ENERGY OFFICE

Home Energy Labeling

Working Group

August 24, 2022

Meeting Format

- 1 Hour WG Meeting
- Each WG Meeting to Focus on Particular Questions
- WG Input to be Collected with Feedback at Future Meetings
- Jam Board Available for Comments/Ideas

Today's Agenda

1. Project Overview
2. Questions and Feedback From July Meeting
3. South Carolina Label Design Discussion
    1. HES Overview
    2. Example Labels
    3. Example Report
    4. Key Label Design Questions
4. Action Items for Next Meeting

Energy Label Working Group Overview

- Energy Label Design
  - What is the key information for the SC label
  - How is the Information presented on the label
- Administration
  - Who creates the label
  - Who manages the assessor/rater
- Training & Education Needs
  - Who needs training
  - What is critical to use/understand the label
- Pilot Program
  - Possible locations/participants

Questions From July Meeting

Label Design

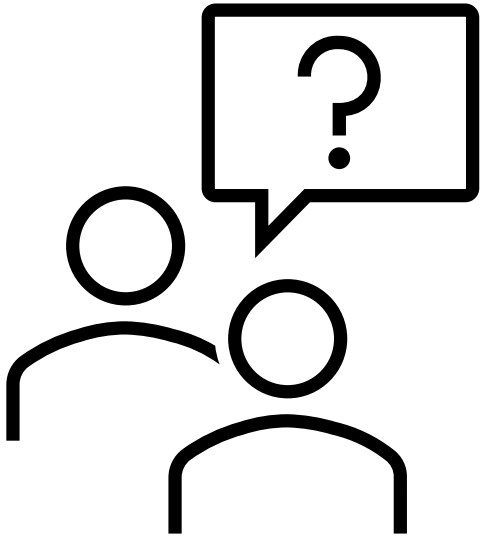
- Should there be a different label for rental versus owner occupied properties?
- How will you integrate all the data so that homeowners understand the data and it is usable for them?
- Are we also including a process to help homeowners and renters get info on the average bills?
- I see both of these use yearly energy costs. I know bills vary during the year but maybe people could better recognize the magnitude of a monthly bill is average or seasonal peak billing information available?
- Is there a way to combine info on each example into one label? Would that be confusing?
- Will info about the type of energy being used be provided? If homes use renewable or passive energy will that be part of the rating?
- Can the WG se the DOE HES inputs?

Questions From July Meeting

Implementation

- Existing Programs
  - How does this include what the utilities are already doing? Are the utilities integrated into the process?
- Training
  - Are we going to use existing training entities in the state?
  - SCACP Provides the BPI training for the weatherization assistance program. Also interested in providing internships and training through the weatherization assistance program and HUD programs.
- Access to Label Information
  - How do people normally access rental and home purchase info?
  - How are labels used? Is there an online component? Does it interface into existing online housing marketplaces like Zillow?
  - Fast forward to when a label is created for South Carolina what mechanism will be used to get labels on homes and in people's hands? legislative, government, peer pressure, incentives, etc?

Questions?



Energy Label Design

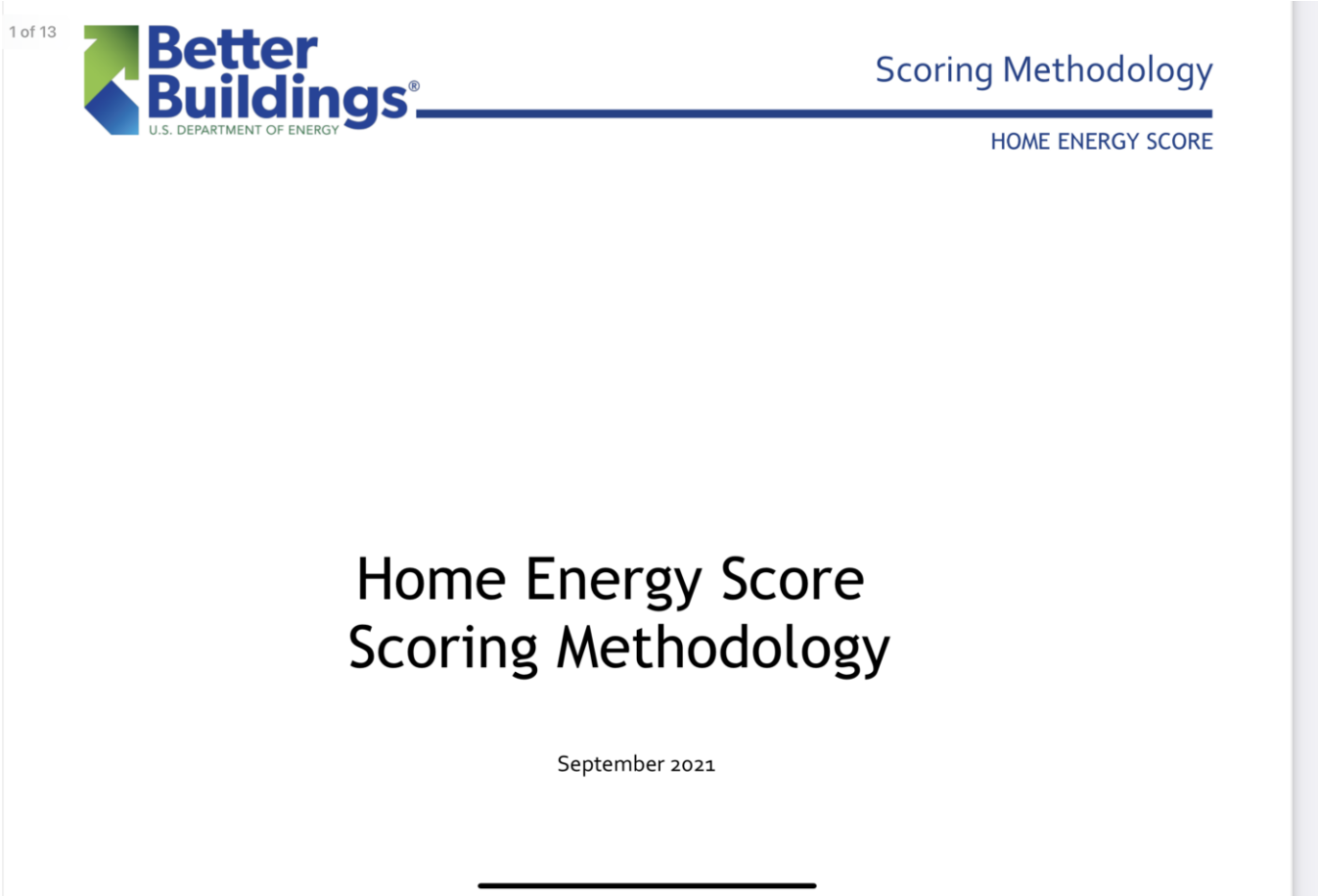
- What is the key information for the SC label to emphasize?
- How is the label information presented?
- Is there any key information missing from the label?

Software for Labeling

- DOE Home Energy Score
- RESNET Home Energy Rating System
  - EKOTROPE
  - REM/Rate
  - ENERGYGUAGE

Home Energy Score

How Does It Work?



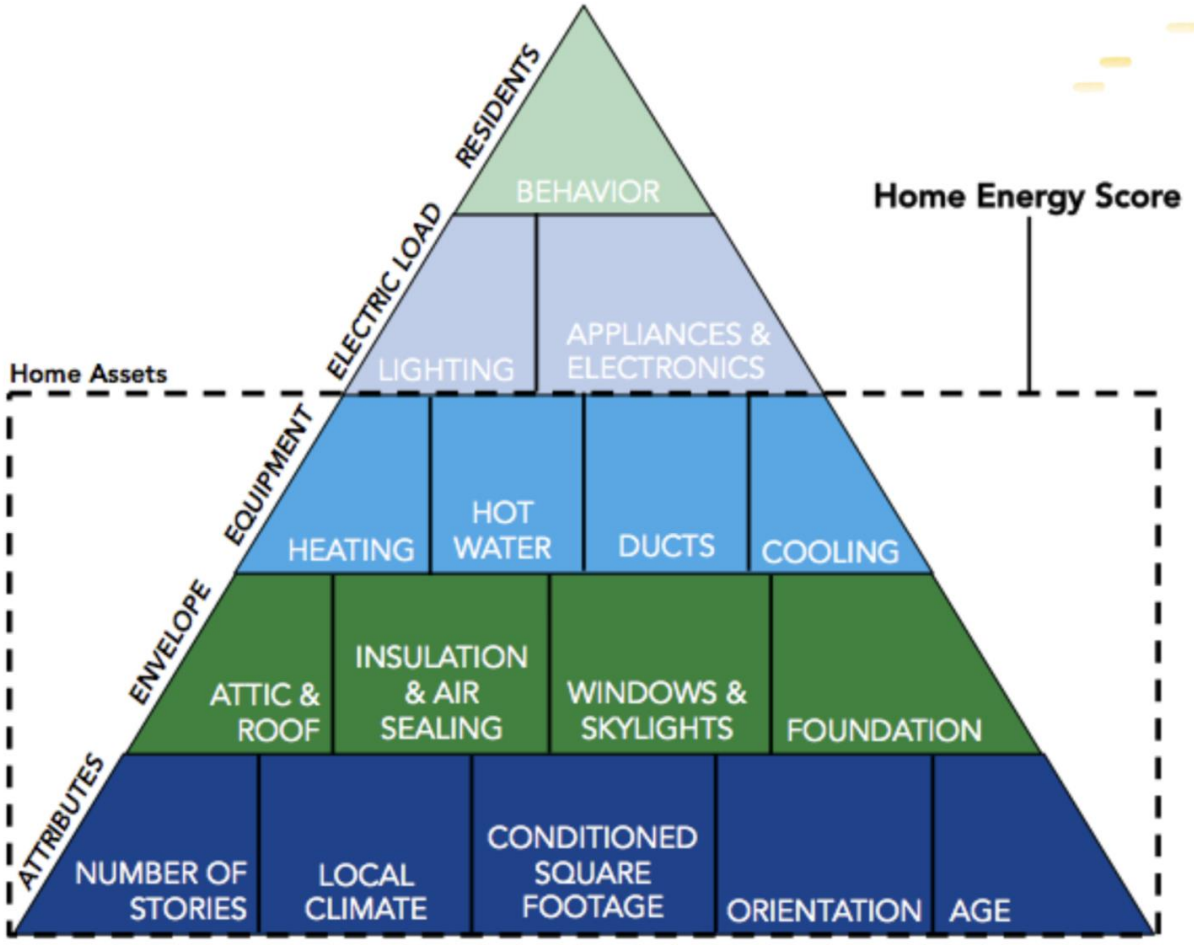
Home Energy Score Overview

- Home Energy Score is an **easy-to-produce rating** designed to help **homeowners/homebuyers gain useful information about a home's energy** performance
- Based on an in-home assessment typically completed in less than an hour
- Home Energy Score **lets a homeowner understand how efficient the home is and how it compares to others**
- Also **provides recommendations** on how to cost-effectively improve the home's energy efficiency
- Home Energy Score uses a **simple 1-to-10** scale where a 10 represents the most energy efficient homes

Home Energy Score Approach

- Home Energy Score is an "**asset rating**"
- An asset rating seeks to quantify the energy efficiency of a building **based upon the components of the house**
- does not take into account thermostat settings, appliances, or plug loads because these components can vary widely depending on occupant behavior

Figure 3. Home Energy Use Pyramid



Home Energy Score Approach

- An asset score allows homes to be **compared** on an "**apples to apples**" basis because it compares houses to one another based on their assets and **not how occupants operate the houses**
- A qualified Assessor inspects each home on-site and enters **50 data** points into the online Home Energy Scoring Tool
- The Scoring Tool scores a home on a **10-point scale**
- A 10 corresponds to lowest energy use and a 1 corresponds to highest energy use

Home Energy Score and Solar

- **Home Energy Scoring Tool accounts for solar PV in three metrics- the Score, estimated electricity usage, and estimated energy costs**
- To generate a Home Energy Score, the Scoring **Tool will subtract** *the* **estimated PV annual production** (in MBtu) **from the estimated energy required** to meet the home's heating, cooling, and hot water needs
- This new MBtu value is used to determine the home's Score – one that reflects all of the home's major energy-related assets, including PV
- The Home Energy Scoring Tool does not include PV as an automatic recommendation for homes to improve their Scores
- **If an Assessor believes a home is a good candidate to improve their Score by adding a PV system, they can utilize the Tool's "Alternative EEM"** feature to showcase the home's Score with Improvements with PV included

Home Energy Score Recommendations

- A **consistent set of upgrade recommendations** are considered for each home's assets (based on the home's location)
- **Upgrades considered in the Scoring Tool include improvements to the house envelope and major equipment ("assets")**
- It does not include upgrades of lighting, appliances or behavioral changes (e.g. change thermostat settings)
- The Scoring Tool applies a fixed, standardized retrofit cost and generates recommendations that provide the highest performance level with a **payback time of 10 years or fewer**

Home Energy Score Recommendations

- These recommendations are provided in two categories:
  - **”Repair Now”** improvements can help the homeowner save energy immediately
  - **”Replace Later”** improvements are recommendations that should be implemented when it is time to replace specific equipment or building materials

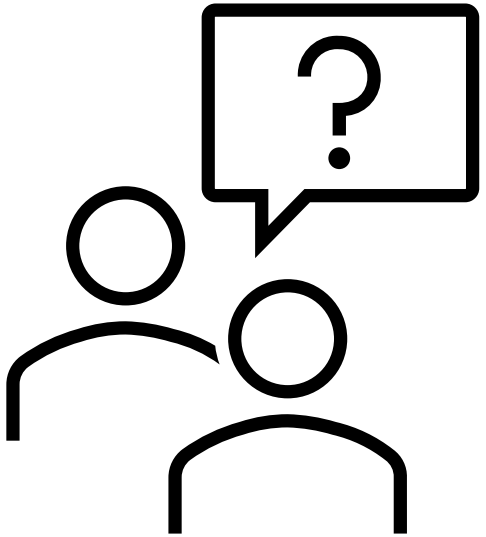
Home Energy Score Recommendations

- ”Repair Now” improvements include:
  - Attic insulation
  - Basement wall insulation
  - Basement/crawlspace floor insulation
  - Crawlspace wall insulation
  - Air tightness
  - Exterior wall insulation
  - Duct sealing
  - Duct insulation
- ”Replace Later” improvements include:
  - Central air conditioner
  - Boiler, furnace or heat pump
  - Room air conditioner
  - Roof – reflectance
  - Roof - insulated sheathing
  - Skylights
  - Siding - insulated sheathing
  - Water heater
  - Windows

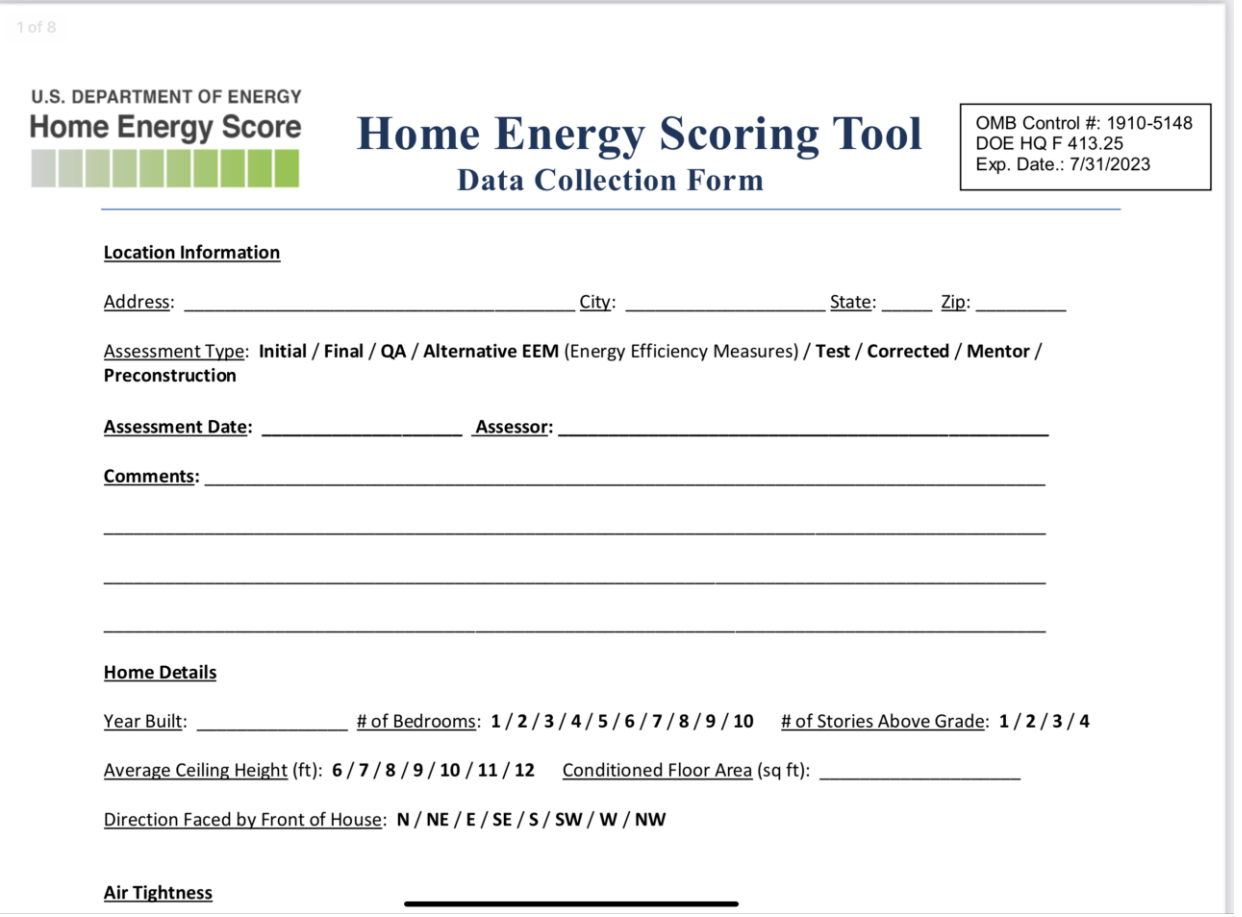
Home Energy Score Recommendations And House Score

- It is important to note that **the sum of the savings from each measure recommended does not equal the total savings for the package of selected upgrades** (the number shown on the label)
- This difference is due to interactive effects of some energy improvements
- For example, **insulation will reduce heat and cooling energy use- This will reduce the potential savings available to the heating/cooling system upgrade**
- This difference will be reflected in the total savings number on the Home Energy Score label

Questions?



HES Survey Questions



1 of 8

U.S. DEPARTMENT OF ENERGY
Home Energy Score

Home Energy Scoring Tool
Data Collection Form

OMB Control #: 1910-5148
DOE HQ F 413.25
Exp. Date.: 7/31/2023

Location Information

Address: _____ City: _____ State: _____ Zip: _____

Assessment Type: **Initial / Final / QA / Alternative EEM** (Energy Efficiency Measures) **/ Test / Corrected / Mentor / Preconstruction**

Assessment Date: _____ **Assessor:** _____

Comments: _____

_____

_____

_____

Home Details

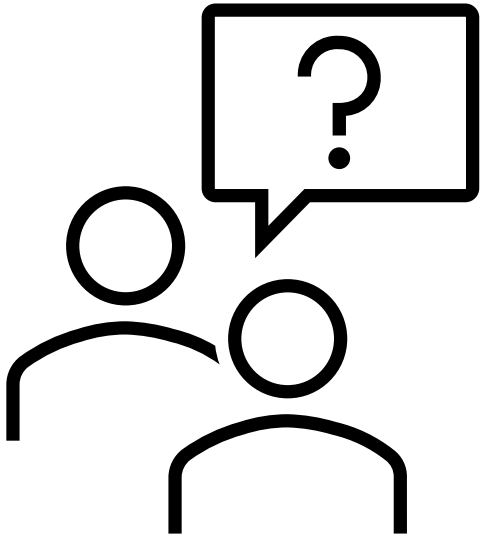
Year Built: _____ # of Bedrooms: **1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10** # of Stories Above Grade: **1 / 2 / 3 / 4**

Average Ceiling Height (ft): **6 / 7 / 8 / 9 / 10 / 11 / 12** Conditioned Floor Area (sq ft): _____

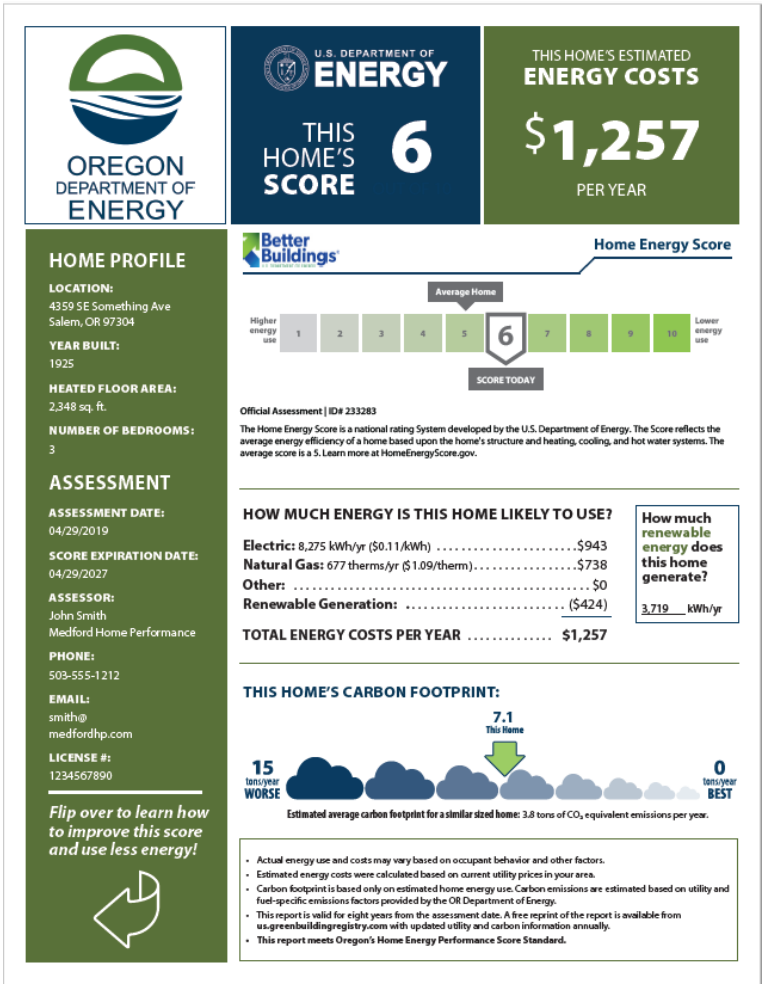
Direction Faced by Front of House: **N / NE / E / SE / S / SW / W / NW**

Air Tightness

Questions?



State Label Examples



OREGON DEPARTMENT OF ENERGY

U.S. DEPARTMENT OF ENERGY

THIS HOME'S SCORE 6

THIS HOME'S ESTIMATED ENERGY COSTS $1,257 PER YEAR

HOME PROFILE

LOCATION:
4359 SE Something Ave
Salem, OR 97304

YEAR BUILT:
1925

HEATED FLOOR AREA:
2,348 sq. ft.

NUMBER OF BEDROOMS:
3

ASSESSMENT

ASSESSMENT DATE:
04/29/2019

SCORE EXPIRATION DATE:
04/29/2027

ASSESSOR:
John Smith
Medford Home Performance

PHONE:
503-555-1212

EMAIL:
smith@
medfordhp.com

LICENSE #:
1234567890

Flip over to learn how to improve this score and use less energy!

Better Buildings — Home Energy Score

Average Home

Higher energy use 1 2 3 4 5 **6** 7 8 9 10 Lower energy use

SCORE TODAY

Official Assessment | ID# 233283

The Home Energy Score is a national rating System developed by the U.S. Department of Energy. The Score reflects the average energy efficiency of a home based upon the home's structure and heating, cooling, and hot water systems. The average score is a 5. Learn more at HomeEnergyScore.gov.

HOW MUCH ENERGY IS THIS HOME LIKELY TO USE?

Electric: 8,275 kWh/yr ($0.11/kWh)	$943
Natural Gas: 677 therms/yr ($1.09/therm)	$738
Other:	$0
Renewable Generation:	($424)
TOTAL ENERGY COSTS PER YEAR	**$1,257**

How much renewable energy does this home generate?
3,719 kWh/yr

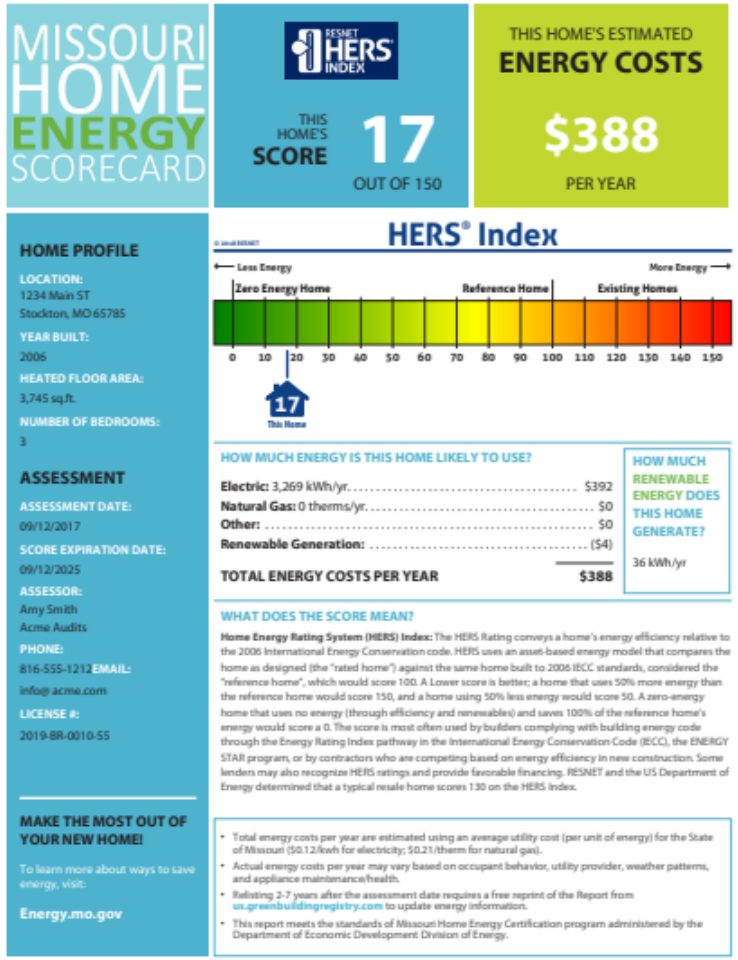
THIS HOME'S CARBON FOOTPRINT:

7.1 This Home

15 tons/year WORSE — 0 tons/year BEST

Estimated average carbon footprint for a similar sized home: 3.8 tons of CO_2 equivalent emissions per year.

- Actual energy use and costs may vary based on occupant behavior and other factors.
- Estimated energy costs were calculated based on current utility prices in your area.
- 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 OR Department of Energy.
- This report is valid for eight years from the assessment date. A free reprint of the report is available from us.greenbuildingregistry.com with updated utility and carbon information annually.
- This report meets Oregon's Home Energy Performance Score Standard.



MISSOURI HOME ENERGY SCORECARD

RESNET HERS INDEX — THIS HOME'S SCORE 17 OUT OF 150

THIS HOME'S ESTIMATED ENERGY COSTS $388 PER YEAR

HOME PROFILE

LOCATION:
1234 Main ST
Stockton, MO 65785

YEAR BUILT:
2006

HEATED FLOOR AREA:
3,745 sq.ft.

NUMBER OF BEDROOMS:
3

ASSESSMENT

ASSESSMENT DATE:
09/12/2017

SCORE EXPIRATION DATE:
09/12/2025

ASSESSOR:
Amy Smith
Acme Audits

PHONE:
816-555-1212 EMAIL:
info@ acme.com

LICENSE #:
2019-BR-0010-55

MAKE THE MOST OUT OF YOUR NEW HOME!

To learn more about ways to save energy, visit:

Energy.mo.gov

HERS® Index

Less Energy ⟵ More Energy ⟶

Zero Energy Home | Reference Home | Existing Homes

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

17 This Home

HOW MUCH ENERGY IS THIS HOME LIKELY TO USE?

Electric: 3,269 kWh/yr	$392
Natural Gas: 0 therms/yr	$0
Other:	$0
Renewable Generation:	($4)
TOTAL ENERGY COSTS PER YEAR	**$388**

HOW MUCH RENEWABLE ENERGY DOES THIS HOME GENERATE?
36 kWh/yr

WHAT DOES THE SCORE MEAN?

Home Energy Rating System (HERS) Index: The HERS Rating conveys a home's energy efficiency relative to the 2006 International Energy Conservation code. HERS uses an asset-based energy model that compares the home as designed (the "rated home") against the same home built to 2006 IECC standards, considered the "reference home", which would score 100. A Lower score is better; a home that uses 50% more energy than the reference home would score 150, and a home using 50% less energy would score 50. A zero-energy home that uses no energy (through efficiency and renewables) and saves 100% of the reference home's energy would score a 0. The score is most often used by builders complying with building energy code through the Energy Rating Index pathway in the International Energy Conservation Code (IECC), the ENERGY STAR program, or by contractors who are competing based on energy efficiency in new construction. Some lenders may also recognize HERS ratings and provide favorable financing. RESNET and the US Department of Energy determined that a typical resale home scores 130 on the HERS Index.

- Total energy costs per year are estimated using an average utility cost (per unit of energy) for the State of Missouri ($0.12/kwh for electricity; $0.21/therm for natural gas).
- Actual energy costs per year may vary based on occupant behavior, utility provider, weather patterns, and appliance maintenance/health.
- Relisting 2-7 years after the assessment date requires a free reprint of the Report from us.greenbuildingregistry.com to update energy information.
- This report meets the standards of Missouri Home Energy Certification program administered by the Department of Economic Development Division of Energy.

PORTLAND HOME ENERGY SCORE

Know the score. Outsmart energy waste.

U.S. DEPARTMENT OF ENERGY

THIS HOME'S SCORE **3** OUT OF 10

THIS HOME'S ESTIMATED **ENERGY COSTS**

$1,233 PER YEAR

HOME PROFILE

LOCATION:
123 Main St
Portland, OR 97201

YEAR BUILT:
1924

HEATED FLOOR AREA:
1,500 sq. ft.

NUMBER OF BEDROOMS:
3

ASSESSMENT

ASSESSMENT DATE:
12/22/2016

EXPIRATION DATE:
12/22/2021

ASSESSOR:
Maria Gomez
Gomez Energy Partners

PHONE:
503-555-1211

EMAIL:
maria@gomezenergy.com

CCB LICENSE #:
1234567890

Flip over to learn how to improve this score and use less energy!

Better Buildings — Home Energy Score

Official Assessment | ID#1234567

The Home Energy Score is a national rating system developed by the U.S. Department of Energy. The Score reflects the energy efficiency of a home based on the home's structure and heating, cooling, and hot water systems. The average score is a 5. Learn more at HomeEnergyScore.gov

HOW MUCH ENERGY IS THIS HOME LIKELY TO USE?

Electric: 10,000 kWh/yr	$600
Natural Gas: 700 therms/yr	$633
Other: _____ gal/yr	$0
TOTAL ENERGY COSTS PER YEAR	**$1,233**

How much renewable energy does this home generate?

3,000 kWh/yr

THIS HOME'S CARBON FOOTPRINT:

Estimated average carbon footprint for a similar sized home: 3.8 tons of CO_2 equivalent emissions per year.

- Actual energy use and costs may vary based on occupant behavior and other factors.
- Estimated energy costs were calculated based on current utility prices ($0.11/kwh for electricity; $0.85/therm for natural gas; $2.50/gal for heating oil; $3.50/gal for propane).
- Carbon footprint is based only on estimated building energy use.
- Carbon emissions are estimated based on utility- and fuel-specific emissions factors provided by the Oregon Department of Energy.
- **This report meets Oregon's Home Energy Performance Score Standard and complies with Portland City Code Chapter 17.108.**

Score today:	Score with improvements:*	Estimated energy savings with improvements:	Estimated carbon reduction with improvements:
3	7	$500	27%

TACKLE ENERGY WASTE TODAY!

Enjoy the rewards of a comfortable, energy efficient home that saves you money.

- ☑ Get your home energy assessment (Done!)
- ☐ Choose which energy upgrades to address first
- ☐ Get a bid. Find an Energy Trust trade ally contractor by visiting **www.energytrust.org/findacontractor** or calling toll free **1-866-368-7878**
- ☐ Find financing options and other helpful services at **www.enhabit.org**

* PRACTICAL ENERGY IMPROVEMENTS | COMPLETE NOW OR LATER

To achieve the "score with improvements," all recommended improvements listed below must be completed. Improvements all have a simple payback of ten years or less and may be eligible for mortgage financing. For a more detailed explanation of costs and payback, please get a bid from a contractor.

FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS
Basement wall insulation	No insulation	Insulate to R15
Attic insulation	No insulation	Insulate to R49
Foundation wall insulation	No insulation	Insulate to R11
Wall insulation	No insulation	Insulate to R15
Envelope/Air Sealing	Not professionally air sealed	Seal the gaps and cracks that leak air into your home
Duct insulation	R3	Insulate to R6
Duct sealing	45% leakage	Reduce leakage to 10% of total airflow
Floor insulation	R5	Insulate to R30
Gas furnace	78% AFUE	Upgrade to ENERGY STAR 95% AFUE
Skylights	Single-paned	Replace with ENERGY STAR (double-pane solar-control low-E argon gas wood frame)
Water heater	Standard electric tank	Upgrade to ENERGY STAR (heat pump, EF 2.76)
Windows	Single-paned aluminum	Replace with ENERGY STAR (double-pane solar-control low-E argon gas wood frame)

YOU CAN DO IT YOURSELF!

Looking for low-cost ways to cut energy waste, boost your comfort and lower your energy bills? Visit the resources below to learn about easy changes you can make today:

www.energytrust.org/tips and **www.communityenergyproject.org/services**

VT HOME ENERGY PROFILE

THIS HOME'S EXPECTED ENERGY USE	THIS HOME'S EXPECTED ENERGY COST	U.S. DEPARTMENT OF ENERGY HOME ENERGY SCORE
93 MMBtu ANNUALLY	$3,137 ANNUALLY	9/10

TURN THE PAGE TO SEE HOW YOU SCORE NATIONALLY.

The Vermont Home Energy Profile is a report on three related components of home energy: usage, cost, and efficiency. The profile is based on the home's structure and heating, cooling, and hot water systems. Energy usage and costs are estimates only. Actual usage and costs may vary and are based on many factors such as weather and occupant behavior. See reverse side for details.

HOME INFORMATION

LOCATION:
123 Main Street
Anytown, VT
05000

YEAR BUILT:
2005

SIZE (SQ. FT.):
3,029

REPORT INFORMATION

PROFILE ISSUE DATE:
X/XX/20XX

ASSESSOR:
John Doe

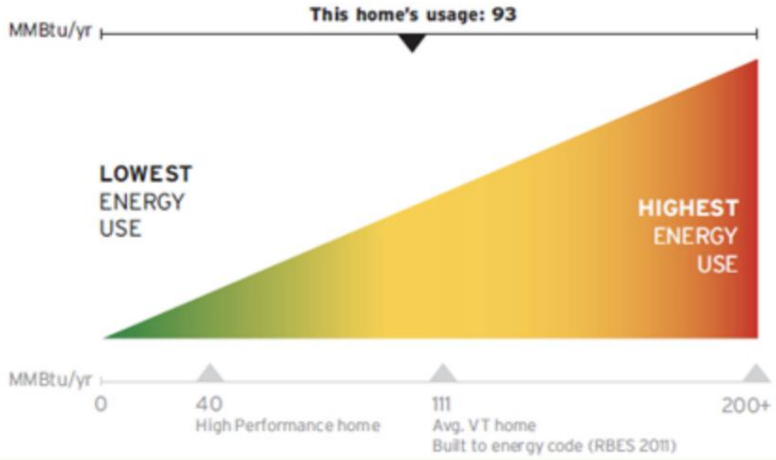
ORGANIZATION:
Common Sense Audits

PHONE:
888-921-5990

Efficiency Vermont

93 MMBtu — Expected Annual Energy Usage

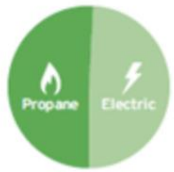
This scale represents how much energy your home is expected to use over the course of a year, placed on a scale of 0 to 200+, where zero energy usage is most efficient.



$3,137 — Expected Annual Energy Costs*

The breakdown of fuel usage is based on the fuels used in this home and average fuel costs as of June 2015.

Propane	$1,578	631 gal @ $2.50 / gal
Electric	$1,559	10,396 kWh @ $0.15 / kWh



Energy Features that Contribute to this Home's Profile

Envelope Tightness: 650 CFM50
Attic Insulation: R-38
Wall Insulation: R-19

Primary Heating System/Fuel: Propane Boiler
Primary Heating System Efficiency: 88 AFUE
Water Heating: Propane, Indirect

Windows: Double-pane

Home MPG
Springfield Area Program

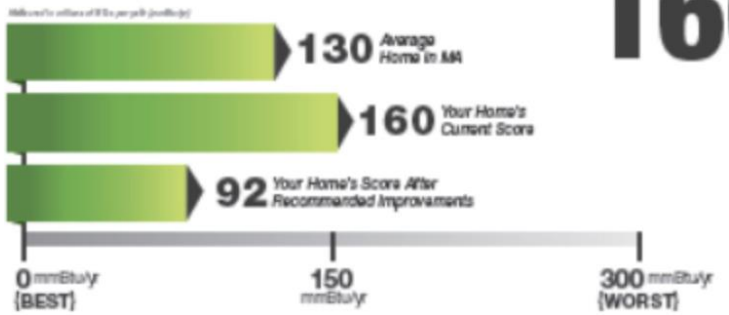
YOUR HOME'S
ENERGY PERFORMANCE SCORE

Home MPG, a program within Mass Save®, provides you with your home's "miles per gallon" energy performance rating, called an "energy performance score" or EPS. By helping you better understand your home's energy use, Home MPG helps you make smart decisions about implementing improvements that make your home more energy efficient and reduce your energy costs.

Your Home's ENERGY PERFORMANCE SCORE

This score shows the estimated total energy use (electricity and heating fuel) of your home for one year. *The lower the score, the better!*

160

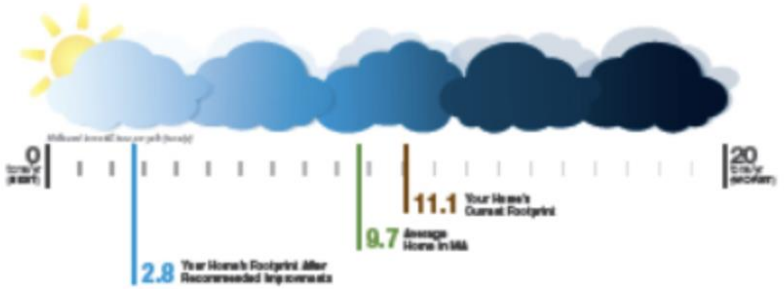


Estimated percentage of energy use by fuel type: Electric: <XX%>, Natural Gas: <XX%>

Your Home's CARBON FOOTPRINT

This score shows the estimated carbon emissions based on the annual amounts, types, and sources of fuels used in your home. The lower the score, the less carbon is released into the atmosphere to power your home.

11.1



Estimated average carbon footprint (tons/yr): Electric <XX>, Natural Gas <XX>

PREPARED FOR
<Customer Name>
<Customer Address>
<City>, <State> <Zip>
Ref #: <Site ID>

Year Built: <XXXX>
Sq Footage: <XXXX>
Bedrooms: <X>
Primary Heating Fuel: <XXXX>

EPS Report Date: <XX/XX/XXXX>
Energy Specialist: <Energy Specialist Name>

DOLLARS & SENSE

Current Estimated Energy Costs **$2000** *Per Year*

ESTIMATED ENERGY SAVINGS

$1150 *Per Year*

Based on implementing all of the recommended energy efficiency improvements

ENERGY.SC.GOV

Home Energy Rating Certificate

Confirmed Report

Rating Date:
Registry ID: 631462669
Rating Number: 631462669

ekotrope

HERS® Index Score:

47

Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$5,912

*Relative to an average U.S. home

Home:

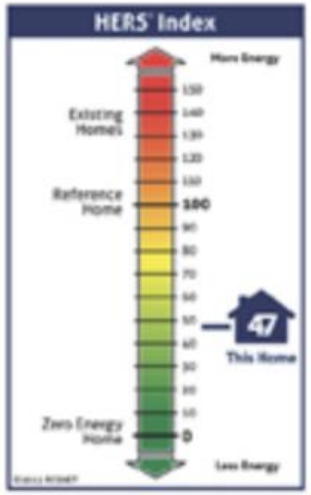
123 Fake St, Anytown, CO

Builder:

Ekotrope

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	77.0	$2,182
Cooling	0.9	$53
Hot Water	17.1	$240
Lights/Appliances	36.0	$1,944
Service Charges		$0
Generation (e.g. Solar)	23.1	-$2,689
Total:	**131.1**	**$1,730**



Home Feature Summary:

Home Type:	Single family detached
Conditioned Floor Area:	4,500 sq. ft.
Number of Bedrooms:	4
Primary Heating System:	Furnace • Natural Gas • 95 AFUE
Primary Cooling System:	Air Conditioner • Electric • 16 SEER
Primary Water Heating:	Water Heater • Natural Gas • 0.67 Energy Factor
House Tightness:	1660 CFM50
Duct Leakage to Outside:	0 CFM25
Above Grade Walls:	R-21
Ceiling:	R-50
Window Type:	U-Value: 0.310, SHGC: 0.250
Foundation Walls:	R-11

This home meets or exceeds the criteria of the following:

Energy Star v3
Energy Star v3.1
2006 International Energy Conservation Code
2009 International Energy Conservation Code
2012 International Energy Conservation Code
2015 International Energy Conservation Code

Rating Completed by:

Energy Rater: Test Rater
RESNET ID:5459458

Rating Company: Ekotrope Rating Co.

Rating Provider: Ekotrope Provider

Test Rater, Certified Energy Rater

ekotrope

Ekotrope HERS Rating Tool - Version:2.0.0.1590
The Home Energy Rating Standard Disclosure for this house is available from the rating provider.

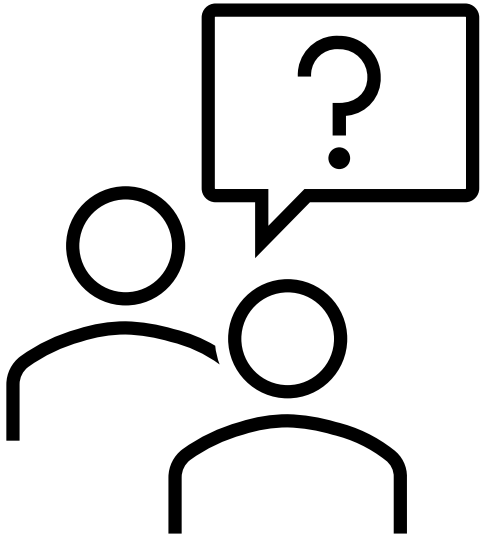
What's On A Label?

- Home location, age, heated floor area, # of bedrooms
- Assessor ID and contact info
- Home's score (HES or HERS number)
- Total estimated energy cost
- Electric, gas and other energy use
- Carbon footprint of home
- List of recommended improvements
- Estimated savings with improvements
- Score with improvements
- Carbon reduction with improvements
- Where to find more information

Energy Label Design Key Questions

- What is the key information for the SC label to emphasize?
- How is the label information presented?
- Is there any key information missing from the label?

Questions?



Questions or Comments

swashington@ors.sc.gov
builtenvironmentllc@gmail.com

Project Information Page:
https://energy.sc.gov/node/3970

Thank You!

ENERGY.SC.GOV

SCEnergyOffice