CITY OF MENLO PARK

REGULAR MEETING MINUTES

Date: 3/17/2021
Time: 6:00 p.m.
Regular Meeting Location: Zoom.us/join – ID# 915 4675 0502

A. Call To Order

Chair Price called the meeting to order at 6:00 p.m.

B. Roll Call

Present: Elkins, Gaillard, Kabat, Martin, Price (Chair), Payne
Absent: London (Vice Chair)
Staff: Rebecca Lucky- Sustainability Manager

C. Public Comment

- Scott Marshall spoke in support of the Environmental Quality Commission including the tree removals from San Francisquito Creek upstream of Highway 101/Pope-Chaucer Bridge project in their work plan.
- Steve Van Pelt shared experience with problematic heritage trees that cause property damage, and advocated for receiving better education upfront about how to manage before they cause damage.

D. Regular Business

D1. Approve January 20 2021 and February 25 2021 minutes

Chair Price introduced item.

ACTION: Motion and second (Martin/ Price) to approve January 20 2021 and February 25 2021 minutes with minor corrections to additional text and pending any revisions to work plan review by commissioners, passed 6-0-1 (London absent).

D2. Informational presentation by Commissioner Gaillard and Kabat on the affordability of building electrification (Attachment)

Chair Price introduced item. Commissioners Kabat and Gaillard provided presentation.

E. Reports and Announcements

E1. Reports and Announcements from staff and commissioners

Commissioner Martin requested that a future agenda include review of the tree removals proposed for the San Francisquito Creek upstream of Highway 101/Pope-Chaucer Bridge project.

Commissioner Gaillard provided updates on state legislation regarding phasing out gas powered leaf

blowers.

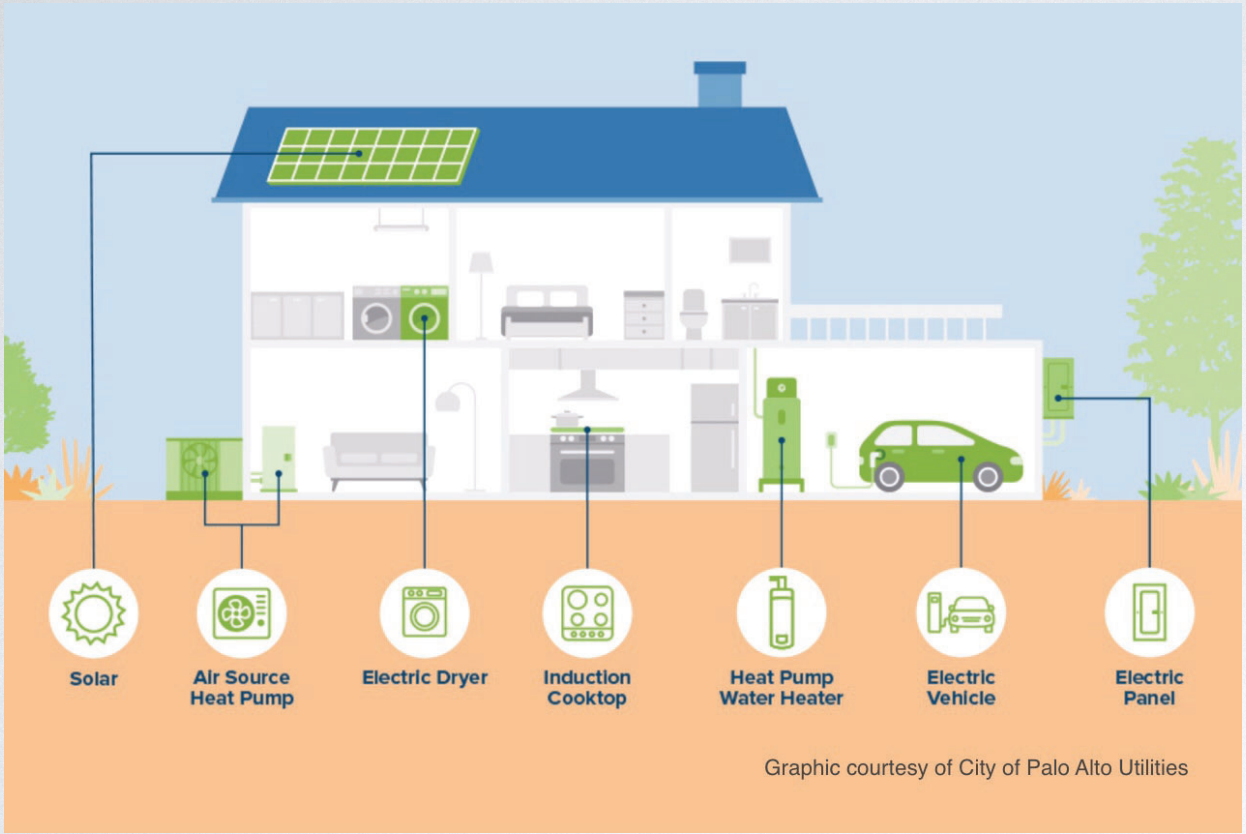
Sustainability Manager provided updates on recent City Council staff reports and decisions regarding the 2030 climate action plan.

F. Adjournment

Chair Price adjourned the meeting at 8:19 p.m.

Rebecca Lucky, Sustainability Manager

These minutes were approved on April 21, 2021 by the Commission

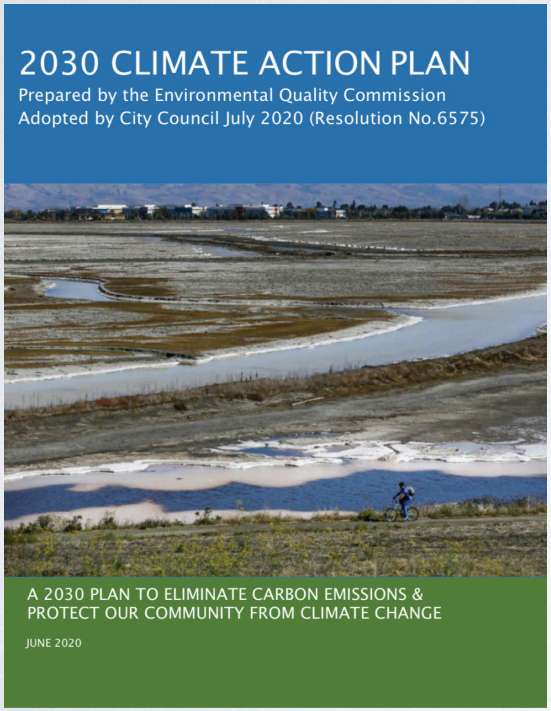


Affordability of Building Electrification

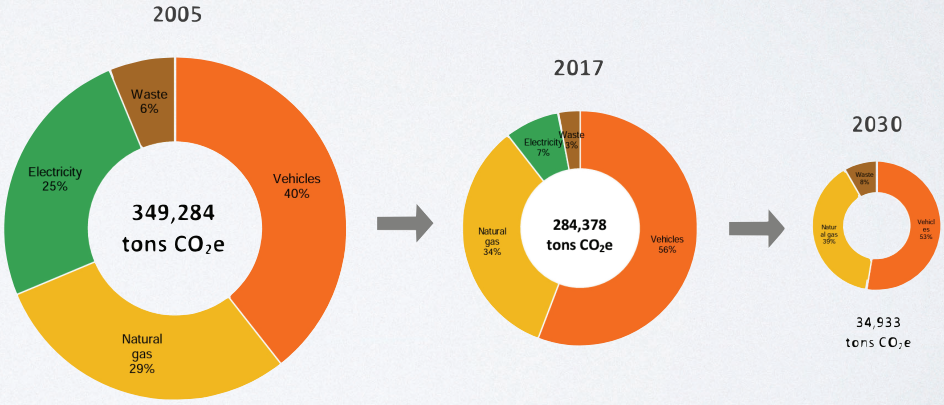
March 17, 2021

Environmental Quality Commissioners Josie Gaillard and Tom Kabat

CLIMATE ACTION PLAN



- Adopted by Menlo Park City Council in July 2020
- Sets a goal of 90% reduction in GHG by 2030 and elimination of the remaining 10% through direct carbon removal



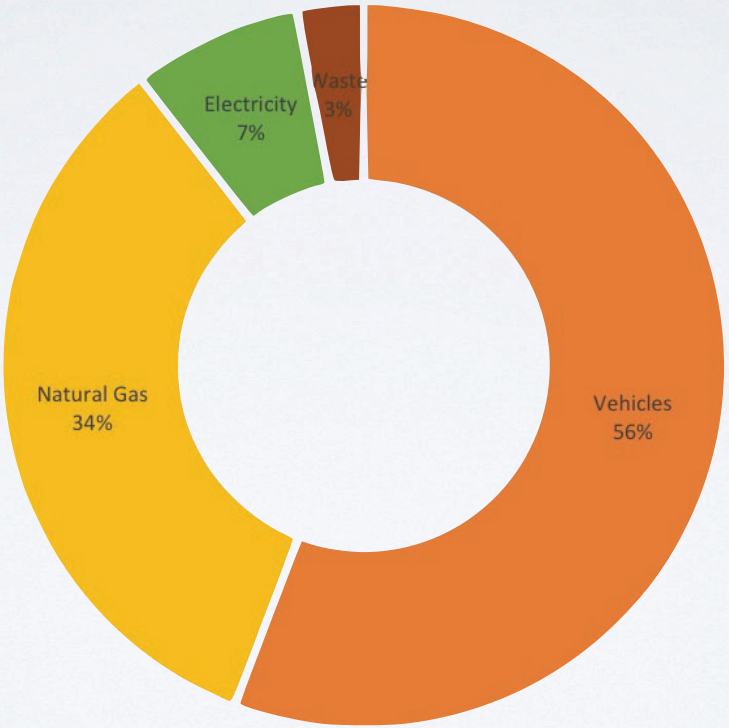
MENLO PARK CAP 2020-21

#	Action	2030 GHG Reduction (tons/yr)
1	Explore policy/program options to convert 95% of existing buildings to all-electric by 2030	1) 86,465 OR 2) 51,636
2	Set citywide goals for increasing EVs and decreasing gasoline sales	7,120
3	Expand access to EV charging	7,370
4	Reduce vehicle miles traveled (VMT) by 25% or an amount recommended by the Complete Streets Commission	31,743
5	Eliminate the use of fossil fuels from municipal operations	879
6	Develop a climate adaptation plan to protect the community from sea level rise and flooding	0
		98,748

GHG EMISSIONS PROFILE

for Menlo Park

Building electrification eliminates these emissions



Building electrification assists in eliminating these emissions

Source: City of Menlo Park December 2019 Staff CAP report

ELEMENTS OF ELECTRIFICATION POLICY

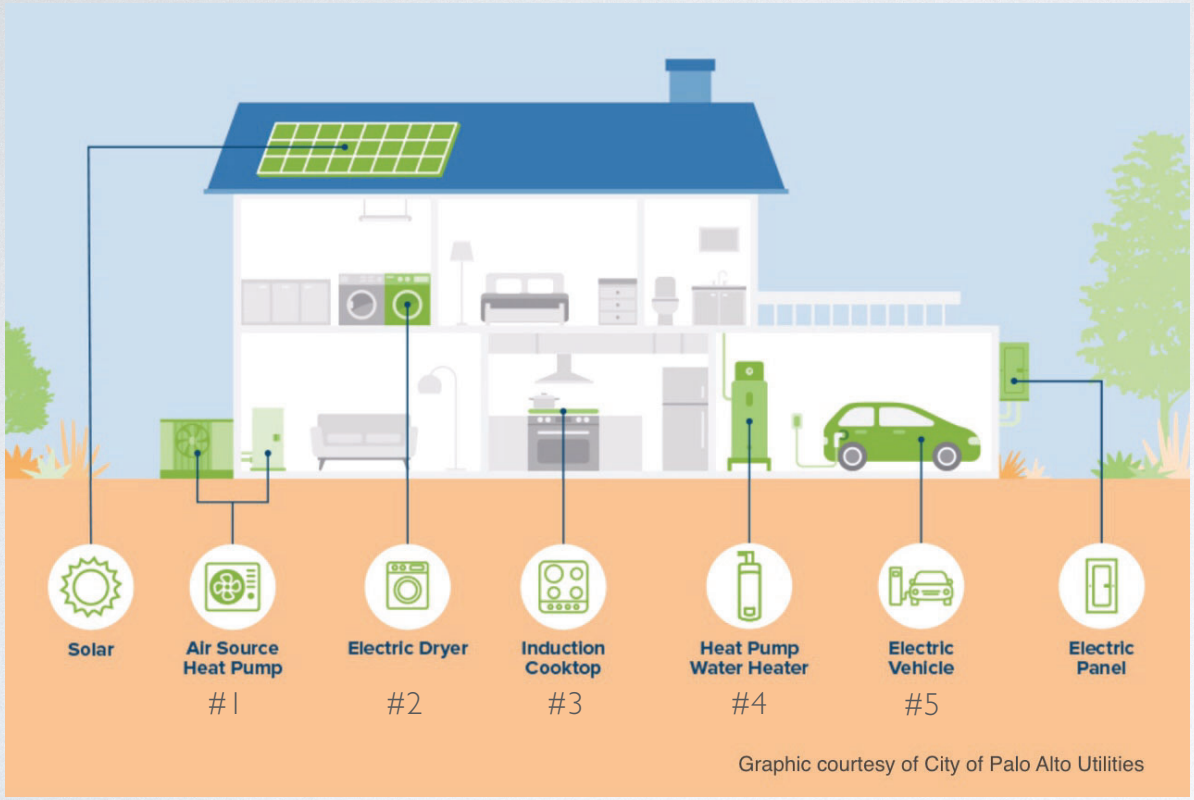
- Legal
- Technical
- Market development
- Enforceability
- **Affordability**

AFFORDABILITY OF ELECTRIFICATION

Basic questions:

1. What does it cost to fully electrify an existing single-family home in San Mateo County?
2. Can we make the transition costs affordable enough to pass city ordinances?
3. What levers do policy makers and utilities have to achieve affordability?
4. What pieces of the puzzle need to be put in place?
5. What partnerships are needed?
6. What can we learn from development of rooftop solar installation or other industries?

WHAT IS BUILDING ELECTRIFICATION?



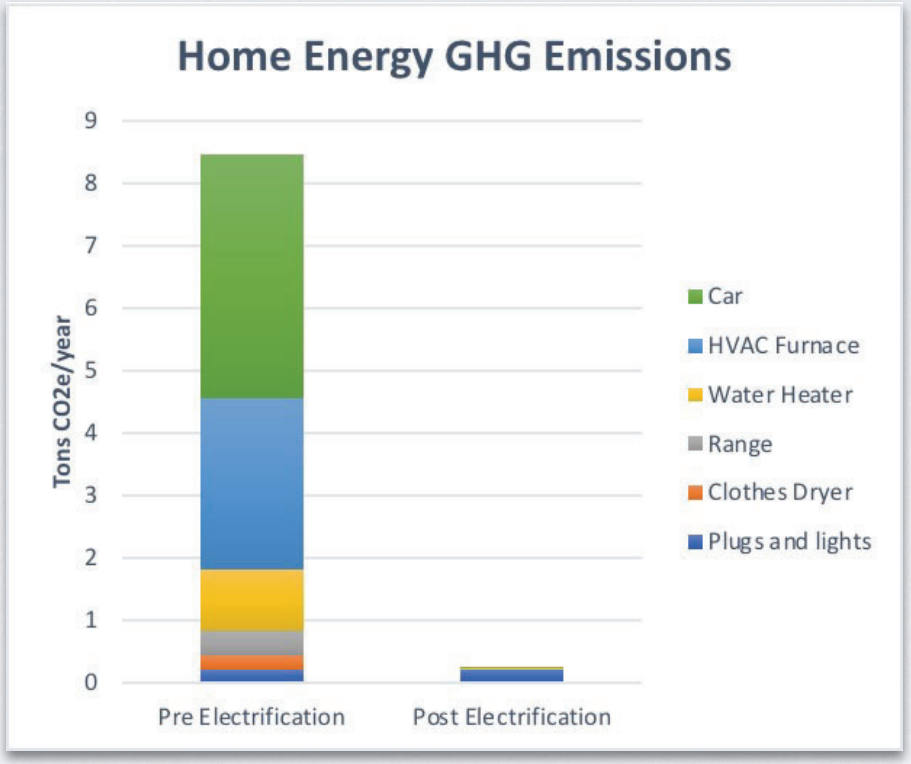
Replacing all fossil fuel appliances in the building:

#1 gas furnace
#2 gas dryer
#3 gas range
#4 gas water heater
#5 gasoline for car

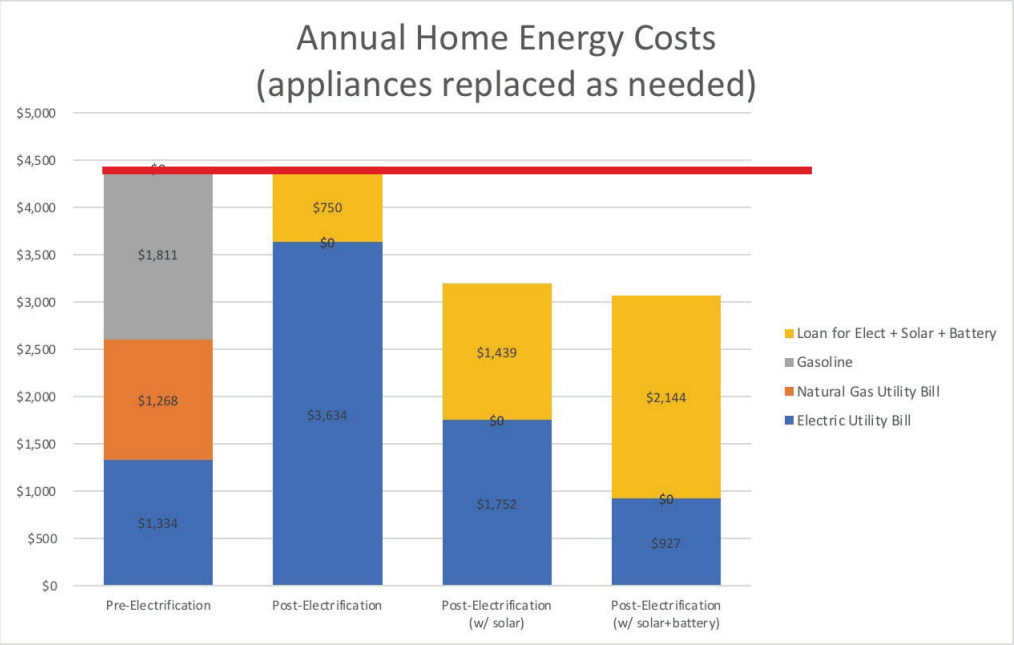
...with high efficiency electric alternatives

- Rooftop solar (at $0.05–0.10 per kWh) makes all-electric home conversions affordable
- Battery backup systems make all-electric homes reliable during grid outages

ELECTRIFICATION NEARLY ELIMINATES BUILDING GHG EMISSIONS



WHAT DOES IT COST TO ELECTRIFY?



Annual Home Energy Costs	Pre-Electrification	Post-Electrification	Post-Electrification (w/ solar)	Post-Electrification (w/ solar +battery)
Electric Utility Bill	$1,334	$3,634	$1,752	$927
Natural Gas Utility Bill	$1,268	$0	$0	$0
Gasoline	$1,811	$0	$0	$0
Loan for Elect + Solar + Battery	$0	$750	$1,439	$2,144
Total	**$4,414**	**$4,384**	**$3,191**	**$3,071**

SCENARIO BUILDING ASSUMPTIONS

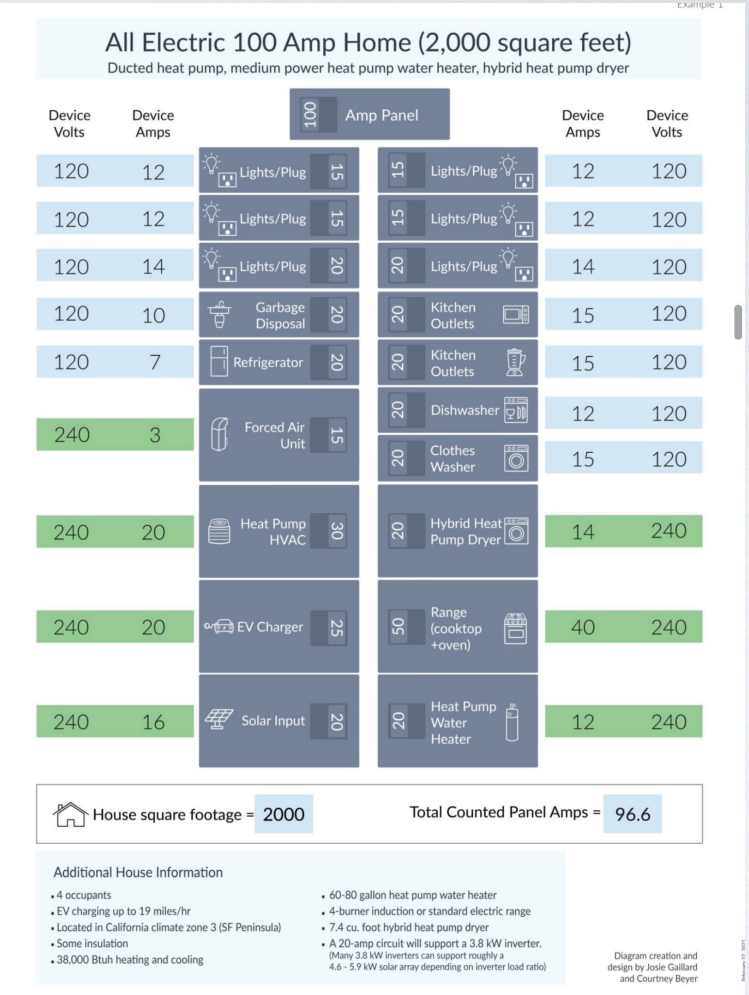
- Typical single family home in Menlo Park, California
- Built mid-century with some energy efficiency upgrades (attic insulation and duct insulation) but no major remodel
- 1,500 sq feet
- 100 amp electrical service
- Home owner has good credit

SCENARIO APPLIANCE ASSUMPTIONS

	Starting State	End State	Conversion Yr
Water heating	gas water heater	heat pump water heater	3
Space heating	gas furnace	heat pump HVAC	5
Clothes drying	gas dryer	hybrid heat pump dryer	7
Cooking	gas range	induction range	8
Vehicle fuel	gasoline	electricity (via home EV charger)	1
Solar	0 kW	5.8 kW	1
Stationary battery	0 kWh	13.5 kWh	3
Electric service	100 amps	100 amps	n/a

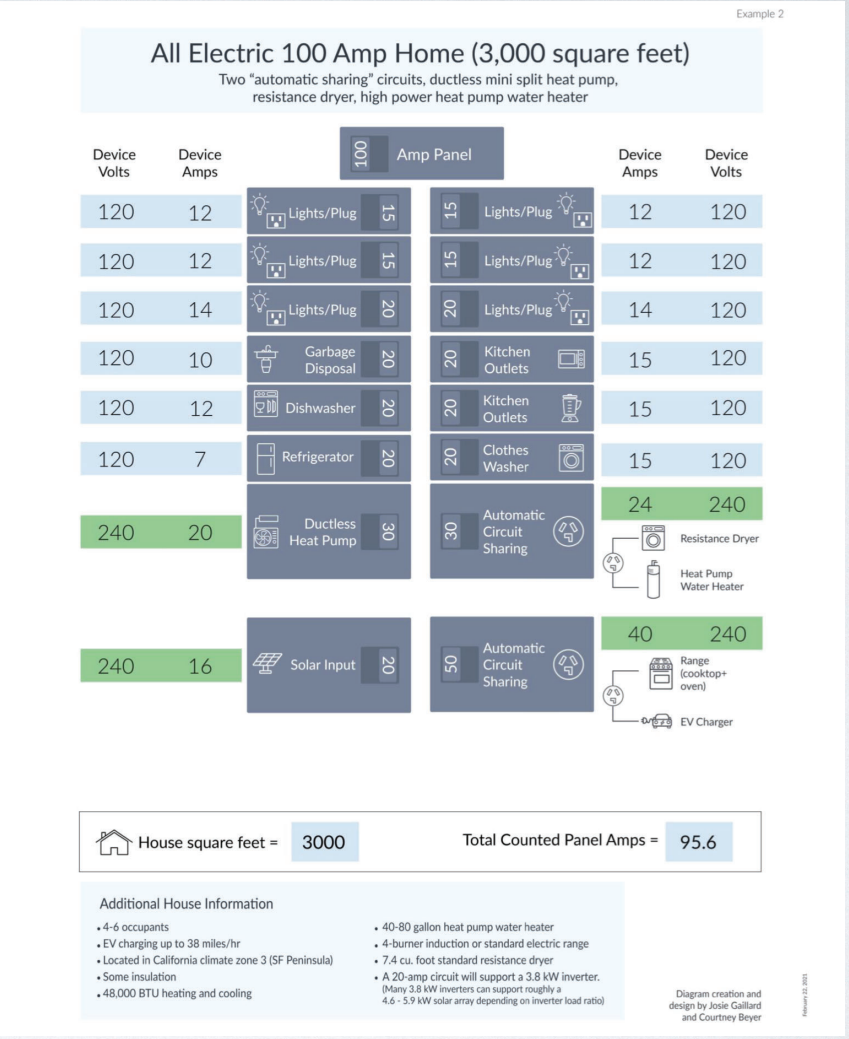
"AMP DIET" for **2,000** sq ft home

- For homes with 100 amp electrical panels
- Helps avoid ~$3,000 electric panel upgrade
- Favors efficient devices w/ low rated amps
- Provides roadmap for building owner
- Helps guide tradespeople



"AMP DIET" for **3,000** sq ft home

- For homes with 100 amp electrical panels
- Uses "circuit sharing" devices like plug-in smart splitter *Neocharge* or hard-wired version *SimpleSwitch*
- Still easy to avoid ~$3,000 electric panel upgrade



A HOW TO GUIDE FOR ELECTRIFICATION

- Just released by Redwood Energy and Menlo Spark
- Electrification solutions for existing buildings
- Product lists
- Case studies from across the country
- Amp diet info
- Cost examples

- https://redwoodenergy.net/wp-content/uploads/2021/02/Pocket-Guide-to-All-Electric-Retrofits-of-Single-Family-Homes.pdf

APPLIANCE INSTALLATION COST ASSUMPTIONS

	Capital Costs - Electrification												
	Electric Equipment Installation								Equivalent Gas Equipment Installation				
New Electrific Equipment	**Included in Project?**	**Equip Cost**	**Labor Cost**	**Wiring Cost**	**Permit Cost (Fee + Labor)**	**Installed Cost Before Incentives**	**Incentives**	**Total Cost Electric**	**Equip Cost**	**Labor Cost**	**Permit Cost**	**Total Cost Gas**	**Premium: Electric v. Gas**
Electric service upgrade	no	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
New electric subpanel	no	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Heat pump water heater	yes	$1,300	$1,200	$400	$500	$3,400	($2,500)	$900	$600	$400	$400	$1,400	($500)
Heat pump HVAC	yes	$5,000	$4,000	$550	$1,000	$10,550	$0	$10,550	$3,000	$2,000	$500	$5,500	$5,050
Hybrid Dryer	yes	$1,500	$0	$300	$0	$1,800	$0	$1,800	$700	$100	$0	$800	$1,000
Induction Range	yes	$3,000	$0	$600	$0	$3,600	$0	$3,600	$1,200	$100	$0	$1,300	$2,300
EV charger	yes	$500	$0	$600	$400	$1,500	$0	$1,500	$0	$0	$0	$0	~~$1,500~~
TOTAL		**$11,300**	**$5,200**	**$2,450**	**$1,900**	**$20,850**	**($2,500)**	**$18,350**	**$5,500**	**$2,600**	**$900**	**$9,000**	**$9,350**

ROOFTOP SOLAR ECONOMICS

Solar System Size	5.8	kW
Solar System Price*	$2.00	per watt
Total Price of Solar System	$11,600	
Federal Tax Credit - 26%	$3,016	
Solar System Cost After Tax Credit	**$8,584**	
Average Full Sun Equiv	1,600	hours per
Average Daily Insolation	4.38	hours per day
Daily Solar Array Output	25	kWh per day
Annual Solar Array Output	9,280	kWh per year
Solar System Life	25	years
Derating Factor due to Aging	20%	
Derating Factor from Size Clipping	7%	
Derated Annual Solar Array Output	**6,922**	kWh per year
Solar Electricity Cost (ex. loan)	**$0.05**	per kWh
Annual Loan Payment on System**	**$689**	
Solar Electricity Cost (inc. loan)	**$0.10**	per kWh
Avoided PG&E Electricity Cost	**$1,661**	
Annual Savings from Solar	**$973**	

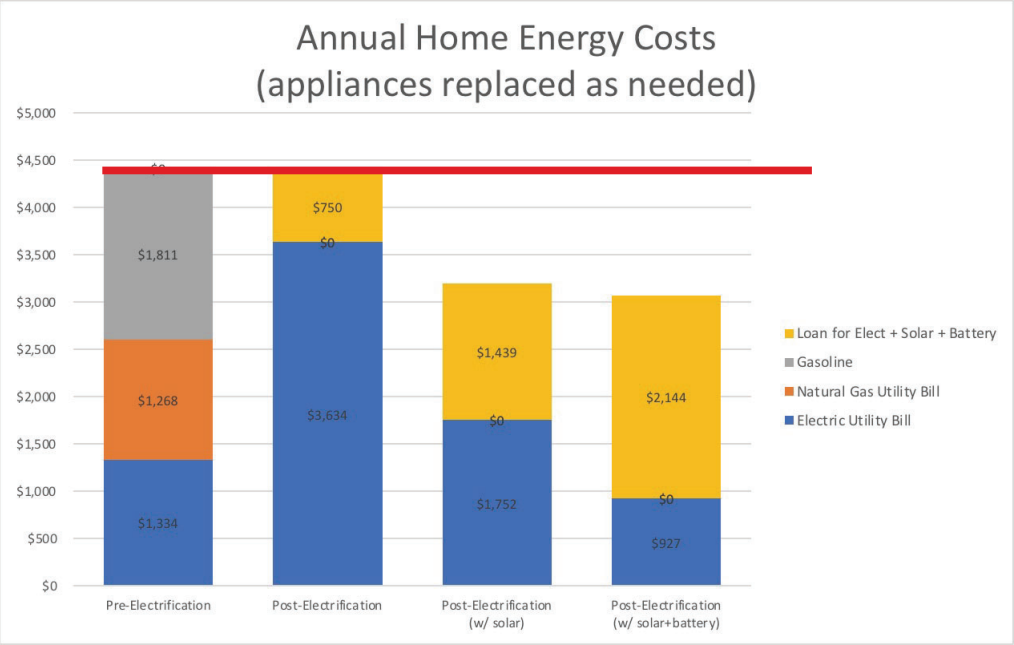
* Note: $2.00 per watt installed price taken from Tesla's website

** Assumes 5% interest rate and 20 yr term

FINANCE AND OTHER KEY ASSUMPTIONS

- Loan term: 20 years
- Loan interest rate: 5% fixed
- Electrification costs reflect actual prices/ quotes
- Rooftop solar installation cost = $2.00/watt
- Stationary battery installation cost = $880/ kWh
- Battery capacity reserved for outages = 35%
- Federal tax credit = 26%
- CCE subsidy = $2,500 for HP water heater
- End state electric rate: PG&E EV2-A
- Natural gas rates increase by 84% (average) over 20-year term of loan
- 12,000 vehicle miles per year
- 120 degree F target temp for water heater
- 5 laundry loads per week
- 14.5 range "burner hours" per week

WHAT DOES IT COST TO ELECTRIFY?



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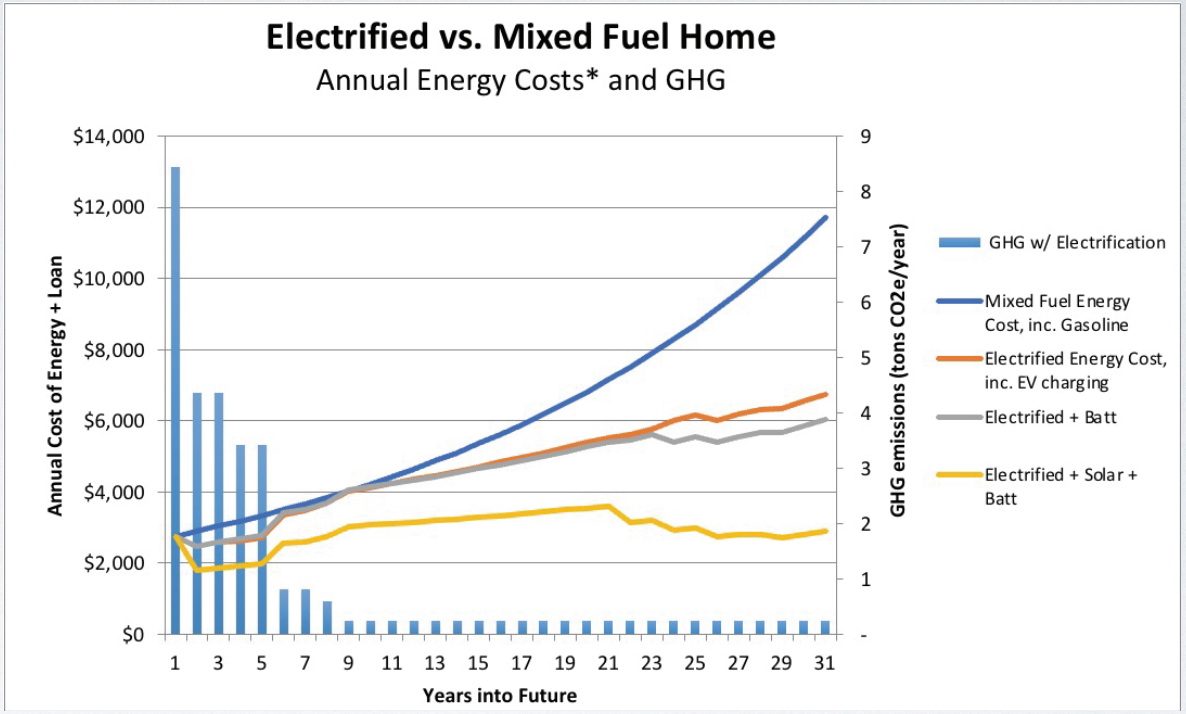
Total	**$4,414**	**$4,384**	**$3,191**	**$3,071**

HOME BUDGET IMPACT OF NOT ELECTRIFYING

Key Variables		
Interest rate	5.0%	
Loan term	20	yrs
Natural gas rate multiplier from inputs b	1.84	
Starting Electric Rate	E-1	
Starting Electricity Rate (Average)	$0.24	per kWh
New Electric Rate	EV2-A	
Include solar?	yes	
Solar system size	5.8	kW
Solar system price	$2.00	per Watt
Include battery?	yes	
Battery system size	13.5	kWh
Battery system price	$880	per kWh
Battery capacity in reserve for outage	35%	
Upgrade to main panel req'd?	no	
Permit streamlining for electrifcation?	no	
Permit cost reduction for electrification	80%	
Federal tax credit applicable?	yes	
Federal tax credit rate	26%	
Incentive for main panel upgrade	$0	
Incentive for subpanel upgrade	$0	
Incentive for HP water heater	$2,500	
Incentive for HP HVAC	$0	
Incentive for HP dryer	$0	
Incentive for electric cooking range	$0	
Incentive for EV charger	$0	



* Annual energy costs for Electrified Home include utility electricity payments + loan payment on incremental capital investments for electrification. Escalation rate assumptions for electricty and natural gas rates in PG&E territory and gasoline prices are all taken from the California Public Utilties Commission Report entitled "Utility Costs and Affordability of the Grid of the Future: an Evaluation of Electric Costs, Rates and Equity Issues, Pursuant to P.U. Code Section 913.1", February 2021, p. 73.

ELECTRIFYING VS. BAU W/O SUBSIDIES

Key Variables		
Interest rate	5.0%	
Loan term	20	yrs
Natural gas rate multiplier from inputs b	1.84	
Starting Electric Rate	E-1	
Starting Electricity Rate (Average)	$0.24	per kWh
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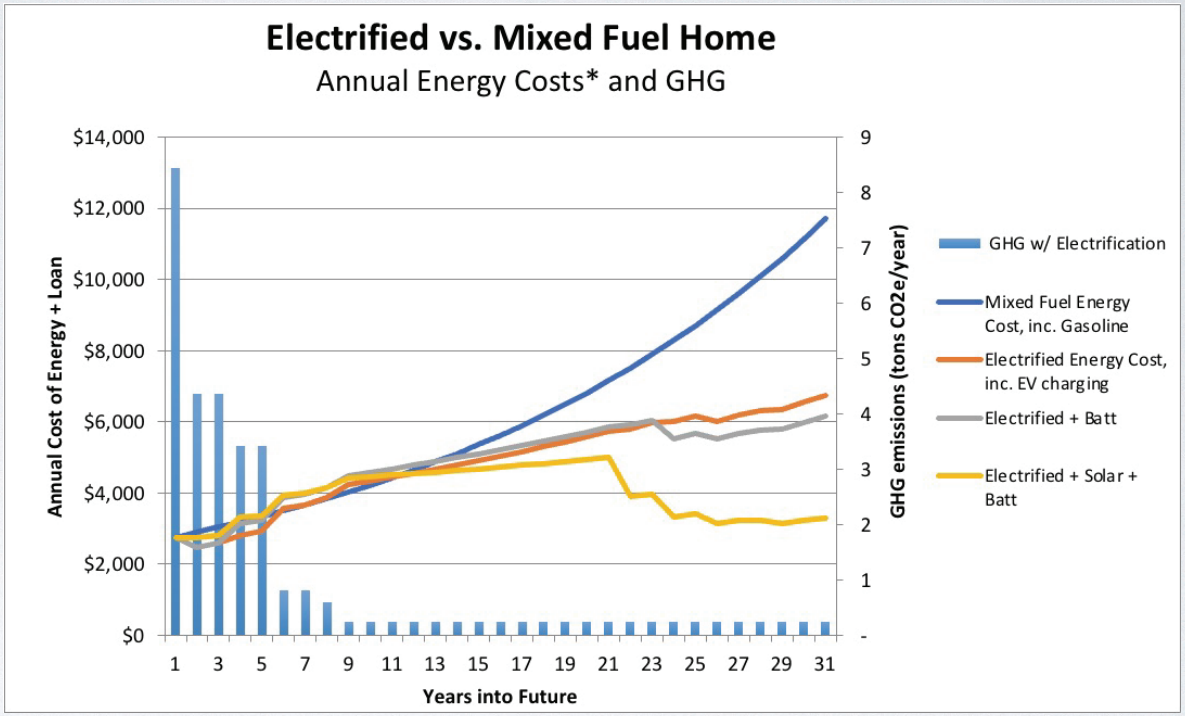
Incentive for HP HVAC	$0	
Incentive for HP dryer	$0	
Incentive for electric cooking range	$0	
Incentive for EV charger	$0	



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KEY FINDINGS

- **Electrification is <u>cost neutral from day one</u> to the end customer if:**
  - Financed
  - Paired with roof-top solar
  - Installation costs are competitive
  - Amount financed is "premium" for electrification over gas appliances
- Panel saving "amp diet" concept is key to avoiding $3,000+ electrical service upgrade
- Capital costs for electric appliances are currently higher than equivalent gas appliances
- Solar is so inexpensive that it floats the economics of electrification
- Adding a battery pays for itself due to "duck-head" savings on PG&E's EV2-A rate

WHAT CAN WE LEARN FROM ROOFTOP SOLAR?

- Installation costs will come down with volume
- Installer training is key to quality and cost
- Streamlining permits is key to reducing costs
- Stepping down subsidies by volume (vs. time) creates prompt demand, injects urgency and imposes discipline on installer market
- Financing will move electrification from something only wealthy people can afford to something most people can afford

KEY LEVERS FOR POLICY MAKERS AND UTILITIES

#		Who
1	Low interest financing	private sector, PCE, County?
2	On-bill financing	PG&E, PCE
3	Extra support for low-income households	?
4	Equipment rebates	PCE
5	Installer training	PCE, County
6	Public education	PCE, County, Cities
7	Permit streamlining	Cities, County, State
8	Favorable electricity rates	PCE, PG&E, CPUC
9	City ordinances	Cities

WHAT ELSE DO WE NEED?

- Low-interest financing solutions
- Financing solutions for customers with poor credit
- On-bill utility financing
- Education on using "amp diets" to avoid panel upgrades
- Permit streamlining and fee reduction
- More developed and competitive installer market

MYTHS

- Heat pumps don't work well in the cold
- My house will be cold if I electrify
- Everyone will need an expensive electrical panel upgrade to electrify
- Electrifying is only affordable for the wealthy
- Electrifying puts me at increased risk during power outages

POTENTIAL POLICY PUSHBACK

Issue	Addressed with...
Cost too high	On-bill financing, avoiding panel upgrades, rooftop solar, permit simplification, utility subsidies
Resiliency risk	On-site battery back-up system
Why us? We are a drop in the bucket	Even small cities can provide leadership for catalyzing change, e.g. Reach Codes
Too much effort - don't want to change	Utility-offered conscierge service, public education, installer market education and development

Research and Modeling:

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APPENDIX

LOAD ANALYSIS