



Home Energy Score™ Program

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Outline

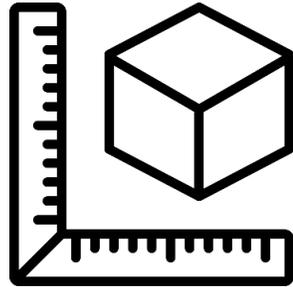
- Introduction to Home Energy Score
- Recent Research & Program Updates
- Partner Information

Residential Buildings Are –



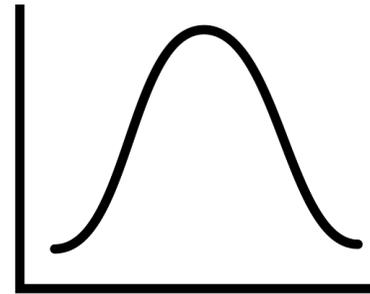
95%

of U.S. buildings



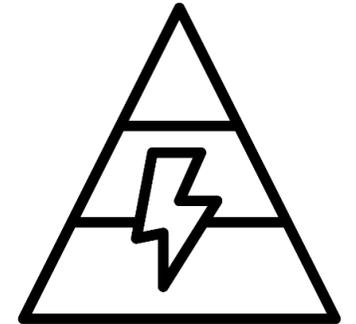
70%

of U.S. building stock
square footage



50%

of peak demand on
electricity (ERCOT)



21%

of U.S. energy use

Energy Efficiency is Good for Residents



Helps Reduce Costs.

Energy burdens average higher than both property taxes and home insurance.



Smart Investment.

Efficiency features pay back via energy savings over time.

Improves Quality of Life



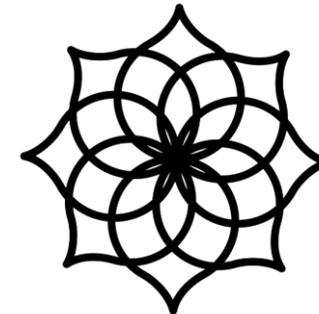
Reduced environmental impact.



Increased comfort.



Improved health outcomes.



Peace of mind.

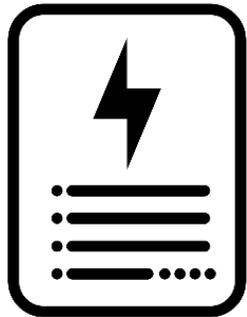


Less draftiness.

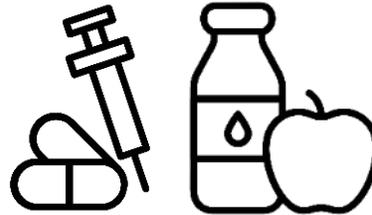


Increased control.

Yet, Energy Burdens Are High For Residents



Nearly **one-third** of U.S. households reported facing a challenge in paying energy bills or sustaining adequate heating and cooling in their homes in 2015.



About **one in five** households reported reducing or foregoing necessities such as food and medicine to pay an energy bill.



The **most common reason** reported for individuals seeking payday loan products is to pay their utility bills.

Sources: EIA 2015 & FDIC 2012

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



Focus Areas

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

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Home Energy Score

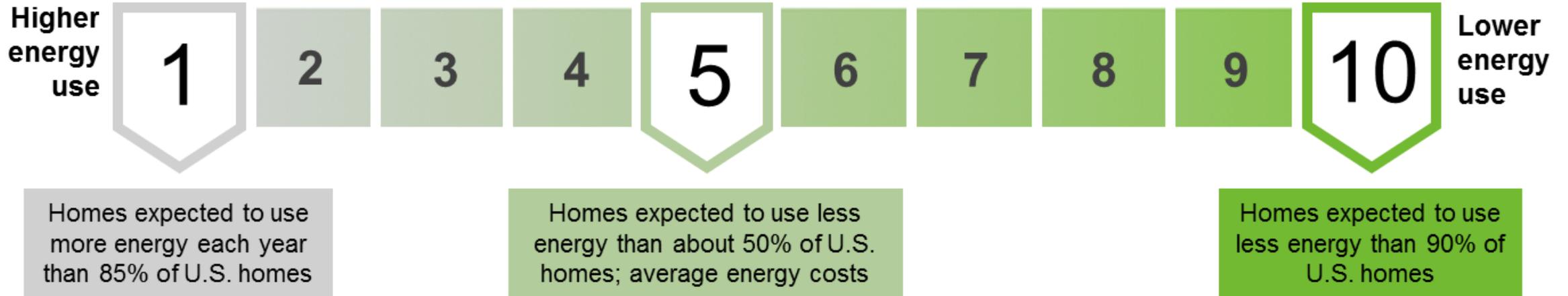


Program Vision & Mission

We envision Home Energy Score serving as a recognized, **widely used and influential tool** in the market that encourages investment to **improve U.S. housing stock** with better energy performance, lower costs, greater comfort, and reduced environmental impact.

Our mission is to **build market value** for energy efficient single-family homes and townhomes that **improve quality of life** for residents.

How It Works



About Home

- Year built
- Number of bedrooms
- Stories above ground
- Ceiling height
- Conditioned floor area
- Orientation
- Air leakage rate
- Professional air sealing status
- Single-family / townhome

Envelope

- Attic type & area
- Roof construction
- Roof color
- Foundation area
- Attic insulation
- Foundation type & area
- Foundation / basement insulation
- Wall construction type
- Wall insulation levels

Windows & Skylights

- Window type & area
- Window glazing, frame, fill
- Window U-factor & solar heat gain coefficient
- Skylight type & area
- Skylight glazing, frame, fill
- Skylight U-factor & solar heat gain coefficient

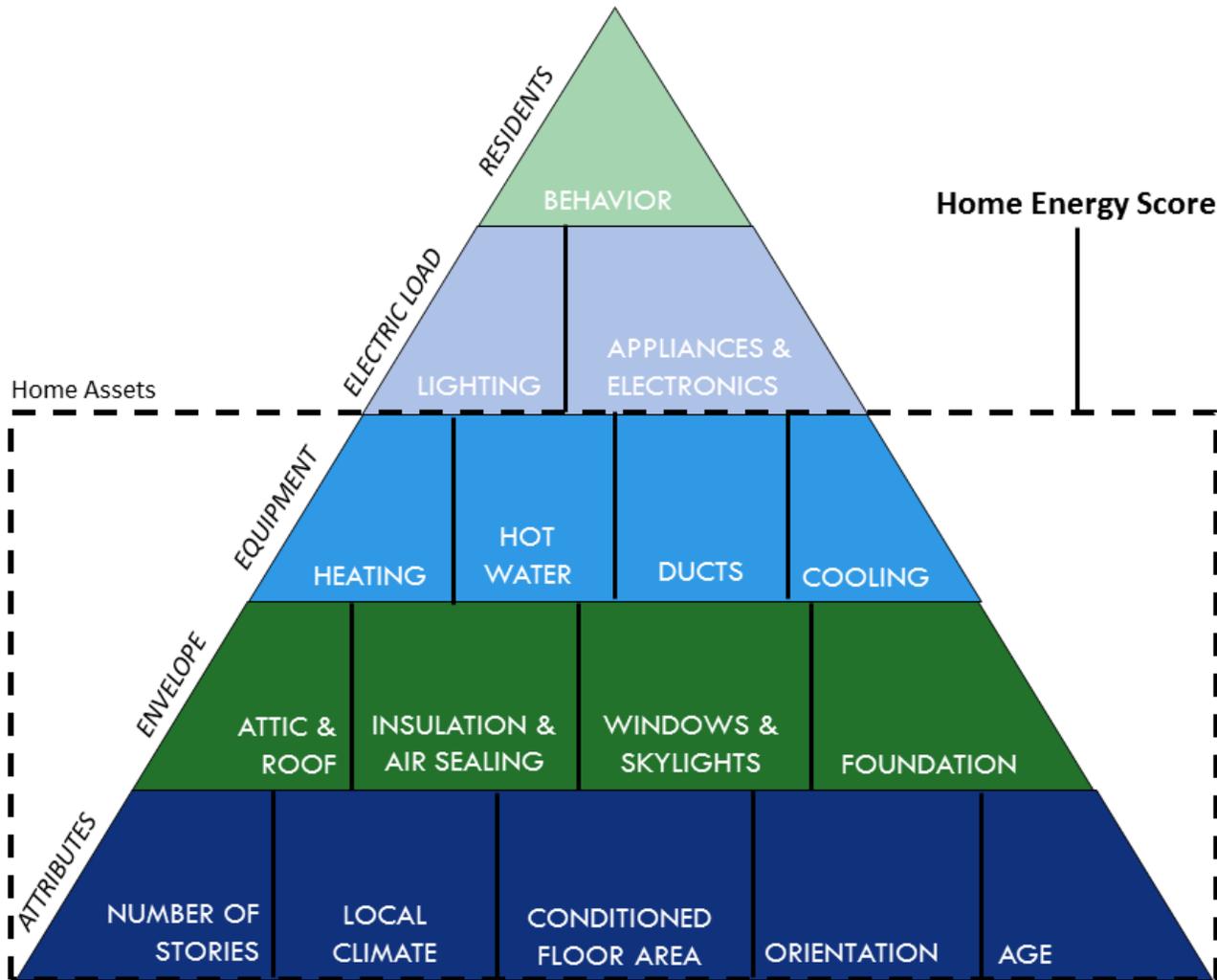
Heating & Cooling

- Heating system type, percent of area
- Heating system efficiency, year installed, maintenance status
- Cooling system type, percent of area
- Cooling system efficiency, year installed, maintenance status
- Duct location, percent area
- Duct insulation & sealing

Additional Equipment

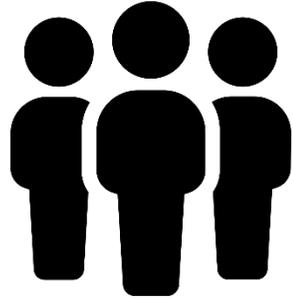
- Water heater type, year installed, energy factor
- Solar PV installation, orientation, number of panels / kW output

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

Why Not Use Energy Bills?



Occupancy Variables. Bills depend on more than just the home assets, like the number of residents and occupancy rate year-round.



Economic Variables. Energy use also depends on economic factors, such as energy price and resident income. These factors may not hold true for future occupants.



Data Privacy. Most utility bills are considered private information, which complicates their use in real estate and financing.

Asset scores rate the home features themselves; leaving residents, their private data, and their preferences out of the equation.

Standard Report



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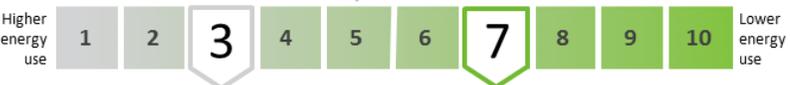
Home Energy Score

12345 Main Street
Springfield, CT 06706

SCORE TODAY **3**

CONDITIONED FLOOR AREA: 2,334 ft²
YEAR BUILT: 1973

Average Home Score



SCORE TODAY

Estimated annual energy cost: **\$2,431**

Score basis: **136 MBTU**

SCORE WITH IMPROVEMENTS

Potential annual energy cost: **\$1,549**

Score basis: **76 MBTU**

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. For more information visit homeenergyscore.gov.

This Home...



CURRENTLY WASTES 44%
OF ENERGY ON INEFFICIENCIES



COULD SAVE \$882
EACH YEAR ON ENERGY COSTS



COULD ELIMINATE 36%
OF CO₂ EMISSIONS WITH COST-EFFECTIVE UPGRADES

This home is expected to use 61 kBtu / ft² and cost \$1.04 / ft² compared to an average home at 58 kBtu / ft² and \$1.37 / ft².

Estimated Energy Use

TODAY:

1,324 therms

9,716 kWh

WITH IMPROVEMENTS:

849 therms

8,649 kWh

Page 1 of 6 ASSESSMENT: Official | April 01, 2017 | ID# 1234567





U.S. DEPARTMENT OF ENERGY

Home Energy Score

12345 Honeysuckle Lane
Smithville, AR 72466

SCORE TODAY **3**

CONDITIONED FLOOR AREA: 2,334 ft²
YEAR BUILT: 1973

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**

Comments 

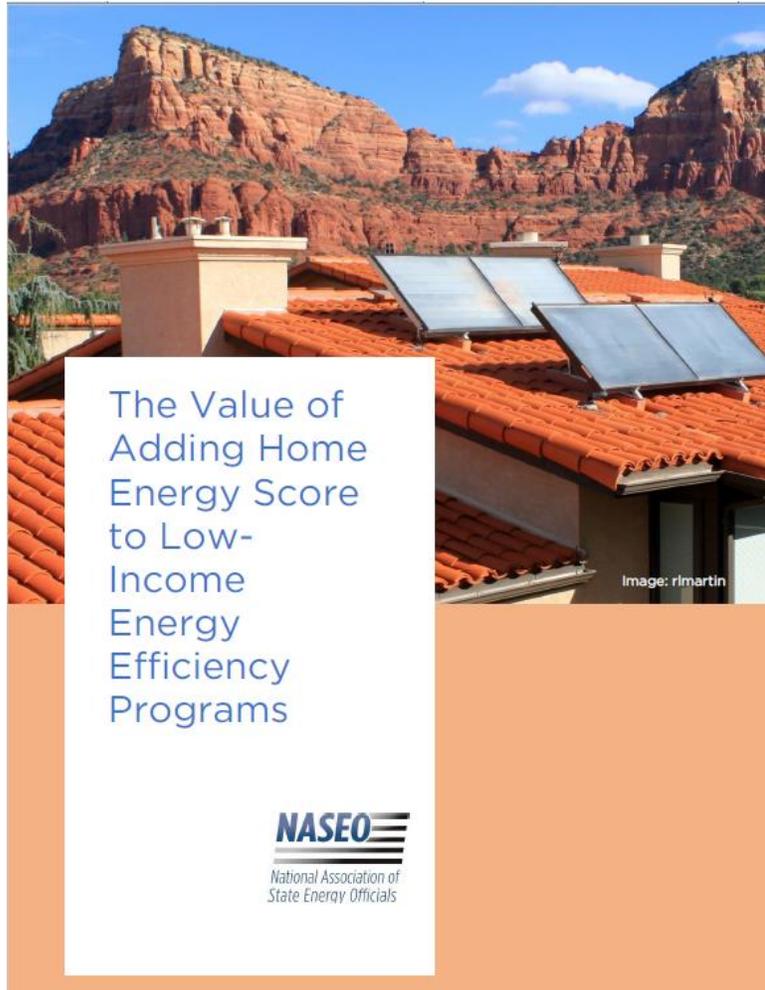
Current local incentives may make this house a good candidate for a new water heater.

Page 6 of 6 ASSESSMENT: Official | December 22, 2016 | ID# 1234567



- ✓ Easy to understand home rating
- ✓ Motivation to improve and compete
- ✓ Recommended improvements to increase score
- ✓ Comparable home energy use and cost estimates
- ✓ Aggregable data across homes and programs
- ✓ Link to financing products and industry standards for data

Value to Low-Income Homeowners, Buyers, Renters

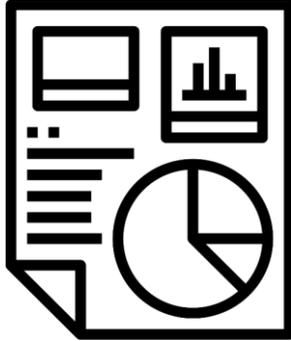


- ✓ Low-income residents face high energy burdens & have greater potential to benefit from understanding home energy performance
 - *Rental properties are particularly underserved in terms of efficiency equipment & programs*
- ✓ Home Energy Score enables low-income homeowners to realize resale benefits of higher home value
- ✓ Lenders can link Home Energy Score & recommendations to financing products to help homes improve
 - *Older, smaller, low-income homes have the most cost-effective potential to increase energy performance*
- ✓ Efforts reduce false association that efficient/green homes are only for wealthy



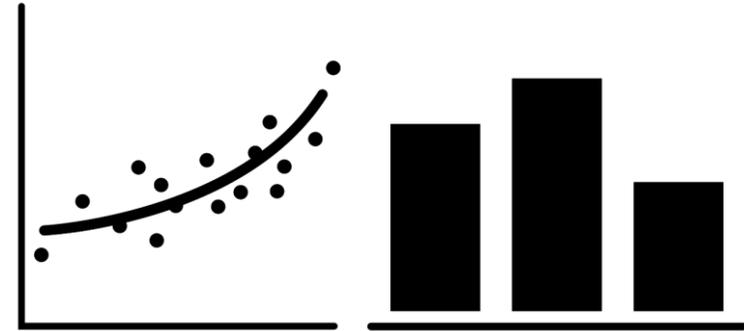
Link: <https://naseo.org/data/sites/1/documents/publications/HES%20for%20LMIv9.pdf>

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

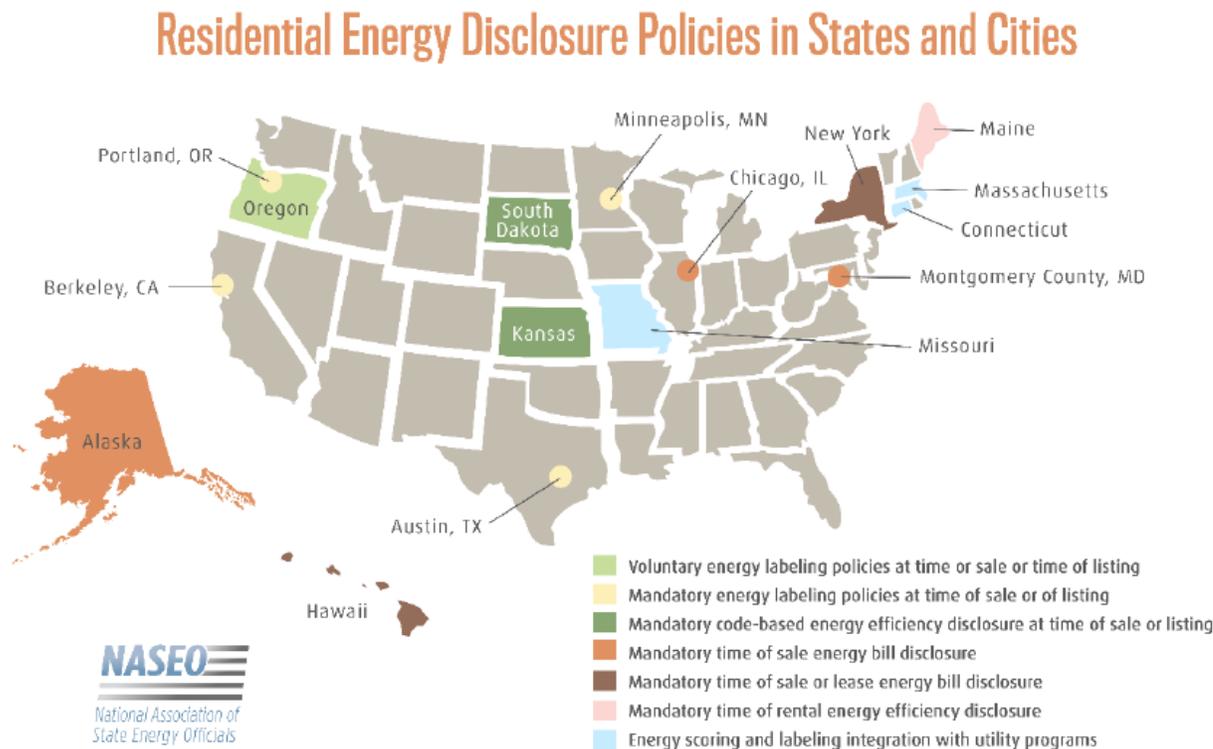


Data in aggregate: Consistent home energy information to understand sector wide issues, gains, and tracking

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

Driving Value of Energy Efficiency Investment in Homes

Figure 2. Cities and States with Residential Energy Disclosure Policies



Source: NASEO (Updated January 2020)

Link: <https://naseo.org/data/sites/1/documents/publications/HES%20for%20LMlv9.pdf>

Educating Consumers –

- Lessons from Europe drive interest in scorecards that are transparent, consistent, and based on science (MA DOER).
- NJ Home Energy Score recipients more likely to accurately choose energy saving measures (NJNG).
- 80%+ of surveyed recipients state Home Energy Score will help them save energy in their homes (Denver).

Adding Value in Real Estate –

- Nationally, homes with better energy efficiency ratings experience a sale premium (Freddie Mac).
- US homebuyers exhibit willingness to pay more for efficiency when shown a Home Energy Score (ACEEE).
- Bay Area certified efficient homes showed 2-5% price premium on home sale (Nils & Kok).

Driving Efficiency Investment –

- 75%+ of surveyed recipients in WI state they are likely to invest in efficiency after receiving Home Energy Score (FOE).
- Austin, TX analysis finds energy disclosure intervention drives investment in improvements and addresses symmetric incomplete information market failure (Myers, Puller, & West).

An Equitable & Actionable Solution



Simple: account for complicated interactions between home energy features



Consumer protection: allow buyers to make informed home purchase decisions



Quicker learning curve: translate building science to the vital information real estate professionals need



Valuable: Enable appraisers to attribute value using comps and income approaches



Relevant: Present efficiency as useful metric for LMI borrowers



Enable Efficiency Financing: Identify good candidates for GSEs' energy improvement financing products

Recent Research & Program Updates

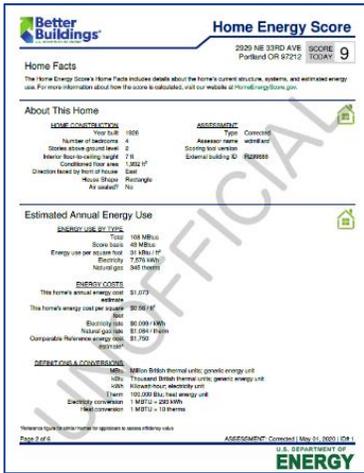
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Home Energy Score



Know your home. Know your Score.



Program Updates



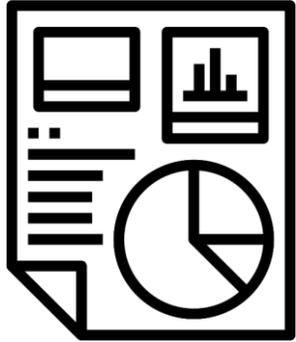
150,000+
Home Energy Scores



Software
Enhancements

- ✓ Dozens of partners implementing Home Energy Score programs in utilities, cities, states
- ✓ Newly funded research to support remote Home Energy Scores in response to COVID-19
- ✓ Online communications to build awareness about the program
- ✓ Published analysis of data in Portland, Oregon by PNNL
- ✓ Increasing interoperability with EnergyPlus transition

Consumer Education



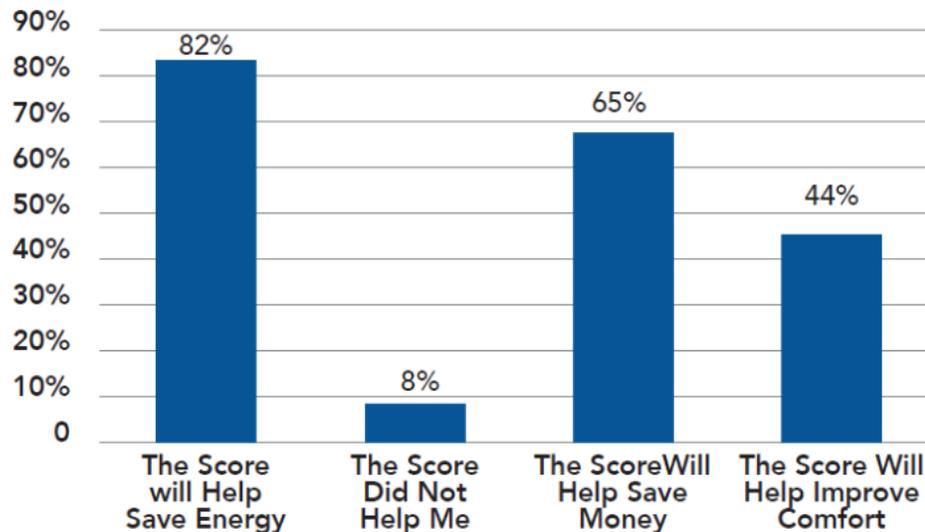
Individual reports: Like a miles-per-gallon rating or “nutrition facts” for a home

- ✓ Estimate energy costs, recommended upgrades
- ✓ Improve energy literacy

Study from Focus on Energy (WI):

- ✓ 83% respondents found Home Energy Score “**somewhat**” or “**very**” clear
- ✓ 75% of respondents described **investment in efficiency after Home Energy Score likely**

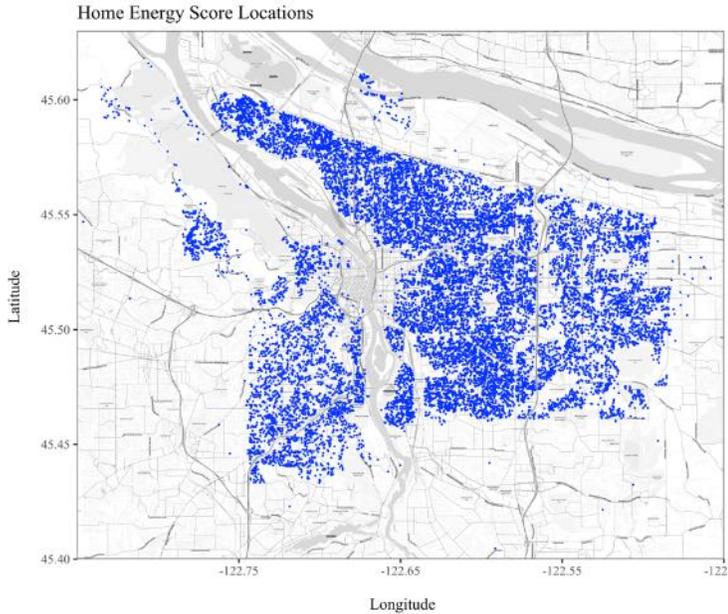
Evaluation for City & County of Denver (CO):



“Very nice service, would have never known that our attic is very under-insulated without the assessment. Thanks!”

- Justin in Denver, CO

Data In Aggregate



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

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

Sample of 100,000+ Home Energy Scores Averages:

4.7

Score Today

7.3

Score with Improvements

Annual Savings Potential

22%

Energy

\$600

Energy Bills

2.0

TCO₂eq

Residential Energy Efficiency for Local Governments & Real Estate

Website of Resources, Tools, Examples

1. Include residential buildings in local energy planning
2. Adopt residential building codes and standards
- 3. Start a home energy labeling program**
4. Enable financing for efficiency upgrades
5. Offer incentives to make efficiency more affordable
6. Upgrade affordable housing stock

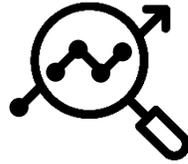
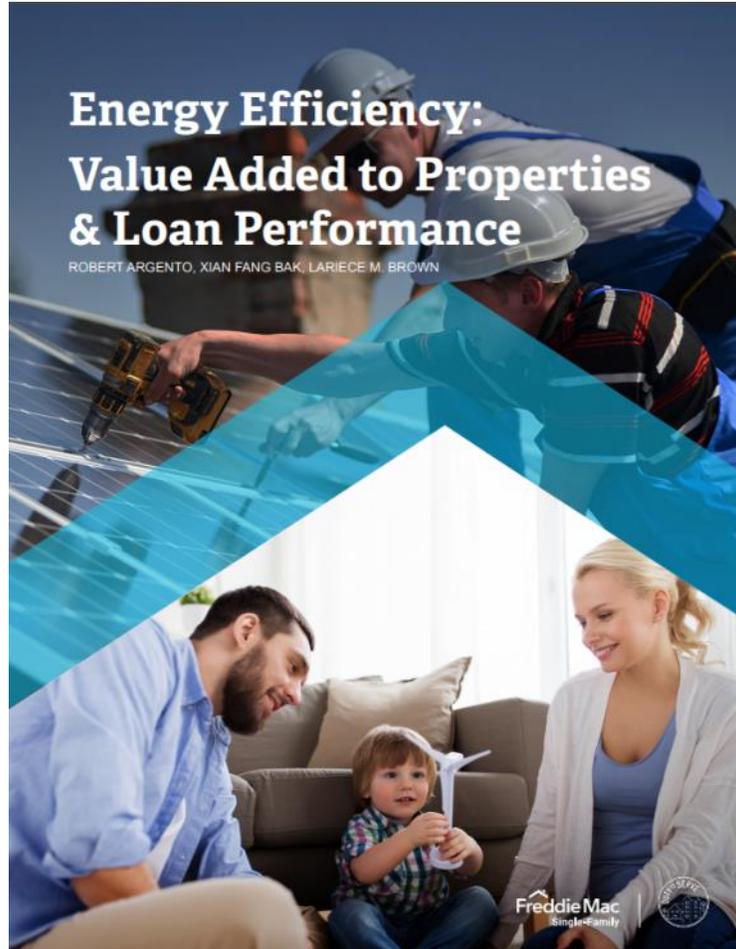
Link: <https://betterbuildingsinitiative.energy.gov/bca/residential-energy-efficiency-local-governments>



Home Energy Information Accelerator: Toolkit to Bring Home Energy Data to the Real Estate Market

AUGUST 2018

Real Estate Integration



Research

- ✓ Freddie Mac Analysis on Home Energy Scores
- ✓ NASEO Analysis of Home Energy Score in Low-Income Programs
- ✓ ACEEE Consumer Behavior Analysis



Financing

- ✓ Fannie Mae's HomeStyle Energy Mortgage Loan
- ✓ Freddie Mac's GreenCHOICE Energy Mortgage Loan
- ✓ FHA's Energy Efficient Homes Policy for 2% stretch on debt-to-income ratios
- ✓ Small Business Innovation Research project focusing on Vermont Credit Union loan products



Education

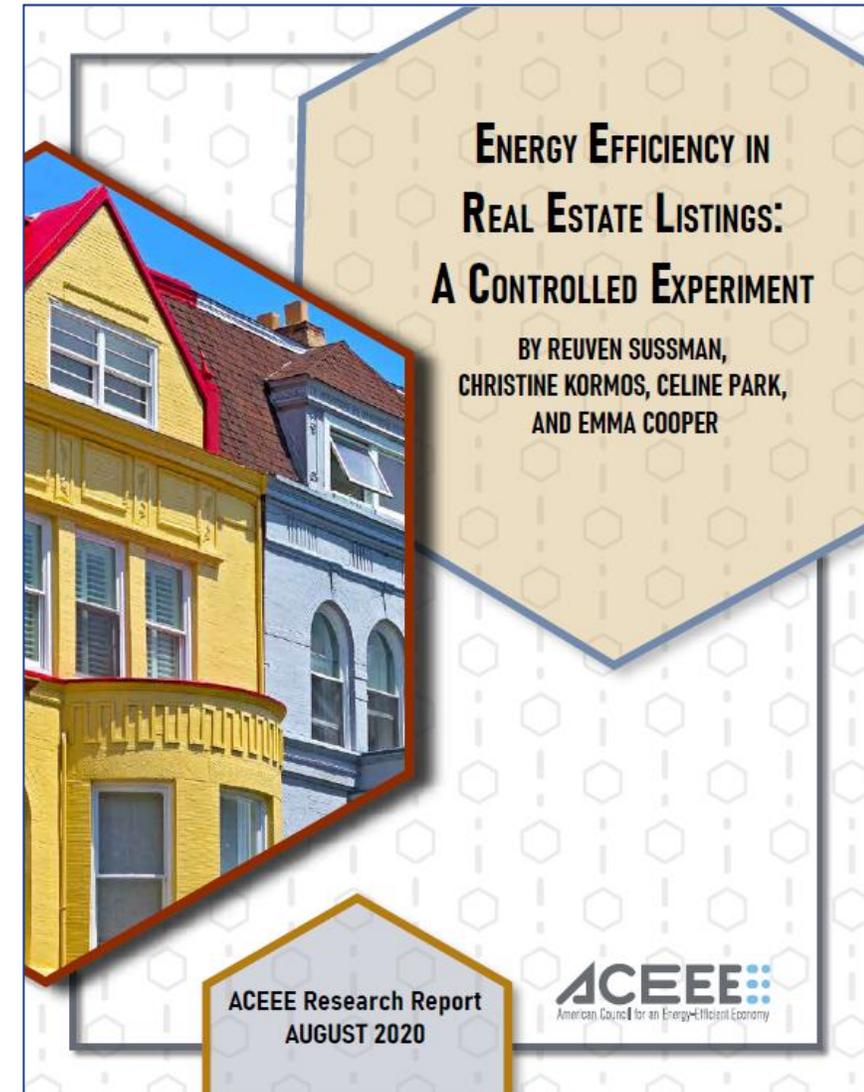
- ✓ Continuing education for mortgage loan officers on these offerings
- ✓ Online materials for real estate professionals
- ✓ Collaboration with Appraisal Institute on Green Addendum

ACEEE Study on Efficiency in Real Estate Listings

Across all housing types, participants were willing to increase the purchase price of their homes for more efficient properties when presented with efficiency information. Participant **willingness to pay was highest when the information was presented as a Home Energy Score along a continuum.**

Presenting efficiency information for only the most efficient homes did not encourage home buyers to choose more efficient homes in our simulation. This suggests that a **voluntary labeling policy might be less effective than a mandatory labeling policy** in which all home listings must include energy efficiency information.

We also found that the HES was an **intuitive concept**. The score swayed participants who were unfamiliar with it just as much as those who already knew what it was.



Partner Information



Partner Requirements

1. Manage Assessor Onboarding, Training, & Mentoring
2. Score a minimum of 500 homes in first year
3. Conduct quality assurance (re-scores) on random sample of 5% of homes
4. Provide mentoring for newly trained Assessors
5. Participate in calls/webinars with DOE and other Partners, and collaborate on continuous improvement of the program
6. Market the Home Energy Score for single-family homes and townhomes in your market

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Home Energy Score™



Partner

Assessor Requirements

1. Work with a Home Energy Score Partner

- ✓ State or local government, local utility, contractor, or national partner

2. Hold a relevant credential

<https://betterbuildingsolutioncenter.energy.gov/home-energy-score/become-assessor>

3. Complete online Simulation Training

- ✓ Available free online to learn correct data input process
- ✓ Sets base expectations of how to collect data in standard way for tool

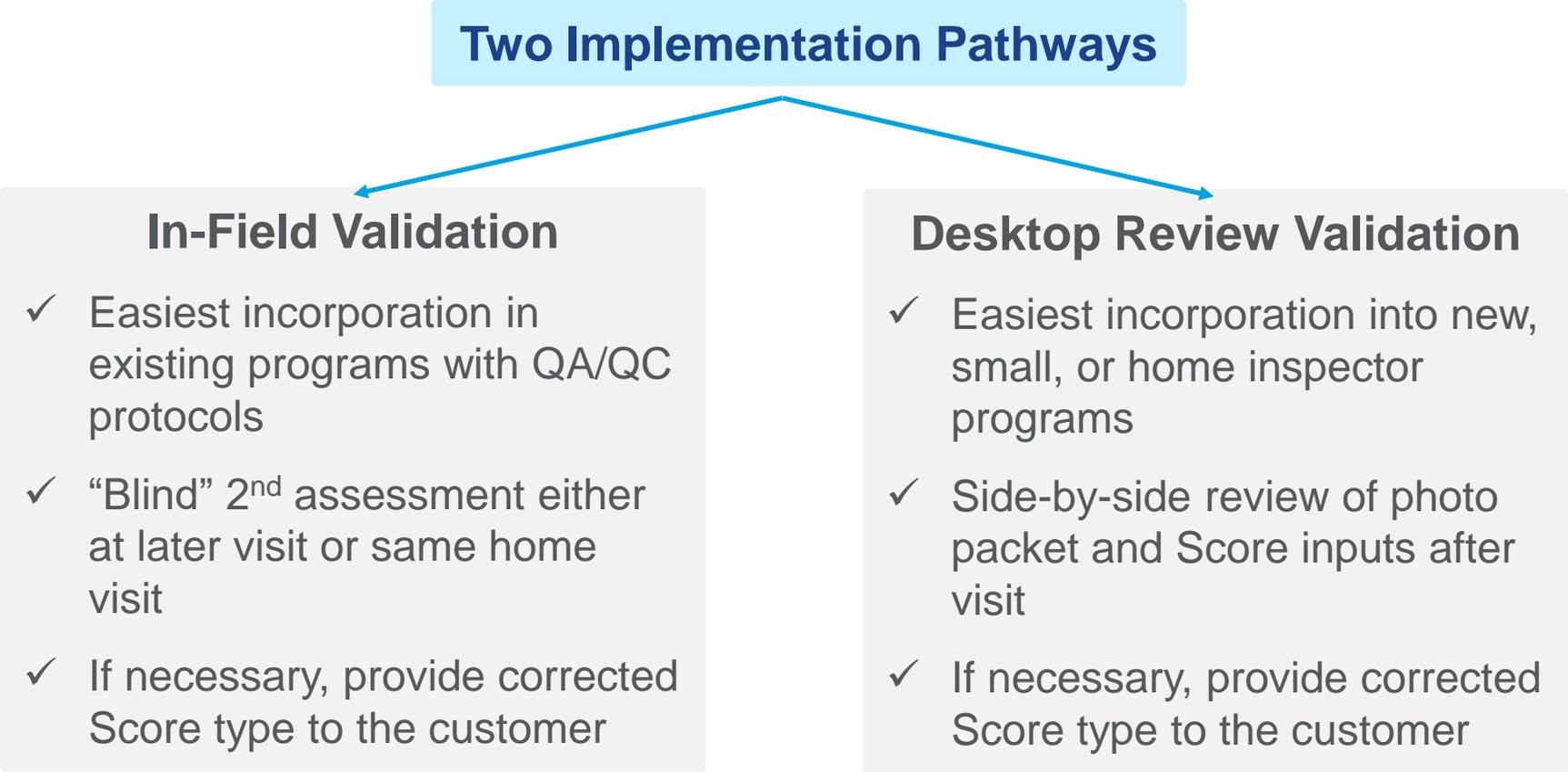
4. Complete first Home Energy Score with a Mentor

- ✓ Mentor is approved by DOE based on experience with Score
- ✓ Virtual mentoring and in-field mentoring available
- ✓ Individual mentorships count toward QA; group mentorships do not

Quality Assurance Requirements

At least 5% of Home Energy Scores must be re-scored to verify data inputs and results.

Two Implementation Pathways



In-Field Validation

- ✓ Easiest incorporation in existing programs with QA/QC protocols
- ✓ “Blind” 2nd assessment either at later visit or same home visit
- ✓ If necessary, provide corrected Score type to the customer

Desktop Review Validation

- ✓ Easiest incorporation into new, small, or home inspector programs
- ✓ Side-by-side review of photo packet and Score inputs after visit
- ✓ If necessary, provide corrected Score type to the customer

Remote Service Providers

Three companies are fully approved to provide desktop review QA services and remote mentoring to Home Energy Score Partners:

IDENERGY[®]



CLEARResult[®]

Qualified Services

- ✓ Submit desktop QA review package of photos and sketches to provider
- ✓ Receive high-quality review of package and guidance to improve assessments
- ✓ Pay for service based on number of Scores
- ✓ Receive remote mentoring

Become a Home Energy Score Partner!

1. Check out our [Become a Partner](#) page on our website.
2. Email us at homeenergyscore@ee.doe.gov if you have any questions about the tool or program.
3. Fill out the [Partner Implementation Plan](#) and submit it to us via email.
4. Once the implementation plan is approved by DOE, sign the Partnership Agreement.
5. Sign up Assessors in your program!



For More Information

Web: www.homeenergyscore.gov

Email: homeenergyscore@ee.doe.gov

