

# Update on Residential Case Studies Webinar and Real Estate Professionals Listening Session

February 15, 2023

Resource Management and Climate  
Protection Committee



# COSTS TO DECARBONIZE SINGLE-FAMILY HOMES



26 January 2023

9:00-11:00AM Presentation

11:00-11:30AM Q&A

[REGISTER HERE](#)

Join us in discussion with consultants Josie Gaillard and Tom Kabat who developed case studies for decarbonizing 10 homes in San Mateo County. They will present customized strategies, contractor quotes, and cost results for the individual homes, plus share insights about how to decarbonize existing homes at scale.

## HOMEOWNER ECONOMICS

See upfront costs (incorporating the latest incentives) plus projected savings over time.

## DECARBONIZATION PLANS

Learn about the benefits for homeowners and contractors of developing a detailed strategy.

## WORKING WITH CONTRACTORS

Hear about some misperceptions that impact electrification projects, plus suggestions for overcoming them.

## POTENTIAL SOLUTIONS

Hear ideas for beneficial policies and programs to reduce barriers to home decarbonization.

## FEEDBACK

Share your thoughts about how we can move forward from here.



## THE PRESENTERS

### Josie Gaillard

Josie's decarbonization journey started in the solar industry. She serves on Menlo Park's Environmental Quality Commission and has a special interest in rapid electrification.



### Tom Kabat

Since retiring from 30 years as an energy engineer for the City of Palo Alto, Tom has been applying his analytical skills as a board member and consultant for multiple environmental organizations.



Marketed to:  
Electrification industry professionals statewide, city staff across the Bay Area, case study participants, posted on LinkedIn

Registered: ~187

Attended: ~100



OFFICE OF  
SUSTAINABILITY  
COUNTY OF SAN MATEO

BAYREN

# Agenda

- Study goals and background
- Value of electrification plans
- Working with home contractors
- Homeowner economics
- Policies to support rapid electrification
- Feedback/discussion



Hosted by: Alero Moju  
County of San Mateo  
Office of Sustainability  
Sustainability Specialist

# Themes of questions

- Technical questions
  - Product information
  - Electrical loads for homes in the study
  - How to handle knob and tube wiring
  - How to avoid upsizing the electric panel
  - Costs of load pausing/load sharing smart device instead of upsizing the panel
- Details about electrification plans
  - Are there any contractors that provide this service?
  - How long it takes to do a plan
  - Process: using gas bill data vs. Manual J calculations

# More questions

- Details about the study
  - Did we exclude homes with existing solar?
  - How does NEM 3.0 change the study results
  - Did gas-to-gas replacement costs include replacing or adding air conditioning?
  - How many of these homes have completed homes since the study?
- Information about rebates & incentives
- Information about how costs were calculated
  - What interest rate was used for loan amounts?
  - What energy cost escalation rates were used in projections?
  - Impacts of including an EV in the calculations



# [www.smcsustainability.org/energy/decarbonizing-homes/](http://www.smcsustainability.org/energy/decarbonizing-homes/)



-  2,000 Sq Ft
-  5 Occupants
-  Built in 1965
-  3 Bedrooms
-  2 Baths

[View Cost Plan](#)



-  1,500 Sq Ft
-  2 Occupants
-  Built in 1934
-  3 Bedrooms
-  2 Baths

[View Cost Plan](#)



-  1,010 Sq Ft
-  3 Occupants
-  Built in 1952
-  3 Bedrooms
-  1 Bath

[View Cost Plan](#)



-  2,244 Sq Ft
-  3 Occupants
-  Built in 1979
-  3 Bedrooms
-  3 Baths

[View Cost Plan](#)



-  1,150 Sq Ft
-  2 Occupants
-  Built in 1974
-  3 Bedrooms
-  2 Baths

[View Cost Plan](#)



-  1,950 Sq Ft
-  4 Occupants
-  Built in 1960s
-  4 Bedrooms
-  2 Baths

[View Cost Plan](#)



## PESCADERO 1-STORY HOME

1,150 Square Feet

2 Occupants

Built in 1974

3 Bedrooms

2 Baths

Remote Location

The Homeowners are Interested in  
 Battery  
 Electric Vehicle Charging  
 Induction Range  
 Electric Dryer  
 Heat Pump Water Heater  
 Heating/Cooling  
 Insulation

# COST SUMMARY

## ELECTRIFICATION COSTS

Subtotals of Upgrade by Trade	Replace Existing (gas)	DIY	DIY With Incentives	Low Bid	Low Bid With Incentives	Mid Bid	Mid Bid With Incentives	High Bid	High Bid With Incentives
Electrical	\$980	\$5,550	\$3,201	\$5,550	<b>\$3,201</b>	\$8,849	\$6,500	\$12,738	\$10,389
Plumbing	\$2,701	\$4,000	\$0	\$4,953	<b>\$55</b>	\$7,649	\$2,751	\$8,325	\$3,427
HVAC	\$4,808	\$5,000	\$0	\$11,370	<b>\$1,834</b>	\$14,950	\$5,414	\$15,066	\$5,530
Insulation	\$0	\$4,918	\$1,969	\$7,248	<b>\$3,177</b>	\$7,647	\$3,576	\$12,675	\$8,604
<b>Total</b>	<b>\$8,489</b>	<b>\$19,468</b>	<b>\$5,170</b>	<b>\$29,121</b>	<b>\$8,267</b>	<b>\$39,095</b>	<b>\$18,241</b>	<b>\$48,804</b>	<b>\$27,950</b>

## OPTIONAL SOLAR & BATTERY INVESTMENT\*

Existing Condition	Proposed Electrification	Replace Existing (gas)	DIY	DIY With Incentives	Low Bid	Low Bid With Incentives	Mid Bid	Mid Bid With Incentives	High Bid	High Bid With Incentives
Rooftop solar PV: none	No Change	\$0	\$0	\$0	\$0	<b>\$0</b>	\$0	\$0	\$0	\$0
Home battery: none	Home battery: 10 kWh	\$0	\$12,359	\$8,651	\$12,359	<b>\$8,651</b>	\$18,500	\$12,950	\$19,075	\$13,353
<b>Total</b>		<b>\$0</b>	<b>\$12,359</b>	<b>\$8,651</b>	<b>\$12,359</b>	<b>\$8,651</b>	<b>\$18,500</b>	<b>\$12,950</b>	<b>\$19,075</b>	<b>\$13,353</b>

For more information about incentives, please visit [www.smcsustainability.org/energy-water/decarbonizing-homes/incentives](http://www.smcsustainability.org/energy-water/decarbonizing-homes/incentives)

\*Solar and batteries are not required for home and vehicle electrification. Peninsula Clean Energy already provides carbon-free electricity for its customers. Solar and batteries are an investment opportunity for any home to save on the electric bill and to increase electricity resilience.



# Next steps

- Discuss what the ideal electrification plan includes
  - Process
  - End result
- Consider spin-off pilots
  - “Train the trainer” to teach electrification plans
  - Offer electrification plans as a service
- Follow-up call with interested webinar attendees
  - Where to go from here?
  - Who else should this information be presented to?



# Home Electrification Listening Session For Real Estate Professionals



February 1st, 2023

11:00-11:30 AM Overview of Home Electrification

11:30-12:30 AM Panel Q&A

[REGISTER HERE](#)

In this listening session, an expert panel will share information about the community shift away from natural (methane) gas to all-electric technologies in our buildings and answer questions about policies such as "reach codes," costs, incentives, and supportive programs. This session will be facilitated by the Peninsula Conflict Resolution Center.

## THE PANEL



**Fred Lustenberger**  
County of San Mateo  
Building Inspector  
Manager



**Eric Sweet**  
Emerald Eco  
Founder and CEO



**John Shipman**  
Franklin Energy  
Workforce Education,  
Training & Energy Codes  
Manager



**Kelly Cunningham**  
PG&E  
Codes & Standards  
Program Manager



**Blake Herrschaft**  
Peninsula Clean Energy  
Building Electrification Program Manager



PCRC

PENINSULA CONFLICT RESOLUTION CENTER



PENINSULA  
CLEAN ENERGY

Marketed to:  
SAMCAR membership, real  
estate professionals

Registered: ~40

Attended: ~20

# Goal

- Share more accurate costs and alleviate concerns
- Build relationships
- Learn from real estate professionals' experience – alternate ways to reach electrification goals

## Potential Cost Range of All-Electric Conversion

*Building Electrification Cost Study Published: August 27, 2021*

STRUCTURAL COSTS	Low End*	High End*
APPLIANCES		
Air/Heating System	\$10,000	\$25,000
Range Cooktop	\$1,500	\$4,000
Water Heater	\$2,000	\$5,000
Clothes Dryer	\$1,000	\$2,000
SERVICES		
Rewiring & New 220 Amp Outlets	\$5,000	\$10,000
Construction Access to Electrical	\$3,000	\$6,000
Abatement of Asbestos & Lead	\$5,000	\$10,000
Replacement Housing During Asbestos Removal & Construction Upgrades	\$5,000	\$10,000
Electric Panel Upgrade from 50-100 to 200 amp	\$4,000	\$6,000
Undergrounding of Lines	\$5,000	\$10,000
To Accommodate 200 Amp Service, Replacement of 2 Inch Pipe with 3 Inch Pipe Under Driveway from House to Street	\$5,000	\$20,000
PG&E Capping-Off Gas Line	\$10,000	\$15,000
<b>SUBTOTAL APPLIANCES &amp; SERVICES</b>	<b>\$56,500</b>	<b>\$123,000</b>
ADDITIONAL FACTORS		
Solar Panels	\$25,000	\$60,000
New Roof	\$20,000	\$40,000
Backup Battery	\$9,000	\$20,000
Swimming Pool/Spa Conversion**	\$8,000	\$10,000
Trigger for fire sprinklers?		
Trigger for sewer lateral?		
*Biggest unknown = cost of labor		
**Discouraged by Pool Company due to significant inefficiency		
<b>TOTAL STRUCTURAL COST</b>	<b>\$118,500</b>	<b>\$253,000</b>

*Sources: Based on a study commissioned by the SAMCAR Government Affairs Committee with estimates from eight (8) electrical contractors in San Mateo County and a pool service company.*

*These appliances, services, and range of costs comprise a "menu" of possible options. Some homes will require only few of the options, others will require most, and some may require all.*

# Agenda

- Objectives
- Basics of Building Decarbonization
- Each panelist answered a question
- Q&A

Facilitated by:



**PCRC**

PENINSULA CONFLICT RESOLUTION CENTER



Hosted by: Alero Moju  
County of San Mateo  
Office of Sustainability  
Sustainability Specialist

# Objectives

## **Listening Session Objectives**

Provide a safe space for Real Estate Professionals to share their thoughts, questions and ideas about the transition from natural gas to all-electric equipment and explore opportunities to collaborate on home electrification.

## **Medium-term Objectives**

Host a series of focus groups addressing topics, ideas or concerns brought up during the Listening Session.

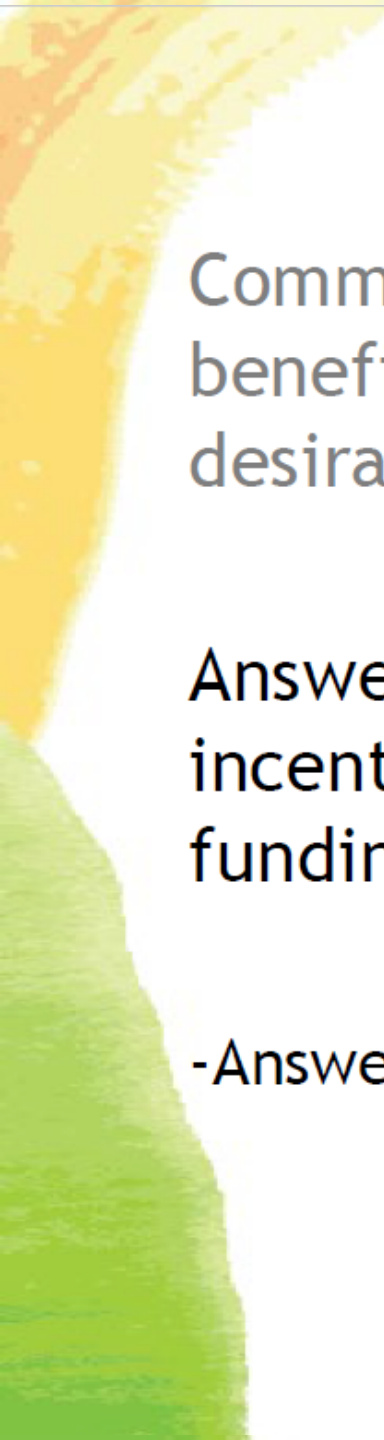
## **Long-term Objectives**

Start a Real Estate Professionals Advisory Group to enable ongoing dialog about home electrification.



# Panelist questions

Panelist	Organization	Question answered
Blake Herrschaft	Peninsula Clean Energy Building Electrification Manager	Can you give us a snapshot of what home electrification looks like today? How do you see this changing in the next 5 years?
Eric Sweet	emeraldEco, Founder and CEO	What does electrification demand look like from homeowners in the Peninsula?
Fred Lustenberger	County of San Mateo Building Official	What concerns you about home electrification?
John Shipman	Franklin Energy Workforce Education, Training, and Energy Codes Manager	What are some benefits of home electrification and why is it important to collaborate with Real Estate Professionals?
Kelly Cunningham	PG&E Codes & Standards Program Manager	How does the regional and state regulatory space support building electrification?



Comment: Promoting electrical connectivity with tax and discount benefits instead of demanding electrical connectivity would be most desirable.

Answer: That looks very possible as we will start to see more robust incentives and tax credits generated by the inflation reduction act funding coming down the road.

-Answer by John Shipman

Question: The San Mateo County Assoc of Realtors Government Affairs Committee put together a potential cost range of all electric we conversation in August 2021 with estimates from 8 electrical contractors in San Mateo County as well as a pool service company. Cost range was \$134,500 on the low end to \$293,000 on the High End. This can a big financial burden. How do you plan to address this?

Answer: Hi, thanks for the question! It is an important one. I spent much of 2023 researching cost data on thousands of electrification projects and have looked at dozens of quotes. Based on our research, it is roughly cost-neutral for many homes to go all-electric. To give specific numbers - maintaining gas equipment costs about \$10,000 every 15-20 years for a typical home without air conditioning. For homes with air conditioning, that number is \$20,000. Electrifying the same home is about \$20,000 after considering \$10,000 in available incentives & rebates. If cost is of concern, newer rebates make 2023 is a great year to electrify.

-Answer by Blake Herrschaft

Question: What will happen to tenants when landlords replace gas water heaters and furnaces with electric, leaving the tenant to absorb PG&E bills that double and triple? That is a very real concern especially since heat pumps require ground space.

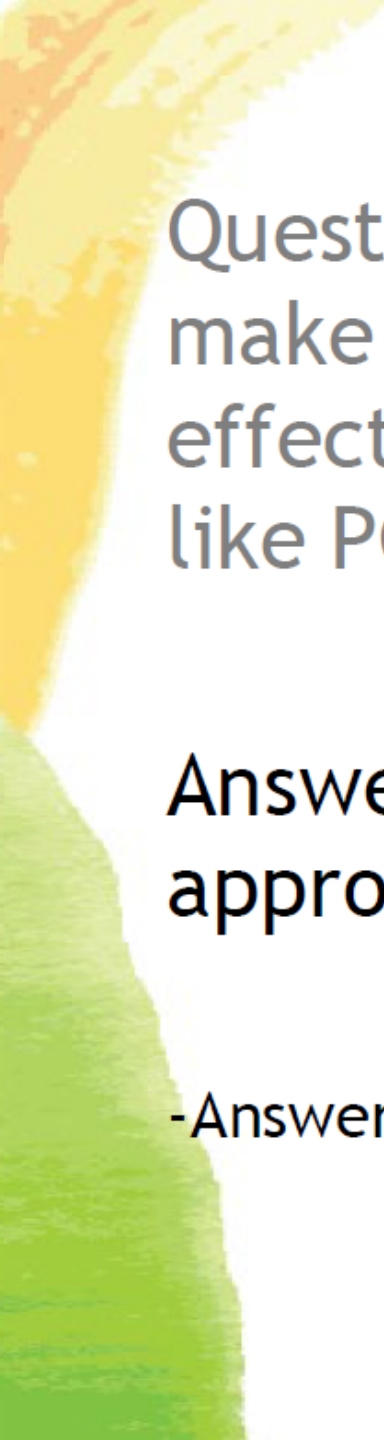
Answer: Renters are always at the top of my mind. The heat pump space and water heaters we are discussing cost about the same to operate as gas, sometimes they result in savings.

We recently reviewed energy cost impacts of lower income households which were electrified through our Home Upgrade program. In 3 out of 4 cases, energy costs went down. In the other case, the costs went up a couple of dollars per month. We are not recommending old-school electric equipment, which can sometimes be expensive to operate.

To the ground space question - while many heat pumps are “split systems” and require outdoor space for the condensing unit, many others are “packaged” and do not require ground space. Heat pump water heaters do not typically require ground space, but some households result in a complicated install. Sorry to get overly technical here.

- Answer by Blake Herrschaft





Question: What about a tiered response to reach codes/ To make sure the grid is there before the requirements take effect? Have benchmarks that the power utility companies like PG&E must meet before the requirements take effect.

Answer: We like this framing and will plan to take a tiered approach per your recommendation!

-Answer by Blake Herrschaft

Question: Can you clarify rebates income qualifications? Timeline for Inflation Reduction Act rebates availability? There are concerns that this is not available for middle class homeowners?

Answer: From what I have seen the Inflation Reduction Act rollout will come in sections. There appears to be a middle-income related opportunity and Income Qualified individuals will likely get additional incentive amounts, but it looks like folks from all socio-economic areas will benefit.

-Answer by John Shipman

Comment: To Blake's comments... Some cities can require the sewer lateral to be replaced if you do remodel. That is why it is in there.

Answer: Thank you. I will make sure to specifically follow up that requirement with our local permitting agencies and dig deeper into how that relates to appliance replacements and electrification. Really appreciate this insight!

- Answer by Blake Herrschaft



# Response and next steps

“Thank you. It's important to have this info. I strongly believe in the goal. We want to make sure if there's a regulation, it's something our clients can comply with in a reasonable fashion.”

Next step: Invite individuals to participate in follow-up focus group