



# Regional Residential Energy Labeling Action Plan

April 2019







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## About NEEP

Founded in 1996, NEEP is a non-profit whose goal is to assist the Northeast and Mid-Atlantic region to reduce building sector energy consumption three percent per year and carbon emissions 40 percent by 2030 (relative to 2001). Our mission is to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities. We do this by fostering collaboration and innovation, developing tools, and disseminating knowledge to drive market transformation. We envision the region's homes, buildings, and communities transformed into efficient, affordable, low-carbon, resilient places to live, work, and play. To learn more about NEEP, visit our website at <http://www.neep.org>.

**Disclaimer:** NEEP verified the data used for this white paper to the best of our ability. This paper reflects the opinion and judgments of the NEEP staff and does not necessarily reflect those of NEEP Board members, NEEP Sponsors, or project participants and funders.

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## Executive Summary

Energy efficiency is a vastly underutilized low-cost resource with the potential to create large economic returns and carbon reductions. Building energy labeling helps solve some of the roadblocks faced by energy efficiency; yet recent experience has taught us that building energy labeling (especially residential energy labeling) has its own set of roadblocks. While residential labeling programs require investment to start and maintain, economic theory tells us that labeling programs should produce a return in the form of energy efficiency improvements. However, in reality, whether or not labeling programs actually produce a return has not been sufficiently proven in the United States. Without defensible evidence that residential labeling produces return on investment, or research into other non-energy benefits, program funders have diminished enthusiasm for continued support of labeling, especially in delivery models where the administrator has a regulatory obligation to deliver savings for investment of public funds.

In order to continue and expand residential labeling programs, the concept that residential energy labels drive energy efficiency improvements and provide added consumer protection must be proven with defensible evidence. Home energy labels provide transparency towards the energy costs of a home, and offering this information to homeowners or potential buyers can drive the connection between energy efficiency and cost savings. This can also help home buyers make better informed decisions about purchasing a home.

Pilot residential labeling programs can help generate the data necessary to develop a proof of concept; however, the strength of a pilot depends on both the study design and the participants involved. The majority of pilot programs conducted so far have not been designed to capture the necessary endpoint – whether or not homeowners pursued energy efficiency improvements after receiving the label. Pilot studies are further troubled by participant privacy concerns. Design of the privacy language should be aligned with the goals of program administration. Opt-in language can be used to decrease liability and increase customer trust; while opt-out language can be used to increase participation. Therefore, the ability of energy auditors to educate participants on the importance of data sharing, while maintaining participants trust is critical to collecting data in an ethical manner.

Proof of concept data is not only critical for maintaining support for residential labeling, it is also important for generating educational material for relevant stakeholders. Materials can be used to educate homeowners, utilities, landlords, and policymakers, which can increase participation in programs, expand programs, and lead to the creation of new programs. In the wake of insufficient proof from United States pilot data that residential labels produce a return, data and educational materials could be taken from international sources. For example, the European Union has required residential labels since 2009, and has evidence supporting the economic returns of residential labeling. Additionally, lessons can be learned from the development and implementation process taken in the European Union. However, the translatability between the European Union and the U.S. is not viewed the same by each stakeholder. Therefore, the decision to use international data should be based on whether or not the target stakeholder believes there is translatability.

Finally, proof of concept is critical for transitioning from a voluntary to a mandatory labeling scheme. At the state level, the proof of concept data drives legislation on a dual front; by increasing public support for labeling schemes, and by demonstrating the value of labeling schemes to policymakers. Collectively, this approach reduces policymakers' perceived risk of passing legislation mandating energy labels. As states start to pass



mandatory labeling schemes, this approach may drive federal action to adopt a national energy label for existing homes, similar to vehicles, appliances, and food standards labeling schemes.

- Educate stakeholders on the importance and value of labeling a home to ensure more informed decisions and actions to improve the efficiency of a home
- Increase robustness on future home energy studies and analyses by encouraging participation to achieve more data points; empowering homeowners' choice by using "opt-in" and "opt-out" language
- Provide trainings to real estate professionals to support transparency between potential buyers and homeowners

Ultimately, the path to successful widespread home energy labeling depends on overcoming a few key roadblocks. These roadblocks have been identified, and strategies for solving them have been crafted. In order to reach our energy and carbon reduction goals, we need to accelerate market transformation for energy efficiency, and mandatory labeling offers us the quickest pathway. While there are multiple pathways to achieve mandatory labeling, the fundamental first step is demonstrating the value of labeling. Therefore, the critical next step in creating a successful labeling program for the region is to conduct pilot studies that incorporate strategies contained in this report so that sufficient evidence can be collected demonstrate the value proposition of labeling.



## The Importance of Residential Labeling

Imagine you are purchasing a car and there are two identical vehicles listed for the same price. Which one costs more over its lifespan to operate? One way we might determine this is via a fuel efficiency label, which tells us the miles per gallon (mpg) of the car. Now imagine you want to purchase a house? What analogous metric would you use to compare lifespan costs to own and operate specific homes? This is where residential energy labeling comes in. Energy costs are often the highest expense homeowners or renters face in operating a home, but before home energy labeling, there was not a way to provide this information to consumers. Residential energy labeling is important because it helps consumers gain a better understanding of the complete cost of running their home.

Residential labeling increases the transparency of home energy costs by adding a simplified rating system for each home. The rating system informs owners, sellers, and potential buyers how the home performs in comparison to a standard, how the home compares to different homes, and how homeowners can make improvements. The easiest way to improve a home energy rating (or score) is to improve energy efficiency. Therefore, logic follows that a residential energy label likely encourages homeowners to invest in energy efficiency, encourages a preference in home buyers and renters for homes with better energy efficient features, and likely encourages builders to build more energy efficient buildings

### *Labeling is a solution to drive energy efficiency*

Energy efficiency is a low-cost energy resource that can help drive decarbonization by reducing the amount of energy needed to fuel buildings and homes. According to a study published in 2010 by McKinsey and Company<sup>1</sup>, strong investments in energy efficiency can result in over \$1.2 trillion in savings while simultaneously reducing U.S. energy consumption by 10 percent. Yet, this least-cost resource has not been utilized to its full potential by states throughout the region. This is due to a few economic issues, including the split incentive and turn-over rates. Energy labeling is one strategy to address both of these issues and subsequently increase the uptake of energy efficiency investments.

The split incentive is a problem that arises when one entity has the power to make decisions on behalf of another even though the decision-making entity typically does not reap the direct benefits. This problem is exemplified by residential energy efficiency both from the builder-buyer dynamic, and from the landlord-tenant dynamic. If energy efficient options for a new home construction are more expensive, builders have little-to-no incentive to pursue energy efficient design since it will increase the build cost, and the improvement does not directly affect builders since they are not paying the utility bill. Building energy codes, along with utility programs which offer incentives and rebates, have sought to solve this problem – and, to an extent, they have by setting minimum standards. Labeling can further solve this issue by adding economic value to energy efficient improvements. Labels add visibility to the energy costs of operating a home; therefore, because of this added market visibility, pursuing energy efficiency improvements makes the home market more competitive, which helps builders sell homes quicker, and for a better price.

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<sup>1</sup> [https://www.mckinsey.com/~media/mckinsey/dotcom/client\\_service/sustainability/pdfs/a\\_compelling\\_global\\_resource.ashx](https://www.mckinsey.com/~media/mckinsey/dotcom/client_service/sustainability/pdfs/a_compelling_global_resource.ashx)



Building codes set the minimum standard that buildings can be built to, but by adding a Home Energy Rating System (HERS) Index<sup>2</sup> to residential new construction, the efficiency of homes built beyond code can be highlighted with the value captured in the price of the home. Achieving a “low” score on the HERS Index equates to a higher level of efficiency with a zero being a zero energy home. The index accounts for assets such as equipment efficiency, solar generation, envelope air leakage, and wall insulation. Using this system provides a compliance mechanism, as well as an incentive, to build beyond code to increase the value of a home.

The landlord-tenant dynamic is yet another split incentive similar to the builder-buyer dynamic in that landlords can make energy efficiency investments, but given that they do not pay for the electricity costs, there is little incentive. Meanwhile, tenants, who do pay the energy cost, have little ability to make efficiency improvements as they do not own the property. Furthermore, even if landlords allow tenants to make improvements, tenants still have little incentive to do so because they do not own the improvements, which are instead tied to the property. Similar to the builder-buyer dynamic, residential labeling can help solve this dilemma by adding market transparency to the energy efficiency of homes. When the energy costs become transparent to consumers, landlords and builders have incentive to make energy efficiency improvements because these improvements make properties more competitive. In addition, renters can make a better-informed decision before committing to a lease.

Another reason energy efficiency is not being fully realized is due to low turnover rates for energy-impacting features like boilers, HVAC systems, large appliances, insulation, glazing, and even buildings themselves. For ease of explanation, we will examine the turnover rate issue through the lens of HVAC systems. Since HVAC systems have long operable lifetimes, the average HVAC stock is often years behind the most efficient HVAC systems on the market. A standardized system of energy labeling can help solve this issue by creating a secondary incentive to improve HVAC system efficiency.

Consider two identical homes listed on the market; one has a high efficiency HVAC system and the other does not. The home with the more efficient HVAC system will use less electricity and thus have lower operating costs. Therefore, adding an energy label will help clearly differentiate these two homes. Even though both homes are listed at the same price, the consumer can now clearly delineate between the true costs of each home. With an energy label, the home with the more efficient HVAC system becomes more competitive and could even increase in price. Therefore, a label adds value to the home via a way to label better efficiency in the HVAC system. This increase in home value could be viewed as a secondary incentive for early retirement of inefficient HVAC systems, since switching to an efficient system can increase the value of the home. Additionally, since homeowners tend to make improvements within the first couple years of owning a home, providing information on energy efficiency improvements through a label during the sales process, will take advantage of this window of opportunity.

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<sup>2</sup> <http://www.resnet.us/energy-rating>



## **Labeling Program Structure**

There are two ways to execute residential labeling schemes: voluntary labeling and mandatory labeling.<sup>3</sup>

**Voluntary:** This structure is typically presented in conjunction with energy efficiency programs offered by utility program administrators to program participants. This method provides transparency to homeowners when completing a home energy audit of the estimated annual energy cost and consumption before and after recommended energy efficiency upgrades. Programs using this method are typically targeting homeowners who are not looking to sell their homes, but may be interested in making upgrades to improve comfort and reduce costs. In these systems, re-scoring after upgrades are completed is important not only to ensure homeowners have a score accounting for completed improvements, but to determine if there are energy savings associated with the addition of the label. Updating efficiency measures for the home some months to years after the initial labeling and updating of the score can be used to provide utility attribution and determine the value proposition for the utility. This last part, however, has not been done for most voluntary labeling programs so far.

**Mandatory:** This structure is implemented at the city or state level where the governing jurisdiction requires a home energy label to be completed, often at time of listing or time of sale. Time of listing is a preferred method for market transformation because the information gleaned from the label can be provided to potential home buyers before purchasing a home. This allows home buyers to include this information in their decision-making process. Mandatory programs often generate a higher market participation level compared to voluntary programs

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<sup>3</sup> EMPRESS, <http://empress.naseo.org/mandatory-vs-voluntary-approaches>



## Residential Labeling in the Northeast

The status of residential labeling in the Northeast varies from state to state, and municipality to municipality. There are many different schemes across the region, almost all of which are voluntary. Because there are so many independently-organized schemes, a variety of labels is used, including: DOE Home Energy Score (HES), RESNET Home Energy Rating System (HERS) rating, ENERGY STAR Certified Homes (HPwES), and state-created stand-alone scorecards (which are often tied to the modeling engines of other labels like HERS or HES).

The assortment of labels used creates a lack of consistency from program to program. Comparing labels is complicated and often requires a detailed understanding of what each label is assessing. Recognizing that this lack of consistency has the potential to create confusion, the National Association of State Energy Officials (NASEO) created a helpful tool called EMPRESS.<sup>4</sup> The Energy Metrics to Promote Residential Energy Scorecards in States (EMPRESS) project is led by the Rhode Island Office of Energy Resources (RI OER) and is focused on advancing large-scale home energy labeling and harmonizing the multitude of energy scoring programs, all to better support market valuation of energy efficient homes. For more information on labeling programs throughout the region see Appendix 1<sup>5</sup>, and EMPRESS case studies<sup>6</sup> for examples beyond the Northeast, including examples at the city level.



### Status of Home Energy Labeling in Northeast States

State	History	Current
Connecticut	<a href="#">Statewide voluntary labeling scheme using HES for existing single family homes since 2015.</a>	Over 33,000 scores have been generated. CT also offers HERS ratings for new construction homes via <a href="#">Energize Connecticut Program</a> .
Delaware		Delaware offers ENERGY STAR certifications via Energize Delaware’s Home Performance with ENERGY STAR Program ( <a href="#">HPwES</a> )

<sup>4</sup> EMPRESS was developed by NASEO and the State of Rhode Island, with support from Arkansas, Massachusetts, Missouri, and Oregon, with funding from the U.S. Department of Energy (DOE) State Energy Program, <http://empress.naseo.org/>

<sup>5</sup> Supplemental document to this report. Not included in this document

<sup>6</sup> <http://empress.naseo.org/casestudies>

District of Columbia		D.C. DOEE’s <a href="#">EnergySmart</a> program offers home energy audits using ENERGY STAR criteria. The updated <a href="#">Clean Energy DC plan</a> calls for zero energy design standards for new smaller residential buildings by 2022.
Maine	2010 legislation: <a href="#">SP0357</a> required the Public Utilities Commission to develop a residential (and commercial) rating framework but has not yet been acted upon	
Maryland	<a href="#">MD has two voluntary labeling programs as of May 2018. Montgomery County, MD, has adopted a mandatory pseudo-label in 2009.</a>	<a href="#">EmPOWER Maryland</a> electric utilities offer Home Performance with ENERGY STAR and ENERGY STAR Certification for new homes, utilizing HERS ratings.
Massachusetts	<a href="#">HomeMPG</a> pilot program: provided free energy performance scores to homeowners in Western MA from 2012-2014 and offered incentives to increase scores.	MA is currently piloting the Home Energy Market Value Performance ( <a href="#">Home MVP</a> ) program as well as developing a home energy score card along with energy assessments to 1-4 family homes through <a href="#">Mass Save</a> .
New Hampshire	<a href="#">DOE SEP Grant</a> : partnership with Vermont via grant awarded to advance residential (and commercial) rating in both states set to kick-off in spring 2015	
New Jersey	<a href="#">Three county pilot</a> : Homeowners receiving an audit through NJ Natural Gas’s SAVEGREEN Project may participate in the Home Energy Score program	
New York	<a href="#">Home Energy Rating Disclosure project</a> : Ithaca-based NYSERDA pilot launched in 2014; additional research underway analyzing DOE HES and Pearl Certification statewide	
Pennsylvania	State has been discussing legislation, but no statewide programs of yet.	The <a href="#">PA DEP</a> promotes ENERGY STAR and HES.
Rhode Island	OER working groups: RI’s state energy office launched residential (and commercial) stakeholder groups in 2015 to advance development of statewide rating programs	Beginning 2018, <a href="#">EnergyWise</a> audits by National Grid will include a HES as part of audit



Vermont	HERS for code compliance since 1997. Efficiency VT statewide energy label implementation (includes DOE HES) since 2014: Act 89 created working groups to develop residential (and commercial) <a href="#">label recommendations</a>	Efficiency Vermont is currently developing a Home Improvement certification that mirrors its Residential New Construction certification.
West Virginia	Since 2013, West Virginia has been working to pass legislation that would have permitted the development of a statewide energy labeling program.	

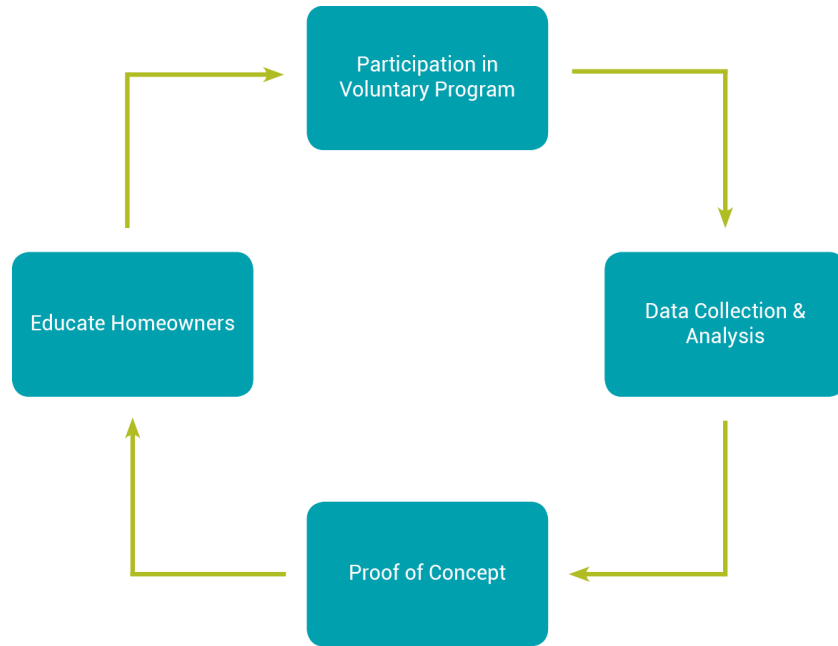
Updated March 2019

## The Cycle of Education-Participation-Collection-Proof

### *Proof of Concept: the end goal*

Rationale for the use of residential labeling centers on a proof of concept: labeling produces economic benefits in the form of decreased energy use and customer protection. As long as programs rely on energy efficiency funds, this proof of concept is critical in voluntary schemes because, without other sources of funding, the program must provide net benefits in order for it to be cost-effective and sustainable. Producing a defensible proof of concept involves a gradual feedback loop that requires constant input and thoughtful design. The process of attaining a defensible proof of concept requires three simple prerequisites: education, participation, and data. As seen below, each item builds upon the others, and collectively they form the foundation for a solid proof. Education of the value of a program drives participation, which permits for data collection, which allows for numerical proof that labeling can accelerate energy reduction in the form of energy efficiency improvements. However without a proof of concept, or data, the information necessary to create education tools is speculative at best.

Figure 1 Education-Participation-Collection Proof Cycle



### The Data So Far

Good data analysis forms the backbone of all proofs, and good analysis is strengthened by large robust datasets. Pilot studies are an ideal way to collect data, and the design of studies can make or break the data. Many pilot studies for residential labeling have been conducted, but none have provided the robust dataset needed to prove that labeling drives energy efficiency improvements.

A common mistake made in study design is failing to design studies that center on the desired endpoints, learning objectives, or goals. This mistake is the most common mistake seen in residential labeling pilots conducted to date. Labeling pilots have failed in this respect for one of two reasons:

1. The endpoint is not clearly defined

There are a variety of benefits from residential energy labeling: increased energy efficiency, improved property value, decreased end-user consumption, etc. While all benefits are worth studying, it is important to consider which endpoint provides the biggest justification for scaling up from a pilot to a city or state program. Often, these justifications are based on a jurisdiction’s market, a state policy goal, and the cost-effectiveness of the program. Regardless of what justifications are based on, measurable improvements in energy efficiency typically meet the objectives necessary to justify continuing a program.

2. The study is not designed to capture the endpoint

Once an insightful endpoint has been determined, the study needs to be designed to capture that endpoint. If the response to an intervention is not instantaneous, logic follows suit that a follow-up must be conducted to capture the endpoint. So far, pilot studies have been focused on the intervention, and





very few studies have conducted the adequate follow-up needed to determine if the intervention triggered the desired response.

Therefore, when establishing a pilot or program, it is critical to clearly identify the endpoint and ensure the program design is intended to capture the endpoint. The endpoint can often be thought of as the market transformation goal.

### ***Participation produces more data***

Participation is crucial to generating data; without any participants, you cannot conduct a study. Typically, with a larger sample size (number of participants), a data set has more statistical power to determine differences between pre- and post-intervention. Given that poor endpoint collection has prevented statistical analysis and, even though most residential energy labeling pilots have been small in size, it is still unknown if sample size is a roadblock.

One important consideration for participants is cost. Who bears the cost for the audit and label is an important factor that affects participation. Pilots that require homeowners to bear the cost of the audit and/or label often result in a lower participation rate, whereas, programs that offer audits and labels with no cost to participants will result in higher participation rates. These audits and labels can even be coupled with an existing service for no additional charge to customers. Designing pilots that reduce the financial burden of participation by offering audits and labels with little to no cost for customers is necessary to increase participation.

Beyond financial limitations, there is one other glaring roadblock to participation that some pilots are encountering: *privacy concerns*. In pilots that are designed to make energy labels available in the market, many participants are electing not to share their score. This not only reduces data points in the dataset, but it also removes part of the transparency that labels are designed to create. This problem is a two-fold problem involving both the language in the data sharing agreement and the information provided to participants.

Data-sharing language can be structured in an opt-in style (where, by default, participant data is not shared, and participants must agree to have it shared) or an opt-out style (where, by default, participant data is shared and participants can elect to not share it). In addition to different legal and regulatory implications, the difference between opt-in language and opt-out language can have large effects on participant attrition rate. In one program, adding opt-in language to the voluntary labeling program resulted in a 46 percent reduction in completed scores with home energy audits.<sup>7</sup> However, opt-in language may be favored if program operators seek to take a precautionary approach to sharing customer data as a strategy for minimizing liability. The decision to use opt-in language may also be driven by the desire to create a better foundation for building trust with participants, and establishing trust is critical to maintain involvement beyond pilot studies. In order to prevent a reduction in completed scores with opt-in language, it is important to train assessors to educate homeowners on how the data is being used and the value of opting-in. There is much debate concerning which language is better, so it is crucial to select language that ultimately matches the objective of the program. If the objective of the pilot is to generate large amounts of data to fill gaps, then using opt-out language may be more beneficial. Conversely, if the primary concern is a sense of trust among participants or if program operators seek to minimize liability, then using opt-in language may be ideal.

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<sup>7</sup> United Illuminating, Home Energy Score Opt-In data, Home Energy Solutions Program, November 2018



Regardless of language selection, a way to address attrition rates is through the information provided to participants regarding data-sharing. Providing better education about why the data is being collected and what data will be made public is critical to reducing attrition. Programs should inform participants that very little of the data being shared is actually new data (in that it was not already public). A significant amount of the information contained in the labels is already available through other sources like building permit registries and real estate disclosure forms. On top of that, the new information being collected is not personally identifiable information. Providing this knowledge to participants may increase trust in privacy protection (i.e. sharing home energy data will not divulge any personal information) while also reducing attrition rates. In addition, it is important to discuss with participants where the data will be shared. This will prevent the wheels of imagination from making presumptions about where the information will end up.

### ***Education Drives Participation***

Education drives participation by reducing participant concern, reinforcing participant benefit, and increasing project awareness. Education helps ensure participants have a clear understanding of requests and potential risks of their participation. As previously mentioned, educating homeowners about things like data privacy are important for building trust without reducing participation.

Education also helps encourage homeowner participation by informing the participants of benefits. While the idea of a pilot should be to collect endpoint data, the participants of these pilots are still gaining some benefits associated with the label. These benefits will also increase as the transition from pilots to full-fledged programs or policies happens. Energy efficiency improvements benefit homeowners by reducing their energy costs. Yet, the average homeowner likely does not know which improvements are best for his or her home. Energy labeling provides this information at virtually no expense. By communicating these benefits to homeowners, they will be more interested in participating in an energy labeling scheme.

Lastly, increasing awareness of a pilot program can spur participation simply because more people know the pilot exists. Often, homeowners in communities where pilots are being conducted are unaware that the pilot exists or that they can participate. Notifying homeowners in communities where pilots are being conducted can help increase participation.

### ***Getting the Data to the MLS***

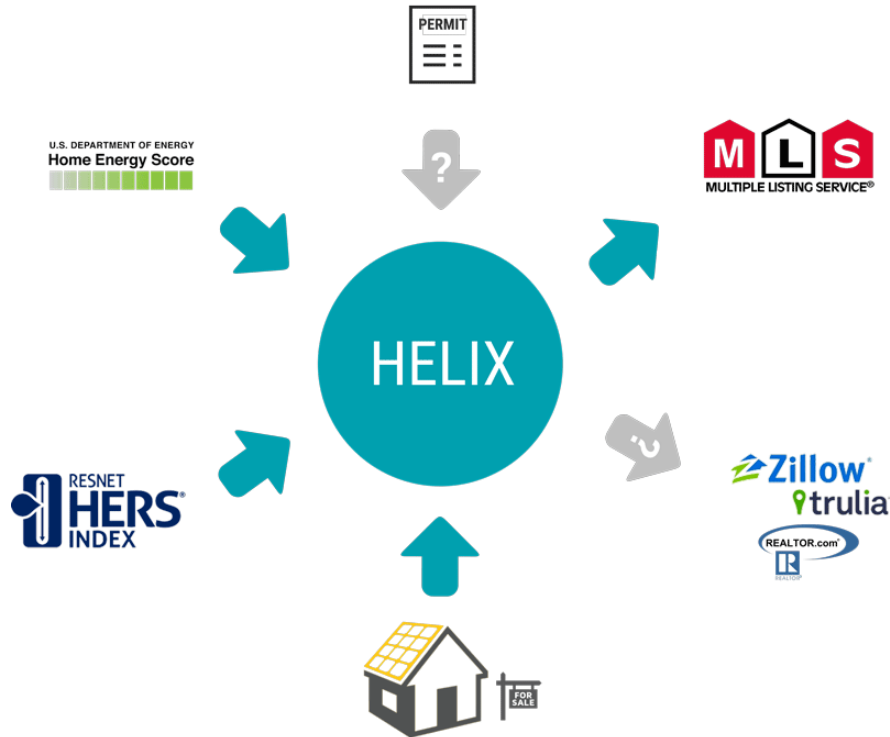
As this education-participation-data cycle grows, it is important for this information to have visibility so it can drive market transformation. The ideal method for creating this visibility is to incorporate the information into the Multiple Listing Service (MLS) with tools such as [Home Energy Labeling Information eXchange \(HELIX\)](#), or Earth Advantage's [Green Building Registry](#). For example, HELIX provides a tool to communicate information to the marketplace by automatically populating the MLS with verified home energy information when it is approved by homeowners. Thus, if a home has an energy label, it will be included with the home's information at the time of listing. This market visibility allows prospective buyers to evaluate homes based on their estimated energy use (via the energy label) and use this determination in their final decision. If energy labeling is truly going to drive an increase in energy efficiency investments, it is absolutely necessary that this market visibility exists; hence, this step should be considered a critical component for all labeling programs.

It is important to recognize that HELIX and the Green Building Registry are databases, and as such, their strength to drive a true market transformation is contingent on the data included in them. The key is to create a

paradigm shift in consumers so that they become accustomed to looking for energy labels, associating them with value, and using them in their evaluations. Large amounts of data are necessary to create this shift. For example, if the database only has a few labels, then only the listings of these few homes will include this information. While some people may notice these labels, they will be seen as more of an added perk, which is not sufficient to create a shift in the market. Conversely, if the database has a profuse amount of home energy information, then many listings will include energy labels. This will create a normalcy to home energy labels and help shift the status quo. Consumers will become accustomed to looking for home energy labels and considering this added information when making decisions. This market demand will prompt realtors to ensure energy information is included in the listings and will provide appraisers with the means to award additional value to efficient homes. As the number of labels in these databases increases, the capability of the databases to drive market transformation by shifting the status quo increases.

**Action:** Increase the data (number of labels) included in HELIX and the Green Building Registry, particularly by incorporating data from pilots, city ordinances, and state programs from around the region.

**Future direction:** build interface capacity with other portals like Trulia and Zillow to expand visibility beyond





## Program Expansion Using Education Mechanisms

The benefit of a proof of concept from pilot studies is that it produces results which can be used for education. So far we have discussed how educating homeowners can increase participation and thus result in a stronger proof of concept, but the educational uses of the results are not limited to homeowners. Results can be used to educate two other critical actors for energy labeling schemes: utilities and realtors.

### *Utilities*

Currently, many utilities cover some portion of the cost of the energy audit required to receive an energy score. Since utilities have an obligation to their customers, they cannot cover this cost without a return. This return has largely been assumed to come from replacing incandescent lights with LEDs. However, as this strategy loses cost-effectiveness due to rising baselines and sockets becoming saturated with high efficiency, long lasting bulbs, this assumption will no longer be valid. Without strong proof of concept, it will be hard for utilities to continue to fund pilots when the return on investment is unproven. This is why it is imperative to attain a strong proof of concept for energy labels now. This proof will show that home energy labels lead to other energy efficiency improvement that the utility can claim savings for. Once a strong proof of concept is attained, it can be used to encourage utilities to invest in expanding labeling programs and further propagate the education-participation-data-proof cycle.

**Action:** Interested utilities should act quickly to establish pilots aimed at determining whether or not labels produce defensible energy efficiency improvements while the known economics (i.e. lighting) still exist.

**Action:** Include opt-out or opt-in language enabling the information to be shared in the real estate market, including the appraisal and lending industries, for all home energy labeling programs implemented by the utility.

**Action:** Streamline data access

### *Role of real estate professionals*

Real estate professionals have a large role to play in the effectiveness of residential labeling schemes. Inclusion of information about energy efficiency in the MLS is a necessary but not sufficient condition for valuing energy efficient homes. Once this information is there, it needs to be understood and properly used.

Appraisers are an important aspect of achieving the maximum impact of a labeling scheme, because the onus falls upon them to interpret and incorporate the label into the value of the home. Therefore, educating appraisers on how to understand the information underlying a label, and how it can impact the operational cost of a home, is important to drive incorporation of the label into the value of the home. This additional information can not only impact the transaction, but also the mortgage terms. By adding value to the home, and gaining better insight to the operational cost of the home, lenders may be more inclined to offer better mortgage terms, which directly benefits sellers. Ultimately, once this additional value has been factored into the value of the home, the energy efficiency assets of the home become more transparent to buyers, sellers, realtors, and lenders. While incorporation of labels into the property appraisal process is heavily dependent on





data, it is also dependent on the appraisers' understanding of where to access said data. Educating appraisers on how to access the data is an important step in increasing the incorporation of labels into the property value of a home.

Realtors have a misconception that energy disclosure will disrupt sales. Basic principle of economics argues that consumers make purchase decisions based on available data where more data increases attractiveness of the product. Therefore, it is important to provide educational materials that draw on this principle, such as linkages between home energy labels and vehicle fuel efficiency. This analogy is an effective device to debunk the notion that low scores may reduce sales. Research has also shown that homes with energy labels have sold anywhere from 18 to 89 days faster than undesignated homes.<sup>8</sup> Furthermore, it has been found that homebuyers appreciate having more information rather than less and that poor ratings don't discourage home purchases, but do inform energy upgrades.<sup>9</sup> In addition, as pilots build out experience selling homes with home energy information included in the listing, this data can be used to develop case studies and best practices.

One of the benefits of labeling is that it allows customers to make more informed decisions when purchasing homes. Realtors should be able to enter the marketplace and understand the value of energy efficiency and a home energy label since it represents part of the home's cost. Educating realtors about labeling schemes is critical to convey the hidden costs of poor energy efficiency to prospective homebuyers. Once homebuyers begin to see the usefulness of energy labels, they can strengthen the scheme.

**Action: Educate appraisers on where and how to access energy labeling data so that they can better incorporate this information into the property appraisal process.**

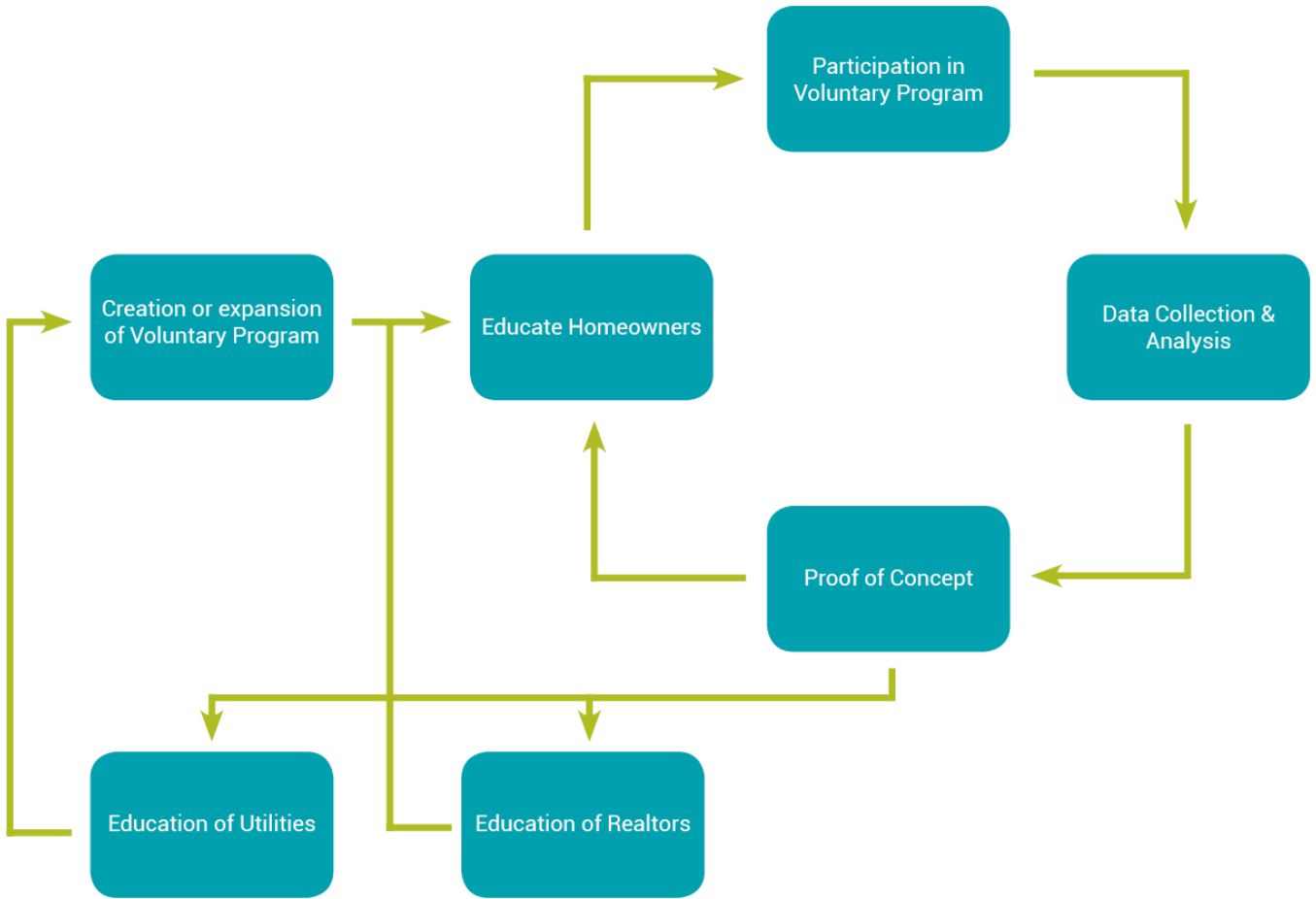
**Action: Provide access to green designation courses offered through the National Association of Realtors and develop specific trainings for realtors interested in learning about home energy information and how to market this information. Offer continuing education credits, which are required for realtors to maintain a license, for these green real estate education courses. This requirement should be used as an avenue to provide courses related to home energy information, green fields in the MLS, and solar PV.**

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<sup>8</sup> Elevate Energy, 2015, Available at: <https://www.elevateenergy.org/chicago-energy-cost-disclosure-homes/> ; Pflieger et al., 2011.

<sup>9</sup> Hill et al., 2016 Available at: [https://aceee.org/files/proceedings/2016/data/papers/7\\_218.pdf](https://aceee.org/files/proceedings/2016/data/papers/7_218.pdf)

Figure 2 Program Expansion Using Education





## From Voluntary to Mandatory

The success of an energy labeling scheme depends on the uptake of the scheme, and the most direct way to increase uptake is to through regulation. However, passing legislation to require labeling has been difficult in practice. This is largely because trying to pass legislation that has little perceived public support is a risk for policymakers, especially if industry professionals like realtor associations, vocalize pushback. Typical sources of pushback include “red-lining marginalized communities” that may not be able to afford energy improvement, or identifying considerations for enforcement of the mandate. Therefore, the first step in getting to a mandatory label is to reduce the perceived risk of passing labeling legislation.

There are ways to decrease the perceived risk of a legislative initiative: pressure policymakers whether as constituents or real estate professionals, and/or educate policymakers on the benefits of the proposed legislation. Both of these solutions center on a strong proof of concept. Proof of concept materials can be used to educate both policymakers and constituents on the value of residential energy labeling. If value is seen in the label, then there will be a stronger incentive to pass regulations requiring labeling. For example, in the case where low-to-moderate income customers are looking to purchase a home, the label will provide the information needed to determine if the potential buyer can afford the estimated energy costs of the home, as well as the recommended energy improvements.

In addition, it is important to ensure the proposed mandatory program has mechanisms in place to address areas of pushback. For instance, ensuring compliance with a time of listing program will be an easier task than a program that provides a timeframe for a label to be completed before or after a home sells, which then requires tracking home sales and which homes have completed audits and which have not.

When shifting from a voluntary to a mandatory labeling scheme, the strength of the voluntary scheme is critical. A successful voluntary scheme makes the argument for a mandatory scheme easier because the value is already clearly exhibited. Therefore, in this scenario, vested stakeholders should focus their efforts on communicating the benefits of the program and developing support for the program across an array of sectors.

It is also possible to skip voluntary programs altogether and move straight to a mandatory scheme. However, implementation of a mandatory scheme without prior exposure to a voluntary scheme requires careful execution, as evinced by Vermont and Massachusetts. In this scenario, policymakers should rely heavily on other successful mandatory schemes as blueprints to ensure the program is successful. Policymakers should also engage with multiple stakeholders and work to address concerns presented by each. It is important that policymakers do not rush creation of a mandatory program as failure may reduce the receptivity to future programs. Additionally, since this route requires significant stakeholder buy-in, it may be more advantageous if constituents are more accepting of regulation, or more energy conscious. Typically, this route is easier for smaller governmental bodies, like cities or counties, to implement.

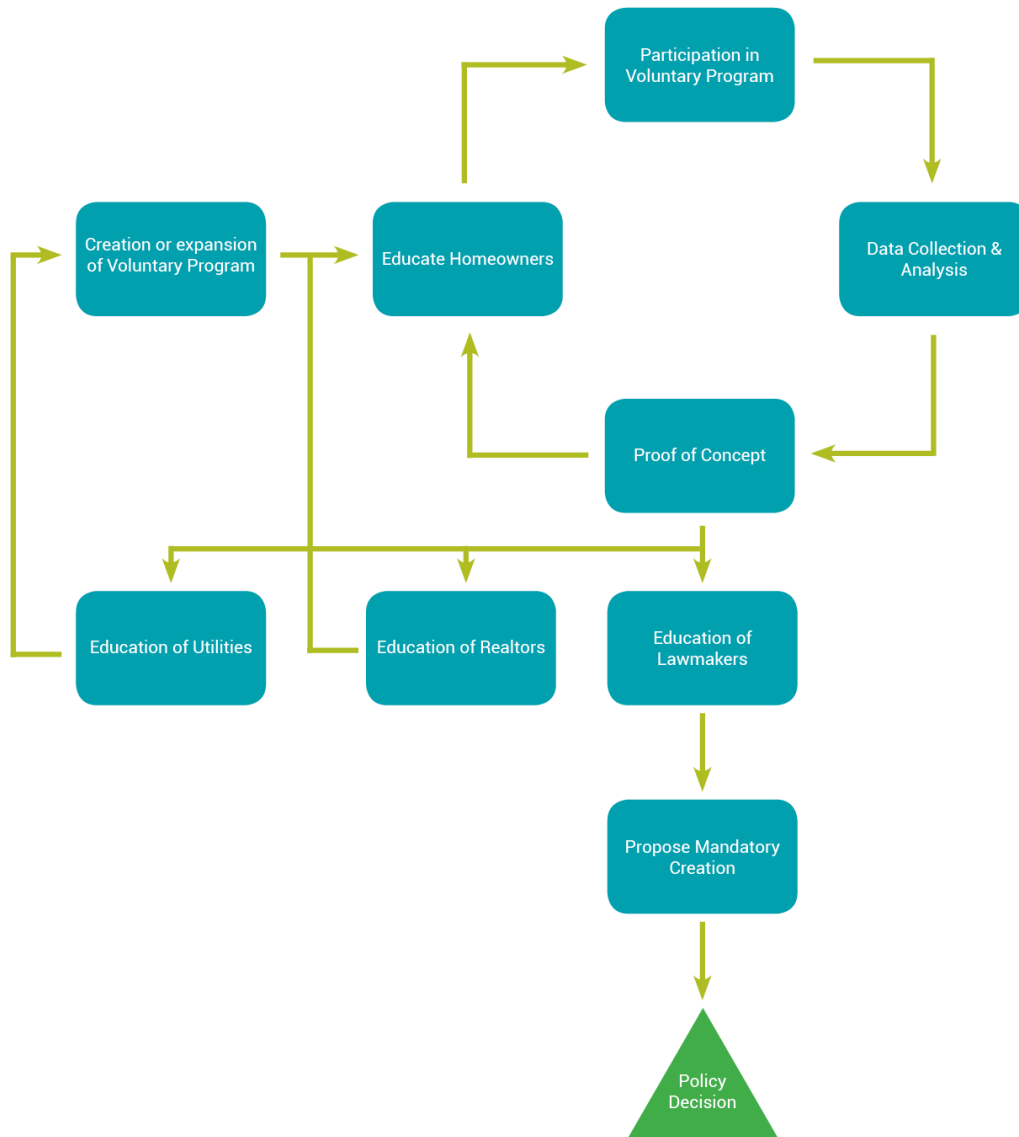
For each pathway to a mandatory program, it is important to consider the value proposition for the various stakeholders that will be impacted by the mandate. For example:

- Owners: property value and potential for energy upgrades
- Buyers: transparency, added metric to assess home
- Contractors: meaningful, consistent information
- Real estate professionals: credible information in the listing

- Appraisers: specific energy efficiency data to reflect in the market value of high performing homes

In addition to considering the value proposition to different stakeholders, the program should also ensure it is aligned with a state’s public policy goals. This will provide a strong incentive to enact the program because it is linked to other state goals, such as carbon reduction. This can be done by designing the scorecard to include metrics aligned with policy goals to track progress. For example, if the public policy goals include energy efficiency and carbon reduction, a scorecard should include energy consumption and CO<sub>2</sub> emissions based on fuel type. For energy affordability, metrics such as energy cost by fuel type, annual generation for on-site units, and current average annual utility retail energy price in dollars, by fuel type, should be included. This should prove the cost-effectiveness of implementing a mandatory program by aligning the costs and benefits of other public policy goals.

Figure 3 Moving from Voluntary to Mandatory Schemes







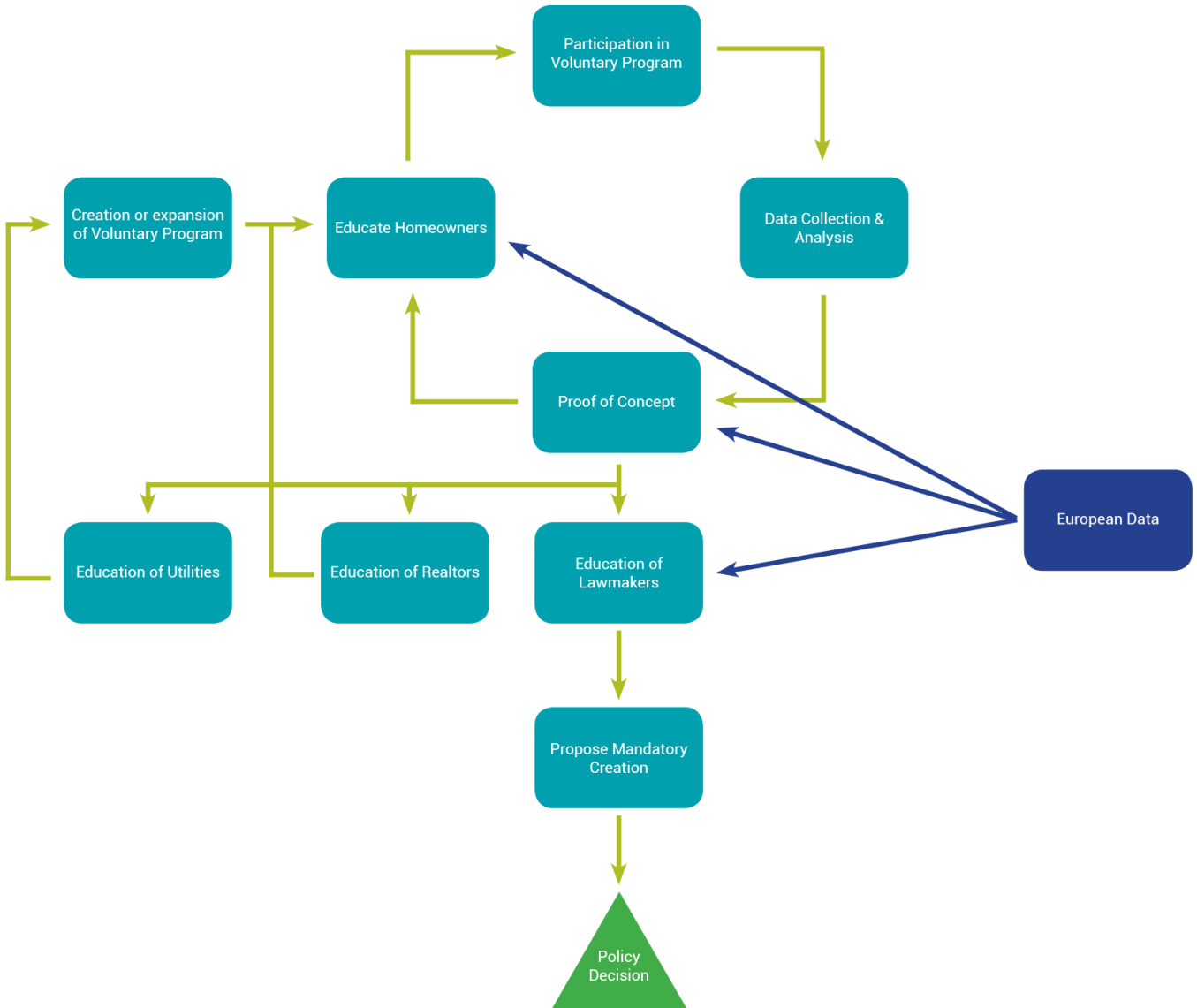
### *Lessons Learned From Abroad*

Since proof of concept is such a critical aspect in the success of residential labeling schemes, pilot studies (at scale) have been minimal, and there has yet to be a mandatory state-level program, it is worth considering what data exists outside of the United States. This data could help provide education material, inform policy design, and guide implementation.

The European Union (EU) passed the Energy Performance of Buildings Directive (EPBD) in 2002 which required energy labeling schemes for all buildings by 2009. Now, homebuyers view energy labels with the same familiarity as a vehicle fuel efficiency label. Each EU state must set up and control its own labeling scheme, but it must be based on the requirements set forth in the EU directives. The road to an effective label that informs consumer decision took a series of failures and setbacks. Since the original directive, three more EU directives aimed at improving the EPBD have been released. The first addition shifted the publication requirements for labels from time of signing to time of listing. This was critical because it informed buyers early enough in the purchasing process to affect the marketability of the home. The second addition mandated the creation of a new buildings database called the EU Building Stock Observatory to keep track of labels. By creating a database, the data is more readily available for analysis and forms the backbone of data analysis. The final modification set a decarbonization goal for 2050 and also provided mechanisms to accelerate cost-effective renovations.

Consensus varies for how data from the EU EPBD can aid labeling schemes in the U.S. Some claim that the EU data is not representative because European's view energy in a different manner from Americans, while others think a proof of concept in the European model is translatable. Because of these varying assumptions, how we utilize EU data depends on which assumptions we choose to agree with. Regardless of whether the data is transferable, the concepts that strengthen the EPBD label can be used to educate U.S. homeowners and U.S. policymakers. If you believe EU data is transferable, then the data can be used to verify U.S. data collection or to support U.S. proof of concept. The figure below shows the entry points for EU data in developing a mandatory policy scheme.

Figure 4 Integration of European Data





## Recommendations and Conclusions

The roadmap to successful home energy labeling is complex and depends on your destination: voluntary or mandatory. While voluntary labeling programs are helpful, particularly with steady-state homeowners, mandatory labeling is a more favorable destination in order to realize the full market transformation benefits of home energy labeling. Programs can cover steady-state homeowners and homebuyers/sellers by requiring a label at the time of an energy audit through utility programs or through time of listing. Either way, in both scenarios, proof of concept is critical. It governs the effectiveness of the labeling scheme, the supportability from a variety of stakeholders, and its speed in changing the market. Proof of concept is not the first step, it's the vehicle.

Arriving at a strong proof of concept requires robust pilots that methodically collect the necessary data to analyze the benefits of residential labeling. Suggestions for a strong pilot include:

- Design pilot with a clearly defined endpoint in mind (i.e. residential labeling increases energy efficiency investments);
- Design pilot with a specific target audience (homeowners, homebuyers/sellers etc.) and create marketing materials for each use case;
- Conduct pilot with intent to collect data on the home efficiency at least twice; once when the audit for the label is performed, and at least once some time (months or more) afterward;
- Use opt-in language for data sharing agreements to protect participant trust;
- Ensure that energy auditors are educating homeowners during inspection, on how the home's efficiency can be improved, on the data-sharing language, and about why energy labeling is beneficial in the long term (provide vehicle MPG, appliance EnergyGuide labels as examples);
- Allow data sharing by incorporating pilot data into a larger national or regional databases;
- Use results to educate all involved stakeholders.

If a strong proof of concept has not been developed from the pilots, then consider either conducting pilots with a better design or using external data to draw comparisons. Even if a strong proof of concept does not emerge from the pilots, the data can still be used to create value in both of the above mentioned solutions.

Once a strong proof of concept has been developed, the path to successful voluntary labeling should be a relatively smooth road. Using the proof of concept to educate stakeholders and drive creation and expansion of voluntary programs, the visibility and success of labels will increase. International data can be used to supplement educational material, however, first consider if the intended stakeholders consider the data transferrable. Recommendation for successful voluntary programs include:

- Ensure label consistency or create avenues that make translation from one label to another simple and clear;
- In addition to the score or rating, ensure data about home energy improvements (recommended or completed) and estimated energy costs are included in the label (see [EMPRESS Key Label Components](#) for more information);
- Ensure labels have market transparency by incorporating them into a database like HELIX;
- Disclose labels to consumers with sufficient time for the label to influence decisions (i.e. disclose the label at time of listing rather than at time of sale);



- Support training that allows real estate professionals to understand and use home energy information to inform clients (regardless of if the client is the buyer or the seller)

From a successful voluntary scheme, the switch to a mandatory scheme mainly involves communicating the desire to policymakers and gaining support across all relevant sectors. Policymakers who either see value or feel there is sufficient public support of labels will likely push for mandatory schemes. Careful policy design and sufficient stakeholder involvement is critical to gaining traction. It is important to remember that successful implementation of a mandatory scheme may be easier on a smaller municipal scale first (i.e. city or county level), and that policymakers do not necessarily need to aim for statewide mandatory schemes as a first step.

Additionally, policymakers can move directly to a mandatory program without first creating a voluntary program. This path requires strategic interaction with stakeholders, more careful policy design and a viable implementation model. Direct creation of a mandatory scheme is recommended for smaller scale municipal governments, or governments with more environmentally-conscious constituents.

Regardless of whether a mandatory scheme is created as a first step or as an outcome from a voluntary program, strategic program development and implementation is important for lasting success. If a mandatory program fails, the receptivity of constituents may be adversely impacted; therefore, careful considerations must be taken. Recommendations for successful mandatory program creation include:

- Utilize existing data to educate stakeholders on the value of the program;
- Encourage involvement of stakeholders across multiple disciplines and with multiple backgrounds;
- Consider all parties affected by the program, and create a channel to discuss their concerns prior to finalizing the program;
- Do not rush the process;
- Look to other successful programs and include attributes that make them successful;
- Design the program with an end-goal in mind (i.e. increase marketplace visibility for home energy efficiency improvements) and ensure the final product meets the end goal;
- Design programs with regional consistency so that the program can effect a more rapid paradigm shift.

There are various pathways that can be taken to implement home energy labeling programs. It is the jurisdiction's responsibility to determine which pathway presents the most benefits and targets the endpoint or policy goal identified by the jurisdiction. Learning from best practices and building the proof of concept cycle will set the jurisdiction up with a solid program foundation. From there, the jurisdiction must carefully construct the program so that the desired goals are achieved.

Energy efficiency is the least-cost reduction tool available for decarbonization. Yet as energy efficiency fails to be realized at its full potential, the importance of increasing market visibility is apparent. Understanding the value proposition of energy efficiency improvements can be accomplished through an effective labeling scheme. Thus, labeling creates market visibility for energy efficiency and may drive further investment in this least-cost carbon reduction tool. The information provided in this action plan provides clear steps to successfully implement a home energy labeling program that can help drive market transformation and push the region closer to its decarbonization goals.





## Appendix: State Residential Labeling

### Connecticut

Connecticut has two **voluntary** labeling schemes: one for existing single-family homes and another for new construction. Both schemes use a different energy label.

- Connecticut has had statewide implementation of a voluntary [labeling scheme](#) using the Home Energy Solutions Program (HES) for existing single-family utility homes since 2015. Over 33,000 scores have been generated since implementation of the program. This program has a unique approach by including direct measures – such as air sealing and installing LED lightbulbs – to improve energy efficiency during the first visit and then offering an opt-in for scoring the home. The initial audit also unlocks rebates for customers to help with their decision to make energy efficient improvements to the house.
- Connecticut also offers HERS ratings for new construction homes via the Energize Connecticut Program.

### Delaware

Delaware has a statewide **voluntary** program and is currently discussing legislation for further labeling.

- Delaware offers ENERGY STAR certifications via Energize Delaware’s Home Performance with ENERGY STAR Program (HPwES).

### District of Columbia

Like Delaware, Washington D.C. also has a **voluntary** program and is currently considering legislation that would establish a building energy performance standard for existing buildings.

- D.C. Department of Energy and Environment’s EnergySmart program offers home energy audits using ENERGY STAR criteria.
- The updated [Clean Energy DC plan](#) released by Mayor Muriel Bowser’s administration calls for zero energy design standards for new smaller residential buildings by 2022.

### Maine

In 2010, Maine passed legislation that required the Public Utilities Commission (PUC) to develop a residential labeling framework. This framework can draw from existing labels or can be another standalone label. Since that time, the Maine PUC organized a stakeholder process that produced a report<sup>10</sup> on building labeling. Since then, however, no further action has been taken. Once completed, the creation of the labeling framework will allow for either mandatory or voluntary program development.

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<sup>10</sup> State of Maine, Report to the Joint Standing Committee on Utilities and Energy, 2010, Available at: <https://neep.org/sites/default/files/resources/Report%20on%20Building%20Energy%20Efficiency%20and%20Carbon%20Performance%20Ratings.pdf>



## Maryland

Maryland has two **voluntary** labeling programs, and as of May 2018, has passed legislation that paves the way for future labeling legislation. Montgomery County, MD, has also adopted a **mandatory** pseudo-label in 2009.

- The five EmPOWER Maryland electric utilities offer Home Performance with ENERGY STAR (including home energy assessments and 50 percent rebates for energy improvements like insulation and air sealing) and ENERGY STAR Certification for new homes, utilizing HERS ratings.<sup>11</sup>
- On May 15, 2018, Maryland signed legislation that requires builders who build more than 10 homes in the same development to provide purchasers with written information on energy-efficient options. While this alone does not constitute a label, it does provide consumer information about energy efficiency and creates a dialogue that would be further facilitated by a residential labeling scheme.
- Montgomery County adopted an ordinance that requires disclosure of energy bills prior to sale of a home. The legislation stipulates that sellers must provide buyers with energy bills for the previous 12 months, as well as information on the benefits of home energy audits and energy efficiency improvements. While this is not technically a labeling scheme, as the bills do not provide the same comparability or frame-of-reference that labels do, it could be considered a pseudo-label. While a standardized label may make this information more digestible for homebuyers, this system is still a step towards increased market visibility for home energy use.

## Massachusetts

Massachusetts homeowners will receive a Massachusetts home energy scorecard in conjunction with home energy assessments for 1-4 family homes provided through the statewide energy efficiency program called Mass Save.<sup>12</sup> The target date for implementation of this effort is July 2019.

In addition, Massachusetts has several experiences with home energy scorecards, including legislation and pilot programs, as follows:

- From 2012-2014, the Massachusetts Department of Energy Resources (DOER), along with several utilities and other partners, implemented a pilot called “Home MPG” (“miles per gallon”)<sup>13</sup>. Home MPG provided 3800+ home energy performance scorecards in conjunction with Mass Save® home energy assessments in eight Western Massachusetts communities. Homeowners also received an updated scorecard following implementation of energy improvements. **DOER found the following from this pilot<sup>14</sup>:**
  - 1,593 homes implemented energy efficiency improvements, which resulted in:
    - 32,000 MMBtus/year or \$650,000/year in energy savings; and
    - reduction in each home’s annual energy consumption by an average of 20 MMBtus or \$400+/year

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<sup>11</sup> <https://www.psc.state.md.us/electricity/empower-maryland/>

<sup>12</sup> Mass Save is the statewide energy efficiency program administrated by Massachusetts’ investor-owned utilities and the Cape Light Compact.

<sup>13</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.

<sup>14</sup> DOER, Home Energy Scorecards in Massachusetts, September 2018, Available at: <http://annualmeeting.naseo.org/data/energymeetings/presentations/Pollard-MA-scorecards.pdf>



- Increased energy efficiency implementation:
  - 25 percent more households completed installations over Mass Save (business as usual);
  - 25 percent more savings per household over Mass Save
- The vast majority of surveyed homeowners agreed that:
  - a scorecard should be included with an audit
  - a scorecard would be useful in the home-buying process
- DOER is currently running a pilot called the Home Energy Market Value Performance (Home MVP) Program, which includes providing homeowners with a Massachusetts home energy scorecard during home energy assessments and an updated scorecard following implementation of energy improvements. The pilot began in fall 2017 and will run at least until fall 2019.
- Energy New England (ENE), which provides home energy audits to residents of 28 municipalities served by municipal light plants, began providing a Massachusetts home energy scorecard in May 2017. As of mid-June, 150 scorecards have been delivered to homeowners and ENE anticipates delivering approximately 1500 scorecards per year.
- In addition, Governor Charlie Baker’s Administration filed legislation in 2018 that, if passed, would have required the following:
  - Scorecards to be produced following Mass Save® home energy assessments, RESNET HERS ratings, and other energy assessments designated by DOER, such as the U.S. DOE Home Energy Score. Municipal lighting plants and their cooperatives could opt into the program.
  - Energy performance ratings to be disclosed when homes are publicly listed for sale and scorecards to be disclosed before the execution of a purchase and sale agreement.
  - The HomeMPG is another voluntary labeling program that was conducted by Mass Save in Western Massachusetts from 2012-2014. The program used its own stand-alone Mass Save scorecard that attempted to make scores more digestible for homeowners by comparing them to a miles per gallon metric.
  - While mandatory labeling legislation was voted down, Massachusetts has taken significant steps towards developing a foundation for a strong labeling program. Massachusetts Residential Conservation Services (RCS) [guidelines](#) require Massachusetts Department of Energy Resources (DOER) to develop a scorecard to be completed at time of audit. Additionally, state stretch codes had originally included RESNET HERS as a [requirement](#) for new construction, and as a compliance option for retrofit projects. However, the second version of these stretch codes have since been changed to allow ENERGY STAR homes, Passive House, and HERS ratings to meet the requirement for new construction homes, and have removed the HERS option for retrofit projects. .

### **New Hampshire**

New Hampshire has a **voluntary** labeling pilot program in partnership with Vermont. The program is funded by a U.S. Department of Energy State Energy Program (U.S. DOE SEP) grant.

### **New Jersey**

New Jersey has a statewide **voluntary** labeling program, as well as a pilot voluntary labeling scheme in three counties.



- While New Jersey has a statewide voluntary labeling program, it is not geared towards homeowners. The program is designed to provide incentives for builders who construct more energy efficient homes. In order to determine the incentive, homes are scored using HERS.
- There is also a pilot labeling program that is run through NJ Natural Gas's SAVEGREEN Project.

### *New York*

New York has a statewide **energy disclosure law** known as the "New York State Truth in Heating Law"<sup>15</sup>, which went into effect in 1981, making it one of the oldest energy disclose laws in the country. This law requires sellers and landlords to provide buyers and tenants with heating and cooling bill information upon request. There is no system in place for implementing or tracking compliance with this law.

NYSERDA is also in the process of rolling out a pilot that will test DOE HES and Pearl Certification in six different markets throughout the state to gauge market interest. This pilot includes two boroughs in New York City and two upstate counties (two NYC boroughs, two upstate towns, and two upstate counties). The purpose is to target two different market actors, including home sellers and existing home owners within each area.

### *Pennsylvania*

While Pennsylvania currently does not have any statewide programs, the state is discussing legislation. The PA Department of Environmental Protection promotes ENERGY STAR and HES on its webpage.

### *Rhode Island*

Rhode Island Office of Energy Resources has launched stakeholder discussions to advance labeling development, and there is currently a statewide **voluntary** labeling pilot program as part of National Grid's EnergyWise audits.

- Beginning in 2018, EnergyWise audits will include a HES as part of the audit for 150 customers.

### *Vermont*

Vermont has a statewide **voluntary** labeling program called [Vermont Home Energy Profile](#). The program is run by Efficiency Vermont, and uses HES. The state previously conducted a one year pilot between 2016 and 2017.

Efficiency Vermont is currently developing a Home Improvement certification that mirrors its Residential New Construction certification.

- Vermont issued its first home energy rating (Energy Rated Homes of VT) in 1987 and continues to offer RESNET HERS Ratings through Efficiency Vermont's Residential New Construction program.
- HERS Ratings have been an allowable compliance path for Vermont Residential Energy Code since 1997.

### *West Virginia*

Beginning in 2013, West Virginia had been working to pass legislation that would have permitted the development of a statewide energy labeling program. While this bill was ultimately voted down, discussions for labeling legislation continues.

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<sup>15</sup> Available at: <http://utilityproject.org/wp-content/uploads/2013/12/Truth-In-Heating-Law-1231131.pdf>