



Planning & Community Development Department

**PROPOSED ORDINANCE REQUIRING THE
ELECTRIFICATION OF BUILDINGS IN CERTAIN
SPECIFIC CATEGORIES**

**Environmental Advisory Commission Meeting
May 10, 2022**





Summary of Proposal

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The City proposes an ordinance that would require electrification in lieu of natural gas 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.



Recommended Exemptions

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Potential exemptions to be considered:

1. New single-family housing (including ADUs and JADUs)
2. 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.
3. Where the cost of electric utility infrastructure and supply upgrades exceed the cost of the entire project.
4. For certain and specific equipment where electrical operating costs would exceed natural gas operating costs by more than 1,000% per annum.
5. Buildings that utilize non-fossil fuels for non-fossil fuel approved equipment.



City Council Direction

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- On November 9, 2021, staff presented information on the proposed ordinance to the Municipal Services Committee (MSC). MSC directed staff to conduct further research and outreach for a potential electrification ordinance.
- On 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 (EAC), 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.



Background

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- The 2006 Global Warming Solutions Act (Assembly Bill 32) mandates state-wide reductions in GHG emissions
 - > Reducing statewide emissions to 40% below 1990 levels by 2030
 - > Local governments can still do more
- At least 54 municipalities throughout California have adopted all-electric ordinances to begin decarbonizing buildings
- Energy is the second highest contributor to GHG emissions in Pasadena
 - > 47% of the City's GHG emissions are from residential and commercial energy use (as of 2009, according to the CAP)
 - > The greatest opportunities to curb GHGs is at the time of initial construction



What is the problem?

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- *Natural Gas and Public Health* – Indoor natural gas use, particularly for cooking, worsens indoor air quality, which disproportionately harms frontline communities, i.e., communities that experience the first and worst consequences of climate change. Children living in homes with gas cooking are 42 percent more likely to have asthma.
- *Natural Gas and Public Safety* – Natural gas presents combustion risk for buildings, especially during and after major earthquakes
 - > Examples: the 2010 San Bruno explosion and the destructive gas fires resulting from the 1989 Loma Prieta and 1994 Northridge earthquakes.
- *Natural Gas and Resilience* – Gas lines are also more difficult to repair following disasters than electric infrastructure, and as such reduce a city's 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.



Implementation

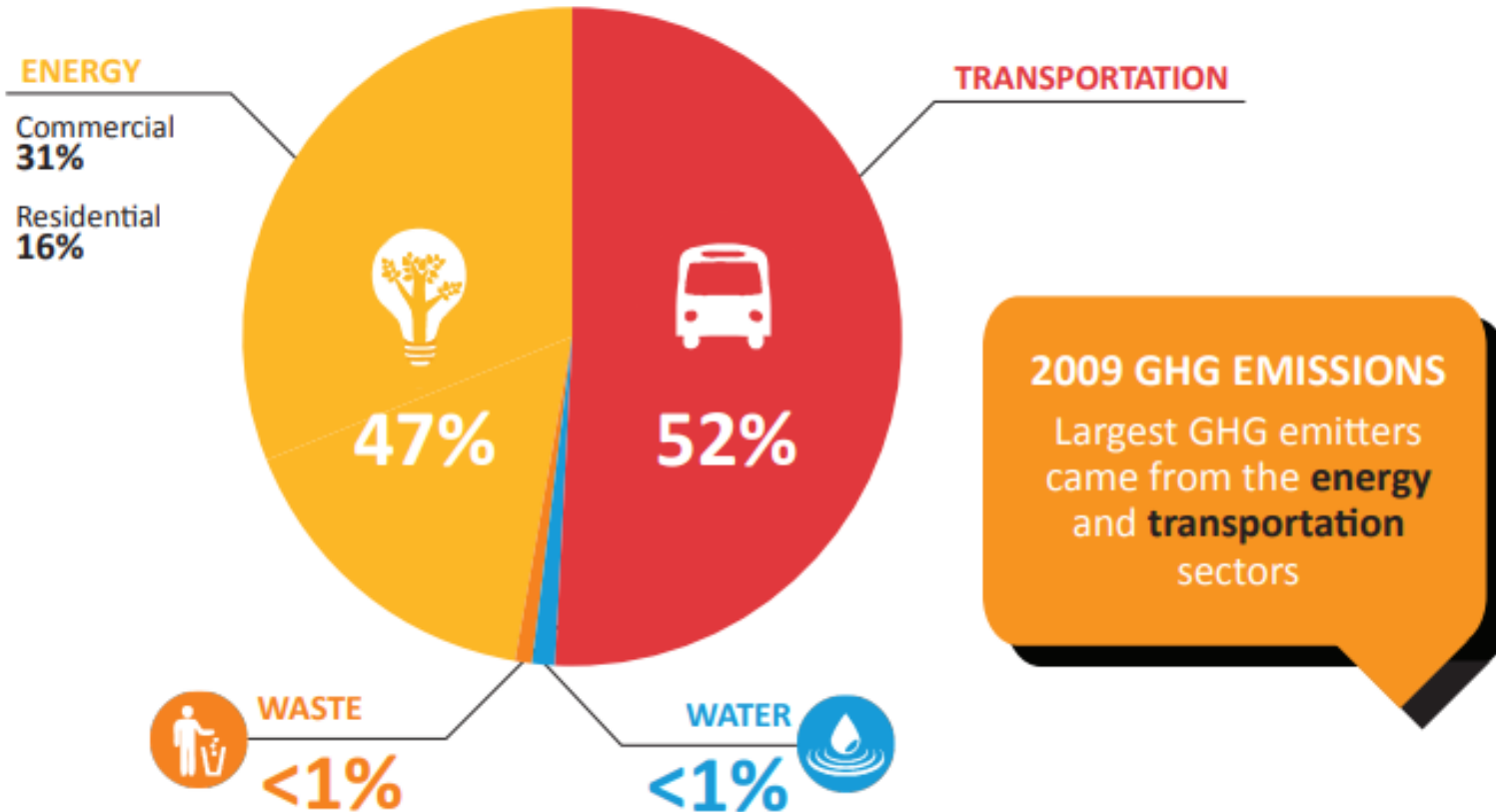
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- The greatest opportunities for electrifying buildings are present when the building is being designed and constructed.
- Staff anticipates requiring new buildings to rely solely on electricity as their energy source if they apply for a building permit after a specific date or have not secured an approved planning entitlement by a specific date.
- A delayed implementation date allows the public and developers time to continue with their existing plans, for projects that are close to submission, and ample time to adjust their plans to the all-electric design for projects that are still many months away from applying for a permit.



Community-wide GHG Emissions (2009)

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Source: Pasadena Climate Action Plan

PASADENA



Questions from City Council

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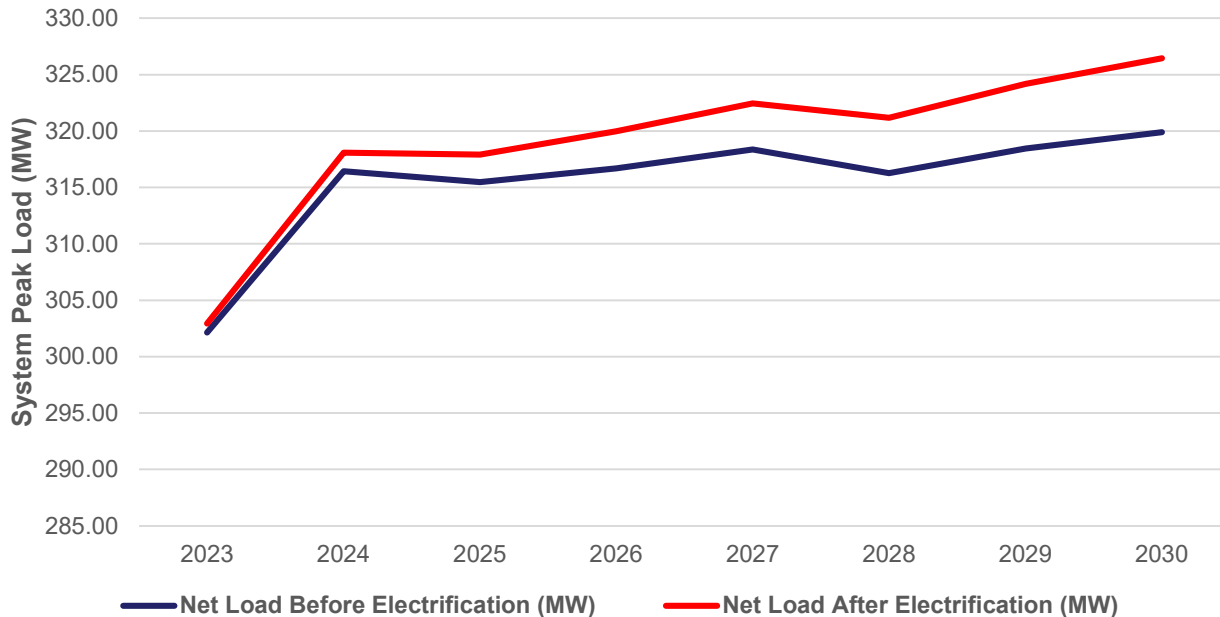
1. How will electrification affect the projected demand on the utility system?
2. How will electrification affect the utility bill for a working family of four? (Heating, Cooking, Water Heating).
3. How will electrification change the carbon footprint compared to the status quo?
4. What are the expected construction costs/cost savings?



Q1: Projected Demand Impact

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Peak Load Impact of Building Electrification to the PWP Power System



Overlaying building electrification's anticipated contribution to the Plan's peak load projection shows that the contribution of building electrification in nominal and can easily be accommodated by PWP power system without modification to the Plan.



Q2: Rate Impact for a Family of Four

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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 2

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

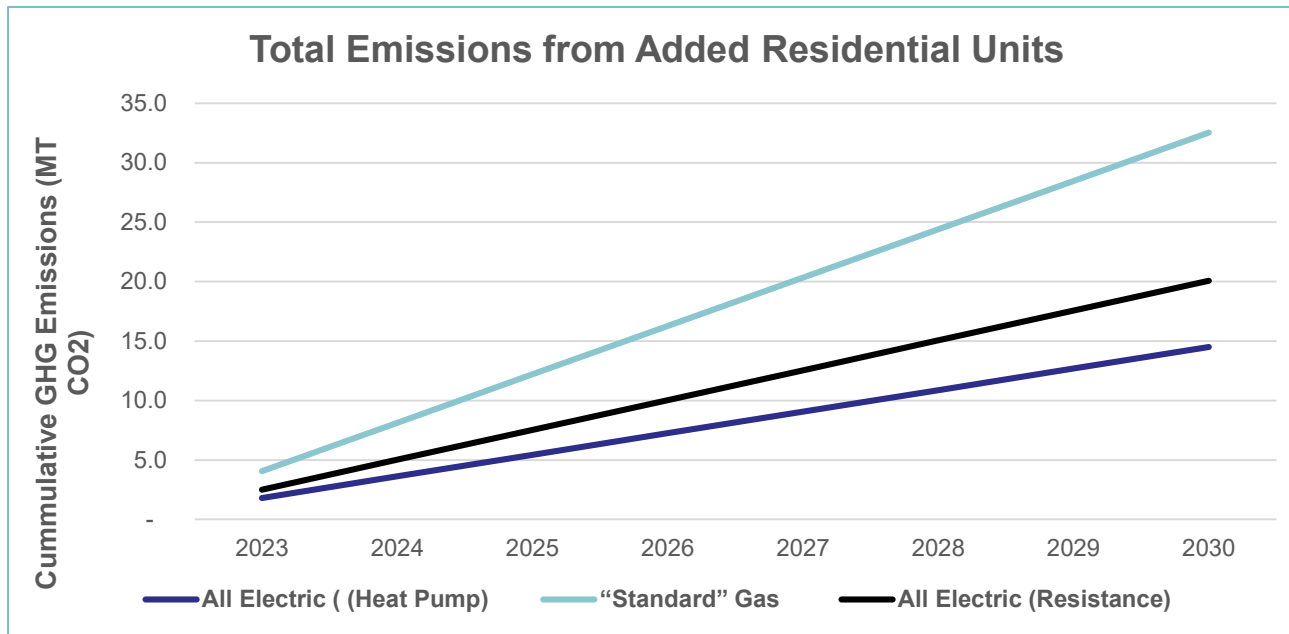
All-electric appliances using heat pump technologies are more efficient and have the potential to match the total annual operating costs of natural gas appliances.



Q3: Impact to Carbon Footprint

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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.





Q4: Construction Costs

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- 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 but overall agree there it is expected cost-savings in the design and construction of electric buildings.
- According to a 2019 report by E3, an all-electric new construction home has a capital cost advantage ranging from \$3,000 to more than \$10,000 over a mixed-fuel home.
- The City of Morgan Hill found that avoiding the installation of gas pipelines into a development can save approximately \$7,000 per unit in construction costs.