

Commercial Building Electrification in California:

An Equity-Focused Policy Analysis

EXECUTIVE SUMMARY

California's building sector generates roughly 25% of the state's annual greenhouse gas emissions from onsite fossil fuel consumption and electricity demand. The California Energy Commission's 2021 Building Decarbonization Assessment identifies building end-use electrification as a central strategy for cutting building sector emissions by at least 40% below 1990 levels by 2030, with the 2022 Scoping Plan setting a path to carbon neutrality by 2045. The commercial sector, encompassing offices, restaurants, hotels, healthcare facilities, schools, colleges, retail, grocery stores, and warehouses, represents roughly 7,400 million square feet of built space statewide, consuming more than 105,000 GWh of electricity and 2,130 million therms of natural gas annually. Despite this scale, no commercial-sector-specific electrification target has been formally established by the state

Comprehensively electrifying California's existing commercial building stock will require enormous investment. No commercial-sector-specific cost estimate currently exists in the published literature, an important gap this brief flags as a prerequisite for effective program design. However, the commercial sector appears to be moving in the wrong direction: between 2006 and 2022, electricity's share of total commercial energy consumption fell from 37% to 31% as gas use increased. While some businesses will act voluntarily, financial incentives are essential to achieving near-universal commercial electrification, particularly for lower- and moderate-income businesses. Without intentional equity design, this transition will continue and entrench existing inequitable patterns of technology adoption, deepening challenges for commercial buildings in disadvantaged communities.

This policy brief examines the equity implications of building electrification, including current and anticipated costs, barriers to adoption, and the specific concerns of commercial tenants and owners, drawing on a multi-year interdisciplinary analysis by UCLA's California Center for Sustainable Communities.

1. Increase Overall Incentives and Financing for Commercial Businesses that are Designed to Offset Both Upfront and Sustained Operational Costs.

Commercial electrification faces tremendous financial barriers. Not only are upfront costs extremely high and available incentives are misaligned with real project costs leading to large underutilization of what is available, but the electricity rate structures actively penalize businesses that make the switch by sustaining high operational costs.

The most fundamental barrier to commercial electrification is a severe mismatch between incentive levels and actual project costs. For every subsector where cost data exists and where electrification carries higher marginal costs than gas replacement, available incentives fail to cover those costs - often by a factor of ten or more.

Electricity rates compound these barriers. California's average commercial rate is nearly 85% higher than the national average. Demand charges - which can exceed 50% of a commercial customer's total electricity bill - make the ongoing economics of electrification appear punishing even when equipment costs are covered. One major hotel group reported demand charges amounting to 30–40% of total electricity costs. This rate structure creates a rational financial deterrent, especially for small operators making marginal decisions about whether to switch fuels.

Cascading infrastructure costs further widen the gap. Kitchen electrification requires upgrading the main electrical panel and service drop: average costs are \$40,000 for institutional kitchens and \$160,000 for quick-service restaurants. Peak demand increases of 50–71% are common when cooking equipment is electrified. Soft costs, feasibility studies, permitting, design work, are rarely covered by programs but are often as burdensome as equipment costs for small operators. No current incentive program provides systematic coverage for these ancillary expenses.

Incentives and financial support mechanisms for replacing polluting cooking end-uses in commercial kitchens must also be expanded. As one of the only appliances with direct indoor emissions, gas stoves are responsible for significant harm to human health stemming from emissions of nitrogen dioxide, methane, and benzene. Electrification of cooking processes is often one of the largest potential sources of load growth in a whole building electrification. Electrifying such large loads earlier in the electrification process can make whole-building electrification more attractive. At the same time, cooking end-use incentives may need to be paired with financial support for service panel optimization or upgrades.

Not all subsectors face prohibitive costs. Stand-alone retail establishments show slightly negative incremental costs (~\$137 per facility) due to favorable packaged HVAC replacement economics. Certain

hotel configurations also show negative incremental costs. Unrefrigerated warehouses face moderate costs (~\$15,003 per facility). These subsectors present near-term opportunities that current programs are failing to capture.

Research Gaps

No empirical, comprehensive data source exists on actual commercial electrification project costs. The Reach Code analysis (2021) covers only a handful of building types and does not capture real-world cascading costs - venting, piping, mechanical room reconfiguration - that contractors routinely encounter. Cost data is entirely absent for healthcare, colleges, and schools. A comprehensive, field-verified cost study across all major commercial subsectors is needed before incentive programs can be meaningfully calibrated.

Recommendations

- **Fund a comprehensive, empirical cost study for all major commercial subsectors**—prioritizing restaurants, schools, colleges, and healthcare—to establish reliable baselines for program design and ensure incentives reflect real-world project costs.
- **Dramatically increase commercial incentive levels, anchored to actual total project costs** including infrastructure upgrades, not just equipment purchase prices. For restaurants, offices, and warehouses, the gap between current rebates and actual costs is so large that modest increases are insufficient - a structural reset is needed.
- **Develop targeted programs for retail, favorable-configuration hotels, and warehouses, where electrification is already cost-competitive**, to drive near-term adoption while cost barriers in other subsectors are addressed.
- **Expand program coverage to include pre-retrofit feasibility assessments, permitting, design, and post-installation service agreements as fundable line items**—not just equipment rebates.
- **Develop utility rate tariffs that provide commercial customers with cost-neutral pathways to electrification**, including demand charge structures that do not penalize facilities for transitioning from gas to electric equipment.
- **Establish vendor-backed financing and utility on-bill repayment programs for small commercial operators lacking upfront capital**, ensuring that businesses can access electrification even when cash is constrained.

2. Tailor Commercial Program Design and Future Appliance regulations to the Subsector-level.

There is a huge diversity of commercial buildings in terms of their size, volume of energy use, ownership structure and composition of end-use activities and equipment. Programs that treat them as a monolithic category systematically underserve the smallest, most resource-constrained operators who are often those most in need of support.

There is enormous diversity among commercial buildings in terms of size, energy intensity, end-use composition and ownership structure. One-size-fits-all program designs are poorly suited to the complex needs and constraints of different commercial subsectors. Program design and interventions must be attentive to the huge diversity of commercial building types and the energy end-use activities that exist within them. Programs that recognize subsectoral diversity can more accurately target incentives, provide tailored technical support, and make use of more relevant performance metrics - improving uptake rates and cost-effectiveness compared to generic programs. Tailored approaches are also essential for advancing equity, as smaller and disadvantaged business owners often face greater barriers to participation due to limited access to information, financing, and technical resources.

Subsector-specific differences extend beyond business models to include workforce needs, building characteristics, and operational priorities. Older buildings, mixed-use properties, and leased spaces often face physical or ownership constraints that limit retrofit feasibility. Programs should therefore enable modular or phased approaches to electrification, emphasizing retrofit readiness ahead of full deployment rather than mandating one-size-fits-all replacements.

Commercial program design should be expanded to include both pre- and post-retrofit phases to ensure successful and sustained electrification outcomes. Pre-retrofit activities that present large costs include structured feasibility assessments that evaluate site-specific factors such as space constraints, electrical capacity, and piping and venting sizing and configurations. These assessments help match technologies to real-world building conditions, avoiding costly design errors, installation delays, or poorly configured systems which compromise performance. Integrating these evaluations early in the process also enables programs to identify potential barriers to electrification and offer targeted technical assistance or financing options to address them. Post-retrofit support is equally critical to ensuring real world performance levels match those of engineering design studies, contributing to market confidence in new technologies. Programs should offer multi-year service packages, including retro-commissioning activities, and potentially even minimum performance guarantees. These could be effectuated through maintenance support agreements that reduce perceived risks for property owners and operators. Many commercial and multi-family building operators remain hesitant to adopt new or unfamiliar equipment that may require specialized service expertise or incur uncertain operational costs. Providing ongoing technical support and clear performance accountability can help overcome this hesitation, improve persistence of savings, and ensure that electrified systems deliver reliable, long-term value.

Finally, installation models must be attentive to the need to minimize operational downtime, as many commercial facilities—particularly those serving customers or guests—are highly sensitive to economic impacts from such disruptions.

Research Gaps

The California Commercial End Use Survey does not report in detail on miscellaneous and process-related gas equipment - including dryers, dehydrators, kilns, pool heaters, incinerators, and fireplaces. As electrification proceeds, a comprehensive accounting of all gas-powered end-uses, their saturation across subsectors, and the availability of zero-emission substitutes is essential. Additionally, the CEUS

categorization system groups facilities with vastly different energy profiles under single sector labels, obscuring the within-subsector variation that program designers most need to understand.

Recommendations

- **Tailor commercial program design and future appliance regulations to subsector-level realities.** Each subsector has distinct cost structures, workforce needs, building characteristics, and ownership models that generic programs cannot address. Programs that recognize subsector diversity can more accurately target incentives, technical support, and performance metrics - improving uptake rates and cost-effectiveness.
- **Enable modular or phased approaches to electrification rather than mandating comprehensive replacement.** Older buildings, mixed-use properties, and leased spaces often face physical or ownership constraints that make full retrofits infeasible in a single phase. Retrofit readiness programs that prepare buildings ahead of full deployment are more practical and more equitable.
- **Coordinate phase-out rules with updates to plumbing, venting, and structural codes to reflect real-world retrofit conditions.** Installation models must minimize operational downtime, especially for commercial facilities serving customers or guests that are highly sensitive to disruption.
- **Implement pre-retrofit feasibility screening as a standard program component.** Match technologies to building realities—space constraints, piping, venting configurations, water quality—before committing equipment incentives. This avoids the costly mismatches that vendors identified as a persistent failure mode across subsectors.
- **Include post-retrofit multi-year service packages and performance guarantees.** Operator skepticism about equipment reliability is a documented barrier across subsectors; ongoing technical support and clear performance accountability improve persistence of outcomes and build market confidence in electric alternatives.
- **Develop subsector-specific workforce pipelines.** Each subsector requires different types of contractors, design engineers, and maintenance staff with specialized skills. Program design should cultivate this workforce through targeted training and credentialing programs, not assume a generalist contractor market that does not exist for many commercial building types.
- **Prioritize interventions that address split-incentive barriers specific to each subsector—**including tenant protections, owner-occupant cost-share models, and financing structures that align the interests of the party making investment decisions with the party bearing energy costs.

3. Establish a Coordinated Statewide Commercial Electrification Strategy.

Despite significant program funding, participation in commercial electrification initiatives has declined, while broader energy trends show gas consumption increasing relative to electricity use. These patterns

suggest that existing electrification programs are misaligned and have not been effective, in part due to the absence of a coordinated statewide strategy with clear accountability. Without such alignment, stakeholders are likely to choose the most cost-effective option, which at present remains natural gas.

The commercial sector exhibits a stark paradox between resource availability and utilization. While 120 active commercial rebates are available with budgets exceeding residential allocations, program participation has collapsed - from 2,428 claims in 2019 to 299 in 2023, representing only 2% of residential claim volumes despite comparable funding. In 2022, the commercial electrification budget in CEDARS exceeded the residential budget by more than \$55 million.

Program participation is starkly uneven across building types. The 'miscellaneous' category alone accounted for nearly 90% of all claims in 2019. Restaurants, food stores, and retail have recorded zero claims in recent years. Healthcare, colleges, and schools -which serve high concentrations of disadvantaged community members - are almost entirely absent. Meanwhile, despite rebates spanning cooking, space heating, and whole-building upgrades, recent claims are dominated almost entirely by heat pump water heaters. Expanded program diversity has not translated into broader adoption.

The sector is also moving in the wrong direction on energy trends. Between 2006 and 2022, electricity's share of total commercial energy consumption declined from 37% to 31% as gas use increased, with particularly concerning trends in subsectors offering the greatest decarbonization potential: electric space heating share declined in lodging and office buildings where heating demands are substantial, while electric water heating share fell in colleges, healthcare facilities, and offices.

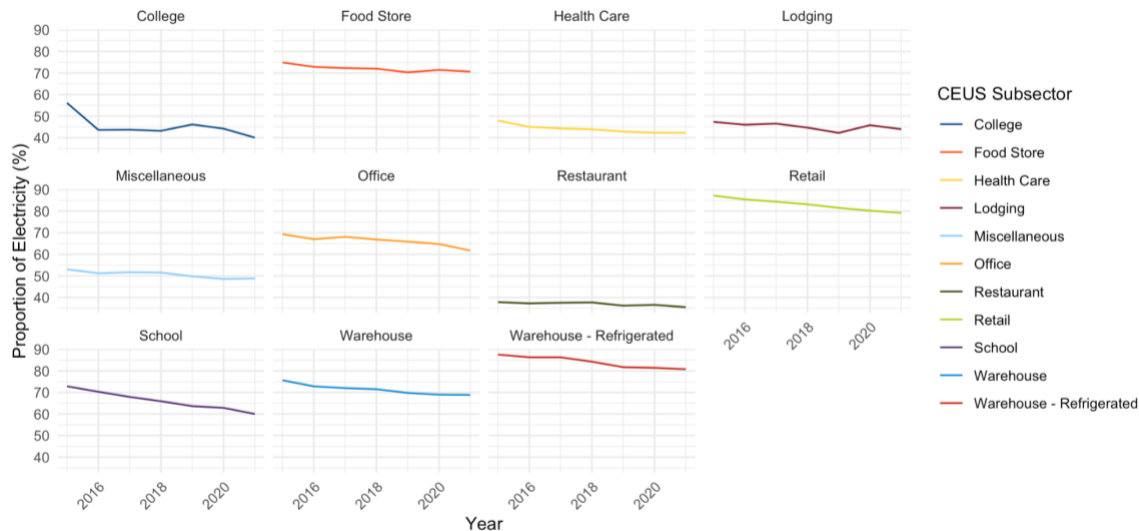


Figure 1. Commercial building electricity share by CEUS subsector (2015-2021)

Current efforts remain fragmented across numerous organizations, implementors, and incentive programs operating without centralized coordination or data tracking. Energy Efficiency (EE) programs, which were designed and implemented long before the development of the state’s policy initiatives

around electrification, continue to focus primarily on reducing energy use rather than on fuel substitution. Most funding continues to support traditional EE programs, including incentives for replacing older gas appliances with newer, more efficient gas models. Most existing incentive programs also tend to favor single family homeowners, even as commercial building owners face disproportionate electrification barriers.

A more comprehensive strategy for both building- and energy system-level decarbonization is needed across the state, one that is conscious of the different challenges and opportunities facing commercial property owners and inhabitants engaged in the transition. Continuing with a piecemeal approach to regulating and incentivizing commercial end-use electrification is likely to result in the inefficient allocation of resources and challenges in meeting state targets.

Research Gaps

The root causes of commercial program collapse are unresolved. There is no publicly available data on what share of allocated commercial electrification budgets are actually spent on claims, nor on TECH Clean California participation since October 2023. CEDARS geographic tracking is deeply flawed - a majority of claims have not been recorded by installation location - eliminating the ability to assess geographic equity or coordinate with gas infrastructure planning. The CEUS sector classification system also obscures critical within-subsector variation: grouping community colleges with research universities, or independent motels with convention hotels, under single categories masks the specific needs of the smallest and most vulnerable operators.

No program administrator, including CPUC staff consulted by the research team, could offer a single conclusive explanation for this collapse. Critical data gaps compound the problem: TECH Clean California commercial claims data has not been made publicly available since the program launched in October 2023, and data on the share of allocated budgets actually spent on claims is not accessible. Publicly-owned utilities represent roughly 40% of statewide efficiency spending but report no electrification data to any centralized public source.

Recommendations

- **Phase out incentives for replacing existing gas appliances with more efficient gas models.** These programs extend the lifetime of fossil fuel equipment and their associated supply and delivery infrastructure, locking in emissions for decades and delaying progress toward electrification. Instead,
- **Direct a larger share of ratepayer-funded energy efficiency budgets towards fuel-substitution and electrification programs,** with particular emphasis on existing commercial buildings where upfront cost barriers are highest.
- **Require CEDARS to collect and report installation location for all claims,** enabling geographic equity analysis and coordination with gas infrastructure planning.

- **Commission an independent investigation into the causes of commercial program underparticipation**, with CPUC, CEC, and program administrators.
- **Establish a centralized coordinating body or accountability mechanism to align programs**, implementors, and data reporting across utilities and agencies toward a unified commercial electrification strategy.

4. Rebuild Outreach Around How Commercial Operators Actually Work.

Incentive programs cannot succeed if they cannot reach their intended beneficiaries. Current outreach models assume that operators will initiate contact with programs, however this is structurally false for most small, independent commercial businesses. Program design must be rebuilt around how these operators actually function within each commercial subsector.

A comprehensive feasibility assessment of the lodging subsector, selected through a comprehensive prioritization framework evaluating emissions, social impacts, and implementation difficulty across 11 commercial subsectors, encountered systematic engagement barriers: despite 180+ call attempts and 15 site visit attempts, no substantive interviews were completed, revealing that traditional program outreach models fundamentally misunderstand commercial property operations where owners are rarely on-site, managers lack bandwidth, and contractors have abandoned certain market segments as economically unviable due to chronic underinvestment.

More than half of California's hotels are small (under 50 rooms), independently operated, Class C properties built before 1990. General managers routinely staff front desks simultaneously. Multi-property owners and are rarely on-site and often disconnected from their utility bills entirely - one mechanical vendor noted that owners 'don't pay attention to bills.' Decision-making is reactive: upgrades are pursued only when equipment fails or compliance requires it. When asked about energy programs, the consistent response from operators was that they were 'too busy.' These reflect genuine structural constraints.

The market failure runs deeper than access. A mechanical vendor who once derived 30% of their business from small independent hotels abandoned that segment entirely a decade ago because chronic underinvestment made projects economically unviable. If professional contractors find the small commercial segment unworkable, rebate programs that require contractors to deliver projects will find no one to do the work. Equipment-focused incentives cannot solve a market where installation capacity has collapsed.

Franchise and chain properties present a structurally different but equally difficult challenge. Approximately 70% of U.S. hotel rooms are brand-affiliated, with roughly 80% of those franchised. Local operators typically lack authority to make capital investment decisions without corporate direction.

Roughly 25% of hotels have on-site restaurants, but these are usually owned and operated by external third parties - fragmenting decision-making within a single property and adding yet another stakeholder to any electrification effort.

Overall, this is consistent with the stark decline in commercial claims observed in CEDARS, current programmatic outreach and program design remains unsuitable and merits a reset.

Research Gaps

Commercial business owners, especially small commercial business owners, are among the least studied populations in the electrification literature. No study has evaluated commercial operators' awareness of state decarbonization goals or their specific barriers to program participation. Commercial cooking electrification - which offers the greatest opportunity to reduce indoor NO_x emissions - is particularly understudied. Current methods for defining equity-priority commercial facilities are also underdeveloped: businesses may employ and serve disadvantaged populations while located outside formally designated DAC boundaries, and no commercial incentive program currently incorporates equity eligibility criteria comparable to those used in residential programs.

Recommendations

- **Shift program delivery away from direct owner outreach toward trusted intermediary models.** Work through industry associations (e.g., California Hotel & Lodging Association), contractors with existing sector relationships, and turnkey service providers who can manage the full project cycle. Do not design programs that assume property owners will initiate engagement.
- **For corporate franchise brands, integrate electrification requirements into brand-level sustainability standards and ESG reporting frameworks.** Local operators are unlikely to act without corporate direction; leverage the leverage that exists at the brand level.
- **Create concierge-style programs with third-party technical assistance that manages the entire process** - feasibility assessment, contractor selection, permitting, installation, and post-retrofit support - on behalf of time-constrained operators. Reduce the burden on operators to near zero.
- **Design outreach with cultural competence and through community-trusted messengers,** especially in disadvantaged communities where government-affiliated outreach faces heightened skepticism.
- **Conduct primary opinion research on small commercial business owners** - especially restaurant and food service operators - to understand awareness of programs, specific barriers, and receptiveness to different program designs.
- **Develop equity-specific eligibility criteria for commercial incentive programs that go beyond geographic DAC status,** incorporating workforce composition and the populations a facility serves.
- **Invest in workforce development programs to rebuild contractor capacity in the small, independent commercial segment** - particularly for heat pump installation, commissioning, and ongoing maintenance.