

# EMPRESS Project Final Report

Created by the EMPRESS Team



The EMPRESS (Energy Metrics to Promote Residential Energy Scorecards in States) project is a State Energy Office-led 2017-2018 project supported by funding from the U.S. Department of Energy State Energy Program and private sector partners. The project is focused on enhancing large-scale residential home energy labeling and harmonizing various energy scoring programs to better support the market valuation of energy efficient homes.

**Project Partners Include:** the Rhode Island Office of Energy Resources, the Massachusetts Department of Energy Resources, the Missouri Division of Energy, the Arkansas Energy Office, the Oregon Department of Energy, the National Association of State Energy Officials, Earth Advantage, Energy Futures Group, and Vermont Energy Investment Corporation.

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## Introduction

The following report is the result of a two-year effort by the EMPRESS Team to 1. More closely align the two dominant national home performance rating systems – Home Energy Rating System (HERS) and Home Energy Score (HEScore) – so that ratings and performance data are comparable and translatable; and 2. Develop and promote policies and programs that support voluntary, harmonized home energy labeling.

Many new resources and materials were created by the EMPRESS Team from 2017-2018 to help State Energy Offices, the real estate market, and other stakeholders in the development and implementation of home energy labeling programs and policies. This report is a compilation of these resources with a brief description of the resources' intended purposes and audiences.

## Resources Summary

### 1. Home Energy Labeling Guidebook

The Guidebook was created to provide background information and actionable recommendations for jurisdictions thinking about enacting a home energy labeling policy or program on either a voluntary or mandatory basis. The information in the guide was informed by interviews with state and local government officials, energy efficiency organizations, and electric utilities that have implemented labeling policies or programs.

The guide focuses on labels for single-family residential homes that communicate the overall estimated efficiency of a home's energy assets, such as its heating, ventilation, and air conditioning (HVAC) systems and insulation levels. It also helps to frame the arguments for why home energy labeling is beneficial.

The audience for this guide is any jurisdiction (state or municipal) that is interested in enacting a home energy labeling policy or program.

To provide information that is easy to navigate, the guide is divided into four primary parts. Part 1 outlines the first steps that should be taken to begin a home energy labeling effort. Part 2 points out specific issues or actions that jurisdictions need to undertake depending on whether they elect to pursue mandatory or voluntary labeling. Part 3 outlines six critical elements for developing and implementing home labeling programs and policies. Additional web links provide specialized guidance on supporting topics, give case examples of labeling policies and programs, and point out additional resources.

### 2. Key Labeling Components Document

This document was created by the EMPRESS team to provide context and recommendations on how to standardize the information on home energy labels. The Team analyzed various metrics in terms of their ability to support different policy objectives, as well as other factors like durability, granularity, ease of understanding for consumers, cost, and financial industry recognition. No recommendations were created on *how* to display metrics on a label, but background information on the strengths and weaknesses of various metrics and their ability to support different policy objectives are provided to help states and other jurisdictions develop

labeling programs and labels that facilitate home energy comparisons and encourage home energy improvements.

In addition to helping state and local jurisdictions, the document is also intended to assist Multiple Listing Services (MLSs) and other home service providers to better design, build, and accurately populate their databases. The long-term goal is information consistency that supports real estate market actors (including consumers, lenders, property inspectors, appraisers, jurisdictions and others) by providing data that is easier to compare, understand and interpret.

The document contains both a matrix and narrative that when used in combination, are meant to be a starting point for the home energy label design process. The matrix describes the effectiveness of currently available metrics and measurements from Home Energy Score and HERS in supporting common building-related energy policy objectives. It also describes metric and measurement characteristics that should be considered when creating a labeling program or policy. States and local governments can use the matrix and narrative to help them select those metrics and measurements to be displayed on building energy labels in their jurisdictions.

### **3. Considerations & Best Practices for Publicly Disclosing Energy Information**

The EMPRESS project team researched whether any current legal barriers exist to making energy rating information public and what the current best practices are for ensuring that this information can legally be conveyed to the public domain. The results of this research are summarized in the Privacy Considerations and Best Practices document.

The intended audience for this document is any governmental jurisdiction, real estate professional, home energy labeling program or organization, and/or database manager interested in reviewing concerns with publicizing home energy information and learning best practices to address these concerns.

The document considers existing federal laws, state laws and best practices used by governmental organizations, energy efficiency programs, and non-profit certification organizations.

### **4. Summary Case Studies**

Over the course of the EMPRESS project, a collection of 13 case studies were created. All of the case studies are located on the [EMPRESS website \(http://empress.naseo.org/casestudies\)](http://empress.naseo.org/casestudies) and provide high-level summaries of both voluntary and mandatory home energy labeling programs and policies that have been or are currently being deployed in the United States.

The intended audience for these case studies are any U.S. governmental organization or jurisdiction interested in starting or improving a home energy labeling program or policy.

All of the case studies on the EMPRESS website were consolidated into a single document for the sake of this final EMPRESS report.

## **5. In-Depth Report on Home Energy Labeling Activities in Missouri and Oregon**

The state energy offices of both Missouri and Oregon were key partners in the EMPRESS project. They both have established interests in supporting residential energy labeling in their states as a means to ensure that energy efficiency investments are appreciable and valued in the real estate market. They were also motivated to participate in the EMPRESS project because of their shared interest in supporting existing scoring programs active in their respective markets to deliver consistent energy performance information to end-users.

Despite having these similar programmatic and policy goals, the two state energy offices took different approaches to creating their desired outcomes. The Missouri Division of Energy developed a unique certification program that relies on nationally recognized residential energy efficiency rating systems and integrates them into a gold-level or silver-level state certification. The Missouri Division of Energy determined that creating an umbrella certification program was the most effective way to provide residents with consistent information without having to mandate action by the existing rating programs or choosing one “winner” over others amongst the rating programs. Alternatively, the Oregon Department of Energy (ODOE) was given a directive by the state legislature to set statewide standards to be met in order for energy rating programs active in Oregon be approved by the state. ODOE decided they could meet these goals best by requiring all statewide scoring systems use the US DOE Home Energy Score modeling engine for generating certain required home energy use information. The differing approaches taken by each state comes in part from the differing regulatory environments and histories with energy scoring in each state.

The outcomes and lessons learned from these two approaches are detailed in the EMPRESS report on Home Energy Labeling Activities in Missouri and Oregon. This report is meant to provide in-depth information for other states or jurisdictions interested in creating umbrella certifications or establishing home energy scoring standards.

## **6. Status Update and On-Going Workplan for Technical Harmonization**

One of the major objectives for the EMPRESS project was to more closely align the two dominant national home performance rating systems – Home Energy Rating System (HERS) and Home Energy Score (HEScore). Achieving better alignment requires progress on both the technical and policy side of home energy labels. The Key Labeling Components document (resource #2 above) was created to address what metrics should be included on home energy labels (a policy decision). The Workplan for Technical Harmonization, in contrast, was created to support the technical transitions needed to ensure metrics generated by different home energy scoring softwares are comparable and translatable.

Specifically, the EMPRESS Team determined that the use of one modeling engine – EnergyPlus – would be the best means of ensuring comparability. Therefore, a voluntary working group was created with the help of the National Renewable Energy Laboratory to support HERS software providers and the Home Energy Score team in transitioning their softwares to use the EnergyPlus modeling engine. The working group meets on a monthly basis and will continue its efforts during 2019. This status update and workplan document describes what has been accomplished thus far and what the timeline and next steps are for successfully completing the transition to EnergyPlus.

The intended audience for the workplan is any HERS or Home Energy Score software provider interested in understanding the effort at a high-level. Any software providers interested in participating in the working group are encouraged to reach out to the National Renewable Energy Laboratory and the National Association of State Energy Officials.

# Home Energy Labeling Guidebook



# Home Energy Labeling:

## A Guide for State and Local Governments

Created by the EMPRESS Team



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## Introduction

This guide provides background information and actionable guidance for jurisdictions thinking about enacting a home energy labeling policy or program on either a voluntary or mandatory basis. The recommendations presented here were developed by a project team representing a group of state energy offices led by Rhode Island, with support from Arkansas, Massachusetts, Missouri, and Oregon, with funding from the U.S. Department of Energy (DOE) State Energy Program. The information in this guide has been informed by interviews with state and local government officials, energy efficiency organizations, and electric utilities that have implemented labeling policies or programs. We hope the guide will provide you with the information needed to implement a successful home energy labeling program in your jurisdiction, as well as an understanding of how residents will benefit.

This guide focuses on labels for single-family residential homes that communicate the overall estimated efficiency of a home's energy assets, such as its heating, ventilation, and air conditioning (HVAC) systems and insulation levels. Think of the yellow EnergyGuide labels that provide the estimated energy consumption and costs for appliances. Similar to an appliance label, or a vehicle's miles-per-gallon rating, a home energy label provides an estimate based on assumed user (occupant) behaviors, in addition to assuming typical weather patterns for the area in which the home is located. In general, residential home energy labeling refers to programs or policies that provide standardized home energy information, typically to the real estate market. By providing consistent and comparable information about how homes use energy, consumers can make more informed decisions when purchasing or renting a home.

When describing home energy labeling programs, whether voluntary or mandatory, this guide generally references two nationally recognized approaches to home energy scoring:

- The United States Department of Energy's (U.S. DOE's) Home Energy Score
- The Residential Energy Services Network's (RESNET's) Home Energy Rating System (HERS)

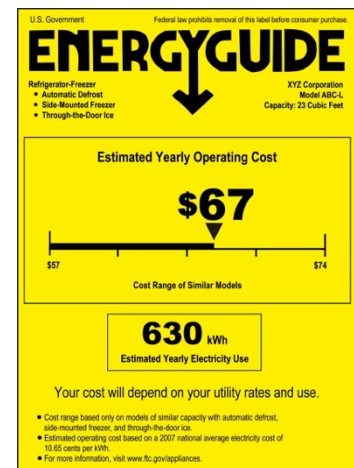


Figure 1. EPA EnergyGuide Appliance Label

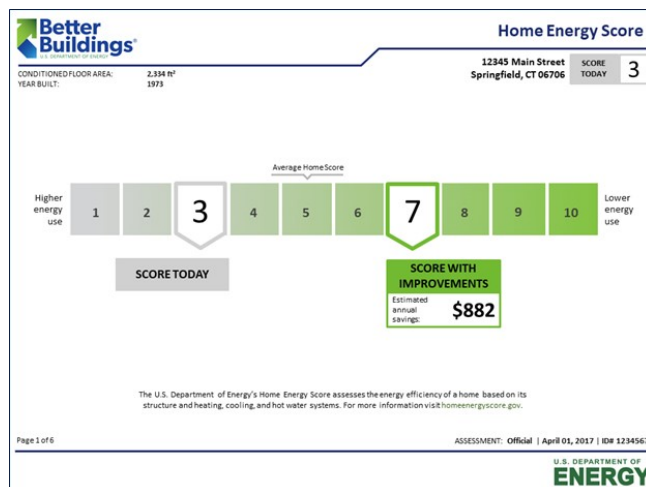


Figure 2. U.S. Dept. of Energy Home Energy Score

HERS Ratings have historically been utilized and promoted for new homes. The Home Energy Score was developed more recently in response to a need for a more accessible means of scoring existing homes. A home energy labeling program can rely on one or both of these national programs. For more information on these scoring systems, click [here for information on HERS](#) and [here for information Home Energy Score](#).

### The Value Proposition

Why should state and local governments make home energy labels a priority?

If your jurisdiction has goals to help residents save energy and reduce their energy bills, to fight climate change, to create a more resilient energy system, to protect consumers, or to develop the local economy, then home energy labeling can help you reach those goals. By facilitating a residential real estate market that appropriately values energy efficiency, home energy labeling has the potential to stimulate significant reductions in the energy consumption of existing buildings, which comprises 40% of the total energy used in the United States<sup>1</sup>. Residential buildings consume about 20% of U.S. total energy use and have been found to disproportionately impact electricity grid peak demand, even up to 50% of electricity use on peak demand days<sup>2</sup>. Knowing the efficiency of your jurisdiction’s housing stock can help you best target upgrades and incentives while also building a market for energy efficient housing, which helps reduce energy demand and associated costs. In addition, home energy labeling can support local jobs and overall economic growth.

What is Home Energy Labeling, and Why is it Beneficial?

Increased uptake of home energy labeling in a jurisdiction can support energy, environmental, health, and economic goals, including less obvious objectives such as consumer protection, improved local air quality, as well as enhanced local economic development through the creation and support of home energy retrofits. Learn more about how home energy labeling helps achieve these goals by [clicking here](#).

Home energy labeling programs and policies help people get the information they need to make smart home investment decisions. In new construction, energy efficiency levels are largely addressed by building code adoption, code compliance enhancement initiatives, and above-code programs. That said,

new homes eventually become existing homes so it is important that they are labeled as they are constructed. The vast majority of U.S. homes, on the other hand, were built to an older, or to no, energy code which makes these homes a logical target for improving energy efficiency. Residential energy labeling helps consumers get the information needed to begin addressing this problem.

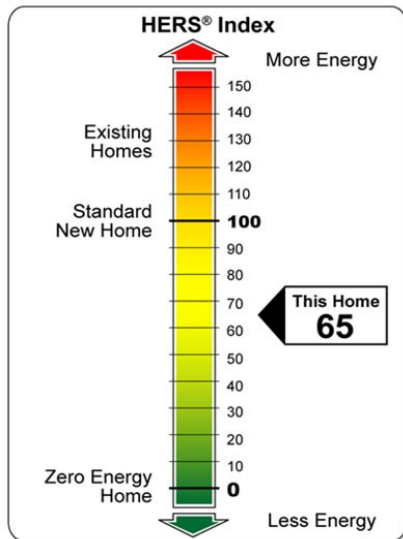


Figure 3. Home Energy Rating System (HERS) Index

Home energy labels bring market forces to bear by making the efficiency level of a home visible to homebuyers and by allowing them to compare energy efficiency potential across homes. Once residential energy efficiency becomes visible in the market, efficient homes are more likely to attain a higher market value. In turn, homeowners will be more apt to invest in energy efficiency projects that will then translate into a higher price for their homes when put up for sale. With labels available, buyers looking at less efficient homes will be made aware of what energy upgrades are needed and can roll the cost of the upgrades into their mortgage or keep the upgrades in mind for future home improvements. Regardless of how they choose to respond to the label, buyers will

<sup>1</sup> U.S. Energy Information Administration. Frequently Asked Questions: How much energy is consumed in U.S. residential and commercial buildings? <https://www.eia.gov/tools/faqs/faq.php?id=86&t=1>. Accessed October 30, 2017.

<sup>2</sup> Electricity Reliability Council of Texas (ERCOT). 2013. A Strategic View of the Future. <http://www.ercot.com/content/news/presentations/2013/GCPA%20-%202002%20Oct%202013%20FINAL.pdf>

be able to make more informed choices and be more prepared to handle high utility costs once they move in. A deeper dive into the benefits of home energy labeling can be found [here](#).

### Organization of this Guide

The audience for this guide is likely to have a wide variety of experiences and differing levels of understanding regarding home energy labeling. To provide information that is easy to navigate, with details needed by some, but not others, the guide is divided into four primary parts. Part 1 outlines the first steps that should be taken to begin a home energy labeling effort. Part 2 points out specific issues or actions that jurisdictions need to undertake depending on whether they elect to pursue mandatory or voluntary labeling. Part 3 outlines six critical elements for developing and implementing home labeling programs and policies. Additional web links provide specialized guidance on supporting topics, give case examples of labeling policies and programs, and point out additional resources. By including more detailed information on website links, our hope is that each reader will find it easy to pick and choose the sections they need to effectively provide home energy labels in their jurisdiction.

## Part 1

### Steps to Establishing a Labeling Program/Policy

Jurisdictions should follow these key steps to develop a successful labeling policy or program. This section outlines four steps:

- Step 1: Assess Your Market and Set Goals
- Step 2: Define the Policy or Program Parameters
- Step 3: Identify a Program Coordinator and Funding Source
- Step 4: Connect the Dots Between Labels and Market Transformation

**Home Energy Labeling Policy:** The creation of a legal framework such as an ordinance, statute or regulation that in some way dictates the use, creation, and/or deployment of home energy labels.

**Home Energy Labeling Program:** A coordinated effort by one or more entities to increase the use, creation, and/or deployment of home energy labels within a jurisdiction.

#### Step 1. Assess Your Market & Set Goals

*By completing Step 1, your jurisdiction will have:*

- *Established clear objectives for implementing a home energy labeling program or policy*
- *Researched existing programs or policies in the region*
- *Engaged relevant stakeholders in the discussion.*

All jurisdictions should start by defining your jurisdiction's policy objectives for home energy labeling. These might include any one or combination of the following:

- Provide a means to value energy efficiency and renewable energy home features in the real estate market
- Address policies barring homeowner investments in renewable energy infrastructure
- Encourage home energy upgrades
- Increase energy efficiency of both new and existing homes
- Increase the number of installed renewable energy systems
- Increase market demand for zero energy homes
- Decrease consumer energy bills/improve affordability of housing
- Decrease greenhouse gas emissions
- Increase participation in energy efficiency programs
- Boost local workforce development efforts.

After defining your objectives, you should review current policies as well as market conditions, including relevant energy efficiency and rating programs in the area. For example, consider the following questions:

- What building energy codes does your jurisdiction currently require if any?
  - For new homes?
  - For renovations to existing homes?
- How does your jurisdiction enforce such codes?

- Is there any pending legislation that covers energy efficiency in homes, labeling, or other related topics?
- Are there any current real estate practices that can be leveraged to support building energy labeling?
- Does any entity in your jurisdiction offer lending/financing mechanisms to encourage construction of energy efficient homes or retrofits of existing homes? (e.g., banks, state/local funds, utilities, non-profits)
- Does your jurisdiction have programs or policies related to specific housing types (e.g., low income, mobile homes, manufactured or modular housing)? If yes, what are they?
- Do any entities in your jurisdiction implement energy efficiency programs, incentives, or rebates (e.g., utility, non-profit, government entity)?
- What data are available to help you inform your jurisdiction’s home energy labeling strategy? Are data available to help you estimate current average home energy usage, cost, and/or number of labeled homes? Is there information available to help you target specific market segments? (It may be helpful to ask what kind of data your local utilities, energy efficiency programs, and/or MLSs have, and if are they willing to share it).

**Assessing Market Goals in Missouri**

To make progress on home energy improvements, the Missouri Division of Energy (under the Department of Economic Development) began administering the Missouri Home Energy Certification program in 2015, which uses home energy labels to promote the existence of energy-efficient homes. The state calls the certification a “win-win” as it gives homeowners an additional “selling point” and conveys the value of home energy information to buyers. Learn more by reading [Case Study: Missouri](#).

Once your jurisdiction is clear about its goals and how home energy labeling can help achieve them, it’s important to articulate these priorities to stakeholders and more formally engage them in the process. Dialogue and engagement early in the process are necessary to gain a better understanding of key stakeholders’ interests and to assist you in refining your program or policy design. Stakeholder engagement is critical to helping your jurisdiction:

- Get input, feedback and buy-in regarding its goals;
- Make sure relevant organizations and interest groups all mutually understand terms, key issues, etc.;
- Address objections or concerns early on; and
- Garner support for the home energy labeling effort.

There are many stakeholders in home energy labeling that should be included at the table. Below is a list to



Figure 4. Missouri Division of Energy's Home Energy Certificate



get you started, but it is not exhaustive. Think about who in your area will be impacted by the policy or program and how they can help inform the design process:

- Real estate stakeholders
- Banks and lenders
- Community Action Agencies, low-income programs and residents
- Housing associations
- Energy programs & energy contractor businesses
- Environmental groups
- Home builders

Develop and publish a stakeholder engagement plan so that your efforts are transparent, inclusive of key interest groups, and clearly articulated. Be sure to also identify “champions” among your key stakeholders to help spur action. For resources on state and regional policies, as well as best practice guidance on creating a stakeholder group, please click [here](#) to view Home Energy Labeling Case Studies and [here](#) to view other relevant resources.

## Step 2: Define the Policy or Program Parameters

*By completing Step 2, your jurisdiction will have:*

- *Determined the scope of housing types to be labeled*
- *Identified the timing and “trigger points” for when homes will get labeled*
- *Considered whether a voluntary program or mandated policy/program is the best fit*

After completing Step 1, a jurisdiction must determine the specifics of the policy or program, including scope, roles/responsibilities, timing, etc. Although you may encounter additional issues that must be addressed, the following discussion summarizes the major considerations that need to be resolved when designing such a policy or program.

### Scope: Types of Housing

Labeling can be applied to all single-family, residential homes or a portion of homes. Your jurisdiction must decide whether to include various subsets of homes, including:

- Existing single-family homes
- New construction
- Multi-family homes/apartments, condos
- Owner occupied versus rented homes
- Mobile homes/manufactured homes

Depending on your market, builder competition has the potential to drive labeling of homes that are built beyond energy code; however, standard new homes will likely remain unlabeled without a requirement.

### Defining the Mandate in Berkeley, California

Berkeley’s Building Energy Saving Ordinance ([BESO](#), 2015) requires homeowners and owners of buildings of up to 25,000 square feet to complete comprehensive energy assessments at time of sale. BESO also requires that commercial and multifamily buildings get an energy assessment once every 5 or 10 years, depending on building size. Buildings less than 600 square feet and individually owned units within a larger building are exempted. Single-family homes (1-4 units) are subject to BESO at time of sale.

To learn more about the ordinance, read [Case Study: Berkeley, California](#).

Policies or programs for both new and existing homes should incorporate elements into the label that are equally applicable to both new and existing homes. This could be estimated annual energy use (measured in millions of British Thermal Units (MBtu) or kilowatt hour (kWh) equivalents per year), and information on energy costs and fuel usage ([click here](#) to see the EMPRESS Labeling Component Matrix and accompanying narrative, for more information). You can think of these commonalities as the base information – the common denominator that will allow comparisons across all homes. Additional information beyond this common denominator (e.g., how a home is built relative to code) may be added where relevant either on a standard label or on supplementary reports.

#### Timing & Targeted Use Cases

Energy labels can be useful in different ways to a range of users, including home buyers, sellers, owners, lenders, home inspectors, real estate agents, appraisers, building code officials and energy or housing programs. Because of this, jurisdictions should determine which labeling “use cases” are most aligned with their priorities. Further, policies and programs should be designed to ensure that the information contained in the label is available to the target users at the right time.

#### Providing Labels Through Utility Programs in New Jersey

New Jersey Natural Gas reaches homeowners through their SAVEGREEN Project, which provides a free Home Energy Score when homeowners install qualifying new equipment. The goal of the assessment is to encourage follow-on participation in the Home Performance with ENERGY STAR program and ultimately installation of other energy improvements. As of 2018, the program has provided more than 18,000 scores. Read more in [Case Study: New Jersey Natural Gas](#).

This guide defines two primary strategies for integrating home energy labeling into the residential real estate market: voluntary and mandatory. These are defined below.

**Voluntary:** Voluntary programs can offer labels at any time for voluntary use in the real estate market, but your jurisdiction may want to encourage programs that target specific times in a home’s ownership cycle and focus on specific use cases.

**Mandatory:** Most mandatory labeling policies or programs are designed to require that information be provided to inform home purchases and support valuation of home energy features in the real estate market. Mandatory policies should include a “trigger” for the labeling requirement, such as time of listing, time of sale, time of rental, or “when obtaining a Certificate of Occupancy”.

Note that home energy labels may be fully integrated into a residential energy efficiency program (i.e. labels may be provided via home energy audits) and still be a voluntary program for purposes of the real estate market.

Table 1 on the next page depicts the common use cases or “trigger” points, along with corresponding policy goals and primary stakeholder(s) engaged in getting the label.

Table 1: Key timing and triggers to consider when designing labeling policies & programs

TYPES OF HOME ENERGY LABELING POLICIES				
Opportunity	Moment/ Trigger	Goal	Participating Entity	U.S. Policy or Program Examples
Home Selling	Time of Listing	Incorporate energy information in home appraisal, lending, and purchasing process.	Seller	<b>Mandatory:</b> <a href="#">Portland, OR</a> <b>Voluntary:</b> <a href="#">Colorado</a> , <a href="#">Vermont</a>
Home Buying	Time of Sale	Inform home buyers to energy features and needs for potential upgrades.	Seller or Buyer	<b>Mandatory:</b> <a href="#">Berkeley, CA</a> ; <a href="#">Austin, TX</a> ; <a href="#">Montgomery County, MD</a> <b>Voluntary:</b> <a href="#">Colorado</a> , <a href="#">Vermont</a> , <a href="#">Oregon</a>
Home Rental	Time of Rental Listing	Inform renters of energy features and estimated energy bills.	Owner/Landlord	<b>Mandatory:</b> N/A <b>Voluntary:</b> N/A
Home Energy Benchmarking	Getting an Energy Assessment	Document building energy use / features to encourage homeowners to take next steps.	Energy Audit Program & Participant	<b>Mandatory:</b> N/A* <b>Voluntary:</b> <a href="#">New Jersey Natural Gas</a> , <a href="#">Oregon</a>
Participating in Home Energy Upgrade or Financing Program	Getting an Energy Upgrade	Document results of home energy upgrades to show programmatic impacts.	Energy Upgrade Program & Participant	<b>Mandatory:</b> N/A <b>Voluntary:</b> <a href="#">Connecticut</a> ; <a href="#">Missouri</a> ; <a href="#">Austin, TX</a> ; <a href="#">Oregon</a>
Documenting Energy Code Compliance	Completing Building a Home	Demonstrate code compliance in new home (HERS program).	Home Builders or New Home Owners	<b>Mandatory:</b> N/A <b>Voluntary:</b> <a href="#">Vermont</a> , <a href="#">Oregon</a>

\* Requiring the periodic disclosure of energy performance is common for commercial benchmarking ordinances (e.g., every 1 year, 5 years, etc.), but no such policies currently exist for single-family homes.

### Step 3: Identify a Program Coordinator and Funding Source

Jurisdictions designing a labeling policy or program should designate an entity responsible for coordinating labeling activities and determine how implementation costs will be covered. This is summarized below depending on if the jurisdiction has chosen a mandatory or voluntary strategy.

**Mandatory:** Under most policies focused on mandatory labeling, at the time of listing or sale, the local government is responsible for coordinating implementation. For a statewide policy, the state energy office would likely be the responsible entity. (See Part 3: Element 1: Create a Start-Up and Implementation Plan for more information.)

Under most mandatory labeling policies, home sellers subject to the requirement pay to obtain energy labels at market prices. Some jurisdictions, such as the City of Berkeley, also require home sellers<sup>3</sup> to pay a filing fee when they submit their home energy label information to the city to document compliance with the ordinance. Such filing fees may be used to help cover the costs of administering the labeling program. Jurisdictions that choose to not require processing or filing fees may need to identify other funding sources to support program administration. Start-up funds are usually a necessity no matter the long-term funding structure.

#### Coordinating Programs through Oregon's Department of Energy

Oregon has a voluntary home energy performance scoring administrative rule drafted and maintained by the Oregon Department of Energy. If energy performance scores are issued in Oregon they must follow these rules. Oregon Administrative Rules specify what is required for residential and commercial energy performance scores, and include training requirements for licensed home energy assessors, and requirements for score systems. Learn more in [Case Study: Oregon](#).

**Voluntary:** Most voluntary programs, such as those offered in Connecticut, Missouri, New Jersey, and Oregon, piggyback on energy efficiency programs and focus on delivering labels to program participants. For these programs, the utility or efficiency program administrator typically leads program implementation. (See Part 3: Element 1: Create a Start-Up and Implementation Plan for more information.)

A few voluntary programs, notably Colorado, San Francisco Bay Area, New Hampshire, and Vermont, have attempted to develop market-based labeling programs that also aim to engage home buyers and sellers at time of sale ([click here](#) to see more detailed Home Energy Labeling Case Studies). Jurisdictions focused on time of sale are often coordinated by state energy offices or another statewide or regional designee. For example, in Vermont, the statewide energy efficiency utility, Efficiency Vermont, was designated as the lead program implementer. The program is overseen by the Vermont Public Service Department and a stakeholder advisory board. Oregon's Energy Performance Scoring (EPS) program implemented by Energy Trust of Oregon provides scores that compare the

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<sup>3</sup> The City of Berkeley allows the seller to defer responsibility of obtaining the Score/label to the buyer, up to 12 months after home purchase.

performance of newly built homes to those built to code. The benefits and drawbacks of these different program coordinators for voluntary programs are summarized in Table 2: Benefits and drawbacks of different program coordinators for voluntary labeling programs.

Although the long-term goal of some voluntary programs is to create a sustainable private market for home energy labels, the start-up phase often requires funding. More information on funding options for voluntary programs can be found in Part 2: Voluntary Approach: Special Considerations.

There are two major choices regarding who can implement a home energy labeling strategy. As described above, a government agency or designee may be the best fit for a policy, while an efficiency program administrator may be the best fit for a program. The benefits and drawbacks for each of these options are summarized below:

Table 2: Benefits and drawbacks of different program coordinators for voluntary labeling programs

COORDINATOR	BENEFITS	DRAWBACKS
<b>Efficiency Program Administrator</b>	<ul style="list-style-type: none"> <li>✓ Can piggyback on existing efficiency program processes and software, which may reduce cost and complexity</li> <li>✓ Good alignment with desire to promote energy upgrades</li> </ul>	<ul style="list-style-type: none"> <li>• Less focused on time of sale use case and connections to real estate industry</li> <li>• May be concerned about negative customer experience with low scores</li> <li>• May not want to fund efforts that don't result in measurable energy savings</li> <li>• May only cover part of the desired service territory, leading to inconsistent customer experience</li> </ul>
<b>Government Agency or Designee</b>	<ul style="list-style-type: none"> <li>✓ Can provide central oversight and coordination across multiple entities for the entire region</li> </ul>	<ul style="list-style-type: none"> <li>• Possibly no built-in source of funding</li> <li>• May require additional development or planning for software and training needs</li> <li>• May be out of sync with efficiency programs operating in the region</li> </ul>

## Step 4: Connect the Dots Between Labels and Market Transformation

One of the principle reasons that jurisdictions pursue home energy labeling is that this approach shows promise in terms of leading to meaningful market transformation of housing stock. Jurisdictions should consider ways to bridge labeling efforts with policies, programs, or entities that can help homeowners or buyers move forward with energy upgrades and/or advanced building practices.

For example, you may be able to establish an automatic link between those who get a label and contractors or utilities who can perform upgrades. Retailers interested in selling home improvement materials or energy efficient appliances may also prove to be effective allies in getting consumers to move from a label to an actual installation.

Partnering with local lenders can lead to greater use of available financing to invest in building energy efficiency. Your jurisdiction should research federal, state, and local policies on attractive financing and other incentives for energy efficiency and/or renewable energy investments in homes and provide this information to stakeholders (see Table 3: Nation-wide financing products related to energy efficiency and home energy labeling).

Table 3: Nation-wide financing products related to energy efficiency and home energy labeling

FINANCING PRODUCTS RELATED TO HOME ENERGY LABELS	
Entity	Financing Product & Description
<b>Energy Efficient Homes Policy</b>	
<b>Federal Housing Administration (FHA)</b>	Allows borrowers to qualify for up to a 2% stretch on their debt-to-income ratios for homes that score a 6 or higher on the Home Energy Score scale or that commit to making improvements that will get the home to a 6 or higher. The cost of improvements can be rolled into complementary products such as the Section 203(k) Rehabilitation Mortgage or Energy Efficient Mortgage. <sup>4</sup>
<b>Energy Efficient Mortgages (EEMs)</b>	
<b>U.S. Department of Veterans Affairs (VA)</b>	VA insured energy efficiency mortgages can be used for the purchase of existing homes or for refinancing loans. Depending on the documentation submitted, homeowners may borrow up to \$6,000. <sup>5</sup>
<b>FHA</b>	FHA allows ≤100% of the cost of energy efficiency measures to be financed by the lender through an existing mortgage loan. Maximum amount of the energy efficiency portion of the loan is the lesser of 5% of the value of the property, 115% of the median area price of a single-family dwelling, or 150% of the Freddie Mac conforming loan limit. <sup>6</sup>
<b>Fannie Mae's HomeStyle® Energy Mortgage Loan</b>	
<b>Fannie Mae</b>	Homeowners with conventional mortgages issued by private lenders and sold to Fannie Mae can finance up to 15% of "as completed" home value for energy improvements with purchase or refinance. Requires a Home Energy Score or comparable report if financing improvements are worth ≥\$3,500. There is a 2% stretch on debt-to-income ratios available for high scoring homes, and Fannie Mae provides a \$500 incentive to lenders on each loan. <sup>7</sup>

<sup>4</sup> Energy Efficient Mortgage Program. U.S. Department of Housing and Urban Development. [https://www.hud.gov/program\\_offices/housing/sfh/eem/energy-r](https://www.hud.gov/program_offices/housing/sfh/eem/energy-r). Accessed May 11, 2018.

<sup>5</sup> Energy Efficient Mortgages. U.S. Department of Energy. <https://energy.gov/savings/energy-efficient-mortgages>. Accessed November 3, 2017.

<sup>6</sup> Energy Efficiency Mortgages. Database of State Incentives for Renewables and Efficiency. NC State University. June 24, 2015. <http://programs.dsireusa.org/system/program/detail/742>. Accessed November 3, 2017.

<sup>7</sup> Energy Efficient Mortgages. US DOE. <https://energy.gov/savings/energy-efficient-mortgages>. Accessed November 3, 2017.

It is important to note that many lending policies exist at the national level but are underused. Currently, energy efficient mortgage products are not well-understood by many banks and mortgage lenders, so jurisdictions seeking to promote labeling in conjunction with mortgage financing may need to invest heavily in outreach and training for lenders.

#### Transforming the Housing Market in Colorado

Colorado integrated the Home Energy Score into real estate transaction infrastructure by sharing information with home buyers, real estate agents, lenders, and appraisers to ensure that the energy features were appropriately valued. They also previously tied Home Energy Score to the Energy Saving Mortgage Incentive, offering \$750 for every one-point improvement up to \$3,000. To learn more about Colorado's market integration efforts, read [Case Study: Colorado](#).

#### Transforming the Housing Market in Austin, Texas

Austin, Texas was an early adopter of an Energy Conservation Audit and Disclosure ordinance ([ECAD, 2008](#)) requiring ratings and disclosures. The seller must disclose the results of the audit to potential buyers and to any real estate agent acting on behalf of the seller. Noncompliance, a Class C misdemeanor, involves fines from \$500 to \$2,000. To learn more about market integration efforts in Austin, Texas, read [Case Study: Austin, Texas](#).

### Part 1 Summary

By utilizing Part 1: Steps to Establishing a Labeling Program, your jurisdiction should feel prepared to take the first steps to establish a home energy labeling policy or program. Regardless of which strategy is chosen, you will need to bring together stakeholders to consider the goals, scope, and implementation strategy for home energy labeling. You will also need to consider the landscape of existing policies, programs, and lending products and how these should shape your strategy. Part 2 will dive deeper into the major considerations between mandatory and voluntary policies/programs for home energy labeling.

## Part 2

### Home Energy Labeling Strategies: Mandatory vs. Voluntary

This section will help you address the question of whether to pursue a mandatory or voluntary approach as your home energy labeling strategy. There are pros and cons to each approach, and this section details the particular considerations necessary for both approaches, with much depending upon the local stakeholder preferences and the political context.

The decision-making process includes an analysis of several factors. If considering a mandatory approach, a locality should determine who is likely to oppose mandatory labeling, and whether their opposition can be softened by education or other means. The locality must also determine the level of political will in the legislature, city council, Mayor's Office, etc. to enact such a policy. Consider the attractiveness of establishing a voluntary program as an "ice breaker" that could evolve into a mandatory policy. Your jurisdiction's ultimate success in creating either a mandatory or voluntary strategy rests significantly on its ability to be strategic and sensitive to political and other interests.

#### A Deeper Dive: Trade Offs Between Mandatory and Voluntary Strategies

To get a deeper dive into various stakeholder perspectives on different home energy labeling strategies, [click here](#) to see tables comparing the significant differences between these programs & policies.

Briefly, the pros and cons of each approach are as follows:

- **Mandatory programs** achieve much higher levels of real estate market penetration and may be less expensive to administer if customers pay the cost of obtaining the label. However, mandatory labeling policies can be difficult to enact due to a perception of slowing or interfering with the real estate transaction.
- **Voluntary programs** initially achieve lower levels of real estate market penetration but are valuable in that they introduce home energy labeling to homeowners, real estate professionals, and other stakeholders, and can help motivate the development of the infrastructure needed to integrate home energy labeling into the residential real estate market. In addition, voluntary programs have the potential to generate a relatively large number of home energy labels, especially if supported by utilities and/or significant marketing. They can be a good option for jurisdictions that can piggyback home energy labels onto utility energy efficiency programs.

As of the writing of this document, a few localities have enacted mandatory labeling ordinances ([click here](#) to view Case Studies of Mandatory Home Energy Labeling Programs and Policies). No jurisdiction has been fully successful at creating a functioning voluntary market dependent solely on consumer demand for labels. In a few jurisdictions, several pieces of the voluntary labeling puzzle have been put into place, such as developing a pool of trained assessors, and educating the real estate community, but the demand for labels among homeowners and buyers of existing homes remains weak. This may be due to a lack of consumer awareness of the labels and their benefits. Therefore, a primary goal for program implementers working to establish a voluntary labeling market for existing homes must be to spur demand through market forces.



## Level of Market Traction

Mandatory labeling programs have the highest likelihood of driving the levels of market penetration required to transform the real estate market. Mandatory programs also offer the best chance for an affordable and sustainable funding model, since labels can be offered at market prices if they are required at time of listing or sale. However, mandatory approaches may encounter more opposition, so assess your political and market factors before determining the right path for your jurisdiction.

Programs focused on existing homes and integrated with utility program delivery have led to large numbers of labeled homes in states such as Connecticut. In contrast, experience to date has shown that voluntary labeling initiatives aimed at the time of sale are difficult to grow, despite efforts in states like Vermont which try to deeply engage the real estate industry through voluntary, education-based approaches.

For states and regions committed to a voluntary strategy that includes both upgrade programs and information at point of sale, the strategy that appears most likely to gain widespread traction across both use cases is for a state or local government to establish a standardized, in-home energy assessment that is:

- Provided at no cost through ongoing utility or state funding;
- Delivered through utility efficiency programs;
- Produced using energy audit software that is already in use or integrates with the already established energy scoring tool application programming interface (API);
- Standardized to produce a comparable report for customers that includes a “pre” score, as well as customized improvement recommendations tailored to the local housing stock and climate zone; and
- Accompanied by extensive real estate training and outreach so that scores are listed on multiple listing services (MLSs) and real estate professionals promote the label to home buyers and sellers.

See Table 4 for a summary of best practices aimed at growing the penetration and use of labels.

*Table 4: Best practices for achieving high levels of market penetration with home energy labeling policies*

ACHIEVING HIGH MARKET PENETRATION	
Use Case	Best Practice
<b>Upgrade Existing Homes</b>	✓ Incorporate fully into utility efficiency program, or at least coordinate with local utility.
	✓ Full software integration.
	✓ Free to customers or part of standard energy assessment practice and pricing.
<b>Time of Sale</b>	✓ Require label generation and disclosure through policy, or provide free to customers if program is voluntary.
	✓ Connect real estate professionals and brokers to home inspectors, assessors, and/or others offering labels so real estate professionals can easily direct clients.

As described in Part 1, jurisdictions should begin with a few common steps regardless of whether they are interested in proceeding with a mandatory or voluntary home energy labeling approach. That said, it’s important to note a couple of key differences. Stakeholder engagement and outreach may be more

critical on the front end if your jurisdiction chooses the mandatory path, while continuous marketing and efforts to drive demand through a program’s life are more critical to the success of a voluntary approach. The following section provides additional guidance depending on which path you choose.

### Mandatory Approach: Special Considerations

Mandatory programs are based on a piece of legislation or ordinance which must be passed for the program to take effect. Once this occurs, promotion of the labeling program takes on a different shape and purpose. A mandatory program will exist as long as the legislation is in effect, and program implementers do not need to create a market in the same way that they would in the case of a voluntary program. After legislation is enacted, implementers are responsible for establishing the six critical elements of a working system as described later in this guide, and ensuring policy compliance. Although a mandatory approach may establish a long-term funding stream through fines or administrative fees, start-up funds are usually needed to get a program off the ground.

As of February 2018, only a few cities in the U.S. have passed mandatory home energy labeling, most notably Portland, Oregon; Berkeley, California; and Austin, Texas. States including Massachusetts and Vermont have considered residential energy labeling and disclosure mandates, but to date, no state has passed legislation requiring home energy labeling. While home energy labeling is voluntary in the state of Oregon, it is required in the city of Portland. Both voluntary and mandatory scoring systems in Oregon follow the statewide law that requires home energy performance labels to have consistent information and to use a consistent modeling engine (the Home Energy Score tool) to generate the energy score. For other examples, jurisdictions should also look to Europe which has extensive experience with mandatory labeling programs.

#### Example Legislation & Ordinances for Home Energy Labeling

[Click here](#) to read example legislation and ordinance language modified from Berkeley, CA and Portland, OR, which require home energy labels in real estate market transactions. You will also find links to existing ordinances and legislation and as well as additional policy examples and analysis.

### Engage Stakeholders and Address Concerns

Once the policy has been designed and a program coordinator identified, a jurisdiction should begin scoping out existing allies and potential detractors. Individual conversations about the pros and cons of mandatory home energy labeling policy options with a variety of stakeholders can help a state or municipality better understand the existing political context. Engaging all stakeholders, including those who may oppose such a policy, will help inform and shape the talking points and informational campaigns needed to garner support over the long-run.

Engage a coalition of supporters by identifying and cultivating key allies and constituencies, establishing a formal stakeholder group, and educating the public on the proposed legislation or ordinance. Ensure that letters of support are delivered and/or a contingent of supporters are present at relevant hearings or council meetings. In Oregon, initial guidance from a Governor’s taskforce lead to a permanent [Stakeholder Panel](#). The panel, along with stakeholder participation, are critical for ongoing, consistent, and meaningful engagement for a statewide scoring model.



Figure 5. Portland Home Energy Score Home Profile

It is also extremely valuable to include a cohort of “green real estate professionals” in your coalition. These green real estate agents can be valuable messengers in explaining the policies and informing other parts of the real estate industry. Other groups that have come out in support of home energy labeling include environmental groups and home performance contractors. [Click here](#) for an example of how Vermont engaged with local Realtors.

Successful adoption of a mandatory home energy labeling policy will likely require multiple years of informational campaigns and alliance-building.

The following page contains a table summarizing policy concerns from various stakeholder groups, along with potential solutions for addressing them.

### Voluntary Approach: Special Considerations

Jurisdictions seeking to establish a voluntary labeling program should realize that for the program to be sustainable, it must be market driven. In other words, the program must establish both supply and demand in a functioning market. For this reason, the project team recommends including your local economic development agency into early planning stages. There are strong ties between establishing a labeling program and economic development, which are described [here](#).

Beyond the six critical elements common to any labeling program (described in detail in the following sections), a voluntary program must also develop a plan to promote labels to consumers and other stakeholders. In the long run, marketing to consumers will ideally be undertaken by market actors who

Score today: **3** | Score with improvements\*: **7** | Estimated energy savings with improvements: **\$500** | Estimated carbon reduction with improvements: **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](http://www.energytrust.org/findacontractor) or calling toll free 1-866-368-7878
- Find financing options and other helpful services at [www.enhabit.org](http://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 R11
Attic insulation	No insulation	Insulate to R49
Foundation wall insulation	No insulation	Insulate to R11
Wall insulation	No insulation	Insulate to R13
Envelope Air Sealing	Not professionally air sealed	Seal the gaps and cracks that leak air into your home
Door insulation	R5	Insulate to R6
Door sealing	40% leakage	Reduce leakage to 10% of total airflow
Floor insulation	R5	Insulate to R18
Casement	10% AIGC	Upgrade to ENERGY STAR AIGC
Skylights	Single-paneled	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 (E, L, H)
Windows	Single-paneled 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](http://www.energytrust.org/tips) and [www.communityenergyproject.org/services](http://www.communityenergyproject.org/services)

### Portland, Oregon’s Efforts to Establishing a Mandatory Home Energy Score Policy:

Energy efficiency leaders in Portland, Oregon spent years building a coalition of stakeholders interested in passing an ordinance requiring home energy labels at time of listing.

Ensuring the coalition represented a wide array of stakeholders was key to gaining the interest of the Portland City Council. Active coalition partners included home performance contractors, real estate champions, and environmental groups. For more information about the coalition, it’s work, and relevant resources, see [Case Study: Portland, Oregon](#).

are making a profit from generating labels, but initially, efforts will need to be supported and possibly subsidized by program implementers.

Table 5: Key stakeholders, common concerns about home energy labeling, and ways to address their needs

KEY STAKEHOLDER GROUPS & COMMON CONCERNS		
Group	Policy Concerns	Potential Solutions
<b>Real Estate Professionals</b>	Concerned that low scores will reduce home values.	<ul style="list-style-type: none"> <li>Show research that energy disclosure does not seem to hurt sales, just informs upgrades. In addition, research shows that providing any information regarding home energy use (“good” or “bad”) speeds up sales.</li> </ul>
	Concerned about policies that increase burdens in home transaction processes.	<ul style="list-style-type: none"> <li>Trustworthy data through a standard program is much better for the real estate market than energy models available online.</li> <li>Energy labeling can help sell more efficient homes at higher prices and more quickly</li> <li>Research shows that providing any information regarding home energy use (“good” or “bad”) speeds up sales.</li> </ul>
<b>Utilities &amp; Energy Efficiency Program Administrators</b>	Concerned about the costs of implementing a labeling initiative without directly measurable energy savings.	<ul style="list-style-type: none"> <li>Home energy labels present information that helps customers understand the benefits of implementing recommended energy efficiency upgrades.</li> <li>Home energy labeling is not a separate initiative. Although labeling may require adjustments to existing home energy audit software and audit field staff protocols, this is no different from software and protocol adjustments that Program Administrators routinely make.</li> </ul>
<b>Low-Income Advocates</b>	Concerned about policies that would require low-income homeowners to pay for assessments.	<ul style="list-style-type: none"> <li>Offer free labels for income-eligible homeowners.</li> <li>Show that labels are useful for consumers to know the full cost of owning or renting a home.</li> </ul>
<b>Home Performance Contractors</b>	Concerned about increasing hurdles and requirements without being able to recuperate costs.	<ul style="list-style-type: none"> <li>Home energy labels present information that helps customers understand the benefits of implementing recommended energy efficiency upgrades.</li> </ul>

Although the goal of voluntary labeling programs is to become sustainable through market forces, funding is required during the startup phase. Program implementers should look for opportunities to leverage existing programs and infrastructure. Funding options for starting a voluntary program include:

- Utility ratepayer funding: Utilities roll the cost of delivering home energy labels into efficiency programs, using funding from either utility rate base or system benefit charges. Examples: New Jersey Natural Gas, Columbia Water & Light in Missouri, EPS implemented through Energy Trust of Oregon, and Energize Connecticut
- Government funds (local, state, and Federal): Agency uses local, state, or Federal funding to pay for home energy labeling efforts. Examples: Colorado (largely funded by DOE State Energy Program (SEP) formula grant), Vermont (largely funded by DOE SEP competitive grant).

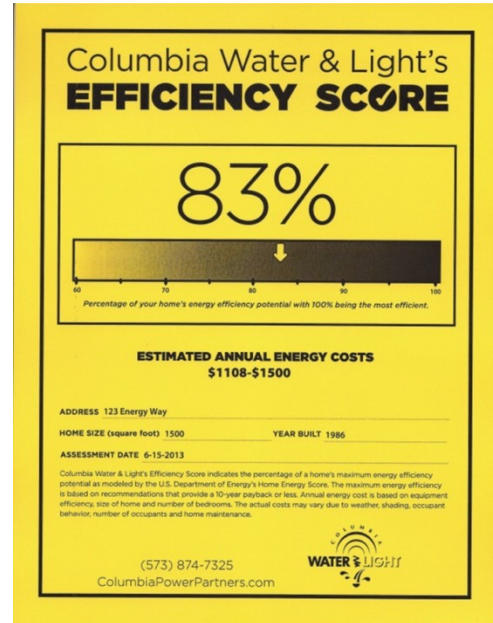


Figure 6. Columbia Water & Light's Efficiency Score

Labeling programs that leverage existing service delivery infrastructure, such as residential retrofit programs that conduct in-home energy audits, usually have lower incremental costs than stand-alone programs. Program components requiring funding during the startup phase include:

- Training for program assessors
- Financial incentives for scoring homes
- Education programs for real estate professionals, appraisers and other stakeholders
- Administrative costs.

### Drive Demand for Labels

Driving market demand also better enables the valuation of home energy performance by home buyers and sellers. The easiest way to establish value for home energy features is for home appraisers to use home energy labels to develop comparable sales. Only significant market penetration will allow appraisers to access comparable homes with energy labels.

Key strategies to drive demand include:

- Offer incentives or subsidies
- Integrate label delivery into energy efficiency programs
- Promote financing options that use labels
- Conduct effective marketing and outreach
- Educate real estate professionals as to the value of marketing labels to their clients
- Provide assessors and other data providers with marketing tools

### Offer Incentives or Subsidies, or Tie to Financing

When left to the private market, the cost for a customer to obtain an asset-based home energy label as a standalone product from an energy assessor can range from \$150-250 for a DOE Home Energy Score and \$400-1000 for a HERS rating. Market-based pricing is appealing because it means that programs must only pay for the costs of program coordination, not for the cost of delivering the label. However, if labels are priced too high, there may be little consumer demand under voluntary programs. Voluntary programs may choose to subsidize or incentivize labels to reduce or eliminate the cost to customers.

Program administrators may also want to subsidize workforce training to encourage home inspectors, energy auditors, and home performance contractors to become qualified to deliver home energy labels. In this case, program administrators should encourage label providers to market labels to potential customers. Partnering with local economic development agencies is one method to engage with label providers. They can provide marketing advice and tools, and may be able to subsidize the cost of engaging with label providers.

As described in Part 1, Step 4: Connect the Dots Between Labels and Market Transformation, financing policies through FHA, Fannie Mae, and Freddie Mac recognize specific energy labeling systems. Therefore, jurisdictions may be able to drive demand for labels by promoting financing options and/or local lenders that offer loans with preferential terms for homes with good energy ratings. If promoted at time of list/sale or refinancing borrowers are more likely to demonstrate interest in getting a home energy label.

### Integrate Label Delivery into Existing Programs

The cost of delivery can be reduced by bundling home energy labels with other in-home services offered by qualified assessors or contractors, such as home energy audits or upgrades. Because much of the label cost is associated with an assessor's travel to the home, the incremental cost of delivering a home energy label will be lower than if the label is offered during a stand-alone visit. Further, if the data collection and software used for home energy labeling is fully integrated with the software used for their standard energy audit, then there may be little or no incremental cost to deliver the home energy label. Note that depending on what software tool the program chooses (e.g., a free on-line user interface, a tool that's already linked to a label, or a new tool), there may be upfront costs associated with software integration. For more information on software integration see Part 3: Table 8.

### Vermont's Challenges with Consumer Demand:

With a purely voluntary approach, Vermont experienced low levels of demand for home energy labels when customers had to pay market prices.

Vermont structured its limited-time incentive at \$200 per label to the assessor and required that labels be offered for free to customers. The \$200 amount was designed to fully cover the cost of delivering the label for an average home.

Demand increased dramatically from approximately 2 labels per week to 11 per week during a limited time when Efficiency Vermont was able to make labels available for free to customers. For more information see [Case Study: Vermont](#).

It is important to consider the difference between using utility programs to deliver energy labels and using a separate, locally established rebate program focused on valuing efficiency in the real estate market. The utility will often use energy scores to communicate a complex topic to their customers with the hope that customers will follow through with energy efficiency retrofits. Utility involvement brings with it the potential to score many homes relatively inexpensively, but it can be unclear how these scores will be shared with the real estate market. Nonetheless, some of the homes scored through a utility program will enter the real estate market over time, and if those homes feature the energy label in the listing, then they will increase market awareness and demand. Note that the goals of the utility are likely different from those of the jurisdiction, and simply having many homes scored does not necessarily create a functioning market.

#### Connecticut/Utility Partnership: Leading the Way

The voluntary program with the highest market traction, Energize Connecticut, has fully integrated the delivery of Home Energy Scores into its flagship Home Energy Solutions energy assessment and upgrade service. Home Energy Solutions assessors use a mobile tool to collect the Home Energy Score data and produce the label at no extra cost to customers.

Connecticut generates approximately 12,000 scores per year using this integrated approach. For more information, see [Case Study: Energize Connecticut](#).

Another productive avenue for delivering home energy labels may be through home inspectors. Providing labels as an add-on to a home inspection has the potential to significantly reduce the cost to the consumer and to reach consumers during the home purchase process. According to the National Association of Realtors<sup>8</sup>, “Seventy-seven (77%) percent of all recent home buyers obtained a home inspection prior to the purchase of their homes”. Generating low cost scores through home inspectors could be a valuable pathway to generating labels quickly, and has the potential to create a sustainable market.

#### Conduct Effective Marketing and Outreach

Marketing channels include paid media (social media promoted posts, online ads, newspaper ads, etc.), owned media (newsletters, websites, blogs, utility bill inserts, and social media posts), and earned media (newspaper articles). Community-based marketing can also be helpful, such as partnering with local energy groups to conduct outreach or participating in community events.

Different customers require different outreach tactics:

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<sup>8</sup> <http://www.homeinspector.org/NAR-ASHI-2001-Home-Inspection-Study-Executive-Summary>

- **Homeowners.** Outreach to homeowners interested in understanding more about how their home performs can often be coordinated with energy efficiency program messaging and marketing channels, such as utility newsletters and Facebook posts. Homeowners can also be reached through community events, home shows, and local energy groups.
- **Home sellers.** Programs interested in encouraging home sellers to obtain labels to document their home’s superior energy features can target real estate professionals specializing in green homes. If data are available, programs may also be able to conduct direct outreach to past participants in energy upgrade programs.
- **Home buyers.** Programs can reach home buyers through first-time home buyer courses, as well as targeted ads on websites commonly used by home buyers, such as Zillow and Trulia.

#### Testing & Refining Your Marketing Strategy

Efficiency Vermont tested the effectiveness of a range of marketing tactics and messaging approaches and used a website landing page to track conversion rates. It found that a Facebook campaign and email newsletter promoting free energy labels were more cost-effective at driving interest than participating in time-consuming community events. Efficiency Vermont also tested different images to promote energy labels. One sponsored online advertisement showed a contractor working with homeowners and the other showed a snapshot of the label itself. The image with people proved twice as effective at driving clicks as the other image. (Efficiency Vermont, Vermont Home Energy Profile Pilot Final Evaluation, July 2017)

For market-based programs, assessors, home inspectors, and contractors are a key channel to promote labels.

Programs can support assessors and contractors in marketing energy labels by offering funding for cooperative marketing and advertising, and by developing marketing materials and messages that assessors and contractors can use with prospective customers. For example, DOE has developed a standard PowerPoint presentation that home inspectors can use to engage real estate agents and real estate brokers and get them interested in the Home Energy Score. Programs can also help assessors highlight their third-party credential from RESNET or DOE as a market differentiator by providing them with marketing collateral, such as lapel buttons and truck decals.

Real estate professionals can also be a good resource for marketing the program, and educational events geared towards training real estate professionals on green homes and home energy labels are an effective strategy (see Part 3: Element 5: Educating Real Estate Professionals and Appraisers for further information on real estate professional education). For example, DOE provides resources on the [Home Energy Score website](#), which can help home inspectors, [real estate agents](#), and energy contractors explain the benefits of home energy labeling to customers.

## Part 2: Summary

By utilizing Part 2: Home Energy Labeling Strategies: Mandatory vs. Voluntary, your jurisdiction should be better prepared to choose between either a mandatory or voluntary approach to home energy labeling. By reading this section, you should have a better understanding of the benefits and drawbacks associated with each approach, and the types of investments required to undergo each successfully. Part 3 will outline the technical details and implementation considerations for all types of home energy labeling initiatives.



## Part 3

### Six Critical Elements for Successful Home Energy Labeling

Once you have formulated a stakeholder group, your goals and objectives, and the type of program or policy you want to implement, the next step is to determine the technical and implementation details. We have identified six critical elements for success:

1. Create a Start-Up and Implementation Plan
2. Define Label Components
3. Determine a Software & IT Path
4. Train Professionals
5. Educate Real Estate Professionals & Appraisers
6. Link Labels with Multiple Listing Services

#### Navigating Privacy Concerns & Legal Issues

When starting a new program, there are often concerns about whether the information contained on home energy labels are public or private information. To learn about the legal precedent on this issue and how other programs have addressed this issue, [click here](#) to read Privacy Concerns.

#### Element 1: Create a Start-Up and Implementation Plan

First, the program coordinator should develop a comprehensive plan for activities needed during both the start-up phase and ongoing program implementation. The plan should cover the following topics and be updated to reflect decisions or changes as they are made during the design and implementation phases:

*Table 6: Key questions to address in a home energy labeling start-up and implementation plan.*

START UP & IMPLEMENTATION PLANS	
Planning Category	Key Questions to Address
<b>Program Management</b>	<ul style="list-style-type: none"> <li>• What are the roles and responsibilities for various stakeholder groups?               <ul style="list-style-type: none"> <li>○ State/local government</li> <li>○ Utilities</li> <li>○ Private Entities</li> <li>○ Non-Profits</li> <li>○ Others</li> </ul> </li> </ul>
<b>Stakeholder Engagement</b>	<ul style="list-style-type: none"> <li>• How will you engage real estate professionals?</li> <li>• How should utilities participate?</li> <li>• Who will promote the label to customers?</li> <li>• Who are other key stakeholder groups?</li> </ul>
<b>Multi-Year Budget &amp; Funding</b>	<ul style="list-style-type: none"> <li>• Where will funding for the program be derived in the short-term and long-term?</li> <li>• How many stakeholder educational events are needed?</li> <li>• Will you subsidize the cost of training for Assessors?</li> <li>• Will you provide rebates to consumers to incentivize labels?</li> <li>• How much will administration/overhead cost?</li> <li>• What are other likely miscellaneous costs?</li> </ul>
<b>Software Integration</b>	<ul style="list-style-type: none"> <li>• Which tool(s) will be used to model the home’s energy use and generate the label? <a href="#">(30)</a></li> </ul>

	<ul style="list-style-type: none"> <li>• How will Application Programming Interfaces (APIs) be used?</li> <li>• Is software development required?</li> <li>• Who will update and maintain the software/IT systems?</li> </ul>
<b>Label Format</b>	<ul style="list-style-type: none"> <li>• What metrics will the label feature? (See Part 3: Element 2: Defining Labeling Components)</li> <li>• How should the label be designed?</li> </ul>
<b>Assessors</b> (see Part 3: Element 4: Training Professionals )	<ul style="list-style-type: none"> <li>• How will you recruit candidates to the program to become Assessors?</li> <li>• Will your jurisdiction impose requirements and/or credentials of Assessors beyond the minimum requirements of national programs (e.g., Home Energy Score, HERS)?</li> </ul>
<b>MLS Integration</b> ( <a href="#">click here</a> to learn more about current efforts)	<ul style="list-style-type: none"> <li>• How will the labels and their associated energy metrics be connected to MLS listings?</li> </ul>

As you develop your start-up and implementation plan, keep in mind lessons learned from other states and local governments ([click here](#) to view case studies). Table 7 summarizes some important program considerations and approaches that can save resources and help make your effort successful.

Table 7: Best practices for program design and implementation

PROGRAM DESIGN & IMPLEMENTATION	
Consideration	Best Practice
<b>Program Management</b>	✓ Define one entity as the lead implementer to manage the work cohesively.
<b>Label Format</b>	✓ Use default label design; customize label only if target population has very different needs and funds permit.
<b>Software Integration</b>	✓ Use one energy model or calculator that can be accessed via an API by multiple software tools to generate a standard label.
<b>Assessors</b>	<ul style="list-style-type: none"> <li>✓ Prioritize training Assessors who are computer-literate and trained in conducting basic energy assessments.</li> <li>✓ Focus on Assessors who work directly for or are subcontractors to an efficiency program.</li> </ul>
<b>Funding</b>	✓ If possible, secure funding for program development and the first year of implementation.

Examples of program management and coordination approaches for home energy labeling programs can be found [here](#).

### Ongoing Implementation Activities

Ongoing implementation activities include:

- Partner and stakeholder coordination (see Key Stakeholders, Table 5, Pg. 7)
- Maintaining and updating software (see Part 3: Element 3: Determining a Software & IT Path)
- Hosting or appointing a host to maintain a repository for energy scores and associated data (see Element 6: Linking Labels and Scores with Multiple Listing Services
- )
- Mentoring and technical assistance for assessors (see Mentoring and Quality Assurance (QA))
- Quality assurance (see Mentoring and Quality Assurance (QA))
- Outreach and marketing (see Drive Demand for Labels
- )
- Real estate and appraiser education and training (see Part 3: Element 5: Educating Real Estate Professionals and Appraisers)
- Connecting labels and scores to the MLS (see Element 6: Linking Labels and Scores with Multiple Listing Services
- and [click here](#) to learn more about on-going efforts to connect with MLSs)
- Responding to customer inquiries
- Progress reporting and evaluation
- Continuously improving the program

## Element 2: Defining Label Components

As you move forward in developing your energy labeling initiative, it's important to think through what types of information are most likely to be valuable to your stakeholders and will advance your goals. To answer those questions, you need to understand the different types of metrics and measurements that can be included on home energy labels, what they mean, and how they can be applied, among other details.

A building energy labeling program can create a new, custom label unique to a jurisdiction, or can adopt usage of existing labels offered by national home energy labeling programs. Stakeholders should consider what information will be most valuable to homeowners and real estate professionals, and best reflect the program/policy goals. States that have designed a custom label found that designing a label that is agreed upon by all stakeholders can be a valuable, but challenging experience ([see Label Examples](#)).

Starting in January 2017, DOE funded a two-year building labeling project called Energy Metrics to Promote Residential Energy Scorecards in States (EMPRESS) through DOE's State Energy Program (SEP). One of the key deliverables from this project was this guide. Recommendations from the EMPRESS team on how to best "harmonize" metrics and measurements on a home energy labels can be [found here](#). At a minimum, the EMPRESS team, which includes energy office staff from Arkansas, Massachusetts, Missouri, Oregon, and Rhode Island along with other energy labeling experts, believes consistent label elements should be established to ensure comparability between labels, even if multiple implementers are able to deliver labels that display the information differently.

Specifically, the EMPRESS team created a matrix and accompanying narrative that describes the effectiveness of currently available metrics and measurements from Home Energy Score and HERS in supporting common building-related energy policy objectives. The matrix also describes metric and measurement characteristics that should be considered when creating a labeling program or policy. States and local governments can use the matrix to help them select those metrics and measurements to be displayed on building energy labels in their jurisdictions. To view the Labeling Component Matrix

### **Custom vs. Standard Label**

At some point in this process, likely sooner rather than later, your jurisdiction will need to decide whether to design a new, custom label or simply adopt or modify a standard label offered by one of the national home energy labeling programs. Keep in mind there are pros and cons to either approach.

Custom labels can help highlight the jurisdiction's goals by focusing attention on local energy use, emissions reduced, jobs created, or dollars saved. In addition to creating a local market-facing product, a custom label can engender a feeling of ownership amongst stakeholders, from the label designers to the end use consumer. The design process offers an opportunity to engage important actors and create a buzz of anticipation and excitement. And once launched, the label may reflect a certain amount of consensus that can bring it an air of legitimacy.

On the other hand, the process of creating the label and deciding which metrics to include can take significant time and pull resources away from other pressing needs like training, stakeholder engagement, and market development and integration. For this reason, creating a timeline for figuring out your path forward is essential, whether that means a step by step plan for designing a new label or a more modest set of tasks to tailor a national label to meet your needs. A decision must be made early on whether the final product needs to be a consensus decision or can be decided by a majority vote. Stakeholders must commit to the timeline and process up front. The timeline should include firm dates for choosing which metrics to include, and for subsequent drafts.

Keep in mind that a number of national, state, and local entities have grappled with many technical issues related to labels, so make sure to reach out to experienced colleagues in the field to help you quickly ascend a steep learning curve.

and its narrative, please [click here](#). The table below summarizes the metrics that are currently generated by Home Energy Score and HERS software programs.

Table 8: Metrics generated by Home Energy Score and HERS software programs

METRIC	HOME ENERGY SCORE	HERS INDEX
Total Source Energy	✓	✗
Total Site Energy	✓	✓
Estimated Energy Costs	✓	✓
IECC Code Compliance	✗	✓
Estimated Carbon Equivalent Emissions	✓	✓
Energy per Square Foot	✓	✓
Energy Cost per Square Foot	✓	✓
Estimated Energy Use by Fuel Type (Electricity, Fuel Oil, Natural Gas, LPG, etc.)	✓	✓
Estimated Electricity Production from On-Site Photovoltaics	✓	✓
Score / Rating with Recommended Improvements	✓	In Economic Cost Effectiveness Report
Total Source Energy with Recommended Improvements	✓	In Economic Cost Effectiveness Report
Total Site Energy with Recommended Improvements	✓	In Economic Cost Effectiveness Report
Estimated Energy Costs with Recommended Improvements	✓	In Economic Cost Effectiveness Report
Estimated Carbon Equivalent Emissions with Recommended Improvements	✓	In Economic Cost Effectiveness Report
Energy per Square Foot with Recommended Improvements	✓	In Economic Cost Effectiveness Report
Estimated Energy Use by Fuel Type (Electricity, Fuel Oil, Natural Gas, LPG, etc.) with Recommended Improvements	✓	In Economic Cost Effectiveness Report

### Element 3: Determining a Software & IT Path

Software plays a key role in labeling. Software is used to:

- Model the home's energy use
- Calculates energy metrics
- Determine the home's score/rating
- Produce the label

There are many asset-based software options available, and certain software tools may be popular in your market. Research the numerous available options to ensure you pick the right tool for your jurisdiction. Selecting the wrong software tool can pose significant cost impacts, waste assessors' time in training, and potentially set back a labeling initiative for years from the backlash. Take advantage of lessons learned by talking to jurisdictions that have already experimented with options and fully research the options available before fully investing in a tool.

The label components may drive the software choice.

Figure out which metrics you want to present on your label, then find the asset-based software that can produce them. Many tools can be modified to meet any specific needs or requirements if they don't already include the desired options. However, expect any customization to come with a price tag and take months or years (in some cases) to be modified. Therefore, it is best to find a software tool that meets all the local requirements without needing further customization. The ideal software for your program will:

- Produce desired metrics;
- Be accurate in predicting energy use and cost once the home's energy use is normalized based on the number of occupants, local climate, and fuel mix;
- Utilize a modeling engine that provides consistency in generating energy use and cost (see below for more discussion);
- Be easy to use, both for the user and for the administrator;
- Provide simple and understandable reports for customers;
- Update to new versions easily via internet-based and centrally managed systems;
- Be able to run locally if internet/cellular connection is an issue in your jurisdiction;
- Be supported sufficiently by the developer;
- Come with robust manual and support materials to provide both user and administrative guidance;
- Be compatible with other software data systems already locally in place (by the administrator, local utilities, weatherization agencies and other partners);

#### Currently Available Home Energy Labeling Tools

There are generally three approaches to generating a score or rating that would populate a home energy label: asset-based, operational, or automated. These three types of scores vary greatly. While all approaches to scoring share the goal of summarizing home energy performance into a single metric, or score, they are typically utilized for different purposes.

These three approaches to score homes are discussed briefly under "[Home Energy Labeling Tools](#)".

- Use HPXML<sup>9</sup> data transfer language to ensure data compatibility between tools and databases;
- Comply with Real Estate Standards Organization (RESO) Data Dictionary<sup>10</sup> to ensure that data can be used in local Multiple Listing Service (MLS) systems; and
- Have robust administrative management capabilities for reporting, tracking and project management.

Energy use and cost inconsistencies with different energy modeling software has become an issue<sup>11</sup>, especially in locations where the most predominant rating systems are in place: HERS and Home Energy Score. Since HERS and Home Energy Score use different underlying energy modeling engines to predict energy use and cost, they generate different results for the same house. To resolve this issue so that regardless of which rating system or tool is used the same energy use and costs metrics are produced, there are efforts underway to adopt a single energy modeling engine for all the major modeling software tools. The U.S. DOE supports moving to Energy Plus as the single hourly-based simulation tool for all energy modeling software. As of January 2018, efforts are underway to coordinate and align software tools used for generating HERS ratings, Home Energy Scores, low-income Weatherization Assistance Programs, and others by promoting linkages to EnergyPlus. Moving in this direction would go a long way toward energy use and cost consistency, thereby reducing customer confusion and increasing confidence in these systems by program administrators.

#### Element 4: Training Professionals

During the start-up phase, labeling programs must focus on establishing a base of professionals who are qualified to generate and deliver home energy labels. This section offers tips on identifying professionals who can provide the label, conducting training and testing, as well as related needs such as mentoring and quality assurance.

##### Identifying individuals to train

Determine if the following types of professionals will be appropriate to provide home energy labels for your jurisdiction:

- Home performance contractors and insulation/HVAC installers
- Energy auditors and independent energy consultants
- HERS raters
- Home inspectors

The table below outlines onboarding considerations for each of these groups.

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<sup>9</sup> [www.hpxmlonline.com](http://www.hpxmlonline.com)

<sup>10</sup> <https://www.reso.org/data-dictionary/>

<sup>11</sup> Oregon requires a single modeling engine, DOE's Home Energy Score, to provide consistent modeling results

Table 9: Who should provide home energy labels?

WHO SHOULD PROVIDE HOME ENERGY LABELS?	
Assessor Type	Onboarding Considerations
<b>Home Performance Contractors &amp; Insulation / HVAC Installers</b>	<ul style="list-style-type: none"> <li>• There is a wide range of knowledge about building science, energy modeling, and software tools among home performance contractors.</li> <li>• Knowledge gaps in building science and/or software tools may present a barrier to becoming qualified to offer home energy labels.</li> <li>• Contractors and/or installers may be biased in their data entry if they are also selling products and services. Some homeowners may perceive a conflict of interest and prefer a label delivered by a third-party.</li> <li>• Contractors may be able to offset the cost of delivering an energy label if they are hired to perform upgrades generated by the label modeling software. This can help reduce costs and streamline the transaction for homeowners.</li> </ul>
<b>Energy Auditors, Independent Energy Consultants</b>	<ul style="list-style-type: none"> <li>• Energy auditors and energy consultants are likely familiar with energy modeling software and have deep knowledge of building science.</li> <li>• May be perceived as the least biased delivery of information to homeowners, as they are not selling a product aside from the label.</li> </ul>
<b>HERS Raters</b>	<ul style="list-style-type: none"> <li>• HERS raters are qualified to deliver one type of energy label, a HERS rating.</li> <li>• HERS raters have deep knowledge of building science and energy modeling, so are strong candidates to deliver other types of home energy labels as well.</li> <li>• Becoming a DOE Home Energy Score Assessor may be a good business opportunity for existing HERS raters. Until there is market demand for home energy labels, the business opportunity may rely on incentives or other subsidies.</li> </ul>
<b>Home Inspectors</b>	<ul style="list-style-type: none"> <li>• In theory, home inspectors would seem to be good candidates to deliver home energy labels in conjunction with home inspections. In practice, labeling programs have found it difficult to recruit participation from home inspectors.</li> <li>• Home inspectors may need more support completing the training and offering marketing materials on home energy labels.</li> <li>• Home inspectors may need more training and support in the areas of building science and energy.</li> <li>• The International Association of Certified Home Inspectors (InterNACHI), American Society of Home Inspectors (ASHI), and Inspection Depot are all Home Energy Score Partners. Programs can target inspectors with any of these groups in their region to better integrate Home Energy Score with the local home inspection community.</li> </ul>

### Training best practices

Training efforts depend on the type of software your jurisdiction decides to use to generate labels (e.g. HERS, Home Energy Score, other). While training to become a Certified HERS Rater or a DOE Home Energy Score Assessor do share some attributes, the differences are worth noting when considering best practice approaches to training. HERS Rater candidates are required to attend classroom trainings conducted by an accredited Energy Rater Training organization. Some training organizations may offer a



portion of the training online, but the primary approach is classroom training. By contrast, DOE Assessor candidates can complete their training and testing independently, via a web-based training and testing process.

Both HERS Rater and DOE Assessor candidates must conduct their first home assessment(s) under the supervision of a qualified trainer. DOE allows this initial mentored site-visit to happen one-on-one, as a group session, or remotely. RESNET requires two training ratings, one of which must be conducted on-site with the trainee, followed by three probationary ratings. With these differences in mind, below are a list of best practices to consider when training candidates for home energy labeling.

- Whether approaching training in a classroom setting or independently, candidates should prepare for the training and testing by reviewing all materials provided to them.
- When independent training and testing is allowed, offering on-site classroom training is highly encouraged.
- Whenever possible, provide computers for trainees. If this is not possible, ensure candidates have a computer that meets all requirements and specifications prior to beginning the training.
- Ensure access to high-speed internet.
- Be attentive to the student to trainer ratio. For example, DOE Assessor trainers have found that a 5:1 student to trainer ratio is ideal. HERS Providers have been delivering training for a much longer period of time and may have higher student to trainer ratios.
- Trainers should be deeply familiar with the training material and any quirks or bugs associated with training software to preempt issues during training sessions.
- Trainers should plan to debrief following classroom and field training sessions to understand what worked and what didn't to improve future trainings.
- If possible, have another person (non-trainer) available for logistical support.
- If possible, provide a group mentoring, probationary assessment session, or in-field training, to allow candidates to learn from each other. This approach can be particularly useful when initially implementing a labeling program to ensure labels are delivered in a uniform manner
- Don't forget the perks! Consider providing meals, snacks, coffee etc. during classroom trainings. Consider having special 'treats' upon successful completion of testing requirements and keep it fun.

### The Value of Qualified Energy Professionals

According to feedback gathered by Efficiency Vermont, Vermont's energy efficiency program administrator, customers highly valued the opportunity to receive recommendations and advice from the qualified professional who delivered their home energy label. This is the case for both new construction (where homeowners typically receive a certificate based on a HERS rating) and existing homes (where homeowners typically receive a label based on the DOE Home Energy Score.)

For more information on training requirements and best practices see <http://empress.naseo.org/resources/home-energy-score> and <http://empress.naseo.org/home-energy-rating-system>.

### Mentoring and Quality Assurance (QA)

If a home energy labeling program is based on DOE's Home Energy Score, RESNET's HERS Rating, or a combination of the two, an initial mentoring period and ongoing quality assurance (QA) are required. These requirements foster accuracy and consistency of data collection and uniform energy modeling, as

well as uniform delivery of results. Mentoring and QA are provided by individuals who hold additional credentials qualifying them to provide these services.

Mentorship and QA has historically been conducted onsite. As of 2017, remote mentoring and Desktop QA (DTQA) was provisionally approved by the U.S. DOE<sup>12</sup> for the Home Energy Score program. DTQA has been successfully implemented by Home Energy Score Partners as well as third-party Remote Service Providers. This approach can be extremely valuable in cases where high volumes of Home Energy Scores are being generated, or in cases where geography is a limiting factor. This approach also offers a business opportunity for Remote Service Providers to support the Home Energy Score when Partners are unable to provide these services directly. RESNET has also recently announced a Virtual QA Draft Protocol.<sup>13</sup> RESNET Virtual QA is included in the Standard Amendment currently out for public comment.<sup>14</sup>

Technical assistance for customers is also important. For example, Efficiency Vermont trained its customer service call center staff to field inquiries about home energy labels. The program developed an internal Frequently Asked Questions (FAQ) document<sup>15</sup> to support call center staff in responding to basic questions. The FAQ document was largely developed from DOE's Home Energy Score FAQs<sup>16</sup>, with added Efficiency Vermont program-specific content. Efficiency Vermont also established a process to elevate more complicated or technical inquiries to a trained technical staff member. When implementing a home energy labeling program, consider how to provide this type of technical assistance for homeowners.

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<sup>12</sup> For more information about Remote Mentoring and Desktop Quality Assurance visit:

<https://betterbuildingssolutioncenter.energy.gov/home-energy-score/provide-quality-assurance>

<sup>13</sup> RESNET draft virtual QA protocol:

<http://conference2017.resnet.us/data/energymeetings/presentations/RESNET-2017-Virtual-QA-Timely-Feedback-in-a-Long-Distance-Partnership.pdf>

<sup>14</sup> [http://www.resnet.us/professional/standards/RESNET\\_QA\\_Standard](http://www.resnet.us/professional/standards/RESNET_QA_Standard)

<sup>15</sup> VERMONT HOME ENERGY PROFILE PILOT FAQs, 6/8/16

<sup>16</sup> <https://betterbuildingssolutioncenter.energy.gov/home-energy-score/home-energy-score-faqs>

### Proving the Value Proposition to Assessors

The key to growing the market of qualified energy professionals capable of delivering home energy labels is proving the value proposition.

Providing labels based on national programs, like HERS and Home Energy Score, requires individuals to become qualified to use the required software. It is no small effort to become a certified HERS rater or a DOE qualified Home Energy Score Assessor, or both. To warrant the time investment, it must be worth it. Requirements for both certified RESNET HERS Raters and DOE Assessors are extensive. Training involves establishing a base level of building science knowledge, understanding the software, and learning about the umbrella program. Both involve training, self-study, examinations and scoring or rating of a home with oversight by a designated qualified individual. Specific details about qualification and training requirements may be found on the RESNET<sup>1</sup> and DOE<sup>2</sup> websites.

In the case of new construction, home energy labels or certificates are commonly part of existing utility incentive programs. Additionally, the rating or score delivered on the label is often an integral part of the program. Therefore, HERS raters are incentivized to work within new construction utility programs. A small subset of HERS raters work outside of utility programs and are paid directly by a homeowner desiring a home energy rating, but the majority operate in conjunction with a utility program structure<sup>3</sup>.

In the case of existing homes, the primary mechanism to provide a home energy label is through DOE's Home Energy Score program. Helping new Assessors with marketing is also critical to building consumer demand and making the proposition worth the Assessors' time. See Part 2: Voluntary Program Considerations for an overview of resources available and guidance on implementing a voluntary Home Energy Score program.

<sup>1</sup> Certified HERS Rater requirements: <http://www.resnet.us/professional/rater/hers-certification-requirements>

<sup>2</sup> DOE Home Energy Score Assessor requirements: <https://betterbuildingsolutioncenter.energy.gov/home-energy-score/become-assessor>

<sup>3</sup> Performance Systems Development, presentation at 2017 RESNET Conference: <https://www.nehers.org/Data/Sites/1/media/training/webinars/presentations/resnet-2017-rater-survey-short-3117.pdf>

## Element 5: Educating Real Estate Professionals and Appraisers

Real estate professionals are a direct link to home buyers and home sellers, two key market actors who can act upon the information contained in a home energy label. Moreover, access to verified, independent home energy information enables real estate professionals to:

- Better market their properties
- Empower buyers to make better informed investments
- Promote wiser use of energy in homes

- Be able to identify which home features and building attributes provide greater energy, water, and resource efficiency
- Create a healthier living environment for their clients

These benefits are contingent upon real estate professionals receiving comprehensive and targeted training for how to understand and use information from home energy labels. For real estate professionals to adequately explain home energy labels to their clients, they must have some training in the specifics of the home energy labeling program and general home energy efficiency.

When implementing a home energy labeling program, it's important to include a mechanism that enables third-party access to the home energy labels. For example, this can be accomplished by including language in the customer participation agreement that states that home energy labels can be provided from the database in which they are stored to a Multiple Listing Service (MLS). This provides standing for the real estate community to access and share the home energy information. Real estate professionals can ultimately serve as the bridge between their clients and the energy information that they want to access. However, real estate professionals need support from the home energy labeling program to fully understand this opportunity.

By working with local or national training providers, home energy labeling programs can provide real estate professionals with the knowledge and skills to communicate with clients about the value and benefits of energy efficiency. To attract real estate professionals beyond the “early adopters,” trainings should provide state-approved Continuing Education Units (CEUs) for real estate professionals. DOE’s [Energy Efficiency for Real Estate Professionals](#) presentation has been approved for CEUs in a few states and is available free online. DOE also created a [Home Energy Score insert](#) for the National Association of Realtors’ (NAR’s) Green Designation Training, which Green Designation trainers can use to provide specific information on Home Energy Score as part of regular programming. Trainings should provide an overview of home energy labeling programs and offer participants a hands-on exploration of high-performance building techniques and products through home site visits.

Successful real estate engagement programs in Oregon and Vermont have

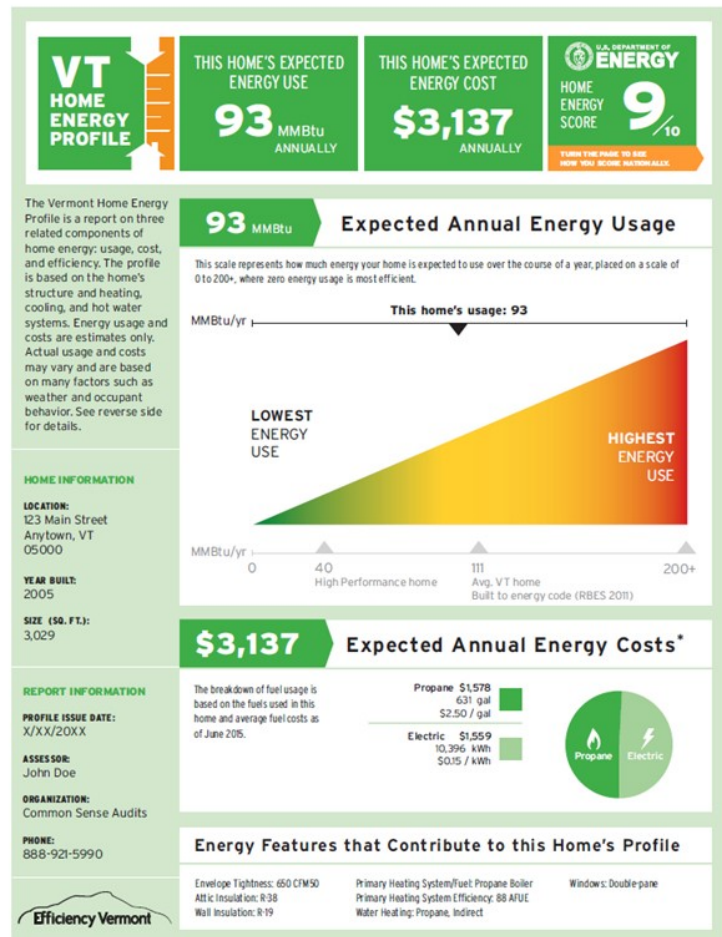


Figure 7. Efficiency Vermont Home Energy Profile

demonstrated that identifying local real estate champions and forming partnerships with real estate associations are critical to garnering interest in trainings. One-touch training programs can be supplemented with ongoing training opportunities covering a diverse set of home energy issues. Real estate professionals often benefit from ongoing engagement so they can gather the latest market insights.

Real estate professionals can access trainings in diverse ways. Consider coordinating trainings that include webinars, videos, site-visits, in-classroom, and on-demand on-line. These trainings should also be of different lengths – from intensive three-day courses that can result in achieving a professional designation to 5-minute videos on a pertinent topic. Local and national real estate training providers can often customize curriculums to support the specific home energy labeling programs and provide connections to on-line real estate training platforms.

#### Engaging with Real Estate in Vermont

Building on the relationships and trust developed between the energy efficiency and real estate industries' collaborations on education and training on energy topics, Vermont Realtors®, the trade association representing Realtors® in Vermont, proposed to voluntarily provide their buyer and seller clients with a two-page informational pamphlet on home energy use. In addition, Vermont Realtors® updated the Sellers Property Information Request (SPIR) to provide better information about the energy features of a home to prospective buyers.

For more information on efforts to engage real estate in Vermont, read [Case Study: Vermont](#).

While buyers need access to energy efficiency information that is credible and easy to understand, sellers need tools that help to accurately capture the value of investments already made to improve a home's energy performance. Appraisers play this important, although longer-term, role in supporting a home energy labeling program and increasing the effectiveness of the label in the local market. Appraisers are the critical link between labels and documenting the value of energy efficient features in a home. When appraisers understand a home's energy information, they can calculate the relative additional value of those features.

Appraisers can see benefits from access to home energy labels in their market. They can differentiate themselves in the marketplace by learning how to use home energy labels in the appraisal process. Labels also help them minimize the risk of inaccurate appraisals that do not correctly value home energy upgrades. Appraiser training surrounding labels is necessary to shift the real estate market toward valuing energy efficiency. As more home energy labels are created, appraisers will have access to improved data regarding how the local market responds to labels and whether the market values more energy efficient homes. The Appraisal Institute's [Residential Green and Energy Efficient Addendum](#) allows appraisers to capture elements of a green building, including the energy label and/or green certification.

Appraisers, like all real estate professionals, require specific training to be qualified to successfully and accurately appraise the energy features in a home. The Appraisal Institute maintains a registry of those appraisers qualified to value energy-efficient high-performance homes. An overview of the appraisal process and energy efficiency, as well as links to appraiser educational requirements and the registry of qualified appraisers are provided in the document, *Appraised Value and Energy Efficiency: Getting it Right*<sup>17</sup>.

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<sup>17</sup> [https://www.appraisalinstitute.org/assets/1/29/AI-BCAP\\_Flyer.pdf](https://www.appraisalinstitute.org/assets/1/29/AI-BCAP_Flyer.pdf)

## Element 6: Linking Labels and Scores with Multiple Listing Services

A 2013 study by the National Association of Home Builders (NAHB) found that “nine out of ten buyers would rather purchase a home with energy-efficient features and permanently lower utility bills than one without those features that costs 2 percent to 3 percent less.”<sup>18</sup>

A primary barrier to widespread access to energy information for homes in the market is that there are few systems in place to transmit this data to the real estate listings that real estate professionals and buyers use to compare homes. To successfully auto-populate energy efficiency data into Multiple Listing Services (MLSs), the home energy labeling program must have a mechanism to alleviate concerns about publicizing information about a home’s expected energy use.

### Ongoing Efforts for Linking to the MLS

There are many ongoing efforts to connect home energy labeling information to MLSs around the country. For more information on these efforts, read [Connecting with Multiple Listing Services: Current Efforts](#).

Such concerns can be addressed through releases or program design. This is discussed in detail on the [EMPRESS webpage](#) on concerns with publicizing home energy information. The technical issues that concern the creation of this type of database system are:

- The ability to efficiently import data generated from a variety of program types
- The capacity to store the data in a secure and durable form
- The methods to make the data available in the formats that the real estate market expects and can utilize.

In 2015, U.S. DOE initiated the Home Energy Information Accelerator to help interested organizations work towards making this home energy data available in local real estate markets. These efforts, and others, have led to several solutions intended to either serve a single market or scale across states and/or municipalities. In the Northeast region, Northeast Energy Efficiency Partnerships (NEEP) has developed the Home Energy Labeling Information eXchange (HELIX) through a multi-state effort. In the Northwest region, Earth Advantage has developed the Green Building Registry, which is used to auto-populate data for the Portland Home Energy Score program. The Colorado Energy Office developed its own database for aggregating data. The North Carolina Building Performance Association has plans to deploy a system and Build It Green has solicited proposals for a system in California. In coordination with the Accelerator, the Council of MLSs released the [Home Energy Information Guide](#), which details the process for MLSs and real estate agents seeking to use home energy information. More detail on HELIX and the Green Building Registry can be [found here](#).

Whether your jurisdiction builds its own database or uses one of the available systems, there will be challenges for integrating with local listing services. There are over 800 local Multiple Listing Services in the country, plus other national services like realtor.com, Zillow, Trulia, and Redfin. Although the Real Estate Standards Organization has created a data dictionary and certifies MLS compliance with that dictionary, there are still differences in how green data fields are applied at the local level. All auto-population efforts require partnering with the local MLS(s) to ensure the data is properly represented in listings. Before assembling its database, Colorado first completed an effort to standardize green fields across most of the MLS systems in the state. This is an excellent idea for a statewide effort.

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<sup>18</sup> <http://energyefficientcodes.com/wp-content/uploads/2013/09/Slide-1-2013-Mar-Building-Online-NAHB-Study-Reveals-What-Home-Buyers-Really-Want.pdf>

It is becoming more common for MLSs to include “green attributes” in listings, and in some cases real estate agents use data generated by existing ordinances to populate the green fields in the MLS. For example, the Energy Conservation Audit and Disclosure ordinance in Austin, Texas allows home assessment data to populate the “green fields” of the MLS.<sup>19</sup> [This webpage](#) describes how some fields in the MLS can now be auto-populated once the data are collected by home energy raters and other verifiable data sources. Auto-population of home energy information can ensure greater accuracy and give real estate agents and their customers greater confidence in the information.

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<sup>19</sup> Energy Audits-Benefits Await. Austin Board of Realtors. November 20, 2015. <http://www.abor.com/blog-energyaudits/>. Accessed October 31, 2017.

## List of Web Links throughout this Guide

1. What Is Home Energy Labeling & Why Is It Beneficial: <http://empress.naseo.org/energy-labeling>
2. Mandatory vs. Voluntary Labeling Programs: Trading Off Benefits & Challenges: <http://empress.naseo.org/mandatory-vs-voluntary-approaches>
3. Home Energy Labeling Case Studies: <http://empress.naseo.org/casestudies>
  - a. Voluntary Home Energy Labeling Programs & Policies
  - b. Mandatory Home Energy Labeling Programs & Policies
4. Example Legislation and Ordinances: <http://empress.naseo.org/sample-legislation>
  - a. Sample Legislation, Derived from Oregon Voluntary Labeling Law
  - b. Sample Ordinance Language, Derived from Portland, Oregon, Residential Energy Performance Rating Ordinance
5. Currently Available Home Energy Labeling Tools: <http://empress.naseo.org/home-energy-labeling-tools>
6. Privacy Concerns: <http://empress.naseo.org/resources/privacy>
7. Label Examples: <http://empress.naseo.org/sample-labels>
8. DOE's Home Energy Score Program: <http://empress.naseo.org/resources/home-energy-score>
  - a. Home Energy Score Label Design
  - b. Home Energy Score Energy Modeling Software and Score Generation
  - c. Suitability of Local Housing Stock and Market for DOE's Home Energy Score
  - d. Considerations for Updating Home Energy Scores after Home Energy Retrofits
  - e. Training Assessors
9. Home Energy Rating System (HERS): <http://empress.naseo.org/home-energy-rating-system>
  - a. HERS Background
  - b. RESNET
  - c. The HERS Index
  - d. HERS Software
  - e. HERS Rating Label Designs
  - f. The Market for HERS Ratings
  - g. Training HERS Raters
10. Connecting with Multiple Listing Services: Current Efforts: <http://empress.naseo.org/resources/mls>
11. Other Resources: <http://empress.naseo.org/resources/other>



## Key Labeling Components Document

## Defining Label Components

A building energy labeling program can create a new, custom label unique to a jurisdiction, or can adopt usage of existing labels offered by national home energy labeling programs. Custom labels can help highlight the jurisdiction's program/policy goals by measuring impacts on local energy use, emissions reduced, jobs created, or dollars saved. Stakeholders should consider what information will be most valuable to homeowners and real estate professionals, and best reflect the program/policy goals. States that have designed a custom label found that designing a label that is agreed upon by all stakeholders can be a valuable, but challenging experience (see [Sample Labels](#)).

Designing a custom label has associated benefits beyond simply producing a market-facing product. A custom label specific to a locality can engender a feeling of ownership amongst all stakeholders, from the label designers to the end use consumer. The design process can engage important actors and create a buzz of anticipation and excitement. And once launched, the label will have a certain amount of consensus that will bring it an air of legitimacy.

However, the process of creating a custom label and deciding which metrics to include can take significant time and resources. For this reason, creating a timeline and schedule for developing the label is essential. A decision must be made early on whether the final product needs to be a consensus decision or can be decided by a majority vote. Stakeholders must commit to the timeline up front. The timeline should include firm dates for choosing which metrics to include, and for subsequent drafts. Minimizing the resources spent on label design will free up resources for other aspects of the program. For this reason, recommendations from the EMPRESS team on how to best "harmonize" metrics and measurements generated by Home Energy Score and the Home Energy Rating System (HERS) index software follow. At a minimum, the EMPRESS team believes consistent label elements should be established to ensure comparability between labels, even if multiple implementers are able to deliver labels that display the information differently.

### Background

The EMPRESS team undertook the task of "harmonizing" Home Energy Score and the Home Energy Rating System (HERS) index due to the potential for market confusion caused by the difficulty of comparing information generated by Home Energy Score and HERS. The lack of comparability stems from four sources: 1.) Different scoring systems and scales (Home Energy Score 1-10, HERS 0-100+)<sup>1</sup>, 2.) energy performance measurements, such as MBtu/year or utility costs/year, are different when calculated by Home Energy Score and HERS software, 3.) the assumptions and inputs used in different modeling tools vary, and 4.) non-standard building energy labels presenting different sets of information further hinders the comparisons of homes.

The EMPRESS team's goal was to provide information to facilitate standardizing building energy labeling. For this reason, the Team analyzed various metrics in terms of their ability to support different policy objectives, as well as other factors like durability, granularity, ease of understanding for consumers, cost, and financial industry recognition. No recommendations were created on *how* to display metrics on a label, but by providing information on the strengths and weaknesses of various metrics and their

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<sup>1</sup> Home Energy Score is a 1 -10 score based on absolute source energy consumption where 1 is high energy use and 10 is low energy use

HERS is a 0-100+ score based on relative site energy consumption compared to a reference home where 0 is low energy use and 100+ is higher energy use

ability to support different policy objectives, we hope to help states and other jurisdictions develop labeling programs and labels that facilitate home energy comparisons and encourage home energy improvements. Furthermore, we aim to help Multiple Listing Services (MLSs) and other home service providers to better design, build, and accurately populate their databases. The long-term goal is information consistency to assist real estate market actors (including consumers, lenders, property inspectors, appraisers, jurisdictions and others) by providing data that is easier to compare, understand and interpret. The recommendations and information that follow were developed by the EMPRESS team through internal discussions and vetted through a large stakeholder engagement process. The EMPRESS team includes energy office staff from Arkansas, Massachusetts, Missouri, Oregon, and Rhode Island along with other energy labeling experts.

### Introduction to the Label Component Matrix

A variety of energy-related metrics and measurements can be generated by both Home Energy Score and Home Energy Rating System (HERS) software platforms. Examples of these metrics and measurements include estimated annual energy costs, site MBtu per year, and annual greenhouse gas (GHG) emissions. Each draws attention to different aspects of a building’s energy use. For instance, greenhouse gas emissions may motivate environmentally conscious homeowners to improve their home’s energy efficiency while helping the public to connect a jurisdiction’s GHG reduction goal to building energy use. Similarly, an annual energy cost metric may motivate a financially conscious homeowner while simultaneously aligning with an energy cost reduction policy objective.

<b>Definitions</b>
<p><b>Measure:</b> single unit with single point in time, unit-specific, usually a quantifiable attribute. For example, annual gallons of oil used.</p> <p><b>Metric:</b> a derivative of one or more measurements, provides broader context by abstracting measurements to be more understandable. For example, a Home Energy Score or a HERS index rating.</p>

The following matrix describes the effectiveness of currently available metrics and measurements from Home Energy Score and HERS in supporting common building-related energy policy objectives. It also describes metric and measurement characteristics that should be considered when creating a labeling program or policy. States and local governments can use the matrix to help them select those metrics and measurements to be displayed on building energy labels in their jurisdictions.

### How to Use the Matrix

Begin by following the instructions on the left-hand side of the matrix (in the orange cells). First, select one or more primary metrics to include on a label. Descriptions of each suggested primary metric are located in the narrative after the matrix and summarized within the matrix cells. Second, select one or both cost metrics with supporting fuel use and price information. Every building energy label should include a cost metric with a specified timeframe, fuel use and fuel unit price assumptions. Every label should also include all supporting information described in the matrix (i.e. date of issue, tool version, and verification body). Lastly, the supplemental information summarized in the matrix should be considered for inclusion on building energy labels.

The graphic design of a label should be used to highlight the items that are the highest priority for a jurisdiction. The EMPRESS team recommends standardizing a minimum set of information to be included on all labels within a jurisdiction. For example, the state of Oregon created administrative rules

which define minimum requirements and options for home energy labels (see [Case Study 6: Oregon](#) for more information)<sup>2</sup>. States and local governments may choose to highlight and prominently display metrics or information that most strongly support their current policy priorities. In making decisions regarding which metrics to include on a label, we advise that jurisdictions do not preclude or prevent other metrics from being on a label. In other words, a minimum set of requirements is recommended, but limiting what other content can be on a label is not advised.

The common policy objectives and program design considerations included in the matrix were put forward by EMPRESS team members and participating stakeholders. Descriptions of these policy objectives and program design considerations are located below. Descriptions of each metric and other recommended information are also located below the table. Most, but not all, metrics and measurements shown within the matrix currently can be generated by either Home Energy Score or HERS scoring systems.

### Labeling Component Summary

To start designing a label, it is strongly recommended that readers follow the instructions on the left-hand side of the matrix and read all of the corresponding sections in the supporting narrative. The matrix, on its own, does not fully summarize the many details that should be considered when designing a label.

However, the matrix and narrative, when used in combination, are meant to serve as a starting point for jurisdictions as they begin the design process. Working through the matrix and narrative, will not only clarify the recommendations on which metrics and measurements should be included on every label, but it will help raise important questions regarding the pros and cons of other common metrics. The detail provided in the matrix and narrative should lead jurisdictions to seek out other needed information and assistance.

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<sup>2</sup> Oregon administrative rules:  
[https://secure.sos.state.or.us/oard/viewSingleRule.action;JSESSIONID\\_OARD=mqczJC1ntNKIbdDUaeC4L5GckJh2S6idoiVuR7AQa5QgsKpVGBzi!79857996?ruleVrsnRsn=48132](https://secure.sos.state.or.us/oard/viewSingleRule.action;JSESSIONID_OARD=mqczJC1ntNKIbdDUaeC4L5GckJh2S6idoiVuR7AQa5QgsKpVGBzi!79857996?ruleVrsnRsn=48132)

		A. Policy Objective		B. Metric Characteristics						
		Greenhouse Gas (GHG) Reductions	Energy Use Reductions & Cost Savings	Use case(s)	Durable	Granular (Impact on the home to change the score)*	Readily Understood by Consumers**	Cost of Delivery	Finance Industry Recognition	
Choose one or more primary metrics	<b>1. Primary Metrics***</b>									
	<i>Home Energy Rating System (HERS) Index</i>	Usually Yes--improvement in HERS/HES is generally correlated with GHG reductions	Yes - Directly compares the home's energy & cost to the reference code IECC 2006	Primarily used for new home marketing, programs (e.g., ENERGY STAR) & code compliance; can also be used on existing homes	Somewhat - Index will change when reference code baseline is updated and/or when software is updated	Yes	The Index generally requires some explanation by the Rater	Generally \$400-1000	Available, but not often used	
	<i>Home Energy Score</i>		Yes - Directly compares source energy & cost to the national averages (derived from 2009 Energy Information Agency data)	Primarily used for existing home retrofit initiatives; can also be used for new homes	Somewhat - Scores will change when underlying score bins are updated and/or software is updated	Somewhat - generally large improvements are needed to impact the score	The score, while simple in scale, generally requires some explanation by the Assessor	Generally \$200-400	Available, not often used but use is increasing	
	<i>Greenhouse gas (GHG) impact</i>	Yes	Yes Indirectly-reduction in GHG emissions may be correlated with a reduction in energy use and/or cost depending on fuel mix	New or existing homes	Generally yes- Subject to changes in fuel and generation mix	Yes - Depends on scale precision	Units new to consumers	Can be extracted from existing tools, so similar cost to HES.	Not currently	
	<i>Site energy use in millions of British Thermal Units per year (MBtu/year)</i>	Usually Yes--reduction in MBtu or kWh-equivalent is generally correlated with GHG reductions	Yes - lower Mbtu and kWh-e metrics directly indicate lower energy use and/or cost.		Yes	Yes				
<i>Site kilowatt hour equivalent per year (kWh-equivalent/year)</i>										
Pick a Cost Metric & A Timeframe	<b>2. Cost Metrics</b>									
	<i>Total Energy Cost (\$/timeframe)</i>	Derived from estimated asset-based energy use, not operational (billing) data. This is usually the total annual energy cost for the home. Some programs might choose to display monthly energy costs if they are messaging monthly mortgage and related costs. Programs that want to message longer term energy costs (e.g., costs over the average timeframe for home ownership) may choose to display 10 year energy costs.								
Support with Fuel Use & Unit Prices	<i>Energy Savings (\$/timeframe)</i>	Usually annual savings from recommended measures. For example, HES recommends only measures with a 10 year payback or better. Not all systems generate recommendations or savings. New homes scores may not display recommended upgrades. New homes programs can display savings above a standard code home (this home built to code)								
	<b>3. Fuel Use and Price</b>									
	<i>Native Fuel Use by Fuel Type</i>	Estimated fuel use in the units a customer would see on their bill. Native units means therms or ccf or decatherms for natural gas, kilowatt-hours for electricity and gallons for oil or propane.								
<i>Unit Price by Fuel Type</i>	Price per fuel in native units, for example \$1.00 per therm, \$0.10 per kWh, or \$2.00/gallon.									
<i>Annual Cost by Fuel Type</i>	Cost of all fuel use in the home, discrete by fuel. Allows homeowners to see what each fuel represents in their energy budget.									
Include on All Labels	<b>4. Supporting Information</b>									
	<i>Date of Issue</i>	Include date of issue as reference point for fuel costs and tool version.								
	<i>Tool Version</i>	Include tool version number for reference.								
Other Information to Include to Help Explain and Substantiate Metrics	<i>Verification Body</i>	Include body responsible for issuing label, such as local provider or verifier with QC oversight responsibilities (reference RESO).								
	<b>5. Supplemental Information</b>									
	<i>Reference Case</i>	Including reference case(s) as indicators can help consumers to better compare homes. For example, including references such as a zero-net energy home or an average home within the specified jurisdiction, can help consumers understand a home's relative performance. In other words, the consumer may not understand what a MBtu/year metric means, but with reference case(s), the consumer could know if a home was better or worse in relative terms.								
	<i>Recommendations</i>	Provide any home performance, energy saving, health and safety, building durability and other recommendations to provide guidance and suggestions to home owners/buyers to make improvements.								
	<i>Conditioned Floor Area</i>	Information on the conditioned floor area of a home allows for better, more accurate, comparisons with other homes by providing a basis for normalization.								
	<i>Year Built</i>	Year built can help predict the performance of a home because it dictates the building code standards used during the home's construction.								
	<i>Home Features</i>	Listing key features such as energy efficiency HVAC systems or extra insulation can help consumers to connect the estimated energy performance of a home to the home's physical assets. Such knowledge can encourage consumers to appreciate and maintain their most important energy-saving features. For energy professionals, this information can provide insight into some of the assumptions used for calculated metrics such as estimated MBtu/year. This information can also support local energy efficiency programs by providing both home energy auditors and home owners with knowledge about existing assets.								
	<i>Site vs. Source Energy Use</i>	The metrics described above use site information in their calculations. However, there are several efforts by DOE, Home Energy Score, California and others that aim to reduce greenhouse gas emissions and costs system-wide. Tracking system-wide reductions in emissions and costs requires metrics to be based on source calculations. However, this adds complexity and can cause confusion for the general public. In addition, it may act to disengage homeowners since reducing source emissions or costs, in contrast to reducing site emissions or costs, is often out of a homeowner's control. Therefore, it is not recommended that metrics indicating source emissions or costs be primary or secondary metrics. The inclusion of this type of information on a label would primarily be for the benefit of state or federal-level program/initiative administrators.								
<i>New Future Asset &amp; Operational Metric</i>	In the future, a metric may be established that considers both asset and operational information for a home. All metrics currently listed in this table are based on asset information only. If a combination asset and operation metric is established, consumers would benefit from understanding both what systems are within a home and how they are currently operating.									
<i>Other Certifications</i>	Include any energy efficiency and green building program certification information, including but not limited to local program certifications, ENERGY STAR, LEED, National Green Building Standard, etc.									
<i>Translations from other score</i>	Any metric can be translated into a "grade" or other simplified "binned metric" such as A-F or 1-10. The A-F approach is currently used in Europe and in some real estate portals; HES uses the 1-10 scale. Often kBtu/sq. ft. is used as the basis for an A-F grade. It is important that the basis of the grade or binned metric be noted on the label.									

\*How sensitive the score is to retrofits - i.e. will small changes impact the score?

\*\*This Metric Characteristic also includes the level of recognition by an average consumer.

\*\*\*Assumes a common calculation engine is used for all metrics.

## Column Headers:

### A. Policy Objectives

Policy objectives refer to the desired outcomes of a home energy labeling policy. While the two objectives considered, “greenhouse gas reductions” and “energy use reduction and cost savings” have similarities in terms of outcome, there are differences in steps that may be taken to achieve each. A greenhouse gas (GHG) reduction goal may have a greater focus on “beneficial electrification” or the shift from fuels such as natural gas, propane or heating oil to electricity or increasing the number of net zero energy homes, while a goal focused on energy use reduction and cost savings may target fuel switching from heating oil to natural gas or increasing insulation.

**Greenhouse Gas Reductions:** For states and localities with the goal of specifically reducing GHG emissions through improved building design, efficiency, and installed renewable energy systems, a greenhouse gas impact metric directly addresses this policy objective. Site MBtu/year, kWh-equivalent/year, HERS and Home Energy Score can be correlated with greenhouse gas emissions, but are a step removed.

**Energy Use Reductions & Cost Savings:** For states and localities with the goal of reducing energy use or costs for consumers, energy cost reductions can be achieved by increased building energy efficiency, fuel switching and, in some cases, renewable energy installations. A lower site MBtu/year, kWh-equivalent/year, HERS index rating or Home Energy Score directly indicates lower energy use and/or cost. A lower GHG impact metric can indirectly signify reduced energy use and/or cost, but the relationship depends heavily on changes to the fuel mix.

### B. Metric Characteristics

This section describes various characteristics that should be considered when choosing a metric(s). Specifically, this section explains what is meant by the following characteristics: use case(s), durability of the metric, granularity of the metric, how readily understood the metric is by consumers, the cost of delivering the metric, and whether the metric is recognized by the financial industry. The matrix includes information about each metric in terms of these characteristics, and this information should be considered, together with the overall program design, when choosing a metric(s).

**Use Case(s):** the types of homes – either new or existing single family residential – that usually receive the metric and/or can receive the metric, along with information on common delivery programs.

**Durability:** the ability of the metric to facilitate “apples-to-apples” comparisons between buildings over time, assuming no building asset changes are made during that time — i.e., the metric can be used to compare homes regardless of when the metric is generated as long as no asset upgrades or changes are made. If an energy upgrade is completed, it is assumed that a new building energy label would need to be generated. Metrics that would change depending on when they are generated (either because the metric itself relies on making a comparison or because it relies on underlying information that changes over time (like energy prices) are generally less durable.

**Granularity:** the ability of the metric to reflect small differences in energy usage – i.e. will small changes in energy use impact the metric value upward or downward. This can be an important consideration for retrofit programs and is largely affected by the scale<sup>3</sup> used to display a metric on a label.

**Readily Understood by Consumers:** the ability of the metric to be easily understood by consumers without additional education/explanation. Note that most, if not all, metrics, can be made more understandable by providing a point of comparison (such as an average home) on the label. The comments included under this category also address customer recognition levels.

**Cost of Delivery:** the cost of delivering a metric to a consumer for a single home. The values are approximate, shown in 2017 U.S. dollars, and assume that the home assessment needed to generate the metric is completed separately from construction. In some cases, a builder or contractor may bundle multiple home assessments together to reduce costs below what is shown in the matrix.

**Finance Industry Recognition:** the availability of financing products that specifically consider the indicated metric in their underwriting. HERS has been available to Energy Efficient Mortgages products for many years, but lack of promotion and cost of HERS ratings has been a barrier to market uptake. The HomeStyle Energy mortgage loan helps lenders offer affordable financing to borrower improving efficiency in their homes. It is available to all Fannie Mae lenders. For home purchases, FHA Energy Efficient Homes Policy was enacted in 2016 to include the Home Energy Score. Homes with an HES of 6 or better can stretch their debt-to-income ratio two percent, allowing them more buying power toward an energy efficient home. Historically, HERS has been recognized by both federal agencies and local lenders. Home Energy Score has also been recognized by federal financing agencies. Recognition of particular metrics and rating systems will continue to evolve over time and should be considered locally depending on which lenders and programs are interested in offering beneficial financing products.

#### Rows:

##### 1. Primary Metrics

Primary metrics can help drive the building market toward net zero homes, strategic electrification, solar installations, and increased energy efficiency. The five primary metrics identified in this effort are the Home Energy Rating System (HERS) index, the Home Energy Score, greenhouse gas impact, site energy use in millions of British Thermal Units per year (MBtu/year) and site kilowatt hour equivalent per year (kWh-equivalent/year). These primary metrics have been selected because they are strong indicators of both a building's annual greenhouse gas emissions, and of a building's energy use.

The matrix includes an evaluation of the primary metrics based on the following metric characteristics: durability, granularity, ease of understanding by consumers, cost of delivery, and financial industry recognition. Common use cases are also summarized. Please see the Further Discussion of Primary Metrics section for more information

The two energy scores, HERS and Home Energy Score have been included because they provide a relatively simple way to compare homes. HERS ratings are mostly applicable for new home and/or code compliance programs which can reduce energy costs through improved energy efficiency. In contrast,

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<sup>3</sup> In this case, scale refers to the precision of the unit used to display a metric on a label. For example, a greenhouse gas impact metric can be displayed in units of metric tons, tens of metric tons, hundreds of metric tons, the number of cars taken off the road per year (which according to the EPA is about 4.7 metric tons of carbon dioxide per year), or some other unit. Some units or scales will show smaller changes in greenhouse gas emissions than others.

Home Energy Scores are primarily used for existing homes and are therefore most effective in improving the energy efficiency of home retrofit projects. The remaining three primary metrics – greenhouse gas impact, site MBtu/year and site kWh-equivalent/year – are calculated directly from total energy use values without normalizing for home size. For this reason, they are indirect indicators of energy efficiency and costs, and there is no guarantee that decreases in these metric values equate to dollar savings.

## 2. Cost Metric & Timeframe

It is recommended that all labels include a cost metric with a specific timeframe. Cost values are easily understood by consumers without additional explanation and can therefore be a useful piece of information for consumers to help with home comparisons. In general, costs are calculated based on current energy rates and may be derived from either asset or operational data. Modeling tools that produce a HERS rating or Home Energy Score score produce this metric from asset-based data. A cost metric, whether energy savings or total annual energy cost, does not normalize for factors such as home size. Because these values will change as energy prices fluctuate, it is important for this metric to be tied to a label's date of issuance. Fuel use and fuel price information should also be included on the label to allow for this metric to be updated with current energy prices (see next section). The timeframe (e.g., per month, per year, per 10 years, etc.) for the metric should also be clearly indicated. In some cases, a monthly timeframe may be preferable, especially if a program is relating costs to monthly mortgage or other types of expenses. In other situations, yearly or even ten-year timeframes (to represent the average length of time that people stay in their homes) may be more appropriate to use given that most people live in homes for about this period of time.

**Asset:** Data based on design and physical characteristics, reveals intrinsic energy performance not how its operated.

**Operational:** Data based on actual energy use, normalized for building size and type, and weather.

## 3. Fuel Use and Price

Information describing fuel use in native fuel units (e.g. gallons of propane or heating oil) and fuel price assumptions are critical to include on all labels. This information can help explain how total energy use and total energy costs were estimated. This information also provides greater transparency regarding calculated metrics. It is recommended that the timeframe used to show fuel use in native fuel units and fuel price be the same as the timeframe selected for the cost metric(s) described above.

Total annual estimated costs by fuel type should also be included on labels to allow homeowners to see what each fuel represents in their annual energy budget. When annual cost by fuel type is presented on an energy label, the homeowner is able to determine which fuels are driving their annual energy costs. Moreover, the cost impacts caused by variable fuel prices and energy use over time can become clearer.



**Sample label that included fuel use and price information:**

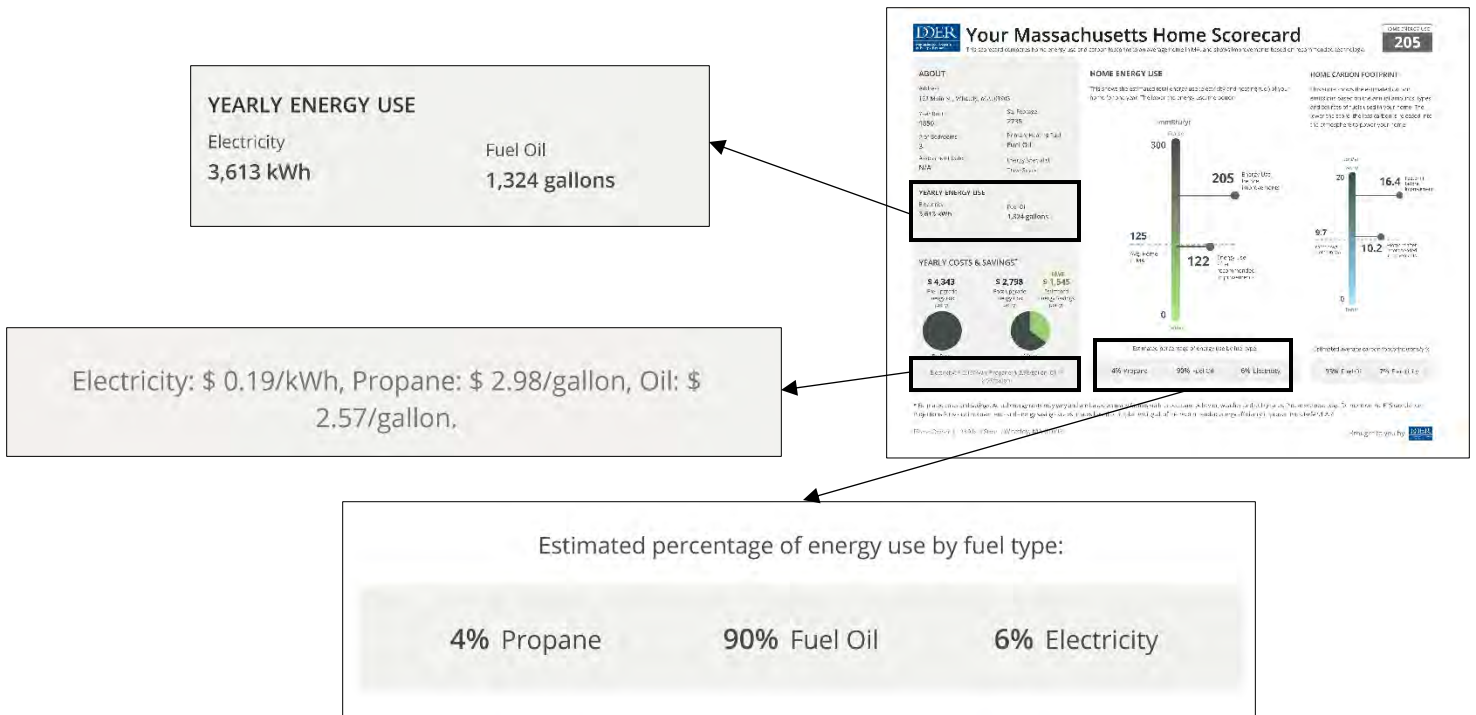


Figure 1: Massachusetts scorecard that includes fuel use and price information  
Image Source: Massachusetts Department of Energy Resources 2.23.2018

**4. Supporting Information**

In the matrix, three items are listed under supporting information: date of issuance, tool version, and verification body. Including the date of issue on a label provides a critical reference point for any metric that may change over time. Indicating the tool version used and the verification body provides credibility and accountability for the program delivering the label.

**5. Supplemental Information**

The remaining items in the matrix should be considered individually by each building energy labeling program or policy. Each item helps explain and substantiate the metrics. Depending on the goals of a program or policy, different supplemental information may be appropriate to include. This supplemental information includes reference consumption, recommendations, conditioned floor area, year built, home features, site vs. source energy use, new future asset and operational metric, other certifications and translations from another score. Each is explained in more detail in the matrix.

## Further Discussion of Primary Metrics

The primary metrics are: the Home Energy Rating System (HERS) Index, the Home Energy Score, Greenhouse Gas Impact, site energy use in millions of British Thermal Units per year (MBtu/year), and site kilowatt hour equivalents per year (kWh-equivalent/year).

1. **Home Energy Rating System (HERS) Index:** This metric or score conveys a home's energy efficiency relative to the 2006 International Energy Conservation code and can be used for indicating code compliance. 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. The rated home then either gains or loses 1 point for every 1% difference from the reference home. So, 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. Lower is better<sup>4</sup>. The score is most often used by builders complying with building energy code through the Energy Rating Index (ERI) 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 U.S. Department of Energy determined that a typical resale home scores 130 on the HERS Index.<sup>5</sup>

**Policy Objectives:** In general, a HERS Index score is quite applicable for new home programs and code compliance verification given its level of detailed inputs and favorable characteristics for program design consideration. Therefore, it can be quite effective for code compliance or to drive new homes towards energy efficiency levels that exceed base code. It is also the only approach available at time of writing for compliance with the Energy Rating Index pathway for performance-based energy code compliance under the 2015 and 2018 International Energy Conservation Code (IECC).<sup>6</sup> Using the HERS Index score can have a positive influence on greenhouse gas emissions, although the connection is indirect. HERS tools also generate greenhouse gas emission values as a tool output which, if included on a label, can support a greenhouse gas reduction policy objective.

### **Metric Characteristics:**

*Use Case(s):* HERS Index scores are often used by programs marketing high-performance new homes (e.g. ENERGY STAR), and to support code compliance. They can also be used on existing homes, although it is more common to use HERS Index scores for residential new construction.

*Durability:* HERS Index scores are based on the 2006 IECC. As long as the 2006 IECC reference home marker is not changed in the future, HERS ratings should remain relatively durable over

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<sup>4</sup> RESNET. Understanding the HERS Index. <http://www.hersindex.com/understanding>. Accessed November 30, 2017.

<sup>5</sup> RESNET. A Lower HERS Index Score Means a More Energy Efficient Home. <https://www.resnet.us/hers-index-large-scale>. Accessed November 30, 2017.

<sup>6</sup> RESNET. Energy Rating Index Performance Path. Frequently Asked Questions. [http://www.resnet.us/uploads/documents/RESNET\\_Energy\\_Rating\\_Index\\_FAQ\\_Factsheet.pdf](http://www.resnet.us/uploads/documents/RESNET_Energy_Rating_Index_FAQ_Factsheet.pdf). Accessed November 30, 2017.

time. However, HERS ratings standards have regularly been modified over the years, resulting in shifting methodologies and home scores. Even as recently as 2017, new standards have gone into effect that have a marked impact of the durability of HERS ratings when house-size factors were applied to the standards.

*Granularity:* In terms of granularity, HERS Index scores can show relatively small changes in energy usage, but these small changes may not necessarily equate to noticeable energy cost savings. For example, lighting and appliance upgrades often do not affect a home's HERS Index score. Therefore, it is recommended that consumers also have an energy cost metric to accompany a HERS Index score, especially when retrofit projects are being implemented.

*Readily Understood by Consumers:* In general, consumers do not understand a HERS Index score without additional information or education. The fact that the scale is based on an energy code baseline and lower values equate to better building energy efficiency usually needs to be explained. However, the score is widely recognized by the building industry and code officials throughout the U.S.

*Cost of Delivery:* The cost of a HERS Index score can vary widely depending on the situation. The cost, in 2017 U.S. dollars, often ranges between \$400-\$1000 for single ratings. Since HERS scores are often applied to new construction, it is common for the cost of the rating to be bundled into the overall construction costs, thereby minimizing its perceived cost. In addition, the rating cost can usually be reduced if multiple homes are rated at the same time ("batch ratings").

*Finance Industry Recognition:* There are several financing products currently available that recognize energy savings from HERS Index scores in their underwriting considerations. RESNET, the HERS Index oversight body, lists the following on their website<sup>7</sup>: Federal Housing Administration, Veterans Administration, Fannie Mae and Freddie Mac. There may also be some local lenders that recognize HERS ratings and provide special financing. However, these products are not well known nor are they widely utilized.

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<sup>7</sup> <https://www.resnet.us/energy-mortgage>

**Sample labels that included HERS:**



**System and score:**  
HES = 8 (or HERS = 65)

Figure 2: Scorecard used with Missouri's Home Energy Certification program that includes a HERS Index Score and a Home Energy Score  
Image Source: <https://energy.mo.gov/energy/mhec> Accessed on 2/22/2018

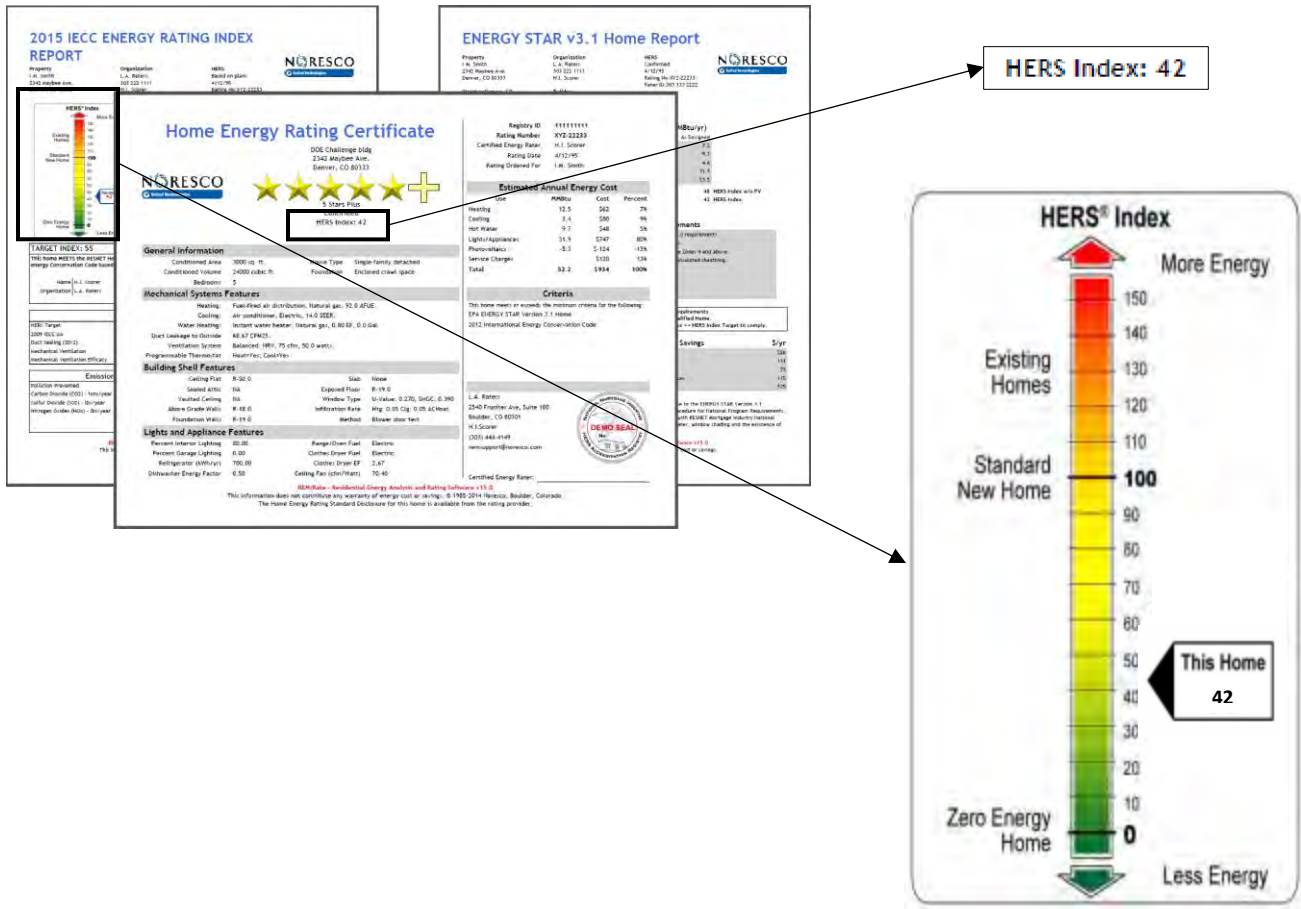


Figure 3: Sample Home Energy Rating Certificate from REM/Rate that clearly highlights the HERS Index score  
 Image Source: <http://www.remrate.com/> Accessed 2/2/2018

- Home Energy Score:** This metric or score conveys a home’s efficiency through a 1 to 10 scale. The model used to generate the score is an asset-based energy model abstracted to “bins” (a band of energy use, similar to how the letter grade A represents a score of 90-100) or deciles based on source energy calculations. A score considers heating, cooling and hot water end uses and normalizes for weather and home occupancy. This score is most often provided for existing homes (versus new construction) and is provided as part of DOE’s Home Energy Score program, which provides consumer-facing materials about energy efficiency. Scores are generated from asset-based absolute energy use. The score is also recognized by the U.S. Department of Housing and Urban Development (HUD) Federal Housing Administration’s (FHA) [Energy Efficient Home \(EEH\) Policy](#).

**Policy Objectives:** Home Energy Score is used primarily for home retrofit initiatives (versus new construction). The score can showcase certain energy efficiency improvements and home retrofits. Therefore, it can theoretically drive existing homes toward energy efficiency improvements and cost savings. This in turn, can have a positive influence on greenhouse gas emissions, although the connection is indirect. The Home Energy Score tool also generates greenhouse gas emission values as a tool output which, if included on a label, can support a greenhouse gas reduction policy objective.

### **Metric Characteristics:**

*Use Case(s):* Home Energy Scores are often used by existing home retrofit initiatives. They can also be used on new homes, but it is more common to see an older, existing home with a Home Energy Score.

*Durability:* The Home Energy Score scale is structured by DOE so that a home with average estimated annual energy use when compared with U.S. housing stock, no matter the climate zone will receive a score of 5. Therefore, as the single family residential building stock's average energy efficiency changes, the "bins" used for the 1-10 scale may be adjusted, which suggests that this metric is not highly durable. Although the future frequency of these changes is unknown, the bins have been modified through updated versions of the scoring methodology three times, most recently in 2016. This may cause long-term comparability problems between homes scored before and after scale adjustments are made. Scores are based on EIA's Residential Energy Consumption Survey (RECS) from 2009. As with HERS, enhancements to the underlying software tool may affect the scores.

*Granularity:* In a similar fashion, Home Energy Score is only considered to be a somewhat granular metric because small changes in energy use are often not reflected in the score. This is a result of having only 10 bins, and that scores only change from improvements that have an impact on a home's overall energy use. For lower to middle bin homes a significant change in energy efficiency is needed to move a home from one bin to another. For example, replacing an exterior door or a few windows often would not affect a score. Additionally, because the tool utilizes a small number of simplified inputs (which reduces the cost of delivery), small improvements such as partial wall insulation may not be reflected in the tool data entry.

*Readily Understood by Consumers:* The 1-10 scale is readily understood by consumers due to its simplicity. Moreover, it is associated with the U.S. Department of Energy, a federal agency that may add credibility to a label. However, it may not be transparent because consumers do not know how "bins" are set, or what it means that the score is based on source energy. Therefore, the energy assessor usually needs to deliver a brief explanation along with the score.

*Cost of Delivery:* In 2017 US dollars, one could expect to pay about \$200-\$400 for a Home Energy Score assessment and report. Generating a Home Energy Score requires less data than generating a HERS rating. Therefore, it can often be less expensive. However, the consumer likely bears Home Energy Score costs, while HERS costs are often bundled into a new construction project's costs. When Home Energy Score is integrated into existing Efficiency Programs and software tools, delivery costs may be significantly reduced. However, initial software integration costs need to be considered.

*Finance Industry Recognition:* Home Energy Scores are recognized by the U.S. Department of Housing and Urban Development (HUD) Federal Housing Administration's (FHA) Energy Efficient Home (EEH) Policy. However, this product is relatively new, and not yet well utilized by consumers. For home purchases, FHA's Energy Efficient Homes Policy allows homes with Home Energy Score of 6 or better to stretch their debt-to-income ratio by two percent.

**Sample label that included a Home Energy Score:**

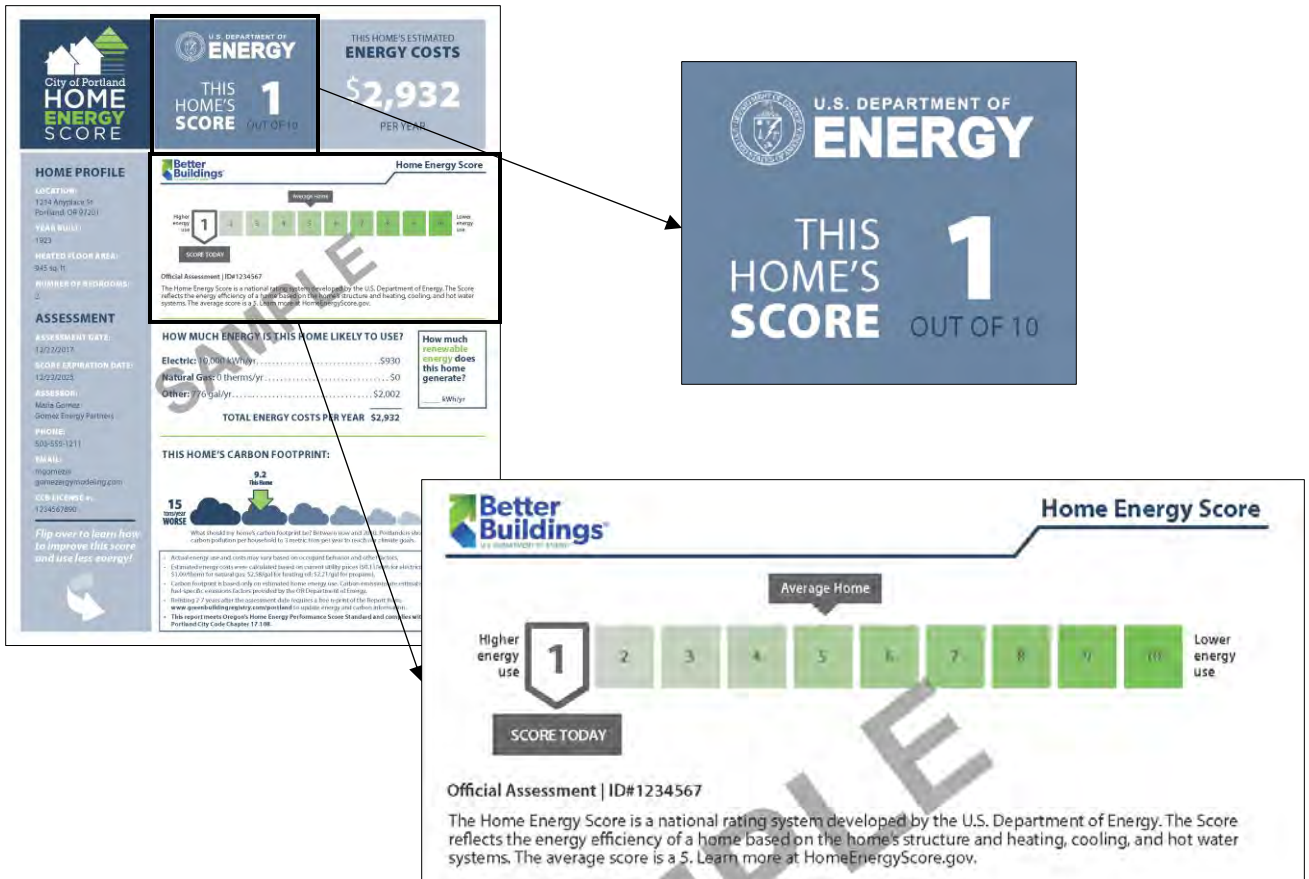


Figure 4: Sample building energy label from the City of Portland that clearly highlights the Home Energy Score  
 Image Source: <https://www.portlandoregon.gov/bps/71421> Accessed 2/22/2018/

- Greenhouse Gas Impact:** This metric shows a home’s total annual site energy use converted into greenhouse gas emission units. The units displayed can be adjusted depending on a jurisdiction’s preference. For example, metric tons of CO2 equivalent is commonly used, and this can be displayed graphically by clouds, number of cars, or another graphic representation. Modeling tools that produce a HERS rating or Home Energy Score can produce asset-based greenhouse gas emission values. This metric does not normalize for factors such as home size.

**Policy Objectives:** This metric supports greenhouse gas reduction policy objectives. It is a metric that can help to raise awareness of greenhouse gas emissions associated with residential buildings. Both the Home Energy Score and HERS tools can generate greenhouse gas emission values as a tool output. A greenhouse gas impact metric can also help drive energy use reductions and cost savings, although the connection is not direct.

**Metric Characteristics:**

**Use Case(s):** This metric can be generated by both Home Energy Score and HERS software. Therefore, it is commonly applied to both new and existing residential homes.

**Durability:** Greenhouse gas emissions are affected by how a home’s heating and water heating fuel mix and a location’s electricity supply changes over time. Assuming that heating and water heating fuels don’t change, then a changing electricity generation mix would be the primary factor that could change greenhouse gas emissions over time. If the fuel mix and renewability of electricity generation changes for the region, then the greenhouse gas emission estimate will no longer be accurate for a home.

**Granularity:** A greenhouse gas impact metric is dependent on the scale<sup>8</sup> used on the building energy label.

**Readily Understood by Consumers:** Consumers may not understand a greenhouse gas emission metric if it is not presented in an intuitive, simple manner. Common methods include number of cars taken off the road or trees planted.

**Cost of Delivery:** Both Home Energy Score and HERS scoring tools can generate greenhouse gas emission values. No additional costs are incurred by including a greenhouse gas impact metric if either a Home Energy Score or HERS rating is already being generated.

**Finance Industry Recognition:** At this time, the EMPRESS team does not know of any financial products that utilize a greenhouse gas impact metric. This could change if carbon pricing is ever implemented at a large-scale.

**Sample label that included greenhouse gas impacts:**

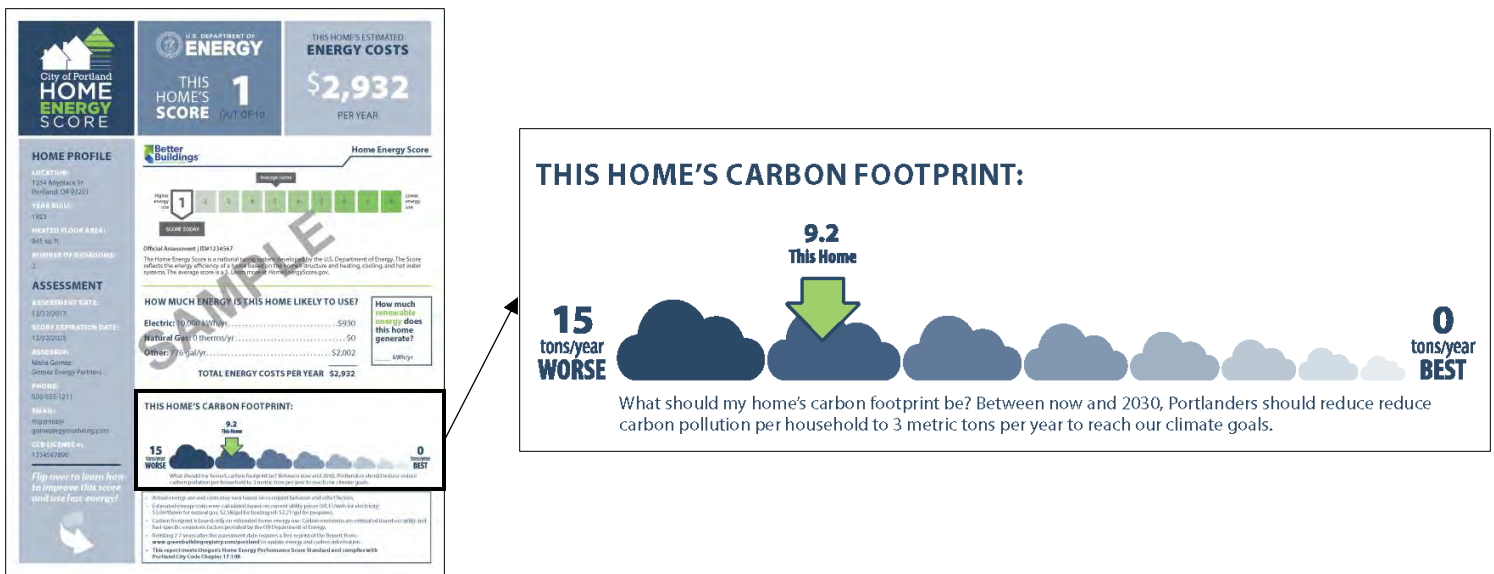


Figure 5: Sample label from Massachusetts’s 2012-2014 Residential Energy Rating Initiative that highlights GHG impacts  
Image Source: <https://www.mass.gov/service-details/home-mpg-energy-performance-scores> Accessed 2/22/2018

<sup>8</sup> In this case, scale refers to the precision of the unit used to display a metric on a label. For example, a greenhouse gas impact metric can be displayed in units of metric tons, tens of metric tons, hundreds of metric tons, the number of cars taken off the road per year (which according to the EPA is about 4.7 metric tons of carbon dioxide per year), or some other unit. Some units or scales will show smaller changes in greenhouse gas emissions than others.



4. **Site Million of British Thermal Units/Year (MBtu/year):** This metric shows a home’s total annual site energy use converted into MBtu units. This metric may be derived from asset or operational data. Modeling tools that produce a HERS rating or Home Energy Score produce asset-based MBtu/year values. This metric does not normalize for factors such as home size.

**Policy Objectives:** Both Home Energy Score and HERS tools generate MBtu/year metrics as direct outputs. This metric is correlated with greenhouse gas emissions and energy costs, but is not a direct representation of either. It can drive some homes toward renewable installations and net zero energy construction.

**Metric Characteristics:**

*Use Case(s):* This metric can be generated by both Home Energy Score and HERS software. Therefore, it is commonly applied to both new and existing residential homes.

*Durability:* Site MBtu projections for a home will not change over time unless the house characteristics change, which makes this metric quite durable.

*Granularity:* In general, this metric is highly granular and will reflect even small changes caused by home improvements. It provides an absolute scale by which to compare the energy use of homes.

*Readily Understood by Consumers:* The average consumer does not understand what a Btu represents. However, understanding can be increased by providing a point of comparison, such as the site MBtu/year used by an average home or a home built to the energy code in the area and indicating that less is better.

*Cost of Delivery:* Both Home Energy Score and HERS scoring tools generate site MBtu/year values. No additional costs are incurred by including a site MBtu/year metric if either a Home Energy Score or HERS rating is already being generated.

*Finance Industry Recognition:* The EMPRESS team is unaware of any current financial offerings that currently use or reference a MBtu/year metric as part of the financing decision-making process.

Sample label that included MBtu/year:

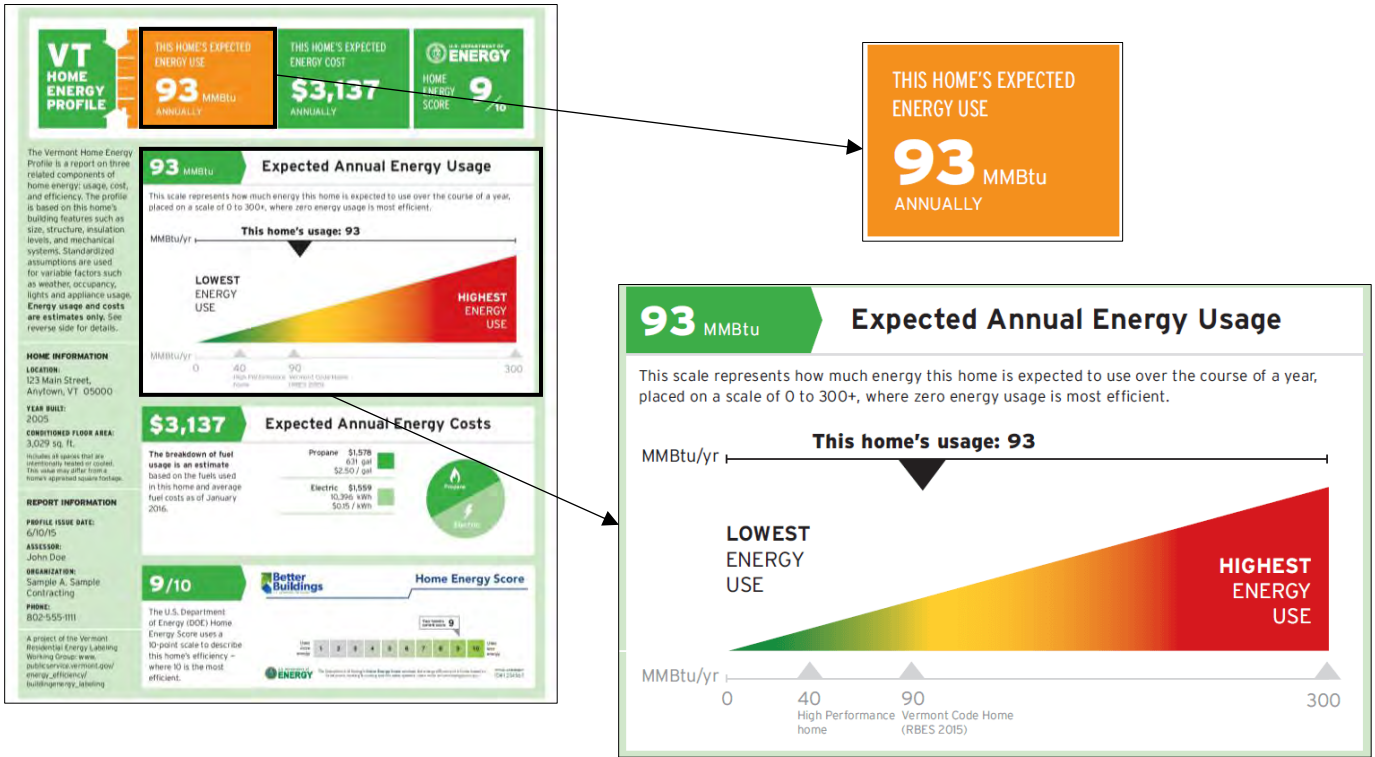


Figure 6: Sample label from Efficiency Vermont that clearly highlights a MBtu/year metric.

Image Source: <https://www.efficiencyvermont.com/news-blog/blog/the-vermont-home-energy-score-a-label-that-matters> Accessed 2/22/2018.

- 5. Site Kilowatt Hour-Equivalent/Year (kWh-equivalent/year):** This metric shows a home's total annual site energy use converted into kWh-equivalent units. This metric may be derived from asset or operational data. However, Home Energy Score and HERS tools do not currently output this metric, although it can easily be calculated from fuel use per year values which are generated by Home Energy Score and HERS tools. This is also a primary metric in some European countries. This metric does not normalize for factors such as home size.

**Policy Objectives:** In a similar fashion to site MBtu/year, this metric is related to, but is not a direct measurement of greenhouse gas emissions and energy costs. It is a particularly relevant metric for jurisdictions interested in driving the market toward beneficial electrification such as fuel switching from oil heat to high efficiency air-source heat pumps. In some areas, electrification is desirable for greenhouse gas emission reductions with an increasingly or existing renewable-powered grid. In addition, this metric may help to encourage zero net energy construction.

### **Metric Characteristics:**

*Use Case(s):* This metric can be generated by both Home Energy Score and HERS software. Therefore, it is commonly applied to both new and existing residential homes.

*Durability:* Similar to site MBtu/year, a site kWh-equivalent/year is a relatively stable metric that should not change unless the characteristics or equipment in the house changes. Therefore, site kWh-equivalent/year should remain a pretty stable metric.

*Granularity:* A site kWh-equivalent/year metric is dependent on the scale<sup>9</sup> used on the building energy label.

*Readily Understood by Consumers:* The average consumer is also unlikely to understand what is meant by site kWh-equivalent although kWh is a familiar unit to any homeowner who pays electricity bills. The average consumer will not understand how other fuels (gas, oil, propane) can be converted into kWh units, but not consumed as kWh. Therefore, further education may be required. However, it is expected that lower values will be understood as better than higher values. In addition, including a reference point, such as the site kWh-equivalent/year of an average home in the area would help consumers to better understand the value presented.

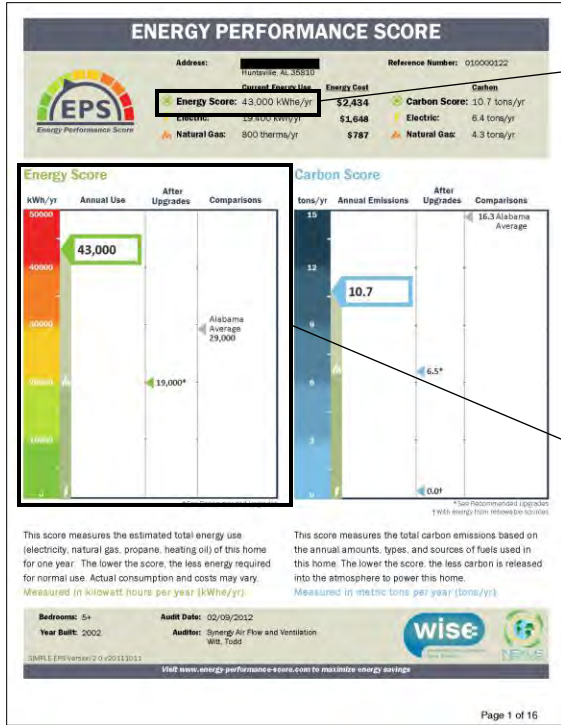
*Cost of Delivery:* Both Home Energy Score and HERS scoring tools generate the data needed to calculate a site kWh-equivalent/year value. Therefore, little to no additional costs are incurred by including a site kWh-equivalent/year metric if either a Home Energy Score or HERS rating is already being generated.

*Finance Industry Recognition:* The EMPRESS team is unaware of any financial offerings that currently use or reference a kWh-equivalent/year metric as part of the financing decision-making process.

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<sup>9</sup> In this case, scale refers to the precision of the unit used to display a metric on a label. For example, an average home uses about 100 MBtu/year which equals 34,120 kWh-equivalent/year. This could be presented in actual kWh-equivalents or per 100 kWh-equivalents, both are somewhat granular. However, if presented per 1,000 kWh-equivalents, it starts to become less granular. Therefore, the granularity of site kWh-equivalent/year is dependent upon the precision used.

Sample label that included kWh-Equivalent/year:



Energy Score: 43,000 kWh/yr

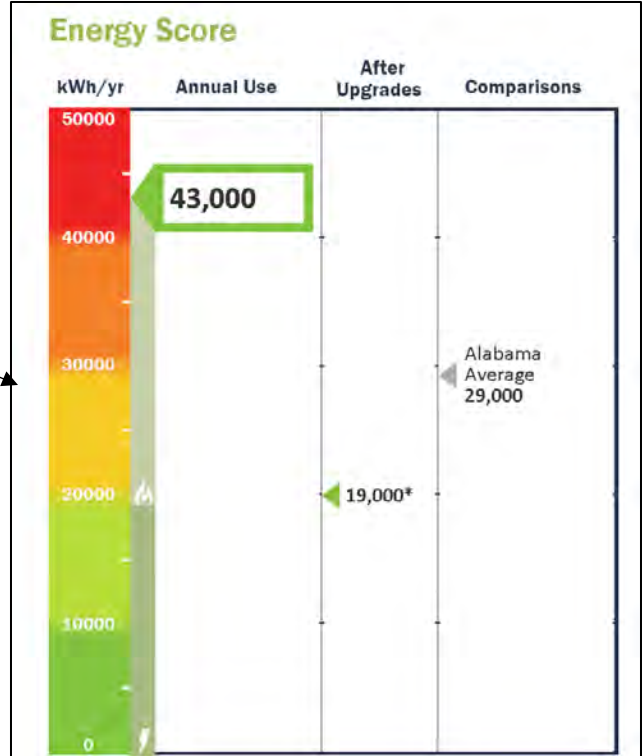


Figure 7: Sample Energy Performance Score (EPS) report label that used kWh-equivalent/year as a primary metric  
 Image source: [https://energy.gov/sites/prod/files/2014/01/f6/eps\\_report\\_sample.pdf](https://energy.gov/sites/prod/files/2014/01/f6/eps_report_sample.pdf) Accessed on 2/22/2018

# Considerations & Best Practices for Publicly Disclosing Energy Information

# **Residential energy ratings: Privacy considerations and best practices**

**Prepared for the EMPRESS Project by:**

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May 7, 2017

Residential energy ratings are important and increasingly popular tools to accelerate consumer use of home energy information, especially during real estate transactions. However, there remain some questions about whether residential energy ratings are protected private information under federal or state law, and whether any consent from a homeowner would be required to automatically populate those scores in an MLS database or similar location that is available to the public.

To this end, the EMPRESS project team, has researched whether any current legal barriers exist to making energy rating information public and what the current best practices are for ensuring that this information can legally be conveyed to the public domain. In order to clarify these questions, the EMPRESS project team researched the following issues:

1. Whether mandatory or voluntary residential energy ratings are considered protected private information under federal law.
2. Whether state laws in several states that are actively promoting residential energy ratings deem them as protected private information.
3. What best practices currently exist to ensure residential energy ratings can be provided to Multiple Listing Service (MLS) databases or similar locations and made available to the public.

#### **Issue #1: Federal Laws**

A full review of federal laws indicates that they do not provide any specific protection to a homeowner with regard to residential energy ratings of their home. Federal law does not specifically address the issue of providing protection for disseminating energy ratings without consent of the homeowner.

The closest federal laws that apply to an individual's privacy rights to certain information are the Freedom of Information Act of 1966 and the Privacy Act of 1974. Both of those laws, however, only limit how a federal agency can use "personally identifiable information." The laws do not apply to a private party or a local or state government use of personally identifiable information. Moreover, they only apply to "personally identifiable information," which is defined to include a combination of the following: full name; home address; email address; passport number; driver's license number; credit card number; date of birth; and telephone number. A residential energy rating does not have the qualities of personal identification that the foregoing list does.

## **Issue #2: State Laws**

An analysis of disclosure and privacy rights in the context of home energy rating programs in a number of states supports the conclusion that home energy ratings are not protected private information and can be shared or disclosed by the originating entities. This conclusion distinguishes between “asset based” information such as home energy ratings and “usage” based information, which typically is protected private information in all of these states. The analysis concludes that it would take combining a home energy rating with other protected personally identifiable information (such as a social security or driver’s license number) to trigger privacy rights issues.

While there were no state laws found that protect dissemination of energy “asset” information on a home by a private entity or non-profit to a public location such as a real estate database, state government use of energy rating information is less clear. State laws typically only protect the dissemination of certain “private” or “personally identifiable information” by state or local governments, agencies and utilities. For example, local property tax information about a home or business includes the name, address, purchase price of the current owners, square footage, etc., and is deemed public information accessible to the public on most county websites.

Each state has its own public records laws that similarly govern what state and local governmental units may disclose or must withhold from disclosure. Generally, under state laws, there is a presumption for disclosure of public records – and every record that is made or received by a governmental entity or employee is deemed a public record subject to disclosure unless a specific statutory exemption requires it to be withheld. These state public records laws only prescribe what a governmental body may or may not disclose. They do not apply to information generated by private parties or entities.

In Oregon, ORS 192.502 protects from public disclosure certain types of information obtained by specified governmental agencies. ORS 192.502(28) applies to public electric and water utilities and protects from disclosure including “personally identifiable information about customers” such as “names, dates of birth, driver license numbers, telephone numbers, electronic mail addresses or Social Security numbers of customers.” However, this statute only applies to instances where the individual is the “customer” or “employee” of the state agency or utility, and further, governs only what the state agency or utility may do with the information.

The Oregon Consumer Identity Theft Protection Act, ORS 646A.602 et seq., applies to non-governmental entities, such as hospitals. The Act applies to any person that “owns, maintains or



otherwise possesses data that includes a consumer's personal information that the person uses in the course of the person's business. ORS 646A.622. It requires those entities to "protect the security, confidentiality and integrity of the personal information." However, it defines "personal information" to mean a person's name combined with any of the following: a social security number, a driver's license number, a state ID number, a passport number, a financial account number, or a credit card number. Therefore, if the information is simply an address and energy rating, it would not fall under that definition of personal information that must be protected.

Oregon's Record Privacy Law (the so-called DMV law) does list a home address as a form of "personal information" that cannot be generally disclosed. However, the DMV law's purpose is to make personal information contained in DMV records private and only applies to disclosure of information by state agencies and does not apply to information generated or held by private parties.

For comparison, according to the Massachusetts Guide to Public Records Law (<http://www.sec.state.ma.us/pre/prepdf/guide.pdf> at p.17), the names and addresses of customers of a municipally owned public utility are not protected from disclosure. It notes that "Names and addresses of residents of Massachusetts over seventeen years of age are not intimate details of a highly personal nature, because they are available in other venues, such as street lists."

In sum, we found no state laws that prevents a private entity from disclosing or making public the names, addresses and asset based energy rating information.

### **Issue #3: Best Practices**

Federal and state laws do not seem to protect residential energy rating from disclosure or publication and there appears to be no legal basis for a homeowner to challenge the uploading of such information to an MLS site or similar real estate sites such as Redfin and Zillow. Given this, MLS organizations will generally turn to their contractual relationship with the data provider to ensure that information they are receiving is not protected.

An MLS organization typically does not own any of the data or information uploaded onto its platform. MLS organizations generally rely on licensed real estate professionals to voluntarily upload the information and assumes that the entity providing the data has determined that the data can be lawfully uploaded and made public. In the case of a licensed real estate professional providing the information, they are given the right to share information by the homeowners via their binding listing agreement. In the case of a public or private entity who

provides data to the MLS, a contract between that entity and the MLS specifies what data can be received by the MLS and how the MLS can utilize the data on their listing service. While MLS organizations are very concerned with the accuracy of information they receive and possible liability for any inaccurate information conveyed through their database, they have expressed comfort with receiving verified residential energy rating information that comes directly from an originating source. To ease the technical and administrative challenges of dealing with multiple sources of energy ratings, this information can also be provided to the MLS via an ‘aggregating’ service that conveys multiple data types from various verified originating programs.

Several leading entities have taken legal steps to ensure they have the ability to convey energy rating data to a real estate database like an MLS, as well as to publicly confirm to their constituents/customers their intent to make the residential energy rating information available for use in the marketplace. The EMPRESS project considers the following project examples of legal disclosure language as best practice for those interested in ensuring that residential energy rating information can be provided to MLS databases and included in real estate listings.

- **Governmental organizations:**

The Portland City Council adopted a home energy score ordinance, [Portland City Code Chapter 17.108](#), on December 14, 2016. The policy’s effective date is January 1, 2018. This policy mandates the issuance and disclosure of an asset based home energy score at the time a home is listed for sale. The City of Portland’s Bureau of Planning and Sustainability (BPS) is currently designing the program, in partnership with Earth Advantage. As the official US DOE Home Energy Score Program Partner, the city of Portland must sign the US DOE Home Energy Score Partner Agreement. That partner agreement template, as drafted by US DOE, provides that energy data is to be treated as confidential and not shared without permission of the homeowner. The agreement specifically provides that DOE will not share any individual home scores publicly, and that only aggregated data that is not specific to any individual home can be shared publicly. The US DOE Home Energy Score Partner agreement states:

*As part of the Home Energy Score Program and to facilitate the scoring of homes, the Partners will provide certain data and information regarding individual residences (“Confidential Information”) to DOE. DOE shall protect all data collected and generated to score homes and shall retain and store all confidential information furnished by the Partners in a secure and confidential manner, subject to applicable law. DOE agrees to share confidential information and scoring calculations for individual homes with its Home Energy Score Partners and their affiliates if applicable (e.g. a state agency that has an agreement with a Partner to share data for homes scored in their state), and each Partner and affiliate will receive only data*

*for homes scored by Qualified Assessors working through that Partner. Qualified Assessors will only have access to data which they have provided to DOE and to Home Energy Score Reports generated for those homes which the Qualified Assessor scored. DOE may develop and release papers and presentations that include information regarding homes scored. However, DOE may only present aggregated data and DOE agrees it will not publicly share any information regarding individual homes, subject to applicable law. If DOE becomes legally compelled to disclose any of the confidential information to a federal or state governmental agency, DOE shall inform Partner of such disclosure promptly after such agency's request so that Partner may contact DOE and/or seek another appropriate remedy. DOE will not disclose any information DOE believes to be confidential information produced pursuant to this Partnership Agreement to any third party, except as may be mutually agreed upon in writing by Partner and, if so agreed, by the execution of a mutually acceptable nondisclosure agreement, or in the case in which DOE is required by law to disclose the information. The rights and obligations arising under this Partnership Agreement with respect to Confidential Information disclosed hereunder, particularly the confidentiality obligations, shall survive any termination of this Agreement.*

Because of this restrictive confidentiality language, the city of Portland has modified the partner agreement to expressly treat the energy score as public and not confidential. The City stipulates that:

*In accordance with Portland City Code Chapter 17.108 (adopted by Ordinance No. 188413 and effective January 1, 2018), Home Energy Scores produced in Portland will be made publicly available through real estate listings. Thus, these scores and any associated information will not be treated as confidential.*

This city of Portland language now replaces and supersedes the original US DOE Home Energy Score Partner agreement confidentiality language in the partnership agreement. While the city of Portland's language clearly conveys the legal status of the scores in a program mandating the issuance and disclosure of energy scores, similar legal language could be used in voluntary Home Energy Score programs which seek to ensure scores can be made available in real estate transactions. After interviewing several current Home Energy Score Partners in Colorado and California, it is understood by the EMPRESS team that no other Home Energy Score Partners altered the US DOE Home Energy Score Partnership Agreement's confidentiality clause to ensure that the Home Energy Scores generated within their program geography were clearly construed as public information. The US DOE Home Energy Score Partnership Agreement's confidentiality language is currently being updated by DOE so that Home Energy Score Partners can more effectively communicate the public use of the scores.

While the federal and state law and the city of Portland’s explicit statement of the public nature of energy ratings provides solid legal footing, the program will also require assessors participating in the program and producing Home Energy Scores to disclose to a homeseller that the scores are deemed public information and will be provided in real estate listings. This disclosure to the homeseller will be conveyed in the contract between the assessor and the homeseller. Developing a system of securing owner consent to share or post a home energy rating before doing so is in-line with best practice. Such a consent process, while not legally required, establishes expectations with the customer, minimizes potential conflict, and alleviates any potential concerns a data aggregator or MLS listing service would have with including such information in their database.

A recommended formulation of such a consent provision would be:

*“Individual consent: The customer hereby consents to allow [entity] to collect and store home energy rating information from customer’s home or building in order to be disclosed through accepted and secure methods of data transportation, for the specific purpose of publishing it on a database which will auto-populate or otherwise be uploaded to the local Multiple Listing Service (MLS) or similar real estate listing sites such as Redfin and Zillow. Disclosing this data and populating it to real estate listing services is consistent with efforts to help promote home/building energy rating disclosure.*

- **Energy efficiency programs**

Energy efficiency programs, whether administered by a utility or a public benefits organization on behalf of utilities, are particularly sensitive to customer information being shared publicly. An energy efficiency program may interact specifically with energy rating information originating from their program, as a partner to an originating organization (e.g. a Home Energy Score partner), or through the use of an existing energy rating that is integrated into a program (e.g. the HERS Index used in an above-code new homes program). In each of these cases, the energy efficiency program may have a different relationship with the energy rating. In one case the energy efficiency program is an “originator” of the energy rating and may claim it’s public use. In other cases, the energy efficiency program may be participating in a third party’s rating system. Nonetheless, best practice would be to ensure that all contractual agreements between the energy efficiency program and customers (whether home builders or homeowners) include a clause noting the public nature of the residential energy rating generated through the program.

As an example, Energy Trust of Oregon is a public benefits organization that administers utility programs funded by ratepayers of several investor owned utilities. As with most utility-entities,

Energy Trust's board has implemented a general policy that treats all customer data and information as confidential. The policy prohibits Energy Trust from sharing any customer information, including energy use or rating data, publicly without the express written consent of the customer. At the same time, Energy Trust understands that energy ratings are an important piece of information for growing awareness of the benefits of energy efficiency, allowing energy efficiency investments to be made "visible" and recouped at time of sale, and allowing homebuyers to adequately compare homes to one another.

Energy Trust balances these competing interests by taking a contractual approach to the disclosure of customer information for both its voluntary Existing and New Homes Programs. According to Energy Trust's general counsel, Energy Trust similarly understands that there is no federal or state law that prevents Energy Trust from sharing a customer's energy rating data with other parties or publicly. However, the Energy Trust board has implemented a policy that prohibits Energy Trust from sharing any customer information, including energy use or rating data, publicly without the express written consent of the customer. As a result, Energy Trust developed contractual language that states the public nature of the energy rating and that Energy Trust may disclose this information.

For the Energy Trust existing home program, the contract provides that:

*"Information Release: The Applicant understands and agrees that ETO and/or its representatives may include a project description of this project, including the Applicant's name, the Applicant's company name, services provided, project costs and energy savings and/or generation, in reports, studies, and other documentation required by the Energy Trust Board of Directors, the Oregon Public Utility Commission, the Oregon Department Of Energy, and the Oregon Legislature...Customer further agrees that ETO may release Customer's EPS publicly for the purpose of supporting ETO program efforts (underline added). ETO will treat all other information gathered as confidential and report it only on aggregate."*

This contractual language is used on all incentive applications provided to homeowners who receive a residential energy rating from a qualified third-party contractor.

The Energy Trust's new homes program uses a similar provision in which an applicant agrees that Energy Trust may release applicant's energy rating publicly for the purpose of supporting Energy Trust program efforts. This contractual agreement is made between the Energy Trust (energy efficiency program) and a new homes builder applying as a participant in the program. The relevant clause states:

*20. INFORMATION RELEASE: The applicant understands and agrees that Energy Trust and/or its representatives may include a description of this project, include the Applicant's name, the Applicant's company name, service provided, project cost, and energy savings and/or generation, in reports, studies, and other documentation required by the Energy Trust Board of Directors, the Oregon Public Utility Commission, Oregon Department of Energy, and the Oregon Legislature. Energy Trust will treat all other information gathered in evaluations as confidential and report it only in the aggregate. Applicant agrees that Energy Trust may include Applicant's name, Energy Trust services, and resulting energy-savings in reports or other documentation submitted to Energy Trust, its Board of Directors, the Oregon Legislature, the Oregon Public Utility Commission, Oregon Department of Energy, and/or Oregon Housing & Community Services. **Applicant further agrees that Energy Trust may release Applicant's EPS publicly for the purposes of support Energy Trust program efforts.** Energy Trust will treat all other information gathered in as confidential and report it only in the aggregate.*

Note that the EPS referenced above refers to the "Energy Performance Score", an Energy Trust-originated energy scoring system. This is an asset-based system with commonalities to both the Home Energy Score and the HERS rating system.

- **Non-profit certification organizations**

Building certification programs such as Build It Green in California and Earth Advantage in Oregon and SW Washington have determined that homes receiving their certifications can be made public and provided to the MLS.

Built it Green made the determination that the only consumer privacy laws that potentially limited the scope of disclosure was the California Public Utility Commission's (CPUC) rules around disclosing a customer's Personal Identifiable Information (PII). Build It Green determined that those CPUC rules focus narrowly on disclosing utility bill and related information that could potentially shed light on customer behavior. Information that is narrowly focused on the house as an asset were determined to not be covered. That being the case, Build It Green was confident that a simple customer permission mechanism (either opt in or opt out) would be sufficient to limit any legal liability or privacy concerns.

Similarly, Earth Advantage received legal counsel that no federal or Oregon state law prevents the organization from sharing certification information with the "public" or with a 3rd party such as a real estate database. The common law "right to privacy" protects an individual from appropriation or exploitation of one's personality, a publication of private affairs, or an intrusion into physical solitude and seclusion for commercial use. However, this tort does not appear to cover asset based information such as energy ratings, and has never been applied to

the disclosure of home address. Home addresses are in the public arena, whether through numbers displayed on the homes themselves or through city websites and other online mapping tools. Therefore, Earth Advantage was advised that it could provide home addresses, certification level, and year of certification for those home addresses to a third party. It was also advised that a third party would not be violating federal or state law in aggregating that information and conveying it to real estate databases such as those maintained and/or owned by multiple listing services.

Likewise, at a national level, RESNET has determined that a home's HERS Index can be accessed by the public. RESNET's Home Energy Code of Ethics takes a similar approach to others by requiring written consent from a homeowner before an energy rating contractor may disclose the rating information to a third party. Their Code of Ethics states that:

*Raters, Home Energy Survey Professionals or a rating organization shall not disclose information concerning the rating or home energy survey for a specific home to parties other than the client or the client's agent without the written permission of the client or the client's agent except to report to the Rating or Home Energy Survey Provider for the purposes of registration, certification, or quality assurance.*

This stipulation allows for public access of the HERS registry, a database owned and managed by RESNET. The registry contains all HERS ratings generated throughout the nation, but does not currently convey that information to real estate databases such as multiple listing services.

It appears that non-profit organizations have determined that as the originators of the residential energy ratings or green certifications, they have the discretion to share this specific asset-based information with the public.

## Summary Case Studies



## Voluntary Home Energy Labeling Programs and Policies

### Case Study 1: Colorado

#### ***Linking the Home Energy Score to Incentives at Point of Sale or Refinancing—with Oversight***

Colorado was the second state (after Connecticut; see Case Study 2) to adopt a statewide Home Energy Score program (2015). The [Better Buildings Colorado](#) program, under the administration of the [Colorado Energy Office](#), targeted [real estate professionals in implementing the benefits](#) that a Home Energy Score can bring to buyers wishing to sell a high-value home, and to sellers wishing to purchase a high-efficiency home. The decision to become a Home Energy Score partner was largely based on the conclusion of a valuation study which found that appraisers need more reliable and accessible information about energy features, characteristics, and operating costs of homes in order to properly value a listing. Home Energy Score checked those boxes.

The State endeavored to not only support the supply of Home Energy Scores by building a network of qualified assessors, but also to create demand for the Score at the time of sale from real estate agents and homebuyers. Colorado funded pre-requisite building science training for aspiring Home Energy Score assessors as well as training for home inspectors and energy auditors to become qualified assessors. The State piloted a consumer marketing campaign aimed at motivating new home buyers to get a Home Energy Score and to talk to an energy advisor about how to implement recommended improvements. Continuing education classes taught real estate agents about the Home Energy Score and the value of energy efficiency.

Colorado also invested in the technology infrastructure to support labeling using Home Energy Score. The State worked with two residential energy audit software providers, which together covered most of the audit programs in the state of Colorado, to integrate their application programming interfaces with the Department of Energy's Home Energy Scoring tool. This enabled assessors to easily generate scores for every audit they completed.

To motivate buyers, sellers, or homeowners wishing to refinance their dwellings, Colorado also tied the Home Energy Score to its Energy Saving Mortgage Incentive, offering \$750 for every one-point improvement the buyer makes on the Home Energy Score—up to \$3,000 credited to the homeowner's principal mortgage, for a four-point jump. Thus, the State played both an oversight and facilitation role in encouraging lower energy use in homes. Although these limited-time programs have ended, the State's efforts in advancing Home Energy Score have enabled other entities to launch and maintain their own Home Energy Score partnerships.

## Case Study 2: Connecticut

### ***Integrating Home Energy Scores into Utility Programs: Connecticut***

In 2013, distribution utilities and the Connecticut Department of Energy and Environmental Protection (DEEP) agreed to work together to collect data and use DOE’s Home Energy Score in the state’s [Home Energy Solutions Program](#). This is part of the wider Energize Connecticut initiative.

The statewide effort began in 2015 and is funded through the [Connecticut Energy Efficiency Fund](#), which supports [Energize Connecticut](#), an information clearinghouse that helps consumers save money on their energy use. The goal of the program is to improve the existing housing stock. One objective within the policy is to increase the “conversion rates” of home energy audit participants. Instead of just receiving an energy assessment, the goal is to increase the number of home energy audit participants that follow through on recommended energy upgrades.

The Connecticut approach involves more than just an audit and a score. The first visit includes direct measures such as sealing air leaks and installing energy-efficient lighting, faucet aerators, and low-flow showerheads. The energy value of these services is then quantified, and the report contains payback estimates and a list of additional opportunities for energy improvement projects. This process unlocks utility efficiency rebates, and produces a final score reflecting any improvements that have been completed.

To date, the program has scored more than 30,000 homes; its objective is to score 11,000 each year, and it is using the Home Energy Score to track progress toward meeting the [state’s weatherization goal](#) (80 percent by 2030).

## Case Study 3: Massachusetts

### ***Home MPG: Integrating Scorecards into Mass Save®***

From 2012-2014, the Massachusetts Department of Energy Resources (DOER), along with several utilities, efficiency program providers, the Earth Advantage Institute, and other partners, implemented an initiative called “Home MPG”. Funded by a U.S. Department of Energy grant<sup>1</sup>, Home MPG (adopting the terminology of the familiar “miles per gallon” rating system) integrated energy performance scorecards into the existing statewide energy efficiency program (called Mass Save®) in eight Western Massachusetts communities.

The Massachusetts home scorecard used in Home MPG presented two primary metrics: the home’s energy performance score (EPS), expressed as the expected total energy usage in one year (in units of MMBtus), and the home’s carbon footprint, expressed as tons of CO<sub>2</sub> emissions per year. The scorecard

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<sup>1</sup> Home MPG was funded by a 2.6 million grant/cooperative agreement from the U.S. Department of Energy’s Better Buildings Neighborhood Program.

provided the home's current energy performance score and carbon footprint, as well as what those metrics would be if recommended cost-effective efficiency upgrades were made (i.e., the home's current state versus the potential it could readily achieve). The scorecard also provided the EPS and carbon footprint of an average home in the area as a motivational point of reference. Both the EPS and the carbon score were asset ratings (i.e., based on an energy model of the home's physical characteristics rather than on occupant behavior.)

Home MPG provided 3,866 scorecards to homeowners via Mass Save home energy assessments. Over 1,600 of those homeowners completed home efficiency projects; those homeowners also received an updated scorecard showing the improvement in the home's energy performance. Response to the scorecard was favorable: based on a homeowner telephone survey, 98% of homeowners stated that the scorecard was either very or somewhat useful, and all of the homeowners who recalled receiving a scorecard (84% of homeowners surveyed) said that the scorecard was either very or somewhat easy to understand. In addition, several energy specialists who conducted Mass Save home energy assessments and provided the scorecard were in favor of integrating it into Mass Save statewide.

Home MPG also provided training for residential real estate brokers and appraisers. A total of 102 real estate brokers and 62 appraisers received training on the concept of home energy performance and how performance metrics can be integrated into the residential real estate sales and appraisal processes. The course developed during Home MPG was accredited for continuing education credits for brokers in Massachusetts, and continues to be taught today.

Home MPG was an important initial step towards a Massachusetts residential real estate market that appropriately values energy performance. In April 2018, Massachusetts Governor Charlie Baker filed proposed legislation, An Act Relative to Consumer Access to Residential Energy Information, that would require a home energy scorecard and energy rating to be provided to homeowners as part of Mass Save residential energy efficiency assessments, and after January 1, 2021, would require that home energy performance ratings be made available to potential homebuyers when one to four unit family homes are publicly listed for sale. More information can be found at <https://www.mass.gov/news/baker-polito-administration-files-legislation-to-improve-residents-access-to-home-energy> and the text of the proposed legislation is at <https://malegislature.gov/Bills/190/H4371>.

#### Case Study 4: Missouri

##### ***Using a Certified Recognition Program to Promote Home Energy Labeling***

Missouri offers [no programs using public-purpose funds](#) to encourage energy efficiency or renewable energy installations, although its distribution utilities annually budget for promoting energy efficiency

(\$103.9 million in fiscal year 2018, for example). It also has no statewide energy codes<sup>2</sup>. To make progress on home energy improvements, the Missouri Division of Energy (under the Department of Economic Development) began administering the [Missouri Home Energy Certification](#) program in 2015, which uses meaningful recognition to promote the existence of energy-efficient homes.

The certification supports the results of a national household poll ([The Demand Institute](#), 2014), on consumer perspectives about home buying. That study concluded that energy efficiency was a top priority among potential homebuyers—a conclusion the state cited as a “win-win” for giving homeowners an additional “selling point” and conveying the value of home energy use to potential buyers.

Two levels of certification—gold and silver—are possible. Missouri uses several rating systems to qualify homes: Home Energy Score, RESNET’s Home Energy Rating System (HERS), and ENERGY STAR. The Division of Energy has begun to work with the distribution utilities to align their energy efficiency programs with the certification effort. The Division plans to work with real estate professionals (agents, inspectors, and appraisers) and homebuilder organizations to increase their knowledge and awareness of the certifications. The Division also intends to promote the availability of modeling software for home energy auditors, so that they can accurately calculate energy savings from installed energy efficiency measures, after they complete projects for their customers. The resulting scores inform qualification for various tiers of Missouri Home Energy Certification.

#### Case Study 5: New Jersey Natural Gas

##### ***Using an Equipment Program as the Entry Point for Scoring, and for Home Performance Projects***

As of 2016, New Jersey Natural Gas had scored more than 13,000 homes since 2012 through its [SAVEGREEN Project](#)<sup>®</sup>, a utility-wide effort for New Jersey Natural Gas customers offering rebates and incentives to make energy improvements. It reached this target primarily through its appliance rebate program, through which homeowners who install qualifying equipment become eligible for a free home energy assessment that includes a Home Energy Score.

The goal of the assessment is to encourage follow-on participation in the Home Performance with ENERGY STAR (HPwES) program and ultimately installation of other energy improvements. The auditor uses the Home Energy Score as the cornerstone of the customized report for homeowners, with recommendations for making a home more efficient (with an estimate of a revised Home Energy Score if the homeowner follows through with energy improvements). The SAVEGREEN Project also makes up to

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<sup>2</sup> Xu, Ming, 2017. “Missouri Division of Energy: Missouri Home Energy Certification (MHEC).” Presentation at the NASEO Energy Policy Outlook Conference, February 7-10.

<http://energyoutlook.naseo.org/Data/Sites/13/media/presentations/Popp--Missouri-Home-Energy-Certification.pdf>.

\$15,000 in financing available for HPwES projects, including a 0 percent annual percentage rate with on-bill repayment.

#### Case Study 6: Oregon

##### ***Legislating a Statewide Framework for Home Labeling***

Oregon has a voluntary home energy performance scoring administrative rule drafted and maintained by the Oregon Department of Energy. If energy performance scores are issued in Oregon they must follow these rules.

Oregon legislation in 2009 and 2013 required the Oregon Department of Energy to establish rules for [energy performance scoring](#). The rule and its implementation is reviewed, refined, and informed by a stakeholder panel. [Oregon Administrative Rules](#) specify what is required for residential and commercial energy performance scores, and include training requirements for licensed home energy assessors, and requirements for score systems.

DOE's Home Energy Score is the approved modeling engine for residential performance scoring in Oregon. The legislation and subsequent rulemaking gave local communities a framework for creating other home energy scoring programs (currently offered by Eugene Water and Electric Board and city of Portland). Oregon Department of Energy is a DOE Home Energy Score partner. The state is also currently seeking assessors and systems that can deliver residential scores statewide.

#### Case Study 7: Vermont

##### ***Reaching Consensus with Real Estate Professionals on Including Score Information at Time of Sale***

Vermont adopted the Home Energy Score as a component of the state's voluntary labeling program in 2015. From 2015 to 2018, the state offered the [Vermont Home Energy Profile](#), an independent summary of a home's energy efficiency, measuring estimated annual energy use and annual energy costs, and offering a Home Energy Score. Vermont developed an innovative approach to encourage sharing of home energy information at time of sale. Building on the relationships and trust developed between the energy efficiency and real estate industries collaborations on education and training on energy topics, Vermont Realtors®, the trade association representing Realtors® in Vermont, proposed to voluntarily provide their buyer and seller clients with a two-page informational pamphlet on home energy use.

The "Home Energy Information Pamphlet" was designed to be provided to home buyers as part of the Purchase and Sales Agreement process. The Pamphlet provides general home energy information to buyers including: typical Vermont energy costs, an overview of Vermont's home energy label, and resources for next steps and home energy upgrades. The Pamphlet approach was suggested by a real estate agent and was based on a similar approach that was already in place for the Vermont Department of Health's "Testing Drinking Water from Private Water Supplies" handout, which is

required to be provided to buyers at the time of Purchase and Sales Agreement signing for homes with a drinking water well.

To ensure that real estate clients receive the Pamphlet, the real estate information document system, Dotloop, now includes a check-box reminding Realtors® to provide the Home Energy Information Pamphlet as part of the Purchase and Sales Agreement process as well as a PDF file of the two-page Pamphlet. In addition, Vermont Realtors® updated the Sellers Property Information Request (SPIR) to provide better information about the energy features of a home to prospective buyers. Both the Home Energy Information Pamphlet and SPIR updates went into effect in July 2017.

#### Case Study 8: Bay Area Regional Energy Network (BayREN)

##### ***Home Energy Score in the Bay Area***

The StopWaste Home Energy Score program is offered in the San Francisco Bay Area in partnership with the [Bay Area Regional Energy Network \(BayREN\)](#). The program launched in fall of 2015 and is funded by California rate payers and the California Public Utility Commission. The BayREN Home Energy Score program has issued approximately 1,900 scores in the Bay Area, with about half of the scores issued in the City of Berkeley, CA as a result of the Building Energy Savings Ordinance (see [Case Study 10](#) for more), and the other scores distributed throughout the nine counties served by BayREN. Outside of Berkeley, a rebate of \$250 is offered to obtain a Home Energy Score, and participation is largely driven by energy efficiency assessors who mostly offer the Home Energy Score to customers for free.

The goal of this program is to drive energy efficiency upgrades and to serve as an “onramp” to other energy efficiency programs offered by BayREN such as [Home Upgrade](#) and [Advanced Home Upgrade](#), and efficiency programs operated by Pacific Gas & Electric (PG&E), the electric and natural gas utility for the area. Once a homeowner has received a Home Energy Score, an Energy Advisor service, also supported by BayREN, contacts the homeowner to provide follow up and recommendations for upgrades.

Challenges this program has encountered are tracking the participation of score recipients in energy efficiency programs offered by PG&E. BayREN and the City of Berkeley have been unable to access participation data due to privacy protections. The program has also modified the standard DOE homeowner recommendations to address California’s energy efficiency code requirements and the long payback period in mild climate zones.

#### Mandatory Home Energy Labeling Programs & Policies

##### Case Study 9: Austin, Texas

##### ***Using an Ordinance to Support Climate Action Goals***

Austin, Texas, was an early adopter of an Energy Conservation Audit and Disclosure ordinance ([ECAD](#), 2008) requiring ratings and disclosures. Among other characteristics, it requires energy audits and

disclosures for homes and apartment complexes served by the local utility (Austin Energy) and located within Austin's city limits. The objective of the requirement is to prompt action on energy savings.

For single-family homes (1-4 units), ECAD is required at time of sale and requires sellers to complete an energy audit if a home is more than 10 years old. The seller must disclose the results of the audit to potential buyers and to any real estate agent acting on behalf of the seller. Noncompliance, a Class C misdemeanor, involves fines from \$500 to \$2,000.

All ECAD energy audits must be performed by qualified ECAD Energy Professionals, who must be either certified Residential Energy Services Network (RESNET) Raters or Building Performance Institute (BPI) Building Analyst Professionals. The audits include performance testing and typically cost \$200-300 for a single-family home. The energy audit includes information on insulation levels, air leakage, heating and cooling equipment, windows, and opportunities to improve home efficiency. Notably, the ECAD audit report does not include a score such as Home Energy Score or HERS.

ECAD supports the City's ability to meet its [Climate Protection Plan](#) goals—among them, offsetting 800 MW of peak energy demand (by 2020) and reducing the city's carbon dioxide emissions by at least 365,000 metric tons by that date.

#### Case Study 10: Berkeley, California

##### ***Mandating a Time-of Sale Label for Homes and Other Buildings under 25,000 Square Feet***

The Berkeley Building Energy Saving Ordinance ([BESO](#), 2015) requires homeowners and owners of buildings of up to 25,000 square feet to complete comprehensive energy assessments at time of sale. BESO also requires that large commercial and multifamily buildings submit annual benchmarking and complete an energy assessment once every 5 years. Buildings less than 600 square feet and individually owned units within a larger building are exempted at time of sale.

Single-family homes (1-4 units) are only subject to BESO at time of sale. The City keeps an online list of properties consumers can look up, to check the status of the property in question. There are several [compliance steps, deferrals and exemptions](#) pertinent at time of sale, including ability to defer responsibility to the buyer for up to 12 months. To comply with the ordinance, the owner must hire a registered, qualified BESO Energy Assessor. The completed assessment goes to both the customer and the City, with a filing fee of up to \$250, depending on the building size. Assessors may use either the Home Energy Score or an Advanced Assessment from [Energy Upgrade California](#)<sup>®</sup>. Public reporting of the energy assessment and disclosure of energy information is required prior to sale.

To encourage owners to complete the energy efficiency recommendations provided in the assessments, BESO assessors provide a list of local energy efficiency programs and resources available to building owners, including financing information. To reward completion of efficiency improvements, a High

Performance compliance path is available for those those that participate in whole building efficiency programs, through which the building is exempted from the filing fee and future assessment requirements. Penalties for not meeting the compliance requirements are a \$100 fine for each violation of the ordinance, and an additional fine of up to \$25 a day (up to \$1,000) for the duration of the violation.

#### Case Study 11: Montgomery County, MD

##### ***Mandating Time of Sale Energy Bill Disclosure***

In 2008, Montgomery County, Maryland adopted an ordinance requiring [energy bill disclosure](#) for the 12 months prior to the sale of the home, with some exemptions for homes that were unoccupied for all or a portion of the 12 months prior to sale. The seller must also provide the buyer with information approved by the county regarding the benefits of home energy audits and energy efficiency improvements. Early drafts of the bill included a requirement for an energy performance audit prior to time of sale. This language was removed prior to passage of the bill. The requirements took effect on January 1, 2009.

#### Case Study 12: Portland, Oregon

##### ***Mandating a Time-of-Listing Label, Citywide***

In 2017, the City of Portland, adopted an [ordinance](#) for mandatory home energy labeling. Starting in 2018, Portland's Home Energy Score policy requires sellers to obtain a home energy performance report prior to listing their properties. The report must contain the DOE Home Energy Score, and each listing must contain the report. Further, the home energy performance report must be given to prospective buyers who visit the listed home.

The Portland label offers the Home Energy Score, carbon impacts, estimated utility costs, and costs of home energy improvement upgrades. Because the ordinance requires a seller to have a home energy assessment prior to listing the home, the city hopes the energy information will drive sellers to make upgrades. Portland will track their program objectives and report back to city council in 2020.

Portland also convened a group of stakeholders to discuss equity issues, with an objective of determining what burdens might be created as a result of a mandatory labeling policy. Portland determined that the upfront cost of the label was a burden on low-income consumers and for the first year of the program, plans to cover the costs for these sellers. The City will collect data through the first year of implementation (2018), and then determine a longer-term solution to cover these costs.



## Case Study 13: Vermont

### ***Vermont Home Energy Profile***

In 2013, [Vermont Act 89](#) required the Vermont Public Service Department (the state’s energy office) to establish a working group to develop an energy label for the state. The resulting program was called “[Vermont Home Energy Profile](#)” and run by Efficiency Vermont. The Vermont Home Energy Profile includes three metrics, annual energy usage in MMBtus, Home Energy Score, and annual energy costs. The Home Energy Profile was run as a pilot program in 2016 and 2017. The pilot focused on training home performance contractors, home inspectors and assessors, conducting outreach through Realtors and communities, and tested free and market rate prices. The Home Energy Profile has not proceeded out of the pilot.

## Report on Home Energy Labeling Activities in Missouri and Oregon

# EMPRESS Case Study

Documenting Home Energy Performance in Missouri and Oregon

July 2018

## Introduction

The state energy offices (SEO) of both Missouri and Oregon have an established interest in supporting residential energy scoring activity in their states as a means to ensure that energy efficiency investments are appreciable and valued in the real estate market. Despite varying histories and SEO involvement with energy scoring, both Missouri and Oregon recognize the importance of providing their residents and their local real estate marketers with uniform and consistent energy performance information. Both SEOs recognize they are well positioned to help address the systemic challenges associated with delivering uniform and consistent energy performance information. The approaches they selected to address these twin challenges are illustrative of how state governments and localities can support the effective introduction of energy scoring information into their respective housing markets.

Both SEOs were motivated to participate in the EMPRESS project because of their shared interest in supporting existing scoring programs active in their respective markets to deliver consistent energy performance information to end-users. Specifically, the Missouri Division of Energy (DE) joined the EMPRESS project with the goal of building on its prior efforts to find market-friendly solutions that increased energy scoring activity in the state and allowed the scores to be more effectively used in the residential real estate market. DE staff recognized that there were multiple scoring systems being used in the state and determined there was an opportunity to decrease marketplace confusion and help provide meaningful recognition of a home's energy performance. Similarly, the Oregon Department of Energy (ODOE) joined the EMPRESS project with the goal of addressing several gaps in how energy scoring was structured and delivered in Oregon. The two primary areas of need were: 1) ensure that energy use information for new homes and existing homes is conveyed to the market using similar metrics, 2) ensure that all homes – new and existing – use a similar methodology for calculating energy use. While partners like the Energy Trust of Oregon have made significant progress with energy scoring over the prior decade with multiple programs active in the state, there were inconsistencies in how energy scores were calculated, what information was conveyed on the reports provided to homeowners and homebuyers, and how the scores were delivered to the market.

Despite having these similar programmatic and policy goals, the two SEOs took different approaches to creating their desired outcomes. DE developed a unique certification program that relies on nationally recognized residential energy efficiency rating systems and integrates them into a gold-level or silver-level state certification. The Missouri Division of Energy determined that creating an umbrella certification program was the most effective way to provide residents with consistent information without having to mandate action by the existing rating programs or choosing one “winner” over others amongst the rating programs. Alternatively, ODOE was given a directive by the state legislature to set statewide standards to be met in order for energy rating programs active in Oregon be approved by the state. ODOE

decided they could meet these goals best by requiring all statewide scoring systems use the US DOE Home Energy Score modeling engine for generating certain required home energy use information. The differing approaches taken by each state comes in part from the differing regulatory environments and histories with energy scoring in each state.

## Documenting Energy Performance: Missouri

Missouri has embarked on supporting energy performance-related efforts in an environment of relatively low utility rates, no statewide energy codes, and no public benefit funds for energy efficiency. Given this circumstance, Missouri Division of Energy focuses its efforts on developing a diverse set of market-friendly tools to ignite improved energy performance. For example, the Missouri Personal Income Tax Deduction allows any Missouri taxpayer to deduct 100 percent of the costs incurred for a home energy audit and the costs associated with the implementation of any energy efficiency recommendations made by the auditor. DE maintains a directory of all Missouri Certified Home Energy Auditors who must be used in order for a homeowner to be eligible for the state income tax deduction. The Missouri certification indicates that an auditor has completed appropriate training and helps insure that residents are getting the most up-to-date advice and financially beneficial recommendations on methods to reduce their energy consumption.

There has also been a relatively healthy market-based delivery of HERS ratings in Missouri for numerous years.<sup>1</sup> At the same time, Columbia Water & Light (CWL) has issued scores to existing-home customers as part of its Home Performance with ENERGY STAR program. CWL's Efficiency Score is provided to customers during an initial assessment to help homeowners identify improvement opportunities. The Efficiency Score is a free service for participants of the Home Performance with Energy Star (HPwES) program. CWL's Efficiency Score compares the current conditions of the home to that home's full efficiency potential based on cost-effective improvements; with every home being able to achieve an energy efficiency rating of 100% if all identified improvements are made. Columbia Water & Light concurrently uses the US Department of Energy Home Energy Score when assessing homes as part of the same Home Performance with ENERGY STAR program. More than 7,000 homes have been scored to date. The municipal utility views the Home Energy Score as an important tool that augments their Efficiency Score by helping to document the value of energy efficiency improvements and quantify energy performance in comparison to other homes. The score makes a record of the homeowner's energy efficiency upgrades and can also be used in real estate transactions with a future buyer of the home and during the appraisal process.

In 2015, DE recognized that the varying scores and reports issued through different programs within the state were working at cross purposes with inconsistent information being conveyed to homeowners. The Missouri Division of Energy initiated a voluntary program designed to

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<sup>1</sup> For example, HERS raters issued 682 HERS ratings in 2017 and 602 in 2016 in the state in 2017, the average rating in the state was a 68 on the HERS Index.

promote energy efficient homes through clear and meaningful recognition. DE sought to create and maintain the Missouri Home Energy Certification (MHEC) program to equip Missouri homeowners with a mechanism that recognizes the value of their energy efficient homes. MHEC is intended to lessen market confusion, drive uptake in efficiency programs and result in more efficient Missouri homes. To achieve this, DE focused on building key partnerships with stakeholders across the state. Importantly, they focused on working with various existing national and local energy scoring programs active in the state and developed a way to tie the contrasting new and existing homes programs together to more effectively recognize and convey a home’s energy efficiency to not only the home owner but also to potential home buyers.

Both new and existing single-family homes in Missouri are eligible to participate in the MHEC program. The MHEC program provides an opportunity to add value to existing program infrastructures by creating a consistent statewide platform to recognize the efforts by programs, utilities, and homeowners to make Missouri homes more energy efficient. An eligible home can achieve one of two levels of certification under this program, Gold level or Silver level. There are two ways to achieve Gold certification. The first relies on existing rating systems, such as the U.S. DOE Home Energy Score, RESNET’s HERS Index, and Columbia Water & Light’s Efficiency Score, to set the threshold for efficiency. The second approach recognizes homes that have installed significant assets to the 2012 International Energy Conservation Code (2012 IECC) level, or have achieved ENERGY STAR Certified Home designation on or after January 1, 2017. For silver certificates, homes are recognized for significant energy efficiency improvements or for completing a majority of the cost-effective energy efficiency measures identified in an energy audit. Program scoring methodology utilizes the HES, HERS Index, Columbia Water & Light Efficiency Score, or energy modeling by an approved software.

<b>GOLD</b>	
HERS Index	Score of 65 or less
Home Energy Score	Score of 8 or greater
Columbia Water & Light Efficiency Score	Received Score backed by an HES of 8 or greater
ENERGY STAR	Certified
IECC	Equivalence of the 2012 for climate zone 4

<b>SILVER</b>	
HERS Index	20 point decrease
Home Energy Score	All recommended cost-effective improvements have been implemented
Columbia Water & Light Efficiency Score	90% efficiency rating
ENERGY STAR	20% modeled energy savings

The MHEC program does not reinvent the wheel or choose a “winner” amongst energy scoring programs, methodologies or modeling engines. DE uses the strong technical underpinning of these credible existing 3<sup>rd</sup> party programs as the foundation for their certification program. The

MHEC program is also designed to have a minimal impact on the existing program process and workflows. No additional site visits are required of program partners, though coordination on data and marketing is important to the success of the MHEC program. Existing programs that offer HES, HERS Ratings, and the CW&L Efficiency Score are encouraged to aggregate qualifying home applications, send them to the state energy office for certification, share which homes have received onsite quality assurance and promote the statewide effort to homeowners. Home Performance with ENERGY STAR program sponsors are asked to share participant addresses and promote the program to homeowners. Because MHEC involves a diverse group of stakeholders, the State of Missouri can leverage existing outreach channels rather than relying on an expensive mass-marketing campaign.

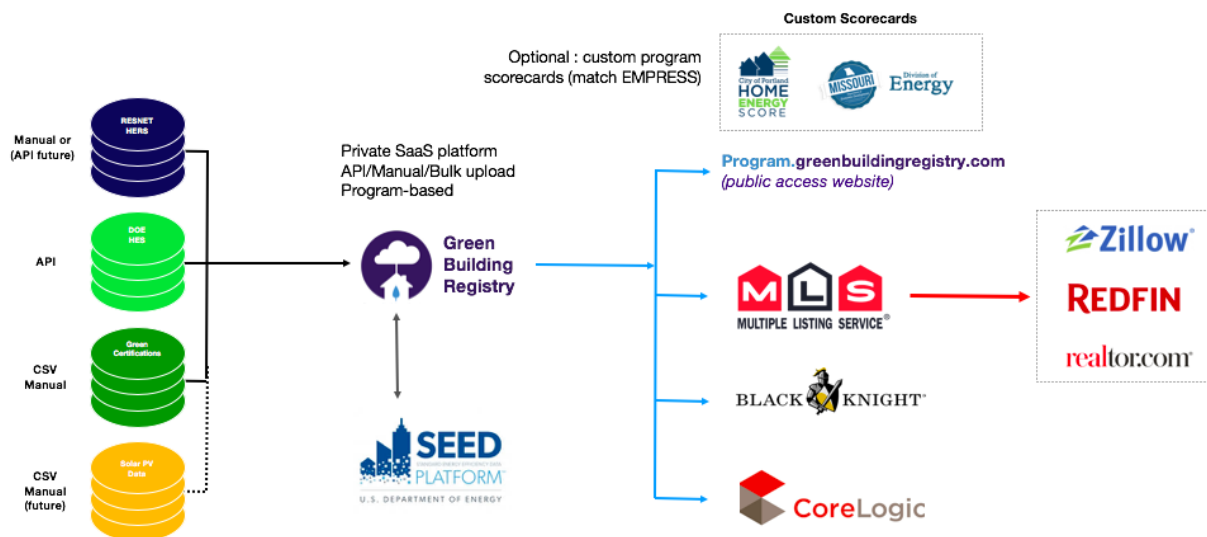
### Missouri EMPRESS Activity

During the EMPRESS project, the Missouri Division of Energy has undertaken several steps to increase the consistent deployment of energy performance information. As more partners are taking advantage of the MHEC program, market awareness of both the certificate and residential energy efficiency in general, is expanding. Helpful in this effort has been the state striving to coordinate with investor-owned and municipal utilities to align energy efficiency programs. They have also developed a strategic outreach effort with professionals of the real estate industry, with the understanding that Realtors, home inspectors, appraisers and homebuilder organizations are key participants in conveying and using energy performance information in real estate transactions. DE has begun investigating Realtor education programs and has facilitated introductory meetings with key real estate association staff.

As part of the EMPRESS project, Missouri Division of Energy has also focused their attention on ways to store home performance data from the energy-performance rating systems that are active in the state, automatically generating the Missouri Home Energy Certification, and eventually passing on that certificate to the real estate market. The State used an on-line system where HES assessors and HERS raters could manually upload relevant program documents, such as the Home Energy Score report, the HERS certification, or the Columbia Water & Light Score. State staff reviewed submissions to determine if the property qualified for a silver or gold Missouri Home Energy Certification. With one-click, the certificate was generated within the on-line system and provided to the rater or assessor, who then delivered it to the homeowner. To improve on this system, the state will soon be issuing an EMPRESS-compliant scorecard that contains key home energy-related data points with a similar design as the front page of the Portland, Oregon report. A majority of this new EMPRESS-compliant scorecard will be uniform for all homes across the state, though there will be a section of the scorecard that will contain either the HERS Index rating or Home Energy Score, depending on the source of the home performance data. The MHEC Certificate is provided in addition to the EMPRESS-compliant scorecard if the property qualifies.

Missouri Division of Energy has also focused on ways to store home energy performance data so that it can be accessed by the real estate industry and the general public. For example,

scoring results will be housed in the Green Building Registry™, a repository that allows the public to search by address for home energy performance information and to connect with a participating MLS. HEScore data can be automatically transferred into the Green Building Registry from HES-compliant scoring tools, while HERS data will initially be manually entered. Green Building Registry has an API connection that can be made available to the various MLS organizations in Missouri to facilitate the automated data transfer directly into real estate listings. This data includes the HERS rating, energy consumption, estimated energy costs in kilowatt-hours (kWh) and therms (thm), as well as other information contained on the EMPRESS-compliant scorecard. This process will save DE staff considerable time and administrative burden. Because the energy data will be coming from verified sources, it eliminates the need for manual verification by state program staff and provides the real estate industry’s MLS systems with assurance the data is accurate. The data flow structure can be seen in the diagram below. Connection to the real estate portals will be completed as a next step.



## Missouri Next Steps

As new technological functionality comes on-line and expands, the state will heavily promote the use of the new EMPRESS-compliant scorecard and the Missouri Home Energy Certification. The ability to automatically import HERS data into Missouri’s Green Building Registry will be available once a HERS Registry API is made available. Missouri’s Green Building Registry will be the first to use the new HERS Registry API to receive this data automatically. The state also plans to expand its initial preliminary outreach to the MLS and real estate community. This activity will be focused first in collaboration with Columbia because of the existing partnership with the local utility, Columbia Water & Light. Today, Missouri has “green” fields in five of the eight MLSs. Collaboration with the real estate industry on data standards will ensure that the new Missouri Home Energy Certification can easily be uploaded to the searchable fields of an MLS, streamlining the process to find homes that have participated in the program.



Additionally, State Energy Program staff encourage appraisers to utilize the Appraisal Institute's Residential Green and Energy Efficient Addendum to ensure the value of energy efficient homes is captured.

## Documenting Energy Performance: Oregon

Oregon law has provided guidance for home energy ratings since 1977, but it was only with the implementation of the Energy Performance Score (EPS) by the Energy Trust of Oregon in 2009 that a labeling concept found a strong niche in the market. Energy Trust began providing EPS labels for new homes in 2009 and later expanded to offer labels to homes that participated in the Home Performance with ENERGY STAR (HPwES) program when requested by a homeowner. The Oregon Department of Energy's (ODOE) involvement with energy scores began with the introduction of Senate Bill (SB) 79 in 2008-2009. SB 79 was an early effort by energy efficiency advocates to develop a mandatory scoring system for the state. While a mandate to institute a required scoring system in Oregon was removed from the bill, when passed SB 79 provided some very early structure to energy scoring at the state level. A governor-appointed task force was charged with researching existing building energy scoring systems in use at the time and then make recommendations to the ODOE about how a system could be used in the state on a voluntary basis and also to report to the legislature with recommendations regarding a potential mandatory scoring system. The Task Force recommended that ODOE adopt a voluntary building energy scoring system. The recommendations formed the basis of administrative rules which went into effect July 1, 2010. The rules spelled out the need for a consistent methodology for building energy scoring, the metrics and format for displaying the score, and software approval requirements. The rules were designed to be flexible enough to accommodate an expected national scoring system that was subsequently established by the USDOE as the Home Energy Score. In addition to recommendations for rulemaking, the Task Force made several legislative recommendations to strengthen the voluntary building energy scoring program. The Task Force recommended that the legislature consider a physical inspection requirement for residential buildings and a certification requirement for raters/assessors.

In October 2011, then Governor John Kitzhaber appointed the Ten-Year Energy Action Plan Task Force. The Task Force was charged with making recommendations to the Governor on coordinated actions and initiatives that the State of Oregon could take in the following ten years. After reviewing the Task Force recommendations, the Governor issued [his proposed Ten Year Energy Action Plan for Oregon](#) in 2012. In that plan, energy scoring was identified as a tool that the state wanted to prioritize: *"Public Performance Disclosure Mechanisms are a critical tool in driving demand for energy efficiency and conservation."* The 2012 plan also contained a specific action item related to energy scoring: *Action Item: The state will build on existing pilot programs to provide a tool that would be available to all homeowners. This tool can help accelerate the market for energy efficiency and, when provided to potential buyers at the point of listing, would allow homeowners to retrofit their new homes and amortize the costs of upgrades over the life of the mortgage.*

In 2013, the local Home Performance industry group and other energy efficiency advocates helped to introduce and advocate for legislation with the goal of establishing statewide energy scoring rules and methodologies. The need for this legislation arose out of the home performance industry's recognition that the Energy Trust's Energy Performance Score (EPS™) was not available throughout the state and there were therefore multiple labeling systems operating without coordination or consistency in various geographies. A completely uniform statewide energy scoring system based on EPS™ was not established, but the Oregon Legislative assembly did adopt House Bill (HB) 2801, which did set rules for assessors providing energy scores and the types of allowable home energy performance score systems. With the passage of HB 2801, the state took on a more active role to help coordinate the professional credentialing of home energy assessors and to facilitate the rulemaking process to clarify the legislative directive.

House Bill 2801 required the Oregon Department of Energy to adopt revisions to the home energy performance score system, including training requirements for home energy assessors certified by the Construction Contractors Board, and requirements for home energy assessors to report home energy performance score data to the department. ODOE formed a rulemaking advisory committee to recommend options for implementing HB 2801. The committee was comprised of representatives of home energy performance score system providers, building assessment software providers, building assessment training providers, residential energy efficiency and construction trades, real estate professionals, utilities, energy efficiency incentive programs and other stakeholders. From this process, three labeling systems were conditionally approved for use in Oregon after making modifications to their label formats. These include: RESNET's HERS, US DOE's Home Energy Score, and Energy Trust's EPS. In providing conditional approval to the three systems, the stakeholder advisory committee recognized this did not solve the issue of scoring consistency and committed to analyzing methods to provide consistent home energy performance information between the three systems. In 2015, the committee recommended that consistency across the state could be secured through the use of the US DOE Home Energy Score calculation engine to estimate the total annual energy used in the home in retail units of energy, by fuel type. The US DOE Home Energy Scoring calculation engine must now be used by all compliant home energy scoring programs active in the state to generate and display these data points.

## Oregon EMPRESS Activity

During the EMPRESS project timeframe (2016-2018), ODOE focused on three primary activities related to energy scoring:

1. Supporting the implementation of the city of Portland's mandatory Home Energy Scoring program. In this geographic area, City of Portland is the Home Energy Score partner.
2. Supporting Eugene Water and Electric Board (EWEB) in the implementation of a limited, voluntary HES program, including a focused pilot program for the rental market. In this geographic area, EWEB is the Home Energy Score partner.

3. Developed a structure for supporting the market delivery of Home Energy Score's in jurisdictions outside of the established program boundaries of Portland and Eugene. ODOE is the Home Energy Score partner for areas of the state not covered by other HES programs partners.

## ODOE support of City of Portland Home Energy Score program

The City of Portland used the policy foundation provided by HB 2801 and ODOE's efforts to develop statewide energy scoring rules to pass an ordinance mandating Home Energy Scores at time of home listing. The ordinance requires sellers of single-family homes to incorporate the following practices prior to listing a home for sale:

- Have a Home Energy Score assessment completed by an Oregon-licensed home energy assessor.
- Provide a copy of the City of Portland Home Energy Score report to all licensed real estate agents working on the seller's behalf.
- Include the City of Portland Home Energy Score report in any real estate listings.

This policy impacts the approximately 10,000-14,000 single family homes listed for sale each year in Portland. In the first year of program activity, the city anticipates that approximately 9000 scores will be issued and that they will achieve an 80% compliance rate. The Home Energy Score and report is disclosed to the public through real estate websites, primarily through the Regional Multiple Listing Service (RMLS), the MLS that serves the Portland metropolitan area. Because of the technological connection made between the program's Green Building Registry and RMLS, listing agents can easily include verified and accurate home performance information into the home listing.

Sellers also must make the Home Energy Score and Report available to any prospective buyer who comes to the home. This can be accomplished either by having a supply of printed reports available in the home or by posting information in a label format inside the home. Portland's requirement applies to all single-family homes, including existing detached single-family homes, existing attached, side-by-side, single-family structures like townhomes, and newly constructed homes that are either detached or attached side-by-side. Portland determined that a time-of-listing requirement met their policy goals most effectively. The time-of-listing requirement ensures that home buyers are provided with the Home Energy Score report information at the most actionable time: when they are comparing homes for purchase. This timing allows prospective buyers to see the potential costs they will incur and potential investments they could make to the home. Importantly, the time-of-listing requirement makes it easier for buyers to consider mortgage products tailored to spur investment in energy-efficiency upgrades.

After investigating several possibilities for filling the official DOE Home Energy Score Partner role, stakeholders came to consensus that the Partner role could most effectively be fulfilled by a public-sector organization like the City of Portland, specifically the Bureau of Planning and

Sustainability (BPS), which had led the policy and program development processes. After signing on to become the Home Energy Score Partner, BPS entered into an agreement with Earth Advantage to provide a number of the required Partner functions. ODOE also provides support in some facets of the program delivery, as shown below:

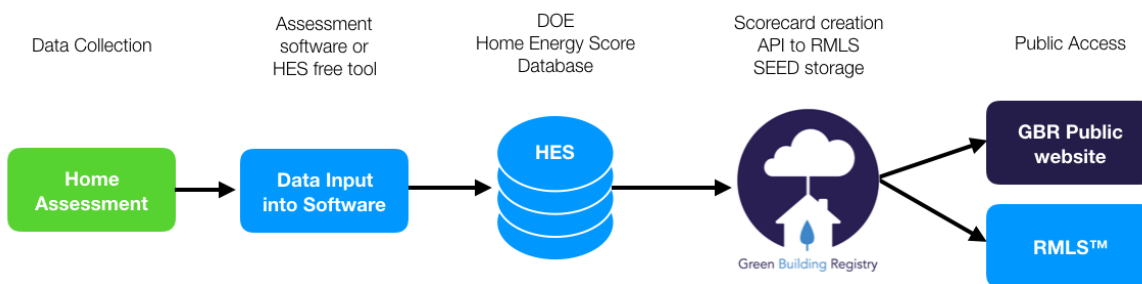
<b>City of Portland - USDOE HES Partner</b>	<b>Oregon Department of Energy</b>	<b>Earth Advantage - Program Implementer</b>
Leadership and oversight of policy development, program development and rulemaking.	Provide utility rate information for use on Home Energy Score reports through ODOE’s annual utility data collection process.	Home energy assessor recruitment, onboarding, training, and maintenance of authorized assessors list
Communications and messaging - Portland Home Energy Report design, program branding, public relations strategy, advertising	Provide utility carbon emissions factors information for use on Home Energy Score reports through ODOE’s annual utility data collection process.	Quality assurance of home energy assessors
General program inquiries	Confirm prospective Home Energy Assessors have secured state credentialing.	Green Building Registry™ - publicly accessible database, localized Home Energy Report generator, direct conduit to MLS
Compliance and enforcement		Real estate industry outreach and education

To meet state regulations as defined by HB2801 and local policy objectives, Portland designed and developed a localized City of Portland Home Energy Score report that condensed HES information into a readable 2-page format. The City of Portland Home Energy Score report includes the following information: 1) A score and an explanation of the score. 2) An estimate of the total annual energy used in the home, by fuel type. 3) An estimate of the total monthly or annual cost of energy purchased for use in the home, in dollars, by fuel type. 4) The current average annual utility retail energy price, by fuel type. Unlike standard HES reports, Portland utilizes local utility rates in the energy cost savings figures and local, utility-specific emissions factors for the carbon footprint information. ODOE plays a key role in providing the city with this utility data on a biannual basis.

The Portland report includes customized descriptions of some of the HES-generated energy-efficiency measure improvement recommendations to match local utility program offerings and energy code requirements. The report also includes a localized “call-to-action” message to make it easier for users to take next steps. A City of Portland Home Energy Score is valid for eight years after issue, provided that no home upgrades occur that change the mechanical systems, energy efficiency, or the square footage of the home. However, if the report is to be

used again in a new real estate listing after two years from the initial assessment date, a new report must be reissued so that current energy rates and carbon emissions can be used in calculating the home’s updated estimated energy costs and carbon footprint. Reissuing a City of Portland Home Energy Score report does not require a new in-home assessment. The homeowner can go to the program’s Green Building Registry™ page to search their address and download a new report. The program’s Green Building Registry auto-generates updated reports with the most recent utility and carbon emissions information.

Portland had two data-related goals when developing the program: 1) localize information as much as possible, using local utility rates and carbon emissions factors; and, 2) convey the Home Energy Score data directly to the real estate market. Portland uses Earth Advantage’s Green Building Registry™ to fulfill these objectives. The Green Building Registry meets these program goals by providing four primary functions: 1) a tool to translate Home Energy Score data into a custom-designed City of Portland report that uses local utility rates, carbon emission factors, and call-to-action messaging; 2) a portal for assessors to generate those localized reports using the data entered into HES-approved tools and then deliver the localized reports in real-time to customers; 3) a searchable, publicly-accessible repository of Portland Home Energy Scores and reports; 4) a database hub that automatically communicates the home information to the local Multiple Listing Service (RMLS) so that the numerical Home Energy Score (1-10) and report URL link are populated in each home listing through one-click by the listing agent. The diagram below represents the current actual data flow in Portland as information moves from the inputs made by the assessor to the eventual delivery of the score and Portland-specific report to the local MLS (RMLS) and then to real estate web portals<sup>2</sup>:



## Eugene Water and Electric Board (EWEB)

In June of 2016, Eugene Water and Electric Board (EWEB) received state approval to use their scoring system which was based upon the USDOE Home Energy Score. EWEB developed an agreement with USDOE to be the official HES Partner to deliver scores within the EWEB service

<sup>2</sup> Because the Portland Home Energy Score data is sent to the local MLS (RMLS) at time of listing, the score and related information is also subsequently automatically made available through RMLS to the public via real estate web portals such as Redfin, Trulia, Zillow etc.

area. In 2017, EWEB partnered with the University of Oregon (UO) and the City of Eugene to deliver an HES program focused on rentals home. The program was developed to (1) encourage landlords to make energy efficiency upgrades to their rental properties, (2) recognize energy efficiency upgrades already made by landlords, (3) help renters understand their energy consumption, (4) help renters shop for affordable housing, and (5) provide a valuable learning experience for UO students.

EWEB's Home Energy Score program for rentals was conducted by student assessors with utility staff oversight. The student assessors used EWEB's customer database to research their assigned homes, which typically provided most of the home energy information that was needed. The student assessors would then visit the homes and complete the assessments, generally within an hour or so. After the in-home assessments, the student assessors returned to EWEB and entered the data into the Home Energy Score tool. Data was reviewed for quality by EWEB staff. Corrections were made as needed by either the assessor or EWEB staff. In this program, EWEB's customized Home Energy Score report is generated manually by taking data from the Home Energy Score database and downloading this information into a custom spreadsheet. EWEB staff then run validity checks on the data entry and manually produce the localized, state-complaint report that was based on the same design as developed by the City of Portland. 328 customers submitted applications for a Home Energy Score. The percentage of applications that came from tenants (75%) was similar to the percentage of tenants who were invited to participate (79%). The program resulted in 248 homes being scored.

ODOE delivery of Home Energy Score's in jurisdictions outside of the established program boundaries of Portland and Eugene.

To support a more consistent delivery of scores across the state in geographies without an established energy scoring program, ODOE serves as the official Home Energy Score partner. To meet the obligations of the DOE HES partner role, 2018 ODOE issued first a request for information (RFI) and later a request for proposals (RFP) for private-sector implementation support. The 3<sup>rd</sup> party implementation support will provide ODOE with:

- Quality assurance of scores produced throughout the state.
- Training, outreach, onboarding and mentoring of home energy assessors.
- Oversight of home energy assessors to ensure they are in compliance with rules related to HB 2801.
- Technical expertise with systems that push scores from a Home Energy Score report generator to real estate listing services. This includes the ability to auto-populate scoring data into real estate listing services.

Next steps for Oregon

Upon the selection of a private sector partner, ODOE will be able to fully promote and support a growing statewide network of home energy scoring activity. ODOE anticipates their role will continue to "fill the gaps" where no local program structure exists but where there is both

homeowner interest in obtaining a score and assessor interest in delivery services. ODOE anticipates growing a list of authorized energy assessors active in a wide array of jurisdictions where no other HES program structure exists. ODOE will also work in collaboration with Energy Trust of Oregon to integrate the Oregon state requirement to include the US DOE HES modeling engine results for energy consumption into Energy Trust's EPS for new homes program score card.

## Status Update and On-Going Workplan for Technical Harmonization



## EMPRESS Harmonization Workplan

The Energy Metrics to Promote Residential Energy Scorecards in States (EMPRESS) project deliverables include the task of “harmonizing” the United States Department of Energy (DOE) Home Energy Score (HES) and the RESNET Home Energy Rating System index (HERS) by transitioning both to a single energy modeling software. Harmonization of energy modeling used for the Energy Rating Index (ERI), used for energy code compliance, has also become a focus of the harmonization work. During the grant period, the National Association of State Energy Officials (NASEO) has led a bi-weekly call to facilitate conversations between HERS/ERI software providers and the National Renewable Energy Laboratory (NREL). These calls began as an effort to communicate to software providers and to RESNET the desire of state energy officials, utility program administrators, and others the desire to achieve harmonization of the two national residential energy asset rating/scoring regimes. The result of this effort has been two working groups, one for each respective scoring system. This work will extend beyond December 31, 2018 due to the technical complexity of the alterations to software required to enable the use of the Energy Plus energy modeling software to generate both scores, and of ‘harmonizing’ the inputs of the existing variety of software programs, particularly for HERS/ERI software providers.

As NASEO has been leading the HERS/ERI harmonization work in coordination with NREL, DOE has begun to transition HES to use Energy Plus for energy modeling. HES currently uses a single engine (DOE2) for all software providers, making the transition process less complex. However, this process still requires a significant level of effort and testing. If the current timeline is maintained, HES is expected to move to Energy Plus for energy modeling in October of 2019.

The HERS/ERI Harmonization effort will require several steps. At present, each HERS/ERI software provider is permitted to use different energy models. Because the different HERS/ERI software programs structure modeling inputs differently the transition to Energy Plus is more complex than for HES. NASEO, working with NREL, has convened voluntary bi-weekly conference calls with three software providers, Ekotrope, Wrightsoft, and Energy Gauge to collaboratively make decisions necessary to enable the transition to a single energy model. The provider of Rem/Rate software has been invited to participate but has elected not to do so. In addition to conference calls, the software providers have been asked to complete voluntary “homework” assignments. The providers have been completing these assignments at their own pace. It is anticipated that the process of building consensus around modeling decisions to enable Energy Plus to output ERI and HERS scores will result in a pilot of Energy Plus with limited functionality in spring of 2019, with a full release being issued in approximately October 2019.

To complete this task NASEO will complete the following deliverables:

- Hold a conference call for all stakeholders (software providers, state energy offices, utilities, jurisdictions) to provide a progress update on the harmonization effort in Q1 of 2019.
- Continue bi-weekly conference calls with HERS software providers and NREL, including maintaining list of attendees.