

Appendix G: Opportunities for Energy Conservation

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State law (Government Code Section 65583[a][7]) requires Housing Elements to contain an analysis of opportunities for residential energy conservation. According to the California Department of Housing and Community Development (State HCD), the energy conservation section of a Housing Element must inventory and analyze the opportunities to encourage energy saving features, energy saving materials, and energy efficient systems and design for residential development.

Residential energy conservation presents an opportunity to improve health, contribute to climate change mitigation and sustainability, and reduce the cost of living by reducing energy consumption. Statewide green building standards regulate energy efficiency and conservation as a part of building permit issuance and is updated every three years to ensure the integration of the latest research and technology. While electrification is one of the primary ways to reduce the environmental impact of a building and improve energy performance, residential buildings in Oakland face a range of difficulties when pursuing electrification including lack of electrical panel or service capacity, and the extensive renovations and remediations that the retrofitting for electrification might trigger.

Residents and property owners in Oakland have access to a variety of resources to assist with and incentivize residential energy conservation including local and state financing programs, and local resources such as solar rebates and incentives, and assistance with conversions of gas stoves to induction cooktops. Low-income Oakland utility customers who qualify can also take advantage of State and Federal Energy Bill assistance and energy efficiency programs. The State of California is pursuing aggressive policies to support efficient electrification, including resources for homeowners and renters, contractor training, and a broad outreach campaign.

G.1 Introduction

Energy conservation can lower utility bills, increase long-term housing affordability, and contribute to climate change mitigation and sustainability. Residential energy is used primarily for lighting, cooking, appliances, heating water, and cooling and heating buildings. Energy use in most California buildings happens in two forms: electricity (primarily for lighting, electronics, and plug-in appliances) and methane gas (often referred to as "natural gas," primarily used for space and water heating, cooking, and clothes drying).

The science of energy systems, climate change, and indoor air quality has grown rapidly in recent years. Once thought to be a "clean-burning" and "bridge" fuel, methane gas is a short-lived climate pollutant 84 times stronger than carbon dioxide in exacerbating the global greenhouse effect (known as "global warming potential"). Methane gas is a major contributor to poor health outcomes: Children who live in homes with gas stoves are 40 percent more likely to develop asthma. A 2022 study by PSE Healthy Energy, an Oakland-based think tank, found that gas stoves emit 0.8–1.3 percent of the gas they use as direct, unburned methane – three-quarters of which occurs when the stoves are off.¹ As a flammable and explosive gas, methane also contributes an additional risk factor to homes and buildings in an area prone to earthquakes. As a result, in the last 10 years, the City's primary building energy focus has shifted from energy efficiency and conservation to electrification: the replacement of all gas systems and appliances with efficient, all-electric alternatives.

¹ Level, Eric D. et al. "Methane and NO_x Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes." *Environmental Science & Technology*, 2022. DOI: 10.1021/acs.est.1c04707

In July 2020, by adopting the 2030 Equitable Climate Action Plan (ECAP), Oakland City Council committed to eliminating methane gas use in building systems and appliances by 2040. Later that same year, the City effectively prohibited any new construction from including gas systems or appliances. Per the ECAP, City staff are developing a policy Roadmap to identify specific strategies to removing gas from all existing buildings by the target date. The Building Electrification Policy Roadmap will outline strategies to ensure that the electrification transition prioritizes resilience and health, and avoids exacerbating housing displacement. Implementing these strategies will require coordination among the City's Housing and Community Development Department, Economic and Workforce Development Department, Planning & Building Department, Dept of Race and Equity, and City Administrator's Office.

Costs are another critical aspect of energy use and the electrification transition. Given the high cost of living in the Bay Area and the ongoing housing crisis, energy insecurity is a serious threat for many households. For many who are housing-insecure, high energy costs can lead to displacement. Electricity is currently cheaper than gas, but rates for both are rising, with gas rates rising faster and at greater risk for price spikes from market disruptions as California makes progress in reducing gas usage across the state.

Energy efficiency and conservation can lessen both the upfront and lifetime costs of electrification, and reduce the amount of onsite renewable energy needed to offset usage costs. Sealing the building envelope and HVAC ducts; insulating walls, floors, and attics; and installing efficient heating/cooling systems and appliances all contribute to the energy efficiency of a residence. Done properly, these measures can also alleviate other public health threats, such as mold. Incorporating passive heating, cooling, and lighting (for instance, maximizing windows on the south-facing side of the building to capture light and heat) into the design of a residence can also contribute to reduced energy use. Urban environments can be more sustainable than suburban or rural environments because many people live in multifamily buildings or townhomes, which are generally smaller spaces with shared walls, thereby limiting demands on heating and cooling spaces. Furthermore, constructing housing in urban and infill areas conserves transportation energy by making it easier for residents to use public transit, walk, or bike instead of driving. The urban forest is another often-overlooked yet important component of building energy efficiency. Urban trees help shade buildings in the summer heat, maximize sunlight reaching buildings in the winter, and mitigate the urban heat island effect in dense communities. Maximizing and protecting the urban forest in accordance with Oakland's forthcoming 50-year Urban Forest Master Plan is thus another critical strategy to reduce building energy use and increase energy security.

The goal of the ECAP is to equitably reduce GHG emissions 60 percent relative to 2005 levels by 2030, on a path to carbon neutrality by 2045. The building sector is the second largest contributor to GHG emissions in Oakland, at just over one quarter of Oakland's emissions, behind transportation (66.0 percent). Reducing building emissions rapidly will therefore be important to achieving Oakland's climate targets.

G.2 Framework for Electrifying Buildings and Conserving Energy Resources

CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS

Title 24, Part 6, of the California Code of Regulations (Building Energy Efficiency Standards for Residential Development), sets California's building standards for energy efficiency and supersedes any local regulations. These regulations respond to California's energy crisis, and each city and county must enforce

these standards as part of its review of building plans and issuance of building permits. The standards, prepared by the California Energy Commission, were established in 1978 in response to a State legislative mandate to reduce California's energy consumption. The standards are updated every three years to incorporate new energy efficiency technologies and methods. Local jurisdictions are allowed to exceed Title 24 requirements where cost effectiveness and need are demonstrated, such as for local climatic or geological considerations, through Reach Codes.

The 2022 Energy Code will go into effect on January 1, 2023. Some of the new measures include:

- Establishing energy budgets based on efficient heat pumps in single-family homes, multifamily homes, and businesses to encourage builders to opt for electric heat pumps instead of gas-powered HVAC units;
- Requiring battery storage equivalent to a percentage of onsite solar-generated electricity in high-rise commercial and multifamily buildings;
- Increasing minimum kitchen range ventilation requirements; and
- Ensuring new single-family homes are electric-ready by:
 - Requiring installation of 240-volt circuits to accommodate electric clothes dryers, water and space heating, and cooking/ovens
 - Providing electric panel, branch circuits, and transfer switch for battery storage of electricity
 - Requiring installation of circuits and panels that can easily convert from gas to electricity for major appliances in the future

Since January 1, 2020, all new single-family homes, multifamily homes up to three stories high, and commercial businesses have been required to include solar panels. Beginning in 2023, all newly constructed multifamily dwellings will require both solar panels and photovoltaic battery storage. This mandate also applies to major renovations. These changes help to ensure that operating all-electric buildings will be cost-effective compared to mixed-fuel buildings.

The California Building Code also includes CALGreen, a set of green building regulations to ensure more sustainable building practices through pollution reduction, resource conservation, and energy efficiency. There are statewide mandatory measures, as well as more stringent voluntary measures that local jurisdictions may adopt.

CHALLENGES OF ELECTRIFICATION

In new construction, in addition to the environmental benefits, avoiding gas infrastructure reduces construction costs. Electrifying existing buildings is more challenging, due to often-outdated or insufficient infrastructure and the need for potentially invasive retrofits. Many older buildings have little or no insulation, inadequate windows, leaky ducts, and other inefficiencies that must be remedied in order to avoid oversized heating and air conditioning systems. Homes often lack the electric service and panel capacity to accommodate all-electric systems. Most of Oakland is served by overhead electrical distribution wires and smaller transformers, so electrifying large multifamily buildings or whole neighborhoods can trigger expensive transformer upgrades. Finally, Oakland's oldest homes often have a host of challenges that

frustrate efficient renovations, such as lathe-and-plaster walls and knob-and-tube wiring. These challenges make renovations for electrification cost-prohibitive for many. Conflicting priorities among electrification and mold, lead, or asbestos remediation, seismic upgrades, or other health and safety renovations that are most needed in low-income and older housing further complicate existing building electrification.

Given these challenges, the ECAP obligates the City to pursue building electrification through an iterative process:

- As of July 2020, all major retrofits to City facilities must be all-electric.
- As of December 2020, all new construction must be all-electric.
- By July 2023, the City will produce a policy Roadmap for electrifying all existing buildings by 2040.
- By 2023, major renovations will be prohibited from connecting to natural gas infrastructure.
- By 2040, all existing buildings must become energy-efficient and convert to all-electric power.

Oakland has shown commitment to its energy targets in the past. The City's 2020 Energy and Climate Action Plan was adopted in 2012, with a target of reducing GHG emissions 36 percent by 2020. Preliminary data indicate that Oakland had reduced its emissions 26 percent as of 2019.

The Building Electrification Policy Roadmap will include detailed considerations and social supports to maximize local economic benefits and avoid displacement from the electrification transition. Most importantly, this will require a focus on holistic electrification – an approach rooted in building science that maximizes overall comfort, lighting needs, and energy efficiency, rather than simply exchanging gas appliances for equivalent electric units. Without significant supports in the form of contractor training, rebates, incentives, and integrating programs across multiple disciplines, electrification could result in low-income residents and building owners being disproportionately burdened with high energy costs, as well as missed opportunities to improve Oakland's older housing stock.

EAST BAY COMMUNITY ENERGY

East Bay Community Energy (EBCE) formed as a Joint Powers Authority in 2016. In 2018, Oakland switched from Pacific Gas and Electric (PG&E) to EBCE as its default electricity provider to maximize its renewable energy supply while securing lower energy rates. As of 2020, EBCE's standard Bright Choice energy portfolio was at least 54 percent carbon-free, and the utility has committed to being 100 percent renewable by 2030. Customers who opt to pay more per month can receive 100 percent renewable energy by opting into EBCE's Renewable 100 rate. By 2030, EBCE's basic electricity mix will be 100 percent renewable. As EBCE generates more revenue and grows as a company, it will be able to invest in more renewable energy and thus lower the cost of providing renewable energy to customers. This surpasses the California Statewide mandate (SB100) of carbon-free electricity by 2045.² Due to EBCE's efforts, Oakland's transition away from methane gas to all-electric buildings will eliminate a potent GHG and major public health and safety threat, and contribute to a clean energy cycle that supports regional green jobs.

² Carbon-free electricity is not the same as renewable. While both types create zero carbon dioxide emissions, carbon-free energy portfolios also include non-renewable energy sources, such as nuclear and hydroelectric, the latter of which can destroy wildlife habitats.

G.3 Energy Efficiency and Conservation Programs

This section describes local, State, and federal energy efficiency, savings, and financing programs that Oakland residents and property owners can utilize.

LOCAL AND REGIONAL FINANCING PROGRAMS

These programs offered by the City or region assist residents and property owners with financing or provide professional guidance for energy efficiency projects.

- Property Assessed Clean Energy (PACE) Financing provides financing for clean energy projects, such as water/energy efficiency projects, solar, or electric vehicle charger installation. A variety of providers offer this service in Oakland, such as Ygrene, HERO and AllianceNRG. Qualification is based on property equity. Financing is repaid via the property owner's tax bill.
- Rising Sun Center for Opportunity's Green House Call program sends trained youth Energy Specialists to residences to find opportunities to save energy or water and install appropriate hardware (such as faucet aerators) for free. This is available to owners and renters who have not used this service within the last five years.
- BayREN's Home+ program offers rebates for energy-efficiency home upgrades, such as duct sealing, insulation, high efficiency furnaces and air conditioners, and high efficiency water heaters.

Bay REN's Home Energy Adviser is a free program that provides homeowners with the assistance of a certified energy efficiency professional. These professionals help homeowners review energy efficiency options, find qualified participating contractors, navigate project installation and financing, and maximize rebates from all sources.

EAST BAY COMMUNITY ENERGY RESOURCES

Resources provided by EBCE include the following programs:

- Community Solar Discount Program (coming soon) will offer discounted community solar access to customers residing in disadvantaged neighborhoods.
- EBCE's Resilient Home Program offers pre-negotiated pricing and a \$500 rebate when customers install home solar and battery backup systems.
- EBCE offers a rebate for switching from gas to induction stoves, and also provides an induction cooktop lending program for Oaklanders to try the cooking technology at home for free.

STATE AND FEDERAL ENERGY BILL ASSISTANCE AND ENERGY EFFICIENCY PROGRAMS

Low-income Oakland utility customers who qualify can take advantage of these programs to assist with energy bills or energy efficiency regardless of whether their energy provider is PG&E or EBCE:

- CARE provides a 35 percent discount on electric bills and 20 percent discount on gas bills.

- Relief for Energy Assistance for Community Help (REACH) provides a one-time credit up to \$300 on a past-due energy bill balance.
- Low-Income Home Energy Assistance Program (LiHEAP) is a federally funded program that assists low-income households pay their energy bills and offers free weatherization assistance, such as attic insulation, caulking, and faucet aerators, as well as weatherization-related repairs.
- FERA provides an 18% energy bill discount.
- Medical Baseline offers customers who need extra energy to assist with a medical condition an additional allotment of electricity each month at the lowest price available.
- Energy Savings Assistance Program offers free weatherization services, such as insulation and caulking, as well as upgrades to more efficient appliances.
- Disadvantaged Communities – Single Family Solar Homes (DAC-SASH) provides free rooftop solar installations to homeowners.

STATE ELECTRIFICATION PROGRAMS

California is pursuing aggressive policies to support efficient electrification, including resources for homeowners and renters, contractor training, and a broad outreach campaign:

- Switch Is On is a statewide marketing and outreach campaign to promote electrification. An online portal explains the benefits of electrification and shares resources for finding contractors. The program also provides marketing across the state in multiple languages.
- Technology and Equipment for Clean Heating (TECH) program is an initiative to advance the market for low-emission space and water heating equipment for new and existing residential buildings. The \$30 million program provides financial incentives, statewide marketing and outreach, and contractor engagement.
- Building Initiative for Low-Emissions Development (BUILD) is a \$20 million program that provides financial and other incentives for zero- and near-zero emissions development and construction of new single-family and multifamily homes, with at least 30 percent of funds reserved for low-income residences.