

# ELECTRIFY SAN MATEO



## BUILDING FOR THE FUTURE

City of San Mateo Sustainable Buildings Strategy

9.13.23 SIC Meeting





# Presentation Goals

- Introduce Electrify San Mateo! Building for the Future: City of San Mateo Sustainable Buildings Strategy
  - Electrification 101
  - Review alignment with existing policies
  - Project timeline
- Policy Analysis Framework: Equity & Effectiveness Criteria
  - Q&A
- Explore Building & Market Segmentation Study Results
  - Q&A
- Next Steps
  - Q&A





# Project Overview

Building electrification background &  
strategy development timeline





# What is Building For the Future?

- **Reach Climate Action Plan Goals:**
  - BE-2: All-electric existing buildings
  - 2030: Reduce emissions 40% below 1990 levels
  - Building emissions make up 38% of the City total
  - Gas accounts for (85)% of building related emissions
- **Electrification of existing buildings is the most cost-effective way to achieve carbon-free buildings**
- Electricity will be carbon free by 2045 (SB 100)- San Mateo is already on the way with ECO100 from Peninsula Clean Energy
  - Any replacement of new gas appliances locks in fossil fuel infrastructure, taking us farther from achieving climate goals
- Building electrification can achieve a host of other co-benefits, including indoor air quality, protection from rising gas prices, and concurrent building upgrades

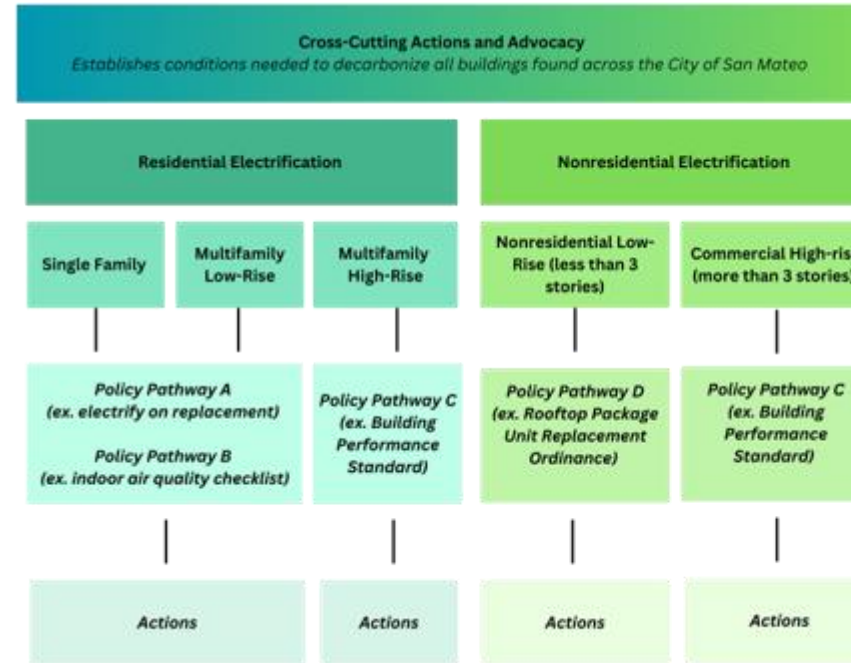


Image source: ThisOldHouse



# Sustainable Buildings Strategy Project Goals

- Actionable roadmap with real steps for City of San Mateo to Electrify Buildings
  - Approach must be cost effective + most effective in reaching climate goals
- Use best available science and data
- Community driven approach: engage early and often, two phases of community outreach
- Policy Analysis Framework used as Criteria to Select Best-fit Policies: Effectiveness + Equity Criteria



**Existing Building Decarbonization Strategy Goal:** decarbonize buildings by switching building appliances and functions from natural gas to all-electric, reducing GHG emissions, achieving 2030 and 2045 climate targets.



# What is existing building electrification?

- Switching from using natural gas to carbon-free electricity for heating/cooling, cooking, and clothes drying in our homes, apartments, offices, stores, and beyond.
  - **Why?** Allows the City of San Mateo to achieve climate goals while increasing community health, affordability, and resiliency through upgraded buildings and appliances

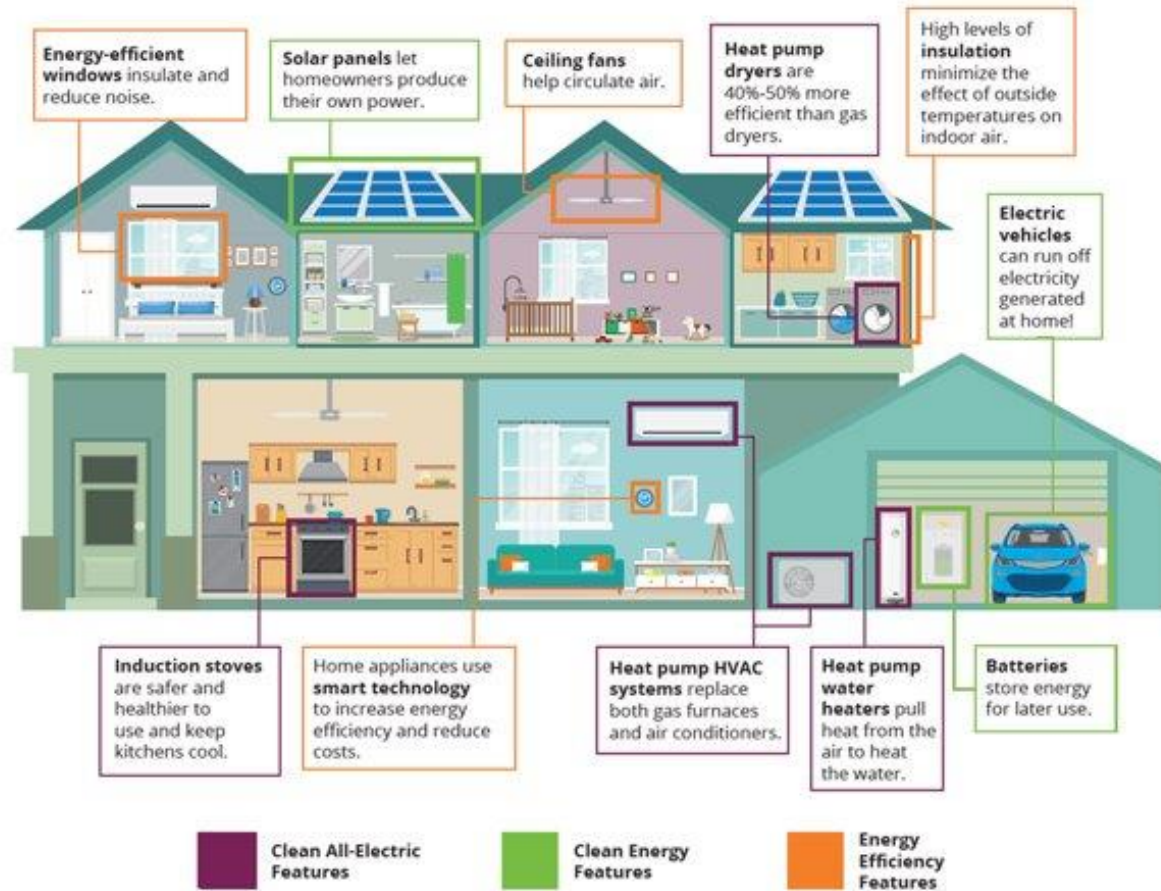


Image source: SCE





# How do we electrify buildings?

- **Building Electrification:** Appliances that use gas are replaced with electric technologies
- **'Electrify on Replacement' & Cost Effectiveness:** Replacing gas appliances with electric when they stop working ('burnout'), or would have been upgraded anyway, increases cost effectiveness since appliance would have been replaced regardless. Cost of electric technologies are supported by incentives from PCE, IRA, BayREN, and TECH.



**Space heating and cooling:** Gas Furnace → Heat Pump



**Water heating:**  
Gas water heater → Heat Pump  
Hot Water Heater



**Cooking:**  
Gas stove → Induction Stove



**Clothes Drying:**  
Gas Clothes Drying → Electric Dryer



# Co-Benefits of Electric Buildings



## ■ Greenhouse gas emission reductions

- Building gas: 42% of total GHG emissions in 2030, 36% in 2045



## ■ Community Health

- Electronic appliances → improved air pollution, reduced risk of asthma (particularly childhood asthma)



## ■ Energy Affordability

- Gas bills could more than double over time



## ■ Resilience & Safety

- Decreased fire & carbon monoxide risk, increased resilience with solar



## ■ Equity

- Equitable access to health, safety, upgraded buildings & comfort benefits.





# Strategy Development Timeline

- Phase 1: Community Outreach: Effectiveness + Equity Criteria Feedback
- Results of building inventory and market segmentation
- Draft prioritized policies list

- Phase 2: Outreach: Community feedback on policies & pathways
- Incorporation of community feedback in prioritized policy list
- Drafting of pathway

Summer 2023

Fall 2023

Winter  
23-24

Spring  
2024

Summer  
2024

- Development of Equity + Effectiveness Criteria
- Identify range of feasible policy options
- Building Inventory and Market Segmentation Analysis

- Incorporation of community feedback for equity and effectiveness criteria
- Draft policies & pathways list-Community feedback

- Public review of draft strategy





# Local Policy Context

Building electrification & existing  
policy + climate goals





# Local Policy Context:

## City of San Mateo Climate Action Plan

Table 9: Reductions from CAP Measures (2030 – 2045)

Measure	2030	2040	2045
BE 1: All-electric new construction	-21,070	-38,450	-47,250
BE 2: All-electric existing buildings	-102,210	-184,610	-221,260
RE 1: Peninsula Clean Energy	-160	-170	0
RE 2: Renewable energy systems for new and existing residences	-70	-160	0
RE 3: Renewable energy systems for new and existing nonresidential buildings	-60	-90	0
EE 1: Residential energy efficiency retrofits	-6,160	-7,020	-6,790
EE 2: Nonresidential energy efficiency retrofits	-3,800	-8,860	-13,380
EE 3: Residential tree planting	Less than -10	Less than -10	Less than -10
ME 1: Energy efficiency for new municipal buildings	Supportive (no measurable GHG reductions)		
ME 2: Energy efficiency at existing municipal buildings	-10	-30	-40
ME 3: All-electric municipal buildings	-130	-200	-270
CF 1: Electric vehicle charging infrastructure	-24,420	-49,390	-69,780
CF 2: Electric vehicle education and outreach	-4,910	-8,030	-12,360
CF 3: Clean city fleet	-130	-200	-270
CF 4: Clean fuel and vehicle emissions	-4,210	-16,920	-26,360

- City of San Mateo Policy: Climate Action Plan (CAP)
  - Climate Action Plan 2030 & 2045 Targets :
    - BE 1: All-electric new construction
    - BE 2: All-electric existing buildings
      - 2030: Reduce emissions 40% below 1990 levels
      - 2050: Reduce emissions 85% below 1990 levels
    - Builds on 2015 climate action plan currently being updated

**BE 2 = most significant driver of GHG reductions**



# Local Policy Context: City of San Mateo Building Electrification (Reach Codes)



Image source: Canva

## ■ Home Renovations: Started Jan. 1, 2023:

- Reach codes for home renovations when a permit is issued:
  - Single family homes + multifamily: panel capacity;
  - Single family homes and duplexes: outlets installed; kitchen + laundry renovation
  - Single family homes and duplexes: Installation of heat pump air conditioning when air con is installed or replaced
  - Single family homes; duplexes, multifamily- no extension of fuel gas for new fireplaces; firepits; grills; pools
  - Single family homes and duplexes: requires HPWH installation during addition + alteration

## ■ New Construction: Started Jan. 1, 2023

- Requires all new construction be all-electric

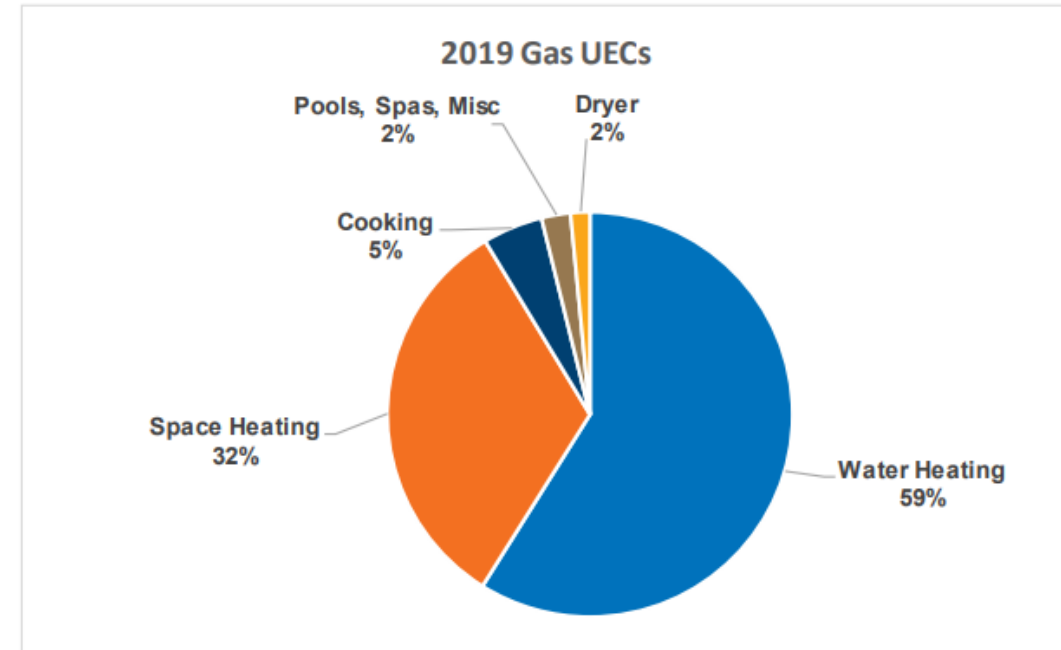




# Policy Opportunity: Bay Area Air Quality Management District (BAAQMD) Zero NOx Standards for Buildings (May 2023)

- Amendments to Regulation 9, Rules 4 and 6
  - NOx water heaters phased out by 2027
  - NOx furnaces by 2029
    - All-electric Heat Pumps and Heat Pump Water Heaters are currently the only Zero NOx option.

**Most stringent building decarbonization policy in the U.S.— City of San Mateo has the opportunity to be ahead of the curve for compliance by taking action early**



Source: 2019 California Residential Appliance Saturation Survey

*End uses covered by BAAQMD ruling make up 91% of home gas use, according to the 2019 by-household Residential Appliance Saturation Survey*

Image Source: RASS CA, 2019, California Energy Commission



# A Historic Time to Electrify: Rising Gas Prices, 2045 Carbon Neutrality State Goals, Inflation Reduction Act

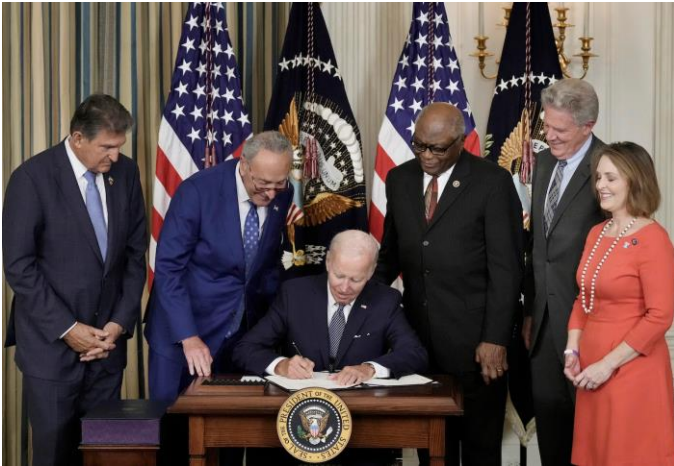
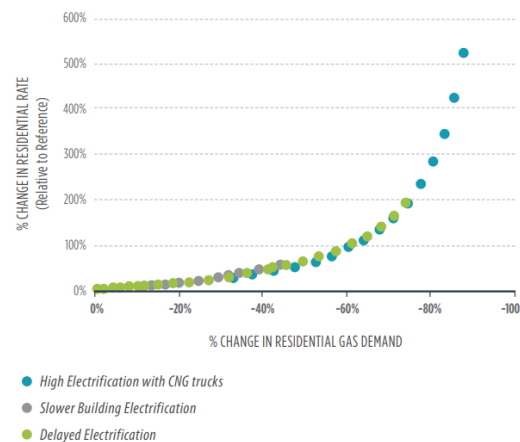


Image source: Grist, Gridworks, CA Gas System in Transition

FIGURE 4. Impacts of Decline in Gas Demand on Rates  
Source: E3



- **New federal incentives to go all-electric:** 2022 Inflation Reduction Act (IRA): \$369 billion for clean energy and climate action, \$8.8. billion for electrification incentives
  - High-Efficiency Electric Home Rebate (HEER) Program offers \$14,000/household
- **California State Carbon Neutrality by 2045** – now codified into law
  - Any gas combustion is fundamentally not compliant with carbon neutrality as it is a fossil fuel
- **Gas prices could more than double** as demand for gas drops, but fixed costs to transport gas stay the same (Gridworks)
  - Building electrification can protect residents and businesses from rising prices





# Policy Analysis Framework

Equity and effectiveness criteria





# How the Policy Selection Process Works

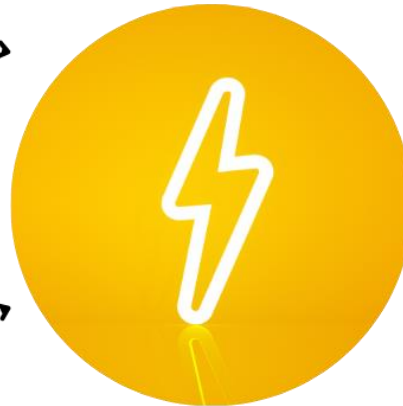


Community feedback shapes Equity & Effectiveness criteria: the *values and outcomes* that the City will bring forward when selecting policies.

Selected policies must touch on all equity and effectiveness criteria



Building and Market Segmentation Analysis provide City-specific cost & natural gas data to select the best-fit policy for San Mateo



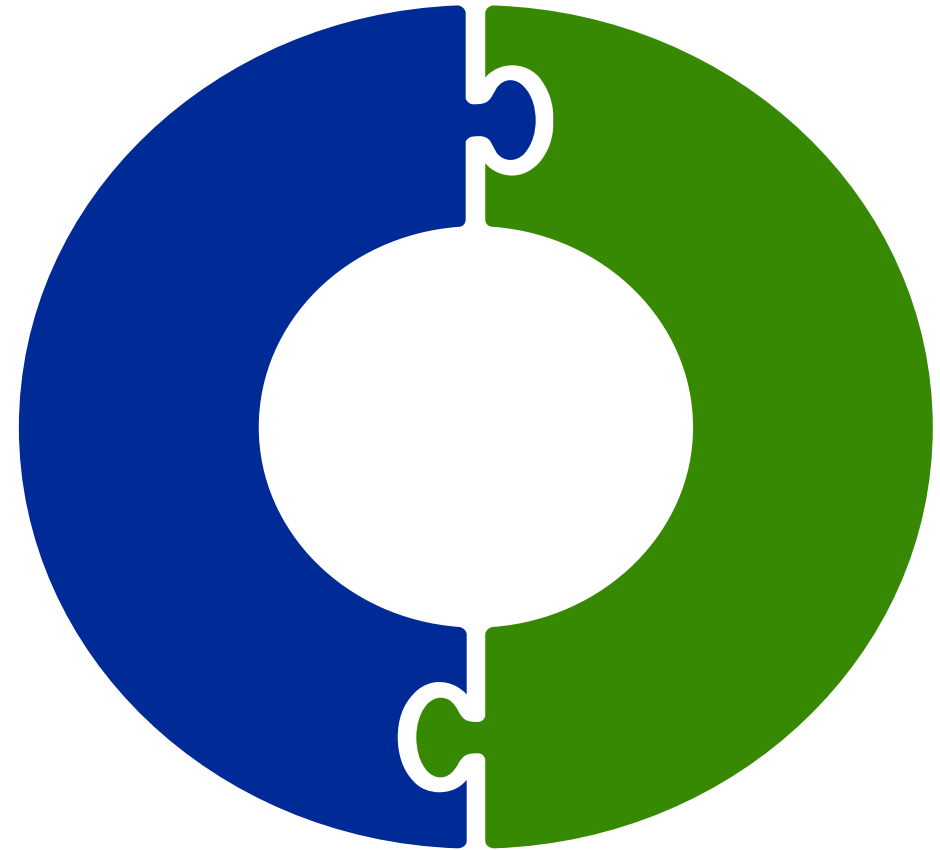
**Equity and effectiveness criteria + building and market segmentation data shape final policy pathway**





# Equity + Analysis = Policy Analysis Framework

- Your feedback will be critical in refining equity and effectiveness criteria.
- **Equity Criteria** informs direction for how to equitably electrify existing residential and commercial buildings;
- **Effectiveness criteria** ensures full realization of electrification benefits, and that there will be no unintended consequences to other City priorities, or harm to residents or business owners
- Each policy pathway should include actions that address at least one action that addresses each effectiveness and equity criteria.



## Energy Equity Definition

The concept of **Energy Equity** recognizes that disadvantaged communities have been historically marginalized and overburdened by pollution, underinvestment in clean energy infrastructure, and lack of access to energy efficient housing and transportation

(Department of Energy, Office of Energy Efficiency and Renewable Energy). <https://www.energy.gov/eere/energy-equity-and-environmental-justice>





# Environmental Justice Communities in San Mateo

- From the Draft San Mateo General Plan 2040: ***Equity priority communities*** are neighborhoods that experience both higher than average sources of pollution or contamination (such as poor air quality or contaminated groundwater) and population and health characteristics that make them more vulnerable to negative health outcomes from that pollution.
  - North Central, North Shoreview/Shoreview neighborhoods

Strive San Mateo: General Plan 2040 Draft July 2023

[https://strivesanmateo.org/wp-content/uploads/2023/07/StriveSanMateo\\_GP2024\\_DRAFT\\_7-28-2023\\_Web.pdf](https://strivesanmateo.org/wp-content/uploads/2023/07/StriveSanMateo_GP2024_DRAFT_7-28-2023_Web.pdf)

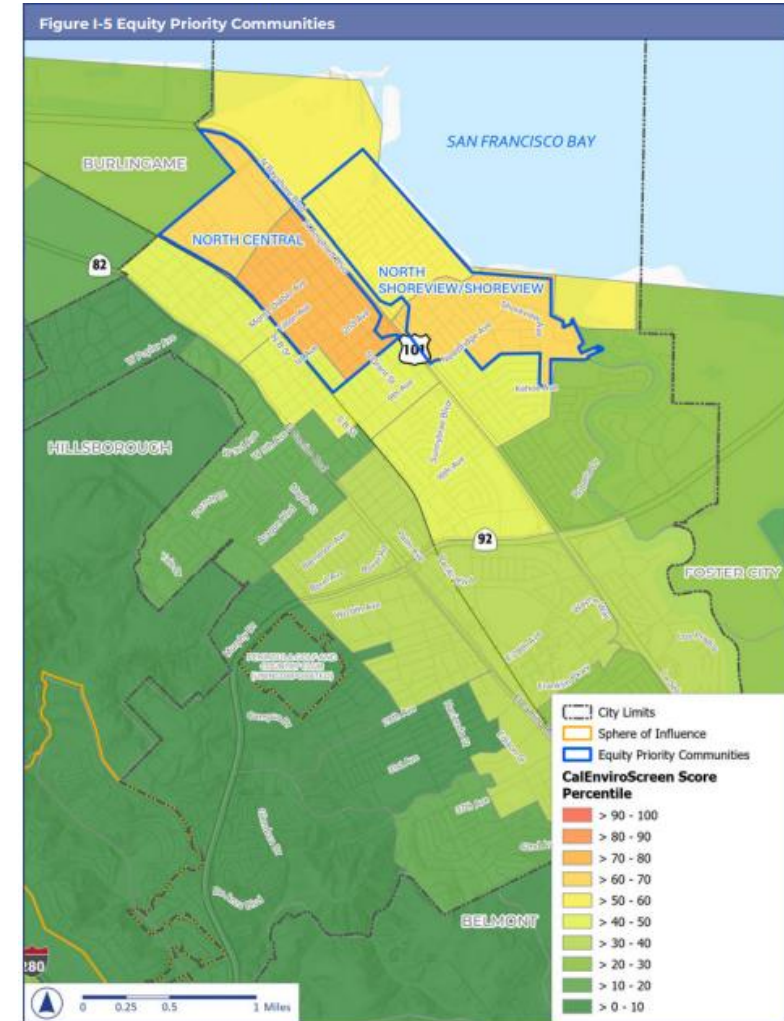


Image source: General Plan 2040 Draft July 2023



# Equity Policy Analysis Sources & Approach

- Building electrification & equity and environmental justice is a growing space for research:
  - Policy analysis referenced leading organizations/agencies like Greenlining Institute\*, Rocky Mountain Institute, U.S. Department of Energy, Equitable Building Decarbonization, Building Energy, Equity, and Power (BEEP Coalition; CARB)
  - **Policy analysis must be informed by equity-centered community outreach to reflect** : community feedback, lived experience, equity & cost concerns will be incorporated into the final equity & effectiveness criteria

*\*GreenLining institute was critical in the initial review of Rincon's Equity Guardrails approach for City of Berkeley*





# Draft Equity Criteria

- Provide equitable access to health, safety, and comfort benefits
- Encourage Concurrent Housing Condition Improvements
- Advance Energy Equity
- Support High Road Job Opportunities
- Maximize Ease of Installation
- Promote Affordable Housing and Prevent Renter Displacement

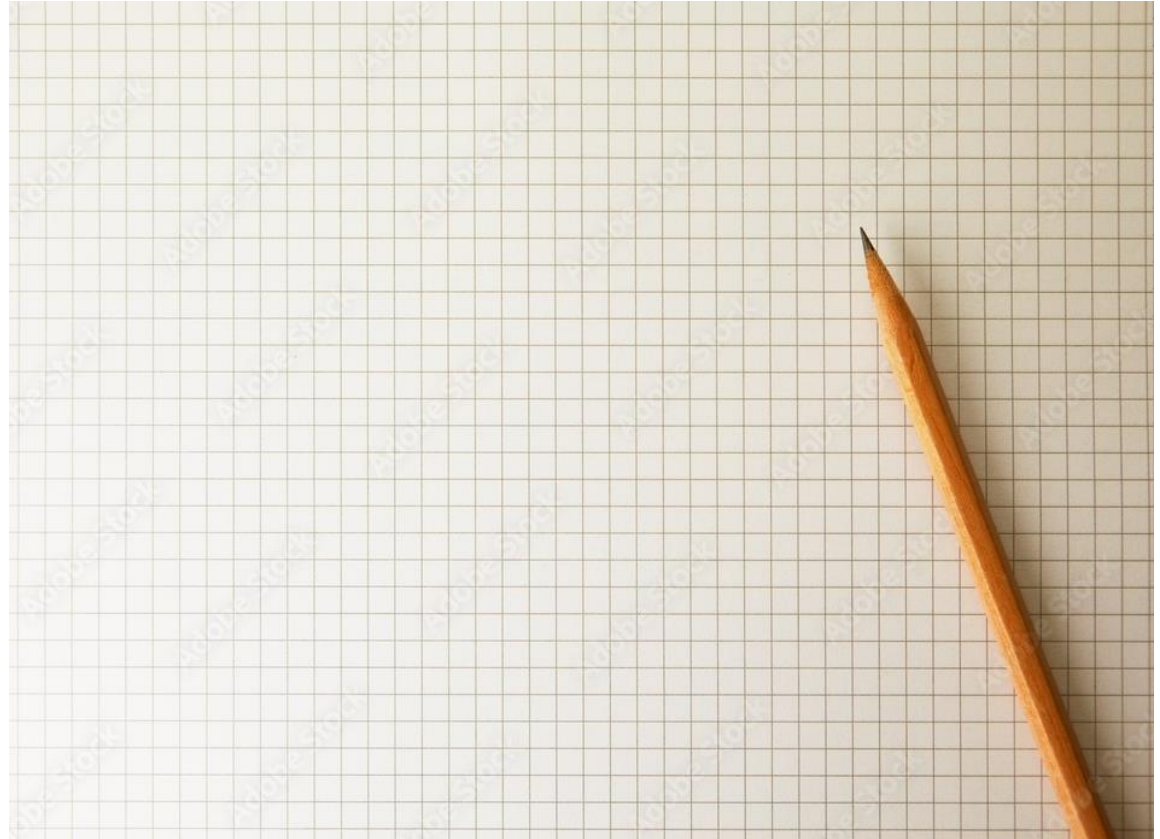


*Image source: UMich*



# Draft Effectiveness Criteria

- Cost Effective
- Feasible
- Measurable and Sustained Impact
- Reliable
- Enforceable



*Image source: Adobe Stock*





# Feedback + Q&A





# Building Inventory and Market Segmentation Study





# Overview: Building and Market Segmentation



## ***Guiding Questions***

1. How much will it cost to electrify residential buildings?
2. What are the on-bill costs of all-electric buildings
3. Where is the most gas used?
4. What policy approach is needed to electrify existing uses of natural gas in buildings based on the specific profile of buildings in the City?
  - *Vintage (age); count; building types & existing appliances in use (ex. stoves; pools)*



# What Buildings are in San Mateo?

**Residential & Commercial: Building Count, Stock, Vintage**

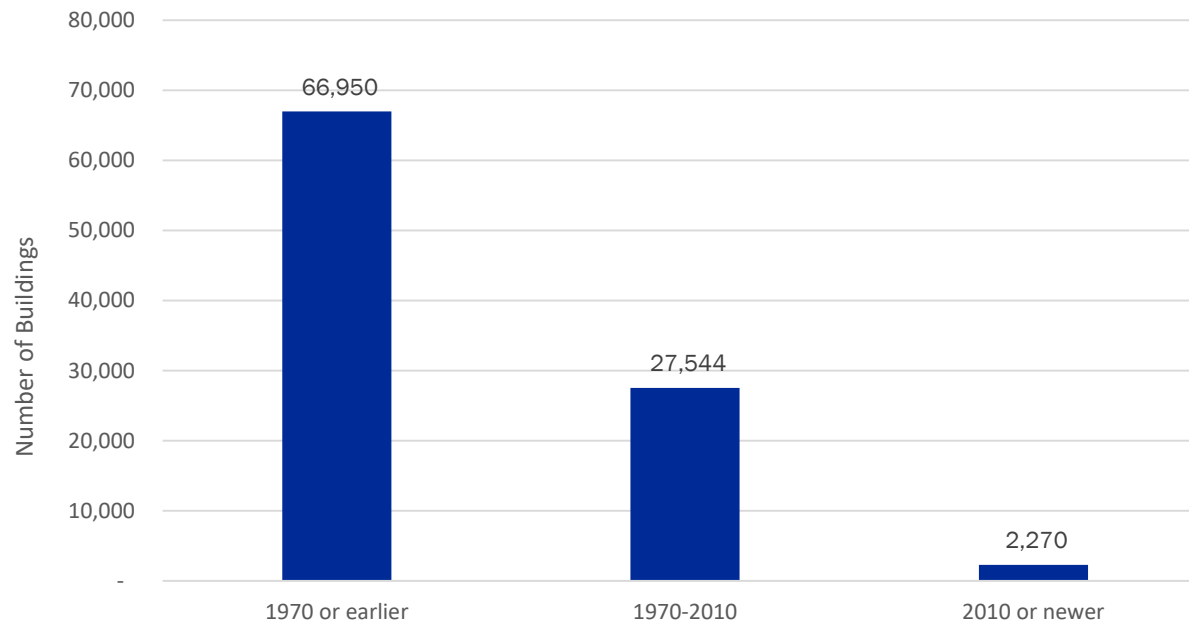


# Building Stock Analysis

## Single Family Homes



**Number of Single Family Residential Buildings in San Mateo Built by Year**



### ***Electrification implications + Key Takeaways***

- **~96,800** single family residential buildings
- **70%** of City building stock was built in 1970 or earlier
- **Before 1970, panel and service upgrades could be more common**
  - Buildings built before 1970 are more likely to have electric panels of 100 amps or less, or fuse boxes, both of which may present hurdles to electrify
  - However, retrofit ready heat pump products, circuit sharing technologies, and home electrification plans could help building owners avoid panel and service upgrades

*Data source: Parcel Data (San Mateo County)*

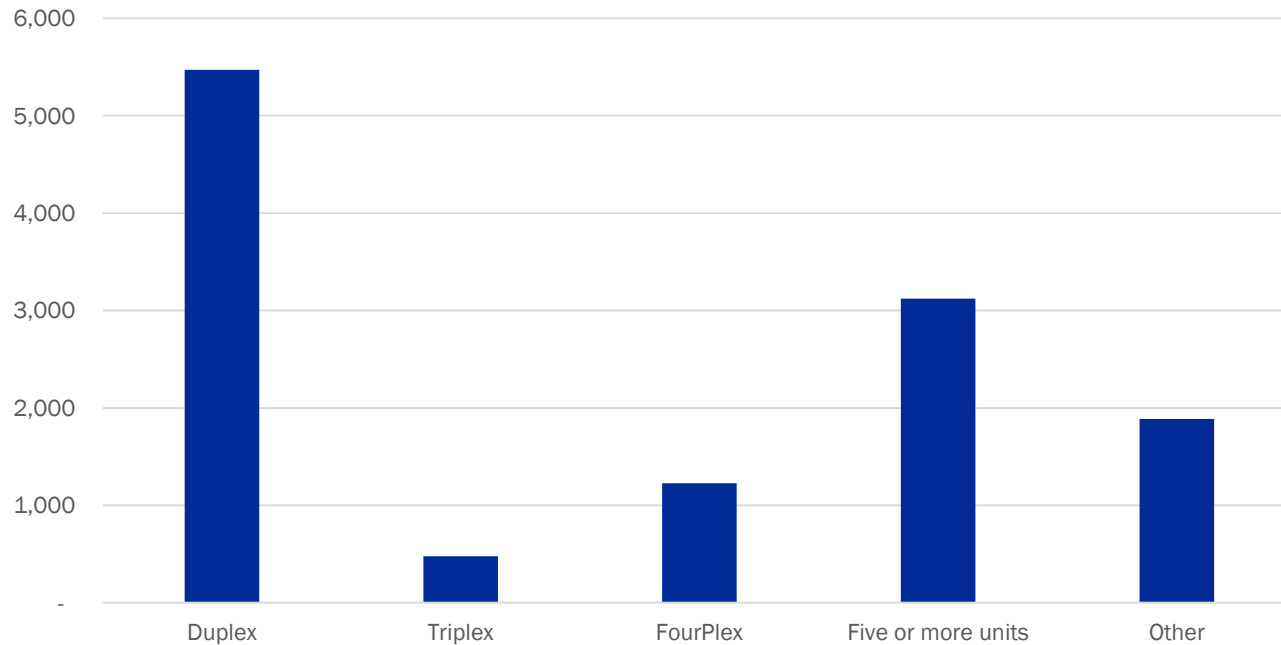


# Building Stock Analysis

## Multifamily Housing



Multifamily Housing in San Mateo (#, by Housing Type)



### *Electrification implications + Key Takeaways*

- **~12,100** multifamily residential buildings
  - Most multifamily buildings are duplex
- At the time of analysis, no building vintage data for multifamily buildings was available

*Data source: Parcel Data (San Mateo County)*



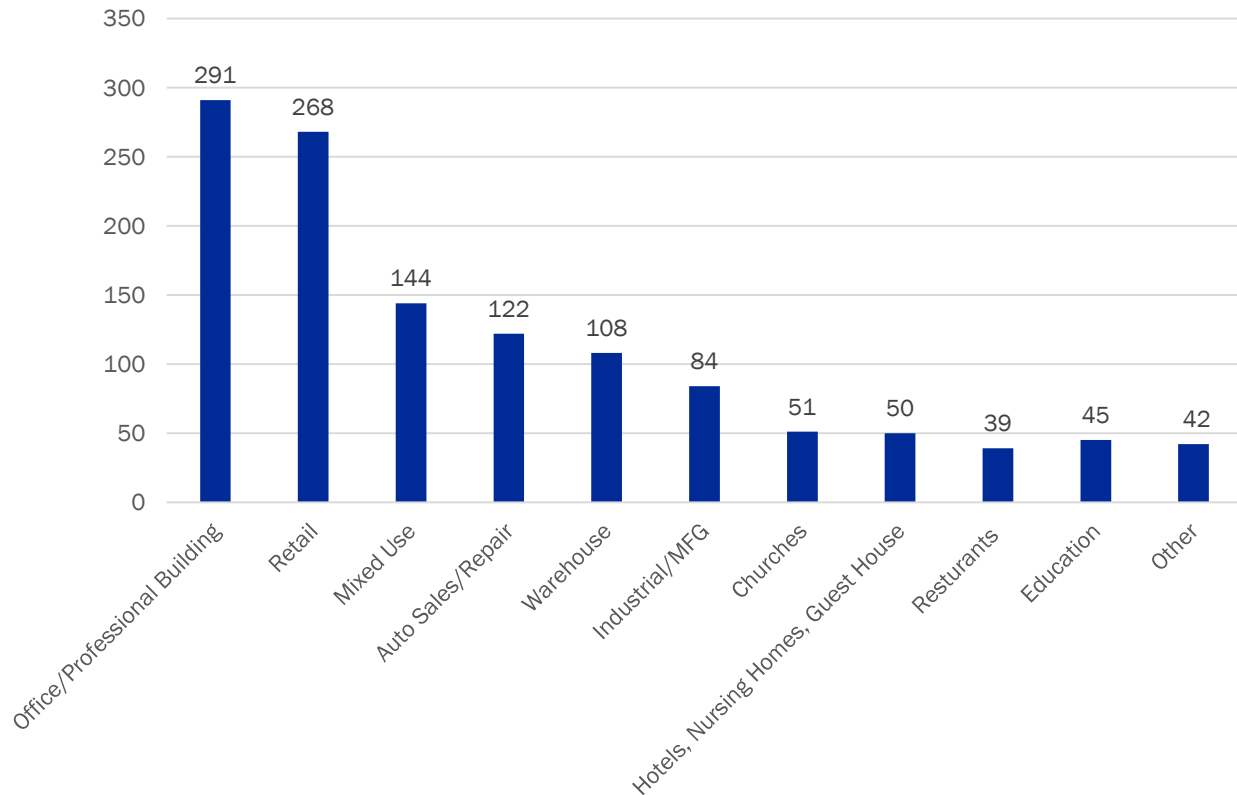


# Building Stock Analysis

## Commercial Buildings



**Commercial Buildings by Type in City of San Mateo**



### ***Electrification implications + Key Takeaways***

- **Most common commercial building types in the City of San Mateo are offices, followed by retail**

*Data source: Parcel Data (San Mateo County)*

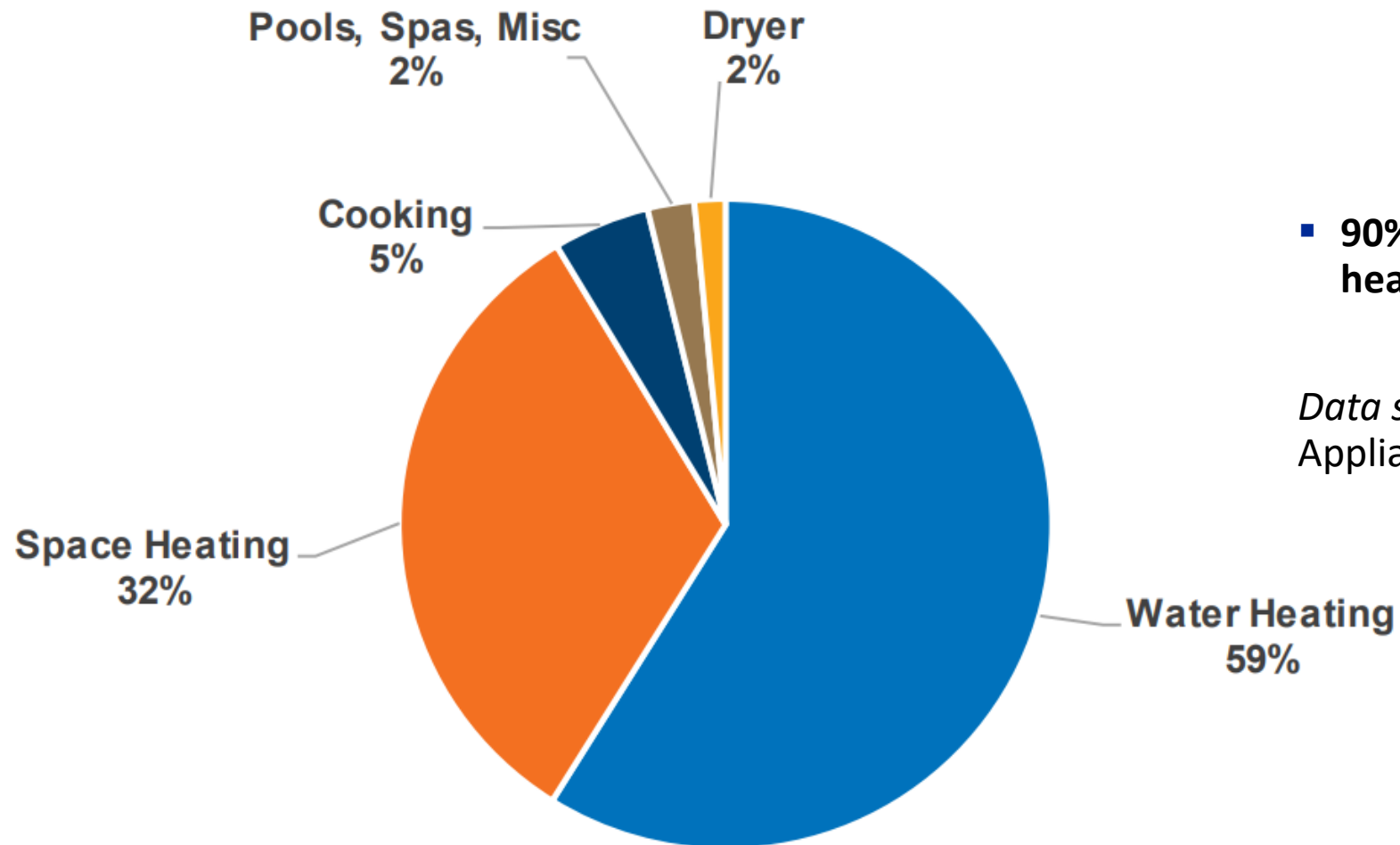


# What Appliances and Fuels are Used in San Mateo?

**Gas vs. Electricity Use: Water Heating, Space Heating/ Cooling, Air  
Conditioning, Stoves & Clothes Dryers**



# Residential Gas Use Summary



- 90% of gas use is for space and water heating

*Data source:* California Residential Appliance Saturation Study

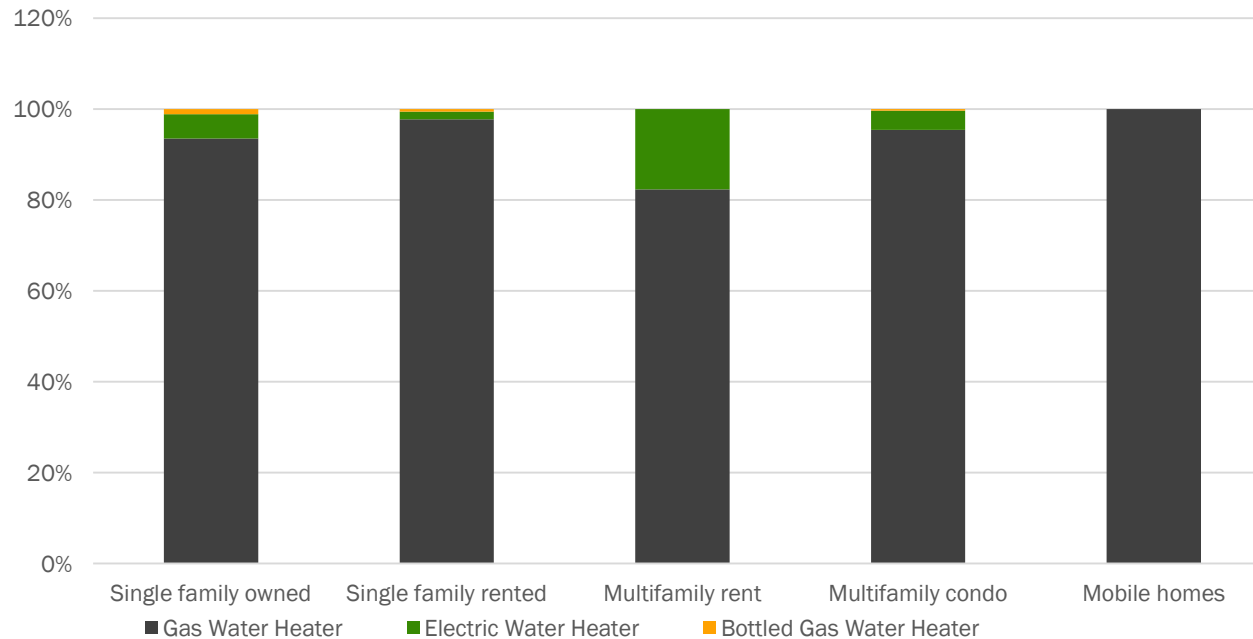


# Appliance and Fuel Source Analysis

## Water Heating (1)



### Water Heater Fuel Types by Building Type



### *Electrification implications + Key Takeaways*

- The vast majority of water heaters run on gas
  - Note that gas-fired water heaters require electricity to operate
  - Multifamily buildings have the largest % of electric water heating
- Scope: San Mateo County

*Data source: Peninsula Clean Energy, Residential Appliance Saturation Survey, American Community Survey*

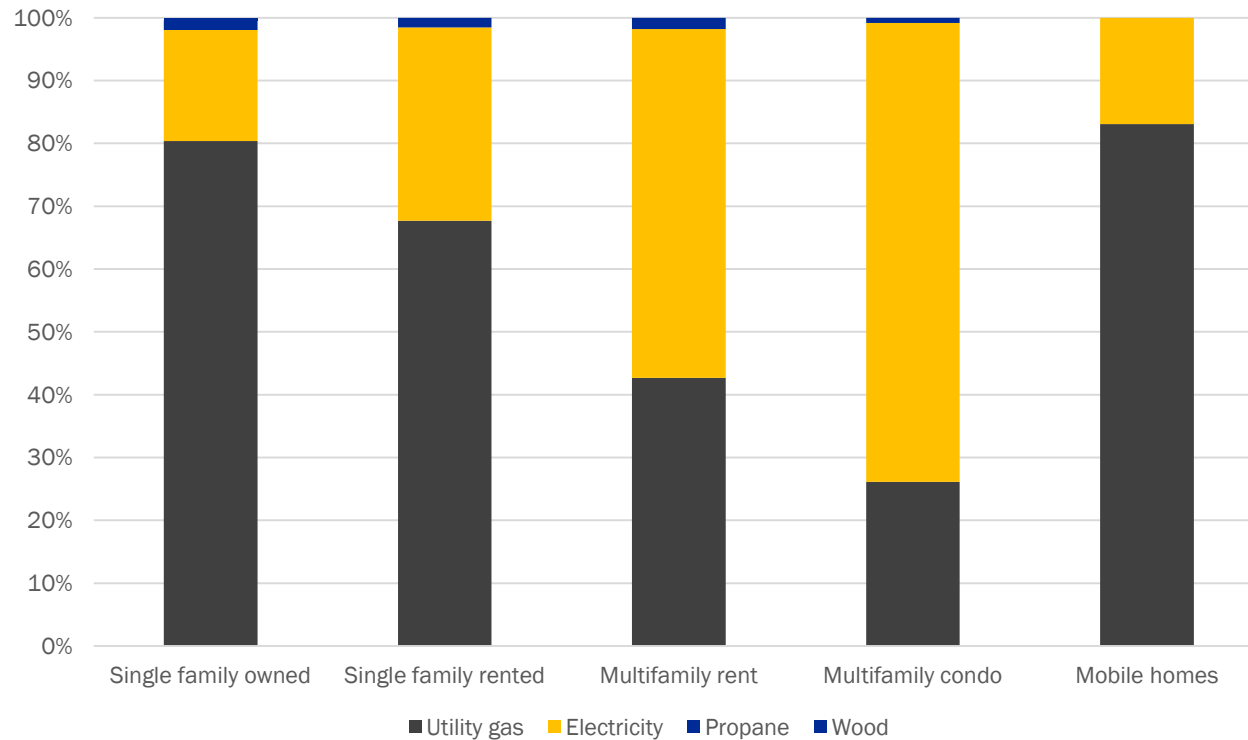


# Appliance and Fuel Source Analysis

## Space Heating (1)



### Space Heating by Fuel and Building Type



### *Electrification implications + Key Takeaways*

- Space heating in San Mateo County sees a broader use of electric appliances and multifamily condos
- Propane and wood use is still seen in the county, likely in unincorporated regions
  - Scope: San Mateo County

*Data source: Peninsula Clean Energy, Residential Appliance Saturation Survey, American Community Survey*



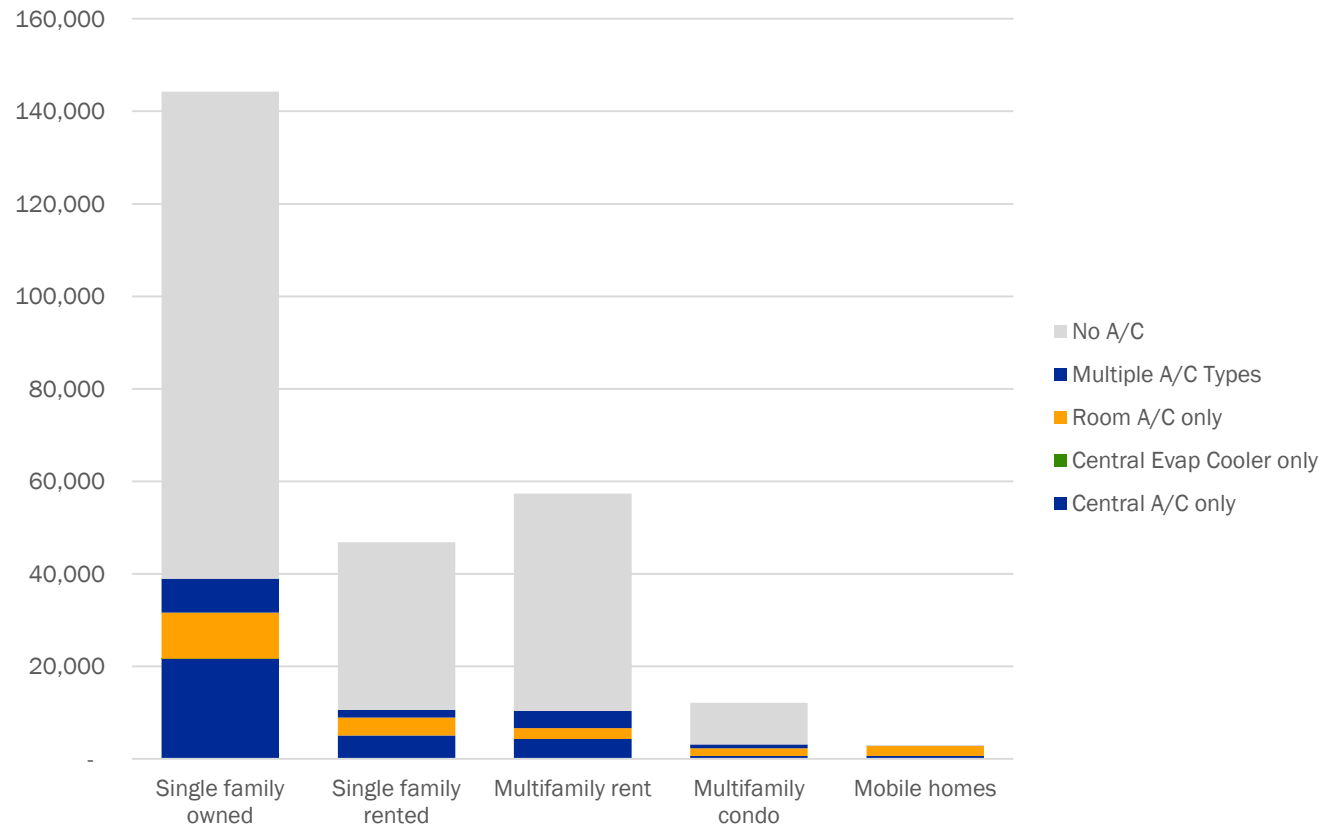


# Appliance and Fuel Source Analysis

## Air Conditioning



### Air Conditioning by Type in San Mateo County Homes



### *Electrification implications + Key Takeaways*

- Most residential buildings in San Mateo County do not have air conditioning
  - Those that do, mostly single-family owned buildings, have central AC
  - Scope: San Mateo County

*Data source: Peninsula Clean Energy, Residential Appliance Saturation Survey, American Community Survey*

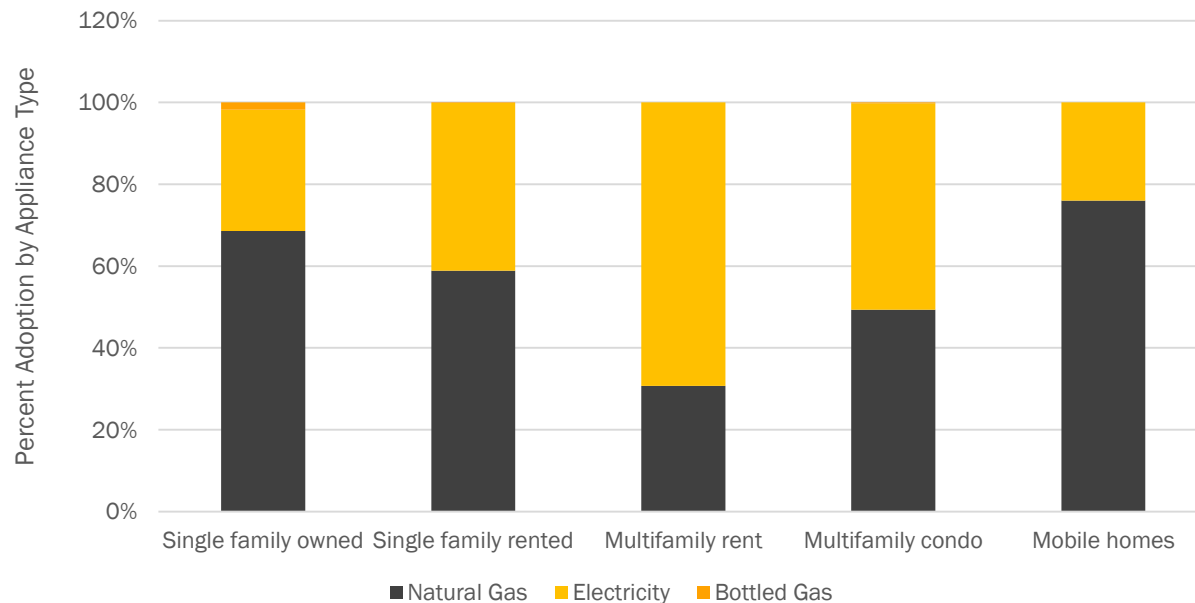


# Appliance and Fuel Source Analysis

## Stoves



### Stoves by Fuel Type and Building Type



### *Electrification implications + Key Takeaways*

- Gas and propane stoves make up approximately 60% of stoves, while electric units make up the remaining 40%
  - Electric stoves are most common in multifamily rental units
  - Scope: San Mateo County

*Data source: Peninsula Clean Energy, Residential Appliance Saturation Survey, American Community Survey*

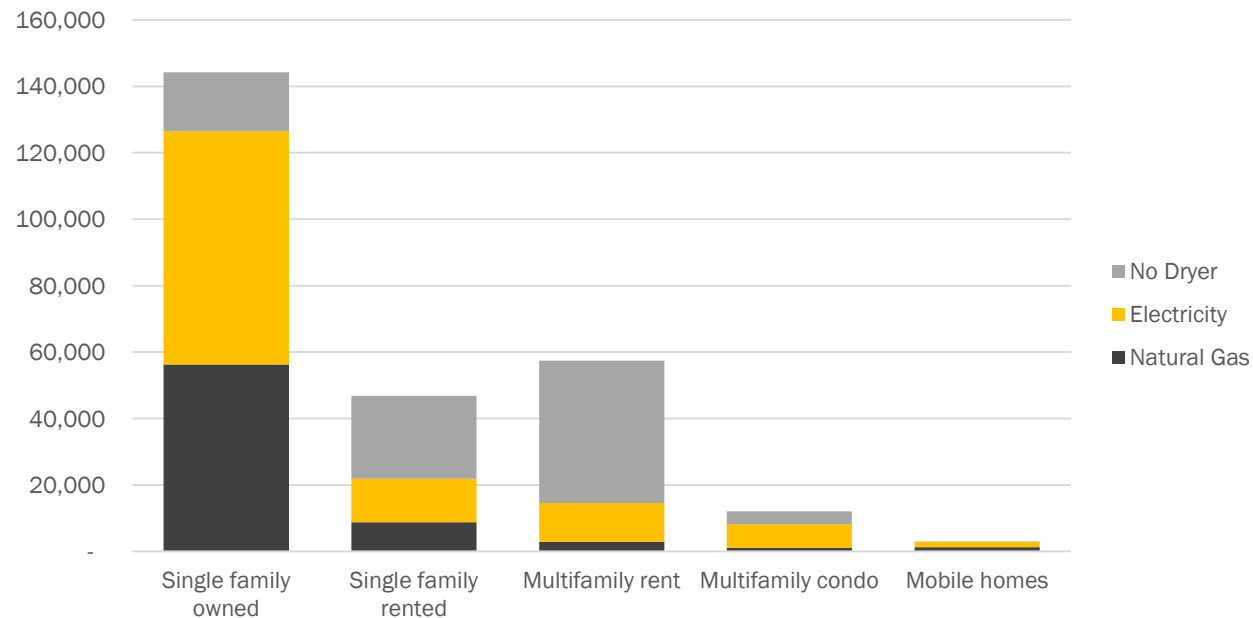


# Appliance and Fuel Source Analysis

## Clothes Dryers



**Fuel for Clothes Dryers by Household Type in San Mateo County**



### ***Electrification implications + Key Takeaways***

- Electric dryers make up 40% of all dryer use, while only 27% are gas
  - Most electric clothes dryers have a dryer on site, while the remaining 34% does not
  - Scope: San Mateo County

*Data source: Peninsula Clean Energy, Residential Appliance Saturation Survey, American Community Survey*



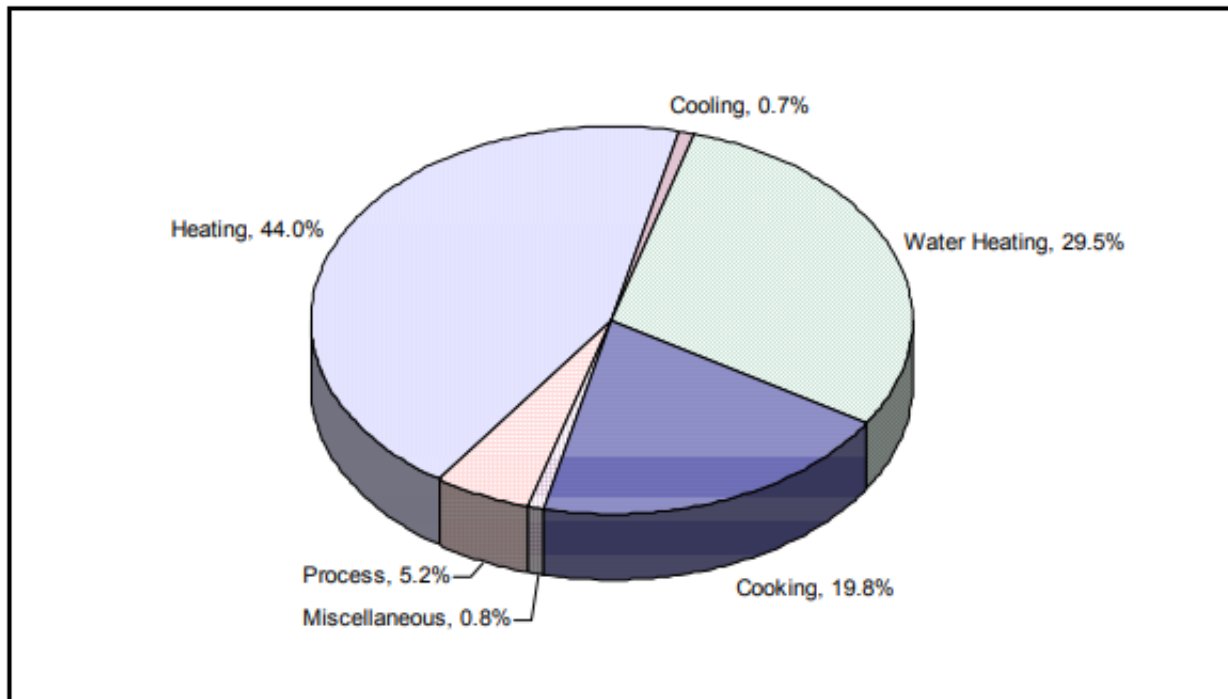


# Appliance and Fuel Source Analysis

## Commercial Gas Consumption by End Use



### Commercial Gas Consumption by End Use



### ***Electrification implications + Key Takeaways***

- Total natural gas usage from commercial buildings in PG&E service area estimated at 565 million therms per year
  - 3 building types represent 54% of gas use: Restaurants (21%), Misc, (20%), and Health (13%)

*Data source: 2016 California Commercial End-Use Survey (CEUS), California Energy Commission, PG&E*  
*\*2018-2022 CEUS not yet available*

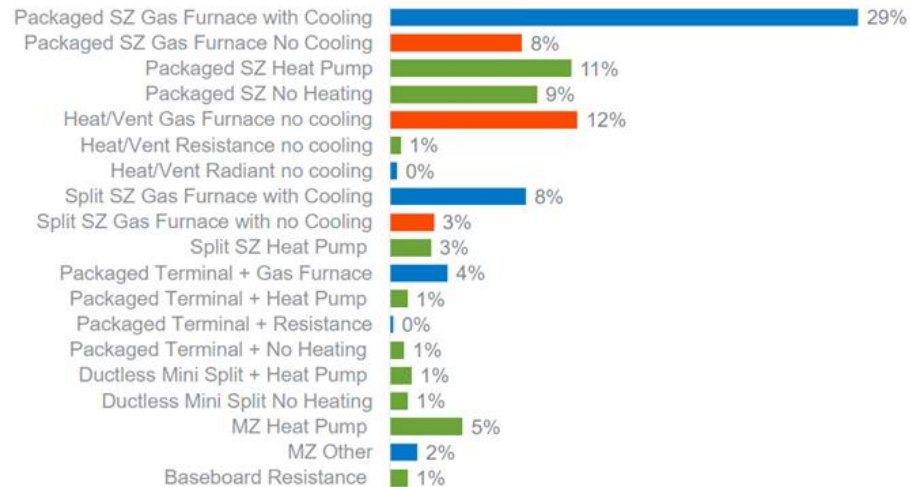


# Appliance and Fuel Source Analysis

## Commercial Space Heating



### Commercial Space Heating by Prevalence by Type (PCE Analysis)



#### Easy to Electrify – 43%

Blue indicates gas units which have cooling. These are easy to electrify during replacement with minimum incremental costs.

#### Already Electric – 33%

Green indicates units which are already electric. No action required except grid enablement.

#### Gas, No A/C – 34%

Red indicates gas units without air conditioning. These are incrementally expensive to electrify.

### Electrification implications + Key Takeaways

- Replacing packaged Single Zone Gas Furnaces with Cooling with electric heat pump rooftop package units (classified as 'easy to electrify') offers a near cost-equal 1 to 1 swap, and a significant electrification opportunity even without additional resources

*Data source: PCE 2035  
Decarbonization Plan*

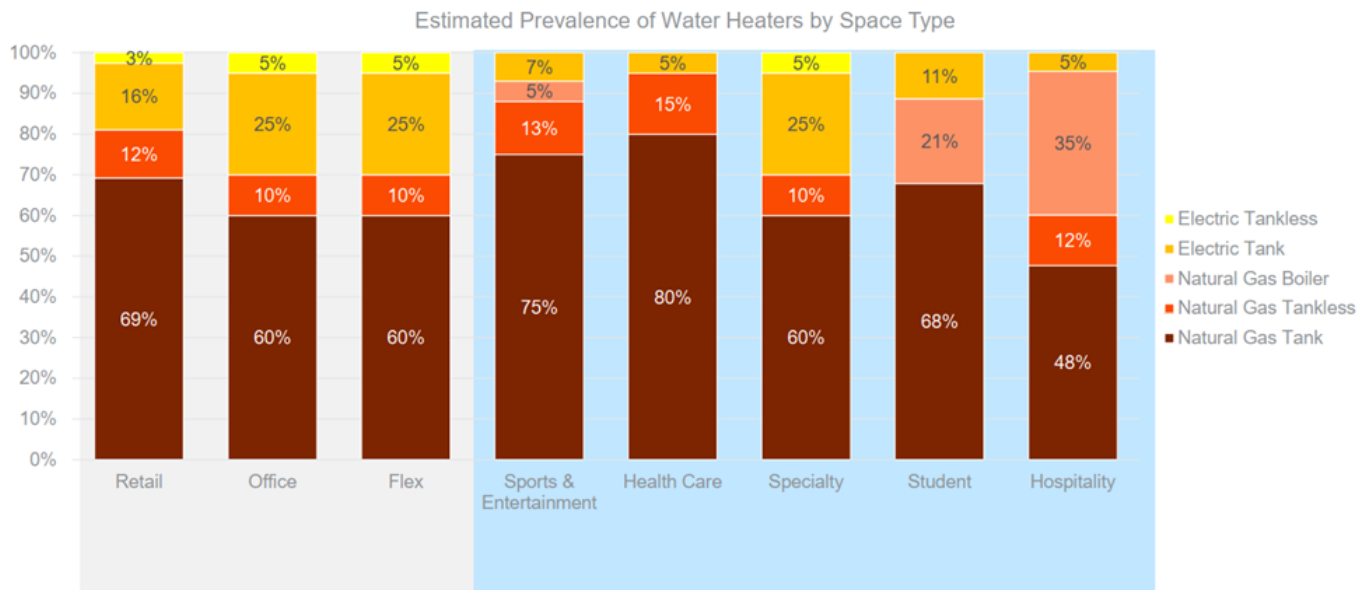


# Appliance and Fuel Source Analysis

## Commercial Water Heating



### Commercial Water Heating Equipment Prevalence by Type



Peninsula Clean Energy

### *Electrification implications + Key Takeaways*

- Most buildings use gas tank water heaters, with a higher proportion of commercial buildings in sports, healthcare, specialty, and student using tanked water heaters
  - Some uptake of electric tank and tankless heaters in retail, office, and 'flex' buildings

*Data source: 2035 PCE  
Decarbonization Study*





# Feedback + Q&A





# How much will it cost building owners to electrify?

**Residential & Commercial Buildings Electrification Economics**



# Overview: Residential Cost Analysis



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## *Framework*

- Rincon analyzed upfront costs to electrify based on available data from PCE, BayREN, and the County of San Mateo
- Upfront costs = appliance + install labor + associated costs like permits and wiring
  - Panel upgrades were broken out as a separate cost



# Key Takeaways: Upfront Residential Electrification Costs

**Marginal costs for electrification are higher, but can reach parity with existing rebates.**

**Whole home electrification could save San Mateans \$709 when compared to the cost of gas-for-gas appliance replacements.**

- Full-home appliance replacement with new gas appliances: \$11,012 - \$18,512
- Marginal cost of full-home electrification before rebates: \$13,291- \$20,936
- Marginal cost of full-home electrification after rebates: **+\$4,836** to **-\$709 (cost savings)**



# Incentives for Electrification

**\$21,600 available to support home electrification through IRA, BayREN, PCE, TECH\***



## **Heat Pump HVAC Total Rebates + Credits: \$7,500**

PCE: \$3,500  
BayREN: \$1,000  
IRA Tax Credit: \$2,000  
TECH: \$1,000



## **HPWH Total Rebates + Credits: \$6,000**

PCE: \$3,000  
BayREN: \$1,000  
IRA Tax Credit: \$2,000



## **Induction Stove Total Rebates + Credits: \$250**

BayREN: \$250



## **Electric Dryer Total Rebates + Credits: \$250**

BayREN: \$250

**Electric Panel Total Rebates + Credits: \$2,100:** PCE: \$1,500: IRA: \$600  
+ *TECH Total Electric Home Rebates (all systems): \$5,500*

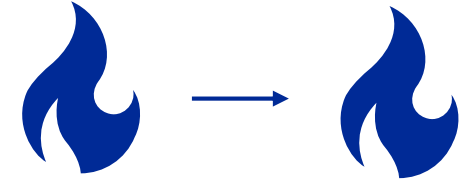
**PCE also provides up to \$10,000 in zero percent loans for building electrification.**

*\*As of August 28 2023; Incentives change regularly based on stacking; availability. These incentives will be updated prior to community outreach*





# Gas-For-Gas Scenario



**Like-for-Like Scenario: Replace Gas Appliances with Similar, New Gas Appliances (Total Costs)**

Appliance, Install, Wiring	Median/Average Cost (All Data)	
Gas-fired water heater	\$	2,800
Gas-fired HVAC system	\$	6,132
AC (keep existing Furnace)	\$	7,500
Gas-fired dryer	\$	925
Gas-fired stove	\$	1,155
Whole-Home Cost w/o AC	\$	11,012
Whole-Home+ AC	\$	18,512

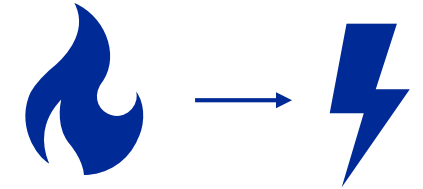
## ***Electrification implications + Key Takeaways***

- Most San Mateans (75%) do not have AC
- If a building owner were to replace every electrifiable appliance, with a similar gas appliance, they would spend \$11,012 w/o AC
- Key takeaway: building owners would have invested in costly appliance upgrades regardless, in a 'electrify on replacement' scenario



# Gas-to-Electric Scenario

## No Incentives



### Electrification Scenario: Cost to Replace Gas Appliances with Electric Appliances (No Incentives, Total Costs)

Appliance, Install, Wiring	Median/Average Cost (All Data)
Electric heat pump water heater	\$ 6,000
Electric heat pump HVAC system (heating and cooling)*	\$ 17,910
	\$ 13,965
Electric dryer	\$ 1,963
Electric stove	\$ 2,375
Panel Upgrade**	\$ 3,700
Low Cost Scenario HP: Whole-Home Cost ( w/o panel upgrade )	\$ 24,303
Low Cost Scenario HP: Whole-Home Cost (+ panel upgrade)	\$ 28,003
Median Cost Scenario HP: Whole-Home Cost ( w/o panel upgrade)	\$ 28,248
Median Cost Scenario HP: Whole-Home Cost (+ panel upgrade)	\$ 31,948

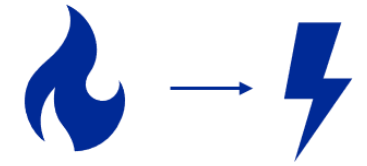
### Electrification implications + Key Takeaways

- Avoiding panel upgrades through home electrification planning, panel splitters, “watt diet” etc. could save building owners ~\$3,700
- Because of significant market, labor quote variation in HVAC system, Rincon ran two cost scenarios to control for significant variation (low, median cost)
- **Total cost to electrify without incentives: \$24,303-\$31,948**



# Gas-to-Electric Scenario – Marginal Cost

## Electric-Gas Appliance Replacement Costs



### Electrification Scenario Detailed Marginal Costs

Appliance	Median/ Average Cost
Electric heat pump water heater	\$ 3,200
Without AC: Electric heat pump HVAC system	\$ 11,778
	\$ 7,833
With AC: Electric heat pump HVAC system (heating and cooling; replaces need for additional AC )	\$ (7,500)
Electric dryer	\$ 1,038
Electric stove	\$ 1,220
Additional One-Time Costs: Panel Upgrade**	\$ 3,700
Low Cost Scenario HP: Whole Home Electrification Marginal Cost (w/o AC or panel Upgrade)	\$ 13,291
Median Cost Scenario HP: Whole Home Electrification Marginal Cost (w/o AC or panel upgrade)	\$ 17,236
Low Cost Scenario HP: Whole Home Electrification Marginal Cost (Without AC WITH Panel upgrade)	\$ 16,991
Median Cost Scenario HP: Whole Home Electrification Marginal Cost (Without AC WITH Panel upgrade)	\$ 20,936
Full-Home Electrification Marginal Cost (with AC, no panel upgrade) (low cost scenario)	\$ 5,791
Full-Home Electrification Marginal Cost (with AC, no panel upgrade) (Median cost scenario)	\$ 9,736
Full Home Electrification Marginal Cost (with AC, Panel Upgrade- low cost scenario)	\$ 9,491
Full Home Electrification Marginal Cost (with AC, Panel Upgrade, median cost scenario)	\$ 13,436

### Electrification implications + Key Takeaways

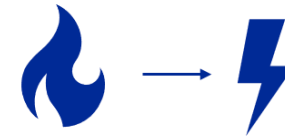
- Low-Cost HVAC Scenario: Cost gap to close with incentives \*: **\$13,291--\$16,991**
- Median-Cost HVAC Scenario: Cost gap to close with incentives \*: **\$17,236-\$20,936**
  - Homes with AC will experience greater cost effectiveness for electrification (25% of San Mateo Homes)
  - Avoiding panel upgrades would also allow for greater cost savings





# Electrification Marginal Upfront Costs + Incentives

## Costs to Electrify with Incentives Applied



### Electrification Marginal Upfront Costs + Incentives

Appliance	Cost Estimate	Minus Combined Incentives	Total Marginal Cost With Incentives
<b>Electrification Scenario Marginal Cost with Peninsula Clean Energy, BayREN, IRA Rebates</b>			
Electric heat pump water heater	\$ 3,200	\$ (6,000)	\$ (2,800)
Without AC-Low Cost HVAC	\$ 7,833	\$ (7,500)	\$ 333
<u>Without AC- HVAC system</u>	\$ 11,778	\$ (7,500)	\$ 4,278
<u>With AC- HVAC System</u>	\$ 4,278	\$ (7,500)	\$ (3,222)
Electric dryer	\$ 1,038	\$ (250)	\$ 788
Electric stove	\$ 1,220	\$ (250)	\$ 970
Additional One-Time Costs - Panel and New Circuits	\$ 3,700	\$ (2,100)	\$ 1,600
<b>Total Costs no panel upgrade Low Cost HVAC No AC</b>			<b>\$ (709)</b>
<b>Total Costs no Panel Upgrade Median HVAC no AC</b>			<b>\$ 3,236</b>
<b>Total Costs + Panel Upgrade Median HVAC w/o AC</b>			<b>\$ 4,836</b>
<b>Total Costs + Panel Upgrade Median HVAC with AC</b>			<b>\$ (2,665)</b>

### Electrification implications + Key Takeaways

- In low-cost HVAC scenario, with no panel upgrade, electrification is **\$709 cheaper** than full-home gas appliance replacement
- With AC, Median HVAC scenario + panel upgrade, electrification scenario outperforms full-home gas appliance replacement by \$2,665
- In median-cost HVAC scenarios, building owners still may incur \$3,236-\$4,836 in costs
  - Key Variables: HVAC install costs, electric panel replacement needs



# On-Bill Costs to Electrify – Upcoming Analysis

*Overview- Work in Progress Peninsula Clean Energy On-Bill Cost Analysis*

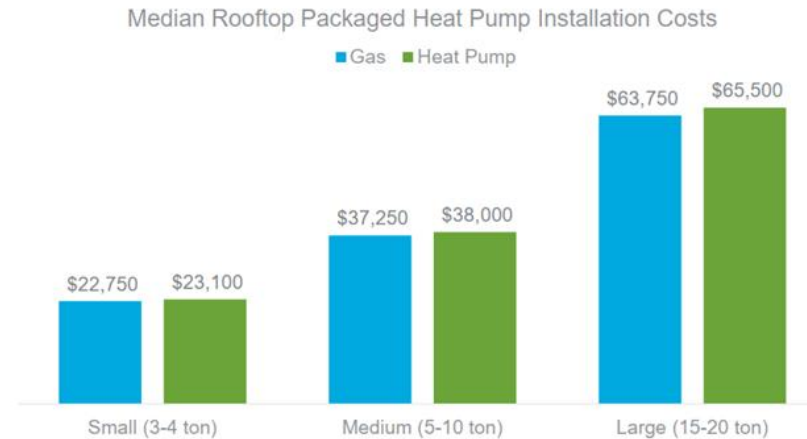


- Draft findings from PCE show all-electric buildings can cost the same or less to operate compared to mixed-fuel
  - On-bill impact is dependent on the rate structure being used
  - *Full analysis will be provided when complete (next SIC meeting)*



# Commercial Building Cost Analysis

**PCE 2035 Decarbonization Plan shows near cost parity for rooftop packaged heat pump installation costs**



- Costs are highly variable, most large buildings have over sized systems, preventing a 1:1 replacement without efficiency or downsizing measure first
- Small and medium sized retail or service buildings have similar electrification costs to single-family homes.
- Most interviewers recommend building performance standards, as electrifying large buildings cannot be a 'one-size-fits-all' approach
- Rooftop package units offer relative cost parity in comparison to gas, even without additional incentive
  - Potential cost-effective policy lever

*Data sources: Rincon contractor interviews (City of Sacramento), Rocky Mountain Institute Economics of Electrifying Existing Buildings, PCE 2035 Decarbonization Plan*





# Feedback + Q&A





# Next Steps: Phase 1 Community Outreach

Next SIC Meeting: 1/10 Review Finalized Prioritized Policies List



- Phase 2: Outreach: Community feedback on policies & pathways
- Incorporation of community feedback in prioritized policy list
- Drafting of pathway

Summer 2023

Fall 2023

Winter  
23-24

Spring  
2024

Summer  
2024

- Development of Equity + Effectiveness Criteria
- Identify range of feasible policy options
- Building Inventory and Market Segmentation Analysis

- Incorporation of community feedback for equity and effectiveness criteria
- Draft policies & pathways list-Community feedback

- Public review of draft strategy





# Thank you!

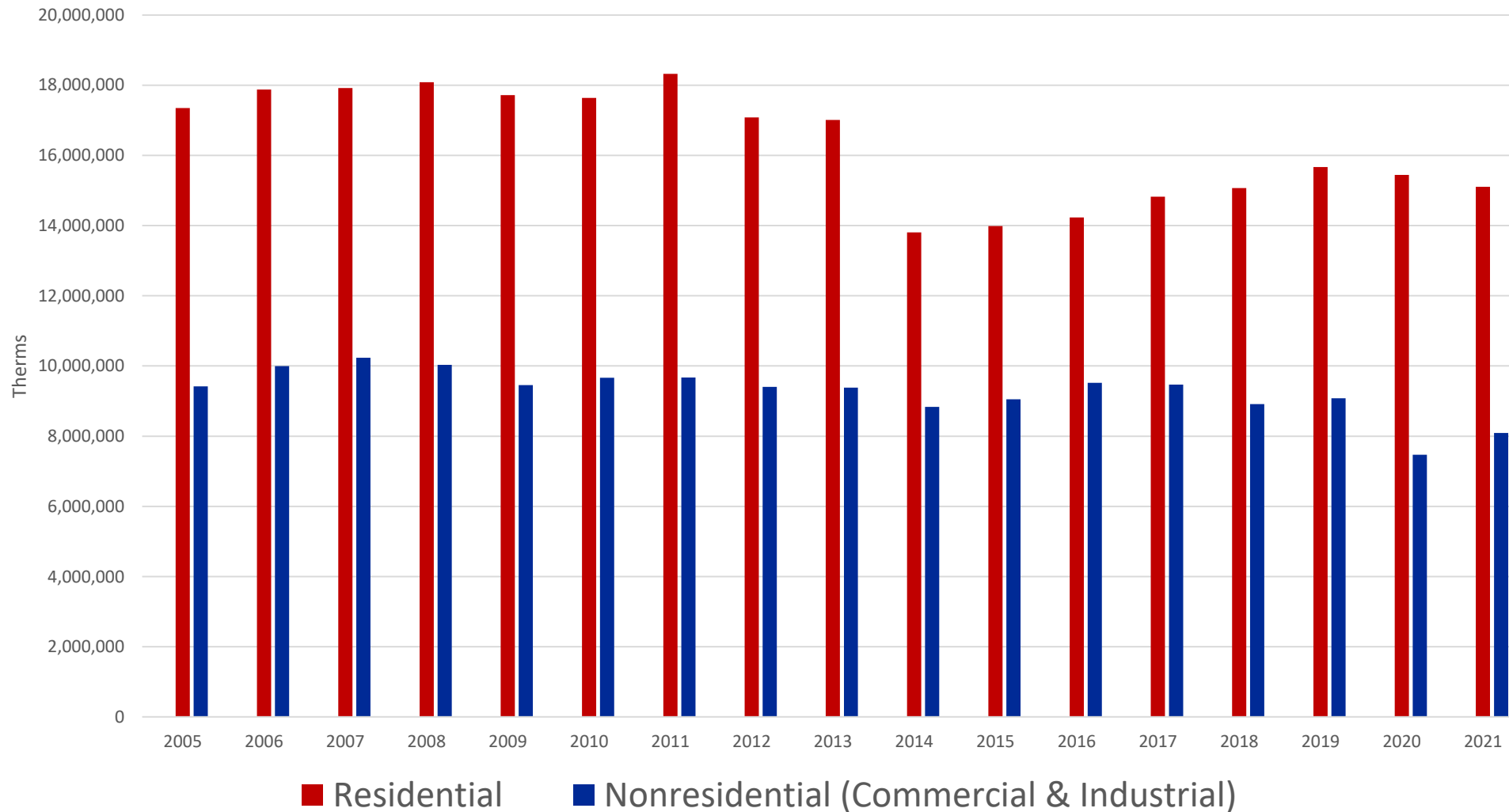
Questions? Contact:  
[achow@sanmateocity.org](mailto:achow@sanmateocity.org)

<https://www.cityofsanmateo.org/4730/Electrify-San-Mateo>





# GHG Emissions by Sector



**Res – 80,000 MT CO<sub>2</sub>e**  
**Com – 43,000 MT CO<sub>2</sub>e**

