

# Residential Energy Labeling: Strategies for Scalability



**National Association of State Energy Officials**

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# Residential Energy Labeling: Strategies for Scalability

**Labeling Meeting Host: National Association of State Energy Officials**

Co-organizers: Massachusetts Department of Energy Resources & Earth Advantage

## Executive Summary

On February 7, 2014, the National Association of State Energy Officials (NASEO) convened State Energy Office representatives, residential energy efficiency organizations, and U.S. Department of Energy (DOE) representatives to discuss the status of residential energy labeling<sup>1</sup> and strategies for scaling labeling programs in a sustainable way across the country. The meeting grew out of NASEO's involvement in a four-state residential retrofit and energy labeling pilot project. Discussions in the fall of 2013 among NASEO, Massachusetts Department of Energy Resources (DOER), Earth Advantage, and the DOE Home Energy Score program led to holding a labeling roundtable in conjunction with NASEO's Energy Policy Outlook Conference. The main goals of the meeting were to hear perspectives from states on the steps for developing a long-term strategy for residential energy labeling and to identify opportunities for stronger collaboration among states and national organizations operating in this space.<sup>2</sup> This document synthesizes the meeting discussion and identifies key takeaways. While one of the primary audiences for this report is the attendees from the February meeting, the issues and takeaways described in the report are relevant for other State Energy Offices and organizations interested in residential energy labeling.

***Overall, the discussion illustrated that significant progress has been made in the residential energy labeling space over the last several years.*** While there were no formal agreements reached among the participants, several conclusions emerged from the meeting:

- 1. There is no “best way” to design a residential energy label, including the metrics chosen, and many state and local programs desire customization. However, the metric “MMBtu/year”—an estimate of the absolute annual energy consumption by the house measured in millions of British Thermal Units—has emerged as a potential primary metric.** Both Vermont and Massachusetts have chosen site energy MMBtu/year as the primary metric on their energy labels. The meeting participants acknowledged that MMBtu/year is a foundational metric from which other metrics can be derived and that it will likely prove durable over time. It also provides a potential link between existing homes and new homes. Other, less granular metrics might still be presented to homeowners, but MMBtu/year could be a common metric for all rating programs. Furthermore, participants acknowledged that having multiple metrics, including potential metrics for transportation efficiency or indoor environmental quality, is acceptable and there should not be an effort to identify “one metric to rule them all.” One approach that has broad support is to include “reference points” for the chosen metric(s), as homeowners care about how they compare to their neighbors.
- 2. States are and will continue to be at the forefront of developing residential energy labeling policies and programs.** States such as California, Vermont, Massachusetts, Colorado, and

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<sup>1</sup> See Appendix A for definitions of key terms in this document.

<sup>2</sup> The initial meeting goals and full list of participants is available in Appendix B.

Oregon have taken the lead in residential energy labeling and have designed programs and policies around these efforts. These states have organized stakeholder processes, often led or funded by the State Energy Office, to conduct research, provide governance, develop long-term strategies, and ensure that residential labeling integrates with comprehensive state energy plans. States beginning to explore residential energy labeling should learn from the efforts of their peers. Additionally, part of the long-term vision for energy labeling programs is to link with the real estate and appraisal industries, and standards in these industries are set on a state-by-state basis. There is also significant interest among states in residential energy labeling, as illustrated by the ten states represented at the NASEO meeting and the additional six to ten states that have expressed interest in the topic.

- 3. The timing is right for states, DOE, and national organizations to increase their levels of dialogue and coordination on residential energy labeling.** It was evident in the meeting that not all parties agree on the best step forward in specific areas, such as how or whether to identify standards of accuracy for creating specific energy scores versus only having one approved tool to create those scores. The group did agree, however, that continued collaboration and coordination would benefit all of the entities involved. States will be best served if they are presented with objective, complete information and options so as to make the best decisions for their policies and programs. National organizations involved in residential energy labeling will continue to pursue independent objectives but should also increase their level of transparency and collaboration. The group convened at the NASEO conference is in a position to provide leadership and forward-thinking on the topic of residential energy labeling.

***In addition to these general themes, the group identified several specific issues that are still being worked through and will require on-going research and discussion.*** These issues include:

- **integrating labels for new and existing buildings**, especially given the recent addition of the Home Energy Rating System (HERS) scale as a compliance path for new homes in the 2015 International Energy Conservation Code (IECC);
- **including solar energy generation in energy scores**, due to the increasing prevalence of solar PV and water heating;
- **aligning energy labeling programs with existing state energy policy goals and energy efficiency programs**, which span new homes, existing homes, and multifamily buildings;
- **designing residential energy labeling programs to maximize the durability** of the chosen approach;
- **balancing state, regional, and national priorities regarding labeling efforts**, as these units of reference can produce differences in priorities that may persist over time;
- **developing a common approach for site versus source energy in metrics such as MMBtu/year**, especially if several states choose to utilize this metric;
- **ensuring consistency of energy scores** produced through established tools while also fostering innovation and competition among rating tools; and
- **facilitating efficient data storage and transfer** between labeling programs and other industries, such as Multiple Listing Service (MLS) databases.

NASEO committed to coordinating future communication with the meeting attendees and, depending on future meetings and agenda topics, identifying other organizations that should participate.

## Meeting Report

This report summarizes a residential energy labeling meeting that NASEO organized in February 2014. The meeting gathered over ten states and several national organizations that are all working on residential energy labeling programs. The issues and takeaways described in the report are relevant for other State Energy Offices and organizations interested in residential energy labeling; as such, this report is intended for a broader audience than only the attendees of the February meeting.

The report begins with a description of state lessons learned regarding residential energy labeling. This section includes in-depth updates from three states and shorter updates from seven additional states. The second section highlights the energy labeling activities of national organizations that attended the February meeting. The third section describes current priorities and challenges related to residential energy labeling that the states and other organizations identified. Finally, the report concludes with a summary of next steps and potential opportunities for future collaboration.

### 1. Lessons Learned from State Experiences with Residential Energy Labeling

The first section of the agenda included state presentations regarding residential energy labeling efforts and lessons learned.<sup>3</sup> Three states—Vermont, California, and Massachusetts—were invited to present summaries of their efforts. The other seven states were offered the opportunity to provide informal updates. This section summarizes the state updates.

#### A. Vermont

Richard Faesy of Energy Futures Group and Emily Levin of Efficiency Vermont presented on Vermont's residential energy labeling efforts. In 2013, the Vermont Legislature passed Act 89, which tasked the Vermont Public Service Department—the State Energy Office—to create a working group to study energy rating and disclosure. The Public Service Department and the working group were required to submit a report to the legislature by December 15, 2013 and to develop or select “one or more tools that can be used to generate the energy rating.” Funding for the report was provided by Efficiency Vermont and the Public Service Department.<sup>4</sup>

The Vermont working group organized a comprehensive stakeholder process, considered several alternatives, and conducted consumer testing. The Vermont experience and lessons learned provide useful context for other states considering residential energy labeling.

The key points discussed by the Vermont representatives included:

- The Vermont labeling effort is a voluntary program that is moving towards a statewide approach. The state wanted a solution that could meet the needs of several independent audit programs: Weatherization Assistance Programs, Efficiency Vermont, Vermont Gas, and NeighborWorks of Western Vermont (a DOE Better Buildings Neighborhood Program grantee).
- Vermont's goal was to have audit/rating costs total approximately \$250. This is one reason why the RESNET Home Energy Rating System (HERS), which generally costs \$500 - \$1,000 in Vermont, was not chosen for the labeling of existing buildings, even though it has been used extensively in new homes.

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<sup>3</sup> See Appendix C for the full agenda.

<sup>4</sup> The full report is available at: [http://www.energyfuturesgroup.com/wp-content/uploads/2011/08/Vermont\\_Energy\\_Label\\_Report\\_to\\_Legislature\\_12-13-13.pdf](http://www.energyfuturesgroup.com/wp-content/uploads/2011/08/Vermont_Energy_Label_Report_to_Legislature_12-13-13.pdf)

- The stakeholders in Vermont concluded that there is no “one right way” to develop a labeling program for the state. Rather, the Vermont labeling stakeholders envision relying on a multi-pronged approach that includes the following:
  1. Develop and make available a voluntary energy score and label that can be displayed within the MLS;
  2. Describe the energy features of the home accurately in the MLS system;
  3. Gather and provide previous utility bills as part of home rental, sales, and purchases; and
  4. Recognize energy efficiency program achievement with certifications that conform to national guidelines so that they may be included in the MLS, used with existing appraisal tools, and are meaningful to mortgage underwriters.
- Vermont eventually opted for a primary metric of an asset- and site energy-based MMBtu/year<sup>5</sup>, which provided sufficient granularity and fit well with other labeling efforts in the region (Massachusetts). While consumers responded positively to both the MMBtu/year metric and the DOE Home Energy Score 1-10 index, consumers preferred the MMBtu/year metric overall.
- Vermont decided to have three metrics on the label: MMBtu/year; estimated energy costs in total and by fuel type; and the 1 to 10 DOE Home Energy Score. Vermont is in negotiations with DOE regarding using the Home Energy Score tool to generate these three metrics by linking with the various auditing tools across the state.
- The Vermont working group put considerable thought into how to integrate a scoring tool across multiple audit programs and link residential energy labeling data with the MLS and appraisal systems. While these are longer-term issues, states that are exploring labeling efforts should consider them early on in the process.
- Vermont is also developing a governance structure for the residential labeling program to provide coordination and make decisions about program design and implementation.
- In order to utilize the DOE Home Energy Score and meet its program requirements, Vermont anticipates ongoing costs related to customizing the tool for Vermont, training, quality assurance and quality control, data management, and reporting. Efficiency Vermont and other organizations involved in the labeling program will share these costs.

### **B. California**

Bruce Mast from Build It Green presented on California’s residential labeling program. The California Home Energy Rating System (CA-HERS) is separate from the national RESNET HERS system. The CA-HERS index is based on a score of 100 equaling a standard 2008 home. Lessons learned from the California experience include the following:

- California’s residential energy labeling effort has been active for over five years.
- The California program’s roll-out was done on a voluntary basis. Overall, the rollout has experienced numerous challenges, including that the initial software was over-predicting the energy savings that could result from energy efficiency upgrades.
- Approximately 8,000 homes in California have been labeled to date. Most of these ratings were subsidized with Recovery Act funds.
- The last few years have averaged roughly 850 ratings per year. A number of these ratings are associated with homes that receive energy efficient mortgages (EEMs), which require CA-HERS ratings.
- The ratings have been implemented through the CA-HERS Rater network.

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<sup>5</sup> An “asset-based” score includes the energy features of the home, such as the envelope and HVAC equipment, and usually averages operational conditions, such as occupancy levels and weather.

- California is currently preparing a draft action plan that will address data management, energy efficiency considerations at the time of home sale, mandatory disclosure approaches, and other issues.
- California has used one tool, EnergyPro, for generating CA-HERS scores. EnergyPro was originally a code compliance tool for new homes. Utilizing the tool in the existing homes market has proven challenging.
- Moving forward, California is considering changing the approach from one tool (EnergyPro) to several, given that the state has not found one workable tool. The goal in California is to ensure that the tools can predict, within a certain range of error, actual utility bills.
- The California experience illustrates the complexity of developing a residential labeling effort. Part of the complexity has been due to layering several program elements and requirements onto the labeling program, including multiple quality assurance visits and contractor requirements that took time away from selling jobs.

### **C. Massachusetts**

Ian Finlayson from the Massachusetts DOER provided an update on Massachusetts' residential energy labeling initiative. The Massachusetts approach was initially informed by labeling efforts from several other countries, including Denmark and Austria, and later on by early labeling efforts in Oregon. HERS ratings have been used in new construction energy efficiency programs in Massachusetts for over a decade, and as part of Massachusetts 2009 stretch energy code, a HERS rating for new homes was required. Last year, over 6,000 of the 15,000 new homes in the state received a HERS rating, with an average score of 59. Massachusetts also began a residential labeling pilot project for existing homes in 2010, as part of the four-state effort funded by a DOE U.S. State Energy Program competitive award. After spending several years developing an approach that integrates with the existing Mass Save program and the utility energy efficiency program vendors, Massachusetts has been providing energy scores for existing homes over the past 12- to 18-months in targeted communities.

Key points mentioned in the Massachusetts presentation included:

- Given state policy goals, integrating a "carbon footprint" metric was important to Massachusetts. This metric is considered a similar but more relevant alternative to source energy consumption.
- Massachusetts settled on the site energy MMBtu/year metric for several reasons, including:
  - An absolute scale was preferable over an index or relative scale (such as "A through F"). Experiences of some European countries illustrated that these types of scales were not transparent and could be vulnerable to pressure to realign the scoring system.
  - MMBtu/year is a foundational metric from which other metrics can be derived.
  - MMBtu/year is durable, which is a priority for the central metric.
  - MMBtu/year does not favor large houses over small houses, which is not the case for metrics that are relative to square-footage (e.g., EUI, HERS ratings, etc.).
- Rather than dictating a specific scorecard layout and graphics, Massachusetts has determined standards related to information and metrics that must be present on the scorecard. Individual energy efficiency program implementers can make marketing and design decisions.
- In regards to the tools used to generate the metrics on the energy label, Massachusetts is supportive of setting performance standards for the modeling tools and allowing multiple tools to generate the energy labels and metrics.
- Similar to Vermont, HERS was not a viable option for an existing home rating. This was due to HERS costs and also because some raters were not comfortable using HERS on existing homes,

as the accuracy of certain inputs (e.g., levels of insulation) is much harder to determine in existing homes compared to new construction.

- Massachusetts also concluded that having more than one metric is acceptable. Current scorecards in the field display an MMBtu/year metric as well as a carbon footprint score and an estimate of total energy costs for the home.
- Part of Massachusetts' vision is to eventually merge the existing homes ratings with ratings for new construction based on HERS. The challenge of creating a system that works for both new and existing homes will be present in other states, as well.
- CSG and Honeywell, the firms that conduct energy audits and produce energy labels for existing homes under the Mass Save program, have embedded the scoring ability in their home audit software and can now generate the labels with a push of a button.
- Massachusetts is beginning to think about how to best handle long-term storage of the energy labeling data.
- A priority moving forward is to engage the real estate community and make them aware of energy labeling as a potential selling point. Massachusetts is currently conducting a small number of real estate professional and appraiser trainings on energy efficiency to gauge the level of interest.
- Massachusetts is also exploring how to incorporate labeling strategies to address the low-income sector.
- Massachusetts stressed that the unit of geography that they believe homeowners are concerned about in regards to energy labeling is the "neighborhood," as opposed to other programs that strive for national comparisons, such as the DOE Home Energy Score. Massachusetts is concentrating on producing consistency in local jurisdictions served by auditors from a specific utility vendor rather than on having regional or national consistency in the modeling tool that produces the energy label. Part of the reason for this is that most consumer real estate decisions occur on a neighborhood level rather than regionally or nationally. Additionally, behavioral programs such as Opower's have demonstrated that relevant local points of comparison are effective at motivating homeowners to act.
- Massachusetts has seen modeling tools improve and suggested that we may reach a point where there is as much variability between different auditors using the same modeling tool as there is variability between different modeling tool results used by the same auditor. Both of these variances are worth tracking and testing against actual customer usage.

#### ***D. Additional State Updates***

The other states represented at the meeting included Alabama, Arkansas, Missouri, Oregon, Florida, Connecticut, and Washington. This section provides brief updates on the residential energy labeling activity in each of these states.

- The **Alabama Department of Economic and Community Affairs** participated in the four-state energy labeling pilot that NASEO helped coordinate. The state has deployed energy labeling in the pilot area communities of Huntsville and Birmingham as part of the AlabamaWISE program. Alabama would like to expand voluntary energy labeling outside of the pilot area as AlabamaWISE spreads across the state. The state would like to study how energy labeling can be used as a valuation tool for appraisers and real estate professionals and what possible support labeling can provide in enforcing building energy codes. Additional funding is necessary to explore these options.

- The **Arkansas Energy Office** proposed the inclusion of the HERS rating and an energy disclosure provision in the state’s residential energy code but this proposal ultimately was not approved by the legislature. From Arkansas’ perspective, the philosophy of states determining their approach is an important element to this discussion. However, it would be advantageous for there to be consolidation around standards that states can adhere to, as has been done for vehicles and large appliances. Standards would help provide consistency and help better leverage resources. Arkansas will be promoting voluntary labeling through its programs and pushing labeling out in the market through education and outreach, possibly utilizing the DOE’s Home Energy Score to power an Arkansas-specific label.
- The **Connecticut Department of Energy & Environmental Protection** has decided to integrate the DOE’s Home Energy Score into the state’s residential energy assessment program, Home Energy Solutions. Beginning in the second quarter of 2014, the state will be working with a group of qualified energy assessors to provide scores to residents when they participate in the program. During this rollout period the state, program administrators, and auditors will work together to observe and test the participants’ understanding and acceptance of the Home Energy Score. By the third quarter, every single-family home that has an audit performed through the Home Energy Solutions program will receive a Home Energy Score. If the energy assessor has internet connectivity he/she will be able to produce the score onsite at the time of the visit. In 2013, over 26,000 residences in Connecticut received an audit from the Home Energy Solutions program.
- The **Florida Office of Energy** recently became engaged in this issue because of legislative changes. The state previously had a sole provider for residential energy ratings. The legislation was changed to allow other rating providers to operate in the state. For example, Building Performance Institute (BPI) has now partnered with the DOE Home Energy Score program to offer the Home Energy Score in Florida.<sup>6</sup>
- The **Missouri Division of Energy** is still in the early phase of its intended home energy certification program. Missouri is proposing to have a Gold Certificate for homes with the lowest energy usage and a Silver Certificate for homes with “significant” energy efficiency improvements or a majority of cost effective measures performed. Missouri described five questions that it has been grappling with and encouraged other states or meeting participants to provide insights regarding those questions (see Appendix D for the full list of questions). NASEO made the point that these questions are illustrative of concerns of other states.
- The **Oregon Department of Energy** is currently undergoing a rule-making process that will adopt a home energy performance score system and add training and certification requirements for home energy assessors who use the system. These requirements will ensure competency and consistency in the assessors that conduct home energy audits and provide home energy performance scores. To date, two tools have been utilized in the state: a tool developed by Energy Trust of Oregon, which is utilized within the service territory of Oregon’s four largest utilities, and the U.S. DOE Home Energy Score, which is utilized by municipal, cooperative, and public utility districts in the state. Moving forward, the state is working to ensure consistency for consumers while allowing choice in the marketplace.

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<sup>6</sup> For more information, see [http://www.bpi.org/professionals\\_rater.aspx](http://www.bpi.org/professionals_rater.aspx).

- **Washington State Department of Commerce and Washington State University Energy Program** participated in the four-state pilot that NASEO helped coordinate. The state is attempting to evaluate whether integrating energy rating and labels into the audit process caused homeowners to be more likely to invest in upgrades and to have larger investments when doing upgrades. This will help the state determine next steps, if any, in terms of residential energy labeling.

## 2. National Organizations Involved in Residential Energy Labeling

In addition to states sharing their residential energy labeling activities and priorities, a secondary goal of the meeting was to provide context on other national organizations active in this space. This section summarizes the energy labeling activities of these other organizations:

- **BPI** reiterated their engagement in Florida mentioned in the previous section. While the BPI partnership with the DOE Home Energy Score will initially focus on Florida, BPI will eventually offer the scoring opportunity to contractors across the country. BPI will coordinate closely with existing Home Energy Score Partners and DOE as the BPI Rater Program develops. Additionally, BPI representatives described that they were involved in a similar residential energy labeling meeting approximately four years ago and one of the key conclusions they came to was that the energy label should be produced at no cost following an energy audit.
- Most meeting participants were familiar with **DOE Home Energy Score** program. The DOE label provides a 1 to 10 score that is meant to be transferable across the country. The Home Energy Score is an asset label and does not factor in plug-load use; it takes into account the characteristics/features of a home that would typically convey at point of sale. DOE recently upgraded the *scoring tool* (which produces the 1 to 10 score) and retested the tool using a set of 1,000 homes with utility bill data. Individual energy auditing or other software can connect with the DOE Home Energy Score tool through an application programming interface (API). All Home Energy Scores must be produced through the DOE scoring tool, due to concerns about consistency if other software tools were allowed to produce Home Energy Scores. DOE is also involved in several academic studies that should help inform energy labeling efforts, including a study on the value of recognition programs.
- **Earth Advantage** has been active in residential energy labeling since 2006 when it started working in Oregon. Earth Advantage also collaborated on the four-state pilot with Massachusetts, Alabama, Washington, and Virginia. While Earth Advantage originally developed a version of an Energy Performance Score label that was implemented in several states and other jurisdictions, the non-profit has recently shifted to focus on supporting states and jurisdictions to develop customized energy labeling policy and programs based on local needs and market conditions. Earth Advantage is currently drafting a regional policy playbook for residential energy labels in the Pacific Northwest.
- The **U.S. Green Building Council's** residential unit is developing an existing homes platform that will utilize market segmentation to prescribe residential energy efficiency projects based on what consumers value and on demographic information. In future versions, the platform will include areas such as water efficiency, indoor air quality, and waste/recycling.

- The DOE **Home Performance with ENERGY STAR** (HPwES) program is currently researching residential recognition and labeling efforts. HPwES has formed a workgroup on this topic and sees potential to link efforts with the group convened at the NASEO meeting. The HPwES and DOE Home Energy Score programs are exploring how to have a consistent methodology for recognizing homes that make energy efficiency improvements and for recognizing homes that have exceptional performance. Additionally, HPwES is organizing a series of meeting in concert with the ACI conference at the end of April, 2014.
- The **National Home Performance Council** provided a brief overview of BPI-2101, a new BPI data standard that identifies a set of information to be collected and included in a certificate at the completion of a whole house energy efficiency upgrade or single-measure efficiency improvements. The standard will provide homebuyers with access to consistent, comparable information about energy efficiency features. The standard is also aligned with both the Appraisal Institute's Green and Energy Efficient Addendum and the Real Estate Transaction Standard (RETS), which will allow easy transfer of data from programs to actors in the real estate value chain. A recent report co-authored by the National Home Performance Council and Elevate Energy provides more detail about how the standard can be used.<sup>7</sup>
- **RESNET** has a longstanding residential energy rating tool, the Home Energy Rating System (HERS) index. The HERS index is a scale in which 100 represents a house compliant with the 2006 International Energy Conservation Code (IECC) and 0 represents a zero-net energy home. In 2013, 218,864 homes were rated on the HERS index, with the average score of 64.<sup>8</sup> HERS has generally been used in new construction, although it was originally developed to assist with energy efficient mortgages for existing homes and is still used for that purpose. An important development in the final 2015 IECC residential energy code was the allowance of a HERS rating to serve as a compliance path, with specific HERS index targets by climate zone.

### 3. Group Discussion Regarding Priorities and Challenges

The second segment of the meeting was devoted to discussing immediate and long-term priorities for residential energy labeling programs, as well as current barriers to pursuing those priorities. This section of the report summarizes the themes that were highlighted by State Energy Offices and other labeling organizations.

- **Defining priorities and identifying tradeoffs is a necessary exercise.** The meeting participants stressed the importance of defining shared or unique priorities related to residential energy labeling as a foundational element to these discussions. Overall, the participants generally agreed on the following priorities:
  1. Energy scores should be consistent and reliable.
  2. The energy label should be based on the home's energy assets, such as the envelope and HVAC equipment, and not depict differences in operations based on the occupants.<sup>9</sup>

<sup>7</sup> See [http://www.elevateenergy.org/wp-content/uploads/Unlocking\\_the\\_Value\\_of\\_an\\_Energy\\_Efficient\\_Home\\_FINAL.pdf](http://www.elevateenergy.org/wp-content/uploads/Unlocking_the_Value_of_an_Energy_Efficient_Home_FINAL.pdf) for the full report.

<sup>8</sup> See <http://www.resnet.us/blog/demand-for-home-energy-ratings-soar-in-2013-up-70-from-2012/> for state-by-state information.

<sup>9</sup> An important distinction is that labeling approaches need to decide whether to include operations at all (such as providing an average based on the house's characteristics) or to remove the operations/plug-load components completely. Some state/jurisdictions might opt to supplement an asset label with operational information, such as details on the previous occupant's utility bills.

3. The energy label should be delivered at a reasonable cost to the homeowner (\$0 to \$250 was the average range mentioned).
4. The label should be simple enough for homeowners to understand, yet granular enough to depict differences in the market.
5. The label should help motivate homeowners to make more frequent and more in-depth energy efficiency upgrades than take place in the absence of the label.
6. The label should be able to be leveraged during a real estate transaction or time-of-sale.

While most meeting participants agreed on this basic list, there are apparent differences in priorities. For example, the definition of “consistent and reliable” can vary. The goal of the DOE Home Energy Score is to have a consistent and reliable tool across the country, while states such as Massachusetts have emphasized consistency and reliability at a neighborhood or state level. Additionally, some of these priorities compete with one another. For example, consistency and reliability might be sacrificed in order to keep costs low. While each state/entity involved in energy labeling will move forward based on their unique priorities, the organizations and states involved would benefit from common interests and standards when those can be agreed upon.<sup>10</sup>

- **MMBtu/year is a foundational metric.** Based on the experience of several states, most notably Massachusetts and Vermont, estimated MMBtu/year consumption seems to be emerging as a core metric for residential energy labeling. There was strong consensus from the meeting participants, including a number of states and DOE representatives, that MMBtu/year is a foundational metric from which other metrics can be derived. Given it is an absolute scale and not an index, MMBtu/year is less vulnerable to being manipulated and it will likely prove very durable over time. Consumer testing in Vermont concluded that homeowners can understand this metric and appreciated the granularity it provided. While some states or programs might opt to utilize a more simplified metric on the energy label or MLS listing, such as the DOE 1 to 10 scale, being able to also provide an MMBtu/year metric might also be an important part of the labeling process. Challenges with the MMBtu/year metric include determining whether it should be an estimate of site energy or source energy, educating homeowners on the meaning of MMBtu/year, and ensuring that the modeling software used to calculate the metric is sufficiently accurate.
- **Addressing differences in ratings for new and existing buildings is an on-going task.** There is currently a divide between energy ratings for new construction and ratings for existing homes. While HERS has a majority of the market share in new construction, Massachusetts and Vermont concluded that HERS is not a viable option for existing homes given cost considerations and challenges in obtaining certain HERS inputs (e.g., wall insulation levels) in existing homes. These states are hoping to potentially utilize their existing homes metrics (MMBtu/year) in new homes by providing the MMBtu/year score alongside a HERS score.
- **The label should include reference points.** While at this time there is no consensus regarding the “best” approach for designing an energy label, one area of agreement is that the label should include reference points based on the main metric(s) chosen. Homeowners care about how they compare to their neighbors. For example, for the MMBtu/year metric, the label should show points such as “the average score for similar houses in your neighborhood/state”

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<sup>10</sup> For an example of program criteria and priorities, see Appendix E.

and/or “the average new home built to the current energy code.” States can design these reference points based on broader policies, such as statewide targets for energy reduction in existing buildings. The idea of providing comparisons to neighbors should extend beyond the label itself and also influence other program marketing and sales tactics.

- **Disagreement remains regarding whether a certain energy score needs to be produced only by one tool or if it is acceptable for multiple tools to produce the energy score, within a certain degree of accuracy.** For example, the DOE Home Energy Score can only be produced using the DOE scoring tool.<sup>11</sup> Local programs can link audit software with this tool via an API, transfer the required inputs into the DOE scoring tool, and produce the 1 to 10 Home Energy Score and label. States would need to develop the infrastructure to support the API process. The advantage to this approach of having only one tool that can produce the DOE Home Energy Score is that it creates consistency across all Home Energy Scores.

An alternative approach would be for the energy score developer or labeling program implementer to set standards that other tools would have to meet in order to produce that energy label. In Massachusetts, the two utility vendors involved in rating existing buildings utilize distinct, proprietary tools to produce the MMBtu/year score. Outside the utility vendor territories, CakeSystems<sup>12</sup> is used by a large home performance contracting company, Next Step Living, to produce the MMBtu/year score. The state approved these three tools given their degree of accuracy. Furthermore, Massachusetts has seen more variability in the energy rating results based on differences across individual auditors as compared to differences across distinct rating tools. The advantage to this approach is that it could produce more competition to develop new, improved tools that can produce the desired score(s).

- **Other types of metrics not related to home energy consumption will eventually enter these conversations.** In Vermont, the idea of a “transportation energy rating” was raised during conversations about the residential energy label. The group agreed to explore this idea further in the future. Additionally, metrics related to indoor environmental quality or comfort might need to be integrated into energy labeling. However, the participants in the NASEO meeting generally agreed that there should not be one metric that attempts to aggregate all of these types of items. While this would be a simpler approach, aggregation would dilute the utility of the individual metrics. Instead, the real estate market, states policies, and residential energy efficiency programs will elevate additional metrics<sup>13</sup> that are important to communicate to homeowners or include in MLS listings. All of these metrics, both energy and non-energy, will require homeowner education.
- **Factoring in solar energy production will be necessary moving forward.** As solar PV and water heating continue to expand and decrease in price, it will be important for energy labeling programs to take renewable energy production into account. The HERS index already factors in renewable energy production. From an economic and policy perspective, most parts of the country continue to identify energy efficiency as an important prerequisite to investing in

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<sup>11</sup> This example uses the Home Energy Score for illustrative purposes but the example extends to other types of scores or metrics, such as an MMBtu/year calculation or home energy costs.

<sup>12</sup> CakeSystems is a software platform that was developed by Earth Advantage.

<sup>13</sup> One illustrative example is the well-known “Walk Score.” This metric has been integrated into MLS listings and real estate professionals pay approximately \$8 million out of pocket for this benefit, given how important they know the metric is to the public.

renewables; however, houses that do produce solar energy should be recognized in labeling efforts that include net annual energy consumption or utility costs.

- **Concerns were raised regarding the durability of labeling programs.** One state representative that has worked with DOE extensively described that, in the past, DOE has frequently changed priorities or altered programs, which has had negative consequences in the market. There is a risk that this could happen to the DOE Home Energy Score program and it remains to be seen how durable the program will be. While certain federal initiatives, such as EPA's ENERGY STAR program, have proven durable over decades, DOE does not have similar longstanding programs. On the other hand, DOE has committed significant resources and staff time to the Home Energy Score program and it appears to be a priority of the current DOE leadership and staff to create a successful, long-lasting program. Furthermore, the durability concern extends beyond federal programs. Utilities, non-profits, businesses, and state and local governments that design, implement, or support energy labeling programs are all vulnerable to durability concerns to varying degrees.
- **States need to make cost/benefit judgments as part of their decision process before starting these programs. Further evaluation of labeling programs would provide information to states to would inform their decisions.** At current prices, subsidizing energy labels for all existing residential buildings would cost states a substantial amount of money. However, residential energy labels are part of state market transformation efforts and many states have invested in labeling as a key element to their broader existing buildings strategy. The hope is that over time labels will become more commonplace and other market forces (e.g., real estate transactions) will allow states to reduce their investments in spurring energy labeling. States may also be able to align common interests in multi-state or regional approaches to ramp-up efforts and reduce developmental costs. Additionally, residential energy labeling programs should attempt to integrate reasonable levels of impact and process evaluation in order to determine the program's effectiveness and collect homeowner feedback. While the true evaluation of these programs will likely occur once real estate markets have a critical mass of labels, program implementers will benefit from insightful evaluation processes in the meantime.
- **States need to think long-term about energy labeling efforts and their costs, especially in early program design and implementation stages.** States considering developing a residential energy labeling program need to have an understanding of long-term funding, staff, and technical needs up-front. The more states can develop local support and capacity to manage and operate residential energy labeling programs, the less risk they will take on regarding long-term durability, as reliance on external partners will be minimized.
- **Program elements such as data storage and data transfer—while longer-term concerns—should be considered during initial program design, as they have significant technical and resource needs.** States such as Massachusetts that are generating thousands of existing home energy labels are beginning to think about how to track these labels in a database. Part of the vision of residential energy labeling efforts is to link with local MLS systems and influence the appraisal and lending communities. Additionally, the process for generating energy labels can add programmatic cost. For example, establishing an API to transfer data and generate an energy label will likely require in-house technical expertise or an outside consultant. Programs should factor in all of these considerations when creating their design.

In order to bring consistency to data transfer in the residential home performance industry, BPI—working with partners such as the National Home Performance Council and Elevate Energy—has published several standards meant to help clarify and facilitate the transfer of data related to home-performance programs.<sup>14</sup>

- **Residential energy labeling efforts have come a long way in the past several years and there is excitement about the potential to continue to evolve and improve labeling approaches.** Meeting participants stated that the residential energy labeling space has greatly matured in the past several years. One of the goals of energy labeling, to value energy efficiency in the real estate market, is still being pursued. There is a necessary process of integrating the energy scores into the MLS system and then achieving a large enough presence of scores in a state or jurisdiction for those scores to have an impact on the market. Over the next several years, the hope is that specific states or jurisdictions will begin to see this critical mass develop and evaluating those markets will allow stakeholders to understand what is working and what improvements still need to be made.

#### **4. Next Steps and Future Collaboration**

The meeting participants agreed that the state agencies and organizations represented are in a position to provide leadership and forward-thinking on the topic of residential energy labeling. NASEO staff stated that they were encouraged by the meeting and hope that it is the beginning of closer coordination on the topic of residential energy labeling. The goal moving forward is that the organizations working on labeling at the national level will collaborate more closely and ensure that states are provided with objective, complete information and options in order to make the best decisions for their policies and programs.

There was consensus that the group, or some configuration of it, should continue to communicate and meet in-person periodically. Several upcoming meetings were identified as potential opportunities to continue the conversation, including the ACI Conference, ACEEE Summer Study (where several meeting participants will present on this topic), or NASEO's September 2014 Annual Meeting in Savannah, Georgia. Another suggestion was holding a stand-alone meeting in the May/June period.

While this first meeting intentionally tried to avoid too much focus on the appraisal, real estate, and lending industries, many participants acknowledged that they are working with these industries and involving them more in the future may be advantageous.

NASEO committed to providing a summary report following the meeting, facilitating information exchange, and coordinating future communication with the group.

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<sup>14</sup> The relevant BPI standards are meant to do the following:

- 1) Facilitate the transfer of home-performance related data between any party involved in a home performance program (BPI-2100: Standard for Home Performance-Related Data Transfer or HPXML).
- 2) Facilitate the exchange of information and data among all actors in the home performance industry by providing a standard vocabulary for describing terms related to buildings, energy consumption, and energy conservation measures (BPI-2200: Standard for Home Performance-Related Data Collection). Each of the data elements defined in BPI-2200 can be transferred via HPXML. For more information on BPI-2100 and BPI-2200, see: <http://www.hpxmlonline.com/>.
- 3) Standardize the set of data elements for certificates that document the completion of home energy efficiency upgrades (BPI-2101: Standard Requirements for a Certificate of Completion for Residential Energy Efficiency Upgrades). This standard was described in Section 2 above within the National Home Performance Council update. For more information, see: [http://www.bpi.org/news\\_expansion.aspx?selectedID=1532](http://www.bpi.org/news_expansion.aspx?selectedID=1532).

## Appendix A: Definitions

For the purposes of this document, the following definitions are used:

1) **residential energy labeling/residential energy rating/residential energy scoring**: the process of gathering information on a home's energy features, analyzing a home's level of energy efficiency, and providing specific, quantifiable energy metrics from that analysis to a person, usually a homeowner or potential homebuyer.

- The three phrases **residential energy labeling, residential energy rating, and residential energy scoring** are often used interchangeably. In this document, we opt for "residential energy labeling" in most cases, in order to differentiate with the alternate meaning of "energy rating" or "energy score" below.

2) **energy metric**: the unit of measurement for the energy score that is produced from the energy labeling process. Examples include estimated MMBtu/year; a number on the HERS index (usually between 0 and 150); a number on the DOE Home Energy Score index (between 1 and 10); or estimated energy costs per year (dollars).

3) **energy score/energy rating**: the specific value for the energy metric(s) of choice. For example, if the metric is MMBtu/year, the **energy score** or **energy rating** could be "120".

4) **energy label/energy scorecard**: the visual representation or document that displays the energy score(s)/energy rating(s). The **energy label** can include other information, such as reference points. In this document, we primarily use the term **energy label** rather than **energy scorecard**.

5) **energy label reference points**: predetermined energy scores displayed on an energy label to place the house's energy score in context. For example, for the metric MMBtu/year, the energy label might show "130 = average home in your area" as a reference point.

On the next page, the energy label for the Vermont Home Energy Score is used to illustrate these definitions.



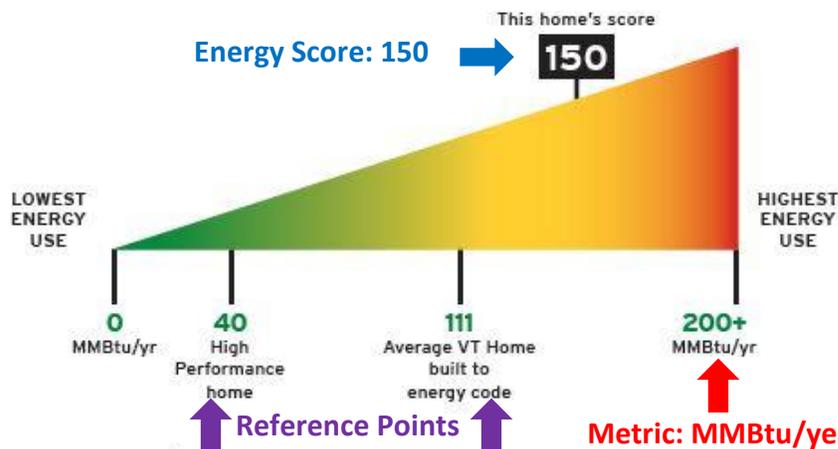
The Vermont Home Energy Score (VHES) ranks a home's energy consumption based on typical occupancy and weather.

*The lower, the better!* A low VHES identifies a home in Vermont as energy-efficient, with lower energy costs and energy usage.

**150**

## THIS HOME'S SCORE

The VHES\* shows the estimated total annual building energy use (electricity and fuel in MMBtu) of this home for one year. **The lower, the better!**

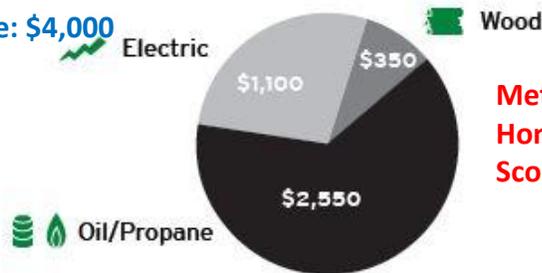


**\$4,000**

## ESTIMATED ANNUAL ENERGY COST\*

Based on fuels currently in use in this home.

Energy Score: \$4,000



Metric: Energy Cost (\$)

Metric: DOE Home Energy Score

## HOME INFORMATION

**Location:**  
123 Main Street  
Anytown, VT 05000

**Year built:** 2002

**Size of home (sq. ft.):** 1,723

**Heating fuels used in this home:** oil, wood

**Other energy features:**  
solar hot water

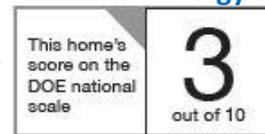
**Score issue date:** 6/23/13

**Assessor:**  
**Name:** John Doe  
**Phone:** 802-555-1111

The U.S. Department of Energy (DOE) Home Energy Score uses a 10-point scale to describe your home's efficiency—where 10 is most efficient.

For more information about this home's national score, visit <http://homeenergyscore.gov/5256788>.

Energy Score: 3



\*Energy use and costs are estimates only. Actual usage and costs may vary and are based on many factors such as weather and occupant behavior, including use of wood stoves. The Vermont Home Energy Score takes into account the energy-efficient features installed in the home on the date the Score was issued, assuming average occupant behavior. Actual energy use will vary depending on how the building is operated, and costs will vary as fuel prices change over time. MMBtu = 1,000,000 British thermal units (Btu) of energy.

## **Appendix B: Residential Energy Labeling Meeting Goals and Participants**

The goals of the labeling meeting held after the NASEO February conference were to:

1. allow states to share updates with one another and key stakeholders regarding their approaches to residential energy labeling;
2. discuss states' perspectives on the steps for developing a long-term strategy for residential energy labeling;
3. identify barriers to long-term scalability for energy labeling;
4. begin to identify the types of standards needed across various energy labeling efforts; and
5. develop next steps this group or others could take in order to further collaboration and address challenges to advancing residential energy labeling.

### **Meeting Participants**

Tiger Adolf, Building Performance Institute (BPI)

Todd Currier, Washington State University Energy Program

Richard Faesy, Energy Futures Group (Vermont)

Ian Finlayson, Massachusetts Department of Energy Resources

Joan Glickman, U.S. Department of Energy

Elizabeth Grimes, Alabama Department of Economic and Community Affairs

Andy Ginsberg, Oregon Department of Energy

Caroline Hazard, SRA International (supporting DOE)

Brian Henderson, NASEO

David Heslam, Earth Advantage

Ely Jacobsohn, U.S. Department of Energy

Patty Kappaz, SRA International (supporting DOE)

Robin LeBaron, National Home Performance Council

Emily Levin, Vermont Energy Investment Corporation (VEIC)

JD Lowery, Arkansas Energy Office

Bruce Mast, Build It Green (California)

Curtis O'Neal, MABTEC (sitting in for Lee O'Neal, RESNET Board of Directors)

Anthony Roy, Earth Advantage

Patrick Sheehan, Florida Office of Energy

Jessie Stratton, Connecticut Department of Energy and Environmental Protection

David Terry, NASEO

Christopher Wagner, NASEO (moderator)

Llona Weiss, Missouri Division of Energy

Larry Zarker, Building Performance Institute (BPI)

## Appendix C: Residential Energy Labeling Meeting Agenda

### 1. Overview of Meeting and Participant Introductions

- Review meeting agenda and goals for the meeting.
- Brief introductions

### 2. Where Have We Come From?

- Discussion of previous and current state activities related to residential energy labeling.
- Representatives from three states (California, Massachusetts, and Vermont) will kick off the session with an overview of how their energy labeling efforts have evolved over the past several years.
- All states are invited to share similar updates.
- Other meeting participants are invited to provide a summary of their engagement with residential energy labeling.

### 3. Where Are We Now and Where Do We Want to Go?

- State discussion of priorities/long-term goals for their energy labeling efforts, given other energy, environmental, and economic development goals.
- Identification of current challenges and potential long-term barriers to widespread adoption of residential energy labels.
- Questions to consider:
  1. What are the advantages/disadvantages of having different energy scores and labels in state/regional/national markets?
  2. How can we effectively link energy labeling for new-home construction with labeling for existing homes?
  3. What data storage and interoperability needs do we have now/will we have in the next decade?
  4. Do we need common standards for the metrics or other elements displayed on energy labels?

### 4. Break

### 5. Synthesis and Next Steps

- Identify any areas of common interest or potential collaboration that the group has uncovered.
  - Are groups/organizations already working on these priorities?
- Identify key questions or issues that need additional thought or research in order to be addressed.
  - Are there any forums/initiatives that currently exist that could help address these issues?
- Are there additional stakeholders/organizations that need to be part of this conversation?
- Are there any potential commitments participating organizations want to discuss?

## Appendix D: Missouri Questions

1. In what ways have the privacy concerns of homeowners been addressed with relation to state level home performance data and the potential to share this data using the BPI standards?
2. What is viewed as the minimum/critical dataset that should be included in a Multiple Listing Service (MLS) to be effective in providing relevant energy related data during the home transaction process?
3. Does anyone use or plan to use a QR code to link from a home performance certificate to a more detailed electronic certificate? This would allow more data to be communicated with only the inclusion of a digital image as a picture on MLS systems.
4. What tools or methods have been used to encourage and allow home appraisers to include energy cost savings measures in home valuations and what information is necessary to determine and support the increased value?
5. Is there a larger movement to consider utility costs as a portion of the qualifying ratios on standard mortgages underwritten by the Government Sponsored Enterprises GSEs similar to how home insurance and real estate taxes are included? If reduced energy costs are not recognized through lending processes as reducing the burden on a buyer and improving their ability to repay the loan, how should the additional value be marketed/realized?

If you would like to provide feedback to Missouri on these questions, please contact Llona Weiss:  
[llona.weiss@ded.mo.gov](mailto:llona.weiss@ded.mo.gov).

## Appendix E: Sample “Criteria” Used in Developing Residential Energy Labeling Initiatives

During the meeting, the Vermont and DOE Home Energy Score representatives shared lists of criteria they used when developing their respective residential energy labeling programs. These lists are provided as examples for reference.

**Vermont’s “Core Principles”** were developed in 2011 and many remain core principles today. Note that some of these principles are specific to commercial/institutional buildings:

1. Reasonable cost to end user (\$0-300)
2. Rating can be presented as a single number or letter to allow market comparisons
3. Accurate
  - a) Repeatable, predictable results
  - b) Tool predicts energy use close to how an average occupant would use the house
4. Makes recommendations for upgrades to focus on high-priority areas
5. Smooth process to pursue upgrades based on rating
  - a) Optional link to home inspection
6. Residential: Asset rating – based on features of home rather than occupant behavior
7. Commercial/Institutional: Operational rating - occupant-based
8. HERS-compatible: If different than HERS, can be translated or linked to HERS (HERS-lite)
9. Tiered on-ramp - allowing drilling deeper if desired for more accuracy
10. Ability to customize and maintain for VT

### **DOE Home Energy Score original four criteria:**

1. Information must be credible, reliable, and replicable.
2. Information must be transparent and easy to understand.
3. Implementation costs must be affordable.
4. Program must include effective quality assurance.