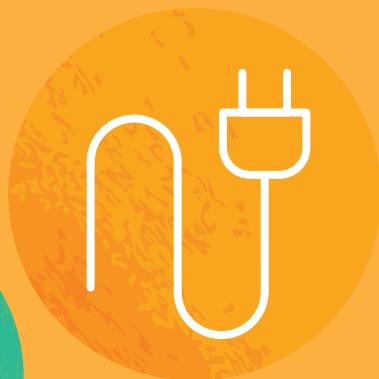
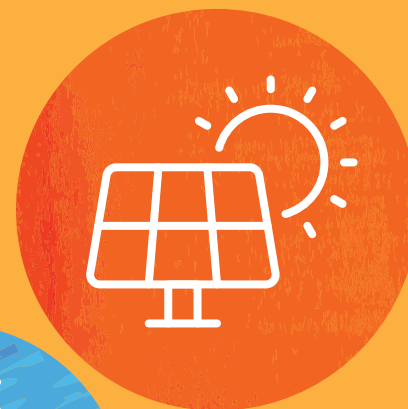


SINGLE-FAMILY HOME DECARBONIZATION CASE STUDY

# EAST PALO ALTO 1-STORY HOME



OFFICE OF  
SUSTAINABILITY  
COUNTY OF SAN MATEO

FUNDED BY



Updated 3/1/2023

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# HOME ASSESSMENT





## EAST PALO ALTO 1-STORY HOME

 **1,010 Square Feet**


 **3 Occupants**

 **Built in 1952**

 **3 Bedrooms**

 **1 Baths**

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



**All recommendations are made to eliminate carbon emissions, increase energy efficiency, and optimize the electric panel.**

Panel optimization calls for fitting all the new electric appliances on the panel without having to upgrade the panel and adequately using unused panel space. This is done by careful selection of appliances based on amps and efficiency.



## INITIAL HOME ASSESSMENT/INTAKE

Roof has great sun exposure

No wall insulation

Qualifies for CARE

Built up tar and gravel roof

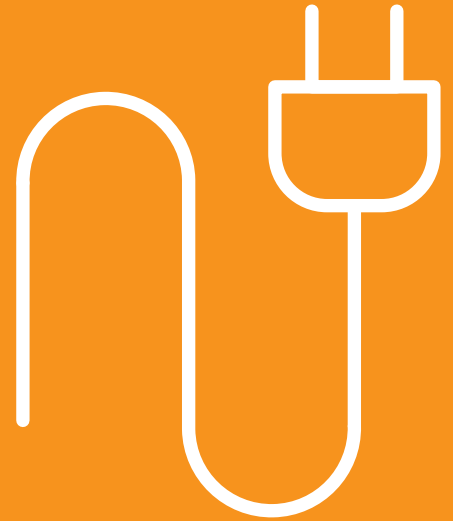








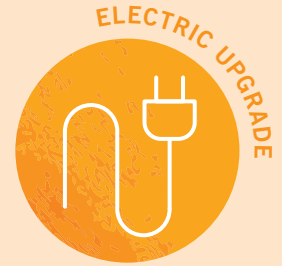
# ELECTRICAL UPGRADES



# MAIN ELECTRICAL PANEL



Existing  
100-amp main  
electrical panel



RECOMMENDED

**No Change**



**Lowest Bid**

Cost without incentives.....\$0

Cost with incentives .....\$0

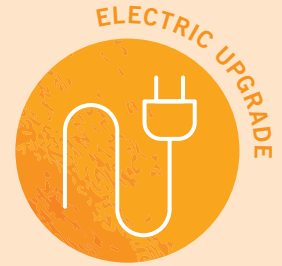
# GARAGE SUBPANEL



Recommended



Existing  
60-amp subpanel



RECOMMENDED

## 100-amp Subpanel

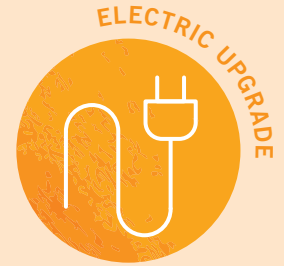
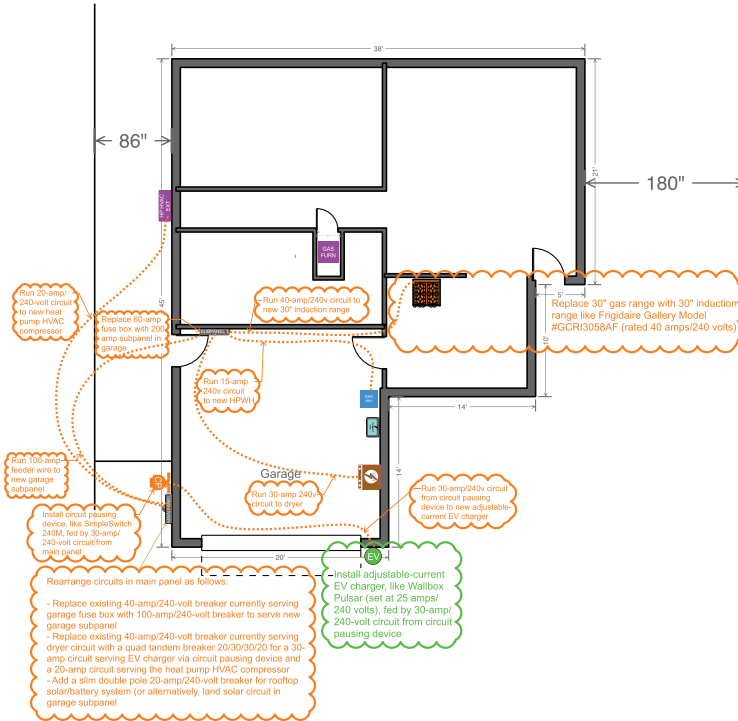


**Lowest Bid**

Cost without incentives.....\$2,875

Cost with incentives .....\$963

# WIRING



## RECOMMENDED

### 4 240-volt Circuits to Water Heater, HVAC, Range, Dryer



#### Lowest Bid

Cost without incentives.....\$2,555

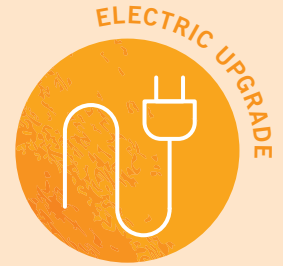
Cost with incentives .....\$55

# EV CHARGING



Recommended

⊗  
Existing



RECOMMENDED

## EV Charger

## Energy Management System



### Lowest Bid

Cost without incentives.....\$2,423

Cost with incentives .....\$1,423

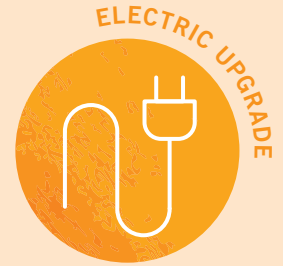
# COOKING



Recommended



Existing  
4-burner 30" gas range



## RECOMMENDED

### 4-burner 30" Induction Range



#### Lowest Bid

Cost without incentives.....\$1,099

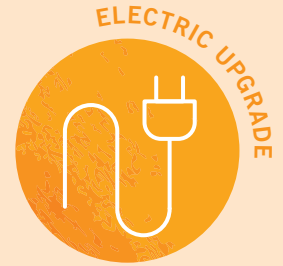
Cost with incentives .....\$0

# CLOTHES DRYING



Recommended

Existing  
7.5 cu ft electric  
resistance dryer



## RECOMMENDED

### No Change



#### Lowest Bid

Cost without incentives.....\$0

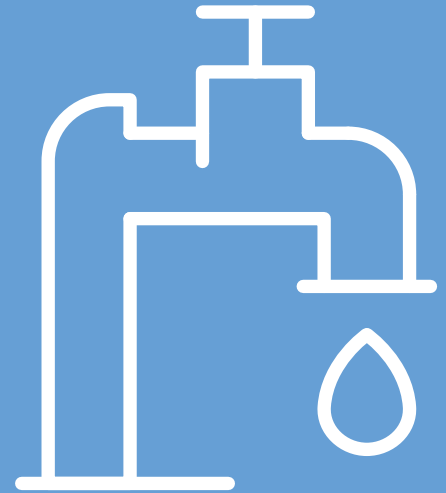
Cost with incentives .....\$0



# CONTRACTOR QUOTES

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
100-amp main electrical panel and 60-amp garage subpanel	100-amp main electrical panel and 100-amp garage subpanel	\$0	\$2,875	\$963	\$2,875	\$963	\$5,000	\$3,088	\$6,460	\$4,548
No 240-volt circuits to water heater, HVAC, range, dryer	4 240-volt circuits to water heater, HVAC, range, dryer	\$0	\$2,555	\$55	\$2,555	\$55	\$7,268	\$4,768	\$7,800	\$5,300
At-home fueling for 1 EV: 12k miles/year	EV charger and energy management system	\$0	\$2,423	\$1,423	\$2,423	\$1,423	\$2,840	\$1,840	\$2,850	\$1,850
4-burner 30" gas range	4-burner 30" induction range	\$949	\$1,099	\$0	\$1,099	\$0	\$1,099	\$0	\$1,099	\$0
7.5 cu ft electric resistance dryer	No Change	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total</b>		<b>\$949</b>	<b>\$8,952</b>	<b>\$2,441</b>	<b>\$8,952</b>	<b>\$2,441</b>	<b>\$16,207</b>	<b>\$9,696</b>	<b>\$18,209</b>	<b>\$11,698</b>

# PLUMBING UPGRADE



# WATER HEATER



RECOMMENDED

## 80-gallon Heat Pump Water Heater

### Why

Uses 1/3 the energy of a gas water heater

### Lowest Bid

Cost without incentives.....\$5,898

Cost with incentives .....\$104



Existing  
50-gallon gas  
water heater



Recommended

# CONTRACTOR QUOTES

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
50-gallon gas water heater	80-gallon heat pump water heater	\$2,754	\$4,100	\$0	\$5,898	\$104	\$7,476	\$1,681	\$8,265	\$2,471
<b>Total</b>		<b>\$2,754</b>	<b>\$4,100</b>	<b>\$0</b>	<b>\$5,898</b>	<b>\$104</b>	<b>\$7,476</b>	<b>\$1,681</b>	<b>\$8,265</b>	<b>\$2,471</b>

# HVAC UPGRADE



# SPACE HEATING/COOLING



Recommended



Existing

80% efficient centrally ducted gas furnace



## RECOMMENDED

### 30,000 BTU Centrally Ducted Heat Pump HVAC System with MERV 13 Filter



#### Lowest Bid

Cost without incentives.....\$12,586

Cost with incentives .....\$0

# CONTRACTOR QUOTES

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
80% efficient centrally ducted gas furnace	30,000 BTU centrally ducted heat pump HVAC system with MERV 13 filter	\$4,808	\$5,000	\$0	\$12,586	\$0	\$15,150	\$2,564	\$17,230	\$4,644
<b>Total</b>		<b>\$4,808</b>	<b>\$5,000</b>	<b>\$0</b>	<b>\$12,586</b>	<b>\$0</b>	<b>\$15,150</b>	<b>\$2,564</b>	<b>\$17,230</b>	<b>\$4,644</b>

# INSULATION UPGRADES





# BUILDING SHELL IMPROVEMENTS



Existing Attic,  
no insulation



Existing Ductwork,  
unknown



Existing Floor,  
no insulation



Existing Walls,  
no insulation



## RECOMMENDED

**Floors: Air Seal, R19 Insulation  
Attic, Ductwork, Floor: No Change**



### Lowest Bid

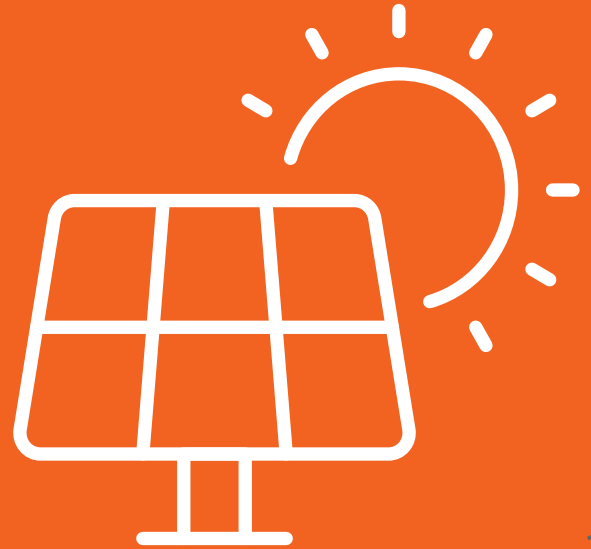
Cost without incentives.....\$2,843


Cost with incentives .....\$375

# CONTRACTOR QUOTES

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
Insulation: attic – none	No Change	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ductwork: unknown condition	No Change	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Insulation: floor – none	Insulation: floor – none	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Insulation: walls – none	Insulation: walls – R11	\$0	\$2,843	\$375	\$2,843	\$375	\$2,843	\$375	\$7,322	\$4,854
<b>Total</b>		<b>\$0</b>	<b>\$2,843</b>	<b>\$375</b>	<b>\$2,843</b>	<b>\$375</b>	<b>\$2,843</b>	<b>\$375</b>	<b>\$7,322</b>	<b>\$4,854</b>

# OPTIONAL SOLAR & BATTERY UPGRADES



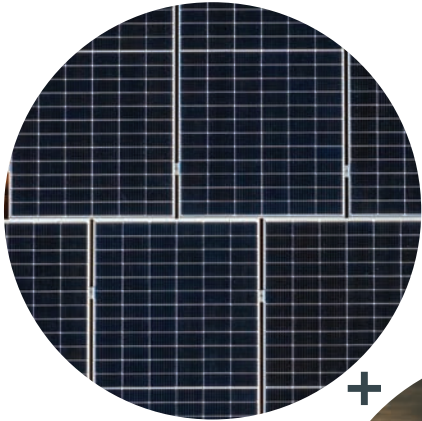


**Decarbonizing a home does not require adding solar or batteries, since the electricity in San Mateo County is 100% carbon emissions free.**

Instead, solar panels can make electrification more affordable and batteries provide resiliency during power outages.



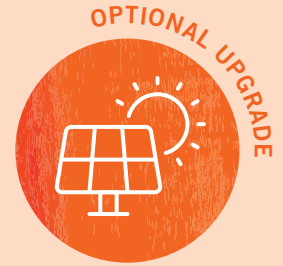
# SOLAR & BATTERY



Recommended



Existing



## RECOMMENDED

### 5.8 kW Solar System

### 10 kWh Battery System



#### Lowest Bid Solar

Cost without incentives.....\$22,325

Cost with incentives .....\$15,628

#### Lowest Bid Battery

Cost without incentives.....\$12,000

Cost with incentives .....\$8,400

# 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	\$949	\$8,952	\$2,441	\$8,952	\$2,441	\$16,207	\$9,696	\$18,209	\$11,698
Plumbing	\$2,754	\$4,100	\$0	\$5,898	\$104	\$7,476	\$1,681	\$8,265	\$2,471
HVAC	\$4,808	\$5,000	\$0	\$12,586	\$0	\$15,150	\$2,564	\$17,230	\$4,644
Insulation	\$0	\$2,843	\$375	\$2,843	\$375	\$2,843	\$375	\$7,322	\$4,854
<b>Total</b>	\$8,511	\$20,895	\$2,816	\$30,279	\$2,920	\$41,676	\$14,316	\$51,026	\$23,667

## 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	Rooftop solar PV: 5.8 kW	\$0	\$22,325	\$15,628	\$22,325	\$15,628	\$22,325	\$15,628	\$22,325	\$15,628
Home battery: none	Home battery: 10 kWh	\$0	\$12,000	\$8,400	\$12,000	\$8,400	\$12,478	\$8,735	\$19,000	\$13,300
<b>Total</b>		\$0	\$34,325	\$24,028	\$34,325	\$24,028	\$34,803	\$24,363	\$41,325	\$28,928

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.

# CONTACT

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OFFICE OF  
SUSTAINABILITY  
COUNTY OF SAN MATEO

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