Electrification 101

City of Alameda

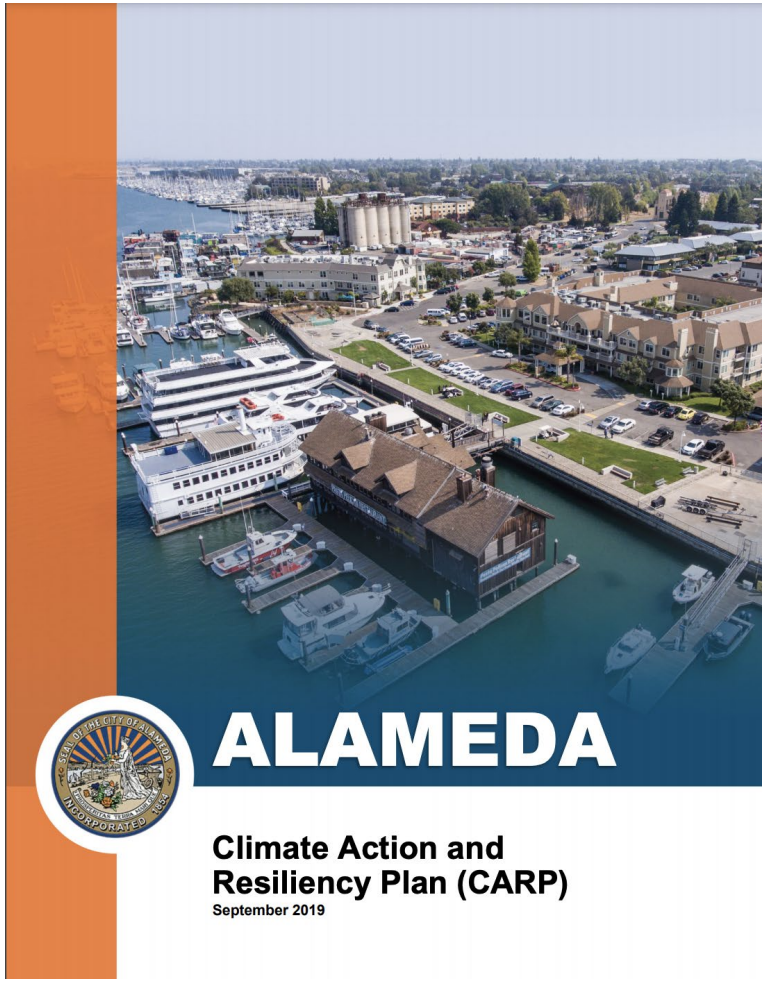
April 6, 2022

Workshop Objectives

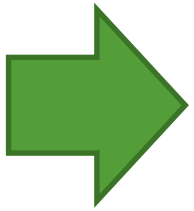
- What is the city doing and where are we going?
- What is building electrification?
- What technologies are available?
- What are the costs and available incentives?
- Real world examples

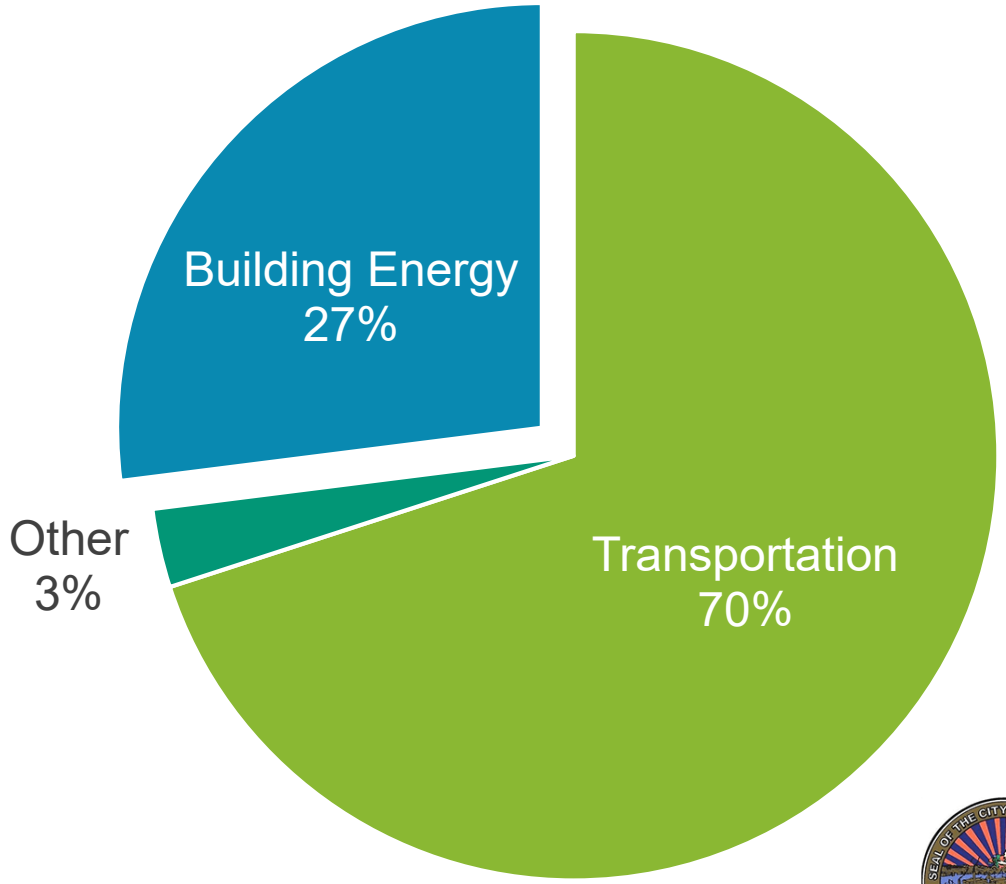
Alameda Climate Action and Resiliency Plan (CARP)

- Reduce emissions by 50% below 2005 levels by 2030
- Achieve net zero emissions as soon as possible
- Climate adaptation
  - flooding, sea level and groundwater rise, drought, extreme heat, hazardous air quality, and earthquakes/ liquefaction.



Alameda's Emissions





Alameda Building Electrification Efforts

- In 2019, City Council passed an ordinance limiting natural gas infrastructure in residential projects on city-owned land
- In 2020, City Council passed an ordinance requiring new development citywide to be all electric, with certain exceptions
- Published "Electrifying Existing Residential Buildings in Alameda" report in 2021
- In 2022, developing a roadmap to equitably electrify all existing buildings in Alameda

Four Elements of Electrification Roadmap

- Alameda Municipal Power
- Policymaking
- Financing
- Education & Outreach

Roadmap Principles

- Everyone, especially low to moderate income households, should be able to affordably switch to modern electric equipment
- Electrification policy should also support housing and anti-displacement policy
- The electrification process should be as simple and seamless and possible
- Our timelines should be fast but be realistic about challenges and other priorities

Electrification Pathway

Ensure energy efficiency in buildings

- Who: Building Owners and occupants
- Why: Reduce resources needed and monthly bills
- How: Efficient appliances and building envelope

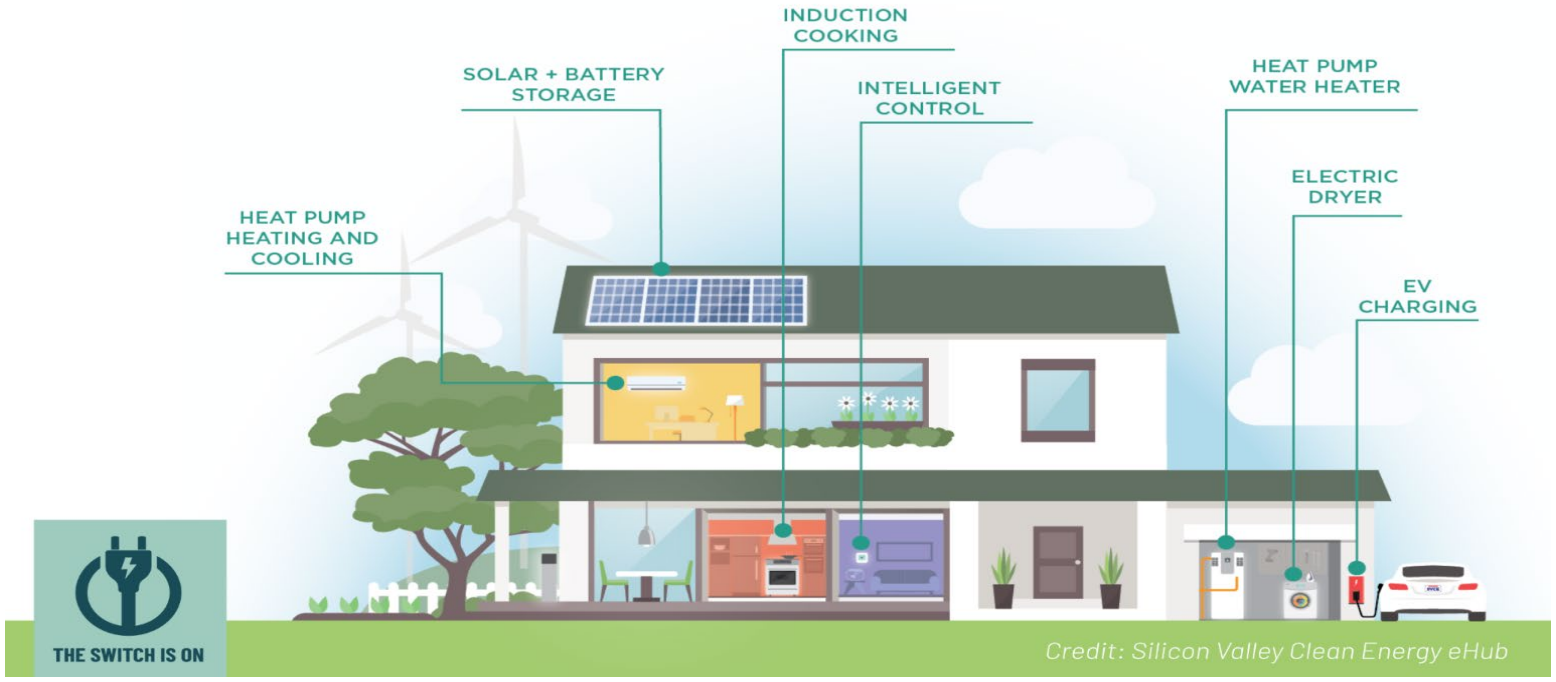
Electrify buildings by converting all gas use to electricity

- Who: Building Owners
- Why: Improve air quality, home health & safety, and use cleaner energy
- How: Replace gas powered appliances with electric appliances

Decarbonize the grid to achieve clean energy

- Who: Utility Providers
- Why: Reduce/eliminate GHG emissions
- How: Create electric power from renewable sources

What is home electrification?



The transition from relying partially on gas combustion to using all electricity to power the appliances in your home

Benefits of Electrifying

ENERGY EFFICIENT HOME

We're talking appliances that are 3-5 times as efficient as their gas counterparts

REDUCE YOUR ENERGY BILL

Appliances that use less energy and could save you nearly $500 a year

HELP THE ENVIRONMENT

Lower greenhouse gas emissions and reduce your impact for years to come

IMPROVE INDOOR AIR QUALITY AND SAFETY

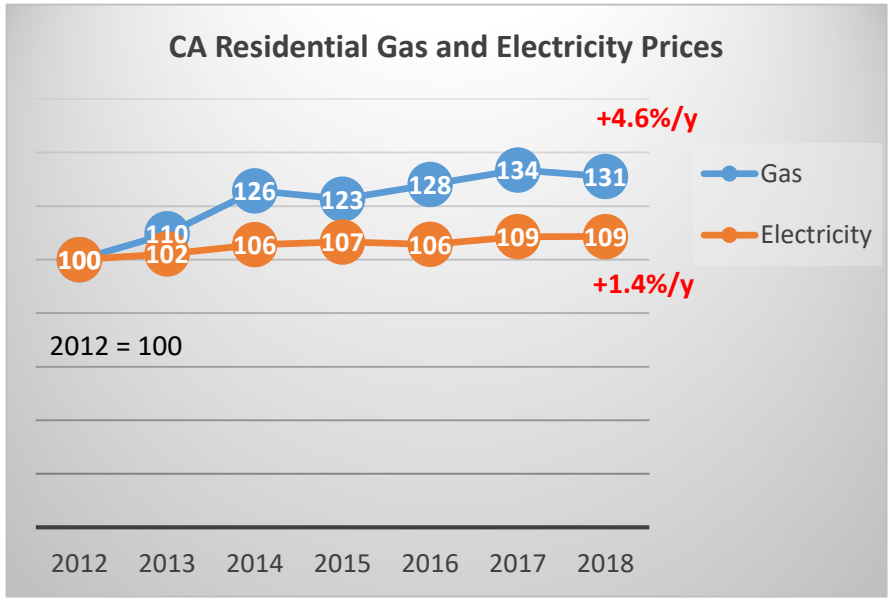
No more indoor air pollution and fewer safety risks

TAKE ADVANTAGE OF LIMITED TIME REBATES

Use **rebates and incentives** to lower the cost of replacing your old appliances

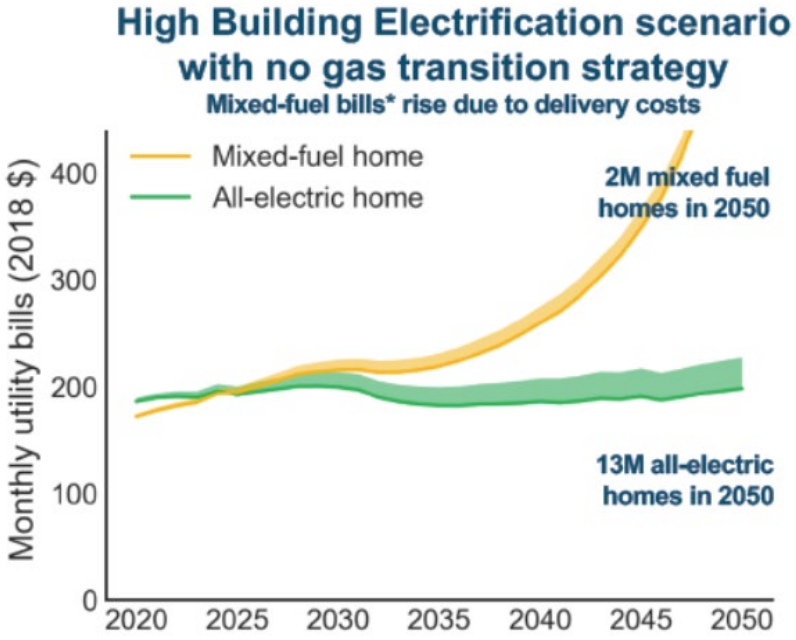
Gas Utility Costs

CA residential natural gas prices increased 3x faster than electricity prices from 2012 to 2018



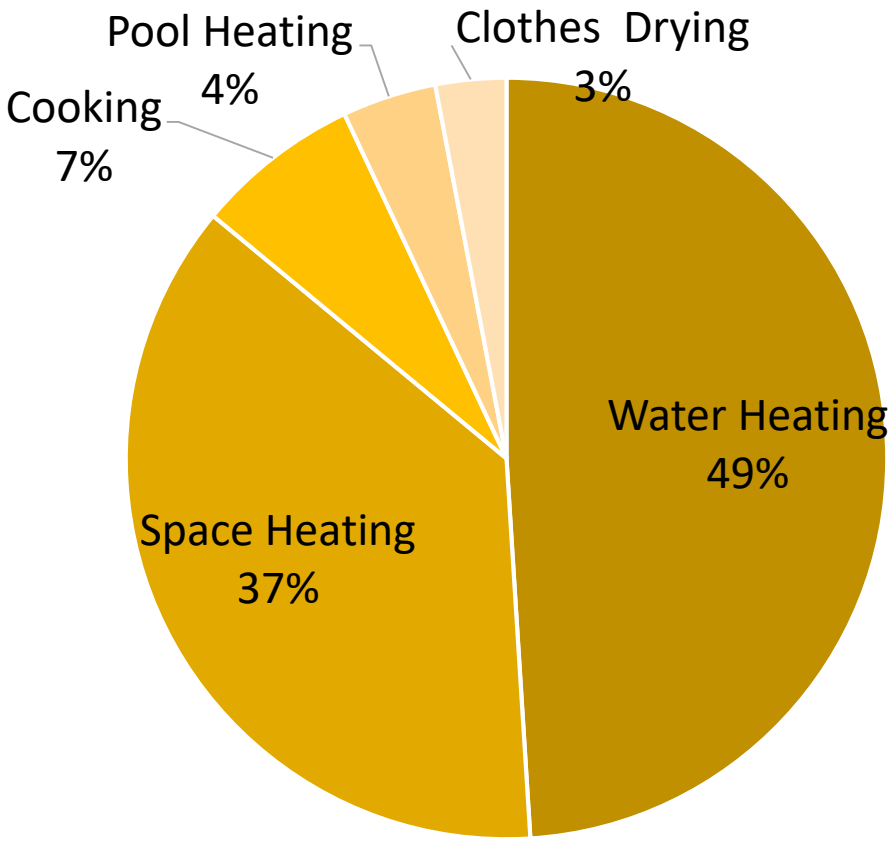
Source: EIA
https://www.eia.gov/dnav/ng/hist/n3010ca3m.htm
https://www.eia.gov/electricity/data/browser/#/topic/7?agg=2,0,1&geo=g&freq=M

Trend expected to accelerate:

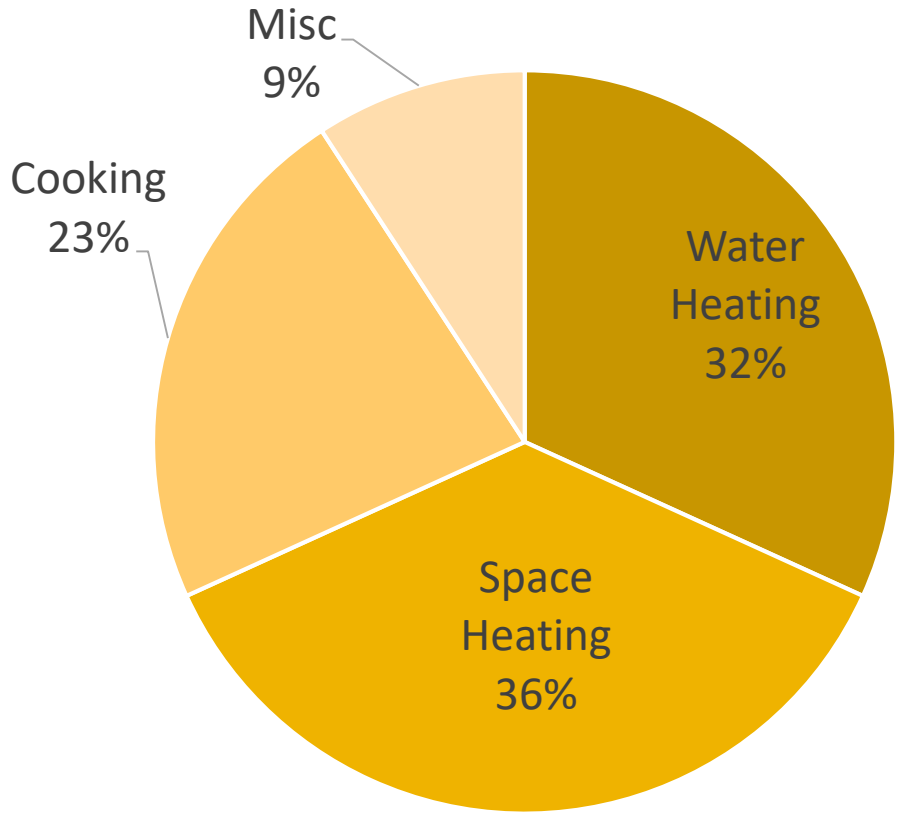


CEC Workshop June 6, 2019: Draft Results from E3 study on the Future of Natural Gas Distribution in California

Building Gas Usage



Residential

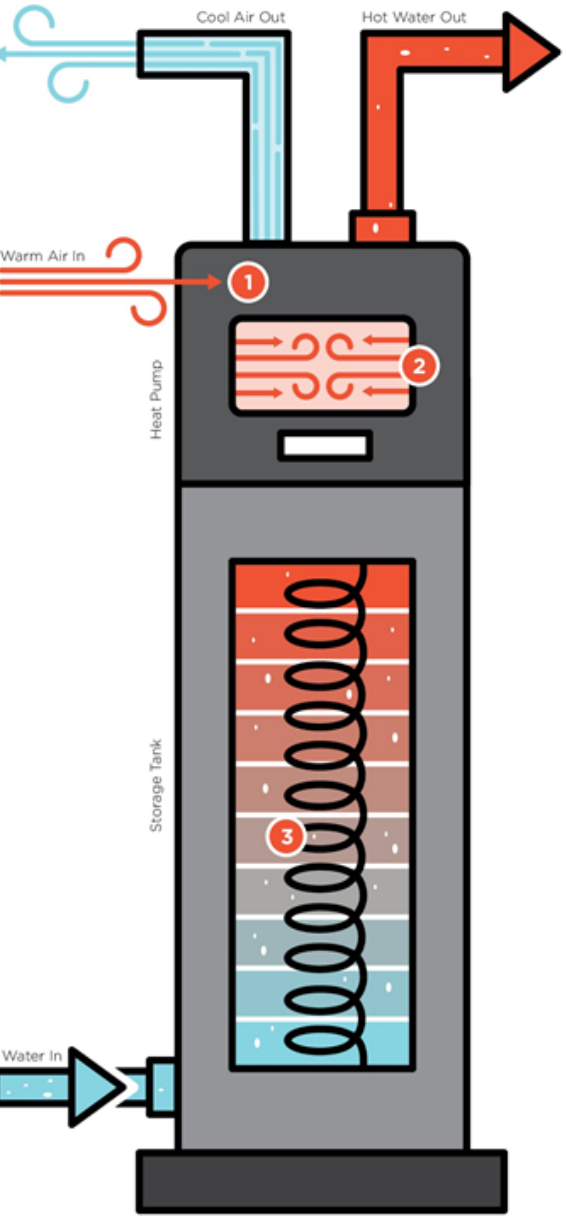


Non-Residential

2009 Residential Appliance Saturation Survey
2006 California Commercial End Use Survey

Equipment

	Space Heating	Water Heating	Cooking	Clothes Drying
Residential				
Commercial				



HOW DO HEAT PUMPS WORK?

By transferring heat rather than creating it, heat pumps deliver hot water **3-4 times more efficiently** than conventional water heaters.

1. Heat pump pulls warmth from the air.
2. Warm air is compressed, increasing its temperature.
3. Condenser coils transfer heat to the water.

SIERRA CLUB

Heat Pumps Explained

A heat pump uses heat transfer technology to provide space heating and cooling and/or water heating.

Like a traditional air conditioner a heat pump, it cools your home, but unlike an air conditioner, it heats as well.

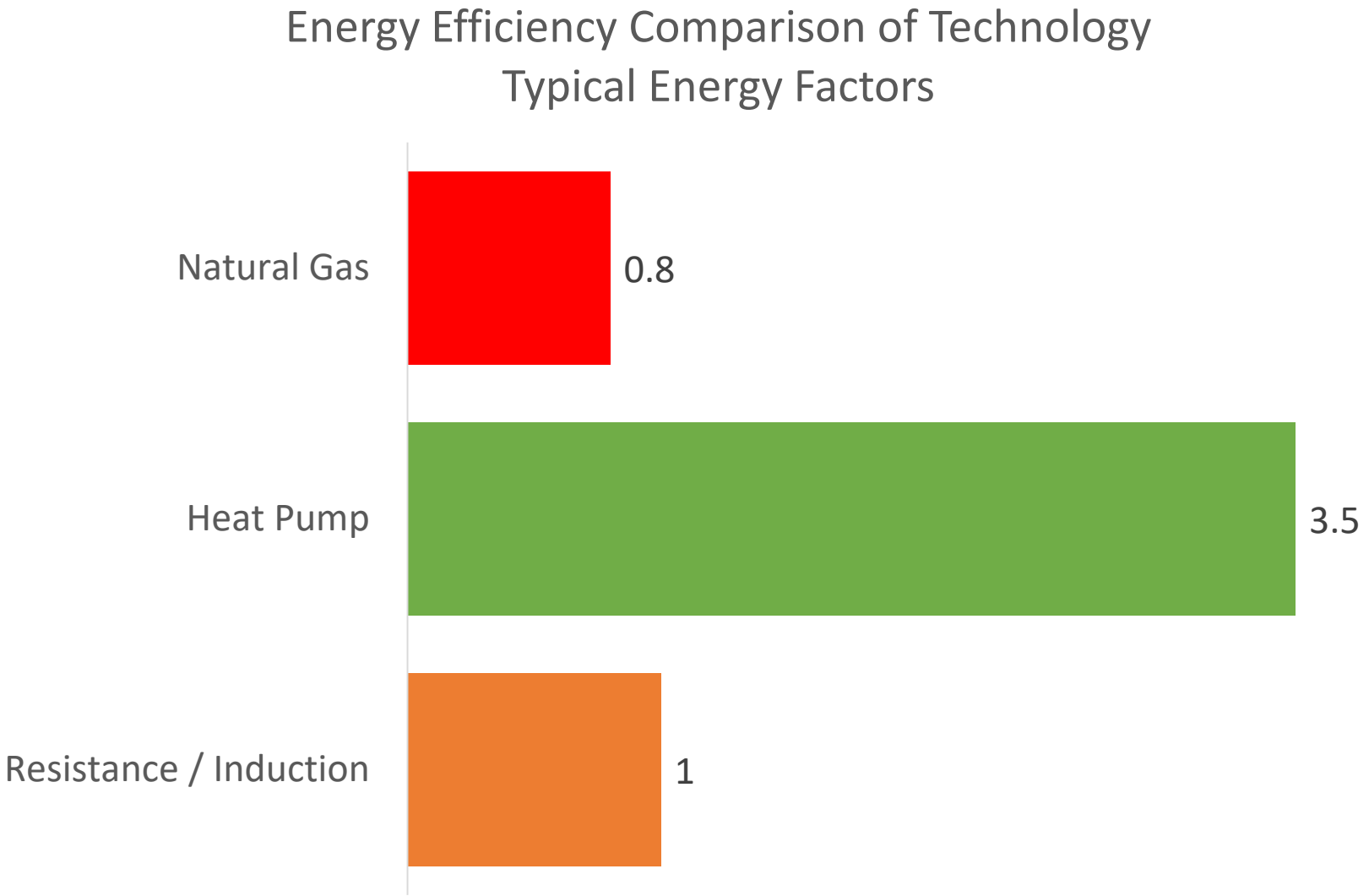
This works by using a refrigerant to pull warm air out of your home during hot days, and vent in warm air from the atmosphere during cooler months.

Low-Cost and Interim Electrification Options

Space Heating

Cooking

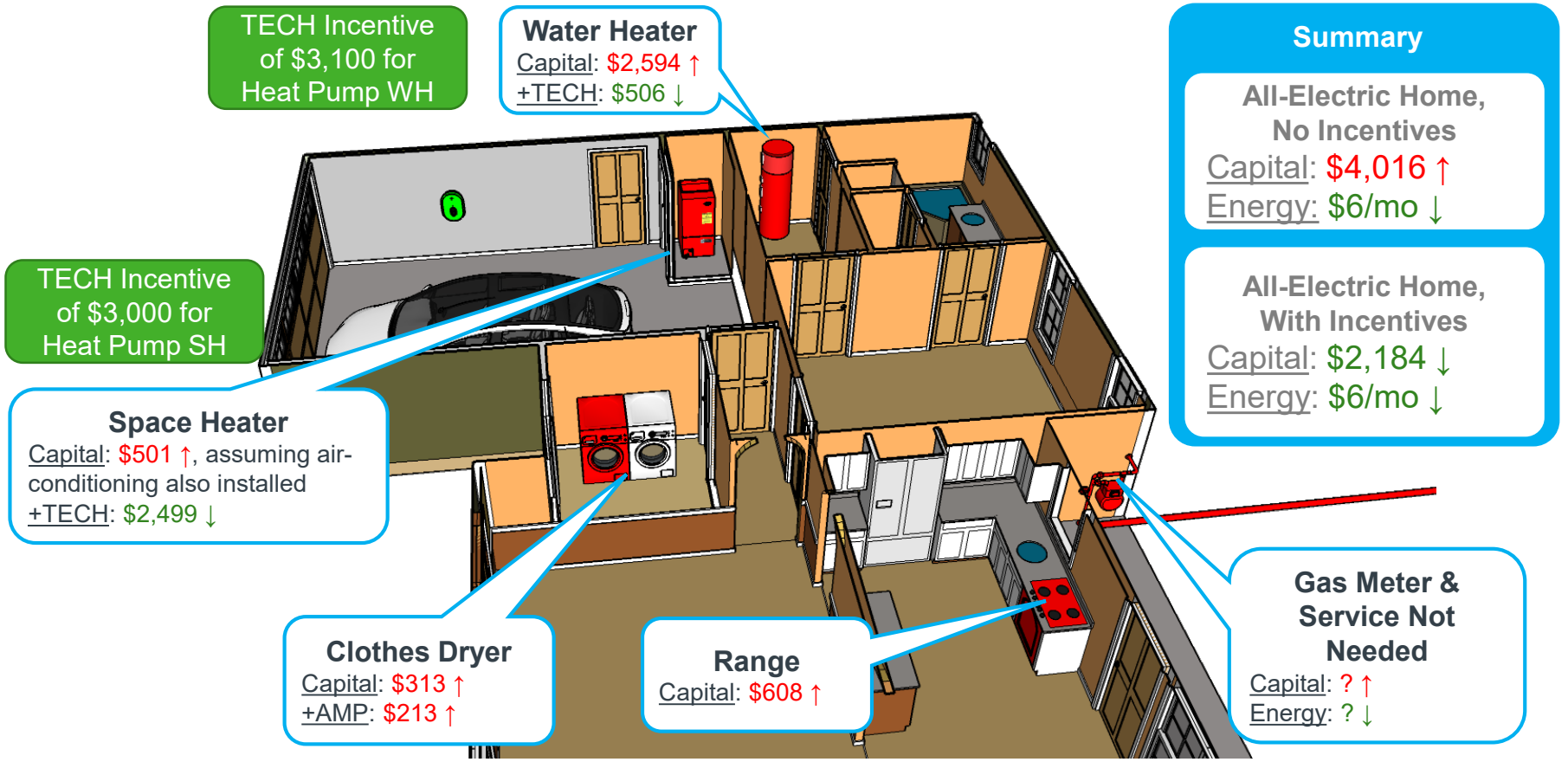
Equipment Efficiency



Space heating,
Water heating,
Clothes drying

Cooking,
High-Intensity Industrial
Processes

The Cost Story



Capital and whole-building energy costs of thermal systems are based on Statewide Utility Codes and Standards Program report, using AMP D-1 and PG&E G1 rates (March 2022).

Rate escalation is based on May 2021 CPUC staff En-Banc analysis.

TECH incentives are based on https://energy-solution.com/tech-incentives/ .

AMP incentive is based on https://www.alamedamp.com/407/Rebates-and-Incentives

Home Electrification Process

1) Understand your home

- Self assess your home and your needs or;
- Consult with an energy assessor, *BayREN Home Energy Score*

2) Plan your journey

- Consider your priorities and budget
- Consult a BayREN Energy Advisor **(866) 878 – 6008**
- Get your home ready

3) Start electrifying

- Take advantage of AMP and Tech Clean California rebates
- Find a qualifying contractor at www.Switchison.org

Tech Clean California Rebates

HP Appliance Incentive Measure	Qualifier	TECH Clean California	TECH Partner Program	Total Incentive
HPWH (Gas/Propane to HPWH)	HPWH < 55 Gallon	$ 1,600	$ 1,500	$ 3,100
HPWH (Gas/Propane to HPWH)	HPWH > 55 Gallon	$ 2,300	$ 1,500	$ 3,800
HPWH (Electric Resistance to HPWH)	All sizes	$ 1,500	$ -	$ 1,500
Panel Upgrade	Up to 200 amps	$ 300	$ 2,500	$ 2,800
HP HVAC (Baseline)	Baseline	$ 3,000	N/A	$ 3,000
HP HVAC (At Least 16 SEER and 9.0 HSPF)	16 SEER and 9.0 HSPF	$ 3,000	N/A	$ 3,000
HP HVAC (At Least 18 SEER and 9.7 HSPF)	18 SEER and 9.7 HSPF	$ 3,000	N/A	$ 3,000

- Rebate paid to contractor and then passed to customer
- Current TECH contractors: https://switchison.cleanenergyconnection.org/tech-clean-california-contractors
- For Space Heating, Water Heating, and Panel as much as **$9600** in incentives

Background- AMP

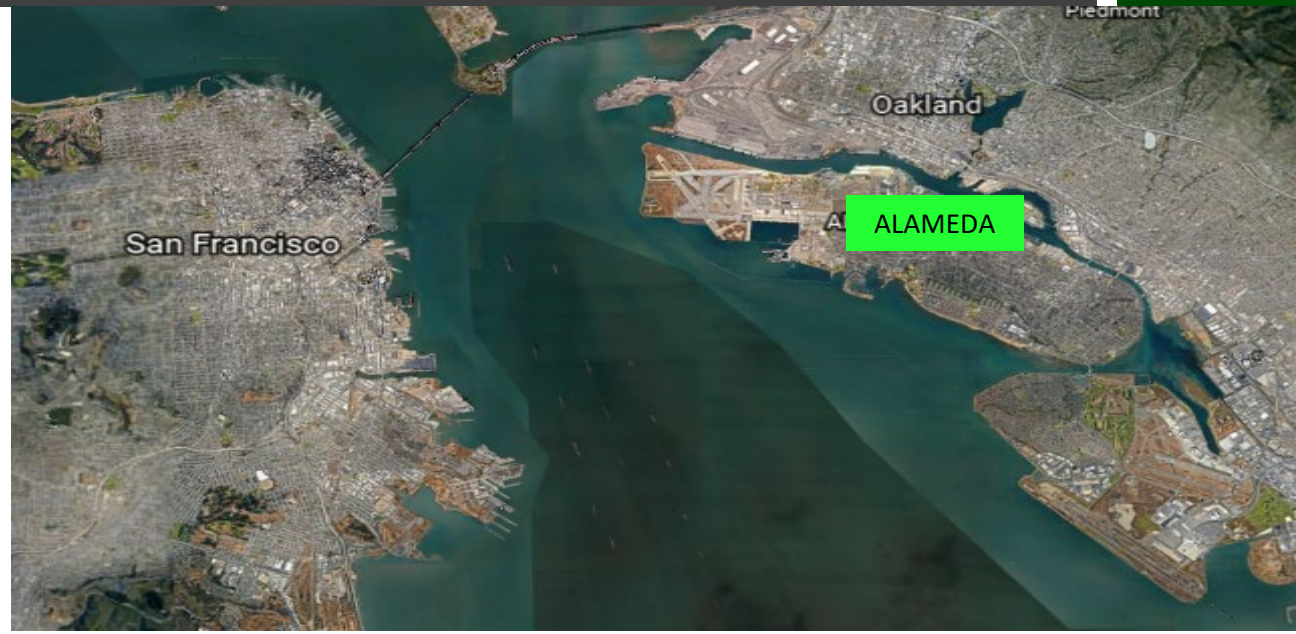
Manage and safely provide reliable, cost effective, and environmentally friendly electric services for a sustainable Alameda

AMP History:

- AMP was established in 1887
- Oldest municipal electric utility in CA
- Community owned
- Locally controlled

AMP Highlights:

- 100% clean electricity
- 20% lower rates than neighboring utilities
- Demonstrated leader in building and transportation electrification programs

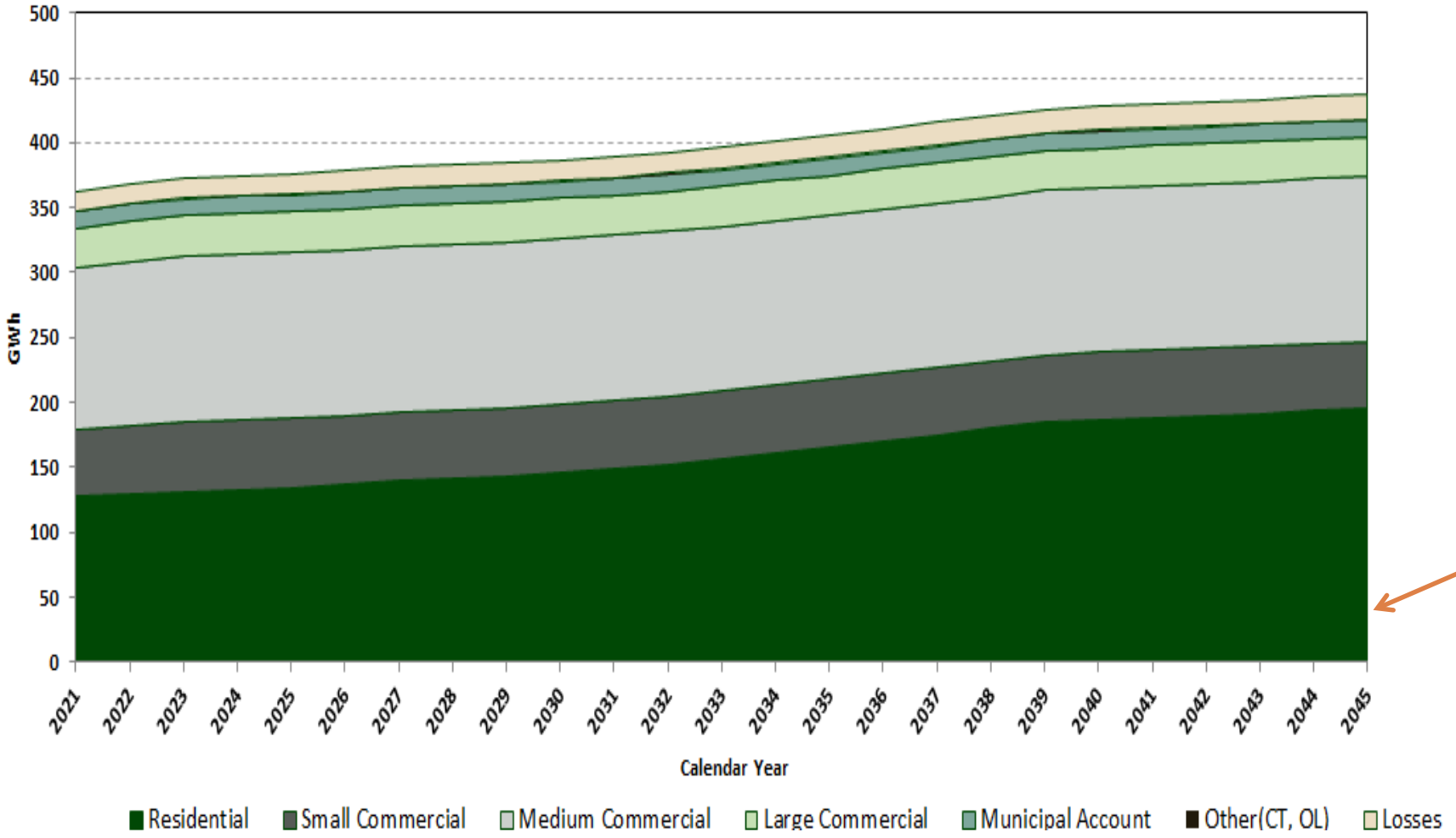


The City of Alameda is a small island community in the heart of the San Francisco Bay Area

- 80,000 residents
- 22.8 square miles
- 36,000 total customer accounts

ALAMEDA MUNICIPAL POWER
A Department of the City of Alameda

How will Building Electrification affect AMP?



Load Forecast by Customer Class

The customer group that is predicted to have the largest load increase is **Residential**

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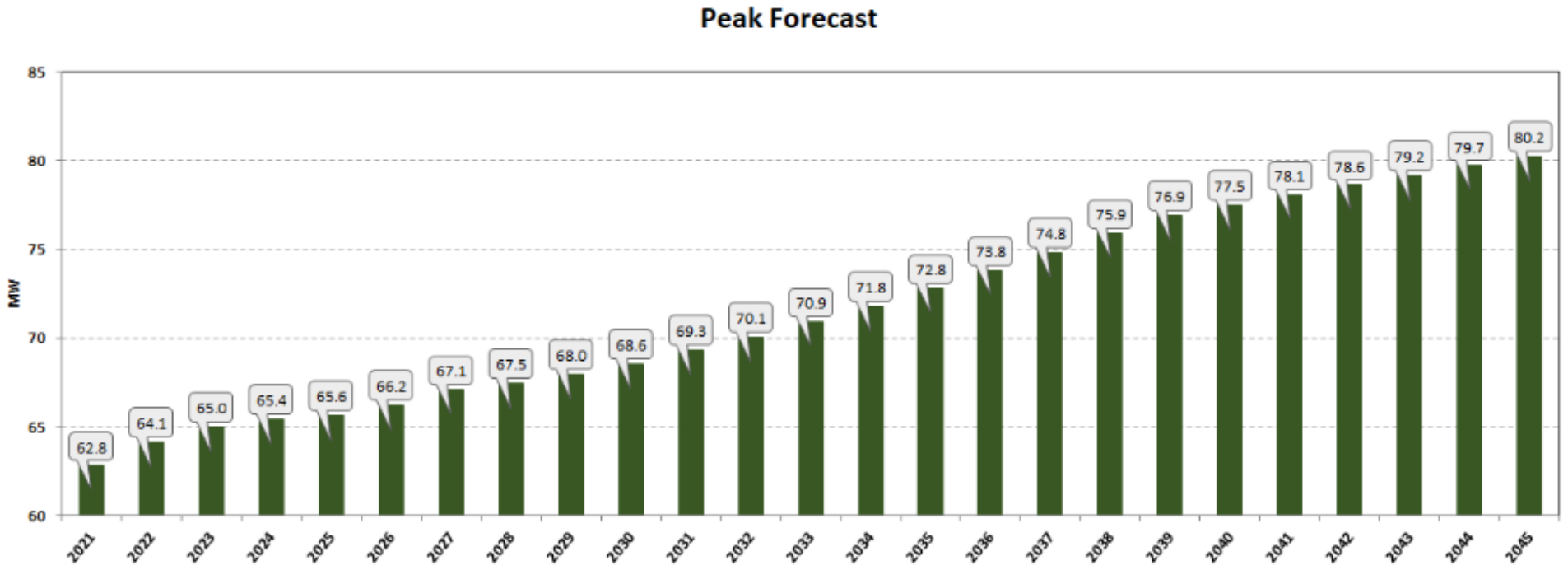
How will Building Electrification affect AMP?

Building Electrification is also expected to contribute to an increase in Alameda's **peak demand** from 62 MW to over 80 MW in 2045



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AMP's Rebates and Incentives

Residential Rebates

Building Electrification Rebates

- Electric Clothes Dryer - $100
- Heat Pump Water Heater - $1,500
- Smart Thermostats- $50
- LED Bulbs - $2
- Electric Panel Upgrade- $2500

AMP Marketplace

User-friendly **online shopping** for energy-efficient electric appliances, equipment, and devices

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Panel Upgrade

- Up to $2500
- Covers permit, installation, labor costs
- Must be electrifying at least one appliance in the home (water heater, dryer, or space heating)
- AND installing an additional electrical appliance
  - EV charger can count as the second appliance

- Must be permitted
- Must work with engineering department
- Must be from 100amps to 200amps

- Application: https://www.alamedamp.com/407/Rebates-and-Incentives

Other Incentives

Bay Area Regional Energy Network (BayREN):

https://www.bayren.org/get-started

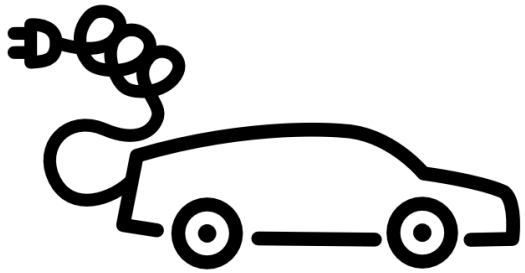
- Home Energy Score Rebate - $200
- Energy Efficiency Rebates before you electrify
  - Attic and wall insulation
  - Duct sealing and insulation
  - Air sealing
- Free Consultation With a Home Energy Advisor
  - Call **(866) 878 - 6008**
- BayREN Contractor Database
  - Submit rebate applications for you!
  - includes Tech Clean California Partner Contractors

All about the EVs

- Level 2 EV Charger: $800
  - Permit, installation, cost of the charger
- Used EV: $2000 and $3000 for income qualified
  - Rebate for Used EV's up to $22,000
- State and Federal Incentives: https://www.alamedamp.com/349/Electric-Vehicles

- Interested in learning more about EVs?

  -Upcoming webinar April 19th about EV and EV charging



Abbe-Patterson Project

Electrification of Existing Single-Family Home Built in 1903

Existing home had:

3 bedrooms/2 bath
1,550 square feet

Solar panels
Electric stove/oven
Electric car charger

Gas furnace circa 1950s
Gas dryer
Gas water heater

New Project – ADU + All Electric Conversion

500 square foot accessory dwelling unit

- Induction stove/oven

Chiltrix – Air to Water Heat Pump

- Electric furnace & water heater

Electric dryer

Unfinished Basement

New ADU

Old Furnace + Water Heater

New Furnace + Water Heater

New Dryer


SENSOR DRY
Normal
Delicates
Heavy Duty
Perm. Press
Bedding
MANUAL DRY
Speed Dry
Towels
Air Dry

New Panel, Induction Stove

Project Contractors

Norman Sanchez Architect
Monterey Energy Group
Sunrise Construction
TEC Electric
AT Weber Plumbing

Thank you! Questions?

Workshop Series

- Electrification 101
  - April 6 @ Main Library
- Roadmap Brainstorm
  - March 28: For Renter
  - March 30: For Property Owners & Management
  - April 4: For Single Family Home Owners
- Draft Roadmap + Ordinance
  - April 27: Draft Roadmap + Ordinance Review
  - May 4: Draft Roadmap + Ordinance Review @ Main Library
  - April 5-15: Interactive brainstorming poster board @ Library

Next Steps

- Visit www.alamedaca.gov/BuildingElectrification
- Take our survey!
- Attend more workshops and give your input to the roadmap