<sup>17</sup>
2. Provide education about manufacturers and suppliers to contractors. Many manufacturers and distributors offer trainings and are willing to host trainings. The City could schedule a training session with a local manufacturer or distributor.

**Supply Chain Barriers**

The increase in electrification projects will require more training of the existing workforce and substantial growth in the number of contractors installing this type of equipment. Contractors may lack sufficient training to properly install systems and may not recommend the technology to customers. Additionally, equipment stock and turnaround time tends to be longer for this type of equipment compared to others. Table 3 includes supply chain barriers for all building types.

**Table 3: Supply Chain Barriers for All Building Types**

All building type supply chain barriers	<ul style="list-style-type: none"> <li>• Limited number of contractors with sufficient training to properly install systems.</li> <li>• Equipment stock and supply chain may be insufficient to support large-scale electrification</li> </ul>
---	--

<sup>17</sup> <https://pge.docebosaa.com/learn/public/catalog/view/26>



*Potential Solutions:*

1. Encourage marketing and education initiatives to raise consumer demand for building electrification technologies while concentrating on establishing local and regional supply chains and providing workers with the necessary training for high-quality installations.
  - a. Example Program: Denver worked closely with Xcel Energy to co-deliver training to its 1,200 trade contractors. Trainings covered topics ranging from completing health and safety repairs to increasing sales and obtaining Performance Institute certificates.<sup>18</sup>

**Permitting Barriers**

Complexity and delays around permitting can deter adoption, which is a barrier for all building types.

*Potential Solutions:*

1. Simplify the permitting process
  - a. Explore streamlining and simplifying the permitting process. For example, provide 3-in-1 permits for HPWH. This could enhance the permitting compliance rate and incentivize more electrification projects. By only requiring one permit, the requirements for installing the equipment would be reduced. This would also translate to less expensive and faster installs.
    - i. Example Program: County of Santa Clara has a 3-in-1 model in order to make the process more uniform around the county and create a universal simple format for permitting projects in general.<sup>19</sup>
    - ii. Example Program: San Carlos has a combination permit that is made for water heaters and electrical panel projects. This creates a separate permit process specifically for water heaters but allows for less nuance with general electrification projects in single-family homes.<sup>20</sup>
  - b. Develop an internal role within the City to coordinate and handle all things electrification.
  - c. Seek out training and resources and support training of staff to keep up to date on electrification technologies.
  - d. Provide trainings and workshops for contractors and homeowners to understand the permitting and inspection process for electrification projects.

---

<sup>18</sup> [https://www.aceee.org/sites/default/files/pdfs/cities\\_workforce\\_development\\_v2\\_0\\_2.pdf](https://www.aceee.org/sites/default/files/pdfs/cities_workforce_development_v2_0_2.pdf)

<sup>19</sup> <https://plandev.sccgov.org/about-us>

<sup>20</sup> <https://www.cityofsancarlos.org/residents/permits>

2. Provide pre-application resources. Develop a local jurisdiction-specific submission requirement checklist and prioritize permit applications that meet all agency’s checklist.
  - a. Example: City of Elk Grove Submission Checklist for Electric Heat Pump Water Heaters<sup>21</sup>
  - b. Example: City of Palo Alto Submittal Guidelines: Electric Heat Pump Water Heater<sup>22</sup>

### Decision-Making Barriers

Building and homeowner priorities tend to inhibit adoption even when they are aware of the technology and understand the potential benefits. Requiring a replace-at-burnout policy has an impact on homeowners when selling or buying a home due to the transition in ownership and costs associated with a near-term potential replacement. For rental units, property owners may not have an incentive to make energy efficiency improvements in the rental unit if the tenant is the one paying the utility bill. Or they may be reluctant to make energy improvements the tenants won’t see. Tenants may not be interested in investing because they might move before seeing a return on their investment. Table 4 below lists the decision-making barriers by building type.

**Table 4: Decision-Making Barriers by Building Type**

Single-family-specific decision-making barriers	Point of sale complexity
Multifamily-specific decision-making barriers	Building or property owners may not have incentive to make energy efficiency improvements due to split incentives
Commercial-specific decision-making barriers	Building or property owners may not have incentive to make energy efficiency improvements due to split incentives

*Potential solutions:*

1. Require that a home energy audit be prepared to buyer and city during sale.
  - a. Example Program: City of Piedmont Energy Assessment Policy<sup>23</sup>
2. Engage tenants and offer incentives to property owners.
  - a. Example Program: PG&E – Multifamily Residential Energy Savings Rebate Program – PG&E offers rebates for owners and managers of

<sup>21</sup> [https://cdn5-hosted.civillive.com/UserFiles/Servers/Server\\_109585/File/Departments/Building/2019%20Forms%20and%20Handouts/Elec%20Heat%20Pump%20Water%20Heater%20Submission%20Checklist%20.pdf](https://cdn5-hosted.civillive.com/UserFiles/Servers/Server_109585/File/Departments/Building/2019%20Forms%20and%20Handouts/Elec%20Heat%20Pump%20Water%20Heater%20Submission%20Checklist%20.pdf)

<sup>22</sup> [https://www.cityofpaloalto.org/files/assets/public/development-services/building-permits/cpa\\_electric-heat-pump-water-heater\\_checklist\\_082022.pdf](https://www.cityofpaloalto.org/files/assets/public/development-services/building-permits/cpa_electric-heat-pump-water-heater_checklist_082022.pdf)

<sup>23</sup> <https://piedmont.ca.gov/common/pages/DisplayFile.aspx?itemId=17426430>

multifamily properties of five or more units. The program offers multifamily owners a no-cost energy assessment, energy-saving building upgrades, and incentives for energy-saving products installed.<sup>24</sup>

3. Create an assessment designed specifically for electrification readiness.
  - a. Example Program: City of Palo Alto Home Energy Genie<sup>25</sup>

### Location and Design Barriers

The sense of urgency that occurs during a typical equipment failure favors like-for-like replacements. Ensuring in advance that location and design barriers do not complicate the installation of electric equipment will be key to successful implementation. Table 5 below lists the location and design barriers by building type.

**Table 5: Location and Design Barriers by Building Type**

Single-family-specific location and design barriers	<ul style="list-style-type: none"> <li>• Other electrical upgrades also required to replace equipment (electric panel upsizing)</li> <li>• Space limitations</li> </ul>
Multifamily-specific location and design barriers	<ul style="list-style-type: none"> <li>• Other electrical upgrades also required to replace equipment (electric panel upsizing)</li> <li>• Space constraints</li> </ul>
Commercial-specific location and design barriers	<ul style="list-style-type: none"> <li>• Other electrical upgrades also required to replace equipment (electric panel upsizing)</li> <li>• Design of building limitations</li> </ul>

### Potential Solutions:

1. Create an assessment designed specifically for electrification readiness. This will help identify the life of the equipment and any upgrades that may be needed for electrification including panel upsizing.
  - a. Example Program: City of Palo Alto Home Energy Genie
2. Require a home energy audit to be prepared for the buyer and city during the sale.
  - a. Example Program: City of Piedmont Energy Assessment Policy

## Manufactured and Mobile Homes Electrification

The two most common types of manufactured home communities are land-lease communities and land-owned or resident-owned communities:

<sup>24</sup> <https://programs.dsireusa.org/system/program/detail/4257/pg-e-multifamily-residential-energy-savings-rebate-program>

<sup>25</sup> <https://www.cityofpaloalto.org/Departments/Utilities/Residential/Home-Efficiency-Genie>

- Land-lease communities are the most common type of mobile home community in the United States. In these parks, residents either 1) buy a home to move to the park and pay rent for the plot of land, 2) Buy a mobile home situated in the park and pay for lot rent, or 3) lease the home as well as the property as a single rent.<sup>26</sup>
- Land-owned or resident-owned communities are when homeowners form a non-profit business called a cooperative. Each household is a member of the cooperative, which owns the land and manages the business that is the community. Members continue to own their own homes individually and an equal share of the land of the entire neighborhood.<sup>27</sup>

In both community types, typically gas and electric service is provided to the entire park at a central location. It is then distributed privately by the mobile home park, to all residents.<sup>28</sup> In February 2011, the California Public Utilities Commission (CPUC) opened a rulemaking proceeding to examine what could be done to encourage owners of mobile home parks and manufactured housing communities to upgrade aging gas and electric distribution systems in an effort to enhance both public safety and service reliability for mobile home park residents.<sup>29</sup> This led to the Mobile Home Park Utility Upgrade Program that began on January 1, 2015, and was designed to end on December 31, 2017. The program was extended and is now designed to continue to convert mobile home park utility infrastructure until the end of 2030, with the goal of converting a total of 50% of the spaces in each utility territory to direct gas and/or electric utility services.<sup>30</sup> Currently, PG&E has a Mobile Home Park Utility Conversion Program.<sup>31</sup>

Electrification of manufactured and mobile homes is possible. Some states and utilities offer rebates or other incentives for the purchase of energy-efficient manufactured homes or energy-efficiency improvements to existing homes.

The California Department of Housing and Community Development (HCD) is the department within the California Business, Consumer Services and Housing Agency that develops housing policy and building codes, regulates manufactured homes and mobile home parks, and administers housing finance, economic development and community development programs.<sup>32</sup> HCD oversees all permitting and inspections for mobile homes and manufactured homes. Manufactured homes are subject to the Manufactured Home Construction and Safety Standards or “HUD Code” rather than

---

<sup>26</sup> <https://www.mhomebuyers.com/manufactured-home-communities/>

<sup>27</sup> <https://mhphoa.com/ca/roc/>

<sup>28</sup> <https://www.youtube.com/watch?v=77piCe4joEU>

<sup>29</sup> [https://apps.cpuc.ca.gov/apex/f?p=401:56:6621172668051::NO:RP,57,RIR:P5\\_PROCEEDING\\_SELECT:R1102018](https://apps.cpuc.ca.gov/apex/f?p=401:56:6621172668051::NO:RP,57,RIR:P5_PROCEEDING_SELECT:R1102018)

<sup>30</sup> <https://www.cpuc.ca.gov/regulatory-services/safety/mhp/mobilehome-park-utility-upgrade-program>

<sup>31</sup> [https://www.pge.com/en\\_US/safety/contractor-construction-business-and-agriculture/mobile-home-park-utility-upgrade/mobile-home-park-utility-upgrade.page](https://www.pge.com/en_US/safety/contractor-construction-business-and-agriculture/mobile-home-park-utility-upgrade/mobile-home-park-utility-upgrade.page)

<sup>32</sup> <https://www.hcd.ca.gov/>

local building codes.<sup>33</sup> HUD has standards that separate mobile home water heaters from regular heaters. Only HUD-approved water heaters can be installed in mobile homes. Mobile homes must have the right electrical infrastructure to support an electric water heater as well as the space to install the equipment. A potential barrier associated with manufactured and mobile home electrification is the number of contractors familiar with HUD Code and electrification.

Manufactured homes can be remodeled or retrofitted to improve energy efficiency and/or add renewable energy equipment. National Renewable Energy Laboratory (NREL) conducted experiments on pre-1976 manufactured homes found that the following retrofit measures resulted in a 31 percent reduction in heating fuel usage:<sup>34</sup>

- Install energy-efficient windows and doors
- Add insulation to the belly
- Make general repairs (caulking, ducts, etc.)
- Add insulation to walls
- Install insulated skirting
- Install a belly wrap
- Add insulation to your roof or install a roof cap

Renewable energy applications can be used to provide electricity, heating, and cooling. These are recommended by the U.S. Department of Energy (DOE):

- Installing a geothermal heat pump (GHP)
- Using passive solar water heating
- Solar water heating
- Installing solar electric or photovoltaic (PV) systems
- Installing small wind electric system
- Installing microhydropower system

*Recommendations:*

1. The City could partner with PG&E on their Mobile Home Park Utility Program and incorporate electrification initiatives for homeowners.
  - a. Note: This program also encourages upgrading of gas systems, which may be controversial or provide mixed messaging when paired with the City's objectives.
2. The City could partner with HCD to understand their processes and coordinate efforts to encourage mobile and manufactured home electrification. HCD handles all permitting for mobile and manufactured homes so understanding their processes and seeing what date they have may be beneficial to

---

<sup>33</sup> <https://www.energy.gov/energysaver/energy-efficient-manufactured-homes>

<sup>34</sup> <https://www.energy.gov/energysaver/energy-efficient-manufactured-homes>

creating/partnering on a program specifically encouraging mobile and  
manufactured home electrification for city residents.