

Building Emissions Saving Ordinance (BESO)

Berkeley's HES Program and Beyond

July 9, 2025



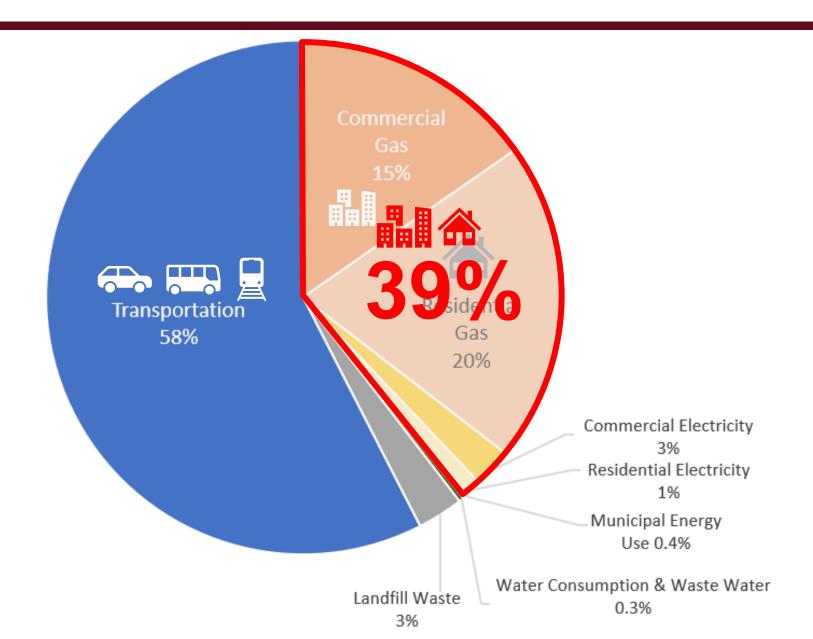
Background and Current Requirements

Berkeley's Ambitious Climate Action Goals



2023 Greenhouse Gas Inventory

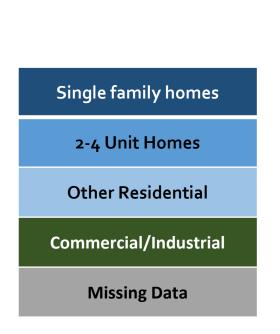


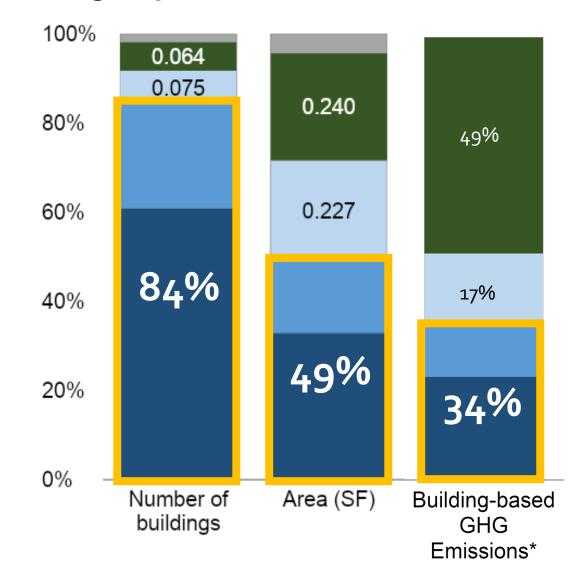


Emissions from 1-4 Units



Buildings by Count, Area, and GHG Emissions





Building Emissions Saving Ordinance (BESO)

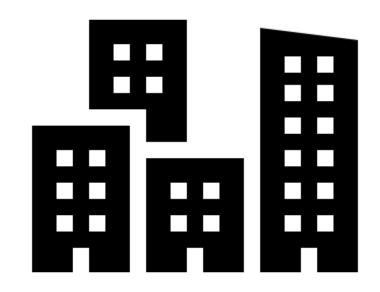


Time of Sale Program



Buildings **less** than 25,000 sqft

Large Building Program



Buildings **greater** than 25,000 sqft

Current Time of Sale Program

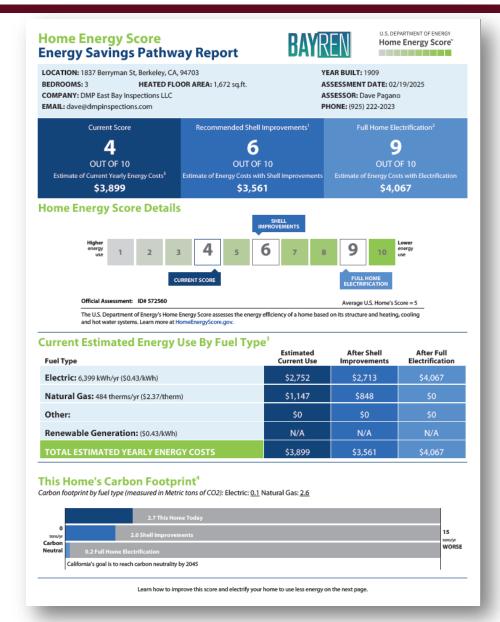
BERKELEY

- Requires an energy/electrification
 assessment prior to listing a building for
 sale
 - Home Energy Score for Single family homes
 - Provides information to potential buyers
- Refers building owners into local incentive programs to complete voluntary upgrades



Home Energy Score Assessment





Tackle energy waste today! Get your home energy assessment. Done!

- ☐ Choose energy improvements from the list of recommendations below.
- ☐ Select a contractor (or two, for comparison) and obtain bids.
- ☐ Perform upgrades and enjoy a more comfortable and energy efficient home.

For More Information Visit the Websites Below

Find Incentives









Current Score

4

OUT OF 10

Energy Improvements Customized for Your Home

SHELL IMPROVEMENTS'				
FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS		
Envelope/Air sealing	Not professionally air sealed	Professionally air seal		
Attic insulation	Ceiling insulated to R-9	Insulate to R-38 or higher		
Duct insulation	Insulated	No recommendation		
Duct sealing	Un-sealed	Reduce leakage to a maximum of 5% of total airflow		
Wall insulation	Insulated to R-0	Insulate to R-13 or higher		
Floor insulation	Insulated to R-0	Insulate to R-30 or fill floor cavity		
Knee Wall insulation	Knee wall insulated to R-11	No recommendation		
Skylights	Double-pane	No recommendation		
Windows	Multiple types	Upgrade to double-pane or other high-efficiency window		

FULL HOME ELECTRIFICATION IMPROVEMENTS ²				
FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS		
Appliances: Heat Pump Dryer	ances: Heat Pump Dryer Gas Dryer Heat pump clothes dryer 4.5 Combine replacing a natural gas clothes dryer			
Appliances: Induction Cooking	Gas Range/Cooktop	Induction electric range/cooktop replacing a natural gas range/cooktop		
Electrical Panel	100Amps	Discuss potential need for a panel upgrade with an electrician		
Air Conditioner	None installed	Upgrade to Electric Heat Pump, minimum 15 SEER		
Heating equipment	Natural gas furnace 80% AFUE	Upgrade to Electric Heat Pump, minimum 8.6 HSPF		
Solar PV	None installed	Consider solar PV		
Water Heater	Natural gas EF 0.67	Replace with heat pump hot water heater		

Next page provides additional notes from your Home Energy Score Assessor

Program Implementation

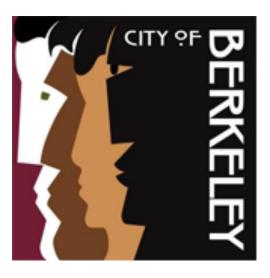




Local Governments Empowering Our Communities

Regional HES Program Partner

- Trains HES Assessors
- Maintains HES database
- Ensures QA/QC



Local Program Administrator

- Monitors real estate listings
- Assists homeowners and realtors with compliance

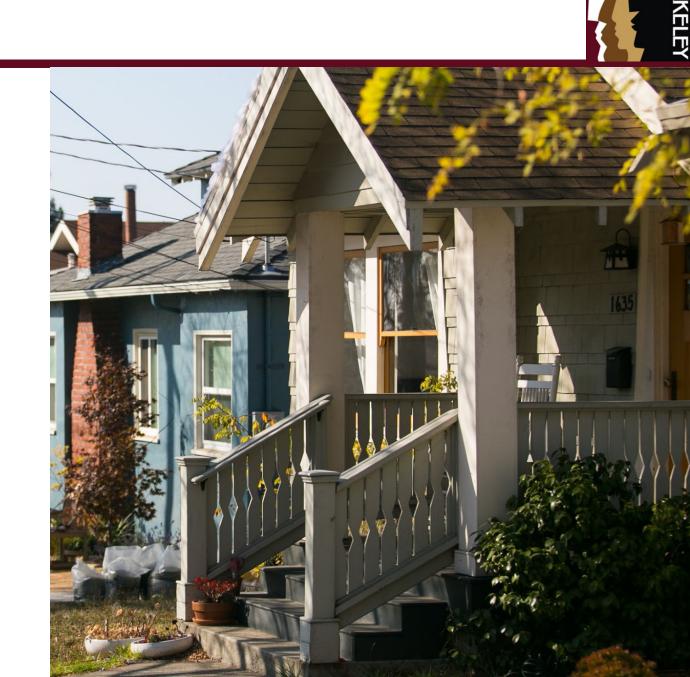
Progress to Date

From 2015-Present:

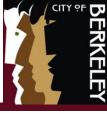
- ~4,500 HES assessments
- ~500 HES per year
- 4.5 average score

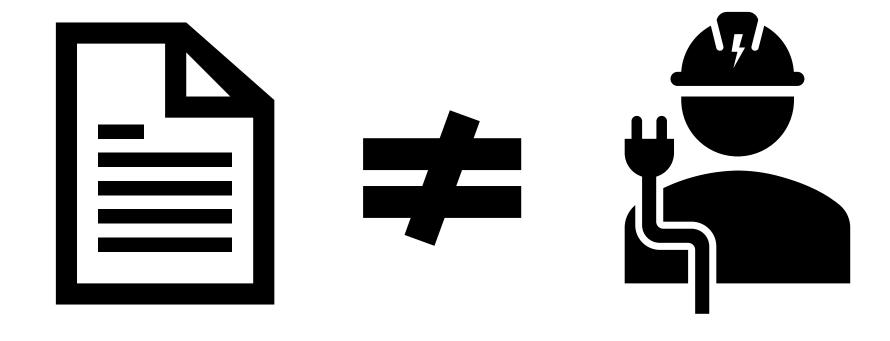
Compliance:

• ~90% compliance rate



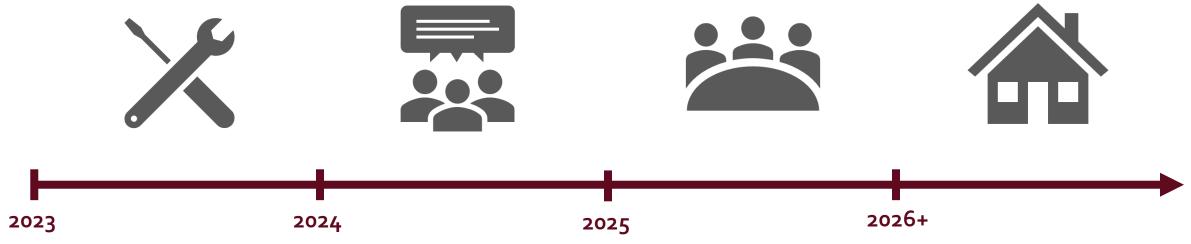
Lessons Learned





Developing Requirements



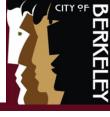


- Developed policy recommendation
- Conducted outreach
- Presented at Commissions and Committees

- Continued Outreach
- Continued to work with Committees
- Passed by Council
- Prep for implementation
- Start implementation

Time of Sale Upgrade Requirements

Overview of BESO Requirements



- Seller completes the BESO assessment (HES)
- Buyer completes the upgrade(s) within 3 years of the sale if compliance has not been met



Flexible Resilience Standard

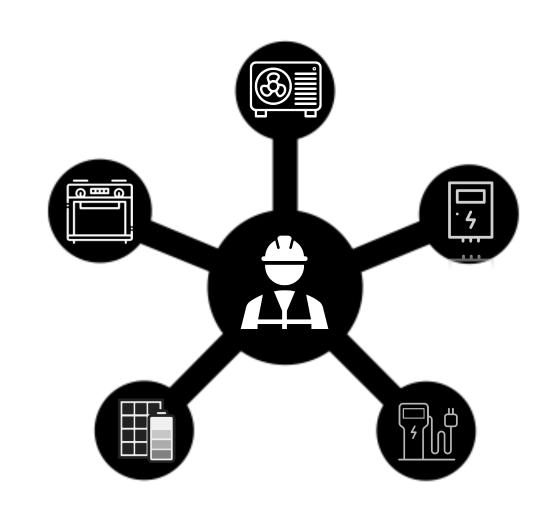


Upgrade requirements:

- List of possible upgrades
- Each upgrade has a corresponding credit value
- Buildings need to achieve minimum number of credits through upgrades

• Credit value criteria:

- Emissions savings
- Cost
- Health, safety, resilience bonus



Upgrade Measures & Credits



Credits Needed: 6

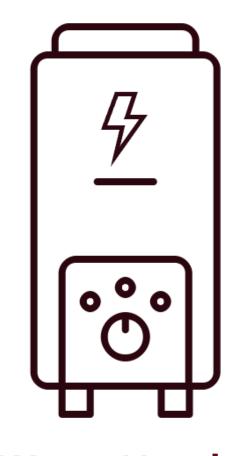
Measure	Credits*	Criteria
Heat Pump Water Heater	6	Emissions
Heat Pump HVAC	6	Emissions
Knob + Tube Replacement	6	Cost
Smart Panel	6	Cost
Solar PV + Storage	6	Cost
Panel/Service Upgrade	6	Cost
Duct Sealing & Replacement	3	Emissions
Bi-Directional EV Charger	3	Cost
EV Charger	2	Cost

Measure	Credits*	Criteria
Induction Range	2	Emissions
Window Replacements	2	Emissions
Attic Insulation	2	Emissions
Wall Insulation	2	Emissions
Floor Insulation	1-2	Emissions
Greywater System	1-2	Cost
Air Sealing	1	Emissions
Prewiring & 240v receptacles	½ per receptacle	Cost

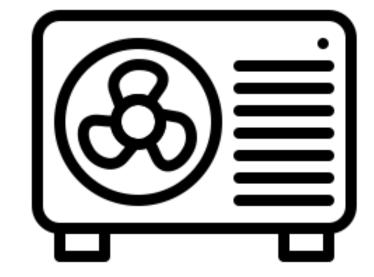
^{*}The credit values may be subject to change

Exemption Pathway: Heat Pump System









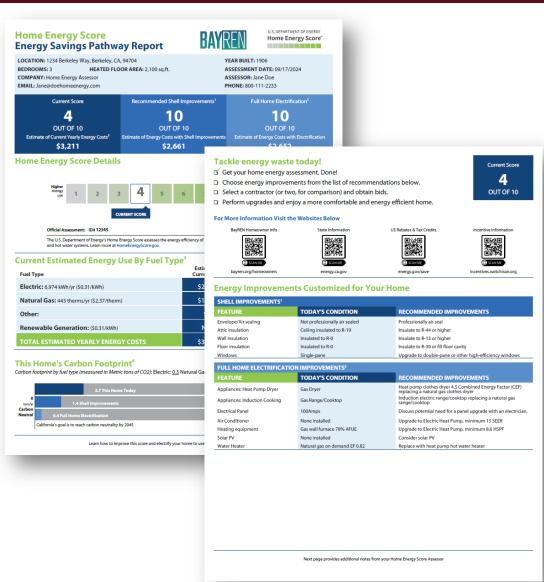
Water Heating

Space Heating/HVAC

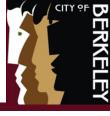
Using the HES with Upgrade Requirements

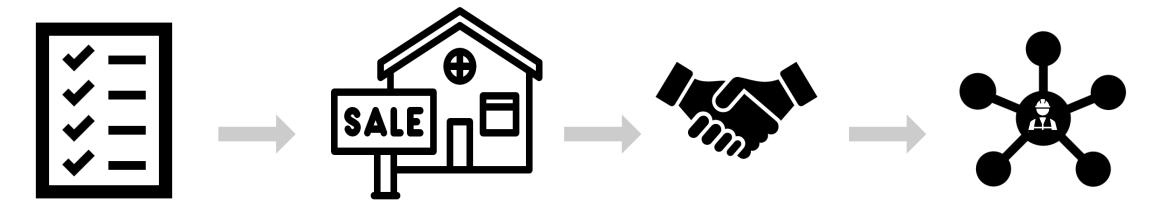


- Provides buyers with recommended measures that would meet requirements
- Confirms heat pump exemption
- Credit for High Home Energy Score



Example: Home doesn't have a heat pump system



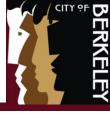


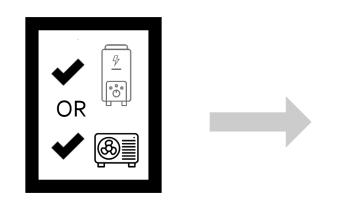
Seller completes assessment (Home Energy Score) Home listed for sale

\$5000 deposit to help cover upgrades sent at closing through escrow deposit

Buyer completes upgrades to meet target credit requirement and utilizes escrow deposit

Example: Home has a heat pump system



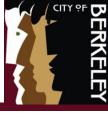


Seller completes assessment (Home Energy Score)





Phase-in by Building Type

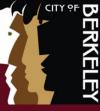


- Phase I (January 1, 2026):
 - Single-family & Duplexes

- Phase II (January 1, 2028):
 - 3-4 Unit Residential Buildings



Thank You!



Valerie Nguyen

Sustainability Program Specialist City of Berkeley vnguyen@berkeleyca.gov





Home Energy Score Program

Maria Hart
California Climate & Energy Collaborative Forum
July 9, 2025



What is Home Energy Score?

- Developed by U.S. Department of Energy and its national laboratories
- Enables comparison: similar to a miles-per-gallon rating for a car or nutrition facts—but for your home
- Provides homeowners, buyers, and renters comparable and credible information about a home's energy use

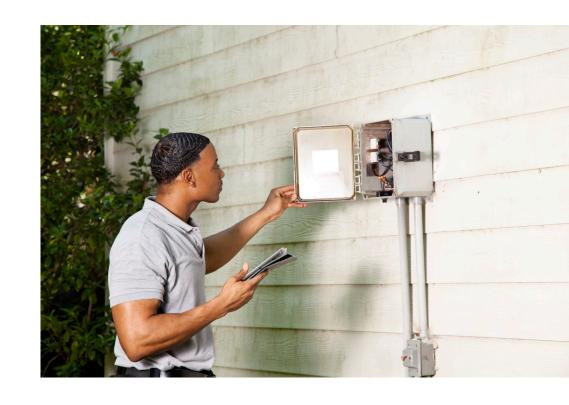


Amount Per	Serving					
Calories 20	0	Calories fro	m Fat 8			
		% Daily	Value			
Total Fat 1g			1%			
Saturated	Fat 0g		1%			
Trans Fat						
Cholestero	0mg		0%			
Sodium 7mg)		0%			
Total Carbo	hydrate 3	6g	12%			
Dietary Fiber 11g			45%			
Sugars 6g						
Protein 13g						
Vitamin A	1% • 1	Vitamin C	1%			
Calcium	4% • 1		24%			



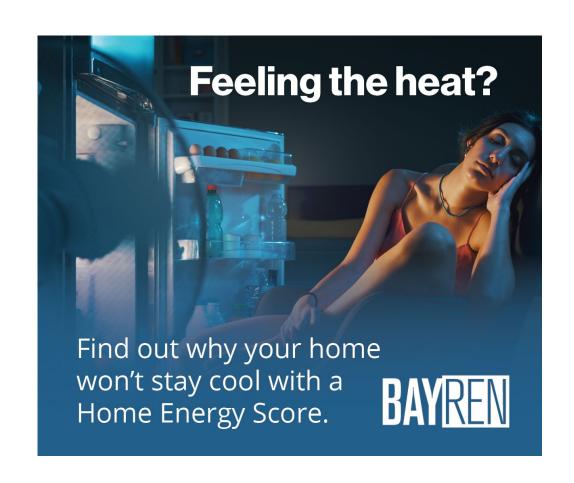
How it Works

- Program is run through HES Partners
 - Partner performs mentoring for new Assessors
 - DOE QA Requirements
- Assessors must hold a relevant credential
 - Pass DOE simulation training
 - Enroll with a partner
- Assessor goes into home, collects 40+ data points, uses DOE software to generate score and report



When Should Homeowners Get a Home Energy Score?

- Before renovating
- When they want to save money & reduce energy bills
- When they want to know how to make a home more comfortable
- When they're ready to sell a home
- After recently buying a home



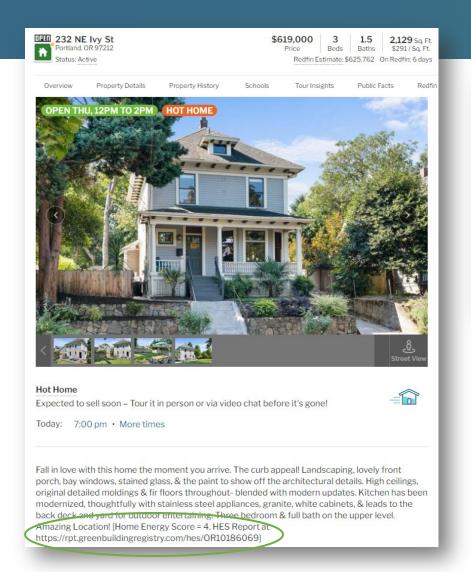
Labeling Policies Nationwide

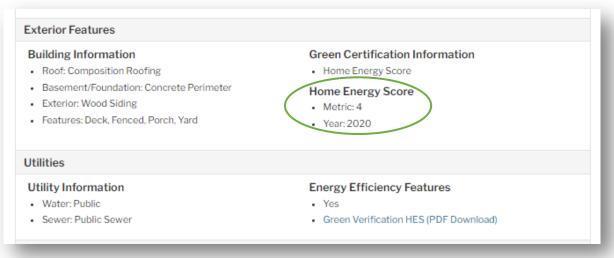
Home Energy Score:

- Berkeley, CA
- Piedmont, CA
- Carlsbad, Chula Vista, and Encinitas, CA
- Portland, OR & surrounding jurisdictions
- Gainesville, FL



Portland Example of Connection to MLS





Portland ordinance report on first 30 months

Bay Area HES Overview



The Bay Area Regional Energy Network (BayREN)



- BayREN is a Program Administrator of Ratepayer Funds from the California PUC
- Collaboration of 9 Bay Area counties to help CA meet climate goals through energy savings
- Successful climate, resource, and sustainability programs:
 - Single Family
 - Multifamily
 - Green Labeling
 - Commercial
 - Codes & Standards
 - Water Efficiency
 - Public Building
 - Workforce, Education & Training

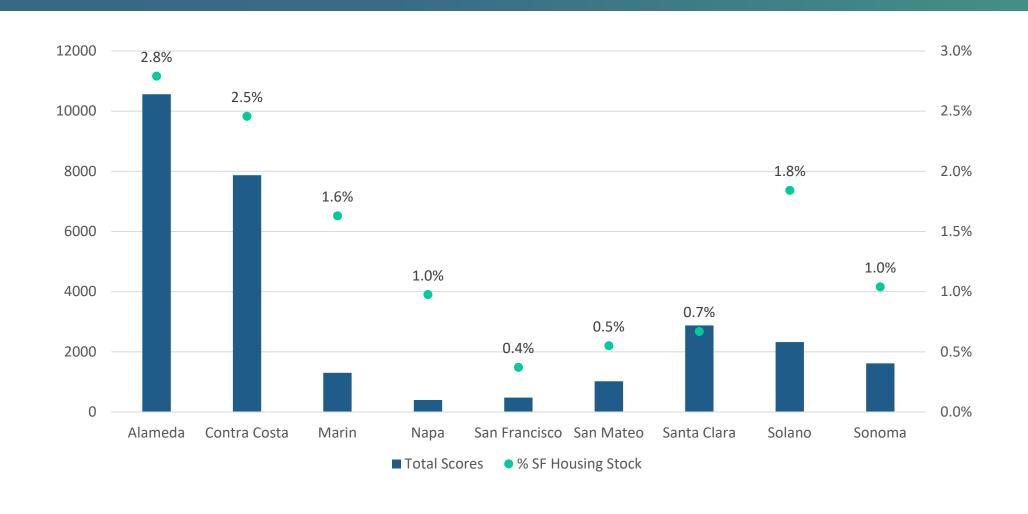
Green Labeling Program Background

- <u>Goal</u>: Increase energy transparency in the single-family residential sector
- Voluntary regional program launched in 2018
 - Scaled from BESO in Berkeley
 - Offers up to \$250 per score
- HES core program offerings:
 - ✓ Trains HES Assessors
 - ✓ Provides rebates for getting a score
 - ✓ Promote score across all nine Bay Area counties

Scores by Year: 2015-2024



What % of the housing stock have we scored since 2018 in the Bay Area?





Increasing Electrification Focus

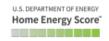
- Launched electrification addendum to HES in 2020 to reflect local/state goals for decarbonization
- Wanted to take next step and center electrification recommendations in report
 - Had to overcome complications with HES giving generally similar scores for high-efficiency mixed-fuel and all-electric homes
 - Look at other metrics such as carbon emissions and cost

Modeling of Upgrade Pathways

- Report models 3 scoring scenarios:
 - **1. Current score**: what the home is now with existing features
 - 2. Score with shell improvements: score if building envelope improvements are installed but equipment remains as-is
 - **3. Score with electrification**: score if envelope measures are made and home goes all electric with high-efficiency heat pumps
- Report also presents estimated costs, energy consumption, and GHG emission metrics
- Helps homeowners to understand upgrade options
- QR codes connect to resources to make upgrades

Home Energy Score Energy Savings Pathway Report





LOCATION: BEDROOMS: 3 COMPANY:

EMAIL:

HEATED FLOOR AREA: 1,932 sq.ft.

YEAR BUILT: 1908

ASSESSMENT DATE: 04/15/2024 ASSESSOR:

PHONE:

Recommended Shell Improvements¹ Current Score OUT OF 10 OUT OF 10 Estimate of Current Yearly Energy Costs³ Estimate of Energy Costs with Shell Improvements

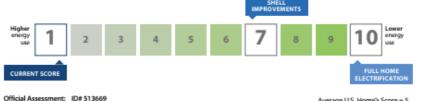
Full Home Electrification²

OUT OF 10

Average U.S. Home's Score = 5

\$2,833

\$3,823 **Home Energy Score Details**



\$2,808

The U.S. Department of Energy's Home Energy Score assesses the energy efficiency of a home based on its structure and heating, cooling and hot water systems. Learn more at HomeEnergyScore.gov.

Current Estimated Energy Use By Fuel Type³

Fuel Type	Estimated Current Use	After Shell Improvements	After Full Electrification
Electric: 7,070 kWh/yr (\$0.31/kWh)	\$2,190	\$2,102	\$2,833
Natural Gas: 689 therms/yr (\$2.37/therm)	\$1,633	\$706	\$0
Other:	\$0	\$0	\$0
Renewable Generation: (\$0.31/kWh)	N/A	N/A	N/A
TOTAL ESTIMATED YEARLY ENERGY COSTS	\$3,823	\$2,808	\$2,833

This Home's Carbon Footprint

Carbon footprint by fuel type (measured in Metric tons of CO2): Electric: 0.3 Natural Gas: 3.6



Learn how to improve this score and electrify your home to use less energy on the next page.



Basic home information



Current score and score if different improvement pathways are taken



Estimated energy costs, energy consumption for current home and improvement pathways



Estimated carbon emissions

Tackle energy waste today!

- Get your home energy assessment. Done!
- ☐ Choose energy improvements from the list of recommendations below.
- ☐ Select a contractor (or two, for comparison) and obtain bids.
- □ Perform upgrades and enjoy a more comfortable and energy efficient home.

Current Score 1 OUT OF 10

For More Information Visit the Websites Below

BayREN Homeowner Info



bayren.org/homeowner

tate Information



energy.ca.go

US Rebates & Tax Credits



energy.gov/sav

Incentive Information



incentives.switchison.org

Energy Improvements Customized for Your Home

SHELL IMPROVEMENTS ¹				
FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS		
Envelope/Air sealing	Not professionally air sealed	Professionally air seal		
Attic insulation	Ceiling insulated to R-3	Insulate to R-44 or higher		
Duct insulation	Insulated	No recommendation		
Duct sealing	Sealed	No recommendation		
Wall insulation	Insulated to R-0	Insulate to R-13 or higher		
Floor insulation	Insulated to R-0	Insulate to R-30 or fill floor cavity		
Knee Wall insulation	Knee wall insulated to R-0	Insulate to R-15 or higher		
Cathedral Ceiling/Roof	Roof insulated to R-0	Insulate R-30 or maximum possible		
Windows	Single-pane	Upgrade to double-pane or other high-efficiency windows		

FULL HOME ELECTRIFICATION IMPROVEMENTS ²			
FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS	
Appliances: Heat Pump Dryer	No Dryer	Replace with electric or heat pump dryer	
Appliances: Induction Cooking	Gas Range/Cooktop	Replace with induction range	
Air Conditioner	None installed	Upgrade to Electric Heat Pump, minimum 15 SEER	
Heating equipment	Natural gas furnace 80% AFUE	Upgrade to Electric Heat Pump, minimum 8.6 HSPF	
Solar PV	None installed	Consider solar PV	
Water Heater	Natural gas UEF 0.63	Replace with heat pump hot water heater	

Next page provides additional notes from your Home Energy Score Assessor



Next steps to take action



Rebate and tax credit information



Current conditions and recommendations about building shell improvements



Current conditions and recommendations about electrification improvements

Report Redesign

- New geographic customizations are live!
 - Reports generated by utility boundary
 - QR codes, utility rates, and emissions factors differ based on IOU vs. CCA vs. municipal utility
 - Third page of report has countyspecific information

Additional Comments and Recommendations:

Overview of An All-Electric Home

An all-electric home with an electric car costs about half as much to operate and uses about onethird of the energy of a typical California home with gas appliances and a gas car. All-electric homes are healthier because they improve indoor air quality and home comfort. When equipped with rooftop solar and/or your utility's clean energy option, your home can helps us combat climate change!

Learn more about electrification and having a green home by scanning the QR code or visiting <u>Sustainability.SantaClaraCounty.gov/earth-day-every-day</u>.

Scan Here







- 15hell Improvements correspond to recommendations that should be first steps in upgrading your home, including air sealing, insulation, duct sealing, etc. This estimate is calculated based on your current heating and cooling systems.
- 2Full home electrification requires the removal of any fossil fuels from the home such as gas or wood burning. Calculations assume shell improvements are made and include heating and cooling recommendations. These upgrades can be made over time as equipment nears its end of life. Your actual energy use and costs may vary hased one courant behavior and other factors.
- 3 Energy savings calculations are estimates only and based on data collected by the assessor and modeled in the Home Energy Score tool. Calculations assume shell improvements are made and all fossil fuel equipment is changed to high-efficiency electric options. Estimated energy costs were calculated based on average utility prices for the inte Bay Area Counties (\$0.43/km/h for electricity; \$2.37/hem for natural gas; \$2.67/qal for propane; \$4.07/qal for fuel oil).
- 4 Your carbon footprint is based only on estimated home energy use. Carbon emissions are estimated based on utility and fuel-specific emissions factors provided by the California Public Utilities Commission. Your carbon footprint may be lower if you get your electricity through a Community Choice Aggregator (CCA) provider. For more information visit Cal-CCA.org.



Statewide Expansion Coming in 2026!



- Approved by PUC to expand HES statewide
 - First non-utility led statewide effort of its kind in California!
 - Advice Letter approved November 4, 2024, authorizing program and \$9.9M budget
 - Submitted Implementation Plan May 2025
 - Soft launch planned for Q1 2026



Basic information and FAQ document posted on <u>www.HomeScoreCA.org</u>



Thank you!

Maria Hart mhart@stopwaste.org



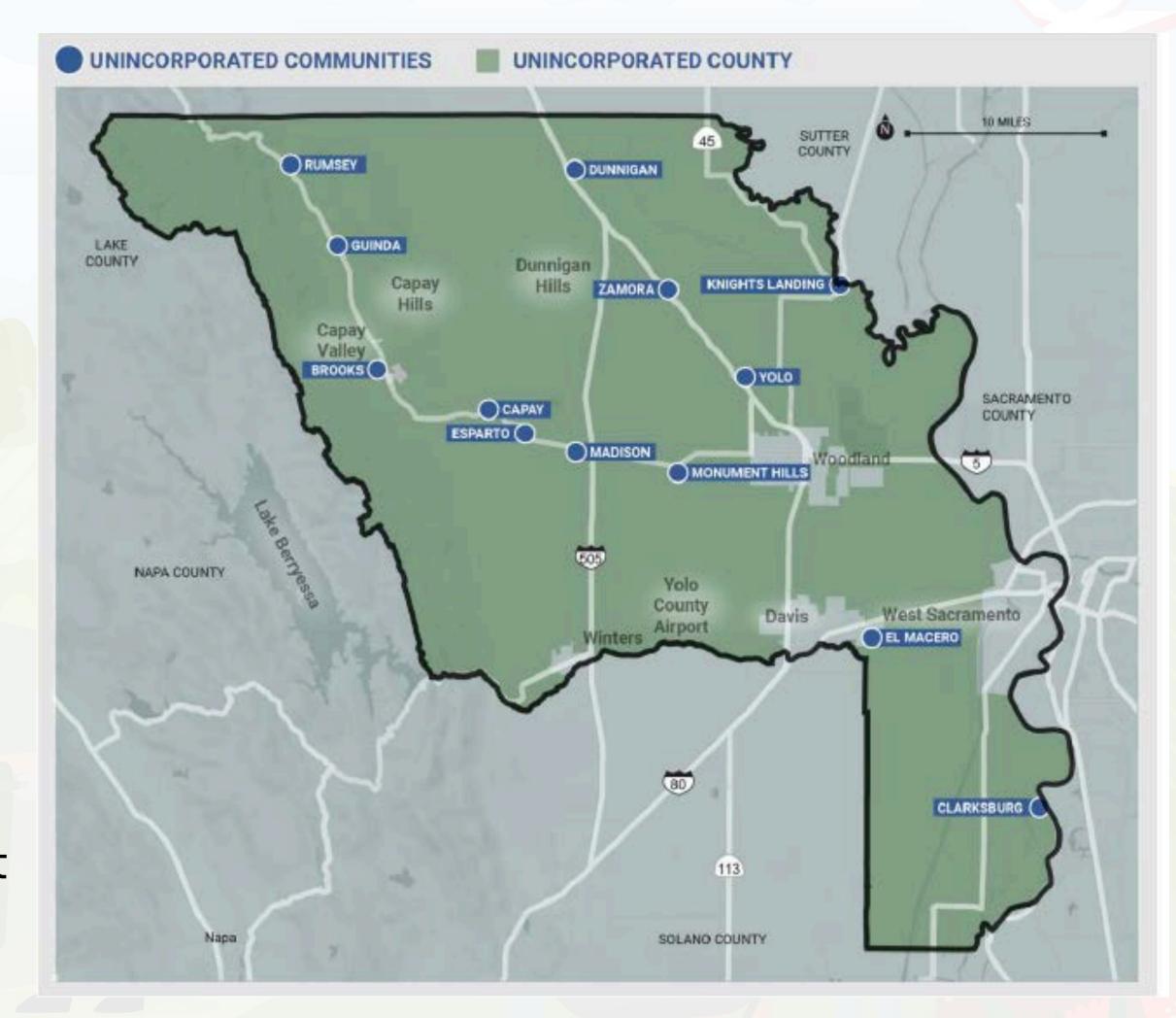






Yuridiana Pantoja

Assoc. Admin Service Analyst County of Yolo Sustainability Division



Project

Timeline

Community Outreach

2023

Early Action Approved

December 2023.

Feedback from CAAP workshops develops the Weatherization Program.

April 4th, 2024

Board of Supervisors (BOS) approved HES & Weatherization and funding.

CBO Solicitation Period

May 25th, 2024

2024

2024

CBO Solicitation opens for 4 months.

2025

Develop YEP w/ CBOs

December 2024 - March 2025 Yolo Energy Partnership (YEP) Program

underdevelopment with CBOS.

County Adopts CAAP

December 03, 2024.County of Yolo adopts CAAP.

Selected CBOs

September 30, 2024.
Selected CBOs, Cool Davis and De
Colores.

2025

Launched YEP Program

April 1st, 2025

YEP Program Launched and open to community.

First HES Completed

May 2025

First Home Energy Score completed in Zamora!

First CBO Outreach

June 2025

CBO partner, De Colores, host their first outreach event!

Yolo Energy Partnership Programs

Programs

About

Benefits

How to Apply

Home Energy Score (HES)
Pilot Program



Free home energy assessments to identify energy savings opportunities.

Personalized report with upgrade recommendations (e.g., insulation, HVAC improvements).

Residents can apply on our website or in person at our outreach events.

Weatherization Program



Free energy-saving kits with LED bulbs, weatherstripping, and insulation materials.

Lower energy bills and improve home comfort.

Residents can apply on our website or in person at our outreach events.

Electric Advisors by Valley Clean Energy (VCE)



Assistance accessing rebates for upgrading to energy-efficient electric appliances.

Helpful call center available for VCE customers to learn more about rebates & incentives.

Hotline support available for step-by-step guidance available for VCE customers.

Owner Occupied Housing Rehab (OOHR) Program



A deferred loan up to \$80,000 for major home repairs in lowincome households. Personalized report with upgrade recommendations (e.g., insulation, HVAC improvements).

Residents can learn more and apply by calling Thurmond Consulting

Yolo Energy Partnership

Sustainability Team

Partnerships

HES

Consultant: Earth Advantage (EA)

Assessor: Archon Energy Solutions

Weatherization

ERRO

Program Admin: Valley Clean Energy (VCE)

Partner: Yolo County

OOHR

Program Admin: Yolo County

Consultant: Thurmond Consulting

Empowering Communities Through Local Partnerships







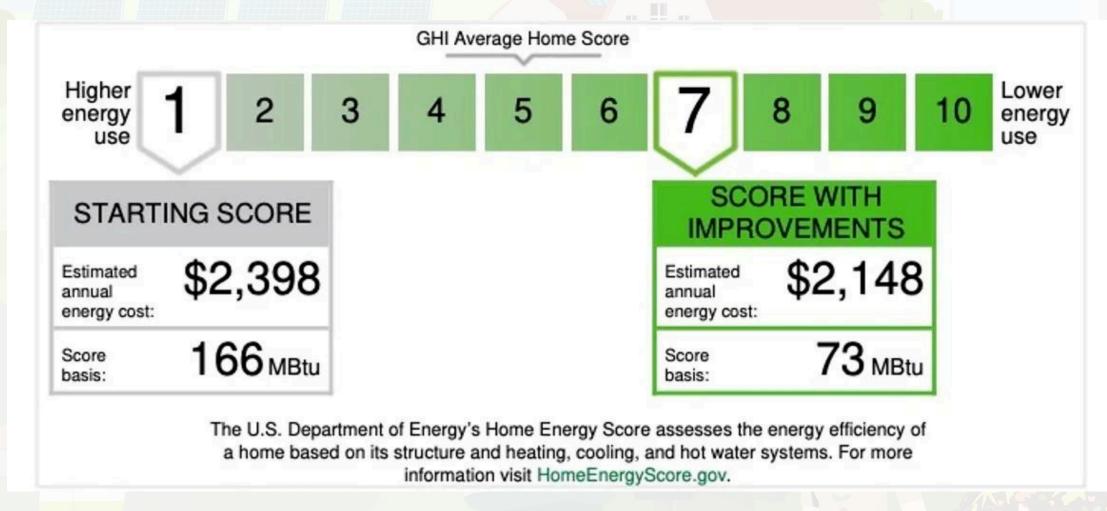




HES Pilot Program

The Home Energy Score (HES) is a pilot program offering FREE energy assessments for homes in the Unincorporated County. Utilizing a Department of Energy scoring system, the program equips homeowners with the information needed to improve their home energy efficiency and reduce utility bills.

One-Time Launch Costs	\$25.6k
Pilot Program Management Costs	\$16k
HES Rebate Costs	\$16k
Community Outreach Partnerships	\$10k
Total:	\$72,600





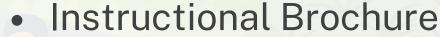


Weatherization Program

- Stems from community feedback received during the 2023 CAAP Workshops.
- Focused on providing FREE DIY kits and education for community members to enhance home energy efficiency and lowering utility bills.
- Focus on low-income community members and renters.

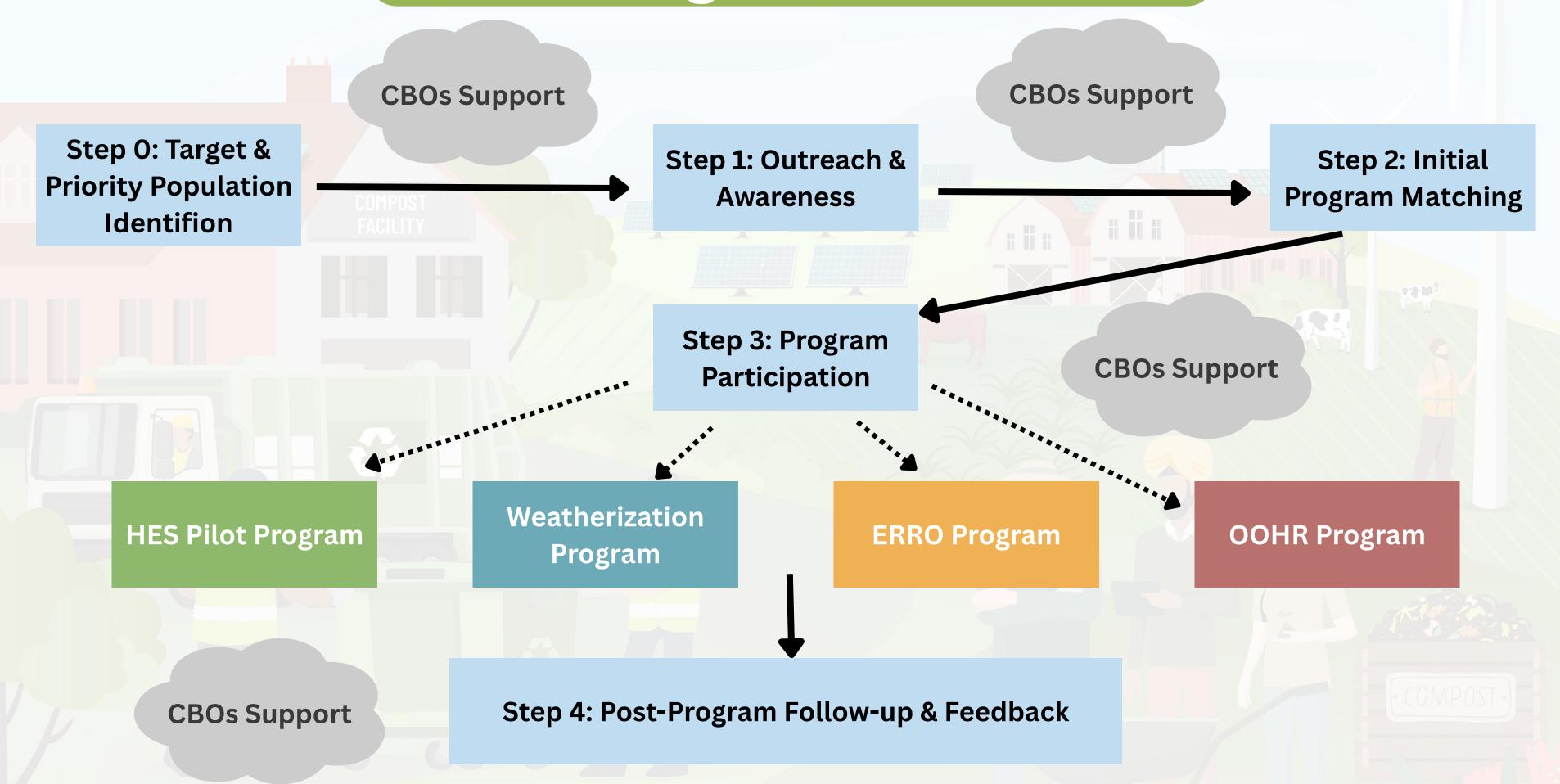
Weatherization Kits (100 kits/year for 3 years)	\$35,000
Community Outreach Partnerships	\$15,000
Total:	\$50,000

Each FREE Weatherization kit contains the following materials for DIY home energy efficiency upgrades:



- LED Light Bulb
- LED Night Light
- Foam Switch & Outlet Gasket
- Power Strip
- Door Sweep
- Weatherstripping
- Water-Efficient Showerhead

YEP Program Workflow





2025 Outreach Metrics

8 Events
Tabled

14 Hrs of Outreach

1HES
Completed &
22 Kits Passed
Out

11 one-hr planning sessions with CBO Partners



A Model for Equitable Energy Programs

Yolo County Sustainability recognizes that community-based partnerships are crucial to the implementation of equitable energy programs that address accessibility, energy burdens and overall building trust between Yolo County and community members.

