

Residential Energy Use Disclosure: A Review of Existing Policies

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Contents

Contents	i
Executive Summary	iii
Acknowledgments.....	viii
Introduction.....	1
Report Overview	1
Types of Disclosure	2
Asset Rating	2
Operational Rating.....	3
Evaluation	3
Time of Disclosure.....	4
Time of Sale Disclosure	4
Scheduled Disclosure.....	5
U.S. Residential Energy Disclosure.....	5
Asset Ratings: Results and Lessons Learned.....	6
Trends in Disclosure of Energy Efficiency Features.....	13
Utility Bill Disclosure in Practice	16
Benchmarking in Practice	20
Voluntary Rating and Disclosure Efforts	22
Home Energy Rating System.....	22
Home Energy Score	23
Energy Performance Score	24
Summary	25
International Residential Rating and Disclosure Efforts.....	26
Australia Capital Territory, 1999, House Energy Rating Scheme	26

Australia NatHERS Ratings for New Residential Homes, 2010, all Australian States/Territories	27
Denmark, 1997-2006, Mandatory Energy Labeling	27
European Union, 2003, Energy Performance of Buildings Directive	28
Findings.....	30
The Value of Asset Ratings vs. Operational Ratings	31
The Importance of a Trusted Rating System.....	33
The Importance of Stakeholder Support	33
The Link between Energy Efficiency Disclosure and Building Codes.....	33
The Importance of Program Infrastructure and Results Tracking	34
Recommendations.....	34
Require a Combined Asset/Operational Rating for Residential Homes	34
Rely on a Trusted Rating System.....	35
Consider the Location Efficiency of a Home’s Energy Use	35
Disclose Performance Data at the Earliest Possible Stage in the Transaction Process.....	36
Encourage Widespread Compliance with Strict Enforcement.....	36
Link to Retrofit Programs	37
Conclusion	37
Contacts	38
References	39
Appendix A: Residential Energy Disclosure Policies	43
Asset Ratings	43
Energy Efficiency Features	48
Utility Bills	52
Benchmarking	56

Executive Summary

This report is an exploration of 14 residential energy use disclosure laws in place in the United States. While our review may not be exhaustive, we believe the report covers almost all of the existing state and local residential rating and disclosure policies. A majority of the 14 policies covered have been enacted in the recent past, making it a good time for an initial assessment of how – and whether – these emerging policies are raising awareness of energy use in homes and motivating energy efficiency upgrade activity. The reach of residential energy disclosure is exciting for a number of reasons, including: (1) how it might motivate people to address valuation of energy-efficient homes in the home sale process; (2) how it can encourage energy efficiency upgrades for sellers aiming to make their home stand out in the market and/or for new buyers; and (3) how it can generate information needed for better valuation of energy efficiency improvements in a home for appraisals and mortgage underwriting. This report serves as a first attempt to see what types of residential energy disclosure policies are in effect in the United States, how they have been implemented, and how effective they have been, through a review of all available documents and data on each policy, as well as interviews with policymakers and stakeholders.

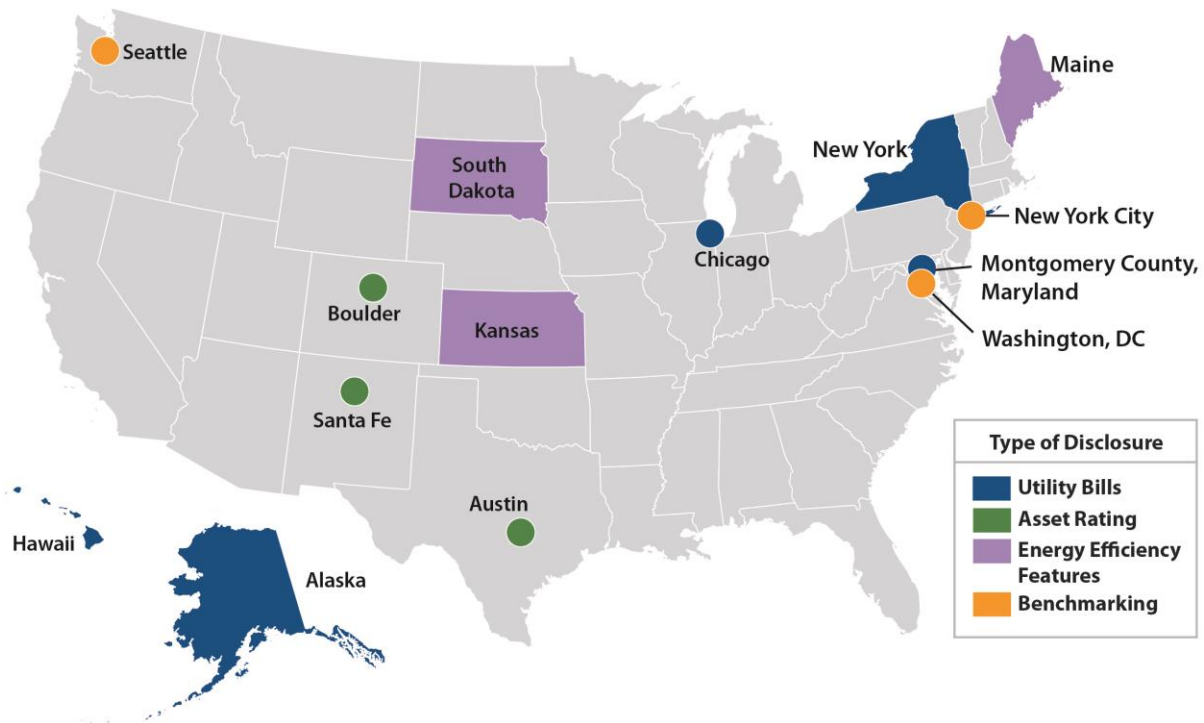
The report is structured as a review of the four main types of energy use disclosure being implemented in the U.S.: asset ratings; utility bills; energy efficiency features; and benchmarking. This is followed by an examination of energy disclosure/rating methods that are not mandatory but provide interesting insight into issues surrounding labeling programs. Efforts to disclose energy use and energy efficiency characteristics abroad are also explored in this report, and a number of studies on the effectiveness of longstanding residential energy performance rating programs are highlighted.

Asset Ratings

Two of the three jurisdictions that have adopted asset rating requirements are characterized by the most extensive implementation and tracking efforts we have seen for energy disclosure policies – Austin, TX and Santa Fe, NM. These two cities plus Boulder, CO require asset ratings. The experiences of these three cities illuminate a number of important factors in determining how best to design and implement a disclosure policy requiring an asset rating.

- The **timing of the energy disclosure** is important in allowing homeowners sufficient time to incorporate energy use information into the home-buying decision-making process. In Austin, the policy was initially designed so that audit results did not have to be disclosed until the closing, which was too late to allow homebuyers to negotiate prices based on audit findings. Now audit results are required for disclosure three days before the end of the “option period,” where a buyer can still exit the contract.

Figure ES-1. U.S. Residential Energy Disclosure Policies



- In order to keep cost and time commitments down for asset ratings, which are more costly than the other forms of disclosure we discuss, Austin **designed the audit program with the existing housing stock in mind** to target common opportunities for energy upgrades for the area housing stock.
- **Partnering with local stakeholders** is crucial in passing energy use disclosure laws and implementing them successfully. Strong realtor engagement in Austin, to create a policy stakeholders could agree on, led to passage of the ordinance and continued engagement by the local realtor association after the ordinance took effect.
- The Santa Fe, NM approach to building energy disclosure began with the disclosure of HERS ratings that were not required to meet any target for year one, and ultimately required specific HERS scores based on square footage. **Engagement with local builders and raters**, as well as familiarity with HERS ratings from the first year of reporting HERS scores, helped to develop a more stringent set of HERS rating requirements than likely could have been passed without industry support, according to program officials.
- **Carefully planned implementation efforts** have contributed to success in Santa Fe and Austin. In Santa Fe, existing city employees were deliberately tasked with implementation of the rating requirement, with hundreds of hours of training for existing staff to make the transition to alternate/additional job tasks.
- **Encompassing enforcement efforts into existing mechanisms for enforcement** was crucial in the compliance success noted in Santa Fe. The HERS labeling requirement is built into the existing structure of the building permitting process, and as a result, no one can obtain a building permit and a certificate of occupancy without adhering

to HERS labeling requirements in Santa Fe—resulting in 100% compliance. In the first year and a half, all 121 of the new homes built in Santa Fe had a posted HERS rating. In Boulder, CO, incorporation of the HERS rating requirement into the longstanding green building program leveraged existing code and permitting mechanisms for enforcement.

Energy Efficiency Features

Disclosure of energy efficiency features for newly constructed single-family homes and low-rise multifamily buildings are required in both Kansas and South Dakota. These disclosure forms require disclosure of features including insulation R-values, window and door U-values, heating and cooling system efficiencies, and a statement of whether the home has been built to 2006 International Energy Conservation Code (IECC) standards. Neither Kansas nor South Dakota has a mandatory statewide residential energy code, thus the treatment of voluntary code requirements as energy efficiency “standards” in both Kansas and South Dakota stand to serve a unique role in bringing attention to code standards in states where the reach of codes is limited.

A disclosure policy in Maine requires disclosure of information on heating systems, insulation, windows, doors, and appliances for lease of all rental properties. Information collected on awareness of the disclosure form from renters signing up for electric service at a new location indicate that on average, 11.3% of renters reported receipt of the form in the first five months the form was in effect. While there were no formal implementation efforts and resources, attempts to educate landlords and tenants on the presence of the disclosure law have been taken up by a number of stakeholders.

Utility Bills

Disclosure of utility bills is required in Montgomery County, MD; New York State; Hawaii; Alaska; and Chicago. Utility bill disclosure is the simplest form of energy use disclosure that a jurisdiction can require. Utility costs can vary significantly since there are so many variables when it comes to how energy is used in a home and are not an objective rating based on the components and construction of a home. However, utility disclosure is inexpensive, if not free, and the data is becoming easier and easier to access via online systems. As utility data gets easier to access and can be presented in a more uniform way for homeowners, the potential for utility information presented at the time of sale of a large number of homes is increasingly feasible.

Information on the number of homebuyers and renters taking advantage of utility bill disclosure in all jurisdictions is very limited. Unlike the asset rating policies that are in effect, few of these policies were met with resources to provide implementation strategies that resulted in widespread use or recognition. Formal tracking of the effectiveness of these policies has not been undertaken in any of the jurisdictions that have utility bill disclosure requirements.

Benchmarking

Multifamily building benchmarking exists in Washington, DC; New York, NY; and Seattle, WA. Buildings in all three jurisdictions over a certain square footage are required to benchmark energy data on a yearly basis; all three benchmarking policies are still relatively new, and while mechanisms to track each policy are in place, results are just becoming available. Key features of the three benchmarking policies discussed in the report include:

1. Access to **aggregate data** presents an opportunity for multifamily building owners to assess the energy performance of their whole buildings for the first time (Krukowski and Burr 2012). In New York City and Seattle, utilities have agreed to provide aggregate data for multifamily building owners. In Washington, DC, building owners are not required to collect energy usage information from residential tenants for individually metered units; benchmarking of the common areas only is required. For cities with older utility system technology, providing aggregate data could present a challenge.
2. **Phasing in benchmarking requirements** based on building size has been done in all three cities and has helped to keep initial reporting numbers high. All cities are beginning with requirements for the largest properties; they are more likely to be positioned to comply with requirements earlier on. In conjunction with the phasing-in of reporting deadlines, significant fines have been put in place to combat non-compliance. Initial results for Seattle benchmarking of multifamily and commercial buildings 50,000 square feet and larger reported 87% compliance. In New York, initial compliance was at 75%. The first round of benchmarking results for Washington, DC were due at the beginning of April 2013.
3. Availability of **resources for building owners** to learn how to comply with benchmarking requirements has been made available in all three cities in the form of classes, call centers, and designated program staff. This is particularly useful for smaller buildings that do not have a designated sustainability manager or building manager.

Voluntary Rating and Labeling Efforts

While many mandatory benchmarking and disclosure programs are in their first iterations, there are some voluntary rating and labeling efforts that have been in existence for a longer period of time and/or have been more closely assessed and evaluated for further development. To date, there are no mandatory labeling programs for existing homes in the United States. The Home Energy Score (HES), Energy Performance Score (EPS), and the Home Energy Rating Score (HERS) rating efforts show significant progress in developing a label that is trusted, easy to understand, low in cost, and accurate, but more assessment is needed before highlighting one as a standout among the others.

International Residential Rating and Disclosure Efforts

While some international residential disclosure programs are just beginning to emerge, other programs have been around for more than ten years and lend insight to the U.S. experience. In the Australia Capital Territory and in Denmark, residential rating and disclosure schemes have been in existence for new and existing homes at the time of sale

since 1999 and 1997, respectively. The most significant evaluations of the effectiveness of residential energy disclosure on home sales and home prices come from studies of these long-running programs. Separate studies of two longtime residential home energy rating policies (House Energy Rating Scheme in the Australia Capital Territory and the energy labeling requirement in the Netherlands) reveal a measurable price premium for homes with a highly efficient rating.

Our initial look at energy use disclosure policies in the United States brings forth the following trends:

- *The Value of Asset Ratings vs. Operational Ratings.* Given that utility use data is becoming increasingly easier to access and is presented in more easily interpreted formats, operational energy disclosure can provide a more near-term step toward energy disclosure in the absence of a more detailed asset rating and can later be useful in conjunction with a forthcoming asset rating. Experience has shown that comparison of operational data use among households can be very effective in rousing behavioral change in home dwellers.
- *The Importance of a Trusted Rating System.* It is important to ensure the infrastructure and tools for implementation are mature enough before requiring implementation of a specific energy rating system for an asset rating. While there has been promising progress with the Home Energy Score, Energy Performance Score, and HERS, barriers still exist regarding accuracy and cost, which should be addressed before any rating system is adopted on a widespread scale.
- *The Importance of Stakeholder Support.* Disclosure policies that have been passed and implemented with the most success in the United States are characterized by significant engagement efforts and communication with stakeholders including the realtor community (Montgomery County, MD; Austin, TX; and Chicago, IL) and homebuilder associations (Santa Fe, NM) to address the potential and perceived impacts of a policy.
- *The Link between Energy Efficiency Disclosure and Building Codes.* Three of the existing disclosure policies suggest a growing relationship between building codes and energy efficiency labeling and disclosure. In Kansas and South Dakota, no statewide energy building code has been adopted, and homes are not required to adhere to a building energy code unless a local jurisdiction requires it, but energy efficiency disclosure forms for new homes in these states allow for disclosure of whether the home complies with 2006 International Energy Conservation Code (IECC). This presents the possible opportunity disclosure policies hold to bring to light the significance of energy codes in areas where there are none.
- *The Importance of Program Infrastructure and Results Tracking.* While a host of disclosure laws were passed in the United States between 2007 and 2009, the majority of the policies were limited by lack of follow-through that led to low rates of awareness and compliance. As a result of limited allocation of resources to program implementation and data management, there has been little to no evaluation done on whether the data being received by homeowners is being used to influence decision making thus far, making it a challenge for program administrators and policymakers to advocate for the benefits of energy use disclosure that are anecdotally apparent.

Key Takeaways from Early Examples of Residential Energy Use Disclosure

Early progress with energy use disclosure policies, plus the careful consideration of existing efforts, has led us to highlight the importance of the following elements to a residential energy disclosure policy that is passed and implemented by a jurisdiction:

- *Requiring a combined asset/operational rating for residential homes*
- *Relying on a trusted rating system*
- *Considering the location efficiency of a home's energy use*
- *Disclosing performance data at the earliest possible stage in the transaction process*
- *Encouraging widespread compliance with strict enforcement*
- *Linking to retrofit programs*

Lastly, a detailed look at all existing residential energy disclosure policies in the U.S. can be found in Appendix A. The approach to energy disclosure in each jurisdiction is detailed using information obtained from: (1) the written law requiring energy disclosure; (2) the legislative history; (3) energy labels and forms from each jurisdiction; (4) recommendations from state energy plans; and (5) interviews with involved stakeholders and state/local officials.

Acknowledgments

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Introduction

Interest in residential energy rating and disclosure to increase transparency about home energy use is growing. While policies requiring disclosure of energy use information have gained significant attention in the commercial sphere, with mandatory policies implemented in a number of large U.S. cities, more disparate policy efforts have characterized the residential sector thus far. A majority of the residential energy policies have been enacted in the recent past, between 2006 and 2012, making it a good time to assess how – and whether – these emerging policies are raising awareness of a home’s energy use during the home buying or rental process, or driving any changes in the market for energy-efficient homes or retrofit activity.

Widespread residential energy rating and disclosure is promising for a number of reasons. While some disclosure policies are present in jurisdictions that have traditionally had progressive energy efficiency policies, other policies have popped up in areas where there are few, if any, other energy efficiency policies on the books. Additionally, energy disclosure supports the trend in increasing transparency of information around the home buying process, adding increased consumer awareness around the costs of home ownership.

Increased information about a home’s energy use can encourage consideration of energy consumption in home purchasing and rental decisions, inform homeowners about cost-effective efficiency improvements, motivate homeowners to invest in efficiency improvements, and generate the information needed for better valuation of energy efficiency improvements in a home for appraisals and mortgage underwriting. Our review found a total of 14 jurisdictions (six states, one county, and seven cities) with policies in place mandating some type of energy use disclosure for portions of the residential building stock.

REPORT OVERVIEW

This report is a first attempt to see what types of policies are out there, how they have been implemented, and how effective they have been through a review of all available documents and data on each policy, as well as interviews with policy administrators and stakeholders. The report will focus only on residential energy disclosure, which includes single-family and multifamily homes, both owner-occupied and rentals. This report begins by outlining the two main types of building disclosure policies that exist today: asset ratings and operational ratings. Existing research on commercial energy disclosure, where research has been more extensive, helps to inform this initial discussion on rating types. The different events in the homeownership life cycle to which energy efficiency actions are commonly linked are detailed next, to present options for how an energy disclosure requirement can fit into existing infrastructure. Research on linking energy efficiency actions, both enforced and voluntary, to discrete points at which property is transferred inform this section. This is followed by a review of all the policies in the U.S. for which we could gather implementation information and look at initial results. Many of the surveyed policies are in the beginning stages of implementation, and some policies have no infrastructure to allow tracking of implementation or monitoring of compliance and effectiveness. The details of all

14 existing policies in the U.S. have been included in Appendix A as a reference for future program design.¹ The approach to labeling in each jurisdiction is detailed using information obtained from: (1) the written law requiring energy disclosure; (2) the legislative history; (3) energy labels and forms from each jurisdiction; (4) recommendations from state energy plans; and (5) interviews with involved stakeholders and state/local officials. For many jurisdictions where concrete data on compliance and effectiveness is not available, anecdotal evidence from interviews is considered.

Overarching trends that are apparent from our survey of the various policies are included in the findings section. The findings section also includes recommendations for the most effective approaches for residential energy rating and disclosure for consideration by policymakers and advocates, as well as recommendations on additional research needs and opportunities.

Types of Disclosure

Disclosure of building energy use or building energy performance generally takes one of two forms: an asset rating designed to indicate a building's energy performance as-built, based on building characteristics and systems; or an operational rating that reports on building energy consumption during building operation. Both types of disclosure are used in the United States.

ASSET RATING

An asset rating relies on computer modeling to create a simulation of a building's projected energy use based on the architectural and system characteristics of a building. Asset ratings often involve building an energy model to run on complex software and/or an onsite audit and diagnostic testing to estimate energy performance. For an asset rating, the energy use of a building is predicted using standardized weather and occupancy conditions, allowing buildings to be compared on an equal footing.

Of the 14 disclosure policies that currently exist in the United States, three (in Santa Fe, NM; Austin, TX; and Boulder, CO) require an asset rating.² There are three prominent rating/labeling systems for residential homes that have gained recognition in the United States, although not all are part of mandatory systems, and are mainly used in voluntary and/or pilot programs at this time. The oldest and most widely used tool is the RESNET Home Energy Rating System (HERS), developed as a tool to qualify homes for energy efficient mortgages in the 1990s, and used as a requirement for several federal programs including FHA Energy Efficient Mortgage, ENERGY STAR for Homes, and a federal energy tax credit for new homes (Weed 2011). The Department of Energy Home Energy Score (HES) was developed in 2010 by Lawrence Berkeley National Laboratory in an effort to create a simplified and accurate building rating program. Similarly, the Energy

¹ While the policies in 15 jurisdictions are reviewed in this report, only 14 policies currently remain in place. In Nevada, the energy efficiency disclosure policy was repealed in 2011 after being in place for only a few months.

² The Austin, TX Energy Conservation Disclosure Ordinance requirements can also be classified as an asset rating, because of the required energy audit, however results are not presented as a formal "rating" or "label" for direct comparison between different homes as they are in the three existing voluntary rating systems that are detailed below.

Performance Score (EPS) was developed by the Earth Advantage Institute in conjunction with the Conservation Services Group in an effort to design a simplified and accurate program suitable for widespread building rating (EAI 2012; DOE 2012).

OPERATIONAL RATING

An operational rating uses metered energy use data to compare how a building's actual energy consumption compares to similar buildings. This type of disclosure can be as simple as providing utility bills at the time of sale of a home. Operational ratings are commonly used for large multifamily buildings because conducting asset ratings on large buildings can quickly become prohibitively expensive. This practice is often referred to as benchmarking: tracking a building's energy and water use to compare its performance with similar buildings, and past usage. A majority of the existing commercial and residential disclosure policies are centered on operational ratings or simple utility bill disclosure. The predominant operational rating tool for large scale commercial and multifamily building benchmarking in the United States is ENERGY STAR Portfolio Manager. There is not currently a universally accepted or industry standard for residential benchmarking.

EVALUATION

Asset and operational ratings have discrete value in different settings. Asset ratings are valuable for a residence that will have new occupants with presumably different consumption behavior and number of occupants. Asset ratings are more permanent, since ratings will only change with large alterations to the building envelope or significant system upgrades. In comparison, most operational ratings are done on a yearly basis, and incorporate a year's worth of utility data into a rating. For new homes, asset ratings are the only feasible rating option since energy has not yet been used in the home. Operational ratings are beneficial for (1) large buildings where a full energy audit and asset rating is more costly, and (2) tracking changes of energy use in a building where occupancy and behavior are constant (Dunsky et al. 2009). Operational ratings can also be crucial in helping to provide information about how behavior and building systems interact to affect performance.

Time of Disclosure

Policies encouraging energy efficiency actions are commonly linked with events in the homeownership life cycle where large upgrades are performed or property is rented or sold (Bamberger 2012). During key events in this life cycle, upgrades that require investments are often already underway, making it easier to tack on efficiency upgrades. Events in this life cycle also often already require permitting or inspection, allowing for use of existing enforcement mechanisms. Examples of programs that take advantage of time of sale and time of renovation triggers include Residential Energy Conservation Ordinances like that in Berkeley, CA which requires certain energy efficiency upgrades before the home can be sold. Other policies, such as those in Boulder, CO and Burlington, VT, require upgrades on rental properties before the properties are granted a rental certificate of occupancy.

TIME OF SALE DISCLOSURE

The primary time in the homeownership life cycle for requiring energy performance disclosure in existing policies is at the time of sale or rental. There are at least three discrete points at which energy performance disclosure can occur during the broad “time of sale” designation: (1) the listing of the home, (2) the contract period, and (3) the closing date. Most jurisdictions currently require disclosure to occur before a purchase contract, which kicks off the contract period.

Time of Listing

Requirements for disclosing energy information at time of real estate listing are currently a part of one mandatory U.S. energy disclosure policy, in Chicago, IL. However, energy efficiency features and energy performance information is advertised on a voluntary basis at the time of listing in other places. Advertising requirements, including for energy related information, are self-designed by regional Multiple Listing Services (MLS). In Santa Fe, NM, for example, where a HERS rating is required of every new home built within the city limits, the regional MLS includes the HERS score in addition to a number of other “green” characteristics included by the MLS. Voluntary efforts thus far have focused primarily on providing prospective homebuyers with better, comparable information on energy efficiency features by listing the following: (1) documentation of any third-party verified information about the voluntary green building standards a home is

“Greening” the Real Estate Industry

Efforts among some realtor associations have led to promising improvements to the Multiple Listing Service (MLS) to better include energy efficiency information on homes. The “Green the MLS” movement, supported by the National Association of REALTORS, is working to make it easier to promote the features and performance of a green home. Disclosure of more verifiable “green” features on the MLS rather than listing more arbitrary green characteristics is expressed by the movement as central to better valuation and comparison of homes (NAR 2012). For example, there is discussion within the Green the MLS movement about inclusion of searchable fields for ratings to allow for search according to a number range. Statewide MLS, such as Arizona’s have been leading the charge to include HERS ratings as a searchable feature in the MLS. Interest in disclosing green building certifications and building rating information in a similar way to how Walk Score information is incorporated on many real estate websites has been expressed by the Green the MLS movement. Walk Score is a walkability index that provides a numerical score between 0-100 to any address based on proximity to a variety of amenities (CNT 2010).

Data held by MLS’ on green features and certification can also be instrumental in determining how green features or energy ratings/certifications affect home sales and value. Sales data provided by the Portland RMLS to Earth Advantage Institute for sales between May 2010 and April 2011 found that Portland area homes holding third-party certifications (such as LEED or ENERGY STAR) sold for a price premium of 8% (EAI 2011). However, despite significant strides in the real estate industry, realtor opposition to disclosure policies remains a significant barrier in many areas of the country.

built to (i.e., ENERGY STAR, LEED for Homes, National Association of Home Builders Green Home Certification), and (2) checkboxes to indicate the presence of specific “green” features including everything from environmentally friendly finishes and flooring, to attic insulation levels, depending on the local MLS. There is currently significant variation in practices and limited standardization of efforts between MLS.

Contract Period

The contract period on a house begins after a purchase offer is made by a prospective buyer and then accepted by the seller, thereby creating the purchase contract. During the period that begins after the purchase contract is signed by both parties, home inspections are performed including general, pest, and other specialized inspections. Based on findings during this period, homeowners can try to renegotiate sales prices. The contract period is the last time period that a buyer can exit the transaction without facing significant financial penalty. The city of Austin, TX altered the timeline of their energy audit requirement to require disclosure of results during the contract period instead of at the closing date, to allow homeowners to better incorporate information about findings from the energy audit into the home buying process (Bamberger 2012). Seven (Alaska, Austin, Kansas, Montgomery County, New York State, South Dakota, Hawaii) of the existing disclosure policies in the United States require disclosure materials to be presented before a purchase contract is signed at the beginning of the contract period.

Closing Date

The majority of federal and state transaction laws (unrelated to energy) that are focused on disclosure and consumer protection come into play at the closing date, the date at which the property transaction and acquisition are officially recorded on title (Bamberger 2012). Since this point is legally identifiable, it has been used as a “final” point at which energy disclosure is required in some policies, in the event that data on the form has been altered or updated since the first release at the purchase contract. While the closing date is a legally identifiable date, there is little chance of a consumer being able to factor in energy use data if received only at this point.

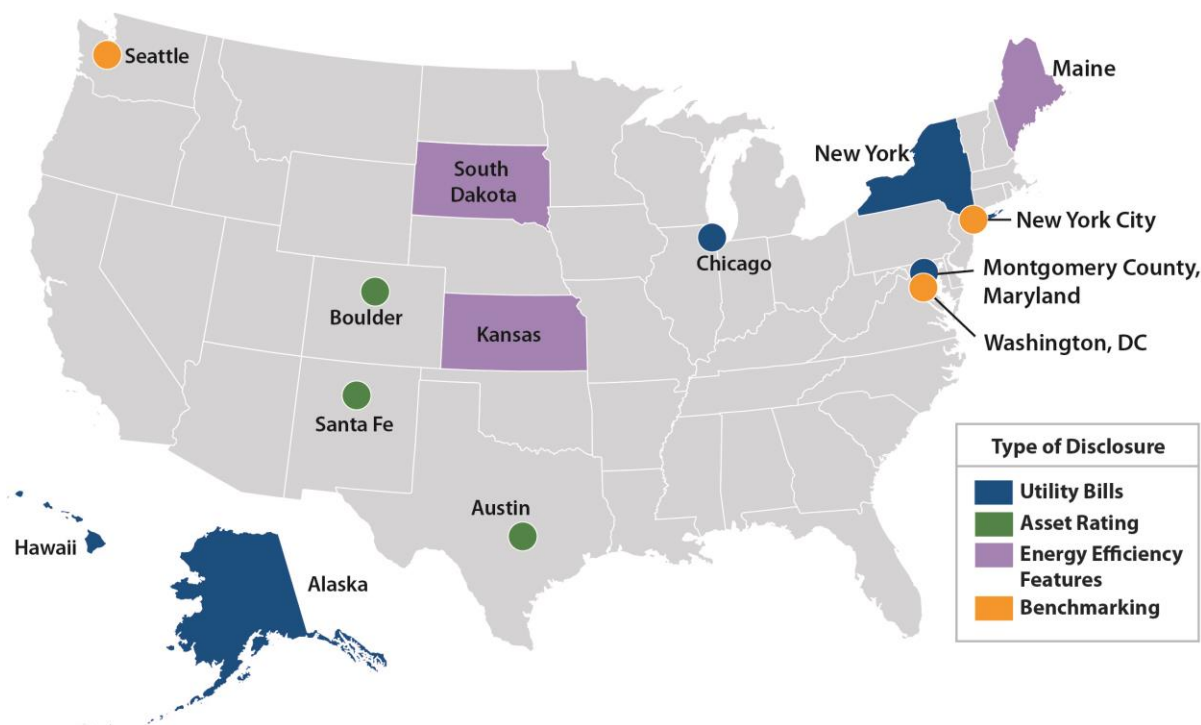
SCHEDULED DISCLOSURE

Scheduled disclosure is when energy use disclosure is required at a set date or at regular intervals rather than at a single point of transaction. All disclosure policies in the United States that require benchmarking for multifamily buildings require reporting of energy use information on a yearly basis. Other policies, such as the Multifamily Energy Conservation and Disclosure Ordinance in Austin, TX, set a deadline for when a one-time disclosure of energy audit results must occur.

U.S. Residential Energy Disclosure

The existing residential rating and disclosure landscape in the United States can be categorized as follows: (1) asset rating, (2) disclosure of specific energy efficiency features, (3) utility bill disclosure, and (4) benchmarking. Of the 14 current residential energy disclosure policies, a majority requires simple energy information disclosure in the form of a utility bill or a checklist of energy efficiency features. The following map shows the number and type of residential energy disclosure policies currently in effect in the United States.

Figure 2. U.S. Residential Energy Disclosure Policies



Results of initial implementation and information on program effectiveness is not available for all jurisdictions with disclosure requirements – for those with mechanisms in place to track compliance and effectiveness, and for those where there is anecdotal evidence on implementation, evidence is included in the next section. Lessons learned from experiences with each disclosure policy type (asset ratings, energy efficiency features, utility bills, and benchmarking) are detailed next. Reference the Appendix for a comprehensive look at the details of each disclosure policy researched for this report.

ASSET RATINGS: RESULTS AND LESSONS LEARNED

The asset rating has taken different forms in three cities in the United States (see Table 1). Austin, TX requires energy audits to be completed prior to sale of a home, and by a scheduled date for multifamily buildings, with audit results given to prospective buyers. Santa Fe, NM requires all newly-constructed residences to obtain a HERS rating and requires new homes to meet a certain threshold HERS level based on square footage, before certificates of occupancy are given (i.e., the labeling program establishes minimum efficiency requirements). Boulder, CO requires all new construction to meet a specific HERS threshold based on building square footage, while also requiring a HERS rating and/or energy audit for homes undertaking construction for additions/renovations.

Two of the jurisdictions we explore that have adopted asset rating requirements are characterized by the most extensive implementation and tracking efforts we have seen for energy disclosure policies – the cities of Austin, TX and Santa Fe, NM. A brief overview of

each policy discussed in this section will be given to provide context, but for more detailed information about each policy, refer to Appendix A.

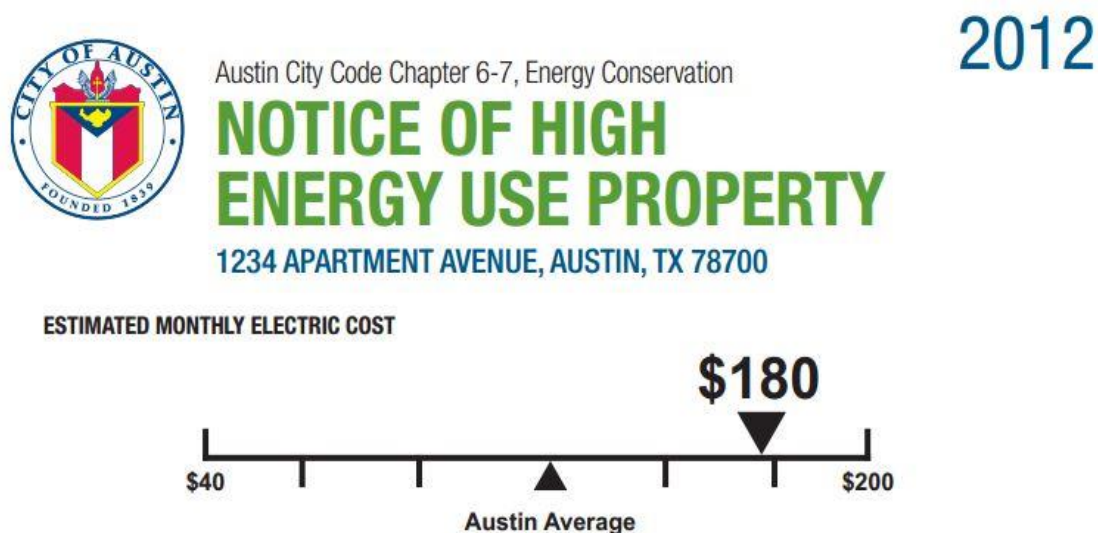
Table 1. Asset Rating Policies

Jurisdiction	Effective Date	Information Disclosed	Time of Disclosure
Austin, Texas	2009 2011	<u>Single-family homes</u> must be audited prior to sale and audit results disclosed to prospective buyers. Audit results are valid for 10 years. <u>Multifamily buildings</u> must be audited and audit results posted within the building. Some deficiencies found in the audit trigger mandatory upgrades.	Single-family homes: time of sale, before “option period” (i.e., contract period) ends. Multifamily buildings: scheduled, must be audited before June 2011.
Santa Fe, New Mexico	2008	Display of HERS ratings in new single-family homes.	Part of the building permitting process
Boulder, Colorado	1996, updated in 2007-2008	HERS ratings required for all new construction, energy audit and/or HERS ratings required for existing properties undergoing renovations and additions	Part of the building permitting process

City of Austin, Texas

Austin adopted the Energy Conservation Audit and Disclosure (ECAD) Ordinance in 2008, which required homes to have an energy audit conducted and an energy audit report presented to prospective homebuyers before the end of the “option period,” the period in which a potential buyer can cancel their contract to purchase the home (also referred to as the contract period). Multifamily properties are also included in this policy, in what are the most extensive requirements for multifamily building energy use disclosure in the country to date. Multifamily buildings are subject to having an energy audit performed before a set date (scheduled disclosure). For properties that are identified as having very high relative energy use (exceeding 150% of the average energy use of multifamily properties), energy efficiency improvements must be made to reduce consumption by 20% within 18 months of the audit. Prospective tenants must also be informed of the building’s high energy use via a posted form detailing the energy use of the building (see Figure 2).

Figure 3. A Section of the Form Used for Notice of High Energy Use for Multifamily Buildings



RESULTS

Between 2009 and 2012, a total of 36,423 homes were sold in Austin, with an average of 64% compliance with the residential energy audit requirement (see Figure 3). With a very high percentage of homes receiving some type of energy efficiency recommendation (97%), the City Council had a goal of 25% for number of retrofits undertaken (Kisner 2012). Low initial retrofit activity – of approximately 5.8% between June 2009 and September 2011 – sparked efforts to move disclosure of audit results from closing to the contract period, through amendments to the ordinance that took effect in May 2011.

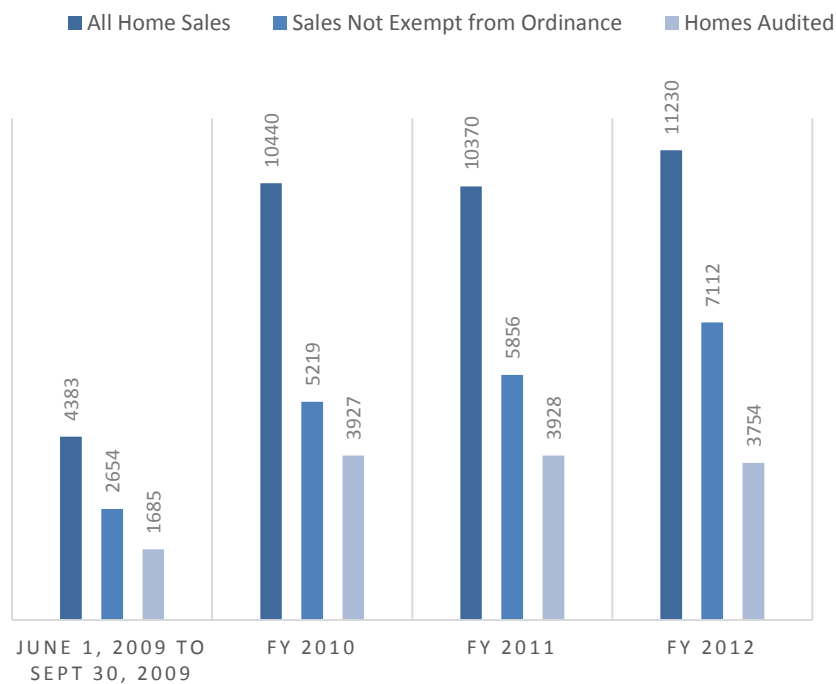
There are approximately 1,372 multifamily buildings in Austin as of 2012. Between October 1, 2009 and September 30, 2011, 574 multifamily buildings were audited, with 235 exempt because they had already taken on retrofit activity. By the end of FY 2012, 66% of non-exempt multifamily building were audited, a total of 724 buildings (Cordova 2013).

LESSONS LEARNED

A number of lessons from the initial results of the Austin ECAD Ordinance are important considerations in determining how best to design and implement a disclosure policy requiring an asset rating.

Timing of energy disclosure was important in allowing homeowners enough time to incorporate energy use information into the home buying decision making process. Initially the ordinance specified that audit results had to be provided “before the time of sale” which caused energy disclosure to occur too late in the real estate transaction process to allow for negotiation of prices or purchase improvements (Haines and Mackres 2011). While this information may have been useful to new homeowners in prioritizing what types of improvements to go forward with on their newly purchased house, the disclosure time did not leave any room for price negotiations based on results.

Figure 4. Compliance with Residential Audit Requirement in Austin between 2009 and 2012



Next, it is important to design disclosure programs with specific building stock and climate zones in mind to most effectively targeting energy efficiency upgrade potential while keeping audit costs down. Austin Energy designed the ECAD program with specific audit requirements to best serve existing Austin housing stock based on what program administrators and energy auditors knew from past experience in area homes. Energy audits are commonly performed with blower door diagnostic testing to pinpoint and assess the magnitude of air leakage in a building. However in Austin, blower door air leakage testing is not required in an ECAD audit. Instead, inclusion of duct blaster testing is required based on knowledge of the leakiness of ducts in the existing housing stock. Data from the first year of audits suggested significant room for energy improvement, as ducts leak almost twice the code standard of 10% duct leakage (Kisner 2011).

While air infiltration is still an issue in Austin homes, with approximately 80% of audited homes needing weatherization, the blower door diagnostic test is not necessarily required to make useful recommendations for improvement. By tailoring the ECAD audit to target Austin housing stock, program administrators aimed to keep the cost of the audit under \$300 for a typical single-family home (1,800 feet or smaller, with a single air-conditioning system) (Austin Energy 2012). A home energy audit generally costs between \$300-500 for an average size home. It is important to consider the price of an audit when designing an asset rating disclosure policy; experience with discussions to require a building energy rating in

Vermont, in the Vermont Building Disclosure Working Group indicated more widespread support for building rating options that did not exceed \$300.³

The Austin experience reiterates the importance of engaging with local stakeholders to design an ordinance collaboratively that can be agreed upon by various stakeholders. Partnering with potential opponents of the energy disclosure ordinance is seen as central to the passage and implementation of a policy. After the mayor of Austin released the city's Climate Protection Plan in 2007, the Energy Efficiency Retrofit Task Force was created to develop and recommend an ordinance that focused on energy efficiency upgrades during the time of sale of a home. The task force was composed of 28 stakeholders, including representatives from the real estate industry, homebuilders associations, HVAC associations, large commercial property owners, and lending organizations.⁴ Initial discussions focused on requiring mandatory upgrades, similar to the RECO ordinances seen in Boulder, Berkeley, and others.⁵ Opposition to mandatory improvements was significant, and focus was shifted by the Austin Board of Realtors (ABOR) to promoting energy efficiency upgrades through incentives and consumer education instead of mandatory upgrades. Strong realtor engagement and development in the process to create a policy many stakeholders could agree on led to passage of the ordinance and continued engagement by ABOR after the ordinance took effect. ABOR has remained involved in informing Austin realtors how best to go about complying with ECAD requirements, and released educational documents, as well as held trainings to educate their members on the ordinance.⁶

City of Santa Fe, NM

The Santa Fe, NM approach to building energy disclosure is unique in its incremental approach that ultimately required mandatory energy saving changes. All new homes in Santa Fe, NM are required to post HERS index ratings as of 2008. Initially, only a posted HERS rating was required – buildings were not required to reach a certain HERS score (see Figure 4). However, after one year of required HERS ratings, the City Council adopted the Sustainable Santa Fe Plan, which includes a Residential Green Building Code for new single-family structures that requires specific

What Is a HERS Rating?

A HERS rating (Home Energy Rating System) is a measurement of a home's energy performance that can be used for both new and existing homes. The home is rated based on an onsite inspection of the home's features. Under the HERS Index scoring system, the lower a home's score, the more energy efficient it is in comparison to the HERS Reference Home (RESNET 2011). The HERS rating is discussed further in a later section – Voluntary Rating and Disclosure Efforts.

³ The Vermont Building Disclosure Working Group was created as a result of the Vermont Energy Act of 2011 to study whether and how to require disclosure of energy efficiency information about buildings in Vermont. For more information, visit http://publicservice.vermont.gov/topics/energy_efficiency/bedwg

⁴ For a full list of involved stakeholders and their respective organizations, see the Task Force's final report: <http://www.austinenergy.com/About%20Us/Environmental%20Initiatives/ordinance/finalTaskForceReport.pdf>

⁵ For a comprehensive look at existing RECO ordinances please reference the ACEEE report, Policy Options for Improving Existing Housing Efficiency, see <http://aceee.org/research-report/a971>

⁶ ABOR's Guide to the City of Austin's Energy Conservation Audit Disclosure (ECAD) Ordinance: http://www.abor.com/gov_affairs/ABORBrochure.pdf

HERS scores be achieved according to home square footage. The Residential Green Building Code was developed through collaboration with the local homebuilder's association, realtors, and HERS raters, all of whom had experience with the initial HERS requirement during year one of the asset rating requirement.

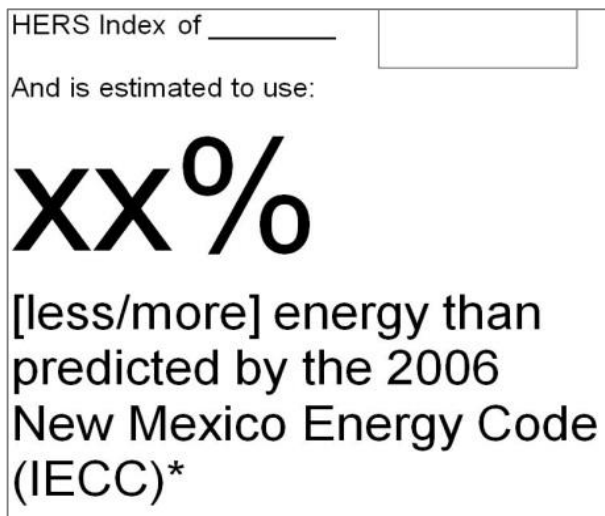
RESULTS

By the end of 2010, one and a half years into the mandatory labeling scheme, 121 permits had been approved under the code. In the early years of the labeling scheme and mandatory HERS requirements, area production builders have learned to successfully build homes that adhere to the HERS rating schedule, figuring out systems that make it relatively easy for builders to adhere to ratings. Production builders have also focused on training laborers to make sure appropriate construction techniques are being used to adhere to the new code requirements. Of the homes that fall within the 0 to 3000 square footage category, most have HERS scores between 68 and 70, falling very close to the required rating. The major builder in the area has not tried to lower HERS scores significantly past this threshold – the builder has been hesitant to change production practices to incorporate foam exterior into the building process, which would likely be the most cost effective next step in building a more efficient building envelope (Mortimer 2012).

The City of Santa Fe is looking to make amendments to the current green building code to include additions and remodels in the rating requirement. Compliance stands as a primary concern with the success of this addition, because there is a belief that many remodels are already done without obtaining permits, and a requirement to including ratings on homes

performing renovations may result in even more noncompliance.

Figure 5. HERS Index Label in Santa Fe, NM



The HERS rating requirements have also had an effect on homes built outside of the city limits of Santa Fe, down to nearby Albuquerque. Some production builders have begun to obtain HERS ratings for homes that fall outside of the city limits, even though they are not required, to better market homes in a slow economy. The demographic moving to the Santa Fe/Albuquerque area is largely characterized by retirees, for whom the ability to shore up finances and have energy costs under control is very appealing (Mortimer 2012).

Since the HERS requirement was put in place, New Mexico has adopted a new residential energy code, the 2009 New Mexico Energy Conservation code, which achieves energy savings about 20% beyond the 2006 IECC (OCEAN 2012). When compared to the new statewide code, the savings from a HERS score of 70 (30% savings from 2006 IECC, roughly equivalent to the 2012 IECC) are not as groundbreaking, however the requirements for

homes of large square footage are still more stringent and unique to the Santa Fe Green Building Code.

LESSONS LEARNED

Collaboration between stakeholders was crucial in the success of the asset rating policy in Santa Fe, as it was in Austin, TX. Katherine Mortimer, the Program Manager of Sustainable Santa Fe, who was instrumental in the implementation of the first HERS requirement and the subsequent Residential Green Building Code development, considers the importance of the collaboration among the local home builders association, HERS raters, and realtors as a key to success. As a result of one year of experience with HERS rating requirements that did not call for a specific HERS score target, builders and raters were able to build relationships and acquaint themselves with rating requirements and ways to meet standards if they were previously unfamiliar with the rating system and/or green building practices that would help them achieve required HERS scores. Additionally, the initial year gave stakeholders ample time to adjust building practices and gear up to meet workforce needs associated with rating all new homes. Mortimer believes that the buy-in and collaboration resulted in the ability to enact a code that was more stringent than if it had only been developed by Sustainable Santa Fe, a group of volunteer citizens that advise the city council on issues of sustainability (Mortimer 2012).

Comprehensiveness of implementation of the rating requirement in Santa Fe was also noted as important to its success. In part, implementation was fortuitously well timed for staff to devote time to program development and implementation with the slow economy – at the time of program implementation, the lighter work load of city building inspectors enabled a smoother transition to a new way of assessing code. According to Mortimer, program implementation required hundreds of hours of training for existing staff, to make the transition to new tasks. Three city employees are responsible for implementing the HERS labeling disclosure and Residential Green Building Code requirements: a green plan reviewer, a green building inspector, and the director of the Sustainable Santa Fe program, Katherine Mortimer.

Additionally, encompassing enforcement efforts into existing mechanisms for enforcement, and training officials who have the additional enforcement duties (code officials) was crucial in the compliance success noted in Santa Fe. The HERS labeling requirement is built into the existing structure of the building permitting process, and as a result, no one can obtain a building permit and a certificate of occupancy without adhering to HERS labeling requirements.

City of Boulder, CO

Boulder's requirement for all new construction residential buildings to obtain HERS ratings is embedded in a comprehensive program called the Green Building and Green Points Program. Boulder has a long history of implementing green building initiatives, dating back to the 1970s – as a result of the long standing presence of these initiatives and the comprehensive incorporation of these requirements as a part of the building code, area builders have become accustomed to the incorporation of the permitting and code requirements, as standard practice. In 2007, Boulder City Council adopted updates to the program that remain in place today, including the requirement for buildings to meet

performance based energy saving goals that must be verified HERS ratings and/or energy audits depending on whether it is new construction, or an addition/renovation (City of Boulder 2013).

Unique to the City of Boulder is the inclusion of additions and renovations in its rating requirements. For significant additions that increase the percentage of existing floor area by a specified amount that is dependent on total condition floor area, new construction standards apply to the entire building (HERS rating to meet specified energy efficiency threshold). For smaller scale additions and renovations a HERS score can be used to specify compliance, or a blower door test to ensure air infiltration on the entire building is below a 0.5 air exchanges per hour threshold. In Santa Fe, where the green building code is similarly designed, renovations and additions are not yet required to comply with the green building code. Concern about the failure to register for appropriate permits as a result of increased requirements is a concern of policymakers in Santa Fe. To date the City of Boulder has not done any evaluation on the effectiveness of their residential green building program – focus has instead been placed on evaluation of opportunities for commercial buildings – thus there is limited information available to address the concerns expressed in Santa Fe. The incorporation of rating requirements into the existing building permitting process has ensured compliance in Boulder in a similar manner to Santa Fe, since permits to build and certificates of occupancy cannot be obtained without adherence to HERS requirements.

TRENDS IN DISCLOSURE OF ENERGY EFFICIENCY FEATURES

Policies requiring sellers/builders/renters to provide a form indicating the energy efficiency features of a home include: Kansas, Maine, and South Dakota. In Nevada, a policy requiring disclosure of energy efficiency features was short-lived, and was repealed less than a year after its passage in 2011. The policies in South Dakota and Kansas target new homes, while the Maine disclosure law applies only to rental properties. A variety of features are disclosed on these forms, as detailed in the table below.

Energy Efficiency Disclosure in New Construction

Disclosure of energy efficiency features for newly constructed single-family homes and low-rise multifamily buildings are required in both Kansas and South Dakota. These policies require disclosure of building features and characteristics, and a statement of whether the home has been built to certain code standards (see Figure 5). While the Kansas disclosure form gives builders the option of disclosing whether they have built the home to 2006 IRC/IECC code, the South Dakota disclosure form requires builders to state how certain energy efficiency elements (i.e., insulation levels), compare to the 2006 IECC requirements.⁷ In South Dakota, builders are also required to disclose whether the home was built to the 2006 IECC. Neither Kansas nor South Dakota have a mandatory statewide residential energy code. While five jurisdictions in Kansas and four jurisdictions in South Dakota have

⁷ The IRC/IECC is the International Residential Code/International Energy Conservation Code, a model building code that establishes minimum design and construction requirements for energy efficiency.

adopted varying levels of the IECC, there are a number of builders who build in areas where the model energy code is not required (KEO 2011; BCAP 2010a).⁸

The treatment of voluntary code requirements as energy efficiency “standards” in both Kansas and South Dakota stands to serve a unique role in bringing attention to code-compliance practices in states where the reach of codes is limited. For states where IECC codes are not widespread, the extent of recognition of the IECC code as an energy efficiency standard to a prospective homeowner is likely limited, but with more context, may also serve to increase homeowner awareness of the state’s code requirements or lack thereof.

Figure 6. Energy Efficiency Features Disclosed

	Insulation Values (R-Values)	Windows/Doors (U-Values)	Mechanical Equipment Efficiencies (DHW, HVAC)	Appliances	Meets 2006 IECC Standards	HERS Rating	Energy Efficiency Certifications (e.g. LEED, ENERGY STAR, Rated)	Utility Costs	Fixed Lighting
South Dakota	x	x	x		x		x		
Kansas	x	x	x		x	x	x		
Maine	x	x	x	x				x	
Nevada	x	x	x	x			x	x	x

Forms disclosing the energy efficiency features of a home can prove helpful if context is given for explanation of these features, and if the form is disclosed early enough in the real estate transaction process. For example, the Kansas Energy Plan of 2007, which contained recommendations on improving existing policies and programs, suggested that “the timing of disclosure and the absence of specific information on the disclosure form undermine its effectiveness in informing buyers about the energy efficiency of new houses.”

Recommendations included form revision to: (1) present the energy efficiency information in a more “quantitative and comparative way” and (2) reflect the latest national and international standards, and providing disclosure on all new houses at the time of listing, instead of just at the closing (KEC 2007). The Kansas example suggests the importance of having the disclosure form itself independent of the body of the law, to allow for more frequent revision based on changing standards. In South Dakota, the disclosure form is not written into law. It instead requires the form to be prepared and disseminated by the South Dakota Real Estate Commission.

Another consideration brought to light in the South Dakota experience in discussions surrounding an energy efficiency disclosure form for existing homes is the option of adding

⁸ In Kansas, currently five jurisdictions have adopted an IECC, while most have adopted varying levels of the IRC. In South Dakota, the IECC and IRC have been adopted in a number of jurisdictions around the state – the IECC in four jurisdictions (two jurisdictions adopted the 2003 IECC, one the 2006 IECC, and one the 2009 IECC).

energy efficiency information to an existing residential disclosure form instead of creating a new form. Supporters of the disclosure (which was ultimately not adopted in South Dakota) advocated for inclusion of appliance and utility bill information on an existing Seller's Property Condition Disclosure Statement, which is already disclosed during the real estate transfer process. Including energy information on a form that is already accepted and in use by realtors may increase the likelihood of compliance and reception by realtors.⁹

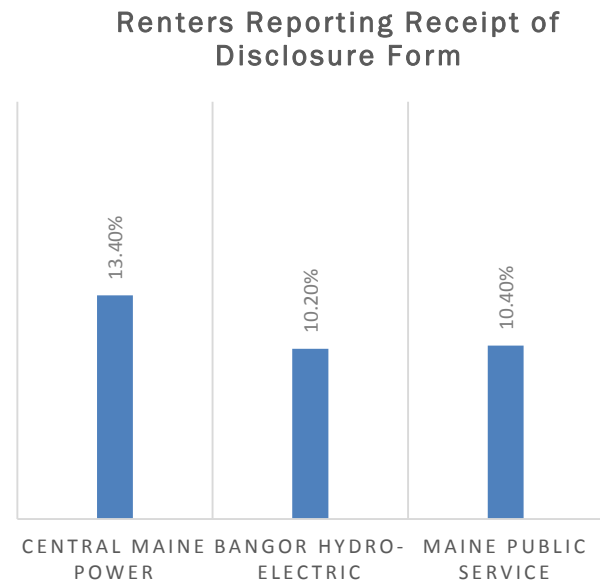
Energy Efficiency Disclosure in Rental Properties

In Maine, landlords and lessors of residential property that will be used by a tenant as a primary residence are required to provide an energy efficiency disclosure statement to any potential tenant or lessee. This disclosure statement includes information on heating systems, insulation, windows, doors, and appliances, as well as a note to indicate the right of renters to obtain a 12-month history of electric usage from the utility company. A "Suggested Energy Efficiency Standards" document was also created as a part of the policy, and although the standards are not mandatory, landlords/lessors must indicate whether the unit meets the suggested standards.

Information on the reach of energy efficiency disclosure statements in Maine is limited but a few data sets offer some information on how well informed renters and landlords are about the disclosure form. A report prepared by the Maine Public Utilities Commission to

assess the disclosure requirement for the Joint Committee on Utilities and Energy was released in December 2007, and concluded that the disclosure form was meeting the law's goals to a limited degree. A record of the number of times the disclosure form has been viewed on the Public Utilities Commission website indicates 6,292 total views of the webpage outlining the program, and 3,040 downloads of the disclosure form, which is about 2% of the 155,000 renter households in Maine in 2006. State electric utilities have gauged awareness of the disclosure form from renters signing up for electric service at a new location, at the request of the Public Utilities Commission. This data indicated a higher awareness of the disclosure form. For the first five months that the disclosure requirement was in effect, the percentage of renters reporting receipt of the form averaged 11.3% (see Figure 6).

Figure 7. Receipt of Disclosure Form by Renters in Maine



⁹ Utility bill disclosure efforts in Alaska and Montgomery County, MD have included this information on real estate disclosure forms that contain other important disclosures to the homeowner.

In the absence of robust public education and enforcement efforts and resources, attempts to educate landlords and tenants on the presence of the disclosure law have been taken up by a number of stakeholders. The Maine State Housing Authority (MSHA) has posted the form, suggested standards, and fact sheets on their website, has sent information to its associated owners and managers, and has also promoted the program at forums where landlords are likely to congregate, such as the MSHA's Affordable Housing Conference. The Maine Apartment Owners and Managers Association wrote about the disclosure requirements in a newsletter, and keeps members informed with quarterly newsletters. Lastly, the League of Young Voters Education Fund led canvassing efforts in the city of Portland, to raise awareness about the disclosure requirement. Over the course of two months, 84 volunteers spent a total of 286 hours canvassing or at events, reaching 684 people (MPUC 2007).

UTILITY BILL DISCLOSURE IN PRACTICE

Disclosure in a number of states in the United States has taken the form of utility bill disclosure. Policies requiring utility bill disclosure are found in Montgomery County, MD, New York State, Hawaii, Alaska, and Chicago (see Table 2). Sellers or landlords in these jurisdictions are required to provide as few as three months to as many as two years' worth of utility bill data to prospective homeowners or renters. While most policies mandate disclosure, others only require it if the buyer or renter requests the information.¹⁰

¹⁰ In New York State, utility bills are only required to be disclosed if a homebuyer requests the information from a seller before the closing. For rental units in Maine, renters have the right to obtain 12 months of electricity and natural gas use information by calling the local utility.

Table 2. Utility Bill Disclosure Policies

Jurisdiction	Effective Date	Disclosure Requirement	Property Type	Time of Disclosure
Hawaii	2009	3 months utility usage	Single-family homes at time of sale	Time of Sale, no later than 10 days after a purchase contract is accepted
Alaska	2008	Average yearly utility cost	Single-family homes at time of sale	Time of Sale, before a written statement/offer has been made
Montgomery County, MD	2009	12 months of utility usage	Single-family homes at time of sale	Time of sale, before a purchase contract is signed
Chicago, IL	1987	Projected annual and avg. monthly cost	Single-family, multifamily properties at time of sale, rental properties at time of rental	Time of listing
New York State	1987	2 years of utility bills	Single-family homes at time of sale	Time of sale, before a purchase contract is signed

Benefits and drawbacks to existing utility disclosure policies are echoed in numerous jurisdictions. On one hand, utility bill disclosure is the simplest form of energy use disclosure that a jurisdiction can require – almost everyone receives utility bills, has an idea of what they are paying in their current residence, and can compare costs dollar for dollar. On the other hand, utility costs can change significantly based on occupant behaviors and are not an objective rating based on the components and construction of a home. The Montgomery County, MD program administrator, Eric Coffman expressed this sentiment, voicing a concern about the utility of energy use data when presented to a homeowner. Since there are so many variables when it comes to how energy is used in a home, there is an obvious limit to how much can be gleaned from disclosure of energy bills without any additional information about the home, occupancy, and occupant behaviors. Program managers expressed that the primary value of this type of disclosure is to illuminate extreme energy use in a house, and increase awareness surrounding opportunities to make a home more energy efficient. While there are limits to simple utility bill disclosure, the disclosure of energy information at the right time in the home buying or rental process offers a platform for prospective buyers/lessees to engage in a conversation with sellers/lessors about energy costs that might seem out of the ordinary for a home type. Effectiveness of this type of disclosure, as with all energy disclosures in general, hinges on utility bills being available for a high percentage of buildings transferring hands so that buyers have the ability to compare similar homes against one another.

Access to Data

Additionally, past usage information is becoming increasingly easy to access with the switch to upgraded metering infrastructure. In Montgomery County, MD, easy access to

utility data eases the burden of disclosure to home sellers. When the law was first passed, the county was in the process of switching over to Advanced Metering Infrastructure (AMI) “smart” meters. The remaining outdated meters presented a challenge for obtaining utility information because (1) only 6 months of utility data were available upon logging into the website and (2) there were a number of homes that had multiple months of estimated meter readings (exacerbating the challenge of interpreting a utility bill for a potential home buyer by providing imprecise readings that a homeowner may mistake as an actual reading) (Coffman 2013). Homeowners are now able to access utility data easily online, reducing some of the challenges noted by realtors as challenges with a utility bill disclosure policy.

In Hawaii for example, the local realtor association contended that only three months of utility data should be required because of the challenges involved in obtaining bills. During the 2009 legislative session the Hawaii Association of Realtors (HAR) was involved in shaping this legislation, advocating against the requirement of disclosure of three months of actual utility bills. The HAR believed that obtaining three months of actual bills would be too challenging at the point of sale, and would be too difficult given the “potential confusion created by different types of utility bills” (HAR 2009).

In Chicago, efforts to update disclosure requirements have been led by Mayer Rahm Emanuel’s Innovation Delivery Team, a team supported by a fund from Bloomberg Philanthropies as a part of an initiative to help mayors design and implement solutions to pressing issues. Discussions to amend the ordinance leveraged advances in technology since the law was passed in 1987, to make utility bills easier to access in a timely manner and easier to understand in a standardized format. The old system required applications to be submitted to individual utilities for release of energy use data, and in turn utilities would send utility usage information via mail. An upgraded system where realtors enter utility information for a home when listing it on the MLS, and are linked to a system to obtain utility information in report form was advocated for. The MyHomeEQ platform, developed by the Center for Neighborhood Technology (CNT) has been highlighted in initial efforts to shift to a reporting method for energy use information that is standardized and easy to understand. Existing relationships between Midwest Real Estate Data (MRED), owner of the local Chicago MLS, and CNT from earlier efforts to green the MLS have proved important to developing a successful implementation strategy to complement the passage of amendments to the existing ordinance (Wheat 2013).

As of April 10, 2013, the following changes to the outdated ordinance passed in City Council, including (1) permission to pull energy use data from the web making it easier for realtors to access utility data (2) requiring that both natural gas and electricity costs be disclosed, instead of solely the heating fuel, (3) and simplification of the language requiring estimates for homes that have recently had heating systems replaced, and making the requirement for disclosure of the past twelve months of energy use data clear (Wheat 2013).

Lack of Tracking and Implementation Efforts

Despite the longtime presence of some of these policies, information on the number of homebuyers and renters taking advantage of this information is very limited. Unlike the asset rating policies that are in effect, few of these policies were met with resources to provide implementation strategies that resulted in widespread use or recognition. Formal

tracking of the effectiveness of these policies has not been undertaken in any of the jurisdictions listed above. In Montgomery County, for example, enforcement of the policy is “complaint based”. To date, the Office of Consumer Protection has not received any formal complaints about noncompliance (Coffman 2013).

Collaboration among Stakeholders

Important to the passage of the Montgomery County bill before the County Council was the partnership forged between the Department of Environmental Protection (MDEP) and the Greater Capital Area Association of Realtors (GCAAR) (Tiger et al. 2011). Representatives from MDEP and GCAAR worked to draft a bill to bring before the County Council that could be mutually agreed upon, after an initial more robust policy caught the attention of local stakeholders and was met with some resistance (Coffman 2013). The multi-stakeholder approach to involvement and bill drafting was viewed as instrumental in winning over the more “business-oriented” members of the County Council (Tiger et al. 2011).

Engaging local stakeholders for continued collaboration with the GCAAR after passage of the ordinance was important in making sure utility bill disclosures were made. MDEP collaborated with the GCAAR to create a uniform, easy to read one page form for disclosure of energy cost and usage history (sellers can also just provide copies of the 12 month history instead of using the form). Additionally, the GCAAR has an Energy Efficiency Disclosure Notice on the “Government Regulations, Easements and Assessments Disclosure and Addendum” document that serves to compile required disclosure information. As noted earlier, having energy disclosure integrated into an existing residential disclosure form that realtors are already familiar with and that homeowners have come to expect, as done in Alaska, may help increase the reach of this information.

Turning Information into Action

The Montgomery County program administrator, Eric Coffman, also suggests the value of embedding disclosure policy with an actionable program. In Montgomery County, a retrofit rebate program was developed after the disclosure law was passed in 2008, but it proved important to have a program for interested homeowners to feed into to go forward with making efficiency upgrades (Coffman 2013). During implementation of the retrofit rebate program, the program manager noted an anecdotal trend in homeowners wanting to make improvements on their homes before putting them on the market, in an effort to increase the value of a home for sale and decrease the amount of time it is for sale in a sluggish market (Coffman 2013).

Table 3. Multifamily Benchmarking Policies

Jurisdiction	Effective Date	Building Sizes	Information Disclosed
Seattle, Washington	2011-2013	Multifamily buildings 20,000 ft ² and larger	Disclosure of energy use directly to tenants, buyers. Disclosure to city government, but information will not be posted publically.
New York City	2010-2013	Multifamily buildings larger than 50,000ft ²	Disclosure of energy use to the city government and the public via a website
Washington, DC	2010-2014	Multifamily buildings larger than 50,000 ft ²	Disclosure of energy use to the city government and the public via a website or online database

BENCHMARKING IN PRACTICE

Benchmarking of large multifamily buildings, is an emerging policy in larger cities as part of broader benchmarking and disclosure mandates for public and commercial buildings. Although this type of energy disclosure is on a very different scale than the rest of the residential energy disclosure techniques being discussed in this report, it is included because of its application to large multifamily buildings. In the United States, seven cities and two states have benchmarking requirements that apply to public and/or commercial buildings; of these, three cities currently extend requirements to multifamily buildings (see Table 3). In New York City, exclusion of multifamily buildings would have meant leaving out a significant portion of the city's building stock. Seattle, New York City, and Washington, DC have benchmarking requirements that include multifamily buildings. Buildings in all three jurisdictions over a certain square footage are required to benchmark energy data on a yearly basis, by inputting utility use information into EPA's Portfolio Manager, which has emerged as the primary online energy management tool for benchmarking policies in the United States. While the specifics of each benchmarking policy are detailed in the Appendix, the following section explores emerging trends among multifamily benchmarking policies.

ENERGY STAR Portfolio Manager

The EPA ENERGY STAR Portfolio Manager is a free online tool that has become the predominant energy management tool for commercial buildings in the United States. Portfolio Manager allows building owners to track and assess energy and water consumption that has been normalized based on weather and fuel source data. Inputs required of multifamily properties include: (1) building address, (2) gross floor area, and (3) at least 12 consecutive months of energy use for all fuel types. Outputs for multifamily buildings differ slightly from the standard output capabilities of Portfolio Manager for other commercial buildings – while Portfolio Manager has the capability of comparing building to building via a rating scale from 1-100, this function is not yet available for multifamily buildings. Currently Portfolio Manager can provide a site and source energy use intensity and energy and water use tracking over time for multifamily buildings. Portfolio Manager also provides an annual CO₂ emissions estimate for all buildings.

As of the end of 2011 more than 260,000 buildings had been benchmarked (EPA 2012). Of the total buildings benchmarked, 13,000 of them were multifamily buildings (Krukowski 2012). The EPA is currently working with Fannie Mae to develop an energy scoring scale for multifamily buildings that is scheduled for release in late 2013 (Krukowski 2012).

Access to Aggregate Data

Benchmarking multifamily buildings presents a unique challenge compared to commercial buildings. In all three cities, building owners are not required to collect any energy usage information from residential tenants for individually metered units. In Washington, DC, buildings that are master-metered can be benchmarked in full, but for buildings with separately metered residential units, only benchmarking of the common area is required. Owners can obtain aggregate data for the whole building from the utility company and can enter this information once it is obtained. While the area electric utility provider, Pepco, is poised to provide aggregate building data as a result of the switch to smart meters, it is more difficult for the natural gas provider, Washington Gas, to do the same because of older system technology that does not allow for tracking as easily. While Washington Gas does plan to have an upgraded system by the end of 2014, it is not seen as a significant data gap because much of the gas in multifamily buildings in Washington, DC is master metered (Andreoni 2013). In New York City and Seattle, utilities have agreed to provide aggregate data for multifamily building owners. Access to aggregate data presents an opportunity for multifamily building owners to assess the energy performance of their whole buildings for the first time (Krukowski and Burr 2012).

Phased in Benchmarking Requirements

Phasing in benchmarking requirements based on building size, has been done in all three cities, and has helped to keep initial reporting numbers high. All cities are beginning with the largest properties, because they are more likely to be positioned to comply with requirements earlier on. In conjunction with the phasing in of reporting deadlines, significant fines have been put in place to combat non-compliance. Results for the Seattle benchmarking program for commercial and multifamily buildings that are 50,000 square feet or larger are now available for the first year of reporting: 87% of buildings reported energy data for 2011, representing about 1,160 individual properties, and more than 200 million square feet of building space (SOSE 2013). In DC, results for multifamily buildings are not yet available – the first reporting deadline in DC is April 1, 2013 for buildings 100,000 square feet and larger. In New York City, approximately 75% of the buildings required to submit data in 2011 did so. Of this batch, approximately 80% of submittals were multifamily housing properties (Krukowski and Burr 2012).

Resources to Aid Compliance

Availability of resources for building owners to learn how to comply with benchmarking requirements has been made available in all three cities, and is an important part of a benchmarking policy, particularly for smaller buildings that do not have a designated building manager. To assist building owners with the benchmarking process in Washington, DC, the District Department of the Environment (DDOE) has held training seminars and posted multiple guidance documents on their website including FAQ documents, compliance checklists, utility data release forms, and info sheets. In response to the new regulation the DC Sustainable Energy Utility (DC SEU), an offshoot of the DDOE, created a Benchmarking Help Center that is open 5 days a week for assistance. The DC SEU also has compiled a list of private companies that are benchmark service providers should owners choose to have benchmarking done for them.

While benchmarking data for individual buildings is required to be publicly available in New York City and Washington, DC via a website, the Seattle disclosure requirement does not call for individual building data to be posted publicly. Instead, Seattle requires energy data to be shared directly between building owners/managers and tenants/buyers (SOSE 2012). Although information is not posted publicly, buildings in Seattle are still required to authorize the city to download annual building performance reports.

Voluntary Rating and Disclosure Efforts

While many mandatory benchmarking/disclosure programs are in their first iterations, with the first sets of benchmarking data or disclosure information being reported, there are some voluntary labeling efforts that have been in existence for a longer period of time, and/or have been more closely assessed and evaluated for further development. In our

consideration of best practices for more comprehensive and widespread rating and disclosure in the United States, it is valuable to consider efforts that are being developed and piloted for use in future programs. To date, there are no mandatory labeling programs for existing homes in the United States; efforts to develop and implement labeling systems have been led by nonprofit organizations and the Department of Energy.

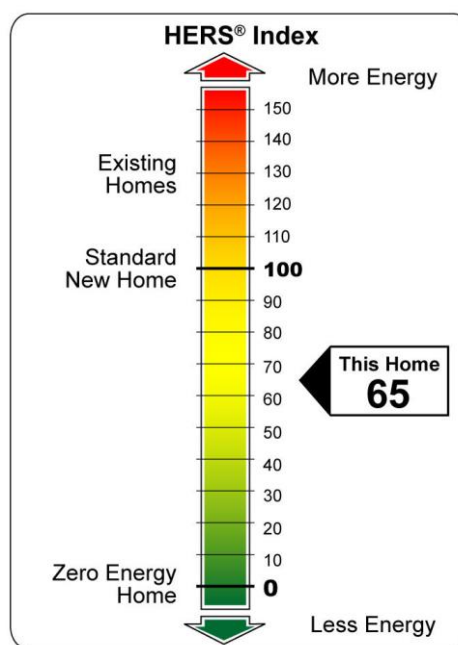
HOME ENERGY RATING SYSTEM

The Home Energy Rating System (HERS), developed by the Residential Energy Services Network (RESNET), provides an asset rating based on how a home is designed and built. A HERS rating gives homeowners and prospective buyers a way to assess a home's energy performance and helps identify improvements in existing homes. A HERS rating is required for a home to qualify for an energy-efficient mortgage, for ENERGY STAR certification, and for many energy efficiency programs that target new construction.

Under the HERS Index scoring system, the lower a home's score, the more energy efficient it is in comparison to the HERS Reference Home. A home built to the specifications of the HERS Reference Home (based on the 2006 International Energy Conservation Code) is awarded a HERS score of 100, and a net-zero-energy home scores 0. Each 1-point decrease in the HERS Index corresponds to a 1% reduction in energy consumption compared to the HERS Reference Home. Thus, a home with a HERS Index of 85 is 15% more energy efficient than the HERS Reference Home, and a home with a HERS Index of 80 is 20% more energy efficient (see Figure 7) (RESNET 2012a).

In support of HERS, RESNET has adopted standards for home energy audits conducted for HERS ratings, provides training and auditor certification, and approves energy modeling

Figure 8. The HERS Scoring Index



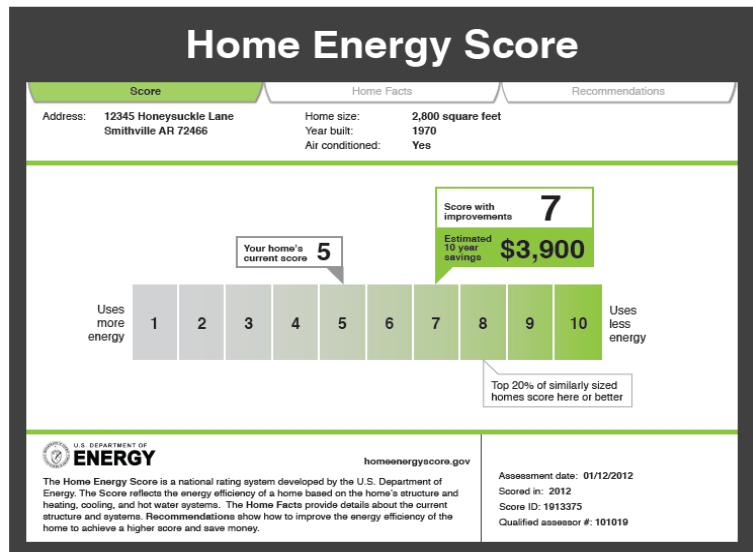
software eligible to calculate a HERS rating. Currently, three software programs are accredited by RESNET. As of 2009, there were more than 3,000 HERS raters nationwide, 88 accredited rating providers, and 29 rater training providers. The market penetration of the HERS rating stands out among other rating systems – more than one million U.S. homes have received HERS ratings, many in conjunction with the ENERGY STAR for Homes program and federal new home tax incentives. A rating typically costs \$300 to \$800 and may be paid for by a builder, homeowner, or other interested party (RESNET 2012a). HERS ratings are regarded as accurate estimates of energy consumption for new construction, but are not as accurate in rating existing homes (Faesy and Kramer 2012).

HOME ENERGY SCORE

The Home Energy Score label, developed by U.S. DOE, allows comparison of a home's energy consumption to that of other homes using a simple metric, similar to a vehicle's mile-per-gallon rating. Scores are on a scale from 1 to 10, with 10 representing a home that has excellent energy performance and 1 representing a home needing extensive energy improvements or upgrades. The score is based on a comparison of the home's estimated energy consumption, against a large group of homes in that climate zone. The Home Energy Score (see Figure 8) is an asset rating and may not reflect how a home performs as used by current occupants. The assessor gives the homeowner a list of recommended energy improvements and the associated cost savings estimates as well as the Home Energy Score label. The assessment process for the Home Energy Score is simpler than the HERS rating and therefore less expensive and less time-consuming, but may not provide the same level of accuracy or detailed information as HERS.

In summer 2011, U.S. DOE completed a set of pilot studies to test homeowner response to the energy score, home energy assessor training and reaction to the scoring tool, quality assurance methods, and climate adjustments of the scoring tool, among other issues. The studies were conducted in partnership with counties, utilities, and nonprofit organizations in nine states representing varied climates and regions and urban and rural communities as part of a range of program designs, many of which were already in existence and incorporated the HES into an established structure (e.g., comprehensive retrofits, public information campaigns, etc.).

Figure 9. An Example of the Home Energy Score Label



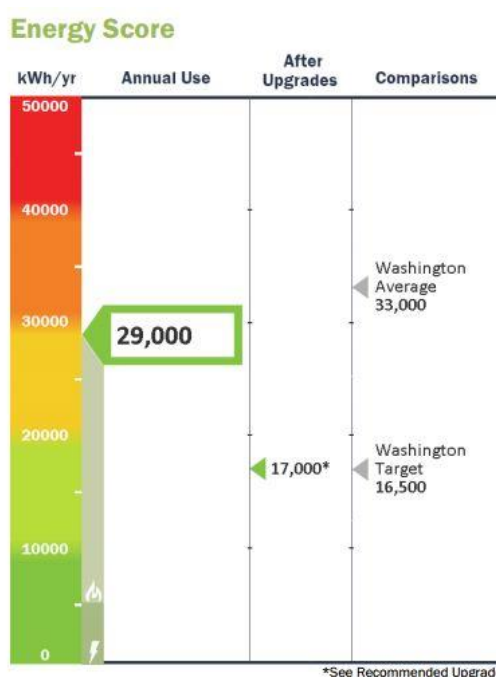
The EPS rating tool requires an audit be performed by a certified EPS auditor who inspects the home and then provides a scorecard that assesses current energy consumption, also making recommendations on improvements. Similar to the DOE HES, the EPS has been developed to provide an accurate assessment of a home's energy use with fewer auditor inputs than required for a HERS rating. The tool relies on SIMPLE, a spreadsheet based modeling program that requires only 32 inputs compared to the roughly 100 inputs required of a HERS rating (Weed 2011). The scorecard presents total estimated energy use in kWh/year on a color coded scale ranging from 0 to 50,000 kWh/year (see Figure 10). The scale also indicates the average energy use for homes in the area as well as the target energy use for area homes and the post-upgrade target for the rated home.

DOE provided \$11.5M in funding in 2010 to deploy EPS pilot programs in a number of cities in Massachusetts, Virginia, and Alabama. The EPS has been used on a voluntary basis for new homes in Oregon and for a 5,000 home pilot on existing homes in Seattle and a 1,200 home pilot in Bellingham, WA. A unique opportunity to compare two main rating programs in the United States came about, when the Earth Advantage Institute was selected by the DOE to compare the results of the Home Energy Score software (HES-Pro) to the results of the Energy Performance Score (EPS) in the 5,000 home pilot program in Seattle, WA. Results from this effort are not yet available.

SUMMARY

The HERS, EPS, and HES rating efforts show significant progress in developing a label that is trusted, easy to understand, low in cost, and accurate. Studies comparing the different rating systems have been performed to better understand the differences and remaining issues to date.¹¹ While barriers still exist, and while one score has not been highlighted as a superior rating system over another, efforts towards continued development of a rating system are crucial to increasing feasibility of implementing an asset rating labeling system. Research on consumer response to initial EPS and HES labeling pilots, as well as the more established HERS scoring is also necessary to consider before moving forward with an energy labeling scheme.

Figure 11. An Example of the Energy Performance Score Label



¹¹ A report from the Energy Trust of Oregon summarizes the efforts as of January 2012 to assess existing energy score tools. It is available at <http://energytrust.org/About/PDF/Jan23EPSReport.pdf>. Another report prepared for the DOE in November 2010 reviews a selection of home energy auditing tools in support of the development of the Home Energy Score Program. It is available at http://apps1.eere.energy.gov/buildings/publications/pdfs/homescore/auditing_tool_review.pdf.

International Residential Rating and Disclosure Efforts

While some international residential rating and disclosure programs are just beginning to emerge, other programs have been around for more than ten years. In the Australia Capital Territory and in Denmark, residential labeling schemes have been in existence for new and existing homes at the time of sale since 1999 and 1997, respectively. The most significant evaluations of the effectiveness of residential energy disclosure on home sales and home prices come from studies of these long running programs. Lessons from early international efforts also highlight the importance of aligning a number of policy elements to create successful results. The following section details existing mandatory residential rating schemes, as well as results available from evaluation of these programs. The broad reaching energy certification requirements of the EU Energy Performance of Buildings Directive are also detailed in this section.

AUSTRALIA CAPITAL TERRITORY, 1999, HOUSE ENERGY RATING SCHEME

One of the first mandatory energy disclosure laws went into effect in 1999 in the Australian Capital Territory (ACT). Sellers of residential properties in the ACT were required to provide information about the home's Energy Efficiency Rating (EER) to all potential buyers. Information about the EER must be provided as soon as a property is put on the market, and must be provided to consumers in all advertising material. The full certificate is supplied when the sale is made. The certificate includes the advertised building rating as well as improvement recommendations that are specific to the building (EWHA 2008). The EER is only a rating of the thermal performance of the building shell. The rating does not incorporate HVAC equipment, lighting, other fixed/moveable appliances, and occupant requirements for temperature control. The efficiency of a home is modeled using software called FirstRate, which takes into account features including building "fabric" (roof and wall composition), window design, orientation, air leakage, and cross ventilation (EWHA 2008). Home rating must be done when homes are listed on the market by an accredited ACT House Energy Rating Scheme assessor. Thermal modeling of the building was translated into a 0 to 10 star rating, with 0 stars meaning "the building shell does practically nothing to reduce the discomfort of hot or cold weather," while a 10 star home is unlikely to need any artificial heating or cooling (EWHA 2008). Compliance is aided by the ability of buyers to obtain financial compensation equal to 0.5% of the sale price of the home if sellers do not provide the EER rating and report (Dunsky et al. 2009).

Results

The program has undergone evaluation on two separate occasions, first in 2002, and again in 2008. The first evaluation presented anecdotal evidence that the rating system was encouraging sellers to improve homes, and that buyers valued homes that have higher ratings, while also uncovering considerable non-compliance and quality control issues. Sellers were not regularly including rating in all of the advertising for homes, only 39% of buyers received an audit report before the signing, 52% of homeowners didn't find the report useful and/or were confused by the rating, and about half of the ratings were made by assessors that hadn't actually visited the property (Dunsky et al. 2009). In 2008, a report was released to quantify the relationship between home prices and the energy efficiency rating of houses in the ACT. This report looked at data from over 5,000 home sales in 2005 and 2006, determining that EER is positively associated with house price. In 2005 the association was 1.23% for each 0.5 EER star and 1.91% in 2006. For a home valued at median

price (\$365,000), a 0.5 EER star increase would translate to an added \$4,489 in price (EWHA 2008).

AUSTRALIA NATHERS RATINGS FOR NEW RESIDENTIAL HOMES, 2010, ALL AUSTRALIAN STATES/TERRITORIES

The Building Code of Australia, passed in 2010, requires all new housing to be rated, and to meet a minimum energy rating of 6 stars or equivalent. The home energy rating builds upon the system set up in the 1990s in the ACT, using the same 1-10 scale to rate the thermal performance of the home. Homes are rated according to the Nationwide House Energy Rating System (NatHERS), which sets national standards for professionals and for rating software. The required 6 star level of compliance for housing can be satisfied in a few ways: (1) by complying with relevant Deemed-to-Satisfy Provisions; or (2) heating and cooling load reduction as measured by the energy rating software, and complying with specific energy saving features including testing and installation of insulation, thermal breaks, compensation for down-lights, floor edge insulation, and building sealing.

DENMARK, 1997-2006, MANDATORY ENERGY LABELING

Denmark was one of the first countries in the world to adopt a mandatory energy labeling policy for both residential and commercial buildings. Many years later, in 2003, the Energy Performance of Buildings Directive (EPBD) was adopted by the EU. Many of the lessons from the Denmark mandatory energy labeling program helped to build support and lay the groundwork for the much broader EU program. In 2006, the Denmark program was altered slightly to incorporate requirements set forth by the EPBD.

Beginning in 1997, all Danish buildings, new and existing, residential, public, and commercial, had to obtain a Specific Energy Label Certificate, providing information about the building's energy and water use as well as its CO₂ emissions. For small buildings (under 1,500 sq. meters, or 16,000 sq. feet) energy consumption for each building was calculated using energy modeling software at the time of sale. Different requirements were set in place for buildings over 1,500 sq. meters requiring actual energy use data to be disclosed.

Historically the labeling program was managed by the Danish Energy Agency (DEA), but was transferred to the Ministry of Climate and Energy in 2007. The Energy Labeling Council, under the DEA, was responsible for collecting data from certified energy consultants about building characteristics, ratings, and energy plans. All energy consultants are accredited by the Energy Labeling Council, and have to hold either an engineering or architecture degree (Dunksy et al. 2009).

Results

Between 2000 and 2001 the Danish Energy Agency conducted an evaluation of the program, which indicated that 45,000-50,000 energy labels were issued every year, with 70% of residential homes (single family) labeled at the time of sale. At the time of the survey, 50-60% of small buildings were registered under the energy labeling scheme, with wide variation in participation between geographic areas of 20-85%. Interviews with homeowners indicated limited knowledge of the existence of labeling – less than half of homeowners interviewed knew about the energy labeling scheme. The study did find that

new home owners planning to make renovations were more likely to incorporate energy efficiency improvements into renovations if the home had received an energy label.

An independent study conducted in 2009 for the years of 1999-2002 found high levels of non-compliance (50%) and revealed that receiving information at the time of sale of a home was not beneficial in persuading new homeowners to make energy improvements on their homes (Kjærbye 2008). While this study indicates the consequences of low penalties and limited enforcement in program success, it is also important to note some of the pre-sale improvement effects that are not captured by looking at post sale energy consumption. The impact of labeling on pre-sale improvements is said to be a “likely impact of mandatory disclosure policies” (Dunsky et al. 2009).

EUROPEAN UNION, 2003, ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE

The Energy Performance of Buildings Directive (EPBD) (2002/91/EC) was passed in December 2002, and went into effect in January of 2003. By January 2006, all EU member states had to translate the Directive into national law, with laws going into effect by January 2009. The main requirements of the Directive are based around main components that each member state must incorporate into national law. The EPBD requires all EU Member States to tighten their building energy performance standards, require regular inspections of boilers and air conditioners, develop and apply a methodology to calculate the energy performance of buildings, and introduce an energy certification scheme for buildings, residential and non-residential, new and existing.

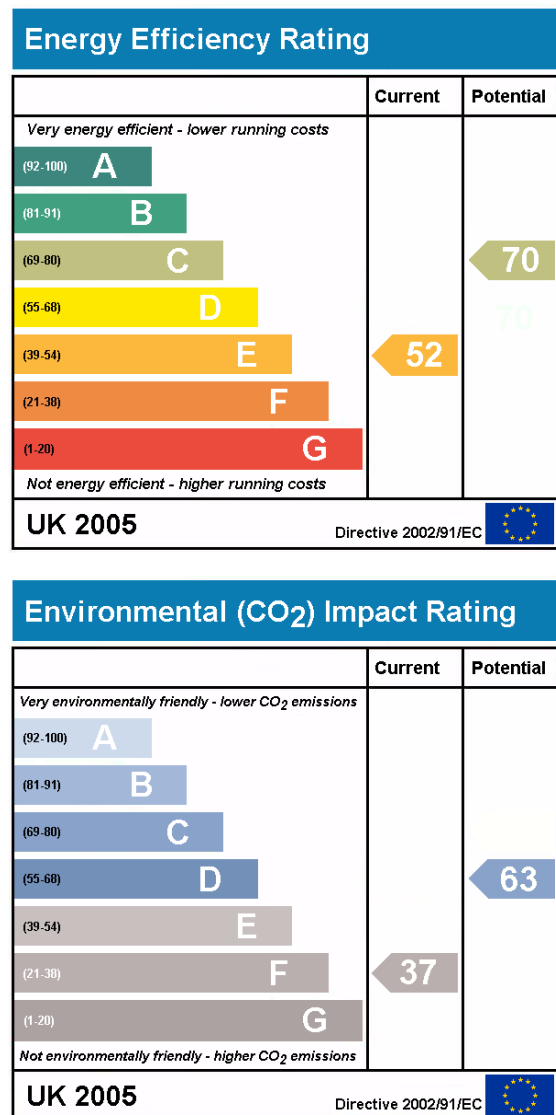
To assist in the development and introduction of national laws to meet the aforementioned EU Directive, a task that is often challenging for many member states, the European Commission launched a forum with officials from all 27 EU Member States plus Norway and Croatia in 2005. This forum, known as the Concerted Action (CA) EPBD was designed to promote dialogue and exchange of best practices between EU Member States. The CA is composed of national authorities responsible for implementing the Directive, who collaborate at a number of meetings, working groups, and networking events. The first CA ran from 2005 to 2007 but was immediately restarted to deal with impending 2009 deadlines for energy performance certifications going into effect. With the passage of the EPBD Recast (Directive 2010/31/EU), which strengthens energy performance requirements and streamlines some of the provisions from the directive it replaces, the CA is meeting again from 2011 to 2015 (under the name CA EPBD 2). The CA is funded under Intelligent Energy-Europe under the European Union’s Competitiveness and Innovation Programme.

The CA EPBD focuses on approaches to implementing the “Core Themes” of the EPBD. The “Certification Scheme” theme revolves around the implementation of mandatory certification of new and existing buildings, including creation, issuance, and display of energy performance certificates. This portion of the EPBD has a unique role of supporting the transition of the real estate sector towards energy efficiency, to increase the energy efficiency of the EU’s building stock (Thomsen and Wittchen 2010). While the EU directive largely leaves development of an energy performance certificate (EPC) up to each Member State, each state must develop their EPC program to have the EPC include recommendations for a list of cost effective improvements for the building, and reference values or benchmarks to allow consumers to compare energy performance of the building with similar buildings (Dunsky et al. 2009). This information must be provided by building owners to prospective buyers or tenants at the time of construction, sale, or rental.

The U.K. Energy Labeling Experience

Each Member State has slight variations on how to implement an EPC program. Early implementation efforts in the United Kingdom provide an example of how implementation of a new labeling scheme can be carried out by a Member State. Energy labeling is separated into two distinct categories of residential and non-residential. The EPC was initially part of a Home Information Pack, which included information about the property for the buyer, however in 2010 the Home Information Pack requirement was scrapped, leaving the EPC as a standalone document required in the transfer of property in the United Kingdom. Residential buildings are rated on a scale from A (most efficient) to G (least efficient) by an accredited assessor – the letter rating scheme and label format match that of the EU appliance labeling program (see Figure 11). The rating must be provided to potential buyers or tenants upon request, and also must be listed on all advertising material. Authenticity of the accreditation of a rater as well as the EPC can be checked on a central website (DCLG 2012). Each EPC is valid for 10 years, or until replaced with a newer rating. Failure to produce a residential EPC results in a fine of £200 (about \$325).

Figure 12. An Example of the U.K. Residential Energy Rating Scale



Energy Labeling in the Netherlands

The Netherlands was of the first countries to implement an EPC program. Since January 2008, EPCs have been required for all transactions occurring in the housing market. Ratings are performed by certified assessors who visit the home to collect data on the physical characteristics of the home. A score from “A++” for the most energy-efficient structures, to “G” for very inefficient structures, is issued by combining data from the home inspection with information from recent energy bills. This certificate is then registered in an official database. The certification process costs the homeowner about €200 (about \$270). Until the EPBD 2010 Recast, sellers could opt out of obtaining an EPC if the buyer signed a waiver.

A RICS report on the Economics of EU Energy Labels in the Housing Market provides insight into early experience with labeling in the Netherlands. Data from the first two years of implementation indicated only 17% of the total sample of home transactions (33,483 homes) obtained an EPC. Over the sample period from January 2008 to August 2009, the number of homes that had an EPC decreased dramatically, from 25% to 9% (Brounen and Kok 2010). This significant decline was attributed to early uncertainty regarding the consistency and reliability of the label from consumer organizations and the real estate industry. Early experience in the Dutch housing market suggests the importance of stakeholder buy-in, and a trusted labeling system for early implementation success.

Since homeowners could opt-out of obtaining an EPC in the early years of implementation, this study offers a unique look at the motivations behind certification of homes. Data suggests a higher likelihood to obtain an EPC in high density neighborhoods where average monthly income is low. EPCs were also more common in areas of weak market demand, suggesting that homeowners regarded an energy label as helpful in the home selling process. In a slow market, energy efficiency features can be a smart way to differentiate a home from others, decreasing time on the market.

Lastly, data from the Netherlands confirms there is a price premium of 6.1% associated with properties that hold an A, B, or C certificate. To control for the possibility that part of the price premium is explained by the better building quality of homes with a high rating, the study controls for differences in home quality, decreasing the price premium for a top rated home to 2.8%. The average transaction price for homes sampled is equal to €231,000, indicating a price premium of €6,200 at the point of sale (Brounen and Kok 2010). This data indicates willingness to pay for homes that have been labeled as more energy efficient, with the highest rated homes being sold for the greatest price premium.

Findings

While many of the existing disclosure policies have been characterized by a wide variety of policies, with varying implementation experiences, a number of trends emerge from the initial years of implementation. These trends are explored in the next sections.

THE VALUE OF ASSET RATINGS VS. OPERATIONAL RATINGS

Residential disclosure policies in the United States have predominantly been characterized by operational energy use information (with the exception of Austin, TX and Santa Fe, NM). This differs from the approaches that have been tried internationally. In the Australia Capital Territory, asset ratings with energy performance labels have been required since 1999. In Denmark, energy labeling has been in place since 1997. In the EU, asset ratings are required in all Member States as a result of the 2003 EU Energy Performance Buildings Directive. A primary value of asset ratings lies in the ability of a consumer to compare buildings on an equal footing, exclusive of how previous occupants may have operated the home. This has led to a price premium for highly rated buildings that has been documented in the Australia Capital Territory and in the Netherlands (EWA 2008; Brounen and Kok 2010).

While the value of asset ratings are apparent from international experience, operational ratings also play a useful role, that can continue to grow with increasing ease of access of energy information. Recent advancements in the access of utility data for homeowners can help energy use data reach a broader audience. In a call-to-action from the White House in 2011, the Green Button Initiative was launched to give consumers tools to help reduce their energy bills. With the increasing trend in widespread availability of energy use information, barriers that currently exist for customers trying to obtain past utility bills are greatly reduced. Standardized access to a year or two of energy use information reduces barriers cited by opponents of utility bill disclosure in the real estate transaction process, including (1) confusion associated with different types of utility bills as noted in Hawaii, and (2) challenges obtaining a year's worth of energy data.

Green Button Initiative

Green Button is based on the idea that electricity and natural gas customers should be able to securely download their own energy usage information from their utility or electricity/natural gas supplier to make more informed energy decisions. The industry led effort is based on adoption of a consumer and computer friendly technology consensus standard by utilities across the country, that allows software developers to leverage larger markets to support creation of applications to help consumers respond to their utility data (Chopra 2012).

Currently, a number of utilities around the country have committed to adopt Green Button, confirming that 27 million households will have easy access to their energy information. A number of private companies are also moving forward with development of web and smartphone applications to help businesses and consumers leverage energy use information.

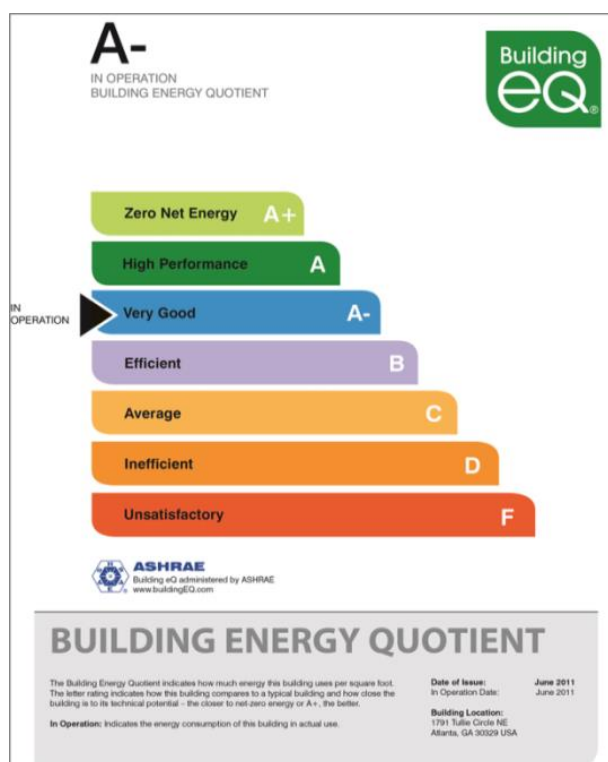
Providing homebuyers with energy use information gives buyers a platform for discussing trends in energy usage. For a home buyer considering multiple homes, viewing utility bills in conjunction with conversations with sellers about occupancy can help consumers make more informed decisions. Concerns regarding difficulty interpreting what utility bills mean are alleviated with (1) increasing standardization of bills (2) increasing comprehensiveness of utility information (e.g., fewer estimated readings), and (3) development of web and smartphone applications in concert with Green Button technology to ease interpretation of energy use information.

Operational ratings are required for all but one multifamily disclosure policy (in Austin, TX, multifamily buildings must have an energy audit). While an asset rating would certainly help to prioritize energy improvements for a large multifamily building, ratings quickly become prohibitively expensive in large buildings. Operational ratings have been successful in filling a role in the management of energy information that otherwise may slip through the cracks for building owners that don't traditionally have time to allocate to observing energy use patterns.

Compilation of energy use data for multifamily buildings in particular, allows owners to observe whole building that they have not yet had access to (in the case of individually metered units). Case studies in Seattle, WA have shown the utility of energy use disclosure in helping a property owner with multiple buildings recognize high usage over a portfolio of similar properties, to recognize problems and prioritize upgrades (SDPD 2012).

Efforts towards commercial building rating can provide insight into innovative energy disclosure approaches. The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) developed a voluntary commercial building label called Building Energy Quotient (bEQ) that is designed to illustrate how closely a building's measured performance aligns with its technical potential, providing both an operational and asset rating to rate a building's energy performance (see Figure 12) (ASHRAE 2011). Given that utility use data is becoming increasingly easier to access, and presented in more easily interpreted formats, an operational energy label combined with a forthcoming asset rating can provide a more near term step toward energy disclosure in the absence of a more detailed rating. Experience has shown that comparison of operational data use between households can be very effective in rousing behavioral change in home dwellers.¹²

Figure 13. An Example of ASHRAE's Building Energy Quotient



¹² Studies on the work of OPOWER, a company that partners with utility companies to send individualized energy report letters to customers that provide comparison of energy use between neighbors, have shown considerable reductions in energy use across the country (Allcott 2011).

THE IMPORTANCE OF A TRUSTED RATING SYSTEM

It is important to ensure the infrastructure and tools for implementation are mature enough before requiring implementation of a specific energy rating system for asset rating. The first years of implementation for labeling in the Netherlands were marked by a dramatic decrease in the number of homes labeled with an Energy Performance Certificate (EPC), from 25% in January 2008 to 9% in August 2009 that was attributed to uncertainty regarding the consistency and reliability of the energy label from consumer organizations and the real estate industry (Brounen and Kok 2010). Progress with the Home Energy Score, Energy Performance Score, and HERS is promising but barriers still exist regarding accuracy and cost, which should be addressed before any rating system is adopted on a widespread scale (Dunsky et al. 2009).

THE IMPORTANCE OF STAKEHOLDER SUPPORT

Disclosure policies that have been passed and implemented with the most success in the United States are characterized by engagement and open communication with stakeholders including the realtor community (Montgomery County, MD; Austin, TX; and Chicago, IL) and home builder associations (Santa Fe, NM). In Austin, TX, collaboration with the Austin Board of Realtors (ABOR) in the development, passage, and implementation of the ECAD Ordinance was important to the success of the program. Involvement of the Greater Capital Area Association of Realtors (GCAAR) in the development of a disclosure policy in Montgomery County, MD helped to win the support of business-oriented members of the County Council. Collaboration with Midwest Real Estate Data (MRED) in Chicago, has been important to developing an implementation strategy to complement the passage of amendments to the existing ordinance. In Santa Fe, disclosure laws requiring a HERS score familiarized local stakeholders, including the local homebuilder's association, realtors, and HERS raters with the labeling requirement, leading to a collaborative effort to enact HERS rating requirements that are now successfully met by builders.

THE LINK BETWEEN ENERGY EFFICIENCY DISCLOSURE AND BUILDING CODES

Three of the existing disclosure policies suggest a growing relationship between building codes and energy efficiency rating and disclosure. In Kansas and South Dakota, no statewide building energy code has been adopted, and homes are not required to adhere to a building energy code unless a local jurisdiction requires it, but energy efficiency disclosure forms for new homes in these states allow for disclosure of whether the home complies with 2006 International Energy Conservation Code (IECC).

Disclosure of compliance with the 2006 IECC code on the form raises questions of the significance of this assertion when (a) there are no mechanisms in place for verification of compliance to the 2006 IECC and (b) many builders in the state do not have to build to these standards and thus may be unfamiliar with how to comply with the code. Claims of code compliance either untruthfully or in error should be considered when weighing the validity of these assertions on energy efficiency disclosure forms.

In Santa Fe, NM, HERS labeling requirements have supported adoption of a more stringent code than required statewide. After an initial year of mandatory HERS disclosure without any rating requirements, a HERS requirement was written into the Residential Green Building Code. HERS ratings have popped up in other residential energy code

requirements in some local jurisdictions, including Brookhaven, NY, Fayetteville, AR, the city and county of Boulder, CO, and Taos, NM (RESNET 2012c). These supplemental codes are known as “stretch” codes, and allow municipalities to adopt more stringent energy codes within a larger jurisdiction (Faesy and Finlayson 2012). In Santa Fe, NM, the initial mandatory disclosure of HERS scores familiarized involved stakeholders with the process before they came together to negotiate residential green building codes for the city.

THE IMPORTANCE OF PROGRAM INFRASTRUCTURE AND RESULTS TRACKING

A successful energy disclosure policy requires infrastructure for implementation and evaluation. While a host of disclosure laws were passed in the United States between 2007 and 2009, the majority of the policies were limited by lack of follow through that led to low rates of awareness and compliance. As a result of limited allocation of resources to program implementation and data management, there has been little to no evaluation done on whether the data being received by homeowners is being used to influence decision making thus far. In Austin, tracking the number of audited homes that performed retrofit work revealed very low rates of action, prompting alterations to time of disclosure of energy audit results. The comprehensive program structure that is characteristic of Seattle, Washington, DC, and New York City’s benchmarking policies sets up jurisdictions to implement regulations that building owners are more likely to comply with, and that results are available for, for future evaluation and alteration. Tracking results of an energy disclosure policy is crucial to continuous improvement for better performance of the policy. Periodic evaluation is also crucial to supporting and justifying disclosure efforts.

Recommendations

Efforts towards energy disclosure and labeling in the United States can hardly be categorized by one approach, nor does one jurisdiction’s experience stand out as an ideal model for adoption elsewhere. Active monitoring of recent program implementation in the United States and voluntary pilot programs provide valuable insights on what makes a disclosure policy successful. Careful consideration of the existing disclosure efforts in the United States, and consideration of existing tools and systems, point to the following elements as instrumental to a robust and effective residential energy disclosure program.

REQUIRE A COMBINED ASSET/OPERATIONAL RATING FOR RESIDENTIAL HOMES

The resources necessary to provide a building with an asset rating or label are significantly more intensive than the resources required of an operational rating or a disclosure form. While a well-developed asset rating gives a homeowner a clear picture of how a home performs, lack of resources, as well as lack of political will for more costly requirements, can limit execution of programs that require asset ratings. Increased availability and standardization of electricity and natural gas use data allows ease of access to utility data, and with widespread availability of this data for homebuyers, we believe this first step in data disclosure can lead to homeowners making comparisons between similar homes and raising questions during the home buying process about energy use (and make it possible to develop benchmarking for single-family homes so buyers and renters can readily compare energy use relative to other homes).

Efforts in Chicago to amend the existing energy disclosure policy are a look towards the future of the increasing ease of obtaining utility data and displaying it in a user-friendly

format. Disclosure of energy information also provides an opportunity to present information on current standards or best practices for comparison, as used on the energy efficiency disclosure form in Kansas. Further down the road, when an asset rating system is more developed, a combined asset and operational rating similar to the ASHRAE Building Energy Quotient can provide buyers and renters with valuable information about a property.

RELY ON A TRUSTED RATING SYSTEM

A key ingredient for a successful residential labeling policy is a metric for measuring performance that can be trusted and understood. A successful labeling report should include not only an energy performance label, but also recommendations for action based on observed characteristics of the home. The report can be a vehicle for creating a link between information and action by including home performance and rebate programs to complement the rating. A nationally adopted rating system is appealing for the purposes of reducing confusion in the market about multiple rating systems, and focusing resources on creating an accurate but inexpensive system. However, it is also important to allow state/local customization to include location-specific recommendations and linkage to retrofit programs. For now, it is necessary to support more pilot programs and assessment of the results to determine the strengths and weaknesses of existing rating systems. There is not currently a system that stands out as a clear choice for a national rating system.

CONSIDER THE LOCATION EFFICIENCY OF A HOME'S ENERGY USE

An opportunity exists for a home energy rating to be complemented by information about the energy costs associated with living at a particular location through the integration of location efficiency information. The energy consumption associated with living in a particular location should not be overlooked in efforts to account for household related energy consumption, as it is the second largest expense for households in the United States (CNT 2012). If the end

Towards Better Valuation of Home Energy Use

Energy use disclosure can also play an important role in valuation of energy used in the home mortgage underwriting and valuation process. In the wake of the U.S. mortgage crisis, the importance of better valuation of property values and the borrower's capacity to service debt is apparent, and energy efficiency is an increasingly large part of the host of costs that a homeowner incurs when they purchase a house. On average, a homeowner spends over \$2,000 a year on energy costs, which is more than either real estate taxes or home insurance, which are already accounted for in mortgage underwriting. Efforts to better incorporate energy costs into the mortgage underwriting process are being taken on in Congress through the SAVE Act (Sensible Accounting to Value Energy). The SAVE Act would instruct federal loan agencies to assess a borrower's monthly energy costs when financing a house, increasing transparency of homeownership costs and better valuing homes that use less energy (Stellberg 2011). Incorporation of the amount of energy a home is expected to use into the home buying and mortgage underwriting process sets homeowners up for better success in being able to afford their home. A recent report by the Institute for Market Transformation provides compelling data on the value of energy efficiency in helping homeowners meet their mortgage obligations. The report assessed whether energy efficiency is associated with lower default and prepayment risks by looking at a national sample of 71,000 ENERGY STAR and non-ENERGY STAR rated single-family home mortgages, finding that default risks are 32% lower on average in energy efficient homes. Within the ENERGY STAR homes assessed, as a home uses less energy (has a lower HERS rating), the default risk continues to drop (Sahadi et al. 2013). Arming new homeowners with information on expected energy costs can go a long way towards providing a complete picture of the costs of home ownership.

goal is to provide homeowners with information on energy costs and consumption expected from a particular house, it is also important to consider transportation costs associated with that location. When considering the overall energy that a particular building is accountable for, as well as the overall energy costs associated with a certain location, it would be an oversight to disregard transportation costs.¹³ While our paper specifically focuses on energy disclosure of residential buildings, it is important to consider how future residential labeling and disclosure efforts can incorporate efforts to shed light on energy costs and consumption through a broader lens. Existing tools, including Walk Score and the Housing + Transportation (H+T) Affordability Index, provide metrics for transportation costs that could be useful for incorporation into an energy use rating in future policies (CNT 20120; 2012).

DISCLOSE PERFORMANCE DATA AT THE EARLIEST POSSIBLE STAGE IN THE TRANSACTION PROCESS

Experience with disclosure laws has demonstrated that the earlier in the process energy disclosure occurs, the better homeowners can incorporate this information into home buying decisions and negotiations. While the majority of disclosure policies come into effect at the time a written offer is made, as the contract period begins, the time of listing is even better suited for a timely disclosure. Requiring disclosure results to be released at the time of listing in all advertising materials encourages the highest visibility of energy performance ratings and allows buyers time to incorporate energy use information into the decision making and negotiating process. The Australia Capital Territory energy labeling law required the rating to be provided as soon as the home is put on the market and included in all advertising material, but a study of the program in 2002 indicated sellers were not consistently including ratings in home advertising. Consideration of opportunities for linking enforcement into already existing mechanisms within the transaction process is essential.

ENCOURAGE WIDESPREAD COMPLIANCE WITH STRICT ENFORCEMENT

The presence of widespread energy labeling information is crucial to moving towards greater incorporation of energy performance information in the home buying process, increasing the ability of homeowners to compare homes to each other. Tying compliance to points in the home buying process where actions are already enforced reduces the burden of adding additional infrastructure and staff. Keep in mind that it may be necessary to educate existing players in the process on how to incorporate enforcement of a new policy into current practices.

A unique opportunity exists for enforcement when labeling new homes. As demonstrated in Santa Fe, NM, a certificate of occupancy will not be granted for a home that has not met HERS labeling requirements, resulting in every new home built in Santa Fe having a new label. Even before Santa Fe adopted code requirements that called for a specific HERS rating, an informational rating could be enforced during final code inspections with proper training of code officials to enforce the new policy.

¹³ The paper, "A New Net Zero Definition: Thinking Outside the Box," from the *Proceedings of the 2012 ACEEE Summer Study on Energy Efficiency in Buildings*, provides a thorough discussion on consideration of transportation energy related to building location.

Large scale multifamily buildings with benchmarking requirements should set forth a compliance schedule that provides ample time to gear up for compliance, and hefty fines to dissuade non-compliance thereafter (as seen in Seattle, New York, and Washington, DC). Educational campaigns have a role in making a smooth transition towards compliance, but they cannot be a replacement for enforcement.

LINK TO RETROFIT PROGRAMS

It is important to keep in mind the end goal of reducing energy consumption when designing and implementing a residential energy rating and disclosure policy. Linking a residential home performance/rebate program to energy rating and disclosure requirements can bridge the gap between information and action in a jurisdiction's portfolio of energy efficiency programs. The Austin City Council set a goal to have 25% of audited households engage in retrofit work for the first year of the program. While first year results were low (6%), the defined goal has encouraged fine-tuning the program to better meet this goal. Similarly, RECO, or Residential Energy Conservation Ordinances can serve as a similarly timed upgrade to require energy efficiency upgrades on homes that don't meet certain standards.

Conclusion

Residential energy use disclosure is a promising area for policy intervention that is increasingly on the radar of policymakers, program administrators, and advocates alike. We have reviewed the initial experience with residential energy disclosure from a number of jurisdictions, and while there is significant variety in these policies, the spread provides a valuable look at what has worked and what has not in a very wide variety of jurisdictions and locations in the United States. Our research has also highlighted a clear need for further tracking and evaluation of existing policies to determine how energy use disclosure can affect home purchasing and rental decisions, and motivate homeowners to invest in efficiency improvements. This is crucial to supporting this promising policy option for passage in additional states and cities. Disclosure of energy use has the real potential to help people quantify the full cost of owning a home, facilitating more financially sound decisions that result in fewer defaults on mortgages (Sahadi et al. 2013). With limited bureaucracy and low program costs, valuable information can be made available for homeowners through residential energy disclosure policies, and it stands as a promising policy option for improving energy efficiency and transparency in the home buying process.

Contacts

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Appendix A: Residential Energy Disclosure Policies

ASSET RATINGS

City of Austin, Texas

Type: Audit and report disclosure

Applies to: Existing homes at time of sale

Year in effect: 2009

In an effort to take specific action towards reduction of greenhouse gas emissions, the City of Austin established the Austin Climate Protection Plan in 2007 (City of Austin 2011). One of the mechanisms to help meet the specific goals laid out in the Climate Protection Plan is the Energy Conservation Audit and Disclosure Ordinance (ECAD), approved in 2008 and amended in 2011. The ECAD Ordinance (Ordinance No. 20110421-002) amends the city code, requiring properties that are within the city limits of Austin and served by Austin Energy, the municipal utility company, to have an energy audit conducted before sale of the property. Results of the required energy audit must be disclosed to potential buyers at least three days before the end of the “option period,” the period in which a potential buyer can cancel their contract to purchase the home. Residential dwellings are exempt from the ECAD if they meet the following conditions:

- *Properties that are less than 10 years old.*
- *Properties that have already participated in the Austin Energy Home Performance with ENERGY STAR program within 10 years before time of sale and have performed at least 3 of the recommended efficiency measures, or received a rebate of \$500 or more from Austin Energy.*
- *Properties that have participated in the Austin Energy Free Weatherization Program within 10 years of sale.*
- *The purchaser of the home has signed an agreement to participate in the Austin Energy Free Weatherization Program.*
- *Manufactured housing built on a permanent chassis and designed to be used without a permanent foundation.*
- *Transfer of title to real property as a result of the following circumstances:*
 - *Homes sold through a foreclosure sale, trustee’s sale, or pre-foreclosure sale*
 - *Homes transferred from one family member to another*
 - *Through the exercise of or under the threat of eminent domain*
 - *Under a court order or probate proceedings*
 - *Under a decree of legal separation or dissolution of marriage*

The amendments to the city code identify Austin Energy (Austin’s municipal utility) as manager of the ECAD Ordinance. Auditors are approved to conduct ECAD audits by Austin Energy by attending an Austin Energy program orientation and by having one of two building science certifications: through RESNET as a Home Energy Rater; or through the Building Performance Institute (BPI) as a Building Analyst (Austin Energy 2012). Auditors must be equipped to collect quantifiable data on the following elements of a home: (1) duct leakage; (2) insulation levels; (3) air conditioning system condition; and (4) solar heat gain through windows. Austin Energy has compiled an online list of auditors that have met the above requirements. ECAD auditors can set their own price for the audit,

which generally ranges from \$200-\$300 for a typical size home. To ensure a certain level of quality, Austin Energy conducts random spot checks of ECAD audits. An audit includes: (1) inspection of the attic insulation; (2) pressure testing of duct systems; (3) inspection of weather-stripping around exterior doors, plumbing penetrations under sinks; and air tightness of attic entries, and (4) inspection of windows exposed to direct sunlight.

The ordinance requires a standardized form for the audit information, which was created as a part of the rulemaking to assist in the implementation and enforcement of the ECAD (Weis 2012). The energy audit data sheet serves as a summary for conditions observed during the audit. It includes information on attic insulation R-value; large air infiltration points including open chases, exterior doors, and plumbing penetrations; HVAC system manufacture date and efficiency; duct system percent leakage; water heater type; and type(s) of toilet(s). All auditors must submit summary sheets to the homeowner as well as to Austin Energy, where audit information is entered into a database (Austin Energy 2012).

Multifamily residential properties were required to conduct an energy audit before a set date – June 1, 2011. Owners were then required to post results in the buildings, distribute the results to tenants, and send them to Austin Energy. For multifamily buildings that were identified as having very high relative energy usage (exceeding 150% of the average energy use of multifamily properties), energy efficiency improvements must be made to reduce consumption by 20% within 18 months of the audit. Prospective tenants must also be informed of the building's high energy use via a posted form detailing the energy usage of the building.

The Austin energy audit program was designed with the articulated intention of encouraging residents to perform efficiency upgrades on their homes. Consumer incentives for completing retrofit work specified in an audit are available from Austin Energy and Texas Gas. Austin Energy offers incentives for qualified improvements with an average rebate of 20% of the cost of improvement. When combined with Texas Gas Service incentives, rebates cover 32-45% of the cost of efficiency upgrades (Kisner 2012). For residential properties, the City Council set a goal of having 25% of audited homes undertake retrofit work.

City of Santa Fe, New Mexico

Type: Asset rating (HERS)

Applies to: New residential single-family units

Year in effect: 2008

In Santa Fe, all new homes are required to post HERS index ratings (Ordinance 2007-38). The HERS ratings are performed by raters that are certified through the Residential Energy Services Network (RESNET) and a list of current HERS raters in the Santa Fe area is posted on the city website. The ratings of homes are posted on a standard form that was created by the Planning and Land Use Department, which must be displayed prominently in the window of each new building. The score is used to compare each home to the 2006 New Mexico Energy Code (see Figure 5). Initially, only a HERS rating was required – buildings were not required to reach a certain HERS score. However, after one year of required HERS ratings, the City Council adopted the Sustainable Santa Fe Plan, which includes a

Residential Green Building Code for new single-family structures that requires specific HERS scores be achieved according to home square footage. The Residential Green Building Code was developed through collaboration with the local homebuilders' association, realtors, and HERS raters, all of whom had experience with the initial HERS requirement.

As a result of the adoption of this code, specific HERS indices are now required based on the size of the structure (see Table A-1). For medium-size homes, the efficiency level required is moderate, while it becomes progressively more stringent for larger homes. In the first year, 80% of homes that were built were 3,000 square feet or less. Of the homes rated, a majority were in the 68-70 point range (Mortimer 2012).

Table A-1. Minimum HERS Index Requirements in Santa Fe, NM

Minimum HERS index is required as follows:	
Heated Square Footage	Required HERS Index
0-3000	70
3001-3500	65
3501-4000	60
4001-4500	55
4501-5000	50
5001-5600	45
5601-6200	40
6201-6800	35
6801-7400	30
7401-8000	25
8001-8500	20
8501-9000	15
9001-9500	10
9501-10,000	5
10,001 +	0

To aid builders with planning for attainment of appropriate HERS scores, builders are required to fill out a Residential Green Building Code Checklist as well as a projected HERS rating before they can obtain a building permit for each project. Once the Code Checklist and projected HERS rating are submitted, it is reviewed by the Santa Fe Green Building Code Administrator.¹⁴ A confirmed HERS rating is done at the end of the building process to account for any changes during the building process. The HERS analysis and performance testing is performed by a third-party rater, while the Green Building Checklist is addressed by the city green building inspector. The builder is responsible for all costs associated with the HERS analysis. All new construction projects must not only meet the Code Checklist point requirements, but must also be under the HERS score limit for the specified square footage. Also, before the home is issued a certificate of occupancy, the standard HERS index form must be displayed prominently in the home.

¹⁴ A Green Building Code Checklist addresses green building issues related to water, etc. in addition to energy, whereas the HERS rating only deals with building energy consumption.

Three city employees are responsible for implementing the HERS labeling disclosure and Residential Green Building Code requirements: a green plan reviewer, a green building inspector, and the director of the Sustainable Santa Fe program, Katherine Mortimer.

City of Boulder, CO

Type: Asset rating (HERS score, and energy auditing requirement)

Applies to: New residential single-family units and additions/remodels

Year in effect: 1996, revised in 2007-2008

The city of Boulder Green Building and Green Points Program requires rating the energy performance of residential construction, remodels, and additions to existing dwelling units. In Boulder, the disclosure of HERS and energy audit ratings is a part of the building code, which requires homes to be built to energy efficiency thresholds above the 2006 IECC. The Green Points requirements focus on construction waste recycling, and demolition management as well, but for the purpose of this report, we will focus solely on the energy efficiency aspects.

In order to obtain a permit for new construction, applicants must meet certain HERS requirements based on the size and housing type as listed in Table A-2.

Table A-2. HERS Requirements in Boulder, CO for New Construction

Type of Project	Square Footage	HERS Index (max.)	Energy Efficiency Thresholds Above Code (2006) (min.)
New Construction	Up to 3,000	70	30%
	3,001-5,000	60	50%
	5,001 and up	35	75%
Multi-Unit Dwellings	Applies to all	70	30%

Source: City of Boulder 2013

For additions and remodels, the requirements apply to additions of 500 square feet in area or greater. There are also thresholds for application of new construction standards to the entire building as a result of larger scale additions addition, which are dependent on the size of the addition and the

percentage of total conditioned floor area the addition contributes to. Additions that don't meet the thresholds in Table A-3 have a few options for demonstrating compliance with the energy efficiency requirements. All applications for a building permit for additions or remodels must be accompanied by a certificate that confirms a home energy audit has been performed. After work is done, homeowners can (1) demonstrate the building meets a specified HERS compliance score, if the energy efficiency of the entire structure is being

upgraded, or (2) parties can demonstrate that the new addition or the area subject to remodel meets the requirements of the IECC, in addition to completing a blower door test before applying for a building permit to prove that the home has an air infiltration rate of no more than 0.5 natural air changes per hour (ACHn). However, if the whole home has an air infiltration rate greater than 0.5 ACHn, the applicant is required to improve the home so that the ACHn is not greater than 0.5. For buildings with a very high infiltration rate of 1.0 or greater, the buildings must improve to have a rate 50% or less than the original blower door test, and buildings must be retested with the blower door to confirm. Remodels that do not substantially remove the interior finish of the thermal envelope (defined as less than 25% of total wall and ceiling areas of the conditioned space) do not have to comply with the efficiency requirements. While all remodels and additions do not have to have HERS ratings due to alternate pathways to compliance (blower door test, etc.), the Boulder policy is a strong example of how energy ratings can fit into an existing permitting mechanism for large additions and remodels of existing homes.

For new construction, a HERS rating is required of all single-family homes and multi-dwelling projects. HERS raters are required to be involved throughout numerous stages in the design and construction process. First builders and designers must work with HERS raters to create a preliminary draft HERS certificate to be submitted with building plans, which aid in planning for compliance before construction begins. During construction, a pre-drywall inspection is performed by the HERS rater to verify proper attention to air sealing and insulation is given. A final HERS certificate must be submitted to the city of Boulder before a Certificate of Occupancy is issued (City of Boulder 2013).

No evaluation of the program has been done to determine the success of the program in terms of uptake and energy saved from upgrades, although over the course of 10+ years of green building code requirements, area builders have become accustomed to the

Table A-3. Thresholds for Additions and Remodels to Adhere to New Construction Requirements

Total Proposed Conditioned Floor Area:	New construction threshold (percentage of existing area)
500 to 3,000 s.f.	100 %
3,001 to 5,000 s.f.	50 %
5,001 s.f. and up	25 %

Source: City of Boulder 2013

incorporation of these permitting and code requirements. For a rating requirement that is incorporated so cleanly into the building code such as this, mechanisms to ensure compliance already exist – permits to perform renovations, building additions, and new construction cannot be obtained without adherence to rating requirements.

ENERGY EFFICIENCY FEATURES

State of Kansas

Type: Energy efficiency characteristics form

Applies to: New single-family and multifamily buildings of four units or less

Year in effect: 2007

State of Kansas law (K.S.A. 66-1228) requires the builder or seller of a new home to disclose energy efficiency characteristics to the buyer or a prospective buyer at any time upon request before the signing of the purchase contract and again before the closing if changes have occurred or are requested. This law applies to previously unoccupied new residential single-family or multifamily buildings with four units or less. A standard disclosure form was created by the Kansas Energy Office that includes information about thermal boundary insulation values (as compared to the 2006 IRC/IECC) as well as efficiency values for the water heater and HVAC equipment (see Figure 12). The builder also has the option of providing additional information about the following energy efficiency standards that the home is built to: (1) the International Energy Efficiency Code (IECC 2006); (2) ENERGY STAR Qualified Home; (3) whether the home has received a Home Energy Rating (HERS) Index score of 100 or less. The simple two-page form also has a page of information on the

Figure A-114. Section of Kansas Energy Disclosure Form

Part 1: Builder *must* describe the following energy efficiency elements of this house:

	Actual Value	2006 IRC/IECC* Zone 4	2006 IRC/IECC* Zone 5
Wall Insulation R-Value		R-13	R-19 (or R-13 cavity + R-5 insulated sheathing)
Attic Insulation R-Value		R-38	R-38
Foundation Insulation R-Value			
Basement Walls		R-10/13**	R-10/13**
Crawlspace Walls		R-10/13**	R-10/13**
Slab-on-Grade		R-10, 2 ft depth	R-10, 2 ft depth
Floors over Unheated Spaces		R-19	R-30
Window U-Value		0.40	0.35
	Actual Value	Current Federal Manufacturing Standards***	
Water Heater			
Gas or Propane (Energy Factor)		0.67 – (0.0019 ×	****) =
Electric (Energy Factor)		0.97 – (0.00132 ×	****) =
Heating and Cooling Equipment			
Warm-Air Furnace (AFUE)			0.78
Air Conditioner (SEER)			13
Air-Source Heat Pump-Cooling (SEER)			13
Air-Source Heat Pump (HSPF)			7.7

[Note: Federal standards for geothermal heat pumps are not available.]

existing standards mentioned above and an explanation of the abbreviations listed on the form. The form was developed with input from the Kansas Homebuilders Association, the Association of Realtors, the Kansas Manufactured Housing Association, and the State Energy Office (BCAPa 2010). There is no provision for enforcement, thus the success of this law requires active participation by homeowners, sellers, and builders.

State of Maine

Type: Energy efficiency disclosure form

Applies to: Residential rental properties

Year in effect: 2006

In the state of Maine, the Legislature passed LD 2704, An Act Regarding Energy Efficiency Standards for Residential Rental Properties, requiring landlords and lessors of residential property that will be used by a tenant as a primary residence to provide an energy efficiency disclosure statement to any potential tenants or lessees (P.L. 2005 Chapter 534). Unlike the state of Kansas, the form is not written into law; it is instead delegated to the Maine Public Utilities Commission and the Maine State Housing Authority for preparation. These parties are also responsible for creating a document with “suggested energy efficiency standards” for landlords and lessors. The standards are not binding; they serve only as guidelines for landlords. The landlord or lessor must provide the disclosure form upon request and must

Figure A-2. Section of Maine Energy Disclosure Form for Rental Properties

Heating Systems	
<i>Space Heat</i>	
Tested heating system efficiency (minimum: 82%)	___% ___ unknown Test date: _____
Exposed pipes or ducts in unheated crawl space insulated?	___ yes ___ no
Heating fuels:	oil natural gas propane kerosene wood electric other
<i>Water Heat</i>	
Accessible domestic hot water pipes insulated?	___ yes ___ no
Fuels:	___ oil ___ natural gas ___ propane ___ solar ___ electric ___ other
Insulation	
<i>Walls</i>	
Insulated? (minimum: cavity filled)	___ filled ___ partially filled ___ no insulation ___ unknown
Insulation thickness:	___ less than 3" ___ 3-6" ___ more than 6"
<i>Ceiling</i>	
Insulated? (minimum: R-38 or cavity filled)	___ filled ___ partially filled ___ no insulation ___ unknown
Insulation thickness:	___ inches or R-___
<i>Floors over unheated areas</i>	
Insulated? (minimum: R-21 or cavity filled)	___ filled ___ partially filled ___ no insulation ___ unknown
<i>Basement wall</i>	
Insulated? (minimum: 2' below grade)	___ yes ___ no ___ unknown
Windows and Doors	
<i>Windows</i> (minimum: 2 panes of glass) ___ single pane ___ single + storm ___ double (DG) ___ DG + low-e (DG + low-e + argon gas) ___ triple or better	
<i>Doors</i> (minimum: insulated or with storm) ___ insulated ___ storm ___ insulated + storm ___ neither	
Appliances	
<i>Refrigerator</i> (minimum: post-1995) ___ yes ___ no ___ unknown Energy Star rated	
<i>Gas stove</i> (suggested electronic ignition) ___ electronic ignition ___ pilot light ___ no gas stove	

also post the form in a prominent location for all properties being offered for lease. Lastly, the law requires the Public Utilities Commission to prepare a report to the Joint Committee on Utilities and Energy before January 1, 2008, to assess whether the law was achieving the

purpose of informing prospective tenants about energy efficiency characteristics of residential properties.

Discussions to address rental property energy efficiency date back to 2005, when the 122nd Legislature enacted P.L. 2005 Chapter 109 which required the Public Utilities Commission and the Maine State Housing Authority (MSHA) to bring together interested stakeholders to settle on appropriate energy efficiency standards for residential rental properties and to create a disclosure form that landlords could provide to their renters. Stakeholders involved in this process included the Maine Apartment Owners and Managers Association, the League of Young Voters, the Commission, and the MSHA. In early 2006, recommendations were presented to the Joint Committee on Utilities and Energy, and soon after the 122nd Legislature enacted the disclosure law.

The disclosure form is straightforward, including information on heating system efficiency and fuel type, water heating fuel type, ceiling/wall insulation, window and door type, and basic appliance age and efficiency info (see Figure A-1). Although the form does not require that utility usage is included, it states the right of renters to obtain a 12-month history of electric usage by calling the local utility company. At the top of the form, the landlord must indicate if the unit meets minimum energy efficiency guidelines that have been suggested for rental units (these minimum energy efficiency guidelines are listed on the form) (see Figure A-2). The second page of the two page disclosure form provides additional information on the terms used in the disclosure form. No penalties exist for non-compliance, however a fact sheet developed by the Public Utilities Commission states that if a landlord does not comply with the law, renters should contact an attorney to determine how to address the problem (MPUC 2007).

Figure A-3. Section of Maine Disclosure Form where Landlords Are Required to Indicate Whether the Unit Meets Voluntary Minimum Energy Efficiency Guidelines

This rental unit ___ meets/ ___ does not meet/ ___partially meets (*check one*) the minimum energy efficiency guidelines suggested below for rental units in Maine.

The “Suggested Energy Efficiency Standards” document is a list of very general energy efficiency recommendations on the following areas: space heating system, insulation, windows and doors, and appliances. Instead of specifying particular efficiency levels for heating equipment and insulation levels, the form suggests for example, “insulate wall cavities to capacity.” Because the suggestions are simple in nature and not overly complex, some members of the group of stakeholders proposed that the suggestions be mandatory to encourage improvements in regions where market pressures from the disclosure form may not be enough to promote change (e.g., buildings frequently sold and resold, rentals with long-term residents, and regions where demand is weak and housing choices are limited) (MPUC 2007).

State of Nevada

Type: Energy efficiency characteristics form

Applies to: Existing homes at time of sale

Year in effect: January 2011, repealed in June 2011

The Nevada residential energy disclosure law (Nevada Revised Statute 113.115), although short lived, required sellers of residential real property to prepare an “Energy Consumption Disclosure Form.” Shortly after the law was passed in 2010, it was repealed and replaced by a law that instead establishes requirements for licensure of energy auditors by the Real Estate Division of the Department of Business and Industry, and establishes requirements for training and qualifications for an energy auditor. The residential energy disclosure law did gain the attention of the real estate industry from various real estate agents in the Nevada markets. In blog posts, some realtors chose to play up the “green” aspect of their real estate practice by supporting the disclosure law, while others voiced concern about the utility of receiving energy bills without any additional information to explain the results. Opponents contended that information on the form was too complex for homeowners to obtain themselves, and would require a certified home inspector to obtain, thus making the form an overly excessive financial burden.

The form included opportunities to provide: (1) monthly utility cost and consumption, (2) insulation type and areas insulated, (3) appliance ages and whether they are ENERGY STAR, (4) HVAC/water heater system age and efficiency rating, (5) types of windows/doors/skylights/roof, (6) fixed lighting types, and (7) if the unit received an ENERGY STAR label or if it was constructed to a “model energy code.” Both major utilities in Nevada – Nevada Energy and Southwest Gas – agreed to make consumption and cost data easily available for customers either by phone or online.

State of South Dakota

Type: Energy efficiency characteristics form

Applies to: New residential buildings

Year in effect: 2009

South Dakota law (SDCL 11-10-8 to 11-10-10) requires builders or sellers of previously unoccupied residential buildings to disclose to the buyer or prospective buyer information about the energy efficiency of the building. The law applies to single-family or multifamily buildings of four units or less. According to the law, the disclosure form shall be prepared and disseminated by the South Dakota Real Estate Commission. The required disclosure statement is written into the law, and includes the following information: (1) if the building was built to meet the standards of the 2006 IECC, (2) if the building has received any other efficiency certification, (3) insulation R-values, (4) window and door U-values, and (5) if the HVAC and water heater are ENERGY STAR certified. The disclosure form can be found both on the South Dakota Real Estate Commission website and the South Dakota Homebuilders website. The law has no mechanism for enforcement. It is to be provided to buyers before the purchase contract is signed and again prior to closing if changes have been made.

Additional energy efficiency disclosure legislation for existing homes was discussed in the South Dakota Senate in 2009, at the same time a new home efficiency disclosure form was considered but not adopted. On the Seller's Property Condition Disclosure Statement for all home sales (which covers items unrelated to efficiency), the Public Utilities Commission supported having appliance efficiency questions, as well as a section for reporting 12 months of utility data. On a mockup of the three-page form that otherwise covers items unrelated to efficiency, four energy efficiency questions about the home were included, as well as a section for reporting of 12 months of utility data. The energy efficiency questions could be checked "yes", "no", or "unknown". A representative from the South Dakota Association of Realtors indicated that the current line items on the seller disclosure form that have yes, no, or unknown options already are regularly checked "unknown", and that inclusion of energy efficiency features with the option to check "unknown" would be useless. Regarding the disclosure of utility cost and usage, the representative indicated that this information is "typically already listed on the marketing sheet that is used by real estate agents" (Mercer 2009). While questions of the usefulness of adding energy efficiency items on the existing disclosure sheet were plentiful, unanimous support was expressed for the new home energy efficiency disclosure form, by parties including the South Dakota Rural Electric Association, the South Dakota Home Builders, and the South Dakota Manufactured Housing Association (Mercer 2009).

UTILITY BILLS

State of Alaska

Type: Utility bill disclosure, energy efficiency characteristics form

Applies to: Existing homes at time of sale

Year in effect: 2008

In 2008, the State of Alaska passed a law requiring that a written disclosure statement be provided by the seller of a residential real property before a written offer is made by an interested party. The statute is titled "Disclosures in Residential Real Property Transfers" and is implemented by the Alaska Department of Commerce, Community, and Economic Development. Exemptions include (1) homes that have never been occupied, and (2) homes for which both seller and buyer agree in writing to waive completion of the disclosure statement. A standard form is used for disclosure – the form has not been created exclusively for disclosure of energy use information, rather it includes energy information on a residential real property transfer disclosure form. The two energy related items on the form are: (1) a checkbox to indicate adherence to the state Building Energy Efficiency Standard (BEES PUR 101 Rating), and (2) a section to list average annual utility costs (AHFC 2012). Other critical information listed on the form includes: property features, structural components, documentation, and disclosure of any existing drainage, roof, water supply and well, sewer system, and pipe freeze-up issues. The disclosure is required for any transfer of property, including lease with an option to purchase. It otherwise does not apply to rental housing. The disclosure statement must be delivered before a written statement is made for the property. If a disclosure statement or material amendment is delivered to the transferee after a written offer has been made, the transferee can terminate the offer by delivering a written notice of termination within 3 days.

Although no data is available on the use of this form, it is expected that due to the cross cutting nature of the information on the form, it is at least included during time of sale interactions between buyer and seller. We believe modest changes to this form in the future could include additional line items to indicate ENERGY STAR appliances, efficiencies of heating, cooling, and hot water equipment.

City of Chicago, IL

Type: Utility bill disclosure

Applies to: Residential properties at time of listing, rental properties where tenants are responsible for heating costs

Year in effect: 1987

The city of Chicago requires heating cost disclosure for rental properties at the time of rental, for rentals where the tenant directly pays for heating costs, and for homes at the time of any offering for sale. For rental units where the tenant is responsible for heating costs, building owners must disclose to tenants the projected annual and average monthly cost of utility service based on energy consumption during the most recent period of twelve months that the building was continuously occupied. The information must be provided only the first time a particular building or unit is rented, and the information must be provided before any written or verbal agreement is made to enter into the lease and prior to any exchange of money – owners cannot execute a written lease without making the above disclosures within the lease. Similarly the tenant or applicant is required to execute a receipt acknowledging that the disclosure has been made. For residential single-family and multifamily buildings being sold, owners are required to provide copies of bills or receipts for heating fuel costs or usage for the unit for the previous twelve months that it was continuously occupied at the time of “offering for sale” (time of listing) (City of Chicago 2011).

For disclosure of utility information in buildings for both sale and rental that have been recently converted to a national gas or electric heating system, or for a new building that does not have energy use history yet, the owner is required to provide estimates of energy consumption of the utility that will be used for primary heating. These estimates must be performed by a method detailed in the Handbook of the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAM) known as the “degree day method”.

The regulations also require utilities to provide utility information at no additional cost to building owners. In addition, the utility company was required to devise the Heating Cost Disclosure form, which is in turn released to buyers/renters. Enforcement of this law is complaint driven – all complaints are received by the Chicago Department of Business Affairs and Consumer Protection. If a complaint is made, the Department sends the landlord/seller a letter that details his obligation to disclose energy use information (City of Chicago 2011). No formal tracking of this policy has been undertaken; there have been very few complaints submitted on behalf of these regulations.

Recent efforts in Chicago in the spring of 2013 have focused on amending the utility disclosure requirements to streamline energy disclosure and increase the effectiveness of

existing requirements. Currently, the City of Chicago is working to pass an amendment to the existing utility cost disclosure ordinance (Chapter 5-16 of Municipal Code).

State of Hawaii

Type: Utility bill disclosure

Applies to: Existing residential buildings

Year in effect: 2009

In Hawaii, residential property owners are required to disclose the electricity costs for the most recent three-month period in which the property was occupied. No proof or copies of the electricity bills are required, but sellers must make a good faith declaration of their usage. This law was an addendum to the existing “Mandatory Seller Disclosures in Real Estate Transactions.” The law only applies when the owner directly pays the utility bills, and does not apply if a house is sold under foreclosure or where there are no utility accounts associated with the property. For example, if a seller was renting out the house for the three months prior to sale, and tenants were paying the bills, the seller is exempt from disclosing bills. Rental transactions are not included in the disclosure of utility information. Disclosure of energy bills must be completed no later than ten days from the acceptance of a real estate purchase contract.

The State of Hawaii has established the Hawaii Clean Energy Initiative (HCEI) to facilitate a transition to the use of 70% clean energy by 2030. In a technical analysis of clean energy policy options for the HCEI by the National Renewable Energy Laboratory (NREL), recommendations were made to expand the existing disclosure policy to rental units, and to expand the scope of the existing disclosure requirement by requiring a standardized form and more detailed assessment (energy audit) and corresponding disclosure (Busche et al. 2010).

Compliance with this law is unknown, although it is apparent that realtor associations have given the requirement consideration. The Hawaii Association of Realtors has released a Frequently Asked Questions document to guide realtors in compliance with the disclosure laws. In response to this law, the HAR has updated the Seller’s Real Property Disclosure Statement to include an area to disclose utility information.

Hawaii is currently considering a bill to extend utility bill disclosure requirements to renters and lessees (H.B. 1407 2013).

Montgomery County, Maryland

Type: Utility bill disclosure

Applies to: Existing homes at time of sale

Year in effect: 2009

A 2008 Montgomery County, Maryland law (County Council Bill 31-07, Montgomery County Code Chapter 40-13B) requires the seller of owner occupied single-family homes and condos to provide information on utility usage as well as information on opportunities for home energy efficiency improvements to a buyer before a contract is signed. The seller must provide copies of all applicable bills or a cost and usage history for the 12 months

immediately prior to sale, unless the home was unoccupied during that time. If the home stays on the market for 6 months or more, utility disclosure information must be updated. Enforcement of this law is complaint driven – complaints are submitted to the Office of Consumer Protection, which is responsible for receiving inquiries and complaints about the law (Coffman 2013).

MDEP collaborated with the GCAAR to create a uniform, easy to read one page form for disclosure of energy cost and usage history (sellers can also just provide copies of the 12 month history instead of using the form). Additionally, the GCAAR has an Energy Efficiency Disclosure Notice on the “Government Regulations, Easements and Assessments Disclosure and Addendum” document that serves to compile required disclosure information. The component of Montgomery County’s disclosure law requiring information on opportunities for home energy efficiency has been satisfied by providing homeowners with a number of websites to consult for more information. MDEP, in conjunction with GCAAR, created a site compiling links for home buyers on comparing energy usage to neighbor’s, home energy audits, and energy efficiency financing. A forthcoming improvement in website materials will likely use the existing GCAAR platform to link to My Green Montgomery, a portal to information on energy saving tips and projects, and incentives and programs available to homeowners.

State of New York

Type: Utility bill disclosure

Applies to: Rental/sale existing properties

Year in effect: 1981

The New York State Truth in Heating Law (New York Code 17-103) is one of the oldest energy disclosure laws in the country. In effect since 1981, the disclosure law requires sellers/lessors of residential structures to provide prospective buyers/lessees with heating and cooling bills for the past two years within 15 days of request. If the request is made after signing of a purchase contract, the seller does not need to honor a request for heating/cooling bills. Additionally, after 1984, sellers are required upon request to provide information regarding the type and areas of insulation installed by the seller and any previous owners.

Improvements to existing disclosure requirements were proposed in the 2009 New York State Energy Plan’s Energy Efficiency Assessment. The plan suggests that additional information should be disclosed to prospective home purchasers or tenants (NYSEPB 2009). The plan also suggests implementing new energy-use benchmarking programs for public disclosure of energy use, though no action has been taken as a result of this plan to date. Despite the law’s long time existence, little information exists on whether potential renters/buyer are aware of this law and have taken advantage of it in New York State. Additionally, little information exists to indicate whether the real estate industry encourages home buyers and renters to take advantage of this disclosure opportunity.

BENCHMARKING

City of New York, NY

Type: Benchmarking

Applies to: Multifamily buildings larger than 50,000 s.f.

Year in effect: 2009

Local Law 84 requires owners of buildings in New York City to enter energy use, water use, and building information into ENERGY STAR Portfolio Manager. The political climate for passage of benchmarking legislation was set by PlaNYC in 2007, when over 25 city agencies joined together to work towards making New York City more sustainable for the future. Recognizing that 80% NYC's carbon footprint comes from building energy use, Mayor Michael Bloomberg introduced the Greater, Greener Buildings Plan in 2009 through PlaNYC as a framework for greenhouse gas emissions reduction from existing buildings (Dunsky et al. 2009). The Greater, Greener Buildings Plan laid the framework for four pieces of proposed legislation, including the benchmarking legislation.

There are three components to the benchmarking law: (1) building owner data entry, (2) public data disclosure, and (3) annual reporting by the city. For multifamily buildings with separately metered dwelling units, building owners are not required to obtain energy use information from their residential tenants. Instead, building owners can obtain an aggregated bill from their utility that shows usage and billing information for the entire building. In some cases the major utilities have begun to charge for requests for aggregated data—for example, Con Edison charges \$102.50 per building to obtain aggregated building consumption for gas and electric usage.

After data is reported annually by building owners through Portfolio Manager, the NYC Department of Finance is responsible for making publicly available certain information from Portfolio Manager via the internet. The Department of Finance must report on the following information for every benchmarked building: (1) the energy utilization index (EUI), (2) the water use per gross square foot, (3) a rating that compares the energy and water use of the building to that of similar buildings, when available, and (4) a comparison of data across calendar years for all years the building was benchmarked (L.L. 84). In addition, the Office of Long-Term Planning and Sustainability must prepare a report that reviews and evaluates the administration and enforcement of the law, and analyzes data obtained from the benchmarking tool. The report must be submitted to the mayor, the speaker of the city council, and must also be posted on the internet for the public. The report must contain the following information: energy and water efficiency of the buildings in NYC, the accuracy of the benchmarked data and if there is a need to train/certify individuals that are benchmarking buildings, compliance with the requirements of the law, administrative and legislative recommendations for improving administration and enforcement, and the effectiveness of the benchmarking tool with regard to specific types of buildings in NYC for which Portfolio Manager may not be well suited.

Benchmarking is enforced and fines are levied by the Department of Finance. For annual benchmarking, the deadline for submitting a report is the first of May in the following year. Building owners are charged \$500 per quarter until the report is submitted.

Release of disclosure results is being phased in over a period of two years. So far, results are available from the first full year of benchmarking for city buildings and non-residential covered buildings; the initial results for multifamily residential buildings are scheduled for release on September 1, 2013.

City of Seattle, WA

Type: Benchmarking

Applies to: Multifamily buildings of 20,000 square feet or greater

Year in effect: 2012

In 2008, Seattle set goals to reduce existing building energy use by 20% by the year 2020. To meet this goal, the city set up the Green Building Task Force, a group of stakeholders that devised policy recommendations to meet the city's energy efficiency goals, including a recommendation to implement an energy benchmarking and disclosure program for all buildings other than single-family homes. Soon after, Ordinance No. 123226 was adopted, adding a new chapter to the Seattle Municipal Code.

As a result of Seattle Municipal Code 22.920, multifamily buildings that have five units or more must annually fulfill energy benchmarking, reporting, and disclosure requirements. The code was later amended to update the benchmarking threshold to 20,000 square feet. Administered through the Office of Sustainability and Environment, the Benchmarking and Reporting Program requires non-residential and multifamily building owners to report annual energy use data through the U.S. EPA's Portfolio Manager. Buildings that are less than 20,000 square feet are not required to enter usage data in Portfolio Manager, although they may voluntarily submit this data. Owners must then download a Statement of Energy Performance for each building to provide to a current or prospective tenant, buyer, or lender, which shows the building's energy intensity per square foot. Lastly owners must authorize the city to download annual building performance reports, including aggregate energy consumption data for the previous calendar year. Step by step instructions for compliance, compliance deadlines, and compliance fines are clearly laid out on the website to encourage easy fulfillment of requirements by building owners. Additionally, the local utilities have made it possible for building owners to upload energy use data in an automated way to ease some of the burden associated with obtaining and entering energy use manually (SOSE 2012).

Unlike many cities that require public display of individual building energy data, Seattle requires energy data to be shared directly between building owners/managers and tenants/buyers but is not posted publically (SOSE 2012).

Compliance deadlines are being phased in according to building type and size and fines vary according to building type and year (see Table A-4). After each building type is phased in, data will be due annually for the past year on April 1.

Table A-4. Seattle Compliance Deadlines and Fines

Building Type & Size Threshold	Reporting Deadlines	Fine Schedule for Failure to Submit 2011 Data	Fine Schedule for Failure to Submit 2012 Data
Non-Residential 50,000 SF or Greater	April 1, 2012 FOR 2011 DATA	July 1, 2012 \$1,000 per quarter begins to accrue	July 1, 2013 \$1,000 per quarter begins to accrue
Multifamily 50,000 SF or Greater	October 1, 2012 FOR 2011 DATA	January 18, 2013 \$1,000 per quarter begins to accrue	July 1, 2013 \$1,000 per quarter begins to accrue
Non-Residential & Multifamily 20,000 to 49,999 SF	April 1, 2013 FOR 2012 DATA	NA	July 1, 2013 \$500 per quarter begins to accrue
Non-Residential & Multifamily Less Than 20,000 SF	VOLUNTARY REPORTING	NA	NA

Source: SOSE 2012

City of Washington, DC*Type: Benchmarking**Applies to: Multifamily buildings larger than 50,000 s.f.**Year in effect: 2010-2014*

Washington, DC passed the Green Building Act in 2006, which introduced performance standards and benchmarking requirements for new government-funded buildings, paving the way for legislation including existing buildings in 2008. The Clean and Affordable Energy Act of 2008, established requirements for the District Government to track energy consumption of all private buildings over 50,000 square feet (including multifamily residences) to measure and disclose energy and water consumption to the District Department of the Environment (DDOE) using the EPA's Portfolio Manager tool. Building owners are required to release a "District Benchmark Reporting Template" that is submitted to DDOE electronically. In turn, the DDOE is required to make benchmarking data available for the public on an online database after the second annual benchmarking data is received. Benchmarking for private buildings is phased in over 4 years according to building square footage, beginning with the largest buildings (DC Energy Act of 2008). While legislation requiring benchmarking was passed in 2008, the final rulemaking on benchmarking requirements was released on January 18, 2013, and thus, 2013 will be the first year that data is reported to the DDOE (see Table A-5).

Table A-5. Compliance Schedule for Washington, DC Benchmarking Requirement

Size (square feet)	Data required
0-50,000	Not required. Buildings above 5,000 ft ² may benchmark voluntarily
50,000-100,000	2013 to current date
100,000-150,000	2012 to current date
150,000-200,000	2011 to current date
200,000 +	2010 to current date