



AGENDA REPORT

TO: G. Harold Duffey
Interim City Administrator

FROM: Daniel Hamilton
Director, Sustainability and
Resilience Group

SUBJECT: Informational Report Regarding
Electrification Of Affordable Housing
And Commercial Kitchens

DATE: February 2, 2023

City Administrator Approval

Date: Feb 2, 2023

RECOMMENDATION

Staff Recommends City Council Receive An Informational Report Regarding Programs, Resources, And Available Technologies For Electrification Of Affordable Housing And Commercial Kitchens.

EXECUTIVE SUMMARY

On December 16, 2020, City Council adopted Ordinance No. [13632](#) C.M.S., mandating that all new construction be all-electric, fulfilling the first major policy step of phasing out fossil fuels in Oakland's building sector. Residents of affordable housing, small restaurant owners, and laborers in the restaurant industry have the most to gain from the benefits of electrification, but are also the most vulnerable to displacement, job loss, and financial insecurity if electrification is implemented without equity as a driving force.

As directed by Ordinance No. [13632](#) C.M.S., this informational report describes available technologies for energy efficiency and electrification retrofits in affordable housing and restaurants. It also describes the local, regional, and statewide programs and resources available to property owners, renters, and restaurants to support equitable electrification. Finally, it provides a list of key challenges facing these two frontline sectors.

There are few technological constraints to electrifying, particularly for affordable housing. Restaurants have numerous options for high-quality, all-electric cooking technologies, but water heating in larger operations remains a challenge. The primary constraints facing both sectors are related to cost. Even with the many subsidies and resources available, capital costs can be untenable, especially when energy efficiency, health, and other critical maintenance issues are incorporated in project scopes. Energy costs of fully-electrified spaces can remain high for restaurant owners and low-income renters or homeowners if energy efficiency is not maximized and solar panels are not installed. California Public Utility Commission (CPUC) policy actions in

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the form of utility rate reform could lessen this challenge, as could additional subsidies to encourage efficiency measures and solar panels as part of standard electrification projects.

Given the relative newness of broad-scale electrification of buildings, public education is needed to expand awareness of key technologies as well as available resources and incentives. Staff training in emergent technologies, including appliances, building energy management systems, and load management systems will also be critical. The information in this report will be incorporated into the forthcoming *Building Electrification Roadmap*, as required by Action B-2 of the ECAP.

BACKGROUND / LEGISLATIVE HISTORY

The City of Oakland (City) has set increasingly ambitious targets to reduce local greenhouse gas emissions, consistent with similar direction from the State of California. Resolution No. [82129](#) C.M.S. (2009) directed staff to develop Oakland's first climate strategy, the 2020 Energy and Climate Action Plan, with greenhouse gas (GHG) emissions reduction targets of 36 percent below 2005 levels by 2020 and 83 percent (83%) by 2050.

In 2016, the California Legislature enacted Senate Bill (SB) 32, requiring Statewide GHG emissions to be reduced to 40 percent (40%) below 1990 levels by 2030. In 2018, Oakland City Council adopted Resolution No. [87183](#) C.M.S., establishing a GHG emissions reduction target of 56 percent below 2005 levels by 2030. That same year, City Council adopted Resolution No. [87397](#) C.M.S., declaring a climate emergency and calling for regional collaboration and a "citywide just transition and urgent climate mobilization effort to reverse global warming ... as quickly as possible towards zero net emissions."

In July 2020, through Resolution No. [88267](#) C.M.S., City Council adopted the 2030 Equitable Climate Action Plan (ECAP), a comprehensive plan responsive to the abovementioned targets. The ECAP details 40 Actions within the City's regulatory and legal spheres of control that together will improve Oakland's climate resilience, advance equity, and reduce local GHG emissions on a path projected to exceed Council's adopted targets. Alongside the ECAP, City Council adopted a 2045 full carbon neutrality target via Resolution No. [88268](#) C.M.S.

On December 16, 2020, City Council adopted Ordinance No. [13632](#) C.M.S., mandating that all new construction be all electric, effective immediately. The Ordinance fulfilled ECAP Action B-1 (*Eliminate Natural Gas in New Buildings*), and directed staff to study and provide Informational Reports regarding:

- Energy efficient commercial and residential appliances appropriate for all-electric buildings;
- Potential marketing assistance opportunities and funding incentives and sources to support restaurants in newly constructed all-electric buildings with their transition to all-electric commercial kitchens; and
- Potential marketing assistance opportunities and funding incentives and sources available to applicable affordable housing projects.

This Report addresses all three of the required Informational Reports requested as part of Ordinance No. [13632](#) C.M.S. and will inform the *Existing Building Electrification Roadmap* mandated by ECAP Action B-2 (*Plan for All Existing Buildings to be All Electric by 2040*).

ANALYSIS AND POLICY ALTERNATIVES

Implementing the City's ECAP meets the Citywide goals of fighting the climate crisis, reducing racial and economic disparities among Oakland residents and communities, improving public health, and increasing community resilience. Implementing the ECAP also addresses the City Council's call to apply a Just Transition lens on climate action, by prioritizing benefits to frontline communities; increasing good, local, sustainable jobs; and nourishing circular economies.

GHG emissions from buildings in the City come from two sources: electricity (when generated from non-renewable sources), and methane (commonly referred to as natural gas) combusted on-site. California's electricity grid is increasingly composed of renewable energy, so the portion of building emissions that result from electricity generation is dwindling. In the City, more than 98 percent (98%) of electric ratepayers are served by East Bay Community Energy (EBCE), which has pledged to deliver 100 percent carbon-free, renewable electricity by 2030. With EBCE's clean electricity supply, eliminating methane gas is the biggest climate and equity priority for buildings.

Electrification means eliminating on-site fossil fuel combustion, with all mechanical systems running on electricity. Numerous technologies are available, and the State of California has dedicated significant resources to the transition. The California Energy Commission (CEC), the state's lead energy policy and planning agency, oversees implementation of SB 1477 (2018), which provides \$50 million annually to support public outreach, incentives, and technology development for zero-emission building technologies. SB 1477 established two initiatives:

- **Technology and Equipment for Clean Heating (TECH)**, a market development initiative to advance low-emission space and water heating equipment for new and existing residential buildings. TECH provides financial incentives, statewide marketing and outreach, and contractor engagement. *\$30 million available annually.*
- **Building Initiative for Low-Emissions Development (BUILD)**, a program that provides financial and other incentives for zero- and near-zero emissions development and construction of new single-family and multifamily construction, with at least 30 percent of funds reserved for low-income residences. *\$20 million available annually.*

The CPUC, which regulates utility companies, including electric and gas utilities, oversees more than \$1 billion annually in utility ratepayer-funded programs to support energy efficiency. Since 2019, these programs have also included electrification retrofits, typically through incentive payments to residents or contractors who install efficient electric appliances. Relevant programs include those overseen by the Bay Area Regional Energy Network (BayREN) and PG&E.

Despite these many resources, some activities and building types will face greater challenges based on costs and competing needs. Affordable housing and commercial kitchens will need

the greatest support and should be granted the most flexibility in when and how they electrify. The sections below summarize relevant technologies and resources for these sectors. All technologies discussed are currently available in local markets.

Affordable Housing

According to California's Housing and Community Development Department, housing is affordable if the cost (inclusive of rent, utilities, property taxes, and insurance) is less than 30 percent (30%) of gross household income. Because of mismatches among household income, housing availability, population pressures, and costs, the City's affordable housing supply is inadequate. Maintaining affordability where it exists is therefore critical. Policies affecting the City's building stock must be carefully constructed to avoid increasing home prices (purchase or rents), and to minimize operating costs (e.g. energy bills). To ensure that the health, safety, and resilience benefits of electrification are equitably distributed, strategies must also account for upfront costs: replacing gas appliances with efficient electric alternatives must be accessible to those living in affordable housing.

Multiple electric options exist for all technology types and all residential building applications. Numerous financial incentives are available to reduce the overall costs of installing these technologies. However, even with current incentives, the electrification market is not yet sufficiently diverse or scaled to be cost-effective for all lower-income residents. In older homes and buildings with concurrent needs (e.g. mold, inadequate insulation, or outdated wiring), upgrades can be especially cost-prohibitive.

The following sections describe relevant technologies and incentives for electrifying affordable housing. The Existing Building Electrification Roadmap will detail strategies to help low-income residents and affordable property managers electrify their properties.

Available Technologies

Methane gas has four main residential uses: cooking, clothes drying, space heating, and water heating. In each category, there are multiple electric alternatives for retrofits. Some technologies are better suited for certain construction types, such as single-family or multifamily homes, or for varying scenarios. While this section addresses appliances, it is important to note that full electrification may require additional upgrades, such as increased electric service or panel and wiring upgrades. Additional related work completed simultaneously with electrification upgrades – energy efficiency, solar, and remediation of related issues, such as mold or lead – can reduce operating bills for the occupants/owners and reduce the overall costs of improving health and safety for building occupants.

Cooking Technologies:

- *Induction:* By heating cookware directly via a magnetic field, rather than heating a surface (as with electric resistance) or air (as with gas) that then heats the cookware, induction is highly efficient and responsive. Induction stoves are safer than both gas and electric, reducing both fire and burn risks. Compared to gas, they are easier to clean and

eliminate an acute source of indoor air pollutants. Induction ranges are readily available from common brands (e.g. Frigidaire, Samsung, KitchenAid, and Bosch). In 2020, five of the 8 top-rated stoves by Consumer Reports were induction. Full-size induction stoves require a 240V outlet. Countertop units, including hobs, woks, and fryers, are readily available and generally utilize a standard 120V outlet, eliminating the need for wiring upgrades. Induction stoves tend to be more expensive at purchase but less expensive to run compared to electric resistance stoves; and comparable in price or slightly less expensive compared to gas. EBCE currently provides a \$300 rebate for replacing a gas stove with induction (see *Resources*, below).

- *Electric Resistance:* Electric resistance stoves are common. They have a lower upfront cost, but are less efficient and have longer heating and cooling times. Electric resistance stoves also use a 240V outlet, and are popular in many apartment buildings.

Clothes Dryers:

- *Electric Dryers:* These are readily available and commonly in use. Electric dryers require a 240V outlet, so rewiring may be needed when replacing a gas dryer. These dryers can be installed in a single-family home, apartment, or common laundry room.
- *Heat Pump Dryers:* These are more efficient than their standard electric counterparts, and also require a 240V outlet. Drum sizes tend to be smaller than in electric or gas dryers, which may be challenging for large families or in multifamily laundry rooms.
- *Combination Washer and Dryer:* A condenser dryer is the most commonly used version of this technology. A combination washer and dryer can use a 120V outlet and does not require any ductwork. The dryer is typically smaller than standard dryers. Condenser dryers may result in more cold-water usage. They can easily be installed in a multifamily housing complex or space-constrained home.

Water Heating:

Water heating systems can be unitary (in individual rooms or apartments) or centralized (serving entire buildings, such as institutions, campuses, or apartment complexes.)

- *Heat Pump Water Heaters (HPWH):* These are suitable for most single-family or multifamily building retrofits. They are common in Europe, Israel, and Japan, and gaining popularity in the U.S. HPWHs typically require 240V, rarely found in water heater closets, and therefore often require a new circuit. Most HPWHs require more space than gas systems, but can be split into two units, with the water storage tank inside and a separate compressor outside or in a basement. Responding to the challenges of rewiring older homes, manufacturers are beginning to offer 120V HPWHs. These may be less suitable for households that use larger quantities of hot water. Because heat pumps take longer to heat the water, some come with resistance back-up, meaning a redundant electric system that can heat water quickly when needed (though at greater expense). A more energy-efficient solution to high demand is a larger tank.
- *Solar Water Heaters:* Also referred to as “solar thermal,” this technology is decades old, and suitable for both commercial and residential use. Solar water heaters often have higher maintenance costs and performance issues. Some solar water heating systems come with electric resistance backup to provide hot water in greater quantities, at night, or on heavily clouded days.

- *Electric Resistance:* These units are best suited for low-usage situations or as backup systems. There are two types of electric resistance water heaters: distributed point, and tankless. A distributed-point water heater is most suitable for small commercial spaces and residences, with a 2-20-gallon tank. Due to their high energy demand, their use is limited by California's energy code (Title 24, Part 6).
- *Tankless Electric Water Heaters:* This technology avoids the large storage tank and the need to keep a large amount of water constantly heated. However, the sudden spikes in electricity demand required for these systems' high voltage render them inefficient and expensive to use. Further, in the earthquake-prone Bay Area, water heater tanks provide an important source of backup water for emergencies.

Space Heating:

There are many electric heating technologies for homes and apartment buildings. Electric resistance (resistance coil and electric boiler) is widely available and in use, but energy-intensive. Heat pumps move heat rather than generating it, using a refrigerant and compressor (like a refrigerator). They use air (air-source heat pumps), water (hydronic heat pumps), or the ground (geothermal heat pumps) as a heat source. The "heat source" can even include cold outside air. Heat pumps are highly efficient and provide both cooling and heating via a single unit. For the many Oakland homes without air conditioning, this is a key benefit as extreme heat events become more common. Replacing an older gas furnace with a heat pump (gaining both heating and cooling capabilities) is less expensive than installing a new gas unit and a separate air conditioner. For units that already have air conditioning, a heat pump can replace two units with one, often saving both space and operating costs. Air source heat pumps are best suited for retrofits, with numerous options:

- *Packaged Terminal Heat Pump (PTHP):* These are ideal for multifamily housing and can easily replace existing packaged terminal air conditioning. They are typically ductless and can be hung from a window or in a wall cutout.
- *Mini-Split:* These are best suited for locations where ducting is not suitable, or where heating needs are minimized (through efficiency, weatherization, or passive solar design) and only a small portion of a building needs heating. Mini splits are commonly found in hotel rooms.
- *Ducted Heat Pump:* Like a central furnace, these consist of one main appliance with ducting to move conditioned air throughout the home. Many contractors prefer to minimize or eliminate ducts where possible, since they are prone to leaks and heat loss. If retaining ducts from a previous system, a retrofit scope should include duct testing and sealing (which could trigger the need for asbestos removal in some cases).
- *Variable Refrigerant Flow (VRF):* These systems are well-suited to multifamily building retrofits.

Energy Efficiency and Electrification:

Converting a building from mixed-fuel (gas plus electricity) to all-electric can increase energy bills if energy efficiency (EE) is not part of the upgrade. EE provides needed services (adequate lighting, sufficient hot water, etc.) with less electricity through the use of more efficient devices (e.g. LED lighting) and energy control systems. In larger buildings, savings through efficiency alone can be dramatic: affordable housing developer Eden saw 40 percent energy savings

through a lighting efficiency project in a large complex that included 24/7 common-space lighting. Similarly, weatherization increases thermal comfort and reduces the need for mechanical heating and cooling through improved insulation, ventilation, and reduced air leakage. EE and weatherization benefit electrification in two important ways: First, they provide the possibility of replacing gas with electricity without raising overall energy bills. Second, they increase the likelihood that electrification can be accomplished without the need to increase electric service or panel size – significantly reducing the upfront cost of electrification.

California has implemented robust EE programs for decades – programs credited for keeping the state’s electricity use relatively flat even while population has increased and consumer electronics have burgeoned. The technologies and program delivery channels for EE are plentiful. The resources listed below in **Table 1** include EE and weatherization programs available to low-income households and multifamily properties.

Technologies for Holistic Upgrades:

Beyond appliances and efficiency, electrification scopes can include related upgrades. Incorporating health and safety measures (seismic upgrades, lead abatement, asbestos removal, mold control, etc.) increases complexity and costs, but can reduce lifetime retrofit costs, maximize health and resilience, and increase trust. Installing other energy upgrades such as solar, battery storage, energy management systems, and electric vehicle chargers at the same time as electrification can maximize efficiency opportunities and reduce the likelihood of needing electric service upgrades in the future.

Current Programs Supporting Affordable Housing Electrification

Numerous publicly-funded programs exist to support EE and electrification. Many take the form of rebates, applied to either the technology or labor and redeemable by the contractor or building owner. The recent Federal Inflation Reduction Act will provide billions of dollars, mostly via rebates and tax incentives, to support electrification.

Table 1: Resources for Residential Building Electrification in Oakland

Program and Description	Incentives	Information	Financing
BayREN: Funded through utility ratepayer funds collected by PG&E, the San Francisco Bay Area Regional Energy Network provides electrification rebates; Home Energy Advisor (a service connecting property owners with rebates and qualified contractors); Bay Area Multifamily Building Enhancements (\$750/unit rebate for qualifying EE projects and more for electrification, preference to buildings in frontline communities); contractor training; and more.	✓	✓	
Switch Is On: Statewide outreach and education campaign. Extensive website to help homeowners understand electrification and find contractors and rebates.		✓	

East Bay Community Energy: EBCE provides rebates to support holistic electrification, including battery storage and induction stoves, plus a territory-wide induction cooktop lending program.	✓	✓	
Low Income Weatherization Program (LIWP): Operated by the CA Department of Community Services and Development. No-cost EE and solar to low-income households, including single-family and apartment buildings.	✓		
California Energy Smart Homes: Administered by PG&E. Covers new construction and alterations, and provides rebates to electrify clothes drying, space heating, and water heating for single-family homes, duplexes, and low-rise multifamily buildings.	✓		
TECH Clean California: A statewide initiative to advance efficient electric space and water heating. Provides funding for Switch Is On, plus direct incentives for heat pumps, policy and program data, workforce training supports, and more.	✓		
Property-assessed clean energy Financing: PACE leverages a property's equity to secure loans for upgrades, repaid through property taxes. Qualifying upgrades include solar, windows, heating and air conditioning, and roofing.			✓
On-Bill Financing: Available from PG&E for qualifying businesses. Provides 0% loans (\$5,000 and \$4,000,000) to replace older equipment with energy-efficient or all-electric alternatives, repaid on the customer's energy bill within 10 years.			✓
Affordable Housing and Sustainable Communities (AHSC): Provides funding for affordable housing developers to install renewable energy, EE, and efficient transportation amenities. Funded through California's Cap and Trade system and implemented by the Strategic Growth Council.	✓		
GoGreen Affordable Multifamily Energy Financing: Run by the CA Treasurers Office. Credit enhancements complement existing financing for retrofits and encourage growth in private-market energy efficiency lending.			✓
Energy Savings Assistance Program (ESAP): No-cost efficiency program for low-income households. Includes attic insulation, weatherization, refrigerators, furnaces, and water conservation. Can be paired with electrification incentives.	✓		
Accelerating Electrification of California's Multifamily Buildings: Created by StopWaste, an Alameda County joint-powers authority, and the Association for Energy Affordability, this report provides policy context and actionable technical information to support electrification of existing multifamily buildings.		✓	

Commercial Kitchens

Non-residential kitchens – restaurants, commissaries, and cafeterias – have specialized cooking equipment needs, all of which have electric options. Cooking technologies are a primary consideration, but water heating is also critical. Commercial kitchen owners are concerned with offering a consistent experience and quality at reasonable prices. Restaurants are particularly sensitive to retrofit costs because of their low profit margins and high turnover rates.

Cooking Technologies:

Many electric alternatives have been available for years, such as griddles, broilers, fryers, pasta cookers, and steamers. Induction technologies are the best choice for replacing traditional gas and wok ranges. They also have less burn risk, less wasted heat, and higher temperature control and accuracy. Induction cooktops are easier to clean and keep kitchens cooler compared to gas ranges, potentially lowering air conditioning and ventilation costs.

- *Induction Ranges*: Numerous commercial-grade induction ranges are available in the U.S., including drop-in or slide-in options. Induction ranges have a higher upfront cost, but similar operating costs.
- *Stock Pot Ranges*: A stockpot allows a kitchen to heat and keep warm a large amount of liquid, such as soup and sauces. Like other induction products, they have higher upfront costs, but equivalent operational costs.
- *Combination Ovens*: These can perform multiple functions, such as steaming, roasting, and baking. Their cost depends on several factors including size and amenities (such as advanced programming and controls). Combination ovens come in various sizes, from countertop units to large roll-in-rack ovens.
- *Full-size Induction Wok*: There are several full-sized induction woks available in the U.S., as well as countertop woks that are easily deployable in different settings and cost much less. By eliminating excess heat and flame of gas cooking, induction woks require less cooling, which can reduce both electricity and water demand.

Water Heating

Commercial kitchens need copious hot water for dishwashing and sanitation. Most restaurant water heaters have one or more storage tanks. Larger establishments may include a boiler. To meet health and safety requirements, the hot water supply must be a consistent temperature and adequate throughout the day, including at the peak times. Although electric options exist, the needs of commercial kitchens present challenges for most of them, and some may require a redesigned water distribution system. System costs will likely decrease as more options with come to market and designs become more standardized.

- *Central Conventional Heat Pump Water Heater (HPWH)*: While multiple central electric heat pump options exist for commercial kitchen applications, the slower heating time compared to gas mean that more tanks or larger tanks are needed, both of which require more space. Tank temperature (set point) can be increased, but with current electricity rates, this can increase operating costs beyond what owners can afford (even though heat pumps are up to five times more energy efficient than gas alternatives). Further innovation is needed.
- *Electric Resistance Water Heater*: These water heaters are common in restaurants in the American southeast, where gas is unavailable. They are much less energy efficient than HPWHs and thus more expensive to operate. Paired with central HPWH, resistance water heaters can provide enough redundancy to maintain adequate supplies of hot water during peak times without multiple tanks. Otherwise, electric resistance water heaters are better suited for remote sites, commercial restrooms, and small cafes.
- *Electric On-Demand Water Heaters*: These have similar drawbacks and applications to resistance water heaters. Best suited for situations where hot water is needed only occasionally or in small amounts, electric on-demand (or tankless) water heaters use extremely high voltage to rapidly heat water. This can lead to spikes in electricity demand – costs that can be untenable for a small business.
- *Solar Water Heating*: These rooftop systems can be paired with a resistance or HPWH, particularly to provide extra evening capacity. They can also preheat water to reduce the time a HPWH would take to reach the required temperature, thereby reducing the space needs for additional tanks. This has been implemented in commercial facilities with limited success. However, due to the roof size and maintenance requirements, these systems are typically best suited for larger facilities with a regular maintenance staff.

Space Heating

Most of the space conditioning technologies that can be used in a multifamily setting can also be used in the commercial setting. However, heat-pump space heating of commercial foodservice operations is currently rare. This makes it hard to accurately gauge how well this technology will perform in a demanding commercial foodservice environment.

Current Programs Supporting Commercial Kitchen Electrification

The upfront costs, space constraints, and specific technology needs of restaurant electrification, combined with the low profit margin of restaurants and the ongoing COVID-19 recovery, make it unlikely that commercial kitchens will electrify en-masse any time soon. However, with current technologies and incentives, many establishments could transition sooner. Resources are available at the local and regional levels, as shown in **Table 2**. The Federal Inflation Reduction Act is likely to create many more resources.

Table 2: Resources for Commercial Kitchen Electrification in Oakland

Program and Description	Incentives	Information	Financing
BayREN: Funded through utility ratepayer funds, the San Francisco Bay Area Regional Energy Network provides contractor training and supports for small businesses to install efficient HVAC, refrigeration, and LED lighting. Services include energy assessments, installation, and remote equipment monitoring.	✓		
East Bay Community Energy: EBCE will cover up to \$17,500 of project costs to cover induction appliances and electrical materials & equipment.	✓	✓	
PG&E / California Energy Wise: CA's energy utilities provide Instant Rebates for electric ovens, fryers, steamers, griddles, cooling, and more. Website includes participating dealers and qualifying equipment.	✓		
PG&E Business Rebates: PG&E provides rebates to small businesses for upgrading HVAC, refrigeration, water heating, and more.	✓		
Now We're Cooking: Case studies, detailed technology information, webinars, resources, and more, curated by the Building Decarbonization Coalition.		✓	
Food Service Technology Center: A partnership between PG&E and Frontier Energy, the FSTC in San Ramon, CA, provides training, consulting, case studies, appliance testing, research, and more to support restaurants and the overall food industry save energy and electrify. FSTC's Try Before you Buy Program allows chefs to try various electric and induction technologies before purchasing.		✓	
Property-assessed clean energy financing: PACE leverages property equity to secure loans for upgrades, repaid through property taxes. Some PACE providers include loans for commercial properties to upgrade mechanical, electrical, and structural components, including water conservation and energy systems.			✓
On-Bill Financing: Available from PG&E for qualifying businesses. Provides 0% loans (\$5,000 and \$4,000,000) to replace older equipment with energy-efficient or all-electric alternatives, repaid on the customer's energy bill within 10 years.			✓

Risks and Challenges of Electrification

Affordable housing and restaurants face disproportionate challenges in the electrification transition. Low-income residents have a heightened background risk of displacement; and, even before COVID, 61 percent (61%) of independent restaurants failed within three years of opening ([Parsa et al, 2005](#)). Yet these populations have the most to gain from equitable electrification, due to lower operational costs of efficient all-electric equipment, reductions in indoor air pollution when gas is eliminated, and increased safety in all-electric kitchens. The *Building Electrification Roadmap* will address the gaps that remain to equitably decarbonize these sectors given their unique challenges, and suggest policy and programmatic solutions to bridge those gaps by 2040. An initial list of gaps follows:

- **Cost:** Electrification is expensive, especially when related upgrades are included. Panel electric service and upgrades, if needed, can add tens of thousands of dollars (and more for apartment or commercial buildings). If EE is not maximized and solar panels are not included, operational costs can increase due to current utility rate structures. For families and dinner restaurants, unavoidable evening appliance use – when electricity is most expensive – can further increase energy costs. While beyond the City’s direct control, electricity rate reform, starting with the California Public Utilities Commission, will be a critical step in making electrification accessible to all.
- ***Naturally Occurring Affordable Housing (NOAH):*** Low-income tenants in subsidized housing receive certain protections to avoid displacement or excessive rent increases when property owners upgrade their buildings. Most protections are unavailable to renters in NOAH – units that are below market rents due to their age, location, or other factors, but which lack subsidies or affordability restrictions. Owners of unsubsidized complexes may not be able to afford the costs of electrification without increasing rents or selling to a larger developer. Additional subsidies and anti-displacement measures could help more low-income residents experience the benefits of electrification without increased housing insecurity.
- ***Split incentives:*** Tenants generally do not make property upgrade decisions. While building owners invest funds for electrification, the tenants enjoy the increased safety, comfort, and health. Many owners are therefore reluctant to pursue upgrades if they cannot rapidly recoup costs through rents or condo conversions. An inverse challenge is master-metered buildings, where tenants have no financial incentive to reduce energy use. Split incentives have long confounded EE programs, and will be a particular challenge for electrification.
- ***Non-compliance:*** Cities face low levels of building permit compliance, and often lack the resources and training to inspect all properties for energy code compliance. The permit process is a convenient moment to clarify retrofit requirements and ensure that upgrades are done efficiently and safely. However, increased requirements can further reduce compliance rates, and do not necessarily lead to greater inspection resources.
- ***Workforce and industry readiness:*** Given the relative newness of broad electrification, the lack of a ready and robust workforce is understandable. Yet the speed and efficiency with which holistic electrification must happen requires rapid scaling-up. BayREN and

PG&E provide contractor outreach and training. Local providers such as the Cypress Mandela Training Center and Rising Sun Center for Opportunity teach electrification skills. Even so, retailers still lack in-house expertise for electric appliances (let alone sufficient inventory), and disconnects remain between the software used to prove electrical code compliance and new technologies that maximize electrical service to facilitate efficient electrification. A search of BayREN-approved electrification contractors yields few Oakland businesses, while many local contractors continue to recommend gas water heaters and furnaces when current models fail.

- *Competing needs:* Despite the allure of an all-encompassing renovation, most building owners and project managers will be unable to address all upgrade needs at once. The challenge often becomes one of competing priorities: whether to invest in electrification, water conservation, cook-line modernization, seismic safety, or a host of other needs.

FISCAL IMPACT

This item is for informational purposes only and has no direct fiscal impact or cost.

PUBLIC OUTREACH / INTEREST

In developing this Report, staff sought experiences and insights from numerous community members with insight into the sectors and/or technologies discussed. This included building electrification workshops; meetings with representatives from the Oakland Chamber of Commerce, Ethnic Chambers of Commerce, and Business Improvement Districts; in-depth discussions with affordable housing managers and leaders; and more. Sustainability Division staff provided several presentations to community groups including the West Oakland Community Action Plan (WOCAP) Steering Committee; East Bay Housing Organization (EBHO); community planning agency SPUR; and others. City staff developed and administered a survey through City Data Services to Oakland affordable housing owners and managers. The survey was live for approximately one month and received ten detailed responses.

Many insights into electrification challenges and available technologies and resources came from the Electrification Workforce workshop series that staff convened in 2021 (discussed in a parallel Informational Report). Finally, this informational report was informed by the community engagement work conducted in preparation for Oakland's all-electric new construction code (Ordinance 13632).

Drafts of this report were reviewed by Common-Spark consulting, an equity-focused electrification consultancy; and Richard Young, a recognized expert in commercial kitchen EE and electrification with Food Service Technology Center.

COORDINATION

City staff consulted with the Department of Race and Equity to gather their insights into community engagement for this report, and with the City Departments of Housing and Community Development (HCD) and Economic and Workforce Development (EWD).

The City Administrator's Office Sustainability and Resilience Division and HCD staff coordinated in developing and distributing the property management survey described above. HCD staff in Residential Lending Services also provided extensive feedback on opportunities and challenges for folding electrification scopes into existing City-supported projects.

For small business and restaurant engagement, EWD staff have provided consistent advice to the Sustainability Division regarding appropriate engagement channels and key business and economic development concerns in light of the COVID recovery. Staff in both groups continue partnering to incorporate electrification needs and opportunities into the City's Economic Development Strategy update.

SUSTAINABLE OPPORTUNITIES

Economic: Electrifying existing buildings in Oakland can provide opportunities for high-road jobs and job training opportunities. Given the extent of the economic transition that 100 percent building electrification will constitute, Oakland stands to experience significant economic development as local entrepreneurs create enterprises to address the many needs described above, and existing local businesses expand to fill niches. As all-electric buildings improve indoor air quality, the City can expect a reduction in asthma-related visits to the emergency room, freeing resources for other community-building needs. For more information on the potential impacts of electrification on the workforce, please refer to the Informational Report Regarding Workforce Development (provided concurrently for the February 14, 2023 Public Works Committee agenda).

Environmental: Building electrification will advance ECAP goals, particularly B2 (electrify all existing buildings by 2040) and A2 (enhance energy resilience). Methane gas is a climate super-pollutant with 84 times the heat-trapping potential of carbon dioxide. Eliminating its use in Oakland's buildings will not only remove a critical contributor to climate change, but also demonstrate to the rest of the world that demand for efficient, all-electric appliances and buildings is robust and attainable; Oakland's transition can have ripple effects that supports decarbonization across the globe.

Race & Equity: Eliminating gas use in buildings has potential to profoundly benefit vulnerable populations, particularly through health and safety. Gas burners release air pollutants such as formaldehyde (a known carcinogen), carbon monoxide (CO), and nitrogen dioxide (NO₂), which have been known to worsen existing breathing problems and other health problems in young children and the elderly. Onsite gas use increases risks of burns, fires, and explosions, all of which are disproportionately harmful to populations already at greater risks of poor health, housing displacement, or resource poverty. And, the ongoing reliance on gas for power needs exacerbates and prolongs the climate crisis, which disproportionately harms Black, Indigenous, and People of Color (BIPOC) and low-income communities.

Prioritizing a thoughtful transition for affordable housing and restaurants is the basis of equitable electrification as set forth in the ECAP's Racial Equity Impact Assessment and Implementation Guide (REIA). All ECAP Actions underwent extensive review and fine-tuning until they passed a "Preliminary Equity Screen" developed and administered by the community-led Equity Facilitator Team. That team created the REIA to ensure that City staff continue to maximize procedural

equity, that frontline community members benefit first and foremost from Actions, and that implementation is inclusive of potential co-benefits whenever possible.

The following communities are most impacted by the negative effects of methane gas use in buildings, and are also most at risk if electrification is implemented without appropriate supports and timing:

- People with asthma and other respiratory illnesses, and those at higher risk of contracting these illnesses as a result of background pollution exposure;
- BIPOC and low-income residents;
- Renters;
- Cash-poor homeowners in homes with deferred maintenance or structural problems;
- Seniors and people medically-dependent on uninterrupted electricity access; and
- Small independent retrofit contractors and construction workers, especially those specializing in gas plumbing, pipefitting, and gas appliance installation and maintenance.

Provided that existing building electrification is implemented consistent with the language in the ECAP and REIA, including continuing analysis of the available technologies and resources to support holistic electrification for all, these frontline communities will benefit from the transition. Potential benefits include better indoor air quality, improved public service provision through greater coordination among relevant agencies, lower electric bills, and increased energy security. Electrification can also increase the number of BIPOC Oaklanders with high-road jobs.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Staff has determined that this informational report does not constitute a project under the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines Section 15378 since the report will not cause a "direct physical change in the environment" or a "reasonably foreseeable indirect physical change in the environment." The report is for the purpose of providing information to the Council and does not authorize any specific development activity or promote new construction or growth. In addition, pursuant to CEQA Guidelines Section 15061(b)(3), CEQA review is not required because there is no possibility that this report, which does not authorize City action or require discretionary approval, may result in a significant effect upon the environment.

G. Harold Duffey, Interim City Administrator

Subject: Informational Report Regarding Electrification of Affordable Housing and Commercial Kitchens

Date: February 2, 2022

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ACTION REQUESTED OF THE CITY COUNCIL

Staff recommends that the City Council receive this informational report regarding the programs, resources, and currently available technologies for the electrification of affordable housing and commercial kitchens.

For questions regarding this report, please contact Daniel Hamilton, Sustainability and Resilience Director, at (510) 238-6179.

Respectfully submitted,

Daniel Hamilton

Daniel Hamilton (Feb 2, 2023 13:36 PST)

Daniel Hamilton
Sustainability and Resilience Director, City
Administrator's Office

Reviewed by:
Jacque Larrainzar, Program Analyst
Department of Race and Equity

Prepared by:
Shayna Hirshfield-Gold, Climate Program
Manager, City Administrator's Office