



MEMORANDUM

TO: Environmental Advisory Commission

FROM: David M. Reyes, Director of Planning & Community Development Department

DATE: May 10, 2022

SUBJECT: Proposed Electrification Ordinance

PROPOSED ELECTRIFICATION REQUIREMENTS:

The City proposes to exercise its police powers to amend Title 8, Health and Safety Code of the Pasadena Municipal Code with a proposed ordinance that would require electrification of buildings in certain specific categories of new construction.

Specifically the following:

- New multi-family residential buildings greater than 3 units;
- New mixed-use buildings;
- New non-restaurant commercial buildings; and
- Additions to existing commercial buildings where the addition adds 50 percent or more to the existing floor area. In such cases, the entire building must convert to electrification.

The proposed amendments and exemptions are fully outlined in Attachment A. Staff proposes an implementation date on or around July 1, 2022, or as soon as practicable following the first and second reading of the ordinance. Staff recommends requiring electrification for new buildings based on a planning entitlement deemed completed before the 'implementation date' or if no entitlement is required that a building permit application is received before the 'implementation date'.

BACKGROUND:

On November 9, 2021, staff presented information on a potential electrification ordinance to the Municipal Services Committee (MSC). Staff presented information on a potential ordinance to achieve carbon neutrality by underscoring the role buildings play in local greenhouse gas (GHG) emissions and the need to take decisive action to reduce current and future GHG emissions. Given recent advances in appliance technologies, recent decreases in carbon-dependent power distribution and a better understanding of the role that buildings play in local GHG emissions, the MSC directed staff to conduct further research and outreach for a potential electrification ordinance.

At the City Council meeting of April 4, 2022, after soliciting public input from various stakeholder groups, staff presented proposals for building electrification to the City Council. The City Council directed staff to first solicit input on a proposed ordinance from the Environmental Advisory Commission, and then return to the City Council with EAC's input as well as a report from the City of Pasadena Department of Water & Power (PWP) addressing utility and capacity related questions, and quantifying construction and operational costs of electrification. The report from PWP is included as Attachment B.

DISCUSSION:

As of April 2022, at least 54 municipalities throughout California have adopted ordinances to begin decarbonizing buildings, using an array of regulatory approaches. This includes numerous cities that have adopted "all-electric, whole-building" requirements. An ordinance requiring building electrification for certain specific categories of construction in Pasadena would further advance the City's commitments to reach the shared goals of like-minded cities to reduce greenhouse gas emissions.

Why Propose Electrification?

Emissions from the use of natural gas and propane have become the largest source of Greenhouse Gas (GHG) emissions associated with buildings. These emissions make up about one-third of the greenhouse gas emissions in our region. According to the City of Pasadena's Climate Action Plan, as of 2009, approximately 47% of the City's GHG emissions are from residential and commercial energy use for buildings with dual-supplied sources, (natural gas and electricity) with residential energy use totaling 16% and commercial energy use totaling 31% of the community wide total.

The City of Pasadena's Climate Action Plan identifies various strategies for GHG emissions reductions, including encouraging the use of carbon-neutral energy in residential and commercial buildings. Pasadena cannot meet its climate goals without reducing natural gas use. State policies and lower prices of renewable energy mean that substituting natural gas with electricity is one of the quickest, safest, and least expensive pathways to eliminating GHG emissions from buildings.

Natural Gas and Public Health – Indoor natural gas use, particularly for cooking, worsens indoor air quality, which disproportionately harms communities that experience the first and worst consequences of climate change. Burning natural gas creates indoor air pollutants including carbon monoxide, formaldehyde, and nitrogen dioxide, all of which contribute to respiratory ailments. These impacts are compounded in small, poorly ventilated spaces. Children living in homes with gas cooking are 42 percent more likely to have asthma.

Electricity and Resilience – Gas lines are also more difficult to repair following disasters than electric infrastructure, and as such reduce a city's resilience. In times of disaster, the fossil fuel supply chain will likely be disrupted. Conversely, all-electric buildings can increase resilience. Electric appliances in conjunction with battery storage technology and renewable energy generation (such as rooftop solar) can operate absent the grid's electric supply chain.

Advantages of Residential Electrification (Using electricity to heat and cook)

Modern electric appliances such as heat pump water heaters, heat pump space heaters, heat pump clothes dryers and induction cooktops, now offer enhanced efficiency and performance.

On operational cost of electrification, it is difficult to definitively determine whether an all-electric building will cost more or less to operate because the relative costs of electricity and natural

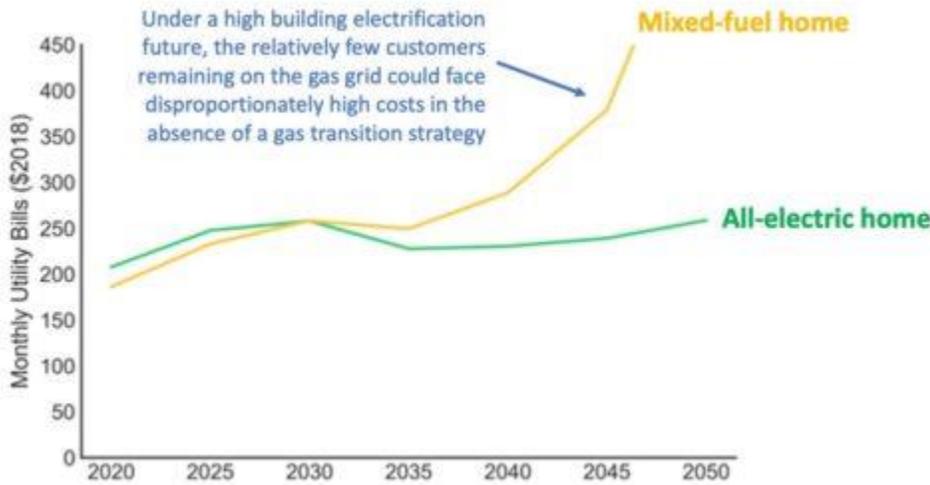
gas fluctuate over time. As shown in Figure 1, statewide electrification policy studies suggest that natural gas rates will increase significantly as their use declines.

Additionally, all-electric homes are considered substantially safer than their dual-supplied counterparts because there are no emissions from gas combustion and there are no gas pipes that can leak due to wear, age, or earthquake.

Why Focus on New Buildings?

The greatest opportunities for electrifying buildings are present when the building is being designed and constructed. With new buildings, the total electrical usage can be calculated leading to the correct size for the electrical main supply. Existing buildings converting to all-electric will encounter challenges in upgrades to the electrical service, routing of new electrical circuits within the building walls, and the removal of abandoned gas lines.

Figure 1 – Monthly Utility Bills for All Electric vs Dual-Supplied Homes in CA



Source: <https://www.ethree.com/at-cec-e3-highlights-need-for-gas-transition-strategy-in-california/>

Why Exempt Single-Family New Construction?

While most of the 54 jurisdictions that require electrification included new single-family dwellings in their ordinances, staff recommends at this time to exempt single-family new construction, including ADUs from electrification requirements. This will enable current property owners to choose the energy type that works best for their needs and will allow for this category of housing to remain competitive while there is still a desire for gas infrastructure in single-family housing.

Further, while the 2022 California Energy Code (effective January 1, 2023) does not mandate the electrification of new single-family homes, it does require new home construction to incorporate electric-ready features. Also, per the City Council at the April 4, 2022 meeting, if the ordinance is adopted, the City Council requested a 1-year update at which point Phase 2 of the ordinance, to include new ADUs and single-family housing, will be considered.

What about Construction Costs?

A common misconception is that construction costs for all electric buildings is higher, although there is growing evidence that there is an actual cost savings in construction since gas infrastructure is omitted entirely. Further, while some claim that electrification will increase the cost

of housing, this is unfounded because while the cost of construction is a factor in the cost of housing, the greater influence on housing prices relates to demand and fluctuation in the housing market.

In researching an electrification ordinance, the City of Oakland found that the cost of all-electric buildings are actually similarly favorable to dual-supplied buildings. And modern electric appliances are significantly more efficient than gas appliances, using fewer units of energy for the same work. Electric heat pump water heaters are up to five times more efficient than gas water heaters. Moreover, electric energy costs can be offset through local renewable generation such as rooftop solar, while gas must be purchased from an outside source.

Specific information exists related to actual construction costs for dual-energy construction versus all-electric. Local developers, such as City Ventures, Heritage Partners, National Core and Community Corporation of Santa Monica, have indicated that construction costs/cost savings are difficult to quantify and vary from project-to-project. As indicated by City Ventures, from a predevelopment perspective, there is a cost-savings related to a smaller scope of work for a dry utility consultant. From a land development perspective, there are cost-savings associated with less trenching and the installation of the actual gas line within the streets (and associated cost such as fees, street replacement, traffic control, etc.). From a building construction perspective, there are cost savings associated with not needing to install gas lines within the home and lack of delays associated with obtaining gas meters. And there are also significant rebates from local electric utilities for building all electric homes. While the increased cost of installing a larger utility electrical transformer will reduce the net savings, depending on the location, all-electric construction is expected to be less expensive on average. Some local developers already choose to construct all-electric homes without natural gas.

Other studies on the cost of all-electric construction versus dual-fueled construction include that of the City of Morgan Hill, who found in their research for an electrification ordinance that avoiding the installation of gas pipelines into a development can save approximately \$7,000 per unit in construction costs. In a 2018 report by the Rocky Mountain Institute titled '*The Economics of Electrifying Buildings*' RMI found that "Electrification is generally cost-effective for oil and propane customers, for both new construction and retrofits. For newly constructed homes, heat pumps are usually the lowest-cost option, particularly since a heat pump provides both heating and air conditioning, and these homes avoid the cost of both furnaces and air conditioners."

Also, according to a 2019 report prepared by consultant Redwood Energy Group for the City of Menlo Park, "In California developers save an average of \$3,300/unit of construction costs by avoiding gas use, or more than \$20,000 per 8-plex for gas distribution, laterals, interior piping, appliances, and venting. In the downtown of a city like Los Angeles, just trenching and piping gas to an apartment building in a busy street can cost \$140,000". Lastly, according to a 2019 report by E3, an energy consulting firm "...an all-electric new construction home was estimated to have a capital cost advantage ranging from \$3,000 to more than \$10,000 over a mixed-fuel home".

How are Restaurants Impacted?

The biggest concern with the electrification of commercial buildings pertains to restaurants, specifically those that have a business reason for gas-powered cooking appliances, such as barbeques, pizza ovens and woks. While some cities have opted to exempt restaurants or delay compliance with the electrification requirements (some due to incremental impacts with COVID restrictions), there are other cities that have applied the requirement across the board to all commercial buildings. Although the proposed ordinance will not require electrification for new and remodeled restaurants, equipment and appliances that can utilize electric energy are encouraged.

What about Electrical Capacity and Reliability?

Some may question whether having an all-electric home or business makes one more vulnerable to dependency on electric power. The answer to this question is largely in the capacity and reliability of Pasadena’s electrical supply grid. Our city is fortunate to have its own municipal utility where in Pasadena’s Water And Power (PWP) 2018 Power Integrated Resource Plan provided that the utility is to maintain a capacity planning reserve margin of at least 15%. The reliability of PWP’s power systems is found to be three-times more reliable than neighboring utilities. Further, PWP’s 2020 Annual Report states that upgrades, maintenance and forecasting to the electrical distribution system will minimize service failures and power outages. It is contended that increased demand by further electrical usages, such as electric vehicles, electric appliances, and all-electric buildings can be accommodated by PWP. For further information these documents can be found at:

<https://ww5.cityofpasadena.net/water-and-power/powerirp/>
<https://ww5.cityofpasadena.net/water-and-power/annualreports/>

What kind of outreach has the City conducted?

An outline of the proposed requirements and exemptions were presented to various stakeholder groups which included the Building Industry Association (BIA) of Southern California, the Building Owners and Managers Association of Greater Los Angeles (BOMA GLA), the Pasadena Building Electrification Coalition and various groups with the Pasadena Chamber of Commerce and BizFed. The input received from these groups are found in Attachment C.

ENVIRONMENTAL ADVISORY COMMISSION CONSIDERATION:

A recommended ordinance furthers the City Council’s strategic plan goal to ensure public safety by adopting the most currently available codes for all types of construction in the City and supports the City’s commitment to increase conservation and sustainability. Input from the EAC on a recommended ordinance will be included in a report to the City Council.

ATTACHMENT A

Building Electrification Requirements and Exceptions

Building electrification shall apply to any building or structure based on the effective date of the Ordinance where an application for entitlement has not been deemed complete, or by the vesting of a valid building permit application to the City.

Electrification of Buildings Will Apply To:

1. New Multi-Family Buildings Greater Than 3 Units
2. New Mixed-Use Buildings.
3. New Commercial Buildings.
 - a. Restaurants and food service facilities are exempted, however, equipment and appliances that can utilize electric energy are encouraged to be utilized to the highest extent possible.
4. New Additions to Existing Commercial Buildings where the addition adds 50 percent or more of the existing square foot area. In such cases, the entire building must convert to complete electrification.

Electrification of Buildings Will Not Apply to any of the following Exceptions:

1. New, Existing, or Additions to Single Family Dwellings.
2. New or Converted Accessory Dwelling Units on Single Family properties. New or Converted Accessory Dwelling Units on Multi-Family properties that are added to an existing building.
3. Essential Buildings, Medical-Health Care Facilities, Research And Development Laboratories, Equipment for Emergency Use and Other Special Occupancies with fossil-fuel equipment directly related to the operations are necessary and where electric alternatives could jeopardize operations, occupant safety or patient care.
4. Where the cost of electric utility infrastructure and supply upgrades exceed the cost of the entire project. The entire project cost shall be based on the cost of an electrified building (without natural gas).
5. For certain and specific equipment where electrical operating costs would exceed natural gas operating costs by more than 1,000% per annum. Example – Cost of heating a swimming pool by electric energy versus natural gas.
6. Buildings that utilize non-fossil fuels for non-fossil fuel approved equipment. Non-fossil fuel types, and equipment are subject to approval by the Building Official and Fire Chief.

ATTACHMENT B



PASADENA WATER AND POWER

MEMORANDUM

May 5, 2022

To: Cynthia J. Kurtz
Interim City Manager

From: Jeffrey Kightlinger
Interim General Manager

Re: City Manager Newsletter Item

PWP Responds to Questions Regarding Proposed Building Electrification Ordinance

The following information is in response to questions raised by City Council members at the regular meeting of the City Council on April 4, 2022, regarding the proposed Building Electrification Ordinance presented by the City's Planning Department. The three questions asked of Pasadena Water and Power ("PWP") related to the ordinance are addressed below.

What would be the rate impact for a family of four if the Building Electrification Ordinance is adopted?

While building electrification can be achieved in different ways, customers utilizing all-electric appliances and heat pump technologies will be more efficient and potentially experience no change in their annual operating costs compared to natural gas appliances. Figure 1 represents a model comparing all-electric appliances (resistance and heat pump) with natural gas appliances. The model uses federal recommendations for appliance efficiencies including clothes drying, cooking, space heating and water heating, based on a typical Pasadena multi-family unit usage.

End Use	Water Heating*	Space Heating**	Cooking ***	Clothes Drying ****	Total Annual Costs (\$)
Standard Gas	\$301 Gas Tank Water Heater	\$194 Gas Furnace	\$39 Gas Oven & Range	\$193 Gas Dryer	\$727
Heat Pump Electric	\$198 Electric Heat Pump Water Heater	\$262 Electric Heat Pump HVAC	\$94 Electric Oven & Range	\$172 Electric Heat Pump Clothes Dryer	\$726
Standard Electric	\$719 Electric Resistance Water Heater	\$262 Electric Heat Pump HVAC	\$94 Electric Oven & Range	\$281 Electric Resistance Clothes Dryer	\$1,356



All assumptions based on res. rate of \$0.20/kWh & \$1.60/therm, HH size of 4 people. **Estimates only, actual operating costs may differ**

*Water Heating EF: Gas (Tank)=0.62/Electric (Resistance)=0.95/HPWH=3.45

** Space Heating: 92% AFUE Furnace, HP HVAC: 15 SEER/8.5 HSPF

Cooking:20 minutes use, 6 days/week (Oven + 2 burners). *Clothes Drying:10 loads/week, 520 loads/year

Fig. 1: Annual Utility Bill Comparison (Natural Gas vs. Electric) for a Typical Multifamily Residential Unit.

What is the grid impact on the Power System of the Building Electrification Ordinance?

PWP’s power distribution system is designed to deliver anticipated peak demand, which normally occurs in the summer. PWP models anticipated peak load, anticipated building construction, efficiency code changes, new customer solar, electric transportation, etc. This forecast is an element of the PWP Power Delivery Master Plan (“PDMP”).

Based on the information in Figure 1 and construction activities anticipated by the City’s Planning Department, PWP determined that the contribution to the peak by building electrification would be approximately 1.5 kilowatts per residential building unit and approximately 2.0 watts per square foot of a commercial building unit.

Figure 2 overlays the anticipated contribution of building electrification to peak load projections. This demonstrates that the contribution of building electrification is nominal and can easily be accommodated by PWP’s power system without modification to current operations.

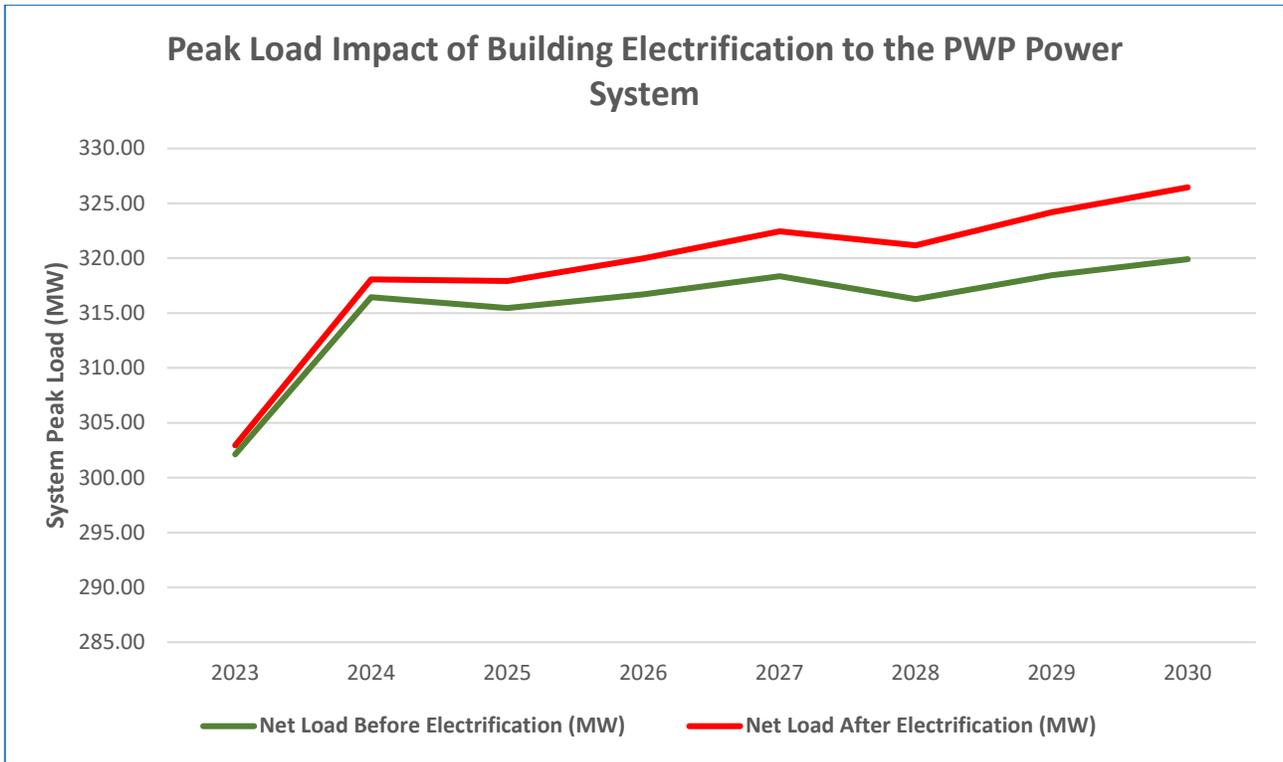


Fig. 2: Peak load impact of Building Electrification on the PWP Power System

What will be the change in Greenhouse Gas Emissions if we adopt this Ordinance? Is there a risk we could be swapping natural gas usage for electricity generated by natural gas with little or no benefit?

While natural gas will always have the same carbon content (CO₂/Therm), PWP’s electric grid is continually getting greener and less carbon intensive as more zero-emission generation sources are adopted and existing fossil fuel generation sources are retired. Current PWP Greenhouse Gas Emissions (“GHG”) are approximately 50% lower than 1990 levels and continues to decline.

Figure 3 compares the anticipated, cumulative annual GHG emissions between natural gas appliances and efficient all-electric appliances. This is based on the City’s Planning Department estimations for new construction and the decreasing carbon content of PWP’s energy mix over time. The illustration shows that the GHG reductions for efficient building electrification are significant compared to the status-quo use of natural gas appliances and will continue to decrease as the grid gets cleaner. Proactively adopting building electrification for new residential and commercial construction ensures that all-electric appliances will collectively become cleaner with the evolving grid, as opposed to retroactively replacing gas appliances at a later date.

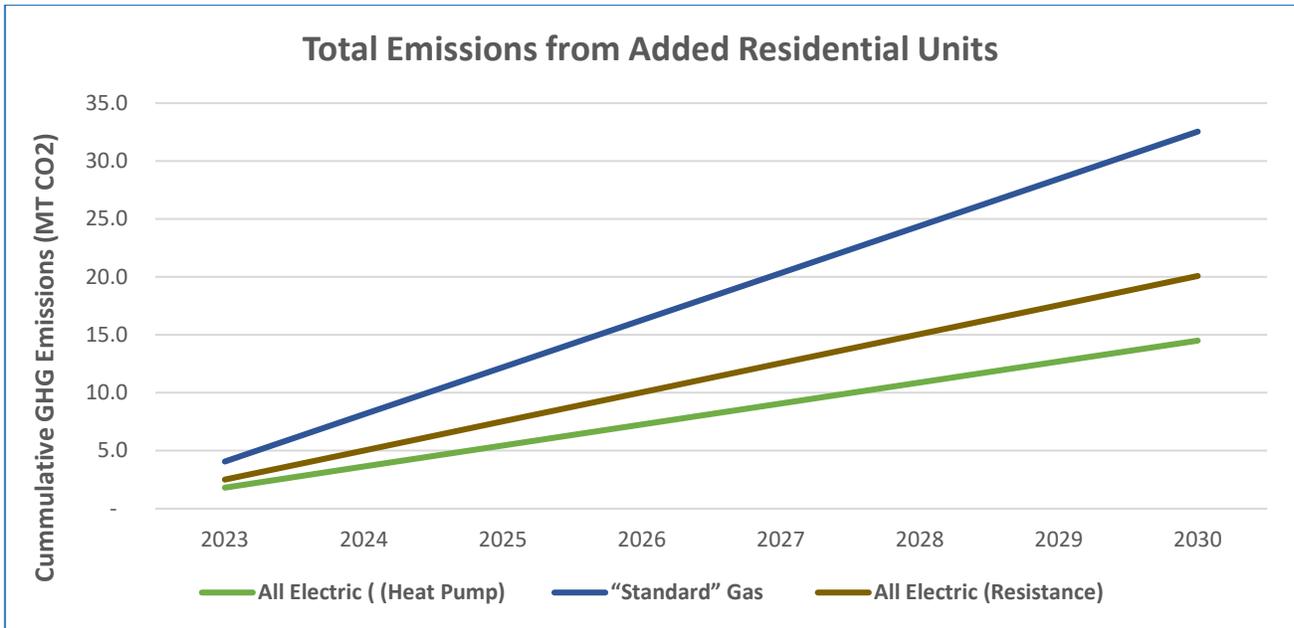


Fig. 3: GHG comparison of Natural Gas appliances and Efficient Electric Appliances

PWP currently offers customers the opportunity to utilize more green power, and support the purchase of local renewable energy through the Green Power Program. For more information, visit <https://www.PWPweb.com/GoGreen>.

ATTACHMENT C

Stakeholder Group Comments to Building Electrification

MEETING #1: Pasadena Chamber of Commerce, and Various Organizations

Attendees: Matt Buck, California Apartment Association
Alexandra Cannarella, Apartment Association, California Southern Cities
Jose Cornejo, NAIOP Commercial Real Estate Development Association
Paul Little, Pasadena Chamber of Commerce
Danielle Peretz, Apartment Association of Greater Los Angeles
Blake Perez, Building Owners and Managers Association
Lilly Rocha, Latino Restaurant Association
Carlos Rodriguez, Building Industry Association
Sarah Wiltfong, BizFed Los Angeles County Business Federation

Meeting Date: January 26, 2022

Date:

Input Provided:

- Electrification could be a significant cost impact to smaller restaurants.
- Would appreciate more communication with the building industry – e.g. BIA.
- Electrification may presents issues of equity, and unintended consequences of affordability.
- Concerns of cost of electricity at peak usage times.
- Concerns for tenant improvement alternations being cost prohibitive.
- Ordinance should not discourage housing with added costs.

MEETING #2: Building Industry Association (BIA) of Southern California

Attendees: DeAndre Valencia, Senior VP and Legal Policy Officer

Meeting Date: March 10, 2022

Date:

Input Provided:

- Will the City conduct future outreach to the building industry?
- Recommends an effective date of January 1, 2023 to coincide with the effective date of the new 2022 California Building Standards Code.
- Stated that the multi-family threshold starting at four units might affect/apply to “Mom & Pop” apartment owners.
- Asked whether an appeal process will be available for developers that do not agree with electrification requirements.
- Asked if we have considered adding an exemption for building material and equipment availability due to current issues with supply chain.

MEETING #3: Building Owners and Managers Association (BOMA) of Greater Los Angeles

Attendees: Althea De Pietro Lemken, De Pietro Holdings, LLC; BOMA Board of Directors

Blake Perez, Government Affairs Manager

Aaron Taxy, Director, Government and Public Affairs

Meeting Date: March 14, 2022

Date:

Input Provided:

- Consistent with Pasadena's Climate Action Plan, will power generation and acquisition include non-fossil fuel power production.
- Concerned about the cost of implementation and logistics of electrification.
- To be successful, incentives for electrification are needed.
- Not a one-size fits all solution – concerns on electrification for every situation.
- Together with other mandates cost implications on businesses could be significant.
- Concerns with electric grid, blackouts, potential implementation problems.
- Is eliminating natural gas really a solution?
- For the cost exemptions, why the threshold of 1000% per annum?

MEETING #4: Pasadena Building Electrification Coalition

Attendees: Kathy Berlin, League of Women Voters, Pasadena Chapter; National Chapter of the League of Women Voters, Climate Action Committee

Wes Reutimann, Active San Gabriel Valley

Michael Rochmes, Climate Reality Project, Los Angeles Chapter

Meeting Date: March 17, 2022

Date:

Input Provided:

- Supportive of the proposal but have desires to broaden applicability.
- Not in favor of exempting single-family dwellings and ADU's.
- Would like ordinance to apply to 'substantial remodels' both residential and commercial.
- Narrow down exemptions for restaurants to only apply to cooking equipment.
- Question the exemption based on operating cost of electrical equipment (versus gas).