About NASEO

- The only national non-profit association for the governor-designated energy officials from each of the 56 states and territories
- Serves as a resource for and about the State Energy Offices through topical committees, regional dialogues, and informational events that facilitate peer learning, best practice sharing, and consensus building
- Advances the interests of the State and Territory Energy Offices before Congress and the Administration
- Learn more at www.naseo.org

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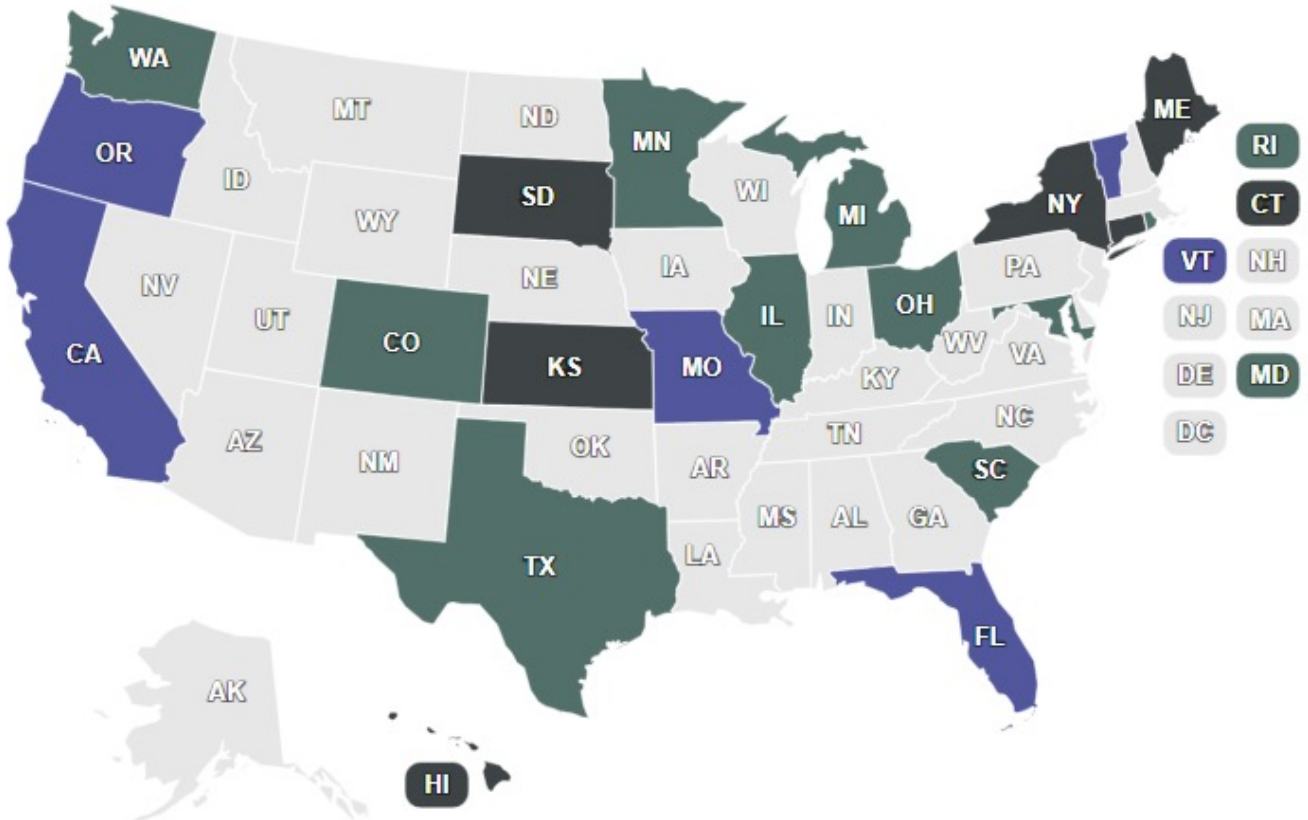
Residential Energy Disclosure Policies in States and Cities

Map Legend

Grey: Statewide policy

Green: Local policy

Blue: Both Statewide and Local policies



RESNET
Home Energy Rating System (HERS)

RESNET

Neal Kruis, Energy Modeling Director

RESNET®
RESIDENTIAL ENERGY SERVICES NETWORK

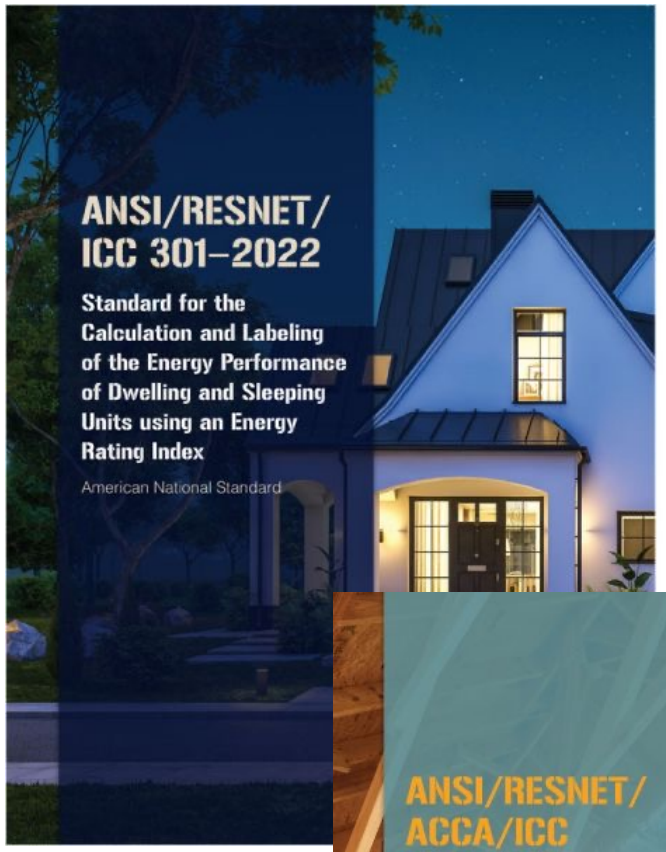
Setting the Standards
For Quality Since 1995

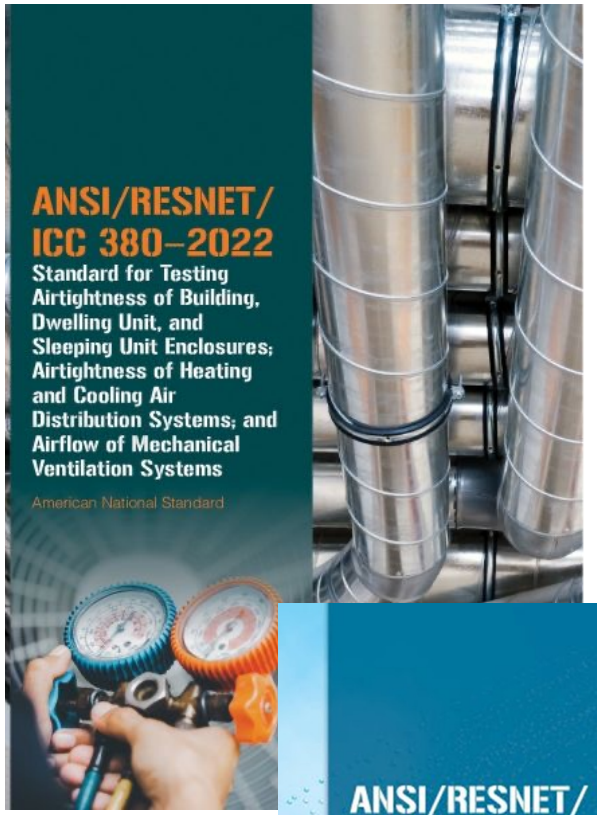
What is RESNET?

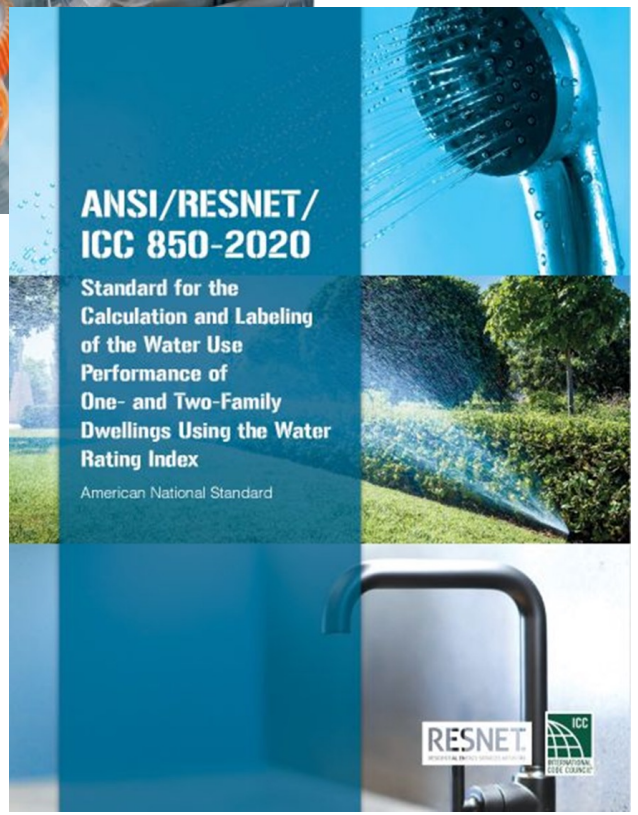
RESNET®
RESIDENTIAL ENERGY SERVICES NETWORK

- An industry-based, not-for-profit organization
- Founded in 1995 by the national mortgage industry and NASEO with initial funding from US EPA
- To improve consumer/lender awareness and create a uniform market for home energy rating systems and green mortgages.

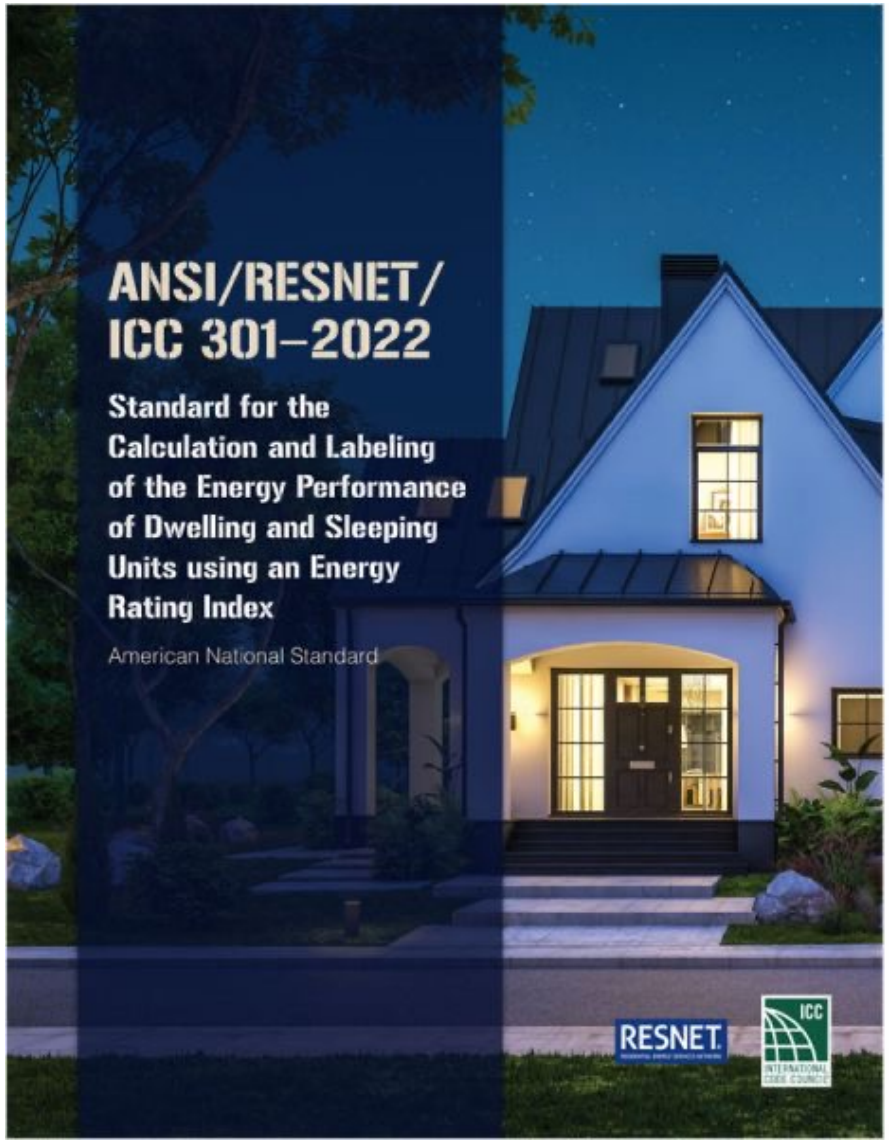
ANS-Accredited Standards Development Organization

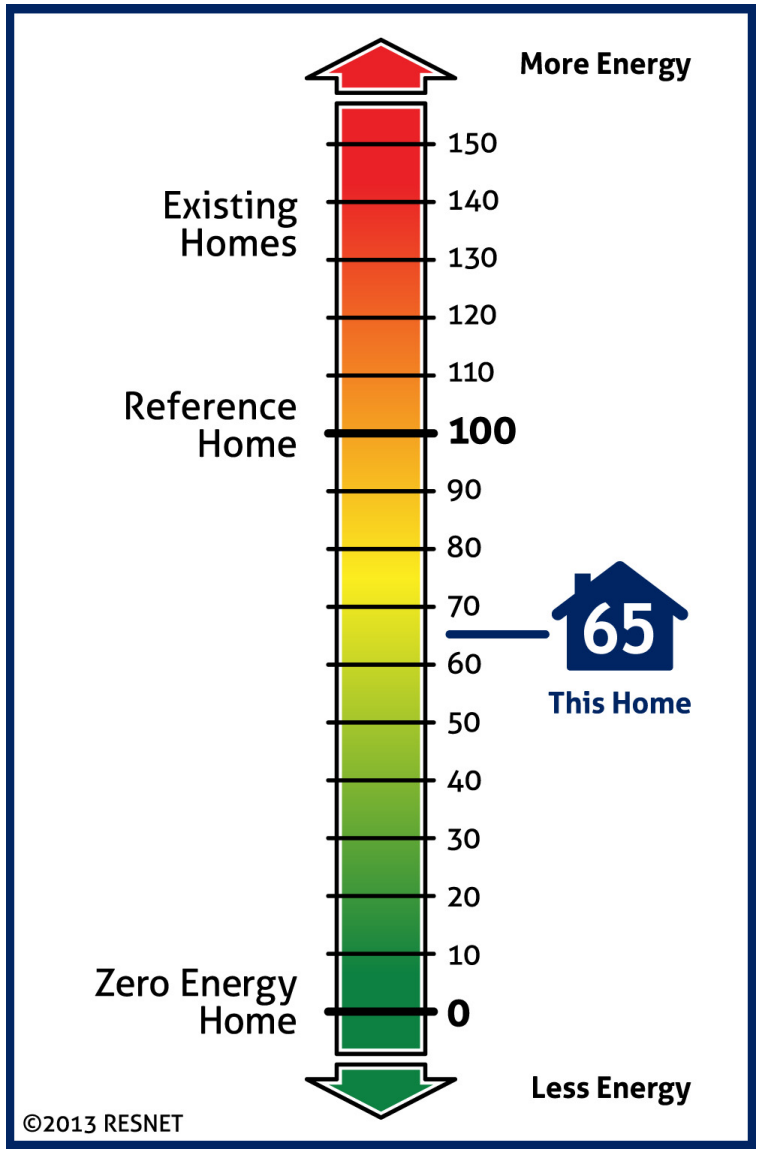






Energy Rating Index (ERI)

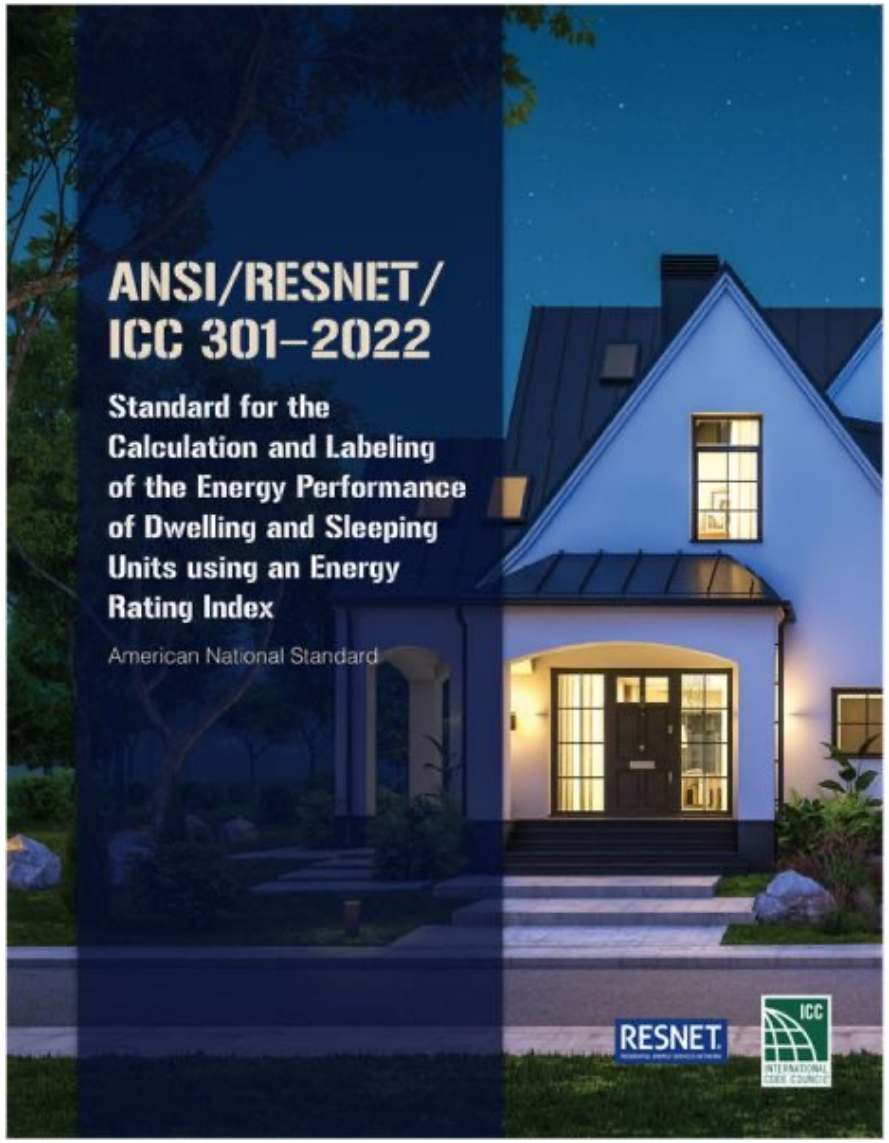




Energy Rating Index (ERI)

vs

RESNET HERS Index



+ **M**ortgage Industry **N**ational **H**ome **E**nergy **R**ating **S**ystems (MINHERS) Standards

RESNET's Network of Certified Professionals

Credit: PSD

- 2,056 Certified HERS Raters
  - (141 in California)
- Under 85 Certified Rating Providers
  - (7 in California)
- 27 Certified HERS Training Providers
- 4 Accredited Software Tools:

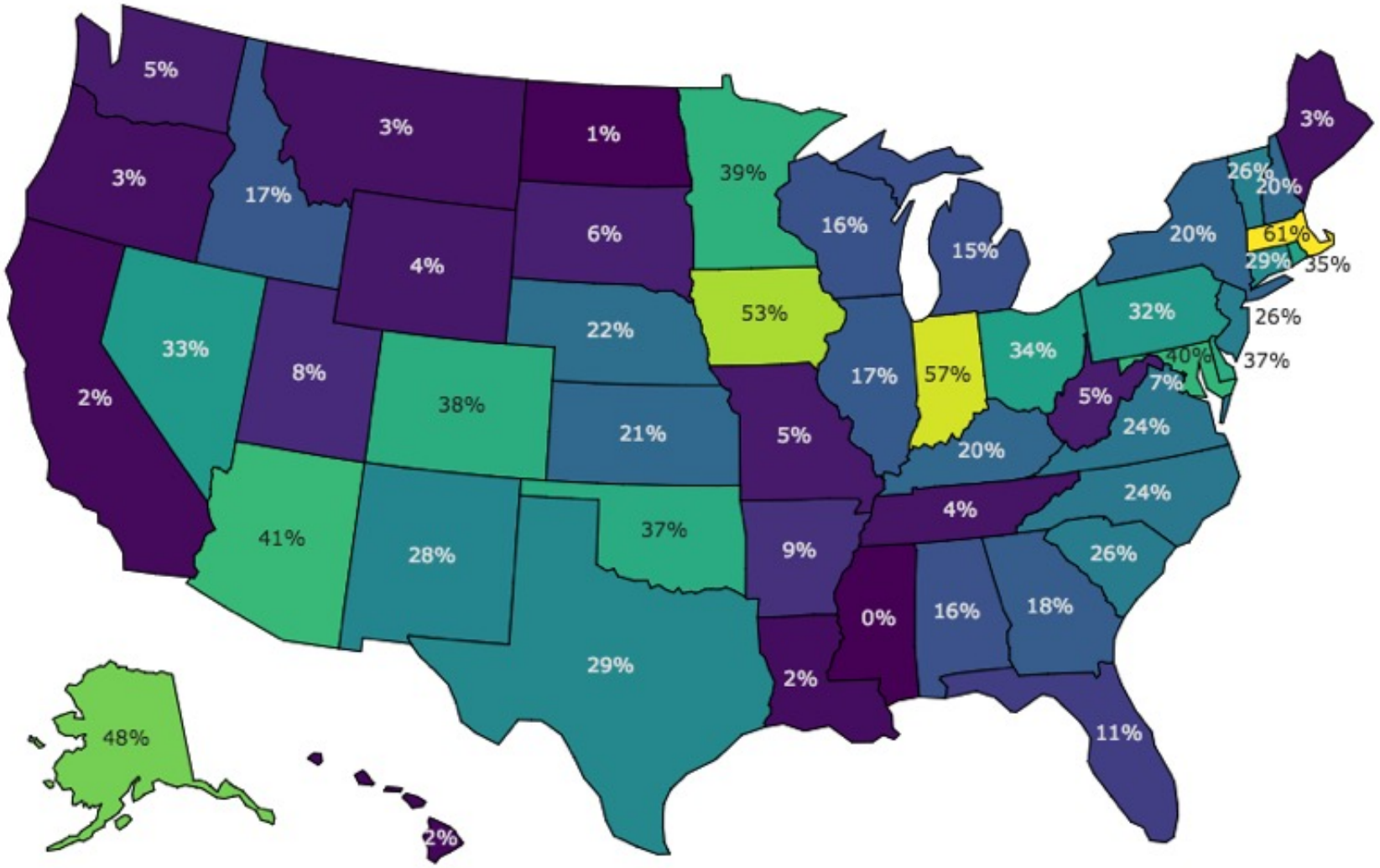
APEX

ekotrope

EnergyGauge® Energy and Economic Analysis Software

REM™ RATE

RESNET HERS Impact



4 Million Homes and Counting!

4,347,271

Homes HERS®-rated to date

353,075

Number of homes HERS®-rated this year

Rated Home Label

RESNET
RESIDENTIAL ENERGY SERVICES NETWORK

PROJECT INFORMATION

Registry ID: 012345678
Address: 498 HERS Rating Way
City, State, Zip: Pendergrass, GA, 30567
Builder Name: Energy Efficient Homes
Rating Date: Mar 26, 2022
HERS Rater Name: John Doe
Rating Provider Company: Best Energy Raters, LLC

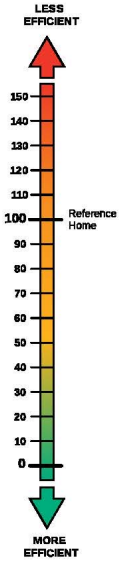
How this Home Performs on the Index Scale

Learn more about the HERS® Index at hersindex.com

HERS® INDEX **70**

HERS$_{H2O}$® INDEX **68**

CARBON INDEX **N/A**



RATINGS & CERTIFICATIONS

All Ratings and Certifications are optional, a check mark indicates your home has received the applicable designation.

- [x] RESNET HERS INDEX
- [ ] ENERGY STAR
- [x] RESNET HERS$_{H2O}$
- [x] WaterSense Meets EPA Criteria
- [ ] ZERO ENERGY READY HOME U.S. DEPARTMENT OF ENERGY
- [ ] RESNET CARBON INDEX

Estimated Annual Energy Use	Estimated Annual Cost Savings	Estimated Annual Carbon Savings	Estimated Annual Water Savings (gallons)
44,580 Btu	$509.00	-3 tons	66,000

ICC INTERNATIONAL CODE COUNCIL®
IECC Code Compliance (R406: ERI)

IRS
45L Tax Credit

Freddie Mac
Green Mortgages

CoreLogic
MLS Aggregation

Appraisal Institute™
Appraisal Portal

E S G
Builder ESG Reporting

Zillow Integration (coming soon…)

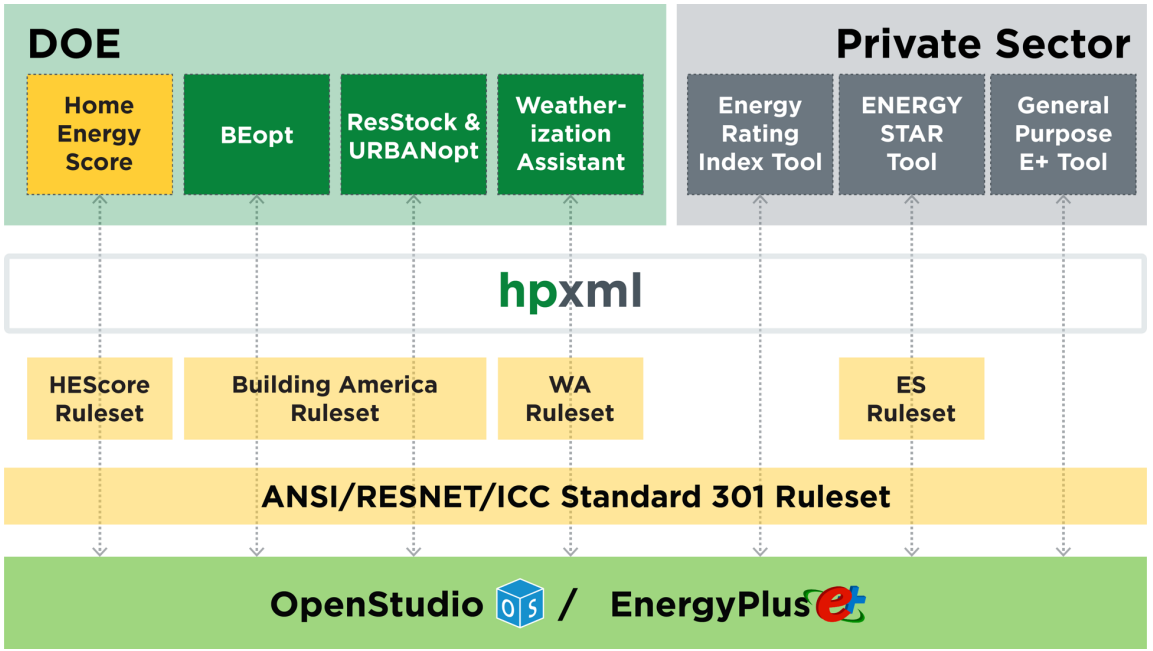
Home Energy Score Modeling

Noel Merket
CalBEM
20 November 2024

Photo from iStock-627281636

Energy Modeling Approach

- ✓ Foundational models are open source.
- ✓ Built upon industry standard rulesets and calculations.
- ✓ Ensures consistency across programs.
- ✓ Reduces development cost.



Multifamily

- Modeling the ***dwelling unit***, not the whole building.
- Walls, floors, and ceilings can individually be adjacent to other units, common spaces.
- Infiltration assumptions for multifamily.
- Steel frame walls
- Flat roofs

- Further down the road:
  - Shared HVAC
  - Shared Domestic Hot Water

Photo from Microsoft stock image

Manufactured Homes

- Updated geometry for single/double/triple-wide.
- Added belly and wing foundation type and insulation measures.
- Bowstring roof

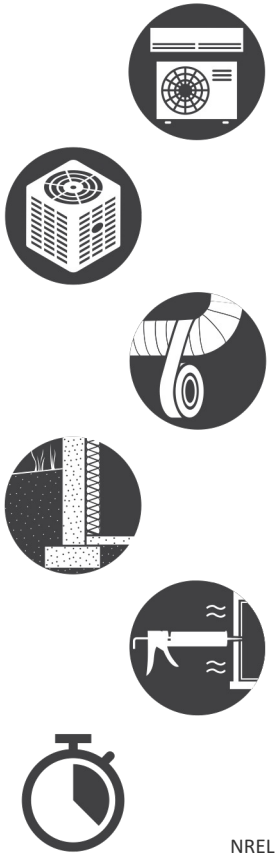
- Aligning modeling assumptions with DOE Weatherization Assistant's Mobile Home Energy Audit (MHEA)

Photo by Roger Starnes Sr on Unsplash

2024 Modeling Improvements

2024: Modeling Improvements

- Further updated modeling assumptions to better reflect the equipment available on the market today
  - Air source heat pumps
  - Ground source heat pumps
  - Central air conditioners
  - SEER2/HSPF2/CEER/UEF rating inputs
- Duct leakage measurement inputs (when available)
- Air infiltration model improvements
- Foundation heat transfer improvements
- Window interior shading improvements
- Updated to latest ANSI/RESNET/ICC 301-2022 to maintain consistency with industry standards
- Runtime improvements



Thank You

www.nrel.gov

noel.merket@nrel.gov

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NREL
Transforming ENERGY

BAYREN

Local Governments Empowering Our Communities

U.S. DEPARTMENT OF ENERGY

Home Energy Score

Know your home. Know your Score.

Home Energy Score in the Bay Area

November 20, 2024

Emily Alvarez, Program Manager, StopWaste/BayREN

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 State 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

Berkeley's History with Energy Efficiency

1987 — **RECO** — Homes required to complete 11 minimal energy efficiency measures at sale, transfer, or major renovation

1993 — **CECO** — Commercial buildings required to meet minimal energy efficiency measures at sale or transfer

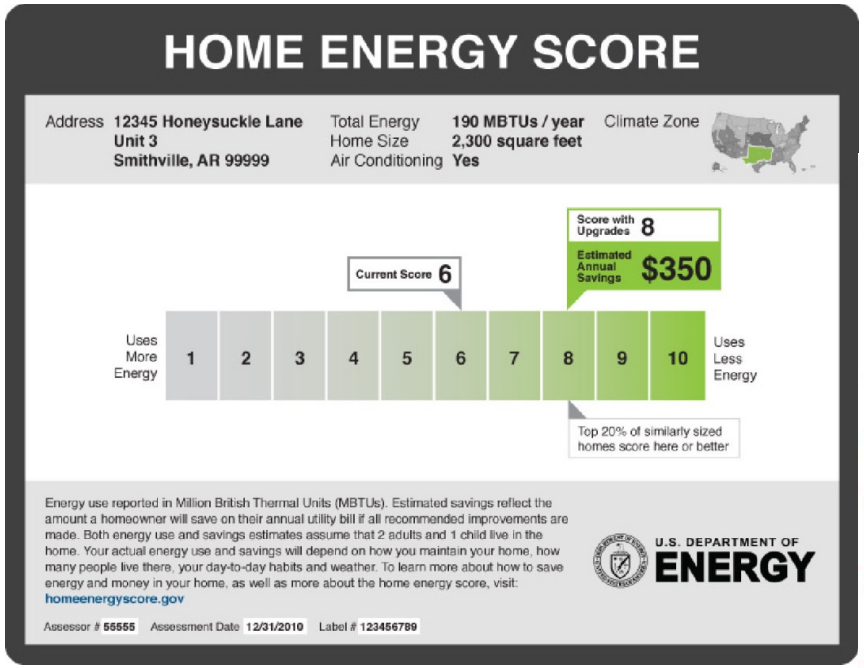
2009 — **Berkeley Climate Action Plan**

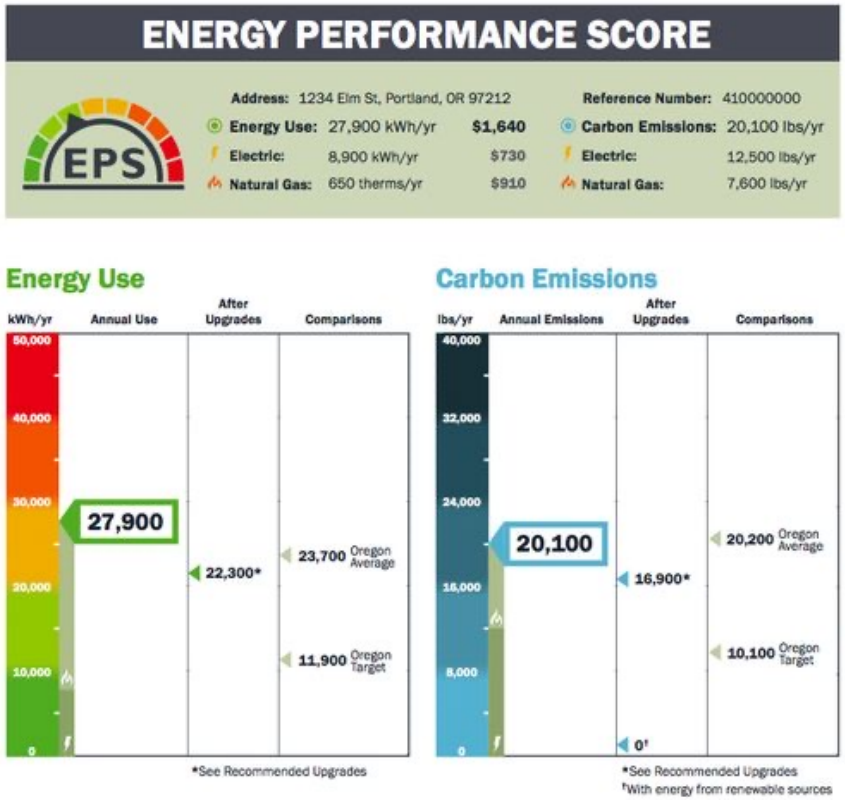
Buildings

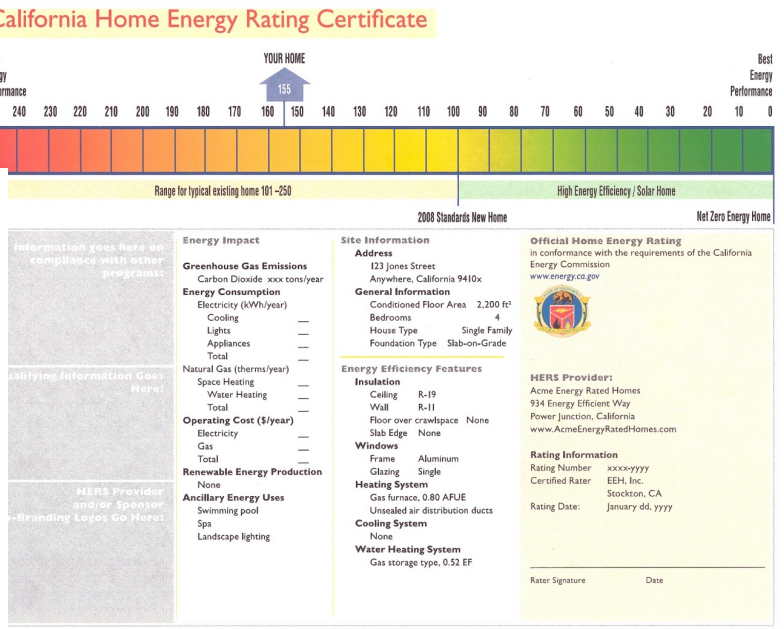
Reduce Emissions 30% by 2020
80% by 2050

2015 — **B**uilding **E**missions **S**aving **O**rdinance

Explored Several Types of Energy Audits

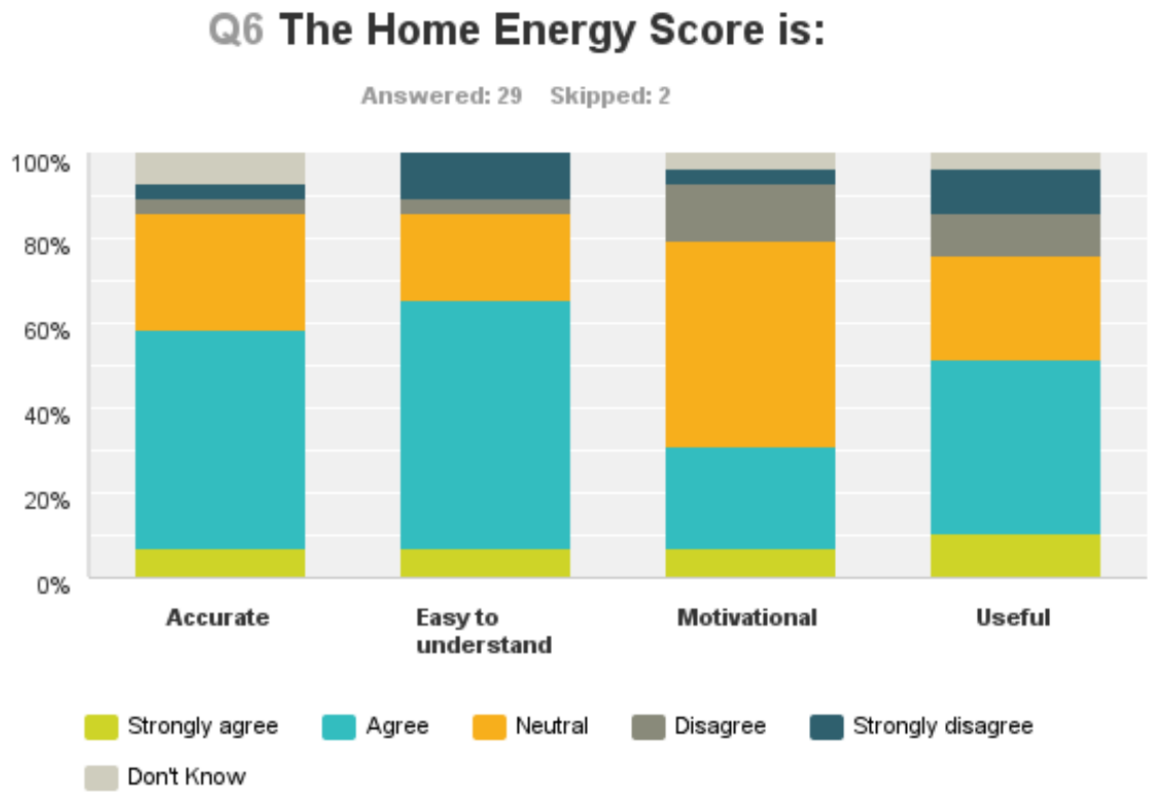






Priority for Easy to Understand Labels

- Home Energy Score selected for:
  - Scalability → price and time to conduct score
  - Intuitive for homeowner to understand
  - Easier to train and enroll workforce
  - Methodology developed by DOE and maintained by national labs reduced onus to upkeep something Berkeley-specific
  - Ability to incorporate into MLS and standardization for financing institutions



Home Energy Score
Energy Savings Pathway Report

BAYREN

U.S. DEPARTMENT OF ENERGY
Home Energy Score™

LOCATION:
BEDROOMS: 3 **HEATED FLOOR AREA:** 1,932 sq.ft. **YEAR BUILT:** 1908
COMPANY: **ASSESSMENT DATE:** 04/15/2024
EMAIL: **ASSESSOR:**
PHONE:

Current Score	Recommended Shell Improvements[1]	Full Home Electrification[2]
1	7	10
OUT OF 10	OUT OF 10	OUT OF 10
Estimate of Current Yearly Energy Costs[3]	Estimate of Energy Costs with Shell Improvements	Estimate of Energy Costs with Electrification
$3,823	$2,808	$2,833

Home Energy Score Details

Official Assessment: ID# 513669 Average U.S. Home's Score = 5

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 Type[3]

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[4]

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	State Information	US Rebates & Tax Credits	Incentive Information
SCAN ME	SCAN ME	SCAN ME	SCAN ME
bayren.org/homeowners	energy.ca.gov	energy.gov/save	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

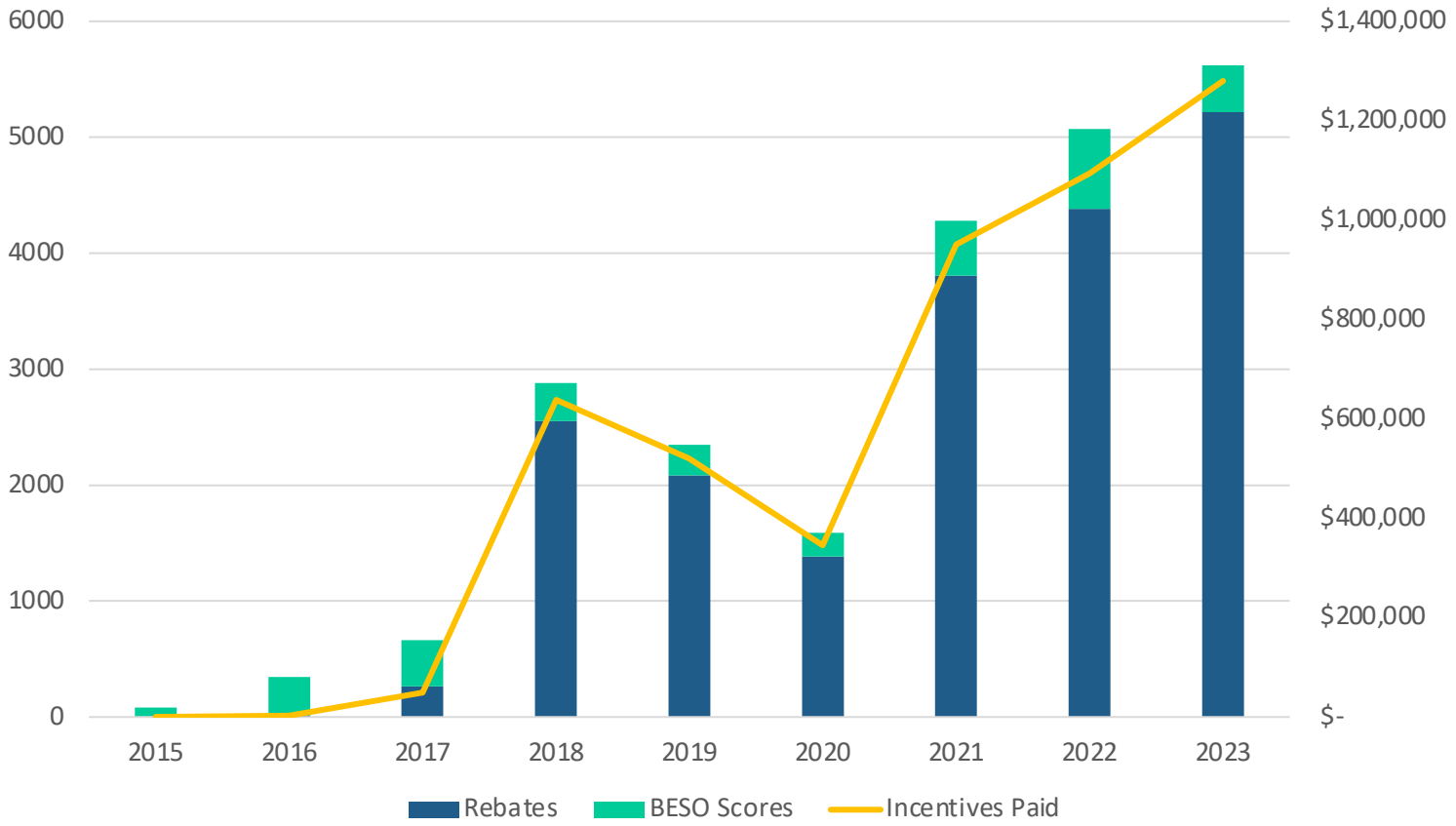
Current conditions and recommendations about building shell improvements

Current conditions and recommendations about electrification improvements

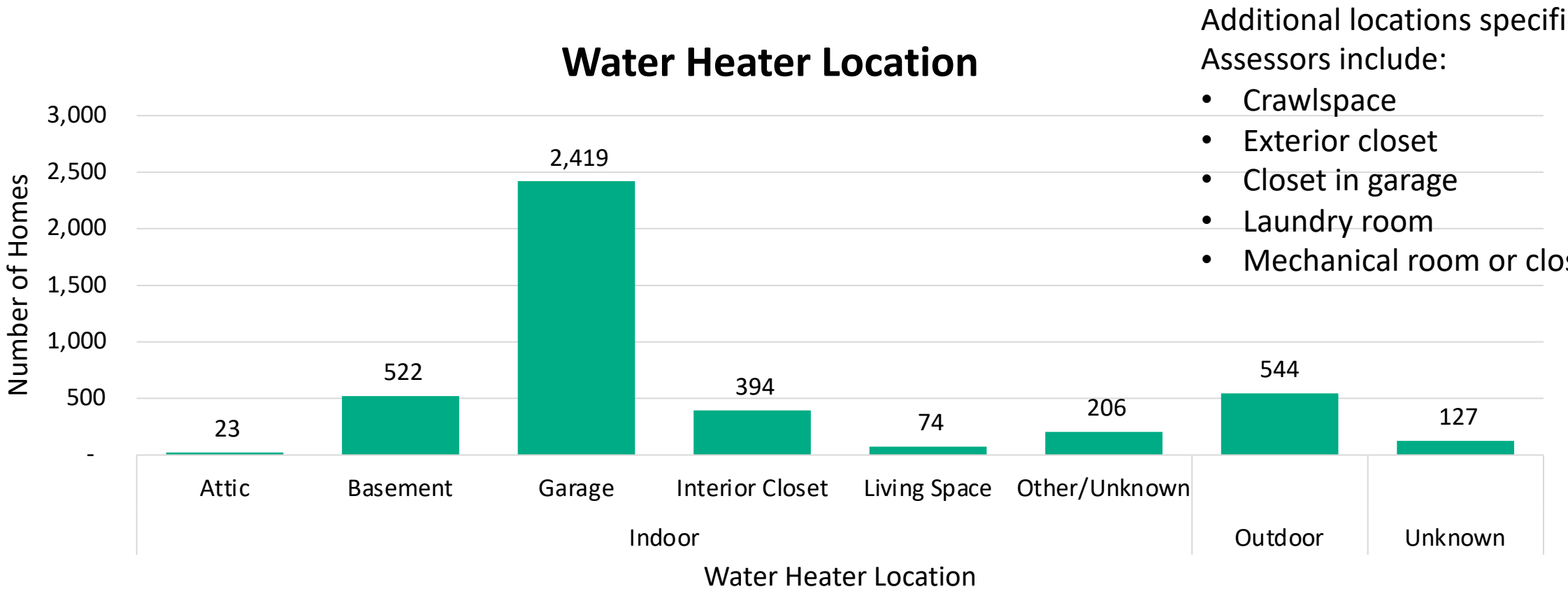
3rd page has (optional) Assessor notes and explanation of how calculations/ recommendations were made

Scores by Year – 2015-2023

Have scored over 1.3% of Bay Area single family homes!



Collection of Housing Stock Data



Additional locations specified by Assessors include:

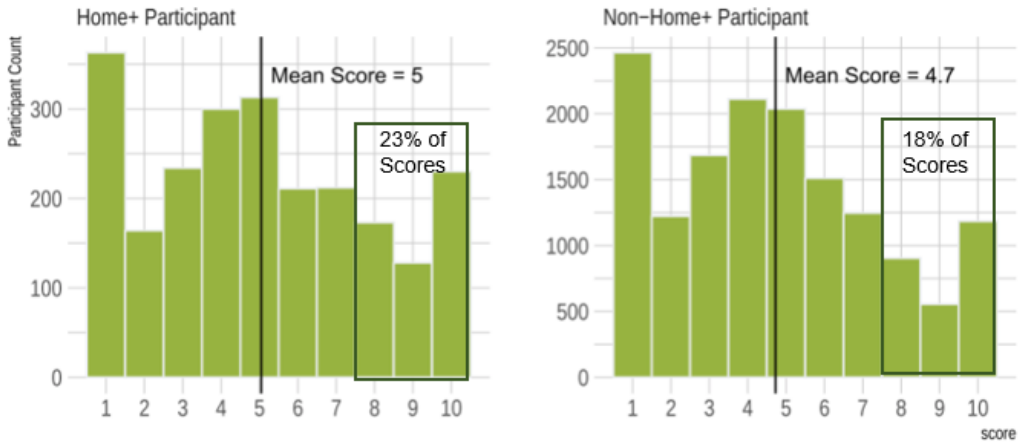
- Crawlspace
- Exterior closet
- Closet in garage
- Laundry room
- Mechanical room or closet

How Often Do Scores Translate to Upgrades?

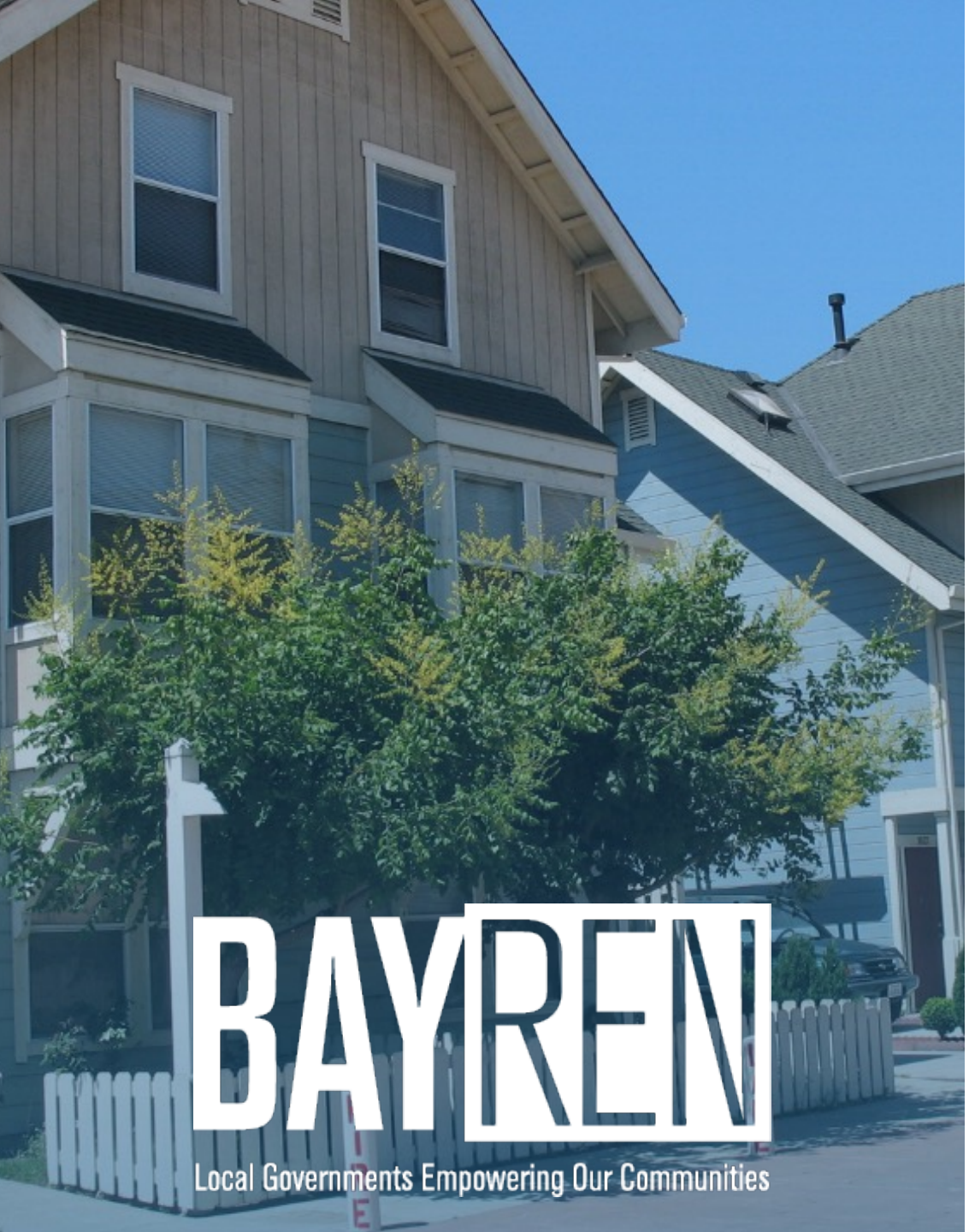
Timing of HES and Home+ Participation by Year

		Year of First Home+ Rebate						Total HES by Year	
		2018	2019	2020	2021	2022	No Home+		
Year of First HES Assessment	2015	-	-	-	-	-	1	1	0%
	2016	-	1	-	-	-	-	1	0%
	2017	-	-	-	-	-	1	1	0%
	2018	312 (10%)	98	8	8	12	2,655	3,093	18%
	2019	7	552 (24%)	34	10	11	1,649	2,263	13%
	2020	1	8	241 (14%)	46	8	1,409	1,713	10%
	2021	1	7	7	550 (13%)	126	3,676	4,367	25%
	2022	3	12	6	12	745 (14%)	4,635	5,413	31%
	2023	-	1	1	-	1	409	412	2%
Total Home+ by Year		324	679	297	626	903	14,435	17,264	100%
		2%	4%	2%	4%	5%	84%	100%	

Initial HES Distributions for Home+ (n=2,328) and Non-Home+ (n=14,938) Participants



Seeing ~11% of homes participating in a rebate program (BayREN Home+ or PG&E) after receiving HES



Thank you!

Emily Alvarez
ealvarez@stopwaste.org