A Cost-Effective, Fast, and Sustainable Fire Recovery in Los Angeles

Considerations for Rebuilding All-Electric vs. to a Dual-Fuel Standard

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ABOUT THIS REPORT

The Center for Law, Energy and the Environment (CLEE) developed this scoping report to examine the potential cost, speed, safety, and sustainability considerations associated with rebuilding the fire-impacted communities in Los Angeles to an all-electric standard vs. a dual-fuel approach. The authors have applied research on building electrification to the Los Angeles recovery context, conducting an interdisciplinary literature review and interviews with experts to inform the conclusions in this report. The report is intended to serve as a starting point for future research and to provide resources for policymakers and residents considering their options in the recovery process.

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CLEE channels the expertise and creativity of the Berkeley Law community into pragmatic policy solutions to environmental and energy challenges. CLEE works with government, business, and the nonprofit sector to help solve urgent problems requiring innovative, often interdisciplinary approaches. Drawing on the combined expertise of faculty, staff, and students across the University of California, Berkeley, CLEE strives to translate empirical findings into smart public policy solutions to better environmental and energy governance systems.

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I. Introduction

The Los Angeles wildfires in January 2025 resulted in significant infrastructure losses, highlighting the need for an urgent, cost-effective, and sustainable recovery effort in the fire-impacted communities of the Pacific Palisades and Altadena. In all, 20,128 properties and businesses within the burn areas were destroyed or damaged by the Palisades and Eaton fires.[1] Structural damage assessments by CAL FIRE found that 56.3% of existing structures were destroyed in the Palisades Fire burn area and 50.9% of structures were destroyed in the Eaton Fire burn area.[2] Both fires caused severe damage to residential properties, commercial infrastructure, and utility infrastructure.[3] These devastating losses underscore the imperative to build back safely, cost-effectively, and resiliently in the fire-prone landscapes both neighborhoods occupy.

Figure 1. Destroyed homes in the Palisades Fire.[4]

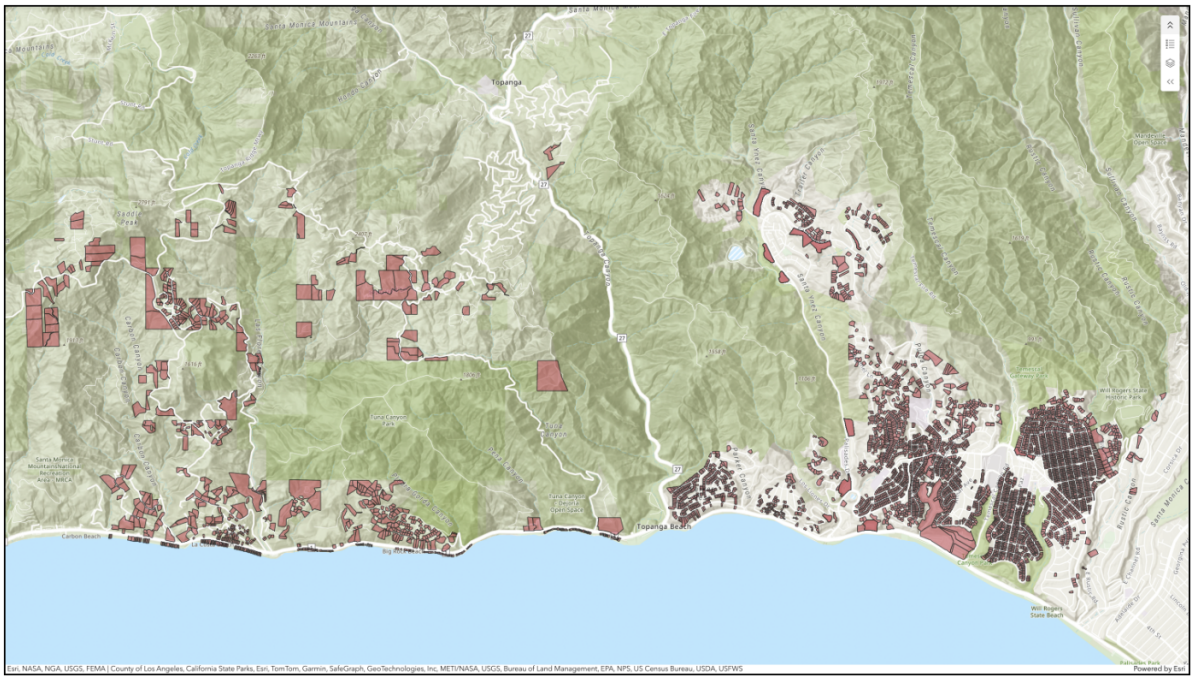
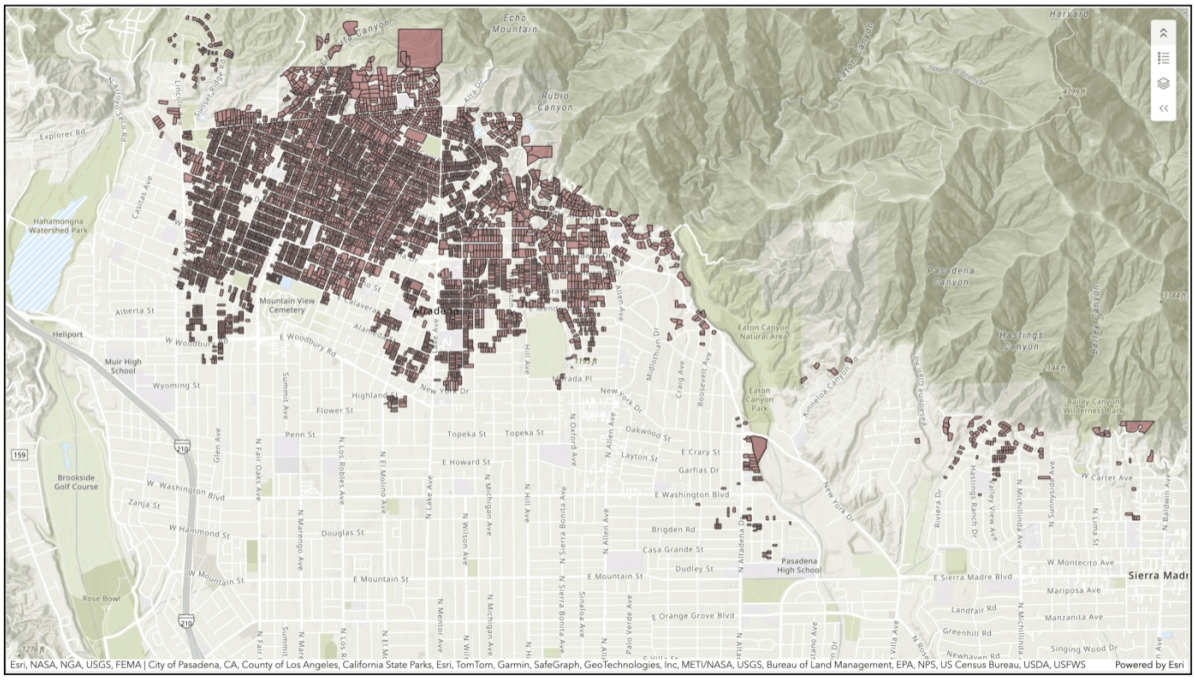


Figure 2. Destroyed homes in the Eaton Fire.[5]



Both commercial and residential buildings in Los Angeles have historically been built to a dual-fuel standard, with both electricity and natural gas used to support building appliances, water heating, and cooking functions. The City of Los Angeles adopted an ordinance in December 2022 mandating new construction to be all-electric effective April 1, 2023, requiring new buildings within city limits to use electric alternatives for heating, cooking, and water heating.

In response to the January 2025 wildfires, Los Angeles Mayor Karen Bass issued an executive order temporarily waiving the city's all-electric building code requirement for rebuilding projects in the fire-impacted areas, among other measures to promote a swift and streamlined rebuilding process.[6] This waived code applies to the community of the Palisades, while Altadena (an unincorporated community) lies outside of Los Angeles city boundaries. California Governor Gavin Newsom also issued an executive order in January waiving the application of CEQA and the Coastal Act for new construction in efforts to promote a swift recovery.[7] The applicable policy landscape is continuously evolving; a March 2025 Executive Order by Mayor Bass also directed city departments to streamline pathways for all-electric and fire-resistant construction.[8]

This report provides an initial scoping exercise into the potential costs, speed, safety, and sustainability issues associated with rebuilding the fire-impacted communities in Los Angeles to an all-electric standard vs. a dual-fuel approach. These considerations aim to identify key areas for future research and provide resources for policymakers and residents considering their options in the recovery process. Rebuilding will necessarily differ between the Pacific Palisades and Altadena due to a multitude

of factors, including differing jurisdictions, utilities, and demographics between the two communities. While this report introduces some of these differences, further research should assess specific considerations and recommendations tailored to each community's rebuilding process.

The report includes an overview of the following key elements:

- **Cost considerations** associated with an all-electric vs. dual-fuel rebuild in the fire-impacted communities, including:
    - *Construction costs* - The construction cost considerations of all-electric vs. dual-fuel buildings in the fire-impacted areas.
    - *Life cycle costs* - The operating cost considerations expected long-term for residents and owners of all-electric vs. dual-fuel rebuilds in the fire-impacted areas.
- **Speed considerations** of an all-electric vs. dual-fuel rebuild, including supply chain and workforce considerations.
- **Safety and sustainability considerations** associated with an all-electric vs. dual-fuel rebuild.
- **Recommendations** and policy options for rebuilding and recovery.

This report does not provide precise costs or recovery speeds in Los Angeles, as these factors are influenced by a continuously evolving policy and market landscape and affected by gaps in data availability. Rather, it provides an overview of likely estimates and relevant considerations based on existing literature and interviews with key stakeholders.

Our initial findings are the following:

- **The overall investment landscape favors all-electric construction.** As residents and business owners increasingly request all-electric construction in California, fewer ratepayers will share the burden of natural gas utility bills over time. Natural gas costs passed down to ratepayers may also increase to cover the cost of full service recovery.[a] As California climate policy transitions to building electrification over the next 20 years, an investment strategy that prevents against risk of stranded assets and brings down costs for ratepayers will be one that transitions away from dual-fuel construction and toward building electrification.

- **The recovery investment landscape differs widely between the Pacific Palisades and Altadena.** For example, tendencies to build custom homes in the Palisades may create greater workforce requirements, whereas opportunities for collective rebuilding and streamlining construction may be higher in Altadena. Cost constraints are less likely to affect the rebuilding

[a] Natural gas bills may also increase over time due to the likelihood of future climate-induced disasters and associated recovery costs.

pathways of residents in Palisades compared to residents in Altadena, and the rebuilding landscape is expected to be more homeowner-driven in Palisades than in Altadena.

- **There are comparable supply chain constraints associated with both a dual-fuel and an all-electric approach.** Appliances and equipment associated with rebuilding efforts faced supply chain constraints prior to the 2025 tariffs, which have exacerbated these constraints and associated construction slowdowns for both approaches. While developers and utilities can purchase necessary products in bulk, the majority of supply chain constraints will likely impact residents directly.

- **Electric new construction is far more cost-effective than a dual-fuel new build, but the Los Angeles case may not bring about the full extent of these cost savings.** The primary cost savings associated with all-electric new construction are in the avoidance of investment in gas infrastructure installation. The Pacific Palisades and Altadena already have existing gas infrastructure, much of which is underground and was undamaged by the fires. These savings are therefore less likely to make a substantial difference in rebuilding efforts.

- **While some concerns have been raised about workforce constraints in all-electric construction, workforce limitations are unlikely to pose barriers to electric recovery.** Workforce constraints for electric construction are much more of a concern in cases of retrofits than in new construction. As electrical equipment and infrastructure will be installed for all buildings regardless of recovery pathways, the labor impacts of adding an additional electric circuit are minimal. Policy pathways such as training provisions can support workforce availability in cases where constraints may arise, such as in building custom homes or installing highly specialized appliances.

- **The life cycle costs of both a dual-fuel and an all-electric rebuild may be comparable and depend on uncertain future electricity and gas rates.** While residents in many states experience lower utility costs in all-electric buildings, comparatively high electricity rates in California may not bring about these cost savings. However, electricity rates may decrease with future legislation on dynamic rate and fixed charge structures, especially for lower-income residents. At the same time, natural gas rates (which are typically lower than electricity rates in Los Angeles) may rise to cover the costs of infrastructure recovery. As electricity rates decrease, the state transitions to building electrification, and fewer ratepayers share the burden of gas recovery costs, natural gas costs over the building life cycle may become comparable or higher than electricity costs.

- **Safety and sustainability considerations favor an all-electric recovery approach.** Natural gas and lithium ion batteries used in all-electric technologies both pose fire risks, and the energy

redundancy provided by natural gas favors a dual-fuel rebuild in the short term. However, natural gas produces substantial indoor air pollution, poses risks of carbon monoxide poisoning, and is by far less environmentally sustainable in terms of emissions reductions and alignment with California's climate targets.

- **Due to the supply chain challenges for both dual-fuel and electric rebuilding, a dual-fuel rebuild is not expected to be faster than an all-electric rebuild.** Electrical equipment and infrastructure will be installed for all residents in the Pacific Palisades and Altadena regardless of recovery pathways. Gas service provision is additional to electricity service, potentially adding time and cost to construction. As both electric and gas-powered appliances are impacted by tariffs and supply chain disruptions, a dual-fuel rebuild does not have speed advantages over an all-electric rebuild.

Recovery pathways will ultimately arise from a combination of decisions made by home and business owners, policymakers, private sector stakeholders, and other actors evaluating current market and policy considerations. Policy measures will be especially decisive in determining whether the timing and cost considerations of all-electric rebuilding efforts will be lower, equal to, or higher than a dual-fuel rebuild. Considering all factors–including cost, speed, safety, state climate goals, and the potential for stranded assets–our initial conclusion supports an all-electric rebuild and the adoption of policy measures to support it accordingly.

II. Cost Considerations Associated with an All-Electric vs. Dual-Fuel Rebuild

Cost considerations associated with rebuilding efforts include:

- *Construction costs* - The construction cost considerations of all-electric vs. dual-fuel buildings in the fire-impacted areas.
- *Life cycle costs* - The operating cost considerations expected long-term for residents and owners of all-electric vs. dual-fuel rebuilds in the fire-impacted areas.

A. Construction Costs

All-electric new construction is associated with a far lower cost profile than dual-fuel new construction. Electrification is also particularly cost-effective in climates with mild winters, as well as in cases of heat pump substitution for both heating and cooling systems or the installation of high-efficiency air source heat pumps.[9] While rebuilding needs meet these conditions in the Pacific Palisades and Altadena, the investment landscape differs from cases of entirely new construction because of some existing, undamaged gas infrastructure already underground in these communities. A key cost-associated benefit of all-electric new construction is the avoidance of expensive gas infrastructure installation. While residents and business owners are less likely to experience substantial savings due to the avoidance of gas infrastructure installation in this case, they are still likely to experience cost savings from other factors, listed below.

1. Integrated system construction.
   In dual-fuel buildings, separate gas piping systems are required for heating, water heating, clothes dryers, and cooking to service each of these appliances. All-electric homes use the electric infrastructure to connect systems, such as heat pumps, for heating and cooling, water heating, cooking appliances and others, which are more streamlined to install and often lead to decreased consumer costs.[10]

2. Avoiding future costs in retrofits.
   Electrifying buildings during construction is far more cost-effective than retrofitting to accommodate electric appliance replacements later in the building life cycle.[11] Costly building upgrades, such as upgrading to a high-capacity electrical panel needed to support technologies such as heat pumps, pose significant barriers to electrification after a dual-fuel building has been built,[12] as electrical panel upgrades can cost between $2,000 and $4,000.[b13] The complexity of adapting an electrical system to a dual-fuel building (such as adapting duct sizing,

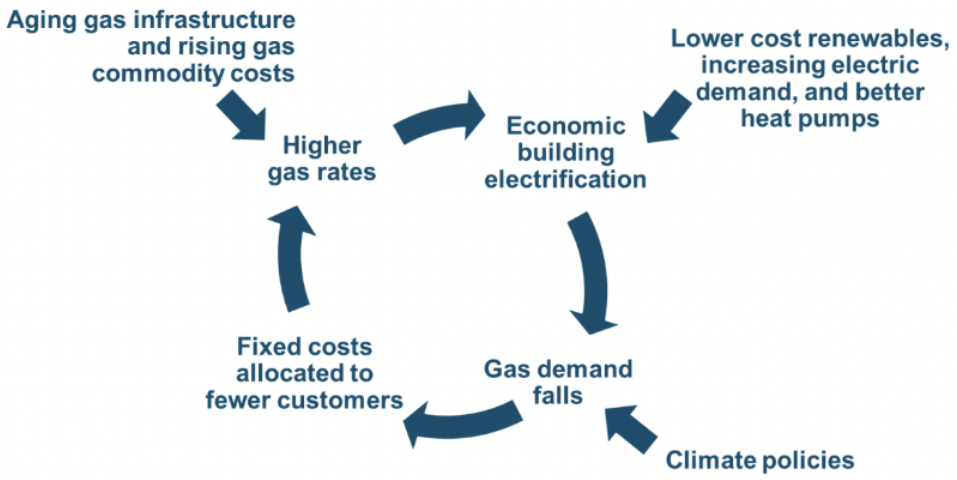
[b] Electrical panel upgrades require skilled technician labor costs to install, making it more cost-effective to install a high-capacity panel in initial construction than to hire technicians to install an initial panel followed by a later upgrade to a higher-capacity one.

water closet placement, the location of a cooking range, etc.), can also add significant time and cost.

3. Avoiding potential increases in future gas bills.
Installing gas lines, installing meters, and running gas pipes through a building is highly expensive,[14] with gas line installation ranging from $500 to over $2,000 in California. SoCalGas will likely incur significant costs for additional infrastructure recovery and safety inspections that are expected to be passed down to ratepayers. This is expected to include nearly 12,000 complete customer service restorations, including reconnecting lines from the street to the home and installing gas meters.[c]

Natural gas utilities are bound by the obligation to serve, a legal principle requiring utilities to provide services to anyone who requests them within the service territory. However, as some developers and building owners will rebuild all-electric, a diminishing natural gas rate base will bear any future costs of restoring and building infrastructure, burdening ratepayers with higher gas bills in the future.

Figure 3. Outside forces in the natural gas delivery sector could lead to lower gas demand and higher rates in future greenhouse gas reduction scenarios.[15]



[c] As of late March 2025, SoCalGas had restored service for nearly 15,000 customers and is continuing to restore service as part of the recovery process.

Commercial and School Construction

The primary costs of electrification for commercial and school construction include heat pumps for HVAC (heating, ventilation, and air conditioning), lighting, and insulation. In dual-fuel commercial buildings, gas is often used for space heating, water heating, dryers, and gas-powered appliances such as dryers in a laundromat or the stove in a school kitchen. Heat pumps are typically the most significant investment in building electrification, although they are most cost-effective when used for cooling and heating larger spaces.

A comprehensive electrification strategy including efficient building design is much more cost-effective for commercial and school construction than one-for-one equipment replacement.[16] In the Los Angeles case, where cooling is a primary concern, new construction can utilize passive architecture in addition to electrification to maximize the energy efficiency of school and commercial buildings. This could include cool roofs, cool walls, and other energy-efficient measures.

Additional equipment often constructed in tandem with all-electric commercial and school construction, such as electric vehicle charging infrastructure, can be associated with higher construction costs due to the high costs of EV charging stations.[17] Policy measures such as rebates and incentives can bring down these costs, and retrofit estimates for installing EV chargers post-construction are 3-4 times higher than in the building stage.[18]

Residential Construction

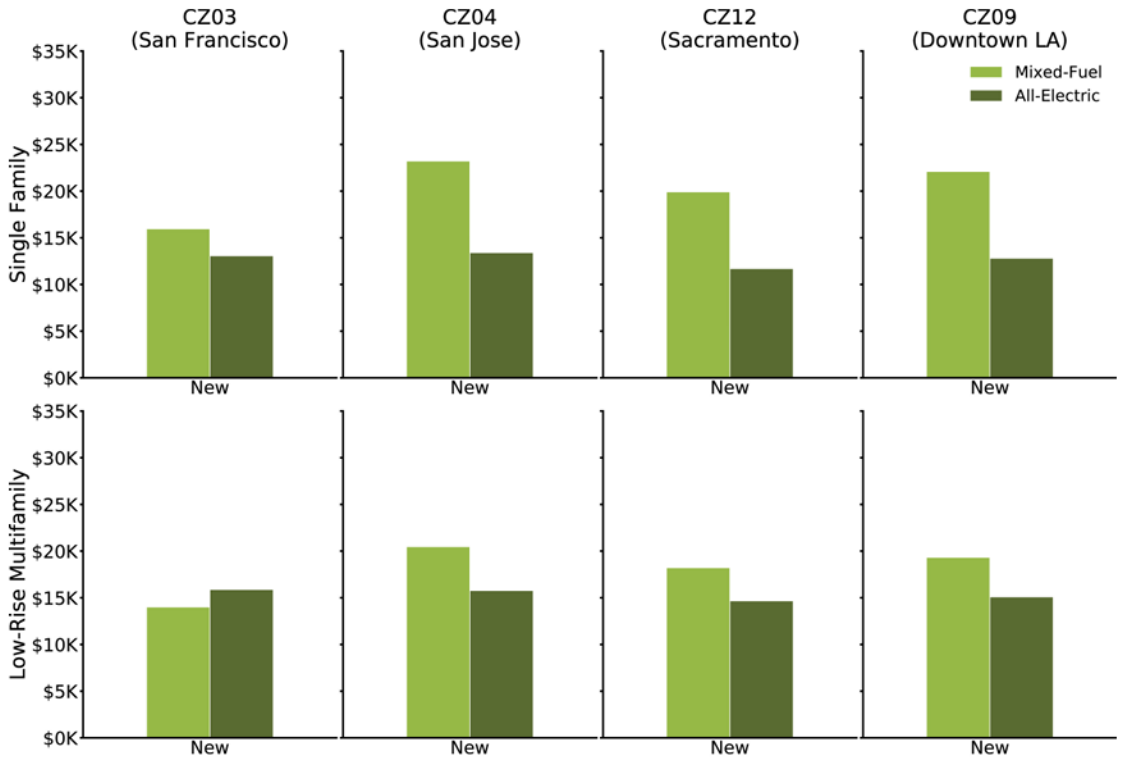
Dual-fuel residential buildings typically use gas for cooking, dryers, water heating, space heating, fireplaces, and grills. Residential homes may also use natural gas for outdoor uses, such as fire pits, pools, and patio heaters. An all-electric rebuild for residential construction includes many of the same components as commercial and school construction, such as heat pumps, efficient lighting, and insulation, as well as additional appliances such as induction ranges or cooktops and electric dryers. Electric substitutes for outdoor use appliances such as fire pits, grills, and patio heaters have not yet been competitive on the market, posing some barriers to homeowners with cultural preferences for significant use of outdoor residential space.[d]

An all-electric single-family home can be $7,500-$8,200 cheaper to build than a home built to dual-fuel baseline code.[19] In Los Angeles, these cost differences have been estimated at $9,000 of cost savings when constructing an all-electric new home rather than construction for dual-fuel use (though these estimates may be impacted by this scenario of already-existing gas infrastructure).[20] In addition to the lower costs associated with an integrated installation system, the capital costs per unit of electric

[d] Cultural preferences for outdoor entertainment are a significant contributor to the use of outdoor natural-gas powered appliances, such as fire pits, grills, and patio heaters in the Pacific Palisades.

appliances have been found to be lower than those for gas-powered appliances and systems including air conditioning systems and gas furnaces, amounting to capital cost savings of between $3,000 to over $10,000.[21] The economics of heat pump adoption are strongest when they can displace both an air conditioning system and a gas-powered furnace or boiler.[22]

Figure 4. Capital costs per unit of appliances (HVAC, water heater, stove, and clothes dryer) and infrastructure (including gas connection costs) for new construction.[23]



While dual-fuel construction can be more cost-effective in different circumstances, such as for some building retrofits and in colder climates, all-new electric construction in the Los Angeles climate is a comparatively more affordable scenario. Residents and business owners are likely to experience cost savings from electrification due to the integrated system construction and design, avoiding future costs in retrofits, and avoiding future increases in natural gas bills.

B. Life Cycle Costs

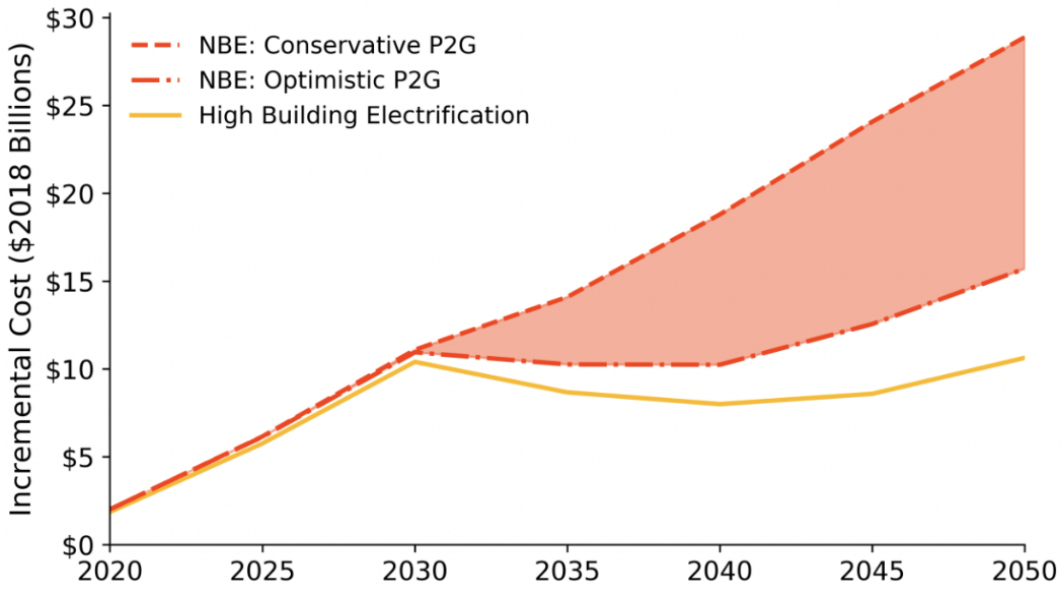
Exact life cycle costs of a dual-fuel vs. an all-electric rebuild will be influenced by a continuously evolving policy and cost landscape. In many states, building electrification is associated with cost savings; in the

California context, this will depend on future utility rates, equipment efficiency, and multiple unknown factors over the life cycle of buildings and associated appliances.

Electrification may still result in cost savings: the life cycle cost savings of new all-electric construction have been calculated at $130 to $540 per year in climate zones across California. Avoiding the need for upgrading a building's electrical panel for electric readiness or retrofits later in the building's life cycle also saves significant life cycle costs, ranging between $2,000 and $4,000 per panel upgrade.[24]

On an economy-wide scale, electrification is particularly cost-effective long-term, especially when low and middle-income (LMI) households are provided policy support to electrify alongside high-income households.[25]

Figure 5. Economywide annual net costs relative to current policy reference scenario.[26]



NBE is short for "no building electrification" scenario. The high building electrification scenario does not assume any retirements of natural gas distribution infrastructure. Transfer payments such as cap-and-trade and LCFS policies do not affect the total costs to the California economy shown here.

LMI households stand to experience the highest life cycle cost savings due to their likelihood of experiencing high energy costs and inefficient cooling and heating systems pre-electrification.[27] However, due to upfront costs associated with rebuilding and a higher likelihood of renting than homeownership, LMI households are unlikely to electrify without policies and programs incentivizing equitable electrification options. A report evaluating life cycle costs for two pathways: 1) prioritizing LMI electrification and 2) excluding LMI electrification, projected that prioritizing equity in

electrification nationally would result in $96 billion in cost savings compared to an $88 billion cost increase if LMI households are left behind.[28] Supporting all-electric recovery, especially for LMI residents in Altadena, can prevent exacerbating existing inequities and save costs for LMI residents.

Home electrification is not expected to require additional investment for the Los Angeles Department of Water and Power (LADWP) in the Pacific Palisades. LADWP has already been investing in an electric transition in the community, so homeowners' decisions to rebuild all-electric are not expected to generate new electric load beyond existing plans. In fact, rebuilding homes in the Palisades (many of which were older and not built to energy code prior to the fire) may generate substantial enough savings to offset any new load coming from electrification.

Given the uncertainty associated with future natural gas and electricity costs, which will affect the life cycle costs associated with both rebuilding pathways, total costs to ratepayers are also uncertain and necessarily affected by the context of the climate transition in California.

Electricity rates may decrease with future legislation on dynamic rate and fixed charge structures, especially for lower-income residents. At the same time, natural gas rates (which are typically lower than electricity rates in Los Angeles) may rise to cover the costs of infrastructure recovery. As electricity rates decrease, the state transitions to building electrification, and fewer ratepayers share the burden of gas recovery costs, natural gas costs over the building life cycle may become comparable or higher than electricity costs.

III. Speed Considerations of an All-Electric vs. Dual-Fuel Rebuild

Speed considerations of an all-electric vs. dual-fuel rebuilding approach tend to favor all-electric construction. A dual-fuel rebuild often involves separate service requests for gas and electricity utilities, creating potential coordination issues (especially for appliances that need both an electric and a gas connection) and associated time delays. As electricity service will be restored to all homes and businesses in the fire-impacted communities regardless of the recovery approach, restoring gas service is often an additional time and cost consideration.

Rebuilding utility infrastructure, especially the recovery and installation of gas infrastructure and services, is a time-consuming process. Gas infrastructure installation can be constrained by the availability and shipment speed of replaced materials (such as gas meters) following an emergency event. Following the recovery and/or installation of gas infrastructure, conducting safety checks for service restoration requires approximately one to two hours per home spent by a skilled technician.

All-electric new construction is typically faster due to the installation of integrated home components all connected to the same system. This can simplify permitting in many cases, speed up safety checks, and bypass duct work, which has been shown to save residents up to $8,000 for both single- and multi-family homes.[29] These speed differences are more likely to be seen in residential buildings in Los Angeles: permitting for school construction, for example, requires approval by the Division of the State Architect (DSA) and may result in longer timelines due to additional steps in the process.

A few key speed considerations associated with rebuilding efforts include:

- *Supply chain considerations* - Supply chain-related considerations for electric and natural gas-based appliances and equipment.
- *Workforce considerations* - Workforce-related considerations for the installation of electric and natural gas-based appliances and equipment.

Supply Chain Considerations

Supply chain costs and constraints are comparable across both all-electric and dual-fuel equipment in Los Angeles. Price increases have affected home appliances and construction costs since the Covid-19 pandemic due to ongoing supply chain impacts, and natural disasters result in supply chain bottlenecks for both gas-powered and electric building equipment and services. Prior to the 2025 tariffs, supply chain considerations would likely have favored a dual-fuel rebuild due to the comparatively more limited domestic availability of electric equipment and appliances. However, the presence of a heightened and uncertain tariff landscape generates substantial supply chain challenges for both approaches.

While businesses and utilities can more easily order equipment in bulk to counteract supply chain constraints, residents are likely to be most strongly affected by price increases and potential delays associated with supply chain disruption. Neighborhood or community-wide collaboration, including through homeowners' associations or community-based organizations, can enable pooled purchasing pathways to minimize these impacts on homeowners and renters.

The development of a stronger domestic supply chain for electric appliances has been recommended as a measure to ensure equipment availability with geopolitical or economic uncertainty.[30] Communities, policymakers, and developers in the Pacific Palisades and Altadena can additionally mitigate any potential delays in product shipment by purchasing products in bulk and engaging with construction and technician labor groups to streamline construction and installation. Policy pathways to support the simultaneous development of multiple properties can also streamline rebuild processes and add to the cost-effectiveness of rebuilding efforts.

Workforce Considerations

Some concerns have been raised about potential workforce constraints for all-electric construction, but we find that these are mostly applicable to building retrofits and are not a likely barrier to electrified construction in the Los Angeles case.

Electrical equipment and infrastructure will be installed for buildings in the Pacific Palisades and Altadena as part of the recovery process, regardless of residents' and business owners' chosen rebuilding pathways. The workforce considerations of running one additional electric circuit are marginal in comparison to the additional costs of gas infrastructure installation, especially if these processes are coordinated by separate utilities. Electrical panels will be installed in all buildings, and electric appliances have simpler installation processes, saving time and associated costs. Multiple interviewees expected an all-electric rebuilding approach to result in net labor savings.

However, there are a few areas in which workforce constraints may cause barriers to an all-electric recovery: some specialized heat pump installations may be constrained by skilled worker availability, especially the installation of large commercial heat pumps.[31] A cultural preference for custom-made homes in the Palisades may also require additional workforce considerations compared to greater options for streamlined rebuilding in Altadena.

The proximity of the Port of Los Angeles and a large workforce in the city may mitigate potential workforce and supply chain issues that may arise in more rural areas with appliance availability and workforce constraints.[32] To address resident concerns about contractor availability, policymakers can take action to support a pipeline of trained workers, including training provisions and pathways toward self-certification of trained workers in the sector. Communities, policymakers, and developers in the Pacific Palisades and Altadena can additionally mitigate any potential delays in product shipment by

purchasing products in bulk and engaging with construction and technician labor groups to streamline construction and installation.

IV. Safety and Sustainability Considerations of an All-Electric vs. Dual-Fuel Rebuild

Safety and sustainability considerations associated with an all-electric vs. dual-fuel rebuild are included in the same section due to the numerous intersections between climate risks and personal safety. Safety considerations are increasingly impacted by climate risks, including wildfire and equipment flammability, the presence of clean, cool indoor spaces in cases of smoke or extreme heat, and the presence of backup energy sources in cases of emergencies or preemptive power shutoffs.

We examined a few safety issues associated with natural gas and electric infrastructure, including fire hazards, indoor air pollution, the potential for carbon monoxide poisoning, and the potential for energy redundancy in cases of emergency or preemptive power shutoffs. While both approaches generate some fire hazards and a dual-fuel rebuild supports energy redundancy, an all-electric rebuild would protect residents from indoor air pollution and carbon monoxide poisoning, as well as lower greenhouse gas emissions and align with California's climate goals.

1. Fire hazards.
   Both natural gas and lithium ion batteries used in electric applications are highly flammable and pose significant fire hazards during cases of existing wildfire. Natural gas may also spark fires through leaks and explosions stemming from corroding or aging pipelines, which may pose a higher risk in a wildfire-prone climate, especially as many parts of the existing pipelines pre-fire were undamaged and are expected to remain.

2. Indoor air pollution.
   Natural gas used/combusted in households contains volatile organic chemicals (VOCs) such as ozone, nitrous oxide, formaldehyde, benzene, and harmful PM2.5. These chemical compounds are associated with numerous adverse health impacts and generate indoor air pollution even when appliances such as stoves and ovens are not in use.[33] Switching from a gas stove to electric induction can reduce indoor nitrogen dioxide air pollution by over 50 percent.[34]

3. Potential for carbon monoxide poisoning.
   Carbon monoxide is a toxic, odorless, and potentially life-threatening gas released due to incomplete combustion of natural gas and other fuels in faulty appliances. All-electric appliances do not produce carbon monoxide due to the absence of combustion.

4. Potential for energy redundancy.

Dual-fuel homes offer energy redundancy, which can provide a valuable energy source during extreme weather events or Public Safety Power Shutoffs (PSPS) to prevent wildfire incidence in dangerous weather conditions. These cases may favor a dual-fuel rebuild in the short term.

The environmental sustainability considerations associated with an all-electric vs. dual-fuel rebuild strongly favor electrification. Greenhouse gas (GHG) emissions from buildings account for roughly 25% of GHG emissions in California,[35] and gas stoves leak methane even when they are turned off, contributing to detrimental climate impacts.[36] Replacing natural gas with electricity would cut GHG emissions from California's single-family homes by up to 90% in the next 30 years.[37]

The California Air Resources Board has approved a proposal for zero-emission standards for all new space and water heaters sold in the state by 2030,[38] essentially requiring electrification of new appliances in line with California's carbon neutrality targets by 2045.[39] AB 39 (Zbur), currently in the California Legislature, would require each city or county to adopt a plan for integrated electrification and equitable investment in zero-emission technologies.[40] As state policy moves toward decarbonization, electrification will be not only more sustainable but more cost-effective, avoiding risks of stranded assets and increased homeowner costs associated with replacing gas-powered equipment in the future.

V. Recommendations and Policy Options for Rebuilding and Recovery

California state policy directs a low-carbon transition, with a carbon neutrality target by 2045[41] and required reduction of greenhouse gas emission levels to 40% below 1990 levels by 2030.[42] The Los Angeles Climate Action Plan also has a goal of carbon neutrality for unincorporated Los Angeles County by 2045, with interim climate targets for 2030, 2035, and 2045.[43] As gas distribution infrastructure has a typical useful life of over 65 years, investment in new gas infrastructure (even if mostly above ground, such as installing meters and gas pipes) is not a sustainable recovery pathway. While the market considerations of dual-fuel vs. all-electric construction are nuanced, we find that the overall investment landscape favors all-electric construction. The goals of providing affordable and swift rebuilding and recovery options to wildfire-impacted communities can effectively be achieved through an all-electric rebuild while also supporting public safety and the state's sustainability goals.

The following recommendations for policymakers help support this effort:

1. **Pursue and resource policies supporting all-electric recovery, including streamlining all-electric construction and facilitating electricity affordability.**
   Policy measures supporting the streamlining of all-electric construction and facilitating electricity rate decreases can support all-electric and sustainable recovery. Los Angeles policymakers should pursue and resource City Executive Order No. 5 streamlining pathways for all-electric and fire-resistant new construction.[44] Policymakers can also support dynamic pricing and fixed rate electricity structures to facilitate electricity affordability, as well as other measures such as requirements or incentives for demand-flexible appliances[45] and incentivizing thermal storage.

2. **Provide incentives and public funds to support lower costs and higher speed of all-electric construction.**
   Policymakers should support and expand funding pathways for existing incentives and resources for building electrification, including:

   - Rebuilding Incentives for Sustainable Electric (RISE) Homes, a statewide incentive program for all-electric rebuilding providing homeowner assistance.[46]
   - The Switch Is On rebate database, which provides homeowners with incentive and contractor locating tools.[47]
   - Southern California Edison rebates and incentives for cost-effective, energy-efficient homes.[48]

3. **Work with key utility stakeholders on transition planning to support financial certainty.**

State and city-level policymakers can support building electrification through measures such as legislative action clarifying utilities' obligation to facilitate the electrification transition with clear associated timelines.[49] This could build on efforts such as SB 1221 (Min), which created a framework for neighborhood-scale transition from gas infrastructure to all-electric alternatives in 30 pilot communities in 2024.[50] As the construction of new gas distribution infrastructure introduces risks of stranded assets and future costs to ratepayers, public agencies should work with key utility stakeholders to secure a managed transition to building electrification that supports financial certainty for utilities and lower costs for consumers.[51]

4. **Provide capacity building and technical assistance to support communities in sustainable and resilient construction projects.**
   The costs and requirements of rebuilding (with either fuel approach) pose barriers to LMI households and small and medium enterprises (SMEs). Incentives and rebates for electrification should be designed with equity in mind, and policymakers can expand the provision of capacity building and technical assistance to communities and community-based organizations to support residents with limited resources for recovery.

5. **Manage a just workforce transition toward sustainable construction opportunities and training.**
   Policymakers can engage with construction and building design stakeholders to ensure workforce familiarity with electric equipment and availability for all-electric construction. This can include supporting certification and training programs for building electrification (including a pathway for self-certification), as well as engaging with labor unions to manage this transition in a way that supports transferable employment pathways.

6. **Work proactively to address potential supply chain delays through strategies such as streamlining mass rebuilding and pooling purchasing.**
   Policymakers can create avenues for streamlining mass rebuilding and incentivize neighborhood-scale rebuilding efforts to mitigate potential supply chain constraints and bring down construction costs. These can include joint incentives for community groups developing together, pre-designed all-electric homes, and bulk purchasing of necessary appliances and equipment,[52] among others. Effective mass rebuilding strategy should include collaboration with distributors, home retail outlets, community groups, contractors, and housing associations to identify neighborhood needs and collectively support the equipment necessary for an all-electric rebuild.

7. **Provide consumer education resources about the cost-effectiveness, speed, safety, and sustainability of all-electric infrastructure.**

Consumer preferences and familiarity with all-electric appliances are a key determinant of adoption of electric technologies, especially cooking preferences for gas stoves over induction. Consumer education and resource provision about the effectiveness, affordability, speed and ease of installation, safety, and environmental sustainability of electric appliances are essential in supporting an all-electric recovery. These resources can be provided at already-existing community meetings, public events, farmers' markets, local businesses, outdoor spaces, and online spaces. Working with trusted community partners to share public information about electrification and invest collectively is key to neighborhood uptake and building resident trust.

8. **Conduct further research to differentiate economic barriers to electrification from other barriers.**

   This research has identified differences between economic barriers to electrification from cultural or political barriers to a transition away from the legacy utility system. Due to the key role political and cultural barriers play in decisions impacting rebuilding and recovery, further research is needed to better understand and address these considerations in the context of a statewide energy transition.

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