SoCalREN

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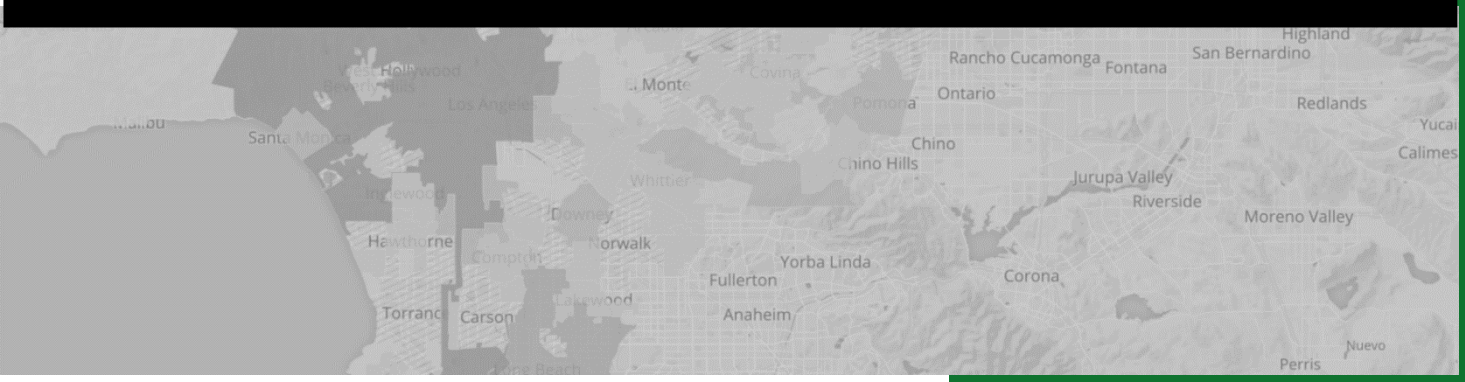
SoCalREN Electrification Research –

Early Insights on Local Government Policies



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SoCalREN Electrification Research Exec Sum

SoCalREN currently offers programs that support the adoption of fuel substitution measures in public agencies; however, public agencies have been slow to install fuel substitution measures. For those that have completed electrification projects, one of the drivers has been local policies or initiatives. Local policies can affect all building types, including municipal and privately owned buildings. As such, this research sought to better understand electrification policies that affect the jurisdictions within SoCalREN's region.

This research was undertaken to help inform SoCalREN's 2024-2027 portfolio of programs. This study presents information on barriers to local government adoption of electrification policies for buildings; the range of local government electrification policies and actions in SoCalREN territory; and existing electrification programs available to homes and businesses in SoCalREN's region. This research represented a limited review of information gathered from the program implementers and publicly available data, including information gathered from a literature review and case studies of 12 jurisdictions (secondary research only including review of websites, review of Climate Action Plans, etc.).

Barriers. At the local government level, there are four main barriers and hurdles to adoption of decarbonization policies (and electrification measures) affecting buildings: costs, equity concerns, political opposition and concerns around the lack of a skilled workforce. Local governments are concerned about the cost of mandated electrification – particularly for existing residential buildings.[1] Costs are different for new construction versus retrofits. Incremental costs for new construction are expected to be small; however, existing buildings may need to replace multiple measures (as well as update infrastructure such as the electric panel and wiring). For existing single-family homes, TECH data shows that:

- **HVAC electrification** costs range from $7,400 to $33,000 (average cost of ~$18,000)
- **HPWH electrification** costs range from $4,000 to $12,800 (average cost of ~$7,000)

In addition to these upfront costs, both new construction and existing buildings will see higher electric bills (operational costs). Limited studies have been conducted on whether the increased electric costs are offset by reduced gas bills. More research is needed, but the existing data indicates some variation by measure. There is also some evidence that lower income homes may see smaller savings because they have lower baseline consumption. Local governments are very concerned about equity issues when putting in place decarbonization policies. This may be particularly important in Southern California since there are many households that fall within Disadvantaged Communities (DACs) and lower income areas. Additionally, local governments may be concerned about local opposition because electrification has been perceived by some as limiting options for residential constituents. Lastly, there is a concern about the lack of skilled workers to implement decarbonization policies.

SoCalREN is looking to overcome these barriers with their portfolio of programs, including Codes and Standards (C&S), Workforce Education and Training (WE&T) and sector-specific programs.

Range of policies and actions regarding electrification. Southern California lags behind Northern California in terms of the adoption of electrification policies. Of 76 jurisdictions within California that have adopted electrification policies, 10 are located in SoCalREN's region (as of Feb 2023). For those with adopted policies (or codes), these range from natural gas bans to "phasing in" electrification for **new** buildings. Local governments do not yet have electrification policies for **existing** buildings – but many are supportive of electrification goals (but not

[1] Note that they are also likely concerned about electrification in their own (public or municipal buildings); however, this was not described in the literature. We would need to conduct interviews to gather more information.

necessarily policies). Across SoCalREN's region, we estimate that under half of all jurisdictions appear to have had discussions or taken some action that indicates that they are supportive of electrification[2].

Our research attempted to explore whether there was a disconnect between supportive rhetoric and funding. For new buildings, this is difficult to assess since enactment of building electrification ordinances (the main policies currently being put in place) require political support but almost no funding from the local government. For electrification of existing buildings, most of the supportive local governments indicate in their climate action and sustainability plans that they rely on external funding through voluntary programs at the state or Investor Owned Utility (IOU)/REN/CCA level rather than allocating local funding for programs. We note that there were some cities in our case studies that clearly stated in their climate action plan or on their website that their electrification goals were unfunded.

Electrification programs. While we only found a couple of local electrification programs within our review, there are multiple federal and state-level programs that do (or will) support electrification of buildings in SoCalREN's territory such as the Technology and Equipment for Clean Heating Program (TECH), the Building Initiative for Low-Emissions Development Program (BUILD), the Equitable Decarbonization Program and Inflation Reduction Act (IRA)-funded efforts. Many of these target low- and moderate-income households. Fewer programs seem to be directed to commercial or municipal facilities. Support for residential-sector electrification may not be a gap in the market (as programs are available for all income levels); however, SoCalREN's region includes lots of equity targeted communities. The large number of disadvantaged communities in SoCalREN's region, in combination with the high cost of some of the measures, means that cost will continue to be a barrier for households and businesses. As such, stacking of incentives from multiple program administrators (including SoCalREN) could help.

SoCalREN Options for Future Electrification: This report describes some of the existing policies and programs to help SoCalREN understand the current environment so that SoCalREN can understand where their support will be most valuable.

- **Building level support.** Our findings show that for residential, non-residential and municipal buildings, SoCalREN support could help extend the reach of existing and emergent programs, either through additional funding or through education, outreach and connections to existing programs.
- **Policy level support.** Our findings also show that some jurisdictions in SoCalREN's region may need support developing and implementing electrification policies. SoCalREN has proposed support for reach codes and code compliance that could play this role. These efforts will need to coordinate with SCE, 3C-REN and IREN as they also have programs supporting this area.[3] Within this report, the authors describe existing resources that could serve as a model for electrification policies and reach codes, so SoCalREN should seek to connect local governments to these resources.

[2] Jurisdiction support for electrification is described in the next paragraph, but this is generally through support for voluntary actions.

[3] SCE has a Reach Codes program that will go into 2024. It has a 2024 budget of $1.3 million and supports decarb. The IP is here: https://cedars.sound-data.com/documents/download/2813/main/.

SoCalREN Electrification Research

Introduction to this Study

This study gathered information on federal, state and local electrification policies; local government adoption of electrification efforts; and barriers to local government adoption of electrification policies. (This work did not focus on electrification of transportation.)

The objective was to provide information that SoCalREN can use to better understand gaps and needs of public agencies and the communities they serve.[4] Specifically, the report provides recommendations about what support (regarding electrification) may be valuable in the future – primarily from SoCalREN's public-sector programs since our research grew out of a public sector research effort. This report, however, also touches on residential sector costs since the costs relate to public sector decisions about mandates for energy efficiency.

We note that electrification is of particular interest in Southern California, due to both climate and air quality issues.

Key Research Questions:

The research questions[5] for this study included:

1. **Barriers**. What are the barriers and hurdles to adoption of decarbonization policies (and electrification measures)?
    - **Cost as a barrier.** From the literature, is there a significant cost impact related to electrification? Is the public sector concerned about the costs?

2. **Range of policies and actions.** What is the range of public sector actions regarding electrification policies for their communities? (Note that we use the term "communities" to refer to both public and private buildings that would be affected by any new local government policies or mandates.)
    - **Funding of electrification actions.** Is there a disconnect between public goals around electrification (as stated in their policies) and public funding (i.e., actions) to get the community's buildings electrified?

3. **Programs.** What other programs in SoCalREN's territory already support public sector efforts to decarbonize/electrify buildings?

The research methods included review of existing literature and public sector programs, secondary research (i.e., websites and literature review), and feedback from SoCalREN implementation team that works directly with public agencies. Additional information about the literature reviewed is included in Attachment 1b.

Background on SoCalREN Public Sector Electrification Efforts

Through SoCalREN's Project Delivery Program (PDP), SoCalREN provides public agencies with assistance to help reduce energy use in their facilities. This includes technical assistance and project support for electrification projects, if needed by the participating agency. In addition to assistance and guidance, if a building is eligible, SoCalREN can also provide incentives for fuel substitution measures such as the electrification of HVAC systems,

[4] We use the term "communities" to refer to both public and private buildings that would be affected by any new local government policies or mandates.
[5] These have been grouped to roughly align with the structure of the report.

water heaters, and the conversion of gas ovens and fryers to electric equipment through SoCalREN's Streamlined Savings Pathway.[6] To date, however, uptake of fuel substitution measures has been limited.[7]

In May of 2023, SoCalREN added a Heat Pump Water Heater (HPWH) offering to their Streamlined Savings Pathway. HPWHs were offered for free[8] to underserved public agencies, or at up to 80% cost coverage for all other agencies. While SoCalREN was able to get some traction installing HPHWs in 2023 – 87 were installed in municipal buildings, schools, police departments, community centers, retail buildings (owned by cities), park facilities, fire stations and libraries – according to the implementer, uptake was difficult. SoCalREN implementers described some of the challenges (captured below).

Barriers and Drivers of the Adoption of Electrification Measures in Public Sector Buildings

Based on the SoCalREN implementer's experience installing fuel substitution measures, the main barriers to installation are the cost of the equipment, the availability of some types of equipment (supply side barriers), difficulties in older buildings, procurement, and permitting.

- **Upfront costs and availability**. Even though a significant portion of project installation costs were covered for agencies, uncovered costs - even just 20% - were often a barrier for participants to overcome. For HPWHs, while public agencies can use the same size HPWH as residential buildings, SoCalREN has found that HPWH costs are very different for the public agencies (than for the residential sector). Part of the higher costs may be because public agencies often require installers to be paid prevailing wages – so installations cannot scale as well in the public sector as in the residential sector. SoCalREN reported that the cost of the HPWH equipment in general jumped (~200%) in 2023. For HVAC equipment, electric equipment is both very expensive and according to the implementer, very backordered. Some planned projects are still waiting for units and have been quoted upwards of one year in lead time.
- **Older building stock.** Many public agency facilities are old and the older the building is, according to the implementer, the harder (and more expensive) it is to convert to electric. Electrical panel upgrades are required to handle the additional electric load required when transitioning equipment from gas to electric. Older facilities typically have smaller electrical panels, in terms of amperage and number of breaker slots available. Thus, according to the implementer, the need for panel upgrades is more prevalent when electrifying older facilities.
- **Procurement and permitting.** Public agencies have arduous permitting policies that require many different documents to be developed, procedures to follow, and a large amount of labor hours to complete the procurement process. Each public agency has their own unique policies to adhere to, and this is very time-consuming to learn the proper process and manage the procurement appropriately, according to the implementer. Similarly to procurement, the permitting process varies significantly across public agencies. This process can be equally as time-consuming and labor-intensive as procurement in many cases and poses similar barriers to project completion for public agencies and program implementers.

SoCalREN implementers noted, however, that barriers are not the same as drivers. SoCalREN found that one of the main drivers is how progressive the local government is in terms of their policies. For example, Culver City has an

[6] SCR's Even Access Portfolio funded by CEC also supports charging station installations. Participation in the EE program is mandatory.

[7] As of data available in CEDARs on 1/4/24, in 2023 the only SoCalREN's public sector claims were 2 NMEC claims (without information on what was installed). Q4 2022, is similar. There were 13 NMEC claims and savings from streamlined savings (HVAC and lighting). The HVAC measure was a chiller.

[8] Costs covered included heat pump water heater equipment, contractor labor, capping existing gas line with a brass plug, demolishing existing vent, installing water heater electrical hookup, running electrical wire, and electrical panel upgrades. Note: electrical panel upgrade incentive coverage dependent on the scope and economics of the upgrade.

aggressive goal to decarbonize all of the equipment in their city. As such, policies (or proposed policies) were more of a driver than costs. The remainder of this report focuses on electrification policies. Note that we recognize that air quality regulations (not covered in this document) may also be a driver for the installation of heat pumps (or fuel substitution).

Barriers to the Adoption of Electrification Policies

Through our literature review, we came across four prominent barriers to the adoption of local government policies. Some, such as cost, pose as a barrier both to the adoption of local policies (because local governments are concerned) as well as a barrier to individual building owners taking action in their own buildings[9]. Note that currently these barriers are based on our review of the literature – not on discussions with local governments.

(1) Cost

One of the main concerns with building electrification is the cost. Local governments do not want to adopt policies (related to residential or commercial electrification) that lead to higher costs for their constituents. This is less of a barrier to the adoption of policies around new construction since electrification of new construction has only small or no incremental costs.[10] As such, some jurisdictions have started to adopt policies related to the electrification of new construction (discussed more in the sections below). However, *retrofitting* a building from gas appliances and equipment to all electric does have additional costs and for this reason, local governments are hesitant to adopt policies related to electrification of existing buildings. Available data on costs is described briefly below. We also provide more details in the attachments to this document. For the purposes of this document, we focus on costs for electrification in single-family residential homes. (We did not come across good information on commercial or public sector costs; however, as noted above, the SoCalREN implementers found that HPWH costs for public buildings were roughly 10% higher than residential costs.[11])

Residential Existing Construction – The Upfront Cost of Electrification.

In California, the best available data on the total cost of electrification projects comes from TECH data. TECH reported on total project costs for HVAC and HPWH electrification projects over the past couple of years in their TECH Working Data Set (https://techcleanca.com/public-data/download-data/). Total project costs (after removing the bottom and top 5% of costs[12]) vary both within and across measures. Within the residential single-family data:

- **HVAC electrification costs.** $7,400 to $33,000 (average cost of ~$18,000 for the 10,984 HVAC units)
- **HPWH electrification costs.** $4,000 to $12,800 (average cost of ~$7,000 for the 1,896 HPWH units)

Notably, only about 5% of the projects included a panel upgrade with more HPWH including panel upgrades than space HPs (9% vs 4%, respectively). On average, costs for projects with panel upgrades were only a few thousand

[9] This report looked at costs from a public policy viewpoint. We did not explore residential barriers to electrification (beyond cost).

[10] A Rocky Mountain Institute Study (RMI) found that in every city that they analyzed (none of which were in CA), a new all-electric, single-family home is less expensive than a new mixed-fuel home that relies on gas for cooking, space heating, and water heating. (https://rmi.org/all-electric-new-homes-a-win-for-the-climate-and-the-economy/). Other studies have found that for residential new construction projects (without any natural gas in a home), it is $7,500-$8,200 less expensive (cheaper) to construct than the baseline home (modeled data).

[11] Based on TEC discussion (Dec 2023).

[12] Note that this value represents the middle 90%. The full range is from $1,250 to $70,000 but these projects have not had QA/QC by us to fully explore the extent of the project so we report only on the middle 90%. We also note that these are TOTAL costs, not incremental costs (i.e., incremental costs are the difference between the cost of a standard piece of equipment and the cost of the energy efficient piece of equipment).

more than those without panel upgrades. (The cost of a panel upgrade is not broken out – they are included in the HVAC and HPWH bullets above.)

A full electric upgrade could require the cost of upgrading the electrical system as well as replacing gas-powered appliances with electric ones (e.g., HPWH, induction cooktops, space heat pump).

We note that the data above represents total projects costs – **not incremental costs**. (Energy efficiency rebates generally cover all or part of the incremental costs if households receive rebates.)

Residential Existing Construction – Operating Costs. Little analysis on actual bill savings exists. However, one California study (DNV 2023) indicated that the average residential household saved ~$50 per year on their bills when moving from a gas furnace to a central heat pump (actual data). This same study found that lower income households (i.e., those on the CARE or FERA rates) saved less on average as they also had lower consumption. A similar study from the previous year (DNV 2022) indicated slightly higher savings ($95/year) for central heat pumps. However, it also showed negative savings, equivalent to bill increases, for ductless heat pumps (which the study authors thought was because the ductless HPs were installed in places where there was no previous AC).

(2) Equity Concerns

Local governments are concerned about equity because electrification of retrofits can be costly – and will increase the electric bill. Some communities (both the municipal buildings and residents/businesses if it is a lower income community) may not have the resources to upgrade their buildings or pay for any increased utility costs. **Equity may be one of the biggest barriers in Southern California since there are a lot of disadvantaged communities.**

Local governments are concerned about electrification costs disproportionately affecting lower income communities and leading to an increase in poverty levels.

Our literature review indicated that the operating cost burden of policies requiring electrification will more heavily affect poorer households (Price Schools of Public Policy 2021) and that lower income customers may be left shouldering the increased cost of the gas infrastructure as wealthier customers fully decarbonize (and so are not required to pay for any gas infrastructure). (Climate Change and Business Research Institute 2021). If there are local investments in electrification, lower-income customers are more likely to rent and live in multifamily housing which reduces their ability to invest in electrification.

However, lower income communities are also often disproportionately affected by the health impacts of home natural gas use due to smaller, older housing stock[13] and limited ability to maintain and replace older appliances.

(3) Political Opposition (e.g., from those wanting to maintain reliability and not wanting to restrict choice)

There can also be political barriers to electrification. Some stakeholders are resistant to change or have concerns about the reliability of the electric system or the perceptions of limiting options available for homeowners. This can make it difficult for local governments to get buy-in for electrification programs.

In the past, local groups have demonstrated that there is opposition to electrification. For example, Californians for Balanced Energy Solutions (C4BES) launched in February 2019 as the first front group in the United States to fight building electrification. This effort was led by SoCalGas, which got 133 local governments across California – the majority of which were in SoCalREN's region – to sign on to this effort.[14] This effort is now defunct, but it

[13] Lower income households tend to live in smaller homes and consume less energy which means savings are not as high. Also, low-income households tend to spend more per square foot on utilities, perhaps due to the conditions of the building.
[14] The now-defunct organization served as a template for other anti-electrification front groups, including Partners for Energy Progress, created in March 2020 by gas utilities in Oregon and Washington. (https://energyandpolicy.org/californians-for-balanced-energy-solutions/).

demonstrates local attitudes. While only representative of their position in 2019-2021, the number of cities and counties that signed shows that somewhat recently (within past 5 years), the city leadership (and community) was hesitant to adopt electrification policies. **Note that 45% of all cities in SoCalREN's region had signed on to the C4BES resolution by 2021.**

The percentage of jurisdictions by county that signed on to the C4BES is shown in the table below. Again, this is older data – and some jurisdictions have since changed their opinions – however, it indicates hesitation in some areas.

Table 1. Count of Cities, Cities with CAP, EAP, or Inventory and Cities that are SoCalGas Resolution List by county (higher percentages in yellow indicate counties that may be harder to penetrate)

County	# of Incorporated Cities	# of cities with CAP/EAP/ or inventories	Percent of cities that signed C4BES Resolution (prior to 2021)
Los Angeles	88	41	31%
Orange	34	16	47%
Riverside	28	28	79%
San Bernardino	24	24	54%
Kern	11	2	64%
Ventura	10	10	20%
Santa Barbara	8	4	13%
Tulare	8	2	75%
San Luis Obispo	7	7	0
Imperial	7	2	100%
Kings	4	2	50%
Mono	1	0	0
Inyo	1	0	0
Total	**231**	**138**	**45%**

Yellow indicates C4BES signature values over 50%.

Even cities that are supportive have made recent statements such as "While the City recognizes that building electrification is beneficial from a GHG reduction perspective, it also sees the need to retain natural gas as a reliable energy source for times when the electricity grid is disrupted, at least for the foreseeable future (Oxnard Climate Action Plan, December 2022, https://www.oxnard.org/wp-content/uploads/2023/01/Oxnard-CAAP_2022-12-07_Adopted.pdf).

(4) Lack of a Skilled Workforce

Another local concern is workforce development. As more buildings are electrified, there will be a need for trained workers to install, maintain, and repair electrical systems. However, there may be a shortage of such workers, which can make it difficult for local governments and their constituents to find qualified personnel to do the work.

We note that the TECH program trained 180 workers from January to June 2022 (and are continuing their training). Additionally, 594 contractors have installed slightly more than 12,000 space heat pumps and ~2,100 heat pump water heaters (HPWH) through the program. (TECH database accessed 8/5/23.) Slightly less than half of the installed space heat pumps (~5,500) and ~13% of the HPWH (~260) were in the SoCalGas service territory.

SoCalREN's future programs should seek to understand what is already happening in the region and offer support to local governments, their communities and the workforce to help the region decarbonize. We describe some of the existing policies and programs below to help SoCalREN understand the current environment and where SoCalREN support will be most valuable.

Overview of Electrification Policies – Statewide and Local

This section first provides an overview of state policies, followed by local policies. This includes policies that are in effect now, those that have been adopted but go into effect in the near future, and other support for state programs and future efforts. We present this information since SoCalREN experience has shown that often, the driving policy for going to a heat pump is related to policies. Note that the driving factor may also include air quality regulations (not captured below).

Statewide Electrification Policies

Adopted Statewide policies (in effect now). Statewide, a recent statewide energy code (enacted by the California Energy Commission) supports and encourages the electrification of new residential and nonresidential buildings (which includes municipal buildings)[15], i.e., the 2022 Energy Code[16]. The energy code *encourages* (rather than *requires*) electrification, and it only targets some measures. *It does not mandate the electrification of new buildings.* The only mandate in the Energy Code is a requirement that *enables* electrification for the future. This code also only applies to new construction or major retrofits – existing buildings are not addressed. Specifically, the 2022 code:

- *Encourages* efficient electric heat pumps in new construction
    - The code establishes performance standards (the energy budgets) based on efficient heat pumps for space or water heating to encourage builders to install heat pumps over gas-fueled HVAC units. Energy budgets vary based on climate zone and building type.
- Establishes electric-ready requirements for new homes to *enable* future electrification
    - The code requires single family and multifamily homes to be "electric-ready", with dedicated 240-volt outlets near furnaces, cooktops, and dryers so electric appliances can eventually replace installed gas appliances.

Adopted Statewide policies (not yet in effect). In addition, the California Air Resources Board (CARB) has approved a strategy to ban the sale of gas heating and water heating equipment statewide starting in 2030. After 2030, existing gas furnaces and water heaters will remain in place, but the only option for replacing equipment that breaks after 2030 will be zero-emission alternatives like electric equipment. Customers who are aware of this upcoming restriction may seek to replace their existing gas equipment with new gas equipment before 2030. However, those replacements may need to be made absent any incentives since, in April 2023, the CPUC put in place a framework that reduces incentives for gas appliances over the next ten years.

Adopted Statewide policies that support voluntary electrification in buildings. Other statewide policies have established programs to allow owners to voluntarily start to electrify their homes or businesses.

- In 2018, Senate Bill 1477 (Stern) required the CPUC to develop and supervise the Building Initiative for Low-Emissions Development Program (BUILD) and Technology and Equipment for Clean Heating (TECH) voluntary programs. TECH began in 2021 and BUILD launched in 2022.
- In 2020, a trailer bill for AB209 (Committee on Budget, Chapter 251, Statutes of 2022), established the Equitable Building Decarbonization Program that will be run by the CEC (beginning in 2024) to help decarbonize residential homes.

[15] Schools are a specific type of nonresidential building. A municipal building would fall into one of the other building types such as office, library, parking garage, etc. and would be covered under the category of a nonresidential building. A nonresidential building is further divided into function areas that have varied requirements for items such as temperatures, ventilation rates, etc.

[16] 2022 Building Energy Efficiency Standards for Residential and Nonresidential Buildings: For the 2022 Building Energy Efficiency Standards Title 24, Part 6, and Associated Administrative Regulations in Part 1, effective January 1, 2023

- Early in 2023, the CPUC adopted a decision to reduce incentives for natural gas energy efficiency measures in both residential and commercial new construction (D.23-04-035 specifically exempts agricultural and industrial segments).

Potential future statewide policies. There are also other statewide policy decisions and initiatives underway. One policy, AB 593 (Haney), if it passes, will encourage faster adoption of electrification by directing the California Energy Commission to develop a greenhouse gas emission reduction plan for the building sector, complete with milestones to ensure the state stays the course. (https://buildingdecarb.org/ab-593-california-building-emission-reduction-strategies-haney-passes-first-committee)

An overview of these Statewide efforts, by category, is shown in the table below,

Table 2. Overview of Statewide Policies (and Programs)

Organization	Policy / Program	Timing of Policy	Mandatory or Voluntary	Type of Building Affected by Policy	Notes
Adopted (in effect) Statewide Policies that Support Electrification in New Construction					
CEC	Statewide Energy Codes (updated every three years)	2022 Energy Code now in force	Mandatory	New construction (or major retrofit) of any residential or nonresidential building	Enables "electric-ready" residential new construction [Does not mandate the electrification of new construction.]
Adopted (but not yet effective) Statewide Policies that Support Electrification in New and Existing Buildings					
CARB	Banning the sale of gas heating and water heating equipment	Starting 2030	Mandatory	Existing buildings and new construction	
Adopted Statewide Policies that Support Voluntary Electrification in New and Existing Buildings					
CEC	TECH Program	In place now	Voluntary	Existing buildings	
CEC	BUILD Program	In place now	Voluntary	New buildings (primarily 75% lower income)	
CEC	Equitable Building Decarbonization Program	2024	Voluntary	Statewide	
CPUC	Reduction of incentives for gas equipment	2024	Mandatory	EE Programs	For specific measures only and a stepped change over 10 years

Local Electrification Policies

Some local governments have also developed local policies to encourage electrification. This includes a few different approaches ranging from full bans through a municipal ordinance, changes to buildings codes, and policies that offer exemptions or phase in of electrification for various building types over time.

The most common mechanism used by cities has been building codes or "reach codes" for new construction. A few local governments have passed "gas bans", meaning that any residential (and nonresidential) new construction must use electric appliances since gas can no longer be extended to the home. However, some of these codes are not comprehensive but rather the code takes a go-slow approach encouraging a first step, or one electrification measure, such as in November 2022, when lawmakers in Palo Alto, Calif., required heat pumps for water heating but not space heating during residential alteration projects.

Notably, even the most progressive cities have restrained from requiring electrification of existing buildings, although some (Northern and Southern) California cities are considering passing policies to encourage electrification of existing buildings. For example, San Mateo is evaluating whether to require homeowners to install electric space and water heating appliances when gas equipment reaches the end of its useful life, a policy sometimes called a "burnout" provision. Climate advocates proposed prohibiting gas appliance replacements by 2025 (five years before the CARB policy takes effect). City staff is preparing to study that idea and other decarbonization strategies.[17] Two jurisdictions in Southern California are also considering policies that would affect existing buildings (discussed further below).

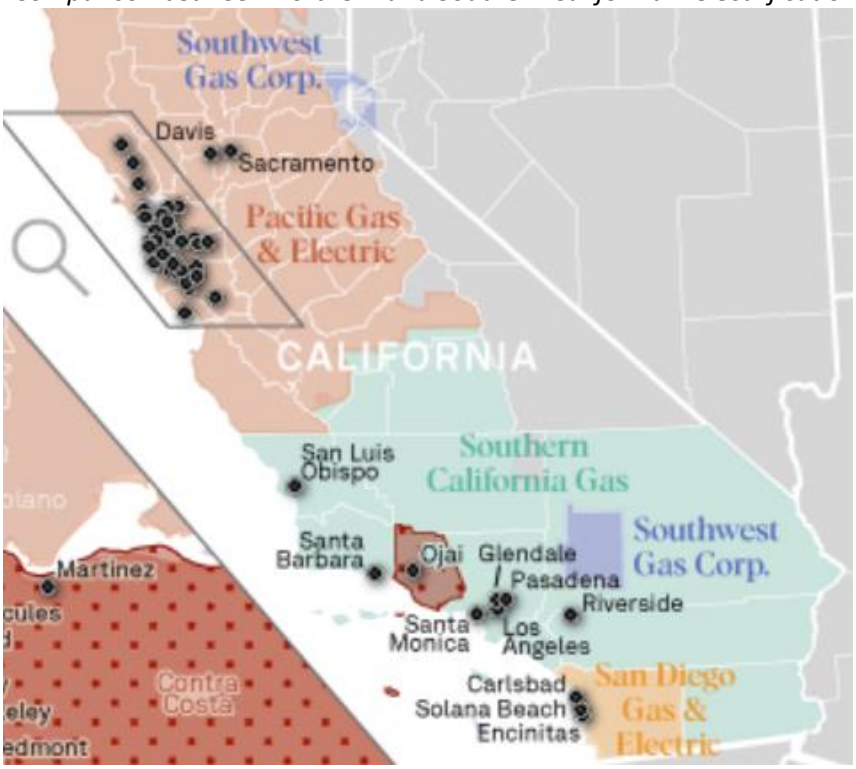
Southern California Lagging Northern California

Overall, it is clear that Southern California is behind Northern California in their adoption of electrification policies (and thus may need more support from organizations such as SoCalREN). As of February 2023, there were 76 California cities that had adopted local electrification policies – however, most of these are in Northern California or PG&E's territory.[18] The large majority –more than 60 of 76 – are in Northern California. The figure below shows the density of electrification policies in the North compared to the spread across Southern California.

[17] [SOURCE IS SAME AS MODEL ORDINANCE. NEED TO ADD]

[18] Source: https://www.sierraclub.org/articles/2021/07/californias-cities-lead-way-pollution-free-homes-and-buildings, Feb 2023.

Figure 1. Comparison between Northern and Southern California – electrification policies



Source: DiChristopher, T. 2023 (Feb 2). California cities begin to require building electrification retrofits. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/calif-cities-begin-to-require-building-electrification-retrofits-74078882. Note that XYZ are not shown in the figure above (and a few from Northern California are also missing) but the figure demonstrates the difference between Northern and Southern California.

Of the 76 jurisdictions with electrification policies, 10 - nine cities and one county - fall within SoCalREN territory. (We describe the 10 SoCalREN jurisdictions with electrification policies in the section below.) While these policies are primarily for new construction (rather than existing buildings), these actions indicate an inclination to support electrification in their communities.

The 10 Southern California jurisdictions with electrification policies[19], (i.e., 9 cities and 1 county), range from "natural gas bans" to requirements for new construction to be "all electric" sometimes with no restrictions and sometimes with more extensive exemptions such a Ventura County's exemptions for "*indoor/outdoor fireplaces, outdoor grills, swimming pool and spa heaters, commercial cooking, and commercial and industrial equipment approved by building officials".* Similar to other parts of California – all policies only apply to new construction (or major retrofits). However, we found two local governments (the City of Los Angeles and Burbank) planning to implement a policy related to **existing** buildings (as of August 2023). Most local governments rely on voluntary programs.

Table 3. All SoCalREN Cities and Counties with Local Electrification Policies

Cities or Counties*	NEW building policies
1. **City of Santa Barbara** ("gas ban" for all new construction) 2. Carpinteria ("gas ban") 3. **Glendale** (for all new construction) 4. Ojai (recently removed all exemptions)	• **Natural gas bans** (i.e., prohibits installation of natural gas infrastructure in new construction) and electrification of **all new construction (no exemptions)**

[19] These are based on the Sierra Club document.

Cities or Counties*	NEW building policies
*Culver City (FUTURE – with efficiency requirements) *Los Angeles County (FUTURE– also some mention of existing transition)	
5. Agoura Hills (exception for commercial cooking and spas) 6. City of Los Angeles (exemption for commercial cooking) 7. Santa Monica ("limited exemptions") 8. Ventura County (exceptions for indoor/outdoor fireplaces, outdoor grills, swimming pool and spa heaters, commercial cooking, and commercial and industrial equipment approved by building officials) *Burbank (FUTURE– also some mention of existing transition)	• Electrification of **all new construction** (**limited exemptions**)
9. Riverside City (three-stories or less until 2026 then all) **10. Pasadena** (multifamily and non-residential new construction (not residential)	• Electrification of **some building types** or **phased in** electrification

* Bolded cities or counties are explored as case studies below.

Other jurisdiction, however, such as Burbank and Culver City, have ***proposed*** reach codes and building electrification policies that they are starting to phase in through the decarbonization of public facilities (https://www.culvercity.org/City-Hall/Departments/Planning-and-Development/Building-Safety/Electrification-REACH-Codes).

Note that we dig into four of these jurisdictions (two from the top of the list and two from the bottom, all shown in bold) in the case studies below.

SoCalREN Area- Electrification Case Studies Demonstrating Range of Efforts

The evaluation team did a deeper dive into 12 cities to gain a better understanding of local government opinions, attitudes and actions towards local policies that encourage electrification of buildings (i.e., 12 case studies). To give SoCalREN a sense of the efforts being undertaken by local governments – and the need for support by SoCalREN – our case studies attempt to represent jurisdictions along a continuum of electrification efforts from those that are least likely to electrify to those that have already made significant efforts to electrify on their own.

Overall, our review suggests that many local governments are supportive of electrification, but the pace and scale of implementation may depend on various factors, such as available funding, community support, and political will.

Table 4. Case Studies - a Deeper Dive Into 12 Local Jurisdictions

Continuum Grouping		Estimate of % of SoCalREN pop	CAP (Y/N)	12 Jurisdictions
Most Likely to Electrify	Leading edge	<5%	HAS a CAP, EAP or some sort of inventory	**Riverside City (has reach codes) (B)** **Glendale (has reach codes)** **Pasadena (has reach codes)** **Santa Barbara City (has reach codes)**
	Some movement	30-35%		Palmdale (future plans for reach codes) (B) Oxnard Claremont 2021
	"Green" but no electrification actions	40-45%		Fontana (B) Tulare County (B) Visalia
Least Likely to Electrify	Least likely	15-20%		Kings County (B)
			Does NOT have a CAP, EAP or some sort of inventory*	Compton

*(Many not explored for this research effort)
(B) On Balanced Energy Resolution List (2019)

We provide details on each jurisdiction – by continuum grouping – below. We also provide a rough estimate of the percentage of the jurisdictions that we would expect to fall into this group. Note that this estimate is based on an exploration of past attitudes towards electrification and past data on whether jurisdictions have a climate action plan (CAP). Additional research is needed to make these estimates more reliable, but we offer these values to give SoCalREN some sense of need.

This is currently based on an exploration of CAPs and websites, only sometimes coming across operational plans for implementing actions. This is not based on interviews with these jurisdictions and represents only a snapshot in time.

Leading Edge of Electrification

In the table below, we include four[20] cities within SoCalREN's territory that are the "leading edge" in terms of electrification – specifically because they have electrification-related codes for new construction. The first two cities (Glendale and the City of Santa Barbara) have requirements for all electric new construction or full natural gas bans. Riverside and Pasadena also have electrification-related new construction policies; however, they are not all inclusive. One (Riverside) is implementing a staggered requirement – requiring all buildings that are 3 stories or less to meet the requirements now, while taller buildings will be phased in in 2026. The other (Pasadena) has exempted single family homes.

Notably, electrification of *existing* buildings relies on voluntary programs or "unfunded studies" of fuel switching (e.g., Riverside City).

Three of the four case studies have their own Publicly Owned Utility (POU) and the fourth, the City of Santa Barbara, is served by Santa Barbara Clean Energy (a CCA). The median income in these four cities ranges from $74,000 to just over $89,000 per year.

As mentioned above in Table 3, 10 (<5%) of SoCalREN's 244 jurisdictions[21] fall into this category of being at the leading edge of electrification because they have an electrification policy. Others, however, are moving in that direction (discussed more below).

[20] These are 4 of the 10 with local government policies (shown in Table 3), but we describe the types of policies in the table below.

[21] 231 cities and 13 counties

Table 5. Case Studies of Jurisdictions with Electrification Codes – Leading Edge

Jurisdictions with electrification policies and type/description of electrification efforts		
Jurisdiction	Electrification Policy	Description
Glendale median income of $74,488 (2)	All electric new construction (NC) policy - (also, EV charging for all and PV for MF and commercial)	Glendale (in alignment with the City's Sustainability Plan) has adopted electrification policies (specifically a reach code that applies to all res and non-res new construction), and as such, is at the forefront of electrification (within SoCalREN's area). This city has a **strong focus on EVs and solar power.**
City of Santa Barbara median income of $89,243 (3)	Natural gas ban for NC	While Santa Barbara **emphasizes electrification of vehicle fleets**, electrification and decarbonization of the building sector is very important to Santa Barbara. This city has passed an ordinance that prohibits natural gas in *new construction*. Santa Barbara also directly addresses **decarbonization of *existing* buildings**, but states that this will occur **through voluntary programs**, specifically, through a "combination of incentive and funding programs coupled with educational opportunities to encourage a transition to all-electric existing buildings as owners are able." These voluntary programs are offered by the state, program administrators, and others. In addition, as of August 2023, Santa Barbara offers a voluntary program where customers can try out an induction cooktop.
Riverside City median income of $76,755 (3)	Staggered "all electric" requirement for NC - 3 stories or less now: All new buildings in 2026	Riverside City adopted an all-electric new building code for new buildings (under three-story only) with the **phase in of electrification of all new buildings** (in 2026). Note that in the city's Strategic Plan, fuel switching related action items (Action 4.1.3) - which primarily consists of "studies of fuel switching" - are **unfunded**.
Pasadena median income of $89,661 (3)	All electric NC (single family exempt)	Pasadena appears extremely committed to energy efficiency and the reduction of GHGs. While they have a slightly older CAP (2018), Pasadena is **taking actions** and tracking progress towards the reduction of GHG, and they recently adopted a building ordinance requiring electrification in *certain types* of new buildings. Note that they **exempted all single-family new construction** to "enable current **property owners to choose** the energy type that works best for their needs." Pasadena "may revisit this" (around 2023). This City relies exclusively on voluntary programs for electrification of residential homes despite strong arguments for electrification.

(1) More than 15% below the poverty line; (2) 10% to 15% below the poverty line; (3) 5% to 10% below the poverty line; (4) less than 5% below the poverty line. All data is 2021 data.
Note that the lighter green indicates that these two have exemptions – not a full gas ban or adoption of electric only new homes.

Some Movement Towards Electrification

We also explored a few cities that appear to have taken some actions toward electrification – i.e., made some movement – but that do not yet have electrification policies. These jurisdictions tend to be very supportive of sustainability but are still considering the pros and cons of electrification or feel that other competing priorities are more important.

The median income in these cities represents a large range from around $70,000 (and over 10% below the poverty line) to nearly $112,000 per year (where only 3% of the population is under the poverty line). We would expect that perhaps as many as one third SoCalREN's jurisdictions fall into this category.

Table 6. Case Studies of Jurisdictions – Some Movement Towards Electrification

Jurisdictions that have made some movement in the direction of electrification, but no policy yet			
Jurisdiction	CAP type	Description	
Claremont median income of $111,937 (4)	Sustain. City Plan	Claremont recently (2021) updated their Sustainability City Plan, which includes energy-related goals for city facilities, privately owned facilities, and residential development. The Plan (and the City/City website) appear(s) to be **very green leaning** - emphasizing energy conservation, energy efficiency and sustainability. There is also limited direct mention of electrification. In general, the Plan encourages considering **the pros and cons of electrification** while trying to move in that direction.	
Oxnard median income of $83,180 (3)	CAP	Oxnard has a recent (2022) CAP that emphasizes risk mitigation from drought, wildfire, floods, extreme heat and poor air quality - focusing on the most vulnerable populations. Under Green Buildings, the city has an **explicit goal (B.2) to electrify buildings**, but they have not passed a policy to do this (they encourage CALGreen (Title 24) requirements for electrification of new buildings) and this effort **appears to be unfunded,** with a specific focus on partnering with RENs and others.	
Palmdale median income of $70,858 (2)	General Plan-energy chapter	Palmdale is **supportive** of both energy efficiency and electrification, **but other things are documented as more important** (in CH 14 of General Plan). Most electrification-based action is in transportation, but they have a goal of having a reach code addressing electrification of new buildings. Palmdale explicitly looks to the CCA for reduction of GHG. There is no indication of actions taken towards goals/targets, but they have assigned a group to be responsible for future the future reach code. However, as of April 2022, this city has completed 18 energy saving projects with the support of SoCalREN with seven more active.	
(1) More than 15% below the poverty line; (2) 10% to 15% below the poverty line; (3) 5% to 10% below the poverty line; (4) less than 5% below the poverty line. All data is 2021 data.			

"Green" but No Mention of Electrification

There are also multiple jurisdictions that are more focused on land use or air quality. These jurisdictions appear to be aware of and supportive of energy efficiency, but they have not funded efforts specific to energy efficiency in buildings. There is no mention of electrification within the CAPs or websites in these jurisdictions.

The median income in these jurisdictions ranges from just over $57,000 to around $83,000 per year. Our estimate is that 40-45% of all jurisdictions fall into this category.

Table 7. Case Studies of Jurisdictions – No Mention of Electrification, but Supportive of EE

No mention of electrification, but already supportive of sustainability or energy efficiency			
Jurisdiction	CAP type	Description	
Fontana median income of $83,468 (2)	CAP	In Fontana, **air quality** appears to be extremely important, and the community seems supportive of "environmentally friendly building and development practices" (82% ranked as high or medium priority). The city has GHG and conservation goals (from 2018 Plan), but the **goals appear to be broad and unfunded**. Fontana "promotes green building through guidelines, awards and non-financial incentives." There is no mention of electrification in CAP or on the website.	
Visalia median income of $69,252 (2)	CAP	Visalia has a CAP that is 10 years old. They focus on **air quality** and GHG reductions. While there are GHG goals, they appear to be outdated. The City of Visalia has undertaken a number of initiatives including 6 projects with SoCalREN to date, so are supportive of energy efficiency but there is no mention of electrification in their CAP or on their website. Visalia seems to be a **smaller under resourced city that would need support to encourage electrification.**	
Tulare County median income of $57,397 (1)	CAP	Tulare County is a rural agricultural county with a CAP that is focused on land use and transportation (more than buildings). The county does have a somewhat recent CAP, but they **assessed the viability of taking EE action** and determined that many of the possible actions are not viable or **they don't have time/money**. According to the county, while supportive of voluntary EE/Energy Conservation action, there are "plenty of existing [EE] incentive programs available from the State and utilities." CAP doesn't directly address electrification or decarbonization through fuel switching. These is no action or funding for electrification, but they do mention incorporating renewables and charging stations into public facilities' capital improvements.	
(1) More than 15% below the poverty line; (2) 10% to 15% below the poverty line; (3) 5% to 10% below the poverty line; (4) less than 5% below the poverty line. All data is 2021 data.			

Least Likely to Electrify

Lower income areas and areas with limited resources may be the least likely to consider electrification since they have other priorities. As such, they may be the most in need of support, but it may be difficult to get them to engage. The table below provides two case studies of jurisdictions categorized as gray (least likely to electrify). Their plans (or specifically the "General Plan" and "Risk and Hazard Mitigation Plan") do not mention sustainability or energy efficiency (topics which often precede any discussion of electrification). For one of these jurisdictions, their past leadership had been quoted about wanting to retain access to natural gas. "People are going to want to continue to use natural gas…," said the Chair of the County Board of Supervisors for Kings County. "This clean energy solution works with people's preferences rather than against them. We should have that right to decide.[22]"

Notably, there are also many cities that would be even darker gray (even less likely to electrify) since they do not have any form of CAP or EAP. We would expect that 15-20% of all jurisdictions in SoCalREN's region fall into our "least likely to electrify" category.

If SoCalREN wants to work with these jurisdictions, the best way may be through partnerships where the partners are able to carry the large majority of the load. For these jurisdictions, we recommend that SoCalREN first seek to support energy efficiency (electrification) projects where the community would see more immediate benefits rather than electrification policies.

The median income in these two jurisdictions is around $60,000-$65,000 per year.

Table 8. Case Studies of "Gray" Jurisdictions – Least Likely to Electrify

Jurisdiction	CAP type	Description	
Kings County median income of $63,267 (2)	General Plan	The Kings County website and General Plan have no mention of EE (or electrification). Two cities within Kings County (Avenal and Hanford) used a grant to develop a Regional CAP in 2014 but nothing seems to have been implemented or updated since then. No references to electrification in recent years. Kings County may be in need of support, but the opportunities may be limited due to limited resources and less supportive attitudes. The cities may also be a better target than the county. Note that Avenal and Hanford (two of the larger cities in Kings County, but still less than a total population of 70,000) were hit hard by the flooding in 2023.	

[22] This is a comment from 2019 so may not be fully representative of their position in 2023. (https://www.prnewswire.com/news-releases/socalgas-applauds-more-than-100-local-governments-in-southern-california-that-pass-resolutions-in-support-of-balanced-energy-policies-300931093.html)

Jurisdiction	CAP type	Description	
Compton median income of $62,297 (1)	Risk and Hazard Mitigation Plan	Compton appears to be focused more on risk and hazard mitigation than on EE or electrification. While the city has a first draft of a new plan (Compton Hazard Mitigation Plan. Draft April 2022) that was supported by a grant from SoCalGas, it does not mention energy efficiency, sustainability or GHG reductions. It is focused on assessing the risk from earthquakes, floods and wildfire and on safety measures. Compton is not a participating city with SoCalREN and may not be very open to SoCalREN due to competing priorities. Compton is part of the Gateway City COG so the COG may be the best path to reaching this city. Presumably, Compton would need lots of support.	
(1) More than 15% below the poverty line; (2) 10% to 15% below the poverty line; (3) 5% to 10% below the poverty line; (4) less than 5% below the poverty line. All data is 2021 data.			

Existing Electrification Programs and Support

According to SoCalREN's 2024-2027 Business Plan, SoCalREN will coordinate with existing decarbonization and other programs.

> **"Coordination with Decarbonization, Demand Response, and DER Programs**
> SoCalREN will work with IOU partners as well as other local, statewide, and federal programs targeting demand side energy solutions which align with the SoCalREN mission. SoCalREN will continue its established practice of guiding enrolled agencies and their constituents to advance carbon reduction strategies by leveraging all available solutions, including programs and funding offered by other entities. SoCalREN market support programs will guide customers to participate both in SoCalREN and other PA resource acquisition programs but will also share information of other funding sources which further advance California's climate goals and benefit the long-term energy optimization of those customers." (SoCalREN 2024-2027 Business Plan)

To better understand what is available at the time of development of SoCalREN's 2024-2027 programs, we describe programs that are currently available to homes, businesses and municipalities in SoCalREN's region.

There are several **federal and state programs** to support electrification that will benefit communities in Southern California (shown in the table below). Among these are the forthcoming state-led programs funded by the Inflation Reduction Act and the Equitable Building Decarbonization program, as well as multiple existing programs such as the CA Electric Homes Program (CalEHP), a CA Schools program (CalSHAPE), SGIP programs to support HPWHs and BUILD and TECH.

These state and federal programs are focused on both existing construction and new construction – and many of these are specifically intended to support low to moderate income customers. These programs provide incentives and technical support for changes at the building level.

In addition to the state and federal program, there are **IOU and other regional incentives** that support electrification, including both rebates and technical support. For example, the SCE Codes & Standards Reach Codes program helps Southern Californian local governments encourage changes to their policies (e.g., reach codes) and comply with energy codes. [23] Additionally, it is possible that the SCE Energy Leader Partnership Program (ELP) could provide technical assistance in this area.

Rebates for appliances that support electrification are also available to most of the jurisdictions that we explored. These rebates focus on space heat pumps. However, even for those with available rebates, they do not necessarily have a requirement to replace a gas appliance. However, SCE does have Energy Savings Assistance Program (ESAP) pilots that support electrification of low-income homes – both new and existing low income and affordable housing. SCE has also proposed an effort to fund residential and commercial electrification programs for market rate buildings. (See Attachment 2. Review of Local Electrification Programs, for a description of IOU and other regional incentive programs available in the 12 jurisdictions that are in our case studies).

Federal, State and IOU Programs

In the table below, we describe a listing of some of them based on information from NRDC and other sources. Note that this list focuses on incentives and technical support for changes at the building level.

[23] The 2021 SCE Annual Report indicates 2 jurisdictions adopting reach codes (Ojai and Santa Barbara) and garnered more than 5,000 views of the EnergyCodeAce.com YouTube channel covering topics such as permit tech checklists, annotated compliance forms, etc.

Table 9. Federal and Statewide Electrification Programs (September 2023)

Program	***Description***	***LI/ MI* focus***	***New Con.***	***Exist.***
FEDERAL				
Inflation Reduction Act - HOMES and HEEHRA *(forthcoming)* and tax credits	IRA will provide $582M to the CEC for the HOMES and HEEHRA Programs, which will provide rebates for home energy efficiency and electrification with a focus on low- and middle-income households. Additionally, households can take advantage of electrification tax credits. [will be implemented by CEC primarily]	X	X	X
STATE				
Equitable Building Decarbonization Program *(forthcoming)*	The 2022 State Budget and future year commitments will provide $922M over four years to the CEC for equitable building decarbonization: $622M for a low-income direct install program and $300M for statewide incentives. [CEC] The Direct Install Program provides decarbonization retrofits to low- and moderate-income households. The Statewide Incentive Program incentivizes the increased adoption of low-carbon technologies. (https://www.energy.ca.gov/programs-and-topics/programs/equitable-building-decarbonization-program	X		X
CA Electric Homes Program (CalEHP)	CalEHP dedicates $75M to all-electric market rate construction. (https://www.energy.ca.gov/programs-and-topics/programs/california-electric-homes-program-calehp) [CEC]		X	
CA Schools Healthy Air, Plumbing, and Efficiency Program (CalSHAPE)	The 2022 State Budget provides $20M for the HVAC replacement phase of the CalSHAPE program, limited to "near-zero-emission building technology." See 3360-101-3228 in AB 179. [CEC]		?	?
Building Initiative for Low-Emissions Development (BUILD) Program	The $80M BUILD Program provides incentives and technical assistance to construct all-electric affordable housing. [CEC] BUILD "2.0," a $75 million program focused on market rate construction, is also under development and will promote the use of electric appliances and storage in new buildings through financial and technical support.	X	X	
TECH Clean California	TECH Clean California is a $120M initiative to transform the market for electric heat pumps through incentives, pilot projects, and quick start grants. The 2022 State Budget sets aside an additional $50M for TECH in FY22-23, with another $95M commitment in FY23-24. [CPUC]			X
The Self-Generation Incentive Program (SGIP) – launched through TECH	The SGIP Heat Pump Water Heater (HPWH) Program will dedicate $84.7M to equity-focused residential and commercial HPWH installations. [CPUC]	X	?	X

Program	*Description*	*LI/ MI* focus*	*New Con.*	*Exist.*
The Wildfire and Natural Disaster Resiliency Rebuild (WNDRR) Program	The $50M WNDRR Program will provide electrification incentives to homeowners of post-disaster, red-tagged homes, with higher incentives for occupants of low-income or historically disadvantaged communities. [CPUC] The recently approved program will enable some of the Californians impacted most deeply by climate change to become a part of the climate solution by transitioning to all-electric homes. The $50 million program will provide flat incentives to homeowners of post-disaster, red-tagged homes who rebuild with all-electric appliances, with incentive rates 1.5 times higher for occupants of low-income or historically disadvantaged communities.	X	NC	
Affordable Housing and Sustainable Communities (AHSC) Program	The AHSC Program is helping expand access to all-electric affordable housing by offering "points" for all-electric design. All but one of the 37 projects selected last year received maximum points for electrification. [Strategic Growth Council]	X		
Community Resilience Centers	The 2022 State Budget and future year commitments will provide $270 million for the Community Resilience Centers program, which will upgrade or build vital gathering places (community centers, libraries, schools, etc.) with efficient electric technology, energy efficiency, renewables, and storage. [Strategic Growth Council]		NC	EX
IOU or PA AREA WITHIN SOCALREN REGION				
CPUC Energy Efficiency Programs	In 2019, an update to a decades-old policy enabled the range of CPUC efficiency programs to fund "fuel substitution" measures that replace gas appliances with efficient electric appliances.			EX
SCE Codes & Standards Reach Codes	Supports local jurisdictions to adopt "reach code" ordinances that surpass otherwise applicable codes.			
SCE Codes & Standards Compliance Improvement	Strives to make it faster and easier for each market actor in the compliance supply chain to effectively comply with CA's building energy code (Title 24, Part 6), CalGreen (Title 24, Part 11), and appliance standards (Title 20) to help realize the full benefit of the Statewide Codes and Standards Program's advocacy efforts.			
Energy Savings Assistance Program – SCE Pilots	ESAP offers qualifying low-income households the opportunity to perform energy efficiency upgrades at no charge. In 2021, the CPUC approved $51.3M through ESAP to two Southern California Edison (SCE) building electrification-focused pilots: the Building Electrification Pilot ($40.8M) and the Clean Energy Homes Pilot ($10.5M). [The Building Electrification pilot aims to electrify nearly 3,000 low-income households in disadvantaged communities in SCE territory. The Clean Energy Homes Pilot focuses on all-electric, affordable new construction in SCE territory. It has an approved budget of $10.5 million, and it will enable the	X	X	X

Program	*Description*	*LI/ MI* focus*	*New Con.*	*Exist.*
	development of about 3,800 multifamily and 700 single-family all-electric affordable housing units.			
Southern California Edison's (SCE) Electrification Program (*forthcoming)*	In 2021 SCE submitted a $677M proposal to the CPUC for residential and commercial electrification programs. *This submittal is still being considered with a potential decision in March 2024*. [CPUC] It is a market transformation program that has a strategic emphasis on low income and vulnerable communities as well as businesses in ESJ communities. This program seeks to install 250,000 heat pumps (space and water) and update 65,000 panels.			X
San Joaquin Valley Pilots	The San Joaquin Valley Pilot Programs are an initiative to replace wood and propane appliances in nearly 2,000 homes in the San Joaquin Valley, with $47.4M dedicated to offering climate-friendly electric appliances. [CPUC]	X		X
RELATED LOCAL EFFORT – not specific to electrification				
The Energy Leader Partnership Program (ELP)	The Energy Leader Partnership Program (ELP) recognizes and provides technical assistance to local governments, businesses, and organizations that demonstrate leadership in energy efficiency, renewable energy, and sustainability. [SCE]			

**LI/MI stands for Low Income or Moderate Income effort.*
Sources: https://www.nrdc.org/bio/kiki-velez/ca-building-decarbonization-whats-coming-2022; Information in CEDARS

SoCalREN has partnered with the SoCalEVen Access regional EVSE portfolio administered by the County and similarly covers the same geographic region as SoCalREN, which offers an Electric Vehicle Supply Equipment (EVSE) program that provides rebates for the installation of Level 2 and DC fast charging stations for electric vehicles in Multifamily buildings.

Local Programs

Local programs are more limited. We explored whether any of the jurisdictions with electrification policies, or any jurisdictions in our case studies, had electrification programs (of a total of 20 jurisdictions). Only two of the 20 jurisdictions that we explored (City of Santa Barabara and Carpinteria) have funded programs specific to building electrification. The Santa Barbara program is focused on testing out induction cooktops while the Carpinteria program is much broader.[24] The table below provides insights on programs available to the jurisdictions that we explored for this research effort. See also Attachment 2.

[24] We note that while Carpinteria has reach codes and building electrification for new construction, the city has had little new homes or other growth, so will not affect many buildings. Source: 2021 Carpinteria Valley Economic Profile, https://carpinteriaca.gov/wp-content/uploads/2021/12/2021-Carpinteria-Profile-Final.pdf

Table 10. Programs available to specific jurisdictions

Jurisdiction	IOU or POU rebates – **not** electrification	Local or CCA Programs **specific to building electrification** (as of August 2023)	Notes
City of Santa Barbara	SCE rebates	**YES**	**Santa Barbara Clean Energy electrification rebates:** • Testing out an induction cooktop
Carpinteria	SCE rebates	**YES**	**Central Coast Community Energy (3CE) electrification rebates/programs:** • Partnership with TECH for residential retrofit • New Construction for residential, commercial, and agricultural sectors • Reach Codes • Concierge services for agricultural sector electrification

San Joaquin Valley also has a pilot (under SCE) to convert rural homes powered by propane and wood to all-electric heating, air conditioning and appliances. (https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/infrastructure/identifying-disadvantaged-communities)

Summary of Gaps and Options for Future Electrification Efforts by SoCalREN

Given the findings above (regarding gaps and barriers), and the fact that Southern California policies lag Northern California policies, local governments and their communities in SoCalREN's region will need additional support from SoCalREN and others to decarbonize buildings. SoCalREN could help in a variety of ways including providing support for mandates and policies (potentially connecting jurisdictions to available resources) or providing direct support for electrification of buildings.

Based on SoCalREN's existing Business Plan, in the 2024+ period, SoCalREN will seek to support local building departments and also present "a strong business case for holistic decarbonization projects" by bringing "forward the information, technical assistance, and resources needed to present a strong business case to customers for comprehensive EE and clean energy solutions, building a greater level of confidence about decisions to implement holistic energy projects (Portfolio Level Business Plan, page 303)." SoCalREN also has a stated objective of "Coordinat[ing] with public agencies and external C&S stakeholders to adopt, implement, and enforce advanced energy codes, standards, and policies that pave the way for improved building performance and increased numbers of ZNE buildings. (C&S IP, page 9).

Below we spotlight some existing efforts that could serve as a model for SoCalREN's future efforts.

Future Residential Electrification Program Support

There are existing electrification programs available within SoCalREN's territory – many of which will be targeted at low to moderate income households; however, SoCalREN's region includes lots of equity targeted communities that may be in need of support and so SoCalREN's direct support for the electrification of buildings will be valuable in extending what can be done and the speed at which this change occurs. The magnitude of the need in Southern California, in combination with the high cost of some of the measures, may mean that electrification cost will continue to be a barrier and additional stacking of incentives could help households to electrify. SoCalREN could help extend the reach of existing and emergent programs either through additional funding or through education,

outreach and connections to existing programs. The concerns, however, relate to ensuring that there is *additional* value over and above the federal, state, IOU and local programs; and monitoring to ensure that lower income households aren't burdened by higher electric costs. There is also likely to be a need for additional technical and informational support for the market.

Model Support for Municipal Buildings

SoCalREN's public sector programs (e.g., PDP, Metered Savings program, Streamlined Savings program) already provide direct support for municipal buildings.

Outside of public-sector-specific programs, municipal buildings can obtain rebates and technical assistance through available rebate programs such as the Commercial Energy Efficiency Program.

For the future, the East Bay Community Energy (EBCE) in Northern California has a program that could serve as a model program for SoCalREN. EBCE's **Municipal Electrification Assistance (MEA) program** (https://ebce.org/mea/)[25] because it offers gap funding and reach code support, which are not currently offered by SoCalREN's public program. The MEA program "supports EBCE's member cities and school districts in meeting their climate goals by transitioning buildings from on-site fossil fuel combustion to clean electricity. The program provides technical assistance or gap funding (up to $10,000) to get member agency or district projects over the finish line."

"Municipal agencies or school districts can apply for one of three categories:

> "**Capital Project Technical Assistance**: Project or portfolio level technical assistance up to 30 hours per applicant. Technical assistance may include, but is not limited to: design consultation, technology selection, energy modeling review, charrette facilitation, cost-benefit analysis, financial assistance application support, measurement and verification guidance, and / or guidance on adapting existing capital improvement plans to achieve building electrification goals.
>
> "**Gap Funding**: Funding up to $10,000 to complete a building electrification project, such as switching an existing natural gas boiler to a heat pump water heater. Funding must be leveraged with non-EBCE capital and the project must be "shovel ready," meaning that the project has received necessary internal approvals and funding has been reserved.
>
> **"Reach Code Support**: Applicants can apply for expert technical assistance in adopting a new reach code ordinance or implementation support for an existing reach code ordinance. Technical assistance can include model code language, cost effectiveness support, staff report templates, Council presentations, and more.

"The maximum amount of support available for each jurisdiction is $10,000, either via gap funding or consultant time providing technical assistance. Applicants are encouraged to submit only one application per agency. Should funding be available, we may re-open the application cycle to allow multiple applications per agency."

In addition, **EBCE's Resilient Facilities program** works with local governments and municipalities to reduce the cost and complexity associated with developing solar and battery backup installations.

Model Policies for the Future

There is also the potential to engage in policy work at the local level or to work with elected officials/ commissioners in small cities to encourage them to consider mandates.

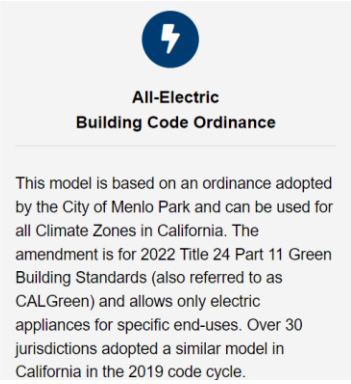
[25] Note that they have recently changed their name to Ava Community Energy (https://avaenergy.org/programs-business/#section-3)

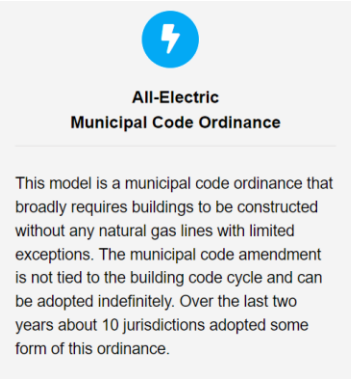
In SoCalREN's 2024-2027 Business Plan, SoCalREN stated that they will "… develop a comprehensive Compliance Enhancement Program template that addresses the entire compliance cycle, from building design to operation. This will overlap with the SCE Codes & Standards Compliance Improvement program and coordination will be needed to prepare the C&S community for quickly approaching EE, ZNE and electrification mandates. The focus will be on implementing systematic improvements along the entire permitting process spectrum." SoCalREN will also seek to "[p]rovide C&S community members with actionable resources to address their role in advancing the state's ZNE and decarbonization goals."

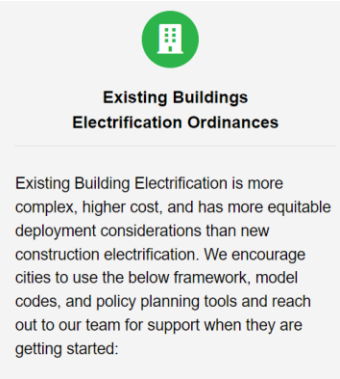
There are existing resources that can serve as a model and offer guidance to support reach codes if there is a local champion, so SoCalREN should seek to connect local governments to these resources.

For those in need of electrification policies, the IOUs (and the Bay Area Reach Codes https://bayareareachcodes.org/) – provide model ordinances that may be useful.

For new construction, these model codes include electrification *building code ordinances* and electrification *municipal code ordinances* – the latter of which is not part of the building code and can be updated indefinitely.







In addition, there is also a model electrification ordinance for existing buildings. Within the existing building electrification ordinance, the Bay Area Reach Codes group, offers a menu of policy options including:

- All-electric requirements upon appliance installation, relocation or replacement
- Electric-readiness requirements during alterations and additions
- Disclosure requirements during property sale
- Termination of fuel gas infrastructure
    - For municipal buildings (MUNI)
    - For all, "buildings within the municipality shall not be served by fuel gas infrastructure" (ALL)

Summary of SoCalREN Options

Going forward, SoCalREN could provide direct support to residential or non-residential customers or to municipal buildings to help them electrify; support training of the workforce so that they have the skills needed to work on decarbonization projects or provide support directly to local governments to develop and enforce electrification policies and buildings codes. A summary of each of these is shown in the table below.

	Recap of "What Exists"	What is needed? Where can SoCalREN help?
Voluntary programs to help encourage the electrification of buildings		
• Direct Support to Residential and Non-Residential Customers	In this report we describe lots of existing and emergent programs that support electrification of homes and businesses (see attachment) – many of which target low- and moderate-income residents. As such, this may not be a gap in the market; however, SoCalREN's region includes lots of equity targeted communities that may be in need of support. This need, in combination with the high cost of some of the measures, may mean that cost will continue to be a barrier and additional stacking of incentives could help.	SoCalREN support could help extend the reach of existing and emergent programs, either through additional funding or through education, outreach and connections to existing programs.
• Direct Support to Municipal Buildings	SoCalREN's public sector programs (e.g., PDP, Metered Savings program, Streamlined Savings program) already provide direct support for municipal buildings. Outside of public-sector-specific programs, municipal buildings can obtain rebates and technical assistance through available rebate programs such as the Commercial Energy Efficiency Program.	SoCalREN support could help extend the reach of existing and emergent programs, either through additional funding or through education, outreach and connections to existing programs.
Support workforce development		
• Support Workforce Development	TECH, manufacturers and others are offering electrification-related trainings for those installing heat pumps and heat pump water heaters.	SoCalREN could also support this area if they identify gaps in offerings or groups that are not well engaged in existing trainings (e.g., disadvantaged workers).
Support for local mandates		

• Public Sector – Policy or Technical Support	In this report we describe resources that can serve as a model and offer guidance to support reach codes if there is a local champion.	SoCalREN should seek to connect local governments to these resources. SoCalREN's proposed efforts in this area (under their C&S program), will be valuable. SoCalREN should seek to connect local governments to existing resources and share information (rubrics and scorecards); provide regional support and coordination; provide training on model policies and ordinances; and provide technical assistance and reporting requirements.

Possible Future Research

This research represented a limited review of information gathered from the program implementers and publicly available data. In 2024, SoCalREN may want to explore electrification-related uses further through a series of discussions with non-participating and participating local governments and public agencies.

Non-participating public agencies (policy focus, with some building- or project-related questions). For non-participating public agencies, SoCalREN representatives could reach out to staff who supported development and/or implementation of the jurisdiction's climate, sustainability or risk mitigation plan to better understand:

- What is the local government's (LG's)/agency's opinions about electrification? (Did a web review correctly capture the information on electrification?)
- Does the LG/agency have policies or standards that support the electrification of existing municipal buildings? If so, what are they?
- Has the LG/ agency considered electrification of your municipal buildings? Have they taken any action to remove gas equipment? (What is the range of public sector actions regarding electrification in municipal buildings?)
- Are there concerns about removing gas equipment and replacing it with electric? (e.g., lack of capital or fearful of the implications of managing new equipment)
- What are the biggest barriers to electrifying municipal buildings/facilities? Does the public sector lack capital? Are they fearful of the implications of managing new equipment?
- What kind of support do they feel that their LG/agency would need to remove gas equipment from existing municipal buildings?

Follow up with participating agencies (project-related questions). For participating agencies that installed HPWHs through the SoCalREN program:

- How did they find out about the HPWHs? Was this something that they were considering before being approached by SoCalREN?
- What were their hesitations (or barriers) to installing HPWHs on their own and through the program?
- Have they seen cost savings and/or other benefits of the new equipment? If so, what?

- Do they have ongoing concerns about the equipment? Do they need follow up support from the program?
- What amount of cost would public agencies see fit for installing HPWHs?
- Is there a need for other electrification or fuel substitution measures?
- What are the barriers to other electrification or fuel substitution measures?

SoCalREN may also want to explore current efforts to inventory equipment (such as the work by South Bay City COG) to see if the local governments have collected information on hot water demands/hot water consuming fixture counts. If not, SoCalREN may want to work with those already inventorying lighting and mechanical systems in public facilities to add additional data collection that could inform SoCalREN's future program.

Attachment 1a. Deeper Dive into Electrification Costs (as a Key Barrier to Electrification)

- Local governments in Southern California are concerned about the potential costs to residents if they pass electrification policies. The cost of electrification can be a significant barrier for many households, particularly low-income households that may not have the financial resources to make the necessary upgrades. In addition, there may be concerns about the affordability and availability of electricity as more buildings and infrastructure are electrified.
    - The research team sought to understand if there is a significant cost impact related to electrification (of residential homes) and found that:
        - Project costs range from $5,000 to $20,000 for residential retrofits (from actual data).
            - According to a report from the Rocky Mountain Institute, the cost of converting a home from natural gas to all electric can range from $4,500 to $20,000, depending on the extent of the work needed. This estimate includes the cost of upgrading the electrical system, replacing gas-powered appliances with electric ones, and installing a heat pump or other electric heating system.
            - A study by the Lawrence Berkeley National Laboratory found that the incremental cost of electrification for homes with gas furnaces could range from $3,000 to $15,000, depending on the size of the home and the specific electrification options chosen.
        - Residential new construction projects (without any natural gas in a home) are $7,500-$8,200 cheaper to construct than the baseline home (modeled data).
        - Little analysis on actual bill savings exists. The average residential household saved ~$50 per year in bills when moving from a gas furnace to a central heat pump (actual data). However, the previous year's analysis indicated slightly higher savings ($95/year) for central heat pumps and negative savings for ductless heat pumps.
- Local governments are taking steps to address these concerns by considering financing options such as low-interest loans or rebates for residents who make energy-efficient upgrades to their homes. Others are working to increase the availability of renewable energy sources and to ensure that electricity rates are fair and equitable for all residents. Local governments are also working to educate residents about the benefits of electrification and the potential cost savings over the long term. By emphasizing the long-term cost savings and environmental benefits of electrification, they hope to encourage residents to make the necessary investments and support electrification policies.

Attachment 1b. Details on Costs of Electrification

Residential Retrofit Findings from Literature

Note that these studies come from various regions across the US – not California specific. The TECH data referred to in the body of the text is California-specific.

Study References	RESIDENTIAL RETROFIT PROJECT COSTS (SINGLE FAMILY)
03_2022_Service Upgrades for Electrification Retrofits	**There can be costs for permits, electrical panel upgrades, and service upgrades.** (actual data) • Customer costs for permits are $130-$170. • Customer costs for electrical panel upgrade are $2,000-$4,500. • Customer costs for service upgrade to utility from $300-$16,000 or more depending on needs.
06_2023_California TECH data	**Early data showed that projects can cost $5,000 to nearly $20,000.** (actual data) • HVAC HP - $17,675 (N=4,494) • HPWH - $5,867 (N=149) **More recent data showed projects that cost $1,250 to nearly $70,000.** (actual data as of August 2023) • HVAC HP – Average ~$18,200; min of ~$1,800; max of ~$70,000 (N=11,591) • HPWH – average ~7,000; min of ~$1,250; max of ~$42,000 (N=2,090)
10_2020_Electrification Story	**Projects can cost $5,000 to nearly $20,000.** (actual data) • Homes have to have a 200-amp panel to go fully electric and author noted that it can cost from $5,000 to over $20,000 for this upgrade
04_2018_CBIA High Cost of Electrifying Homes	**Projects can cost $5,000 to nearly $20,000 and result in higher energy costs.** (modeled data) • Switching to all-electric appliances would cost CA consumers over $7,200 upfront and an estimated total annual increase in $877 in appliance and energy costs.
05_2021_Electrification Policies on Residential Construction	**Retrofitting a home that has gas for electric space and water heating costs from $24,000 to $28,000.** (modeled data) • Additional costs for an induction cooktop are about $1,000 • Adding in an EV charger costs about $1,300 • Upgrading existing gas equipment to high efficiency gas equipment costs about $12,000 - $13,000
16_2019_Residential Building Electrification in California	**Electric panel upgrades can cost from $2,000 - $4,000.** (estimated) • While 200-amp panels are needed for most electrification, newer technologies of low-amperage heat pump options may negate the need for a 200-amp panel.

RESIDENTIAL RETROFIT BILL IMPACTS *Have studies shown significant energy bill impacts for residential customers after electrification?*		
	Bill Savings and Other Benefits	**Increases in Bills, Project Costs and Other Drawbacks**
15_2023_SCE PLA	**Bill Savings** (actual data) – from $30-$90+ • Average bill savings were $46/year ranging from $89 for central HVAC systems to $31 for (supplemental) duct systems. • The gas bill savings associated with each technology outweighed cost increases from the electric load.	
09_2022_ CA HVAC Fuel Substitution Impact Evaluation	**Bill Savings** (actual data) – highest (~$95) for central HP • Central HPs HHs had, on average, $95 less per year in bills	**Bill Increase** (actual data) – ductless HPs could result in bill increases. • Ductless HPs HHs had $86 more per year in bills (on average). The increase was posited to be based on ductless HPs being more load building because they were put in where no AC was previously.
01_2018_Impacts of Residential Appliance Electrification		**Bill Increase.** Electric bills could increase leading to costs of 1-2% of income. (modeled data) • Estimated energy bill increase - their 2030 estimates were that annual bills were $32-$338 higher with electric appliances if high rate increases did not occur. With high rate increases, the annual bills were $143-$746 higher. • If including upgrade costs, they estimated from (-$119) to $1,302 annual costs increase over the 15-year life of an appliance (depending on whether infrastructure upgrades were required. They estimated this increase was 1-2% of the median household income for CA customers.
19_2021_Equity Impacts on Electrification		**Bill Increases** (modeled data) • Retrofits were seen as cost prohibitive. A modeled cost/benefit analysis showed that the high electricity costs and needed retrofits were the main reason by converting exiting homes is cost prohibitive. In total, costs to electrify existing homes ranges from (-$5,600) to (-$7,100) per home over 20 years.
16_2019_Residential Building Electrification in California	**Bill savings occur for space heat pumps and when there is a high demand for space heating and cooling and water heating.** (modeled data) • Space heat pumps can save the homeowner from $75-$575 per year (based on location and ducted/mini-split) • For single family homeowners with high demand for space heating/cooling and water use, most (84%) may save $130-$420 per year over the life of the equipment when installing both a space and water heat pump, but	**By themselves HPWH do not save on costs.** (modeled data) • Compared to gas storage, a HPWH can cost a homeowner from $10-$175 more per year **Electric stoves and clothes dryers do not provide lifecycle savings.** (modeled data) • Induction cooktops can cost from$75-$150 more per year than gas • Heat pump clothes dryers can cost from$125-$240 more per year than gas

	about 16% of single family owners may see bill increases of less than $100 per year.	
RELATED TO COSTS OF ELECTRIFICATION		
14_2022_Paying for Electricity in California	**Utility Costs will Increase.** (modeled data) Based on modeling, the going-forward costs to the *utility* of providing additional electricity to customers for electric heating and EVs will add from $350-$400 per year per household or car (respectively).	

Residential New Construction Findings from Literature

We note that some of the findings from the studies below seem to be conflicting. Additional research in this area is needed. The evaluation team plans to explore residential electrification further in 2024.

Study References	RESIDENTIAL NEW CONSTRUCTION COSTS
19_2021_Equity Impacts on Electrification	**Low savings and growth potential of cities matter.** (modeled data) • Electrification in new construction had minimal positive savings ($100-$400 over 20 years per home). • Some cities have low to no new construction in the future due to lack of space. New construction policies for electrification in these areas will have small, potentially insignificant, impacts.

02_2022_Cost Study of the Building Decarbonization Code	**All electric single family new construction homes are cheaper than mixed fuel homes.** (modeled data)
	• All electric SF home
	  ○ is $7,500-$8,200 cheaper to construct than the baseline home
	  ○ has an incremental first cost of $1,000-$1,800
	  ○ reduced total lifecycle energy consumption by 34% compared to baseline
	  ○ saved 126.2 metric tons of CO2e
	  ○ estimated lifecycle savings from $3,780-$16,200 except for fixed rate utilities with high costs where the home increased lifecycle costs over baseline of $5,500
	• Mixed-Fuel SF home
	  ○ is $936-$1076 more expensive to construct than the baseline home
	  ○ reduced total energy consumption by 9%
	  ○ saved 20.05 metric tons of CO2e
	  ○ estimated lifecycle cost savings from $850-$3,500 for all rate scenarios

08_2018_The economics of electrifying buildings	**Electrification reduces costs and are lower in certain cases.** (modeled data) • Electrification reduces costs over the lifetime of the appliance for new construction, bundling with solar, and retrofits from propane or heating oil. But raises it for retrofits and those with natural gas heating. • Water and space conditioning heat pumps with the ability to optimize energy costs save more. ○ The 15-year net present new construction costs in Oakland for a flexible Heat Pump on TOU where the peak pricing is three times as expensive as off-peak pricing is $10,900 and for a retrofit it is $20,800. These are ~$3,000 cheaper than natural gas with new AC.

05_2021_Electrification Policies on Residential Construction	**Compared to new construction for a home with gas, an all-electric home (with EV charging) adds from $3,800 to $15,000 in costs.** (modeled data) • Electrification costs can vary based on climate. A warmer climate can vary from $4,000 to $11,000 while a colder climate may see higher costs from ($11,000 to $15,100).
12_2021_Cost Disparities New Home Heating Report	**Climate affects the economic cost when considering electrification of heating.** (modeled data) • Households in warmer states may be worse off by less than $500 annually if moving to electric heat. • Households in colder states may be worse off by more than $3,000 annually if moving to electric heat. • Household costs for electric heating in California may range from $1,620 to $1,870.
16_2019_Residential Building Electrification in California	**All-electric new construction homes will cost the homeowner less than a home with gas-fuels. (modeled data)** • Most homeowners (55%) may save $130-$540 per year over the life of the equipment, but about 35% of single family owners of an all-electric home may see bill increases of less than $100 per year and 10% may see bill increases of more than $100 per year.

Non-residential

COSTS OF NONRESIDENTIAL RETROFIT AND NEW CONSTRUCTION	

02_2022_Cost Study of the Building Decarbonization Code	**All electric office new construction buildings are cheaper than mixed fuel buildings. EV charging is a big cost impact.** (modeled data)
	• Medium Office Buildings
	  ○ All electric buildings have an incremental cost of $0.33-0.50 / sf for just base systems in a building and $10.70/sf for EV cost infrastructure (EVCI)
	  ○ All-electric-ready have an incremental cost of $1.03-1.20 / sf for just base systems and the same EVCI (electric ready based on sizing of electric infrastructure)
	• Biggest impact is the cost of EV charging infrastructure (90-97% of the cost increase)

12_2019_ EBCE Cost Effectiveness for HVAC Electrification	**Nonresidential costs vary by building type.** (modeled data)
	• HVAC electrification retrofits were cost effective only in certain cases (i.e., the savings over the life of the measure are equivalent or greater than the incremental cost of the measure)
	  ○ Small offices had a benefit cost (B/C) ratio over 1 when including PV
	  ○ Medium retail had a B/C ratio over 1 in 1970's vintage and only in CZ03 for 1990's vintage.
	  ○ Small restaurants HVAC electrification retrofits were not cost effective.

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Attachment 2. Review of Local Electrification Programs

Jurisdiction	IOU or POU rebates – **not** electrification	Local or CCA Programs **specific to building electrification** (as of August 2023)	Notes
City of Santa Barbara	SCE rebates	**YES**	**Santa Barbara Clean Energy electrification rebates:** • Testing out an induction cooktop
***Carpinteria**	SCE rebates	**YES**	**Central Coast Community Energy (3CE) electrification rebates/programs:** • Partnership with TECH for residential retrofit • New Construction for residential, commercial, and agricultural sectors • Reach Codes • Concierge services for agricultural sector electrification
***City of Los Angeles**	LADWP rebates	None	**Notes on LADWP electrification rebates**: • Rebates for space heat pumps, but no requirements to replace the furnace with the new HP (so not specific to building electrification) • This could change extensively if the Electrify LA initiative is made into policy.
Riverside City	Riverside Public Utilities rebates	None	**Notes on Riverside POU rebates**: • Rebates for space heat pumps, but no requirements to replace the furnace with the new HP (so not specific to building electrification)
***Burbank (f),**	Burbank Water and Power rebates	None	**Notes on Burbank POU rebates**: • Rebates for space heat pumps, but no requirements to replace the furnace with the new HP (so not specific to building electrification).
***Agoura Hills, *Culver City (f),** Compton,	SCE rebates	None	**Notes on SCE rebates:** • Rebates for different electric appliances, but no requirements to replace an older gas appliance with the

Jurisdiction	IOU or POU rebates – **not** electrification	Local or CCA Programs **specific to building electrification** (as of August 2023)	Notes
Palmdale, Fontana, Oxnard, ***Ventura County,** Visalia			new electric appliance (so not specific to building electrification)
Claremont, ***Ojai;** *Santa Monica	SCE / Clean Power Alliance rebates	None	**Notes on SCE & CPA rebates:** • Same as above. Nothing specific to building electrification
Tulare County; Kings County	SCE and PG&E rebates	None	**Notes on SCE & PG&E rebates:** • Rebates for different electric appliances, but no requirements to replace an older gas appliance with the new electric appliance (so not specific to building electrification)
Glendale	Glendale Water and Power – no rebates	None	**No rebates**
Pasadena	Pasadena Water and Power – no rebates	None	**No rebates**

Attachment 3.

The top values (associated with the green header) are all records and the bottom numbers are with the top and bottom 5% of costs removed.

			Project Costs per unit (so cost not affected by one or two units installed)		
Technology Type	# of Units installed	Count of projects	Average	Minimum	Maximum
HVAC	12,275	11,591	$ 18,185.87	$ 1,825.00	$ 69,881.98
HPWH	2,105	2,090	$ 7,049.01	$ 1,250.00	$ 41,918.00
Both	14,380	13,681			

			Project Costs per unit (so cost not affected by one or two units installed) Top and Bottom 5% of costs removed		
Technology Type	# of Units installed	Count of projects	Average	Minimum	Maximum
HVAC	10,984	10,451	$ 17,693.21	$ 7,400.00	$ 33,400.00
HPWH	1,896	1,883	$ 6,599.28	$ 4,007.19	$ 12,850.00
Both	12,880	12,334			