



Home Energy Score™ Manufactured Housing, Multifamily Updates

NASEO Home Energy Labeling Task Force Call

October 8, 2024

U.S. DEPARTMENT OF ENERGY
Home Energy Score™





Home Energy Score™ Program



Goal: Build market value for home energy efficiency through standard data and metrics that are applicable to all existing homes.



Target Markets

- ✓ Existing single-family homes
- ✓ Townhomes
- ✓ **Manufactured, multifamily**



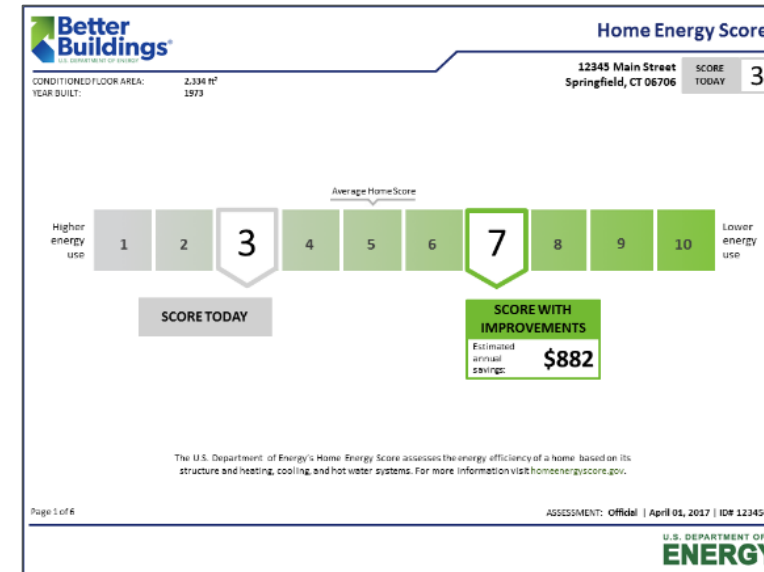
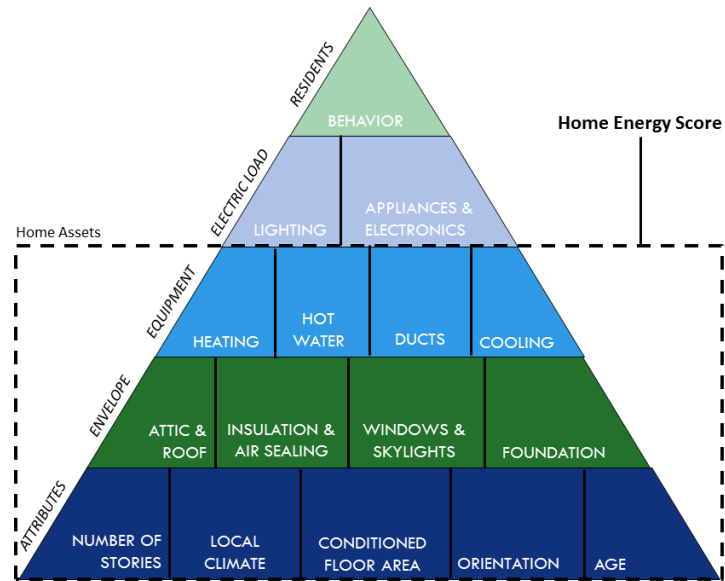
Focus Areas

- ✓ Consumer education
- ✓ Data aggregation
- ✓ Real estate integration

U.S. DEPARTMENT OF ENERGY
Home Energy Score



Home Energy Score – A “Miles Per Gallon” Rating for Homes



An Energy Asset Rating

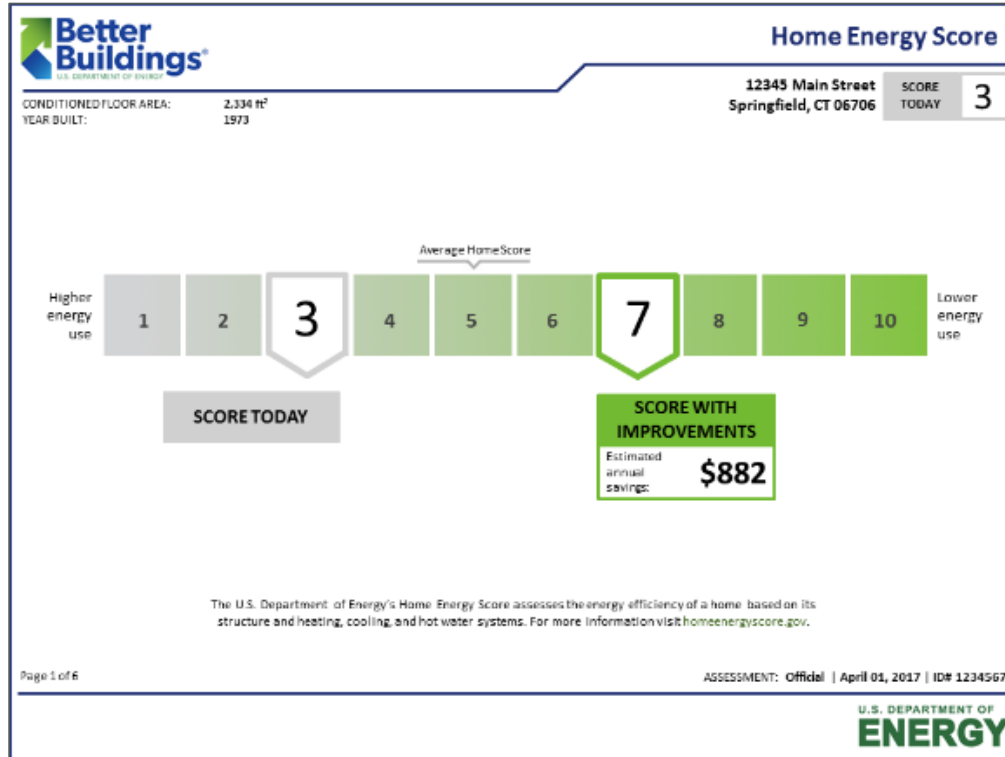
- ✓ Features that convey in home sales
- ✓ Represent bulk of features that impact home energy use
- ✓ Data collection typically under one hour for Assessors
- ✓ Nationally applicable, results in comparable estimates for homes regardless of previous occupancy status
- ✓ Analogous to MPG ratings & nutrition facts in structure

Score Report

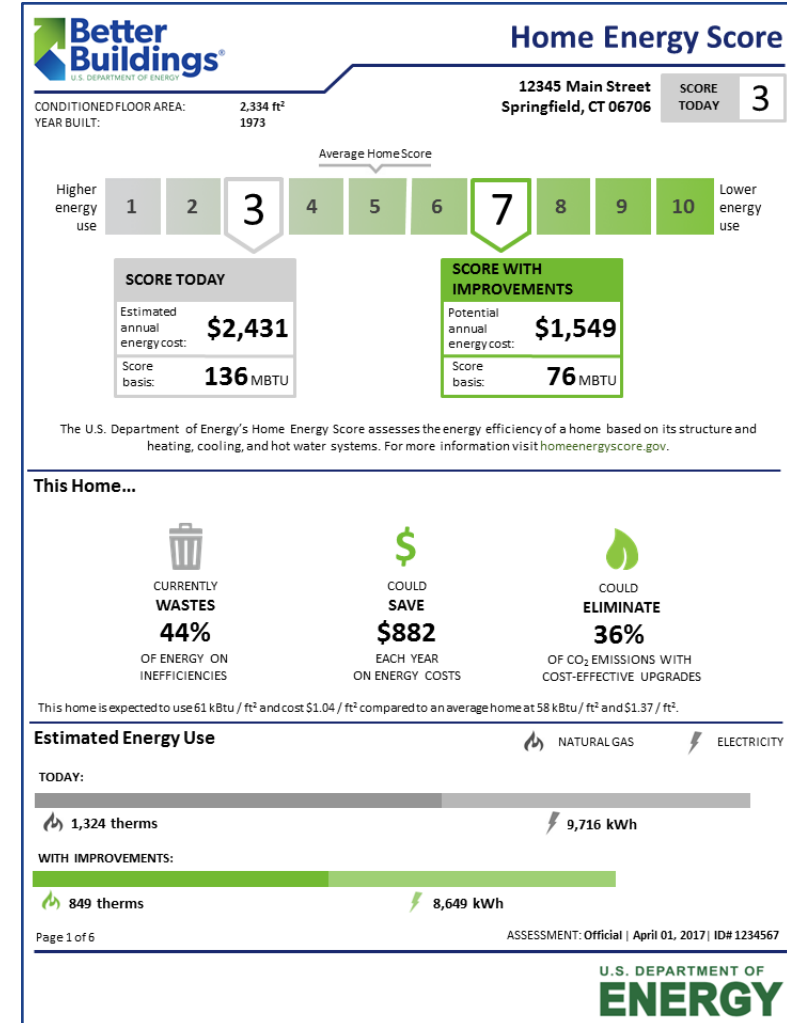
- ✓ Easy to understand summary score from 1 to 10
- ✓ Cost-effective recommendations to save energy and improve score (customizable to local goals & incentives)
- ✓ Comparable home energy use and cost estimates
- ✓ Standard DOE report or customize to your needs/priorities
- ✓ Link to financing products and industry standards for data

Sample Score Pages

Less Metrics



More Metrics



Sample Recommendations



Home Energy Score

12345 Honeysuckle Lane
Smithville, AR 72466

SCORE
TODAY

3

Recommendations

The Home Energy Score's Recommendations show how to improve the energy efficiency of the home to achieve a higher score and save money. When making energy related upgrades, homeowners should consult with a certified energy professional or other technically qualified contractor to ensure proper sizing, installation, safety, and adherence to code. Learn more at HomeEnergyScore.gov.

REPAIR NOW. These improvements will save you money, conserve energy, and improve your comfort.




- ▶ **Air Tightness:** Have a professional seal all the gaps and cracks that leak air to save **\$110** / year
- ▶ **Ducts 1:** Add insulation around ducts in unconditioned spaces to at least R-6 to save **\$43** / year
- ▶ **Attic 2:** Increase attic floor insulation to at least R-19 to save **\$57** / year
- ▶ **Ducts 2:** Add insulation around ducts in unconditioned spaces to at least R-6 to save **\$23** / year
- ▶ **Ducts 2:** Have a professional seal all the gaps and cracks that leak air to save **\$74** / year

REPLACE LATER. These improvements will help you save energy when it's time to replace or upgrade.



- ▶ **Windows:** Choose those with an ENERGY STAR label to save **\$61** / year
- ▶ **Water Heater:** Choose one with an ENERGY STAR label to save **\$159** / year
- ▶ **Electric Heat Pump:** Choose one with an ENERGY STAR label to save **\$32** / year

Reports Can Be Customized by Partner Organizations



HOME PROFILE

LOCATION:
3226 SE 85th Ave
Portland, OR 97266

YEAR BUILT:
1926

HEATED FLOOR AREA:
2,296 sq. ft.

NUMBER OF BEDROOMS:
3

ASSESSMENT

ASSESSMENT DATE:
02/20/2019

SCORE EXPIRATION DATE:
02/20/2027


ASSESSOR:
Indika Sugathadasa
PDX HIVE

PHONE:
503-567-6426

EMAIL:
indika@pdxhive.com

LICENSE #:
215074


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



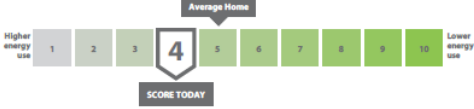
THIS HOME'S ESTIMATED ENERGY COSTS

THIS HOME'S SCORE 4 OUT OF 10

\$1,775 PER YEAR



Home Energy Score



Official Assessment | ID# 238003

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: 12,163 kWh/yr. \$1,387


Natural Gas: 356 therms/yr. \$388

Other: \$0

Renewable Generation: (\$0)

TOTAL ENERGY COSTS PER YEAR \$1,775

THIS HOME'S CARBON FOOTPRINT:



What should my home's carbon footprint be? Between now and 2030, Portlanders should reduce carbon pollution per household to 3 metric tons per year to reach our climate goals.

- 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; \$1.09/therm for natural gas; \$2.38/gal for heating oil; \$2.27/gal for propane).
- 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.
- Retesting 2-7 years after the assessment date requires a free reprint of the Report from us.greenbuildingregistry.com to update energy and carbon information.
- This report meets Oregon's Home Energy Performance Score Standard and complies with Portland City Code Chapter 17.10B.

Score today:
4

Score with priority improvements:²
7

Estimated energy savings with priority improvements:
\$317 PER YEAR

Estimated carbon reduction with priority improvements:
18% PER YEAR

TACKLE ENERGY WASTE TODAY!

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

- ✓ 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. Checkout www.energytrust.org/findacontractor or call toll free 1-866-368-7878.
- Explore financing options at communityenergyproject.org or energytrust.org.
- Visit the following resources to learn about easy changes you can make today: communityenergyproject.org/services or energytrust.org/solutions/insulation-and-air-sealing/

PRIORITY ENERGY IMPROVEMENTS | 10 YEAR PAYBACK OR LESS ¹

FEATURE	TODAY'S CONDITION ⁴	RECOMMENDED IMPROVEMENTS ²
Envelope/Air sealing	Not professionally air sealed	Professionally air seal
Heating equipment	Natural gas furnace 80% AFUE	When replacing, upgrade to ENERGY STAR
Water Heater	Electric	When replacing, upgrade to ENERGY STAR, minimum 2.76 EF (Energy Factor)

ADDITIONAL ENERGY RECOMMENDATIONS ²

FEATURE	TODAY'S CONDITION ⁴	RECOMMENDED IMPROVEMENTS
Attic Insulation	Ceiling Insulated to R-19	Insulate to R-38 or R-49 if code requires it
Duct sealing	Un-sealed	Reduce leakage to a maximum of 10% of total airflow
Solar PV	N/A	Visit www.energytrust.org/solar to learn more.
Air Conditioner	N/A	
Basement wall insulation	Insulated to R-0	
Cathedral Ceiling/roof	None	
Duct Insulation	Un-Insulated	
Floor Insulation	Insulated to R-0	
Foundation wall Insulation	N/A	
Skylights	N/A	
Wall Insulation	Insulated to R-7	
Windows	Double-pane, low-E glass	

1. To achieve the "Score with Priority Improvements" all recommended improvements in this section must be completed. These improvements have a simple payback of ten years or less.
2. Additional energy efficiency improvements may take longer than ten years to make a return on investment but can have a significant impact on the comfort, efficiency and environmental impact of your home.
3. If your home has an oil furnace it is recommended you replace it with a high efficiency electric heat pump.
4. Today's Condition represents the majority condition for that feature in the home.

- ✓ Use DOE Home Energy Scoring Tool to calculate metrics in nationally consistent way
- ✓ Work with software provider to create custom look & feel for your needs
- ✓ Showcase the metrics that matter most to your users

Example: City of Portland

Data Input and Scoring Methodology

The **data collection form** for a Home Energy Score Assessor can be found [here](#).

The full Home Energy Score methodology paper can be found [here](#).

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

Was a Blower Door test conducted on this house?: Yes / No

Air Leakage rate: _____ cfm50 Has the house been professionally air sealed?: Yes / No

Roof / Attic 1 Attic 1 Area (sq ft): _____

Roof Construction: Standard Roof / with Radiant Barrier / with Rigid Foam Sheathing

Exterior Finish: Composition Shingles or Metal / Wood Shakes / Clay Tile / Concrete Tile / Tar & Gravel

Insulation Level (applied to roof): R-0 / R-11 / R-13 / R-15 / R-19 / R-21 / R-27 / R-30

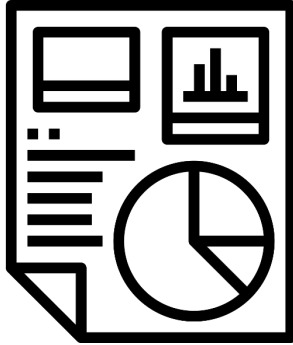
Roof Color: White / Light / Medium / Medium Dark / Dark / Cool Color: _____ (reflectivity)

Attic or Ceiling Type: Unconditioned Attic / Conditioned Attic / Cathedral Ceiling

Attic Floor Insulation: R-0 / R-3 / R-6 / R-9 / R-11 / R-19 / R-21 / R-25 / R-30 / R-38 / R-44 / R-49 / R-60

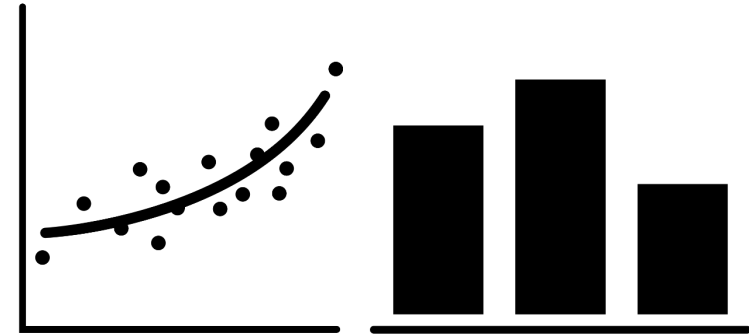
Home Energy Score – Data Collection 1
Revised 7/14/2020

Value at Individual and Aggregate Levels



Individual reports: Like a miles-per-gallon rating or “nutrition facts” for a home

- ✓ Estimate energy costs, recommended upgrades
- ✓ Improve energy literacy
- ✓ Drives interest to compete for better score and delivers roadmap for improvements



Data in aggregate: Consistent home energy information to understand sector wide issues, gains, and tracking

- ✓ Target upgrades, programs, and incentives
- ✓ Track sales rate, price, premiums; influence appraisal and financing
- ✓ Analyze efficiency gains

Schema of Home Energy Score Calculation

Assessor Collects Home Energy Feature Data

- About Home
- Building Envelope
- Windows & Skylights
- Heating & Cooling
- Additional Equipment

Scoring Tool Applies Assumptions & Runs Building Energy Model

TMY3 Climate / Weather Data (NREL)

User Defaults Based on National Lab Consumer Research (LBNL)

Physics-Based, National Lab Building Energy Model Assess Annual Energy Use via 8760 Model; Runs 12+ Iterations to Determine Cost-Effective Upgrades (NREL)

State Average Energy Cost & Emissions Data (EIA)

Data Points Entered into Online Tool

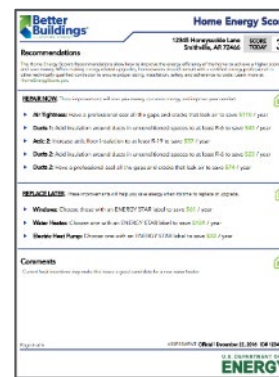
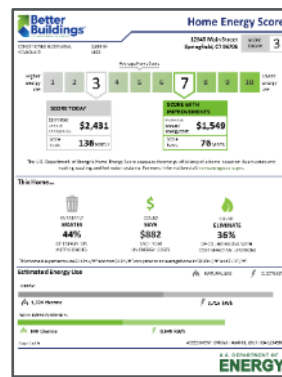


The Department of Energy's Home Energy Scoring Tool allows Assessors to:

- Generate clear, credible home energy assessments at a reasonable cost
- Recommend customized upgrades and other cost saving tips
- Help consumers compare the energy use of different homes

Home Energy Scoring Tool is quick and easy to use. Assessors can gather the information needed to assess a home in one short site visit. This low-cost, high value assessment can be provided as a stand-alone service or as an add-on to a home inspection or comprehensive energy assessment.

For more information on how to become an Assessor or receive a Home Energy Score, visit www.homeenergyscore.gov.

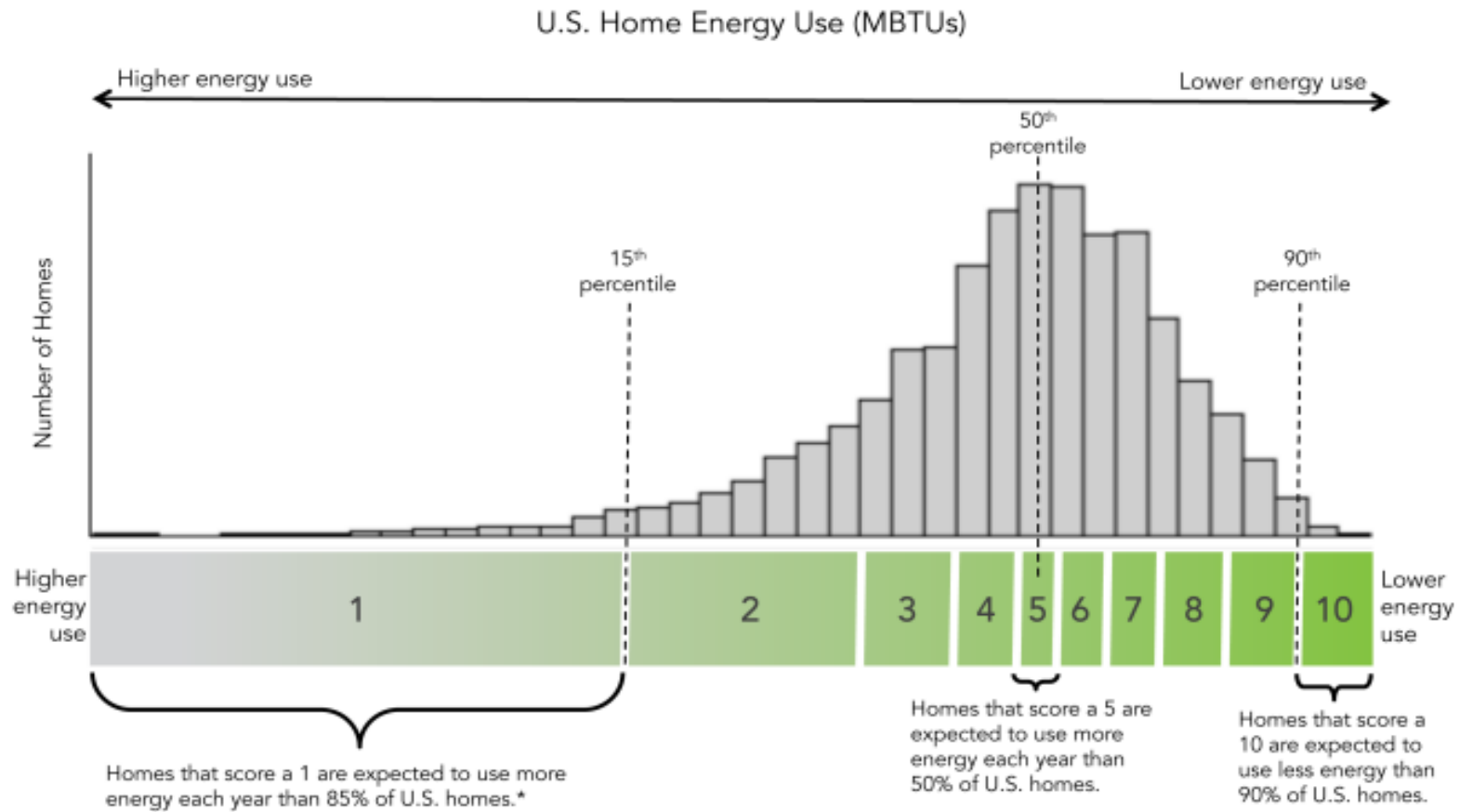


Home Energy Score Report

- ✓ Status of home today
- ✓ Recommended improvements to increase score
- ✓ Comparable home energy use and cost estimates
- ✓ Link to financing products and industry standards for data

What does the Score mean?

Converting Home Energy Use into the Home Energy Score



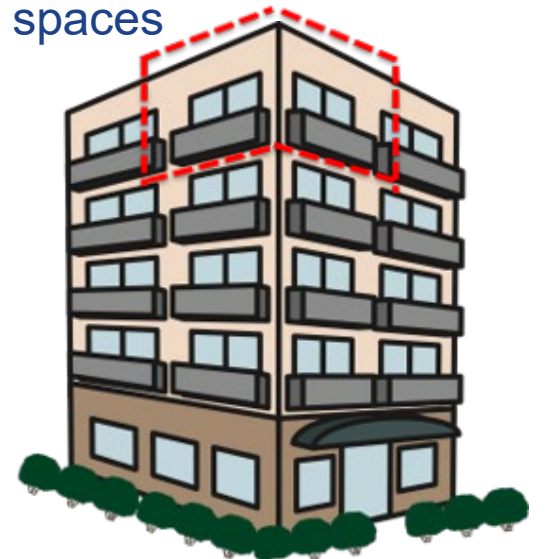
2024 Modeling Updates

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 Assistance's Mobile home Energy Audit (MHEA)

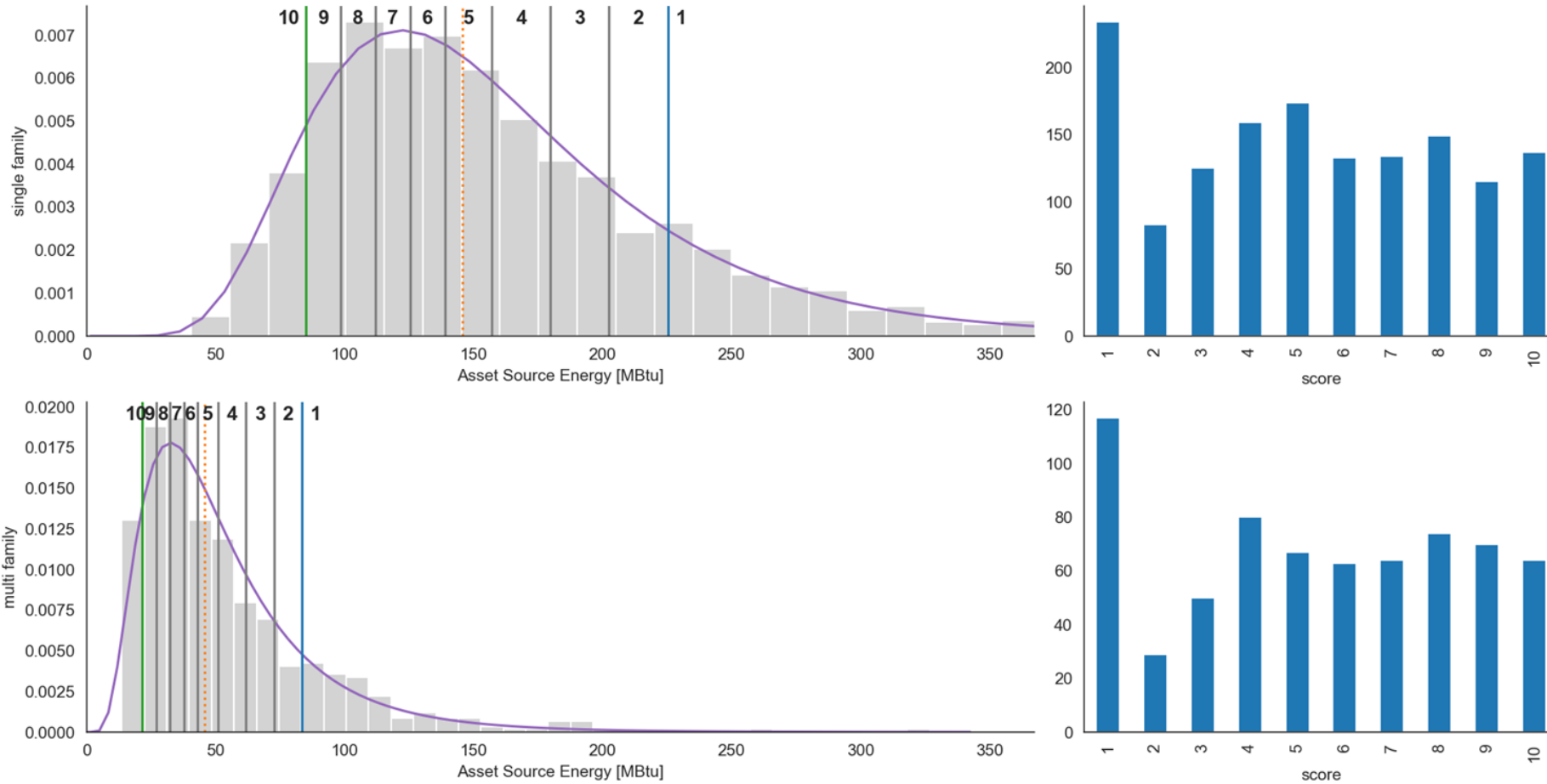
Multifamily

- Modeling the dwelling unit, not whole building
- Walls, floors, and ceilings can individually be adjacent to other units and/or common spaces
- Infiltration assumptions changed for multifamily
- New options: steel frame walls, flat roofs
- Future options: shared HVAC, shared domestic hot water



New ResStock-derived scoring bins for multifamily

USA_MN_Minneapolis-St.Paul.Intl.AP.726580_TMY3.epw



Warning: these bins are not finalized and will be changed before release.

2024 Online Scoring Tool Updates – Manufactured Housing

New *Home Details* input: Dwelling Unit Type

Options are:

- Single Family – Attached
- Single Family – Detached
- Apartment Unit
- Manufactured Home

SUMMARY SAVE

ADMINISTRATOR TOOLS CURRENT ROLE: ADMINISTRATOR

Home Details

Year built

Missing value for mandatory field

Number of Bedrooms

Dwelling Unit Type

-Select-

Missing value for mandatory field

Total conditioned floor area (sq ft)

Missing value for mandatory field

Direction faced by front of house

Missing value for mandatory field

Was a Blower Door test conducted on this house?

Yes No

Missing value for mandatory field

Has the house been professionally air-sealed?

Yes No/Don't Know

⚠ Roof, Attic & Foundation

⚠ Walls

Wall Construction

Construction

2024 Online Scoring Tool Updates – Manufactured Housing

If *Manufactured Home* is selected, the new **Manufactured Home Type** selection is also made visible.

SUMMARY SAVE ✓

ADMINISTRATOR TOOLS ▾ CURRENT ROLE: ADMINISTRATOR ▾

Options are:

- Single-Wide
- Double-Wide
- Triple-Wide

Dwelling Unit Type ⓘ
Manufactured Home ▾

Manufactured Home Type ⓘ
-Select- ▾

Stories above ground level ⓘ
-Select- ▾
Missing value for mandatory field

Note: *Mobile Homes will typically fall within the Single-Wide category – guidance documentation updates will further detail data entry expectations*

2024 Online Scoring Tool Updates – Manufactured Housing

New options for Roof Type

- Below other Unit (multi family apartment/single family attached only)
- Flat Roof
- Bowstring Roof (manufactured only)

SUMMARY SAVE ✓

ADMINISTRATOR TOOLS ▾ CURRENT ROLE: ADMINISTRATOR ▾

⚠ Roof, Attic & Foundation

Roof / Attic 1

Attic or ceiling type

- ✓ -Select One-
- Unconditioned Attic
- Cathedral Ceiling
- Below other Unit
- Flat Roof
- Bowstring Roof
- EXTERIOR FINISH

New options for Foundation Type

- Above other Unit (multi family apartment/single family attached only)
- Belly and Wing (manufactured only)

SUMMARY SAVE ✓

ADMINISTRATOR TOOLS ▾ CURRENT ROLE: ADMINISTRATOR ▾

Foundation 1

Foundation Area ⓘ

Missing value for mandatory field

Foundation type ⓘ


- ✓ -Select-
- Slab-on-grade foundation
- Unconditioned Basement
- Conditioned Basement
- Vented Crawlspace
- Unvented Crawlspace
- Above other Unit
- Belly and Wing
- Enter a second foundation

2024 Online Scoring Tool Updates – Manufactured Housing

SUMMARY SAVE 

ASSESSOR TOOLS  CURRENT ROLE: ASSESSOR 

When the *Dwelling Unit Type* is of the **Manufactured Home Type**, a new “Manufactured Home Belly” location will be available as a *Duct Location* option.

How many duct locations does this system have? 

1 2 3

Duct Location 1

Location


- ✓ -Select-
- Conditioned space
- Under slab
- Exterior wall
- Outside
- Manufactured Home Belly


Yes No/Don't Know

Duct Location 2

Location

-Select-

Percentage of ducts in this location 

Are these ducts insulated? 

Yes No/Don't Know

Recommendations for manufactured homes will be similar to those for single family detached homes, potentially with some slight variation in relevant specific material/equipment details.

More details to come...!

State & Local Home Energy Score Policies are Growing!

Real Estate Listings



Hillsboro
OREGON



Labeling Framework (or State-Led Program)



Rental Inspections



Utility Implemented (State/Local Lead)



Major Renovations/ Reach Code

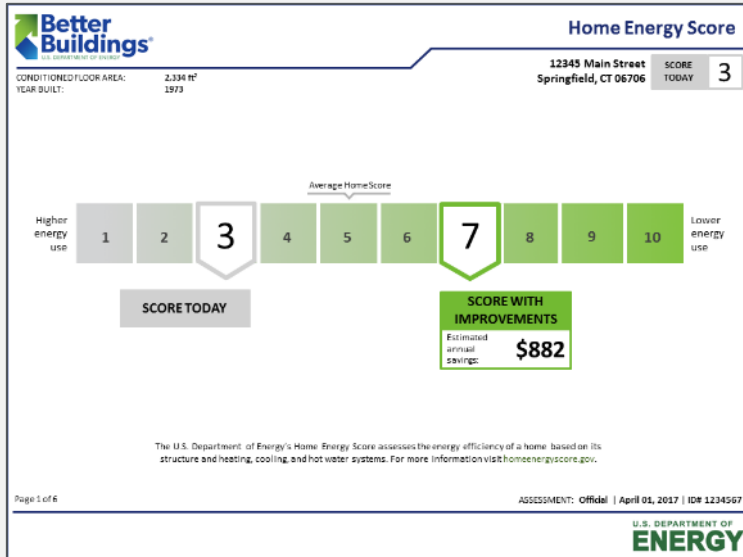


Pending Policies (many others under consideration)



Methods For Market Transformation

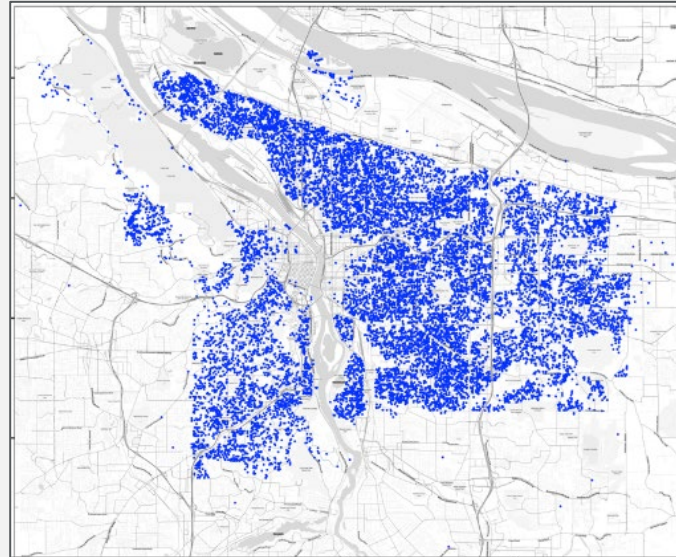
Consumer Education



Home Energy Score

- ✓ Improve consumer energy literacy
- ✓ Better understanding of home energy use, associated costs
- ✓ Roadmap to reduce energy use
- ✓ Link to financing products

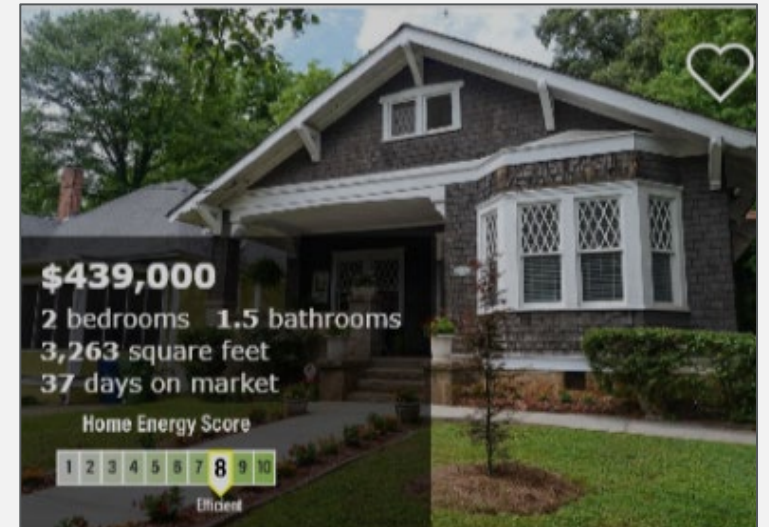
Data Aggregation



Scores in Portland, Oregon

- ✓ Consistent information on home features, energy use
- ✓ Target upgrades, incentives
- ✓ Track impacts, analyze efficiency gains
- ✓ Drive real estate market interest

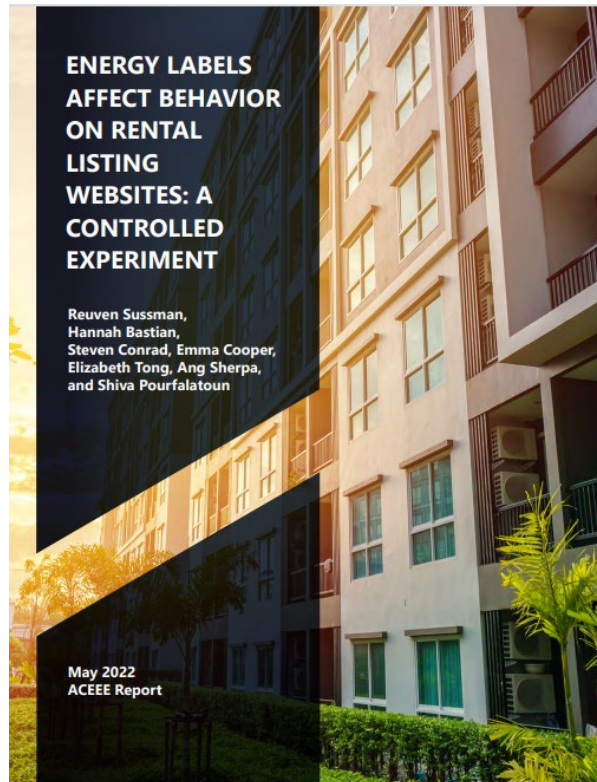
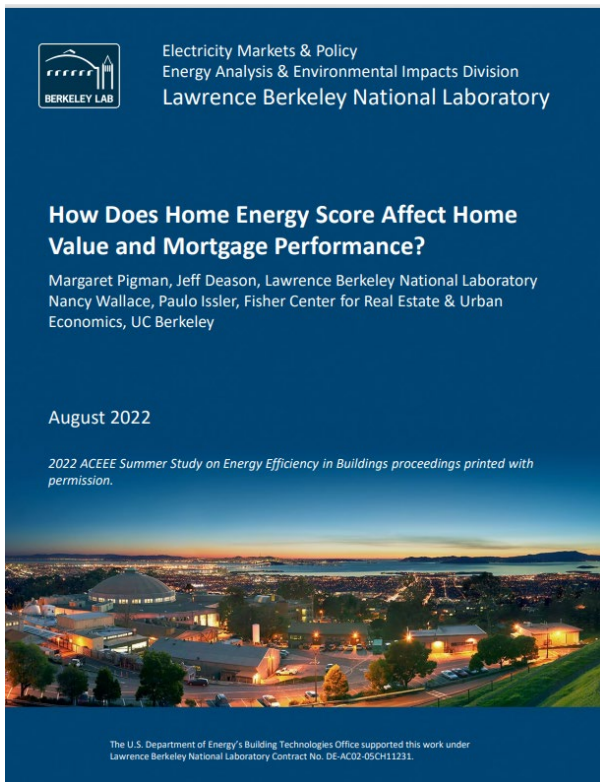
Real Estate Integration



Mock Up Real Estate Listing, courtesy ACEEE

- ✓ Allow valuation of energy efficiency in real estate transactions
- ✓ Enable mortgage financing products to scale efficiency deployment
- ✓ Create market pull for efficiency & solar

Latest Research Findings



How Does Home Energy Score Affect Home Value and Mortgage Performance?

In cities that require Home Energy Score in real estate listings:

- Higher Home Energy Score was associated with higher purchase price (0.5% higher purchase price for each point increase on Home Energy Score scale)
- A \$100 increase in estimated annual energy bills was associated with a 0.4% decrease in purchase price

Energy Labels Affect Behavior on Rental Listing Websites

- Energy labels on a mock rental listing website encouraged renters to select the most efficient listings 21% more often
- Showing listings with a Home Energy Score and the corresponding scale and estimated energy costs led to higher “click” rates of energy efficient properties
- Builds off previous research (ACEEE, 2020) which showed similar findings for prospective home buyers on a mock real estate listing website

“...requiring home sellers to provide buyers with certified audits of residential energy efficiency.... **increases price premiums for energy efficiency** and **encourages energy-saving investments.**”

--Myers, E., Puller, S., and West, J. (forthcoming). *Mandatory Energy Efficiency Disclosure in Housing Markets*. *American Economic Journal*

Thank You!



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Questions

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