



# TRANSFORMING THE MARKET FOR ENERGY EFFICIENCY IN MINNEAPOLIS:

Recommendations for Residential Energy  
Efficiency Rating and Disclosure



FOR  
SALE

SEPTEMBER 2018

CARL NELSON, ISAAC SMITH

CENTER FOR ENERGY AND ENVIRONMENT



## Contents

Executive Summary.....	3
Benefits of Energy Disclosure for Existing Homes .....	3
The Potential for Efficiency in Older Homes in Minneapolis .....	5
Policy Framework for Residential Disclosure.....	6
Disclosure Policy Options.....	7
Design Considerations for Residential Energy Disclosure.....	7
Which rating type is preferable: an asset rating or an operational rating?.....	8
When should energy disclosure happen?.....	8
Will disclosure lead to higher prices for more efficient homes? .....	9
Is a disclosure policy affordable? .....	10
Does disclosure provide a pathway to improvement? .....	10
Does energy disclosure help motivate homeowners to do retrofits? .....	10
Can the policy provide co-benefits, such as information on indoor air quality? .....	11
Is there a practical delivery system in place? .....	11
Truth in Sale of Housing Pilot Summary .....	12
Lessons Learned from Other Energy Disclosure Programs.....	12
Recommendations for City to Promote Residential Energy Disclosure.....	13
1. An asset rating would be most effective method of residential disclosure at time of sale .....	13
2. The rating should be designed to be highly visible to residents.....	14
3. Integrate energy disclosure with the City’s existing TISH process.....	14
4. Integrate disclosure with utility programs and related initiatives and policies.....	14
5. Consider designating funds from the City utility franchise fee to support implementation of energy disclosure and enhanced services.....	15
6. A stakeholder group could help guide implementation .....	15
Summary .....	16
References .....	17
Appendix A. Summary of Residential Disclosure Policies in the U.S.....	19
Energy Disclosure Policies for Existing Homes.....	20
Austin, Texas .....	20
Berkeley, California .....	21
Chicago, Illinois .....	21

Portland, Oregon.....	22
Montgomery County, Maryland .....	23
Denver, Colorado .....	23
Energy Disclosure Policies for New Homes.....	24
Boulder, Colorado .....	24
Santa Fe, New Mexico.....	24
State-based Policies .....	25
International Policies .....	25
Mandatory Upgrade Policies.....	27
Appendix B. Options for Energy Disclosure Mechanisms .....	29
1. Utility bill disclosure .....	29
2. Utility bill benchmarking .....	29
3. DOE Home Energy Score .....	30
4. Energy Fitness Score .....	33
5. HERS Rating .....	35
Summary of Energy Disclosure Options.....	36
Appendix C. Potential Expansion of Energy Disclosure Policies .....	38
Rental and Multifamily Housing deserve special consideration.....	38
New Construction .....	40
Appendix D. Technical Memo on TISH Pilot Results .....	41
Appendix E. TISH Energy Disclosure Report Mock-up .....	44

## Executive Summary

The City of Minneapolis, in conjunction with the Clean Energy Partnership, has expressed an interest in policy options for the disclosure of residential energy efficiency, building upon its Commercial Building Benchmarking and Transparency Policy. This paper examines the benefits and options for residential energy disclosure in the City of Minneapolis, with a focus on single-family homes. Given the city's aggressive greenhouse gas emissions goals, including retrofitting 75% of the single-family housing stock, residential energy disclosure can accelerate the progress of these goals and may be necessary to achieve them.

Based on a review of other policies, and a pilot conducted in 2017 (both described in more detail in the report and appendices), we developed the following recommendations for designing a residential energy disclosure policy in Minneapolis:

- An asset rating would be the most effective method of residential energy disclosure at time-of-sale
- The rating should be designed to be highly visible to residents
- Integrate energy disclosure with the city's existing Truth in Sale of Housing (TISH) process
- Integrate disclosure with utility programs and related initiatives and policies
- Consider designating funds from the city utility franchise fee to support implementation of energy disclosure and enhanced services
- A stakeholder group could help guide implementation

## Benefits of Energy Disclosure for Existing Homes

Residential energy disclosure provides information to homeowners and potential homebuyers at key times, such as the time of sale of a property — it is sometimes referred to as benchmarking or energy labeling for homes. When executed well, it can be a powerful tool to make visible what is generally invisible, like the efficiency aspects of a home. This common and standardized metric can unleash market forces to help drive efficiency improvements. By providing a simple and transparent way to assess efficiency, energy disclosure can help buyers be more sophisticated in their home search, encourage owners to invest in efficiency, and help sellers recoup the value of the efficiency investments they have made. Energy disclosure policy can increase energy upgrades in existing housing stock in a number of ways:

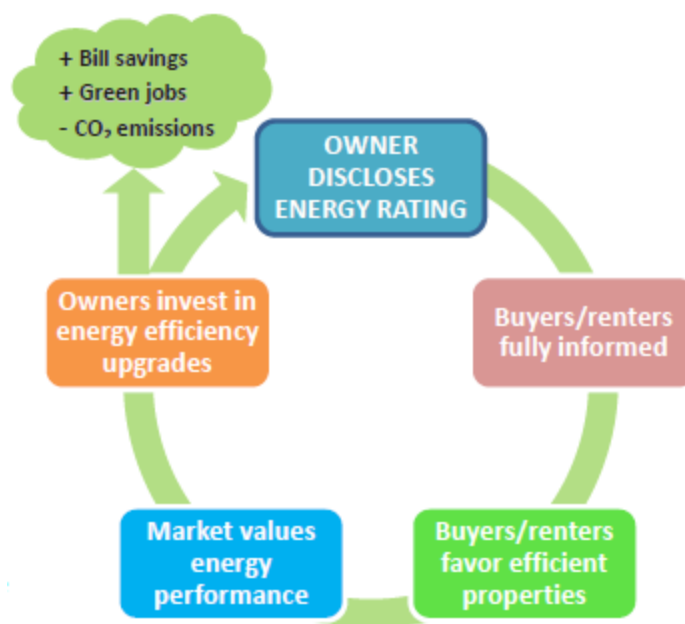
- ***Provides reliable information on energy performance, and how to improve it in a systematic way for every home.*** While information alone is not sufficient to drive action, the lack of credible information on how to improve a home's efficiency is a major barrier for many homeowners in upgrading their home.
- ***Reduces hassle and transaction costs in identifying and implementing energy upgrades.*** Good disclosure policy can also provide a simple pathway to completing retrofits. By reducing the hassle of figuring this out, homeowners are more likely to complete upgrades.

- ***Helps to increase the value of the home for homeowners who make efficiency investments.*** Several recent studies across the U.S. have documented that homes that disclose energy costs sell more quickly and (to the extent those homes are rated as efficient) for a premium. For example, studies show that homes in Texas with one or more green features sold for 5.9% more. Homes certified as efficient in Oregon sold 18 days faster and for 4.2% more. In Chicago, homes where energy disclosure was made sold 20 days faster.<sup>1</sup>
- ***Reduces the home's operating costs.*** Homeowners spend an average of over \$2,500 per year on energy bills. Energy efficiency upgrades can reduce homeowner's energy costs by 20-45%, while creating comfort, safety, and quality of life benefits.<sup>2</sup>

Figure 1 below is a visual representation of how the mechanism for energy disclosure can work, from a study commissioned by the Northeast Energy Efficiency Partnerships.<sup>3</sup>

Figure 1

How energy disclosure can lead to energy savings and carbon emissions reductions.



<sup>1</sup> An MPG Sticker for Houses: Home Energy Labeling. Webinar sponsored by the National Conference of State Legislatures. April 6, 2017.

<sup>2</sup> Corvidae, J. and R. Gold. An MPG for Homes. Rocky Mountain Institute. 2017. It has been difficult to estimate residential energy costs because there is no public access of energy usage data, there has been a low uptake of energy audits, audit data that is collected is not typically accessible to consumers, and public data estimates of energy use has limited accuracy.

<sup>3</sup> P. Dunskey et al. Valuing Building Energy Efficiency through Disclosure and Upgrade Policies. Dunskey Energy Consulting for Northeast Energy Efficiency Partnerships (NEEP). 2009.

Residential energy disclosure provides information on a home's energy performance to a number of market players:

- Homeowners will get a report that identifies priorities for energy upgrades, and they may see higher valuations of property based on which energy efficiency features are installed in the home.
- Prospective homebuyers will get information about which major efficiency retrofits have been installed in the home, and what remains to be done to make the home energy efficient.
- Policymakers will get more access to data that informs future policy development and track progress toward local goals (e.g. climate goals).
- Realtors will be better informed on energy features, which can lead to greater confidence in marketing those features.
- Utilities and other program administrators can use disclosure initiatives to cross market to and increase participation in other efficiency programs.<sup>4</sup>

## The Potential for Efficiency in Older Homes in Minneapolis

Despite having strong utility-funded energy efficiency programs and a generally energy-conscious population, Minneapolis has a high fraction of older homes that have potential for cost-effective energy efficiency improvements. According to Minneapolis parcel data, 90% of Minneapolis single-family homes were built before 1960, which is prior to the adoption of a residential energy code that required minimum levels of insulation and other efficiency features. We estimate that the annual energy savings potential of upgrading homes with opportunities for efficiency improvements could save Minneapolis homeowners nearly eight million dollars per year (Table 2). These upgrades typically have a simple payback of 10 years or less based on energy savings alone.

---

<sup>4</sup> American Council for an Energy-Efficient Economy. Residential Energy Use Disclosure: A Guide for Policymakers. June 2014.

Table 2

Minneapolis Housing Stock – Energy Savings Potential.<sup>5</sup>

Year Built	Number of Homes	Energy Savings (Therms)	Dollar Savings	CO2e (tons)
<1940	52,101	7,369,843	\$5,895,874	39,060
1940-1959	17,106	2,060,161	\$1,648,129	10,919
1960-1979	2,873	292,786	\$234,229	1,552
>1980	4,372	78,717	\$62,974	417
<b>Total</b>	<b>76,452</b>	<b>9,801,507</b>	<b>\$7,841,205</b>	<b>51,948</b>

### Policy Framework for Residential Disclosure

Despite efforts over many years to improve the efficiency of older existing housing stock in the core urban areas, a large percentage of these homes are still below their potential, even when cost-effective retrofit options are available. It is clear that if the aggressive greenhouse gas reduction goals are to be achieved in these cities, an effective and targeted strategy for the residential sector is necessary. The residential sector accounts for 21% of U.S. carbon dioxide emissions from burning fossil fuels, so energy efficiency upgrades can contribute to meeting cities' policy goals.

One of the cornerstone strategies in the City of Minneapolis' Climate Action Plan is to "help 75% of Minneapolis homeowners participate in whole-house efficiency retrofit programs by 2025, ensuring the distribution reflects the current percentage of low and moderate-income homeownership in the city."<sup>6</sup> The City of Minneapolis has started to take steps toward this goal.

Through the Clean Energy Partnership, a pilot program was started to expand existing utility programs' assistance to homeowners in retrofitting their homes, with a goal of reaching 500 households per year in 2015 and 2016. This pilot showed that by removing common customer barriers and adding homeowner assistance, more homeowners would follow through with audit recommendations. Of the 589 participants in 2015, 15% of them completed envelope upgrades, compared to 7% in the traditional audit program.<sup>7</sup> While the pilot results were positive, there are over 75,000 single-family homes in Minneapolis,<sup>8</sup> and more aggressive action and systematic policy is necessary to achieve the Cities' strategy of 75% retrofits. Improving energy efficiency will need to be a core aspect of owning or renting a home in the city.

<sup>5</sup> Housing totals are from Minneapolis parcel data. We estimate the number of homes with opportunities and savings estimates from those opportunities from historical data on CEE-conducted energy audits of several thousand Minneapolis homes. Dollar savings uses a cost of \$0.80 per therm, and CO<sub>2</sub> estimates are based on an EPA value of .0053 metric tons per therm.

<sup>6</sup> City of Minneapolis. Minneapolis Climate Action Plan. Adopted June 28, 2013.

<sup>7</sup> Mark, Nick. *Bridging the Gap Between Direct Install and Whole House Program: Minneapolis Home Energy Squad Residential Engagement Pilot*. ACEEE Paper 2016.

<sup>8</sup> According to Minneapolis parcel data.

One method to systematically address energy efficiency in the market is for cities to enact energy disclosure policies. To this end, the third strategy in the residential section of the Climate Action Plan is “Create time of sale and time of rent energy label disclosure.”<sup>9</sup> It was also listed by the city as one of the priorities to focus on for the City-Utility Partnership, and is supported by advocates. The city recently started a disclosure program for large commercial buildings, which is regarded as a core strategy for improving commercial building energy efficiency. A well-designed residential disclosure policy will provide benefits mirroring those resulting from the commercial disclosure policy, and may be a necessary policy addition to help the city meet its climate goals.

## Disclosure Policy Options

We considered several policy options that the city could enact for residential energy disclosure (described in more depth in Appendix B):

- Utility bill disclosure, requiring homeowners to provide the previous 12 months of average electric and natural gas usage.
- A third-party audit requirement, conducted separately from a housing inspection.
- An energy inspection that is included as part of the existing, required Truth in Sale of Housing (TISH) evaluator assessments, whereby TISH evaluators could be trained to conduct a review of energy efficiency asset features during the TISH evaluation and disclose the results in the report. Note that Minneapolis’s existing TISH ordinance requires inspections of the home prior to the home being placed on the market, and is focused primarily on health and safety issues.<sup>10</sup>

The Clean Energy Partnership, a joint effort of the City of Minneapolis, Xcel Energy, and CenterPoint Energy, in its 2017-2018 work plan, identified the following activity in the Residential (1-4 unit) focus area (pg. 10):

*“The City of Minneapolis will develop a strategy to utilize city regulatory authority to drive energy efficiency and encourage energy usage transparency. Examples may include: mandated disclosure of energy at time of sale through the multiple listing service (MLS) listing, disclosure in advertisements for rental properties, or by expanded energy efficiency information in Truth in Sale of Housing (TISH) disclosures.”<sup>11</sup>*

## Design Considerations for Residential Energy Disclosure

A well-designed disclosure policy can transform the efficiency of Minneapolis’s housing stock, while a poorly designed policy can be a hassle for homeowners, homebuyers, real estate agents and utilities, and still not result in any significant increase in efficiency. These are some of the key design considerations in crafting an effective policy. See Appendix B for a discussion of how each of these criteria relates to the options considered for this paper.

---

<sup>9</sup> City of Minneapolis. Minneapolis Climate Action Plan. Adopted June 28, 2013.

<sup>10</sup> See <http://www.ci.minneapolis.mn.us/ccs/TISH/index.htm>

<sup>11</sup> Minneapolis Clean Energy Partnership. 2017-2018 Work Plan. Adopted January 26, 2017.



## Which rating type is preferable: an asset rating or an operational rating?

There are two basic methods to benchmark the efficiency of homes: based on a home's actual energy bills (operational), or based on a home's physical assets related to its energy performance (asset rating).

- The operational-based rating method uses a home's actual energy bills and, ideally, compares it to the energy bills in similar homes to create an energy benchmark. However, the individual behavior of the home's residents can have a major impact on the energy usage of the home, and behavior may determine up to 2/3 of typical home energy use.<sup>12</sup> While energy bills for a given occupant will be lower in a home with a more efficient furnace or more efficient building shell, energy usage can vary substantially, and the top quarter of households in terms of energy use account for a full half of all residential energy use.<sup>13</sup> Therefore, historic energy bills, while they can be a good general indicator, are not a very reliable predictor of a home's underlying level of energy efficiency. They also do not provide information on what can be done to improve the efficiency of the home.
- An asset-based rating considers the home's physical assets, such as the level of insulation and the furnace efficiency, and the results can be used to compare to other homes. This offers several advantages. First, the rating is not dependent on the occupant, and provides objective information on the energy performance of the home. Secondly, because the rating involves examining the physical assets of the home, asset-based disclosure can provide actionable information on what can be done to improve the efficiency of the home. Therefore, asset-based ratings are more likely to result in improvements being done in the homes that receive them.

Some stakeholders have advocated for having both an operational rating as well as an asset rating, as there are benefits to both. While an asset rating provides more actionable information about the efficiency characteristics of the home, if there is an easy and inexpensive method to receive the data electronically, an operational rating can be a useful supplement to an asset rating.

## When should energy disclosure happen?

The trigger point for disclosure could be:

- Time of sale
- A major renovation or remodel (when acquiring local construction permits)
- On a periodic schedule, such as every year (similar to the Minneapolis annual disclosure requirement for commercial properties), or on longer cycles of 5-10 years
- Time of construction (for new homes)
- Time of rental

---

<sup>12</sup> Lutzenhiser, L. et al. Lifestyles, Buildings and Technologies: What Matters Most? Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings. August 2012.

<sup>13</sup> Moezzi, M. and L. Lutzenhiser. What's Missing in Theories of the Residential Energy User. Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings. August 2010.

For non-rental properties, time of sale is the most practical, and would likely have the biggest impact. Providing disclosure at the very beginning of the homeownership cycle will increase the chances that the new homeowner will upgrade the property. Improving the efficiency of a home is often a process accomplished over many years, as the homeowner has time and resources to deal with home improvements.

Research shows that new homeowners spend more on home improvements in the first year of homeownership, compared to existing homeowners that have owned their home for longer. This makes time-of-sale an important time to make energy upgrade recommendations, as they may be incorporated into their home improvement plans.<sup>14</sup>

First, they receive this information when they are still excited about fixing up their home, and deciding what home improvements they will do, and are more likely to tackle energy upgrade projects rather than later in the homeownership cycle.

Secondly, improving the energy efficiency of a home is often a process that is staged over time rather than accomplished all at once. The earlier in the homeownership cycle that this can be planned, the more likely it is to happen.

Finally, knowing that their home's efficiency level will be disclosed at each time of sale is a large motivator. A homeowner may plan to complete all needed efficiency improvements early in the homeownership cycle in order to maximize the re-sale value of the home, and enjoy the benefits while they are living there.

Minneapolis home sales have recently climbed to over 5,500 homes per year, and have ranged in the past decade between 4,316 and 6,721. This means that for a time-of-sale trigger, about 5% of the city's total housing stock would be affected per year.

### Will disclosure lead to higher prices for more efficient homes?

An important driver for doing energy disclosure is that in the long run, it would support higher home prices for properties that demonstrate greater efficiency. This would overcome a major barrier that is preventing energy upgrades now, and homeowners could have more confidence that they could recoup money that they invest in upgrades. There is market research that shows when there is reliable information about a home's energy efficiency, that those homes can command a price premium. This research shows that energy efficient homes, when they can be validated with a "green" certificate or other means, enjoy a price premium, and that energy efficiency is a key aspect of why homeowners value those green certificates.

In the largest study of green certificates to-date in the United States (over one million homes), the study author found that "energy efficiency is an important underlying determinant of the increased values for 'green' certified dwellings." The study found, on average, a 9% price premium from green labels and a

---

<sup>14</sup> Siniavskaia, N. 2017. *Spending Patterns of Home Buyers: Appliances, Furnishings and Property Alterations*. Washington, DC: National Association of Home Builders.  
[www.nahbclassic.org/generic.aspx?genericContentID=257993](http://www.nahbclassic.org/generic.aspx?genericContentID=257993)

14% premium for ENERGY STAR homes.<sup>15</sup> Another study in the Australian Capital Territory, which has a mandatory asset-based disclosure policy, found significantly higher home prices for homes with higher energy efficiency ratings.

In order to support higher prices for energy efficient homes, the rating must provide credible and reliable information on the home's energy efficiency level. Thus, operational ratings are not sufficient for this purpose, only asset ratings can provide the type of information that can be used to support higher sale prices.

### Is a disclosure policy affordable?

There is an incremental cost to implementing and enforcing energy disclosure beyond existing health and safety disclosure requirements. Keeping the cost of disclosure as low as possible, while still providing actionable information, is an important consideration. Disclosure of energy bills will likely be less expensive than an asset-based disclosure, but not as useful. There is a wide range of costs for different asset-based ratings. A group in Vermont investigating building ratings found that there was more widespread support for building rating options that did not exceed a \$300 cost to the homeowner.<sup>16</sup>

Currently, a Minneapolis homeowner can expect to pay about \$150 - \$250 for a Truth-in-Housing inspection from City-licensed inspectors. Ideally, any disclosure requirement would not add significant cost to this. Since TISH inspectors already have access to the home and are conducting a detailed inspection, it is possible to leverage the existing inspection process to collect information used in computing an energy rating for the home at a low incremental cost.

### Does disclosure provide a pathway to improvement?

The end goal of an energy disclosure policy is not benchmarking itself, but making benchmarking information available and actionable to help people invest wisely in efficiency upgrades. Recent homebuyers invest more in renovation and are more willing to take on large projects than other types of homeowners. Disclosure should help provide a pathway to making improvements. This can be done by:

- Providing clear and prioritized recommendations for energy upgrades;
- Providing supplemental information to support decision-making, such as specifications for getting work completed, and a list of contractors that can complete the work; and
- Tying into other programs that can assist the homeowner to get work completed, such as utility rebate programs and city financing programs.

### Does energy disclosure help motivate homeowners to do retrofits?

Ideally, a disclosure rating will not only provide information to help homeowners improve their property, but will also provide them with the motivation to follow through on the improvements. One of

---

<sup>15</sup> Nils Kok, M. Kahn, "The Value of Green Labels in the California Housing Market: An Economic Analysis of the Impact of Green Labeling on the Sales Price of a Home," July 2012. 70% of the homes in this study were sold as new-construction homes, and more than two-thirds of the labeled homes in the study were ENERGY STAR.

<sup>16</sup> "Legislative Report: Working Group on Building Energy Disclosure," Vermont, December 2011. Available at: [http://publicservice.vermont.gov/topics/energy\\_efficiency/buildingenergy\\_labeling](http://publicservice.vermont.gov/topics/energy_efficiency/buildingenergy_labeling)

the best methods for providing this motivation is by scoring the home, which many asset ratings can do. The score shows the homeowner how their home stacks up to similar homes.

Two basic distinctions for these types of scores are an “absolute scale” and a “house-type-based scale.” A “house-type-based scale” scores the home against a prototypical home of the same house type that has completed all cost-effective energy upgrades. In this way an older home, if it has been upgraded, can receive a perfect score. CEE has found that this type of score can be more motivating for homeowners.

In contrast, an absolute scale scores the home against all homes, including newer homes that meet strict energy code requirements. This is useful in comparing energy performance across a wide range of house types to see, for example, how a newer home in the suburbs might compare to an older Minneapolis home. These scores are generally normalized to some degree on a square footage basis so as not to unduly penalize larger homes that are built energy efficiently. However, this means that it can be possible for a larger house with a better score to actually have higher energy bills than a smaller house with a worse energy score. It can also be less motivating, because upgrades completed on an older home may only marginally improve the score (further details in Appendix B).

### Can the policy provide co-benefits, such as information on indoor air quality?

The implementation of a disclosure policy may be able to provide benefits beyond energy efficiency, or *co-benefits*. One potential co-benefit is an improvement in indoor air quality. Asset ratings, employing the methods of an energy audit, frequently result in measurements that are useful to assessing and improving indoor air quality. This includes an assessment of the combustion safety of gas-fired appliances in the home, as well as the level of fresh air in the home.

Although all new homes are required to have continuous mechanical ventilation to assure adequate exhausting of indoor contaminants in the home, few existing homes have these types of systems. While it is true that many older homes are adequately leaky and do not need mechanical ventilation, as efficiency improvements are done and the home tightens up, occupants may benefit from adding mechanical ventilation. A blower door test done by many asset ratings can provide this assessment of whether mechanical ventilation is needed.

### Is there a practical delivery system in place?

A disclosure policy cannot be effective unless there is a practical way for it to be delivered. If the disclosure involves an asset rating, this means that a trained workforce needs to be available to conduct the asset ratings, at a reasonable cost to homeowners and on-demand. Having trained inspectors who are able to keep property sales moving at the speed of the market is a critical part of a practical delivery system.

For utility bill disclosure, a practical and reliable way to get access to utility bills must exist. Customers rarely keep 12 months of records of their own bills. Even if they did, relying on homeowners to self-disclose their bills would not provide reliable information. Ideally, cooperation with utilities would provide a method of easy access to utility bill information, with quick turn-around and in a standardized format that would be suitable for disclosure.



## Truth in Sale of Housing Pilot Summary

The overall goal of the Truth in Sale of Housing (TISH) pilot was to evaluate the feasibility of increasing the usefulness of information provided through home inspections done at time of sale, with the ultimate goal of increasing energy retrofits. The residential sector is a significant contributor to GHG emissions, and City of Minneapolis Climate Action Plan has a strategy of getting 75% of homeowners to participate in an energy retrofit program. Research has shown that new homeowners are more likely to conduct energy upgrades, making time-of-sale an important target for energy retrofit efforts.

Approximately 5,000 homes per year are sold in Minneapolis, with seller-paid home inspections required prior to the home going on the market through the city's existing TISH program. The resulting TISH report is available to all prospective homebuyers. While some energy information is currently required in this inspection, further data input guidelines and enhanced quality of information could increase the usefulness of this information. Further, most homebuyers conduct their own home inspection, although energy asset information about the home is rarely provided by these inspections. Better information through these voluntary inspections could also help to increase energy retrofits.

The project involved training a small number of existing Minneapolis home inspectors to conduct 35-40 inspections to test two different protocols for assessing a home's existing energy efficiency level. Specific research objectives included:

- Develop and test out two different inspection protocols for home inspectors (an easier version that would be an extension of the city's existing TISH guidelines for seller-paid inspections, and a more in-depth version that would potentially be a voluntary guideline for buyer-paid inspections)
- Assess training requirements, time requirements, and accuracy of home inspectors in implementing protocols
- Assess homeowner interest and perceived value from the additional information provided

This pilot determined that it is feasible to include energy asset data collection within the TISH inspection, and some of this data is already collected. However, the reporting of the energy asset information needs to be improved, and a few additional data points are needed in order to generate an effective energy report. A technical memo describing in greater detail the TISH pilot and its results, can be found in Appendix D.

## Lessons Learned from Other Energy Disclosure Programs

A summary of energy disclosure programs in other jurisdictions is in Appendix A. Each program has unique features, but there are some common themes that are useful for designing a program for Minneapolis.<sup>17</sup>

---

<sup>17</sup> Dunsky 2009, pg. 23; ACEEE 2013, pg. 34-37.

1. ***An asset rating is the most effective method of disclosure for the residential sector.*** Asset ratings can provide objective information on what can be done to cost-effectively improve the efficiency of the home. It is important that the asset rating be based on a trusted assessment system, and that it be communicated clearly so sellers and buyers understand what it means.
2. ***Make the disclosure timely*** — with disclosure reports available at the earliest possible state in the transaction process.
3. ***Link disclosure to action, and facilitate access to energy efficiency offerings available locally.*** Disclosure can be a powerful tool for increasing energy efficiency. The experience of one of the longest-running disclosure policies in the world, in the Australian Capital Territory, provides compelling data that disclosure can provide a market premium for houses that are more efficient. Austin, Texas, with one of the strongest local disclosure policies in the U.S., has demonstrated a significant uptick in energy upgrades from their disclosure policy.
4. ***To be effective, disclosure must be mandatory, with mechanisms to ensure high compliance.*** Achieving high compliance is critical to an effective policy. As put by one authoritative report, “The value proposition for mandatory disclosure (the idea that the market would begin to value energy performance in a way it currently does not) is based on the very premise of a mandatory, market-wide approach. This requires that disclosure of the energy performance of homes and other buildings be ubiquitous. If not, homebuyers are unlikely to recognize or value energy performance labels (if only one home in ten they are looking into provides it). Homeowners will not consider improving poorly-performing homes, or voluntarily disclose their performance, if buyers don’t value the improvement.”<sup>18</sup>

## Recommendations for City to Promote Residential Energy Disclosure

### 1. An asset rating would be most effective method of residential disclosure at time of sale

This report has shown that an asset rating would be the most effective method of residential disclosure. An asset rating considers the energy use irrespective of the current occupants, and provides critical information on what cost-effective opportunities are available in the home. It can also generate a score that can act as a normative tool to compare homes to each other, and provide the basis for supporting increased value for homes that are more energy efficient. The experience in places such as Austin, Texas, and the Australian Capital Territory, provide hard data to demonstrate that an asset rating can provide measurable impacts. The city should adopt a policy that requires every homeowner in Minneapolis, at time-of-sale, to provide an asset rating for their home, and to disclose it to any potential buyer.

The Energy Fitness Score is a low-cost asset rating (further detail in Appendix B) that could be used for this purpose. It is specific to Minnesota’s housing stock and based on a robust energy model. It can also be customized for the purpose of Minneapolis energy disclosure, is less expensive than similar asset ratings, and is already being successfully used by auditors in Minnesota. Requiring an asset rating at

---

<sup>18</sup> Dunsky, 2009, pg. 47.

time of sale would place Minneapolis among the leaders in the county, and is fundamental to achieving city climate and energy efficiency goals.

An operational rating based on the home's past energy bills can provide useful supplemental information along with the asset rating (if the data can be acquired easily), automatically and in a useful format.

## 2. The rating should be designed to be highly visible to residents

In order to truly transform the market for energy efficiency, the asset rating used for disclosure should be highly visible to all city residents, with clear and compelling information. The disclosure policy should be the centerpiece of a larger campaign to achieve the strategy expressed in the city's Climate Action Plan of getting 75% of Minneapolis homeowners and rental properties to participate in comprehensive energy efficiency upgrade programs.

The energy rating document itself should be well-designed for maximum impact, and should be a separate report from the standard health and safety TISH report. It should provide clear and compelling information that will both inform the property owner about what cost-effective energy upgrades are recommended for the property, but also help serve to motivate them to do so. Supporting information should be provided that would help them accomplish the recommended upgrades, such as a list of qualified contractors to complete the upgrades, financing options, available technical assistance, and rebates.

CEE worked with a professional design team to create an example of a separate TISH energy disclosure report, shown in Appendix E. The individual elements and language in the report could be adjusted based on the city's preferences and system capabilities.

The city should partner with utilities to provide technical assistance and other resources to homeowners should we add trusted energy advisor, and other tools and engagement mechanisms.

## 3. Integrate energy disclosure with the City's existing TISH process

CEE's pilot, which considers how to effectively add energy disclosure to the existing TISH health and safety process, demonstrates this can be done for a low incremental cost and with minimal disruption to the current process.

## 4. Integrate disclosure with utility programs and related initiatives and policies

An energy disclosure policy (and the associated report) is a necessary first step in a broader agenda, which is to help homeowners take action on disclosure recommendations. Other supporting programs and policies are necessary to achieve the goal of increased energy efficiency in Minneapolis residences, and should be coordinated with the disclosure policy. This would include coordination of services and incentives available from energy utilities, as well as access to financing used to invest in energy efficiency upgrades.

Minneapolis' energy utilities are critical to the successful implementation of a disclosure policy. CenterPoint Energy and Xcel Energy have programs and rebates to support efficiency upgrades in homes that will be promoted by the disclosure policy. To the extent that the disclosure policy can help them meet their state mandates to save energy, the utilities may also be able to help fund some aspects of

the delivery system for the disclosure policy or incentives to help the homeowners implement recommended upgrades.

The utilities will be crucial stakeholders in any aspect of the disclosure policy that involves utility data. If an operational rating is to be used, it will be critical to find a streamlined way for home sellers and real estate agents to be able to get the data. Ideally, this would happen via a web-based portal, similar to the system Chicago has set up.

In order to better coordinate efforts at getting energy upgrades in Minneapolis residential housing stock, the city may want to consider setting up a centralized database for storing home efficiency data. Information about what was found in homes during the asset ratings may be useful for targeting other related programs focused on improving energy efficiency.

## 5. Consider designating funds from the City utility franchise fee to support implementation of energy disclosure and enhanced services

As the city makes decisions about spending the funds from the increased local utility franchise fee, there are a few key recommendations to consider that will enhance the likelihood of success for a residential energy disclosure policy:

- Utility incentives can be a deciding factor for homeowners weighing the costs and benefits of investing in energy upgrades that can cost thousands, such as wall insulation or a new efficient furnace. The city can help boost market participation by adding tiered incentives to utility incentives as a way to increase urgency for homebuyers. The city could add to the available utility incentive by a meaningful amount, but set rules around the timing of completed upgrades — so that the highest additional incentive is available for the first four months after the home purchase is completed, a lower incentive is available for the next four months, and an even lower amount for the four months after that. For one year after home purchase, the homeowner would be able to leverage utility incentives with city incentives, and would maximize those incentives by completing work in a timely way.
- The city could consider credit enhancements to support financing for energy efficiency upgrades. Loan loss reserves can be helpful to financial institutions in creating loan products to support energy efficiency investments, particularly for moderate income homeowners. In the recent past, interest rates have been quite low, so buying down interest rates may have a very limited effect on the uptake of financing products. But, as interest rates rise, an interest buy-down may be helpful.

## 6. A stakeholder group could help guide implementation

A time-of-sale disclosure policy for 1-2 unit homes in Minneapolis will affect about 5,000 property owners per year. Homeowners, real estate agents, city staff, property owners, home inspectors, environmental advocates, utilities and others will all have a stake in any such policy. This report has attempted to outline some of the considerations in designing and adopting a policy that will be helpful in informing potential options. However, there are other options than those considered here, and any



policy ultimately adopted by the city should have broad stakeholder buy-in. Bringing stakeholders together to discuss options will be critical.

Should there be agreement that the city move forward with a disclosure policy, there would also be additional crucial design issues that were not considered here that a stakeholder group could help inform. These design issues include:

- What information should be included on an asset-based energy label?
- What data would need to be collected for the asset label, and how would that data be managed?
- How could the disclosure policy best leverage existing utility energy efficiency programs, and what role would the utilities play, if any, in helping to implement the disclosure policy?
- How would compliance be assured?

## Summary

The Minneapolis Truth in Sale of Housing process offers a unique opportunity to provide value-added information and services to Minneapolis homebuyers and sellers that should result in a higher level of energy efficiency upgrades being installed in Minneapolis single-family homes. An energy asset disclosure report, delivered through existing TISH processes, would provide multiple benefits to city residents and help the city meet its climate action goals. Integrating energy disclosure with utility and city services and incentives to promote efficiency would lead to market transformation and higher levels of efficiency in Minneapolis' residential housing stock. Leveraging utility incentives with time-sensitive city incentives would create urgency and additional market lift for upgrades. The processes recommended for single-family residences could also be expanded in the future to include other types of residences, including rental and multifamily properties.

## References

- American Council for an Energy Efficient Economy. Residential Energy Use Disclosure: A Guide for Policymakers. June 2014. <http://aceee.org/sector/local-policy/toolkit/residential-disclosure>
- Center for Energy and Environment. Transforming the Market for Energy Efficiency: Recommendations for Residential Energy Efficiency Rating and Disclosure in Minneapolis. Draft report. March 2015.
- City of Minneapolis, Disclosing Energy Use through Truth in Sale of Housing (TISH) White Paper, March 2016.
- City of Minneapolis. Minneapolis Climate Action Plan. Adopted June 28, 2013. <http://www.minneapolismn.gov/www/groups/public/@citycoordinator/documents/webcontent/wcms1p-109331.pdf>
- Clean Energy Partnership Board Q1 Meeting, March 4, 2016 [mplscleanenergypartnership.org/wp-content/uploads/2016/03/cep-board-presentation-030416\\_finalkm.pptx](https://mplscleanenergypartnership.org/wp-content/uploads/2016/03/cep-board-presentation-030416_finalkm.pptx)
- Clean Energy Partnership Planning Team for the Minneapolis Clean Energy Partnership. 2017-2018 Work Plan. Adopted January 26, 2017.
- Cluett, R. and J. Amann. Residential Energy Use Disclosure: A Review of Existing Policies. American Council for an Energy Efficiency Economy. Report Number A131. April 2013. <http://aceee.org/research-report/a131>
- Corvidae, J. and R. Gold. An MPG for Homes: Driving Visible Value for Home Energy Performance in Real Estate. Rocky Mountain Institute. 2017. [https://www.rmi.org/wp-content/uploads/2017/09/RMI\\_An-MPG-for-Homes\\_Report\\_2017-1.pdf](https://www.rmi.org/wp-content/uploads/2017/09/RMI_An-MPG-for-Homes_Report_2017-1.pdf)
- Dunsky P. et al. Valuing Building Energy Efficiency through Disclosure and Upgrade Policies. Dunsky Energy Consulting for Northeast Energy Efficiency Partnerships (NEEP). 2009.
- Edwards, J., et al. Field Assessment of Energy Audit Tools for Retrofit Programs. U.S. Department of Energy, NorthernSTAR Building America Partnership. July 2013. [www.nrel.gov/docs/fy13osti/56762.pdf](http://www.nrel.gov/docs/fy13osti/56762.pdf)
- Grevatt, J., I Hoffman and D Hoffmeyer. Keys to the House: Unlocking Residential Savings with Program Models for Home Energy Upgrades. Lawrence Berkeley National Laboratory for U.S. Department of Energy's Building Technologies Office. July 2017. <https://emp.lbl.gov/sites/default/files/keys-to-the-house-final-07052017.pdf>
- Kok N. and M. Kahn. "The Value of Green Labels in the California Housing Market: An Economic Analysis of the Impact of Green Labeling on the Sales Price of a Home. July 2012. [http://immobilierdurable.eu/images/2128\\_uploads/Kok\\_green\\_logements\\_en\\_calif.pdf](http://immobilierdurable.eu/images/2128_uploads/Kok_green_logements_en_calif.pdf)
- Lutzenhiser, L. et al. Lifestyles, Buildings and Technologies: What Matters Most? American Council for an Energy Efficient Economy Summer Study on Energy Efficiency in Buildings. August 2012. <http://aceee.org/files/proceedings/2012/data/papers/0193-000034.pdf>
- Moezzi, M. and L. Lutzenhiser. What's Missing in Theories of the Residential Energy User. Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings. August 2010.

[https://www.pdx.edu/cus/sites/www.pdx.edu.cus/files/Moezzi%20%26%20Lutzenhiser%20\(2010\)%20Whats%20Missing%20In%20Theories%20of%20the%20Residential%20Energy%20User\\_0.pdf](https://www.pdx.edu/cus/sites/www.pdx.edu.cus/files/Moezzi%20%26%20Lutzenhiser%20(2010)%20Whats%20Missing%20In%20Theories%20of%20the%20Residential%20Energy%20User_0.pdf)

National Conference of State Legislatures. An MPG Sticker for Houses: Home Energy Labeling. Webinar April 6, 2017. <http://www.ncsl.org/research/energy/an-mpg-sticker-for-houses-home-energy-labeling.aspx>


Vermont Public Service Department. Legislative Report: Working Group on Building Energy Disclosure. Vermont, December 2011.  
[http://publicservice.vermont.gov/topics/energy\\_efficiency/buildingenergy\\_labeling](http://publicservice.vermont.gov/topics/energy_efficiency/buildingenergy_labeling)

## Appendix A.


### Summary of Residential Disclosure Policies in the U.S.

While at least 12 major cities across the U.S. have adopted commercial benchmarking ordinances, residential disclosure is still relatively new.<sup>19</sup> The Institute for Market Transformation (IMT) has been a key promoter of energy disclosure policies, and is a partner with the Natural Resources Defense Council (NRDC) on the City Energy Project, which provides funding and other support for cities working to implement disclosure policies, both for commercial and residential buildings. IMT lists five cities as currently having residential energy use disclosure policies (Table 2).<sup>20</sup>

**Table 1**  
**Comparison of U.S. residential energy disclosure policies<sup>21</sup>**



IMT  
INSTITUTE  
FOR MARKET  
TRANSFORMATION



Building Rating

# Comparison of U.S. Residential Energy Disclosure Policies

	Legislation				Disclosure			Trigger		Building stock
	Jurisdiction	Short name	Enacted	Effective	Efficiency Checklist	Utility Data	Evaluation/Audit	Sale	Rental	New Homes Only
Cities & Counties	Austin, TX	ECAD Ordinance	2008	2011	-	-	✓	✓	-	-
	Berkeley, CA	Building Energy Saving Ordinance	2015	2016	-	✓	✓	✓	-	-
	Chicago, IL	Ordinance No. SO2013-1645	2013	2013	-	✓	-	✓	✓	-
	Montgomery County, MD	Bill No. 31-07	2008	2008	-	✓	-	✓	-	-
	Santa Fe, NM	Ordinance No. 2007-38	2007	2008	-	-	✓	✓	-	✓
States	Alaska	AS.34.70.101	2008	2008	-	✓	-	✓	-	-
	Hawaii	§508D-10.5	2009	2009	-	✓	-	✓	-	-
	Kansas	HB 2036	2007	2007	✓	-	-	✓	-	✓
	Maine	H.P. 1468 - L.D. 2074	2006	2006	✓	-	†	†	✓	-
	New York	Truth in Heating Law	1980	1981	-	✓	-	✓	✓	-
	South Dakota	SB 64	2009	2009	✓	-	-	✓	-	✓

Updated 3/12/2015

† Standards exist for a voluntary program

Copyright © 2015 Institute for Market Transformation

<sup>19</sup> R. Cluett and J. Amann, "Residential Energy Use Disclosure: A Review of Existing Policies," American Council for an Energy-Efficient Economy (ACEEE), 2013.

<sup>20</sup> Keicher, C. Comparison of U.S. Residential Energy Benchmarking and Transparency Policies, Institute for Market Transformation, 2015. <http://www.imt.org/resources/detail/comparison-of-u.s.-residential-energy-disclosure-policies>

<sup>21</sup> Portland, OR, has installed a new policy since this graphic, and the Governor of Massachusetts recently announced a new policy that will begin in 2021. More details are in the following sections.



## Energy Disclosure Policies for Existing Homes

### Austin, Texas

Austin started requiring residential disclosure in 2011 (it also requires commercial and multifamily disclosure, although the mechanism is different). The ordinance requires all homes being sold within city limits to receive an energy audit by a certified energy auditor using a standardized audit form, which generally costs \$200-\$300 for a typical sized home. The audit requirements are specialized for Austin's climate conditions and housing stock, and include: 1) inspection of 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 local municipal utility (Austin Energy) administers the program and conducts random spot checks of the audits for quality control.

Austin Energy has an aggressive program, including rebates, to promote upgrades for recommended audit items to new homeowners that have received the audit. For example, the average rebate for participants that complete all recommended upgrades in Austin Energy's Home Performance program is \$1,713, not including additional rebates of \$298 from the natural gas company.<sup>22</sup>

Residences may be exempt from the requirement if they can document they have participated in a weatherization program and done the upgrades, or if the home is less than 10 years old. The ordinance specifies that the audit must be provided at least three days before the end of the "option period," or the period in which a potential buyer can cancel their contract to purchase the house. In practice, this has often meant that potential homebuyers do not receive the audit report until after closing on the house, rather than when they are looking at different homes.

For multifamily, the city has a separate operational rating disclosure requirement (based on actual energy usage). Owners of multifamily properties must reduce their building's energy use by 20% within 18 months if its per-square-foot usage exceeds 150% of the average for its category. Furthermore, owners of properties in the high-energy use category are required to disclose the high-energy use designation to tenants and prospective tenants.

The city maintains a record of each of the completed audit reports. The city does not actively enforce the ordinance, except by complaint. Compliance is estimated at about 52% for homes, and 80% for multifamily residences. In the first program year 9,549 homes were sold, 4,862 homes had been audited, and 3,999 were determined to be exempt. It is estimated the ordinance could affect about 3,000 homes annually going forward. Austin Energy tracked the actual rates of homeowners that completed the recommended upgrades in the first year at 12% and for the second year at 7%.

---

<sup>22</sup> See Austin Energy's "Guide for Homebuyers, Homesellers and Homeowners"  
[https://austinenenergy.com/wps/wcm/connect/465a73b8-4c68-465a-96bd-3ab24dccac4c/ECAD\\_GuideForhomebuyersSellersOwnersBroch0714LR.pdf?MOD=AJPERES](https://austinenenergy.com/wps/wcm/connect/465a73b8-4c68-465a-96bd-3ab24dccac4c/ECAD_GuideForhomebuyersSellersOwnersBroch0714LR.pdf?MOD=AJPERES)

### Berkeley, California

Berkeley has a Building Energy Saving Ordinance (BESO), which requires building owners and homeowners to complete and publicly report comprehensive energy assessments to uncover energy saving opportunities. The assessments are conducted by registered energy assessors who provide tailored recommendations on how to save energy and link building owners to incentive programs for energy efficiency upgrade projects, such as Energy Upgrade California. Energy efficiency improvements are voluntary and encouraged. BESO is required prior to the sale of a house or whole building under 25,000 square feet, and on a phased-in schedule for multifamily and commercial buildings.

BESO Requirements:

1. Energy efficiency assessment
  - High-performance buildings are exempt from the assessment requirements, which require a separate application and additional documentation on performance in other programs, certifications or standards.
  - Assessments may be deferred to buyer for up to 12 months, at time of sale.
2. Public reporting of energy assessment and disclosure of energy information prior to sale.

### Chicago, Illinois

Chicago has had a heating bill disclosure requirement for residential sales since 1987, which they recently updated in 2013. The updates addressed residential sales to add electricity disclosure to the natural gas disclosure and allow web-based data access.

The ordinance has also covered leases since 1987 and this portion of the ordinance has not been updated. Chicago requires heating cost disclosure for rental properties at the time of rental, for rentals where the tenant directly pays for heating costs. This information must be provided prior to any verbal or written agreement is made to enter into a lease; renters must sign a form acknowledging that the disclosure has been made. The Chicago Association of REALTORS provides space on their standard lease form to enter heating cost disclosure information.

For both sales and leases, the ordinance also requires utilities to provide the information at no additional cost to building owners. There are penalties for non-compliance (\$500 per offense) included in the ordinance, but the ordinance does not specify an enforcement method from the city. No known reports are available that track compliance rates.

Another ground-breaking element of Chicago's disclosure law is the availability of data online for residential sales transactions, which dramatically eases the ability of property owners and real estate agents to access the data for compliance purposes. In addition, it provides a higher degree of reliability than other jurisdictions that allow self-reported energy bills.

Elevate Energy partnered with the local Multiple Listing Service, Chicago utilities, and the City of Chicago to develop a web-based portal for accessing utility bills (called "My Home EQ") that can act as an easy compliance mechanism for meeting Chicago's disclosure mandate (Figure 7). The real estate agent must have the property address as well as the utility account number from the property owner in order to

access billing information, so only users with access to the account number can access the data. Elevate Energy has worked with regulators and other stakeholders to ensure that state regulations on data privacy allow utilities to continue to add data to the website on an ongoing basis. In addition to providing access to utility bills, the website also provides information on a home's expected energy performance, predicts what energy upgrades might be needed, and provides extensive resources to help homeowners get started on completing upgrades.

Digital disclosure has been available since July, 2013. In the first seven months of the digital compliance process, about 10% of listings used this option based on a study conducted by Chicago-based nonprofit Elevate Energy of property sales in the Chicago region. This study also reported that Chicago single-family real estate listings that disclosed energy costs spent less time on the market and had a higher closing rate. The differences were not statistically significant across the whole sample but were significant in one neighborhood – in Lakeview, homes with energy cost disclosure spent a median of 43 days on the market, compared to 63 days for homes that did not disclose energy costs (these findings are correlational and do not imply causality).

**Figure 2**  
Screenshot of My Home EQ website

The screenshot shows the My Home EQ website interface. At the top is a blue header with the logo 'My Home EQ' and the tagline 'Improving the Value, Comfort and Energy Savings of Your Home'. Navigation links include 'Need help? Call 855-9-IMPACT', 'Connect', 'LOG IN', 'BLOG', 'ABOUT', 'FAQs', and 'Like'. Below the header is a white navigation bar with links: 'Home', 'Find Contractors', 'Financial Incentives', 'Resources', and 'ENERGY IMPACT ILLINOIS'.

The main content area features the heading 'How much energy does your single-family home *really* use?'. A numbered step '1 See what you use' is highlighted. The text explains: 'MyHomeEQ automatically pulls in all your household information and determines what you can do to save the most on your energy costs.'

To the right, a 'DETAILS ABOUT YOUR ENERGY USE' section displays a score comparison chart. It shows 'Annual Gas Use' (GAS USE (THERMS)) and 'Annual Electricity Use' (ELECTRICITY USE (KWH)). The chart compares 'YOUR HOME EQ SCORE' to 'AVERAGES FOR' similar homes. The score is 145, which is 19% lower than the average score of 175. A color-coded bar indicates the score range from 100 (blue) to 200 (red). The text 'Your home uses 13% less than similar homes' is also present.

Below the chart is a 'START HERE' button and a search bar with the placeholder text 'Enter Your Address.' and a 'Search' button. An example address is provided: 'example: 123 Main St. Riverside, IL'.

### Portland, Oregon

The Portland City Council unanimously adopted the home energy score ordinance [Portland City Code Chapter 17.108](#) on December 14, 2016. The City of Portland Home Energy Score program began on January 1, 2018. The ordinance requires sellers of single-family homes to:

- Obtain a home energy report, including a home energy score, from a licensed home energy assessor;

- Disclose the score and the report prior to listing a home publicly for sale in Portland on or after January 1, 2018.

Portland's Bureau of Planning and Sustainability (BPS) spent 2017 developing the City of Portland Home Energy Score program, in collaboration with interested stakeholders and partners.<sup>23</sup>

A home energy performance report includes the following information:

- A score and an explanation of the score.
- An estimate of the total annual energy used in the home, by fuel type.
- An estimate of the total monthly or annual cost of energy purchased for use in the home, in dollars, by fuel type.

Any real-estate listing(s) for a home in Portland, Oregon, must include the Home Energy Score. This includes the Regional Multiple Listings Service, Redfin, Zillow, Trulia, and other third-party listing services. In addition, sellers will need to provide a copy of the report and score to any real-estate agent working on their behalf, and to any prospective buyers who visit their home while it's listed for sale.

Early results show a cost of \$150 - \$250 for the Home Energy Score assessment, and a 54% compliance rate. To date the city has prioritized education and outreach over enforcement. The city can administer fines of up to \$500 for noncompliance. However, this is predicated on sellers not complying for 90 days and many homes are currently selling faster than this in Portland's current housing market.

#### Montgomery County, Maryland

Since January 1, 2009, Montgomery County has required that home sellers provide an energy cost and consumption history along with information on the benefits of home energy audits and energy efficiency improvements.<sup>24</sup> The law applies to owner-occupied single-family homes and condos that are individually metered by electric or gas utilities. At time of listing, the seller must provide copies of utility bills or comparable information for the 12 months immediately prior to the sale of the home. The seller must also provide information, which is approved by the Montgomery County Department of Environmental Protection, to assist homebuyers in making energy conservation decisions, including:

- The benefits of home energy audits, such as Maryland Home Performance with ENERGY STAR
- Energy efficiency improvements (e.g. insulation, home sealing, heating and cooling, lighting energy efficiency and financing options)

#### Denver, Colorado

The Denver Department of Public Health & Environment just announced (May 22, 2018) a pilot to deliver the Department of Energy's Home Energy Score to 300 homes. The assessment required for the score is being offered for free to pilot participants. In order to qualify you need to be a seller, buyer or recent owner of the home. Denver sees this pilot as way to explore options for delivering this score and to understand how this information can influence new owners to complete energy improvements. It is an initiative that they are hoping will support the city's climate goals.<sup>25</sup>

<sup>23</sup> Administrative rules at: <https://www.portlandoregon.gov/citycode/article/643393>

<sup>24</sup> [https://www.montgomerycountymd.gov/OCP/Resources/Files/disclosure\\_consumers.pdf](https://www.montgomerycountymd.gov/OCP/Resources/Files/disclosure_consumers.pdf)

<sup>25</sup> <https://www.denvergov.org/content/denvergov/en/denver-council-district-13/news/2018/denver-announces-pilot-program-to-raise-awareness-of-energy-cost.html>

## Energy Disclosure Policies for New Homes

### Boulder, Colorado

Boulder's disclosure policy applies to new construction and major remodeling only, and is an extension of the city's building code adoption and enforcement. In Colorado (unlike Minnesota), adoption of building codes is not statewide, and adoption of a specific model code and enforcement is up to the local jurisdiction. In order to obtain a permit for new construction, applicants must meet certain HERS (Home Energy Rating System) requirements based on the size and housing type as shown on the table below. HERS is a rigorous rating system that assigns an asset score to a home based on its predicted energy usage per square foot. It is widely used for new construction; a HERS score is necessary to achieve the ENERGY STAR certification for new homes.

For reference, a HERS score of approximately 70 is equivalent to the energy performance required by the 2012 IECC energy code, and 0 is equivalent to a net-zero home. Each integer value on the scale represents a 1% change in the total energy use of the rated design relative to the total energy use of the HERS reference design. A specific HERS rating that meets code can vary by about 25% for a given home.<sup>26</sup> For example, PNNL estimates that a HERS index rating for climate zone 6 (Minneapolis's climate) that is compliant with the 2012 IECC (which Minnesota has adopted) can vary from 48 to 79, depending on the specific house characteristics. The cost for a HERS rating can be \$500-\$1000 per home, and is generally not considered cost-effective for existing homes.

**Table 2**  
**Threshold ratings for Boulder's residential disclosure policy**

Type of Project	Square Footage	HERS score	Energy Efficiency Thresholds Above Code (IECC 2012)
<b>Single-family</b>	Up to 3,000	60	14%
	3,001 - 5,000	50	43%
	5,001 and up	25	64%
<b>Multi-Unit Dwellings</b>	Applies to all	60	14%

### Santa Fe, New Mexico

Santa Fe's ordinance, in effect since 2008, only applies to new residential single-family homes. Similar to Boulder, all new homes are required to post HERS index ratings. The HERS scores are posted on a standard form created by the city, which must be displayed prominently in the window of each new building. Initially, only a HERS rating was required. However, after one year of required HERS ratings, the City Council adopted a Residential Green Building Code for new single-family structures, which requires that specific HERS scores be achieved according to home square footage. Specific HERS scores are required based on the size of the structure, and become progressively more stringent as the home size increases (a smaller HERS score means that the home uses less energy). The requirements vary from a HERS score of 70 for a home 3,000 square feet or smaller, to 0 (that is, net zero energy usage) for homes greater than 10,000 square feet. The Santa Fe Building Code Administrator requires all new single-family

<sup>26</sup> Z. Taylor and V. Mendon, "Identification of RESNET HERS Index Values Corresponding to Minimal Compliance with the IECC Performance Path," Pacific Northwest National Lab (PNNL), 2013.

homes to have a third-party issued HERS form (with a score that meets the Green Building Code) prominently displayed in the home prior to issuing a certificate of occupancy.

## State-based Policies

Several states have energy bill disclosure policies.

- **Alaska** requires home sellers to disclose average annual utility costs to prospective homebuyers (H.P. 1468).
- **Hawaii** requires residential property owners to disclose electricity costs for the most recent three-month period in which the property was occupied ([HRS Â§ 508D-10.5](#), enacted in 2009).
- **Kansas** requires the disclosure of energy efficiency characteristics of new single-family and low-rise multifamily homes to prospective homebuyers prior to the signing of a contract (HB 2036). One reason for Kansas' policy is that it has no statewide energy code; the disclosure requirement is partly to compensate for lack of an energy code.
- **Maine** requires the disclosure of an energy efficiency checklist of homes to prospective residential renters at time of rental, and allows for the release of audit information of residential buildings (SB 2746). The Maine Public Utilities Commission has adopted voluntary standards for the energy rating and disclosure of homes and commercial buildings.
- **Massachusetts** requires the disclosure of information regarding the benefits of home energy audits to buyers of single-family homes or small multi-family homes at the time of closing (SB 2746). On April 3rd, 2018, Massachusetts Governor Baker announced a requirement that a home energy performance rating be made available to potential buyers of 1-4 unit homes. This will become a requirement on January 1st, 2021.
- **New York** has a Truth in Heating Law that requires the disclosure of utility bills to prospective homebuyers and residential renters, but only upon request by the homebuyer/renter.
- **South Dakota** requires the disclosure of energy efficiency characteristics of new single-family and low-rise multifamily homes (2-4 units) to prospective homebuyers prior to the signing of a contract. Like Kansas, South Dakota has no statewide energy code.

## International Policies

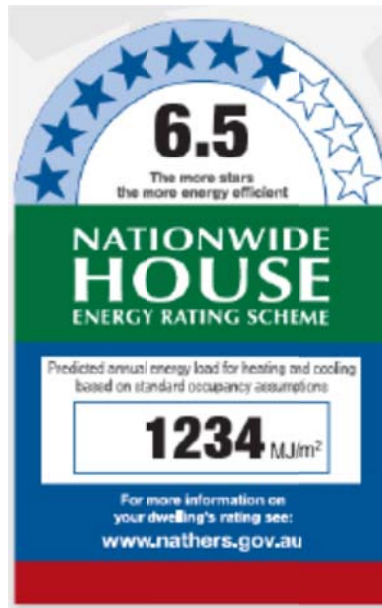
Australia, the European Union and other European countries have enacted mandatory asset labeling programs for residential buildings.

- **Australia** passed a law in 2010 requiring all new housing to be rated, and to meet a minimum rating requirements. A 10-point system is used (the Nationwide House Energy Rating System or NatHERS), with six being the minimum rating required.
- The **Australian Capital Territory** (the City of Canberra and surrounding area) enacted one of the first mandatory asset-based energy disclosure laws in the world, which has been in effect since 1999. Sellers of properties are required to have the home rated according to a 10-point rating scale (the Energy Efficiency Rating), and disclose this rating to all potential sellers. The rating also has recommendations for improvements that would increase the home's score. Results indicate that this policy may be helping the value of energy efficiency to be incorporated into the home sales price. A study by the Australian Bureau of Statistics of houses sold in 2006 in



Canberra showed that for each increase in half a star, the sales value of the property increased by 2%.<sup>27</sup>

**Figure 3**  
**Example of rating graphic used in Australia's Nationwide House Energy Rating Scheme**



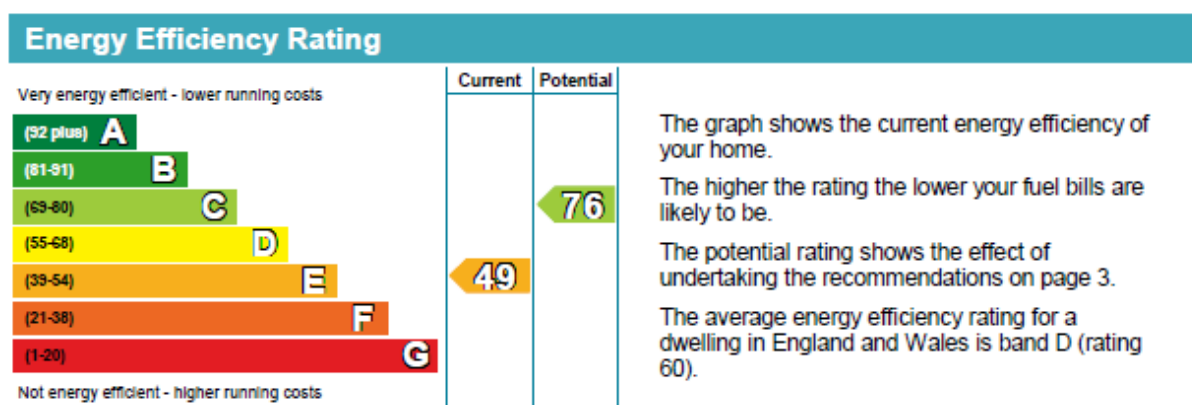
- **Denmark** has had a mandatory energy audit and labeling law for homes since 1997. It has a time-of-sale trigger, uses a “sticker”-type rating (“Specific Energy Label Certificate”), and requires inclusion of a list of cost-effective potential improvements. The seller pays for the rating and audit report. An independent study conducted in 2009 for the years 1999-2002 found high levels of non-compliance (50%) and revealed that receiving information at the time of sale did not result in a measurable decrease in energy consumption, compared to energy consumption before the sale.<sup>28</sup> However, energy bills were only analyzed a maximum of four years after sale, and it is possible that homeowners made improvements later in the home’s lifecycle. The author of the study suggests that “an energy labelling scheme alone is not sufficient to induce renovation works including energy improvements.” The study also indicates the importance of compliance in achieving desired results.
- The **European Union** (EU) in 2002 issued a directive requiring all EU member states to introduce an energy certification scheme for residential and non-residential buildings, both new and existing, by 2006. This directive was modified in 2010 to strengthen energy performance requirements and streamline some other provisions. While the EU largely left the implementation of the Energy Performance Certificate (EPC) up to each member state, each state must develop an EPC that includes recommendations for cost-effective improvements to the building, and reference values or benchmarks to allow consumers to compare energy performance of the building with similar buildings. This information must be provided by

<sup>27</sup> “Energy Efficiency Rating and House Price in the ACT,” Australian Bureau of Statistics, 2008.

<sup>28</sup> V. Kjaerbye, “Does energy labelling on residential housing cause energy savings?,”

building owners to prospective buyers or tenants at the time of construction, sale, or rental. While not all member states EPC's are alike, there has been significant coordination amongst EU members in developing and implementing their EPCs.

**Figure 4**  
Example of a rating graphic for an Energy Performance Certificate in United Kingdom



## Mandatory Upgrade Policies

While the focus of this paper is on disclosure policy, a few local jurisdictions have enacted policies that require energy upgrades, either at time of sale, or at time of major renovation. Berkeley, California, has had a mandatory upgrade policy in place for residential properties since the 1980s. The Residential Energy Conservation Ordinance (RECO) requires homeowners to install ten prescriptive measures at either the time of sale or major renovation (over \$50,000). Most measures are relatively low-cost, with the exception of duct-work and ceiling insulation, and all are typically cost-effective. The ordinance includes a spending cap of 0.75% of the sales price of the home. Homes are audited to ensure compliance. As noted above, a component of Boulder's disclosure policy includes meeting mandatory requirements for adding an addition to an existing home. The threshold for triggering these requirements is based on the total square footage of the home, relative to the total square footage of the addition. San Francisco has a similar ordinance, passed in 1982.

At the state level, Wisconsin adopted a Rental Weatherization program in 1985, which is still running today. The program establishes minimum efficiency requirements for rental units. For rental properties constructed before adoption of the state's building energy codes, the policy requires an inspection to certify that the property meets certain energy efficiency requirements before it can be sold. Compliance can be met with a list of prescriptive energy efficiency measures or through satisfaction of an energy performance metric. While the ordinance sets no firm cost limitations, specific measures may be exempt if the payback period is greater than five years.<sup>29</sup>

<sup>29</sup> See: <http://dsps.wi.gov/Programs/Industry-Services/Industry-Services-Programs/Rental-Weatherization> Also: Patrick J. Coleman, "Ordinances to Enable Energy Efficiency in Rental Housing in the United States," Thesis paper for MA in City Planning, Massachusetts Institute of Technology, 2011.

Starting in the early 1980s and continuing into the early 1990s, Minneapolis enforced a City Rental Energy Code, which was a mandatory upgrade policy for rental property owners. This was based on the City enforcing a state statute<sup>30</sup> for landlords that stated they must complete all energy efficiency improvements with less than a 10 year payback.<sup>31</sup> The Rental Energy Code applied to all rental buildings older than 1976, and had different requirements for 1-4 unit and 5+ unit buildings. The City (and later CEE) inspected buildings for compliance, assisted those not in compliance with making the necessary upgrades (including audits and financing), re-inspected buildings if necessary, and issued a Certificate of Compliance once buildings were in compliance. Inspections were not generally done unless there was a request or a complaint, which could come from tenants and tenant organizations or other City employees. By August of 1989 the City had inspected, and issued Certificates of Compliance for 1,928 properties.<sup>32</sup> In 2011, the City considered re-instating a similar version of this policy. The Regulatory Services, Energy and the Environment Committee of the Minneapolis City Council had a public hearing to consider a “Green and Healthy Rental License Standards” proposal that would have increased requirements for energy efficiency in rental housing. However, at that time, influenced by the recession and perceived sensitivity of the housing market, and under strong opposition by rental property owners, the committee declined to take action.<sup>33</sup>

---

<sup>30</sup> Minnesota Statutes § 504B.161 (1)(a)(3).

<sup>31</sup> This statute has since been modified to change the threshold from a 10-year simple payback (meaning the annual energy savings must be greater than 1/10<sup>th</sup> the direct cost of the upgrade), to a 10-year payback that includes financing costs. The upgrades are not.

<sup>32</sup> Robert Henderson (CEE), “Minneapolis Rental Energy Code,” memo to Tim Dillon, City of Burlington, June 1989; and various other correspondence.

<sup>33</sup> City of Minneapolis Regulatory Services staff memo, “Request for City Council Committee Action from the Department of Regulatory Services, Subject: Green and Healthy rental license standards,” Regulatory Services, Energy and the Environment Committee, February 14, 2011.

## Appendix B.

### Options for Energy Disclosure Mechanisms

Here we discuss two options for operational ratings, and three options for asset ratings. While there are other options, we feel these cover the most important options appropriate for Minneapolis (these aren't necessarily mutually exclusive, and hybrid options are possible).

#### 1. Utility bill disclosure

Perhaps the simplest option is to disclose historical monthly energy usage, such as the previous 12 or 24 months of energy data. While both electric and natural gas data would be useful, the natural gas data is most informative about the efficiency of the home, while the electric data can have a much wider variation depending on the occupant, and is less telling about the home's energy performance.

Both Xcel Energy and CenterPoint Energy require that the existing owner of the home sign a release in order to receive this information. It can take up to several weeks to get this data from the utilities. This time lag may be problematic for time of sale or time of lease, when property owners generally have a long task list of things to do to get their properties ready for sale/lease, and time is at a premium.

If this option is pursued, streamlined and expedient methods for gaining access to the data would be needed. Ideally, realtors would also be able to request data, as an agent of the property owner, in addition to the property owner.

Privacy concerns about the data may also limit how widespread the data could be shared. There have been many other jurisdictions that have implemented disclosure policies that provide the information to prospective tenants or homebuyers without any known issues. However, there may be resistance to providing more widespread access to the information, such as the city currently does for the commercial benchmarking ordinance.

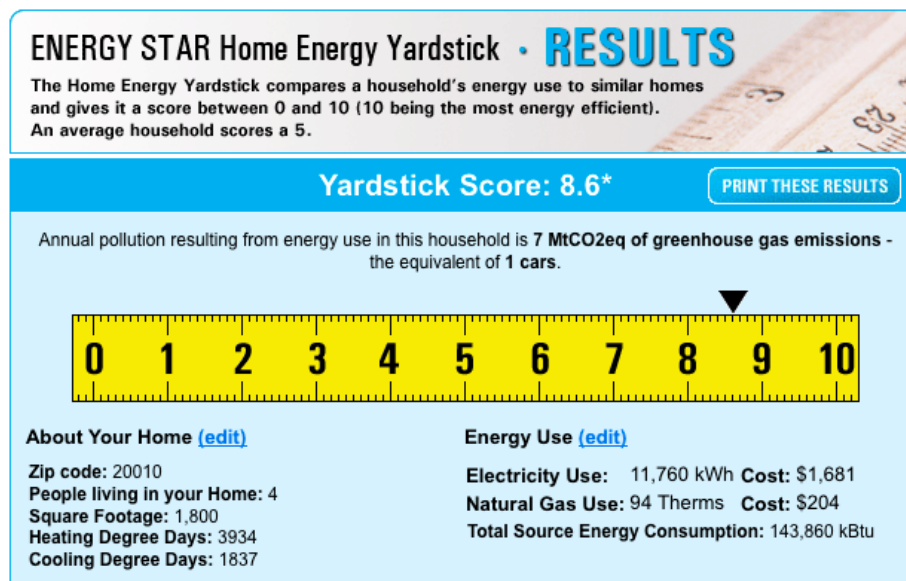
As has been noted above, while it may be the simplest option, utility bill disclosure in itself is considered the least effective option for energy disclosure. It is more indicative of the energy habits of the occupant than the fundamental energy performance of the home. Thus, utility bill disclosure alone will not be able to provide the full potential benefits of an energy disclosure policy.

#### 2. Utility bill benchmarking

It is useful to put the information in a benchmarking tool, such as the Environmental Protection Agency's Home Energy Yardstick (rather than to rely solely on raw energy usage data), so that users can get some idea of how their energy use compares to similar homes. This requires the input of additional information about the home, such as square footage and the number of people living in the home.

There are also other options for benchmarking. For example, both Xcel Energy and CenterPoint Energy provide some of their customers with Home Energy Reports produced by the energy software company OPOWER. These reports compare the energy usage of the home with similar homes on a monthly basis.

Figure 5  
EPA Home Energy Yardstick



If homeowner-based information is added to a benchmark, there should be some consideration of how to ensure the reliability of the data. This may involve a quality control check of a random sample of homes to verify homeowner-provided information. Without this, the benchmark could potentially be subjected to “gaming” (for example, if the homeowner said there were more occupants in the home than was actually the case, it would make the score appear better than it was).

While providing better information than simple utility bill data, benchmarking still cannot provide actionable information on what can be done to improve the efficiency of the home, and is still only marginally reliable as a predictor of energy use for the new homeowner — this is a major shortcoming of this method.

### 3. DOE Home Energy Score

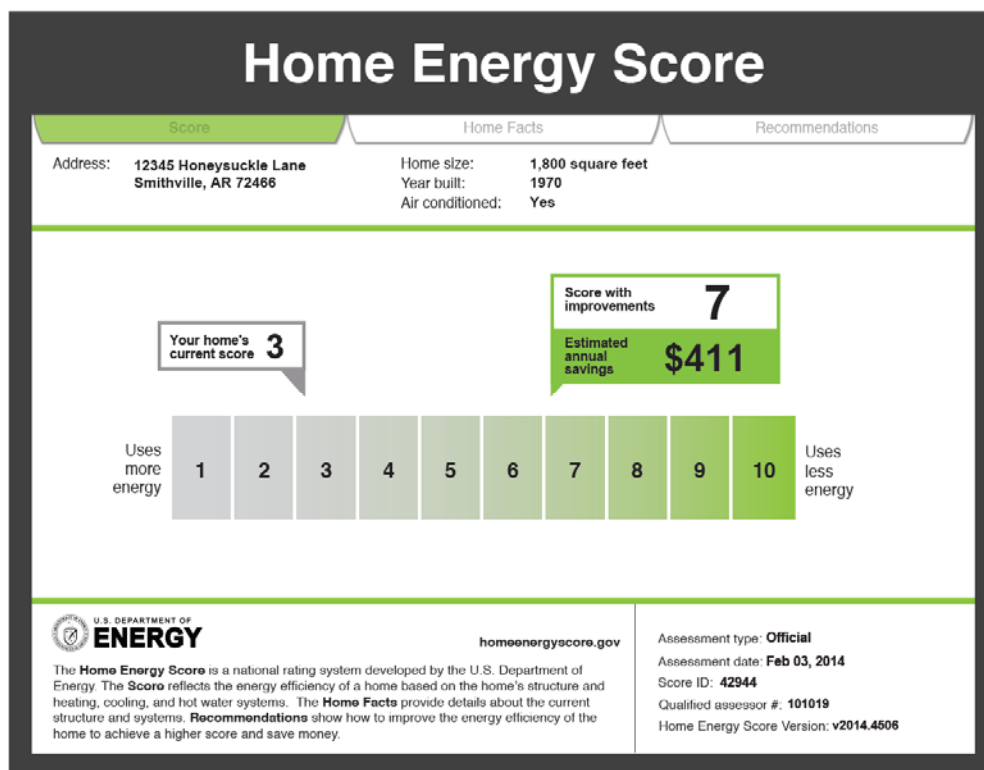
In 2011, the U.S. Department of Energy (DOE) created the Home Energy Score as a national tool appropriate for creating an asset score for existing homes. It rates a home's asset performance on an absolute scale of 1 to 10, with 10 being the best score (corresponding to the lowest energy use). The assessor can make recommendations for improvements, and the Home Energy Score calculates a potential rating if these suggested energy efficiency improvements are completed.

A qualified assessor must collect at least 64 data points on the home (increased for a more complex home) in order to generate a score. A blower door test can be helpful for the assessment, but is not required by DOE and is generally not performed. This data collection generally takes 1 to 1.5 hours. The data is then input into the DOE's online database and a score is computed. In order to generate the score, an assessor must first have one of two nationally recognized energy auditor credentials.<sup>34</sup> Then

<sup>34</sup> The accepted certifications are BPI's Building Analyst, or RESNET's HERS rater certification.

the assessor must pass a separate DOE test through a DOE-certified test center in order to be allowed to conduct the certification.

Figure 6  
Home Energy Score sample report (page 1 of 5)



CEE has extensive experience with the Home Energy Score and managed the implementation of a pilot of the Home Energy Score in the Twin Cities, as one of 11 pilots nationally. One hundred and fifty-four homes in the Twin Cities, about 75% of them in Minneapolis, were rated with the Home Energy Score. CEE was also part of a DOE-funded research report to compare homes scored with the Home Energy Score with two other rating systems, and documented the results.<sup>35</sup> One of the noted issues with the Home Energy Score is the fact that since homes are scored according to an absolute scale, not all homes will be able to achieve a “perfect” score, even if they do all of the upgrades. Thus, an existing home can do every cost-effective retrofit for that home, and may still achieve a low score.

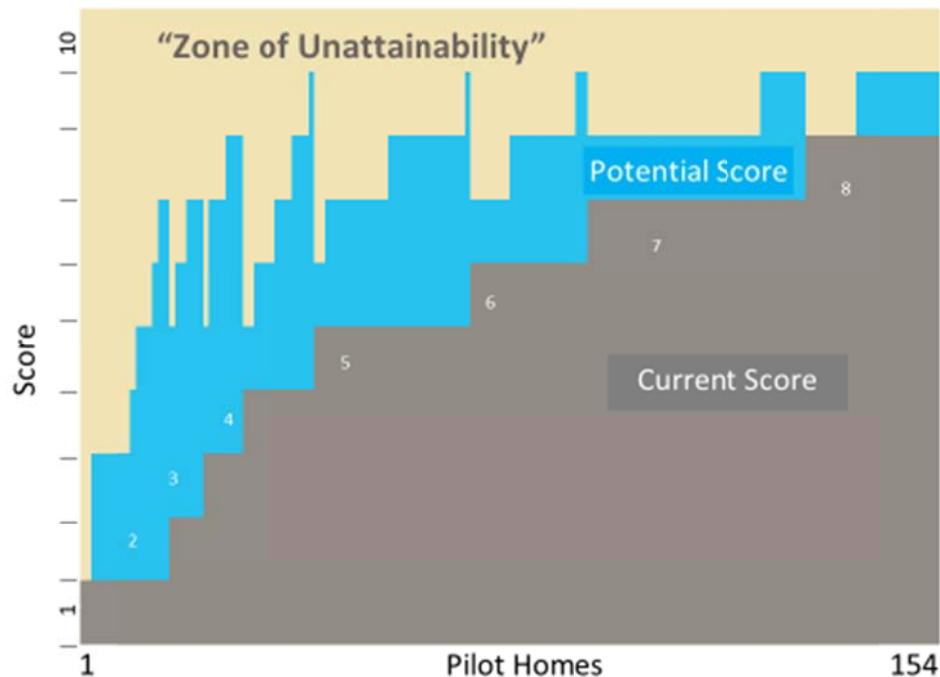
Figure 7 indicates the distribution of the current scores, as well as the computed scores after completing recommended upgrades (the “potential score”) for the homes in the pilot. None of the homes in the pilot were capable of achieving a “perfect” score of 10 for their potential score, and many could not score better than 6, thus creating what we have termed a “zone of unattainability” – the difference

<sup>35</sup> J. Edwards, D. Bohac, C. Nelson, and I. Smith, “Field Assessment of Energy Audit Tools for Retrofit Programs,” U.S. Department of Energy, NorthernSTAR Building America Partnership, July 2013. [www.nrel.gov/docs/fy13osti/56762.pdf](http://www.nrel.gov/docs/fy13osti/56762.pdf)



between the homes' potential score, and a perfect score of 10, which the homeowner cannot obtain by investing in cost-effective upgrades.<sup>36</sup>

**Figure 7**  
**Plot of current & potential Home Energy Scores of 154 homes in Twin Cities pilot**



The concern with the Home Energy Score's "zone of unattainability" is that it can significantly reduce the motivation of homeowners to upgrade their homes. This is particularly true of the older homes that make up much of Minneapolis housing stock which, compared to homes built to today's strict energy codes, will always be left with lower scores, even post-retrofit. Why should a homeowner invest money in a major energy retrofit, if it will only increase their score from a 4 to a 6?

Note that this issue is not unique to the Home Energy Score, but to all absolute-based rating systems. According to a recent evaluation of Oregon's Energy Performance Score (another absolute asset score), "numerical improvements in a home's energy performance score from efficiency upgrades are generally small relative to the overall score. The modesty of the potential change in score could diminish the impact of energy performance scores on consumers' decisions to upgrade and could reduce the effectiveness of a score as a market signal to potential buyers of a previously-owned home, assuming the buyer is comparing the scores of two or more homes with similar characteristics...."<sup>37</sup>

We believe that the primary goal of a scoring system or certification for existing homes should be to motivate homeowners to invest in energy upgrades, and thereby improve the energy efficiency of

<sup>36</sup> Although the Department of Energy has since modified the score in a way that will reduce the zone of unattainability, it is still a structural feature of the scoring method.

<sup>37</sup> J. Stout & S. Scott, MetaResource Group, "Home Energy Performance Scores: Efforts to Date with Modeling Tool Comparison and Summary of Key Issues," prepared for Energy Trust of Oregon, 2012.

existing housing, which is where the biggest efficiency gains can be made. Thus, while the absolute nature of the scale is appealing because it can be a yardstick to compare the performance of newer homes with older homes, it may, counterintuitively, not help increase the efficiency of Minneapolis' older homes as much as would be desired. Another consideration is in the homebuyer market, it may make newer, suburban homes more attractive than older Minneapolis homes.

Nonetheless, the Home Energy Score would provide accurate and useful information for a time-of-sale energy disclosure tool. It can be relatively cost-effectively delivered as well. It is expected that qualified assessors could deliver the service for \$200-\$300. While there are very few qualified assessors certified by DOE to deliver the score right now, given a ramp-up period to starting a policy in Minneapolis, there would be a sufficient workforce available, given the demand of 5,000+ homes per year. For reference, CenterPoint Energy and Xcel Energy contractors perform about 6,000 audits per year.

#### 4. Energy Fitness Score

The Energy Fitness Score is an asset rating for existing homes. It was developed by CEE, and is tailored specifically for older homes in Minnesota. It provides a score of 0 to 100, with 100 being the most efficient. It is a house-type-based scale, so the reference home for getting a score of 100 score is the same house type as the one being scored, except that it has completed all of the cost-effective energy efficiency upgrades. Thus, each home scored can get a score of 100, or very close, by doing cost-effective energy efficiency upgrades. Underlying the rating is a physics based model that utilizes algorithms to model energy savings and usage. This type of model has been shown to have equivalent accuracy to the Home Energy Score and other more complicated rating systems in predicting actual energy usage.<sup>38</sup> The Energy Fitness Score is used to determine eligibility for the Energy Fit Homes program, a certification program for existing homes that meet a basic level of energy efficiency (homes that score better than 95 are eligible).<sup>39</sup>

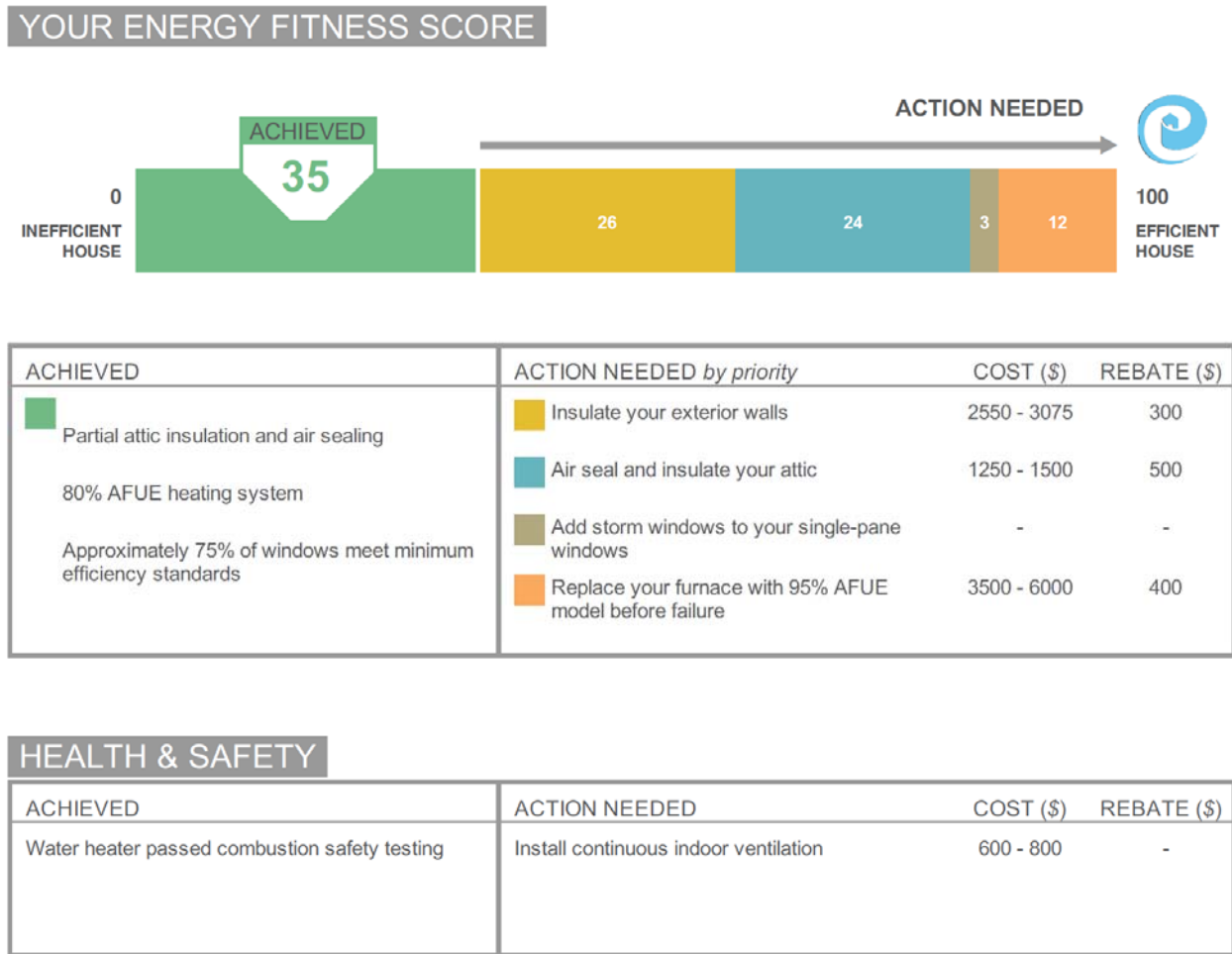
In part because it focuses narrowly on efficiency upgrades possible in Minnesota's housing stock, the Energy Fitness Score assessment requires less data inputs than the DOE's Home Energy Score, and it takes less time to gather the inputs for the score. It provides recommendations for cost-effective upgrades to the homeowner. The recommendations show how many points they would receive for completing each upgrade, so that homeowners can prioritize upgrades. The assessment, as it is currently done, also includes two health-related tests; combustion safety of major natural gas appliances, and adequacy for indoor air quality of fresh air intake into the building (the latter can be done because of a blower door test that is completed as part of the assessment). The data is entered by the assessor, and software calculates the score and generates the graphic for the report (see Figure 8).

---

<sup>38</sup> See Edwards, et al. (2013), and Earth Advantage Institute & Conservation Services Group, "Energy Performance Score Findings & Recommendations Report," prepared for Energy Trust of Oregon, 2009.

<sup>39</sup> See [www.mnenergyfit.org](http://www.mnenergyfit.org)

**Figure 8**  
Example of Energy Fitness Score rating



Currently, the Energy Fitness Score is generated for participants in Xcel Energy's and CenterPoint Energy's audit program. The report is currently reaching about 5,000 Minnesota homeowners being served by these programs annually.

If it were to be used for a time-of-sale energy disclosure program, it could be delivered by existing energy auditors for about \$200 per home. However, it may also be possible to dramatically reduce this cost by adding on this assessment to the existing Truth in Sale of Housing inspections that are done by private contractors. With training and the purchase of some additional equipment, it should be possible for inspectors to collect the necessary data for the Energy Fitness Score in less than an hour, while they are already at the home for their Truth in Sale of Housing inspection. This would also ensure that the score was generated prior to the home going on the market.

It would be possible to modify the existing Energy Fitness Score report to customize it for the purpose of energy disclosure. This could include, for example, provide an estimate of total annual energy costs for the average homeowner.

## 5. HERS Rating

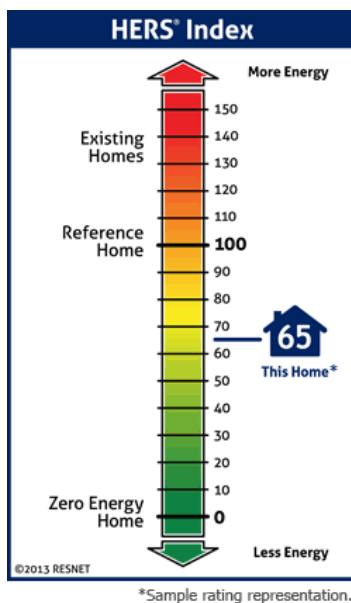
The Home Energy Rating System (HERS), administered by the Residential Energy Services Network (RESNET), is a home energy rating system that was originally developed through federally sponsored research in the 1980s. It has generally been used for new homes, and has been used nationally on hundreds of thousands of homes to certify compliance with ENERGY STAR and other federal guidelines. It is a robust modeling tool, requiring the gathering and input of hundreds of variables by RESNET-certified energy auditors. This generally includes information on combustion safety and the need for mechanical ventilation for indoor air quality in the home.

The HERS index is a score from 0 to 250, with 0 being the lowest possible score, and representing zero net energy consumed by the house. It is an absolute score, but normalized for square footage. Therefore, all other things being equal, a larger home will use more energy than a smaller home with the same HERS index score. A 100 on the HERS index is approximately equal to the 2006 EICC energy code.

It is generally not considered practical for widespread use on existing homes, primarily because of cost. A typical HERS rating costs \$500-\$1000, which is a significant fraction of the typical costs for retrofitting an existing home with higher insulation. In addition, the HERS index would suffer the same issue as the Home Energy Score, in that it may not be very motivating for homeowners to seemingly only marginally increase their score compared to newly constructed homes.

However, a growing trend in Minneapolis is “tear-downs” of existing homes to make room for construction of newer, larger homes. Thus, HERS may be an appropriate tool for measuring efficiency in Minneapolis’ new construction. The Twin Cities region has an ample workforce of certified HERS raters to support this effort. Both Xcel Energy and CenterPoint Energy have new construction programs that help subsidize HERS ratings in approximately 2,000 homes per year.

Figure 9  
Example of a HERS index score



### Summary of Energy Disclosure Options

Table 2 below provides a summary of the options considered here, with reference to the key design considerations discussed earlier in the report.

**Table 3**  
Summary of energy disclosure options

Key Features	Disclosure Options				
	Utility bills	Utility bill benchmarking	DOE Home Energy Score	Energy Fitness Score	HERS rating
Is it an asset rating?	No	No	Yes	Yes	Yes
Can it support higher prices for efficient homes?	No	No	Yes	Yes	Yes
Is it affordable?	Low cost	Low cost	Yes	Yes	Not for existing homes
Does it provide a pathway to improvement?	No	No	Yes	Yes	Yes
Does it help motivate homeowners to do retrofits?	Somewhat	Somewhat	Somewhat	Yes	Best suited for new homes
Is there potential for co-benefits?	No	No	Maybe	Yes, combustion safety & indoor ventilation	Yes, combustion safety & indoor ventilation
Are there existing delivery options?	Needs to be improved	Needs to be developed	Could be developed with existing auditor capacity	Existing auditor capacity; possible for home inspectors to do at low cost	Existing capacity



## Appendix C. Potential Expansion of Energy Disclosure Policies

While this report focuses on homes of four units or less, there may be benefits to policies that expand energy disclosure to multifamily buildings, rental properties, and new home construction.

### Rental and Multifamily Housing deserve special consideration

The city's Climate Action Plan has a strategy for targeting rental housing: "Help 75% of Minneapolis renters and rental property owners participate in efficiency retrofit programs by 2025, with a distribution that reflects the current percentage of low and moderate-income rental housing in the city."<sup>40</sup> As implementation for single family owner-occupied property disclosure gains traction, the city may want to consider how to expand it to include rental and multifamily properties.

Energy disclosure can effectively support energy efficiency improvements in rental and multifamily housing, by addressing the split incentives issue in rental housing. In rented homes, owners are typically responsible for investing in energy-related retrofits, while the benefits of such investments (namely lower bills and comfort) often accrue to tenants. Energy disclosure can help create a market demand for more efficient housing and provide a benefit to landlords by helping them more easily rent efficient housing.

A time-of-sale disclosure policy could apply to rental properties as well as owner-occupied ones. However, the logical trigger for rental housing is at time of lease instead of at time of sale. The addition of a time-of-lease disclosure would provide information to renters to make informed decisions, and provide an incentive for rental property owners to increase the efficiency of their properties.

In several ways, designing an effective rental energy disclosure policy is more complicated than time-of-sale disclosure between the old property owner to the new property owner. Some of the additional considerations for time of lease disclosure are:

- There is likely to be a higher concern about the cost of compliance. A cost burden of several hundred dollars for an asset rating can be a significant portion of the overall net revenue from a property, and rental property owners are generally very concerned about holding down operating costs. At time of sale, while the cost concern exists, a few hundred dollars is a smaller portion of the total closing costs the property owner can be expected to pay, and an insignificant amount of the total sale price.
- Change in tenancy in rental units occurs much more frequently than changes in home property ownership. According to census data, 63% of occupied rental units in Minneapolis were rented to the same renter for three years or less.<sup>41</sup> This represents nearly 20,000 units of 1-4 unit housing in Minneapolis that changed tenancy within a three-year period.
- Many renters looking to rent in a 1-4 unit property will also be considering multifamily properties (5+ units) as well. Yet, these property types are different in some fundamental ways that make an apples-to-apples disclosure policy difficult:

---

<sup>40</sup> City of Minneapolis. Minneapolis Climate Action Plan. Adopted June 28, 2013.

<sup>41</sup> 2012 American Community Survey 1-Year Estimates.

- 1-4 unit buildings typically use significantly more energy than multifamily buildings. The average single-family house uses twice as much energy as the average multifamily unit.<sup>42</sup>
- Utility billing arrangements are typically different. Renters of 1-4 unit housing (and newer multifamily developments) generally pay both electricity and heating. In older multifamily buildings, the landlord usually pays for heat and common area electricity, and the tenant only pays for electricity used within the unit. Thus, the typical renters of 1-4 unit housing can have an energy bill over four times greater than the average multifamily unit renters (\$1700/year versus \$360/year).<sup>26</sup>
- Because many multifamily renters do not pay for heat, asset ratings for multifamily are usually not relevant. In addition, the asset ratings discussed above for existing homes are not appropriate for rating multifamily buildings; different rating systems are needed. Multifamily is also generally more complicated, from an energy upgrade standpoint.
- While the biggest driver impacting renters' energy bills for 1-4 unit housing will be the building envelope and heating system efficiency, because multifamily landlords typically pay the heating bills, the largest drivers of the typical multifamily tenant's bill are lighting and major appliances in the unit.
- Based on disclosure policy experience to date, a time of lease disclosure is unlikely to be effective without widespread enforcement. But enforcement of a time of lease disclosure will likely not be as straightforward as for time of sale. While for time of sale there is already a mechanism for the City to be involved through Truth in Sale of Housing, the City is not currently involved in change of tenancy for rental properties, nor would they even know about it.

Given these challenges, there are a few options for disclosure at time of lease that the City might consider once the single-family energy disclosure policies are decided, implemented, and running smoothly.

- The City could require asset rating disclosure at time of lease for 1-4 unit buildings only. Asset ratings will be most effective at incenting landlords to improve the efficiency of their housing. A rating of how efficient a building is can create market pressure for improving its efficiency. The rating could be good for 5-10 years, so that the landlord would not have to get a new rating for each new tenant. The rating could be required to be permanently posted in each rental unit. There may also be multiple channels for landlords to receive this rating:

---

<sup>42</sup> A Minnesota Department of Commerce sponsored study found that the average tenant of a gas centrally-heated multifamily building pays about \$360 per year in energy bills, and the landlord pays \$440 per year in energy bills, for a total energy bill of \$800 ("Minnesota Multifamily Rental Characterization Study," Energy Center of Wisconsin, 2013). According to the U.S. Department of Energy Residential Energy Consumption Survey (2009) the average house in the Midwest region (IA, MN, SD, ND) uses about 10,734 kWh and 859 therms per year. At 11 cents/kWh and 62 cents/therm (the same assumptions used in the study above), this would be \$1,713 per year.

- The City could perform a simple asset rating during their rental licensing inspections on 1-4 unit properties. This data collection and report could align with time-of-sale report that may be implemented by TISH inspectors. This would fit well within an existing City process that has staff to meet this demand.
- Utility-funded programs could also be a path to compliance. For example, CenterPoint Energy's current Home Energy Squad program provides participants with an Energy Fitness Score, which could meet City asset score requirements. The cost for this service to the property owner is currently \$100, as it is subsidized by the utility.
- The City could also require operational ratings for time of lease, while asset ratings could still be used at time of sale. Because they use so much more energy, 1-4 unit buildings should be the priority for this policy, but multifamily units could also be included. Operational ratings cannot be expected to drive capital energy upgrades as effectively as asset ratings, but could be a driver for a multifamily program that uses direct installation strategies (such as LED light bulbs, programmable thermostats, and low flow water devices). It would be best to have utility support for programs targeting renters, including direct installation of efficient measures, as well as some mechanism at time of rental to provide operational ratings or energy consumption data needed to calculate those ratings.
- The City could also have a hybrid requirement, with asset ratings for 1-4 unit rentals, and operational ratings for multifamily rentals.

The City may want to take a phased approach to implementation, implementing a time-of-sale disclosure for rental properties once systems are fully implemented to support owner-occupied disclosure. Then, with a couple years of experience, and growing buy-in by property owners, adding a time of lease requirement could be the next step.

## New Construction

Compared to older homes, new homes built to the state energy code are much more efficient than older homes, and make the usefulness of energy disclosure in new construction questionable. When energy codes are robust, the benefits of rating new homes will be small compared to the large savings that comes from upgrading existing, inefficient housing stock. Also, compared to the number of existing homes per year being sold, the number of new homes being built in Minneapolis is relatively small and the number on the market, even smaller. There are only two local jurisdictions in the U.S. (Boulder, Colorado, and Santa Fe, New Mexico) that have implemented local ordinances requiring energy disclosure for new homes (See Appendix A for summaries). Among disclosure mechanisms, only the HERS rating, which is an asset rating, would be appropriate for new construction.

In addition to exempting new home construction from an energy disclosure policy, it may also be advisable to exempt newer construction, e.g., homes built after 2000, from the disclosure requirements.

## Appendix D.

### Technical Memo on TISH Pilot Results

#### Time of Sale Energy Assessment Pilot – Summary of Findings

From June to October 2017, the Center for Energy and Environment (CEE) conducted a pilot for home inspectors. The overall goal of this pilot was to increase the usefulness of information provided through home inspections done at time of sale, with the ultimate goal of increasing energy retrofits. The residential sector is a significant contributor to GHG emissions, and the City of Minneapolis Climate Action Plan has a goal of getting 75% of homeowners to participate in an energy retrofit program. Research has shown that new homeowners are more likely to conduct energy upgrades, making time of sale an important target for energy retrofit efforts. Approximately 5,000 homes per year are sold in Minneapolis, with seller-paid home inspections required prior to the home going on the market through the city's Truth in Sale of Housing (TISH) program. We see this as an excellent opportunity to inform homebuyers about their energy retrofit opportunities, which would lead to further participation in these programs.

#### PILOT DESIGN

CEE completed this pilot, with funding from Minneapolis and CenterPoint Energy, to assess the feasibility of adding an energy assessment to existing home inspections. The pilot evaluated the training needs of home inspectors, required data points to make energy recommendations, the time required to collect and record data, and related costs.

CEE recruited inspectors by offering a \$75 incentive for collecting additional data during their already scheduled home inspections. Inspectors were required to attend a two-hour training that covered the pilot process, required data collection, an overview of residential building science and recommended treatments. Eight inspectors went through the pilot training and roughly 40 inspections were completed.

#### FINDINGS

**TISH inspections already require most of the data needed to make energy recommendations.** The pilot assessed four major areas for energy improvements — attic insulation, wall insulation, heating system, and windows. In order to make recommendations in these areas inspectors collected nine data points for the pilot, five of which are already collected for TISH. Further details are in the table below.

**Little training is needed for inspectors to collect this data.** As illustrated in the table below the additional data that is required to make these energy recommendations is in areas that inspectors are already reporting on for TISH. Since they are already knowledgeable about these areas of the home, the extra data points that we asked them to collect were details they were already familiar with.

Category	TISH Data	Additional pilot info
Attic Insulation	- Insulation Type - Inches	- Attic Type: Unfloored, slant, peak, kneewall
Heating System	- Heating system Type - Evaluate venting size	- Venting type (natural draft, sealed, etc.) - Age: over/under 20 years old

Windows	- Evaluate for screen and/or operating storm	- Determine if single-pane windows w/out storm are present (yes/no)
Walls	- Evaluate structural condition	- None: recommendation will be based on year built.

**Home sellers would not have to pay more for TISH inspections if this data is added, because it does not take extra time for inspectors to collect it.** We held a focus group with the inspectors who participated in the pilot. When asked if this data collection added any time to their inspections they stated that they were already evaluating all of these areas, so the only extra time was for the pilot paperwork. This paperwork would not be required if the inputs were incorporated into the TISH process.

## RECOMMENDATIONS

**The four additional data points required for the pilot should be incorporated into TISH inspections.**

The four inputs required – heating system age (over/under 20 years old) and venting type, attic type, and single pane windows without storms present (yes/no) – are small tweaks to data that is already collected for TISH, and are areas of the home that are already being evaluated. Incorporating these inputs would be a small effort, but very valuable, as they allow for reporting on energy retrofit opportunities. There may also be some database changes needed to utilize this data effectively (see database section below for additional information).

**A separate TISH report, specifically about energy, is the best way to utilize this data.** The goal of this report is to inform potential homebuyers about the key energy assets of the home. It must also inform the homebuyer of how to improve these energy assets, with a clear call to action. If this information is “hidden” within the current TISH report it will not be as effective. Having a separate report will make this data more visible and impactful to potential buyers, and ultimately spur the necessary energy retrofits for the city to reach its goal.

## ADDITIONAL CONSIDERATIONS

**Report recommendations should be rooted in cost effectiveness.** TISH data is typically reported in relation to code, which can still be done with the energy data collected compared to the energy code (the current energy code includes requirements for attic insulation, wall insulation, heating systems, and windows). However, for the pilot we utilized a decision tree to determine if an energy asset should be recommended. The recommendation criteria in the table below are thresholds for cost effectiveness. This is defined by a 10-year payback, where the estimated energy savings would pay back the cost of the upgrade within 10 years.

**Recommendation decision tree:**

Energy Asset	Recommendation Criteria	Recommendation
Attic Insulation	Less than R-30 (~10 inches of insulation)	Air-seal and insulate your attic to R-49
Heating System	20 years or older AND < 90% efficient	Replace heating system with a 95% Annual Fuel Utilization Efficiency (AFUE)
Windows	Single pane window without storm	Add storms to single-pane windows
Wall Insulation	< 1945	Dense-pack exterior walls with insulation

It will be important to base the recommendations outlined in the report around cost effectiveness, because not all existing homes can achieve current code requirements. We should recommend

improvements that are possible for existing homes to achieve, and not punish them for energy assets that can't feasibly be completed (e.g. reaching an R-value of 19 in an existing home with 2"x4" wall construction).

**Not all of the energy assets can be visually verified on every home, and that's ok.** This is evident with wall insulation. Inspections cannot be intrusive, so there is not a good way to verify the wall insulation levels. However, CEE has thousands of data points from audits completed in Minneapolis. This information can be used to inform homeowners of their likely wall insulation levels. The recommendation could read, "Homes of this age typically have xx insulation, we recommend..." Having this information will still fulfill the report's purpose of informing the homebuyer of the status of the home's energy assets, and show them a path to verification and/or upgrade completion (scheduling an energy audit or contacting an insulation contractor).

This will also occur in attics that have no access. This can be done in a similar fashion, utilizing the year built as well as the house type (1 story, 1.5 story). Typically an older home that does not have access to the attic has not been treated with insulation. CEE's database can also be used to inform the homeowner of likely insulation levels.

**Home sellers can verify energy assets through an audit and/or project invoice.** Home sellers would also have the option of verifying this information by completing a home energy audit. This would give the seller further details on the energy assets of their home, which can be reported to the buyer. A contractor invoice could also be used to verify that an area has been treated.

**The TISH dashboard/database could be updated to improve data quality and reduce data entry mistakes.** After reviewing the TISH data we would recommend changing any "text" fields to dropdowns with applicable options for inspectors to choose from. For example, "insulation type" appears to be a text field (i.e., inspectors type in the insulation type rather than choose options from a drop box) because the TISH data we received shows "cellulose" spelled five different ways. We also noticed some mistakes like "heating system type" entered in the heating fuel type field, and so on. Changing these fields to applicable dropdowns will improve the accuracy of data entry and create a cleaner database for reviewing data. We realize that some of these inputs may have changed over time, and dropdowns could already be implemented, we just wanted to emphasize the importance of these upgrades for accurate entry, report generation, and ease of data mining later on. We have gone through our own growing pains with our database and it is always better to change things sooner rather than later.

**TISH inspectors are required to complete 18 hours of CEUs per year. These could be utilized to review the TISH guidelines and data entry with inspectors.** Reviewing program guidelines and procedures with TISH inspectors annually will help improve the accuracy of data collected and the data entry.

**The TISH energy report and additional data collection could be leveraged for other Clean Energy Partnership activities.** The city has increased the franchise fee to generate funds for energy efficiency initiatives. These changes to TISH would allow the city to offer a time-of-sale rebate for energy upgrades, and promote it through the TISH energy report (one of many options). It would also give the city important and useful data about its housing stock, which can be used to inform future initiatives.



## Appendix E.

### TISH Energy Disclosure Report Mock-up

The following report was created as an example of what a report could look like.

# Home Inspection Energy Report



This report's purpose is to lorem ipsum dolor sit amet, consectetur adipiscing elit. Cras quis neque pharetra, rhoncus lectus sit amet, placerat metus. Suspendisse potenti. Curabitur lacinia est in tortor bibendum auctor.

#### LOCATION

1234 Sample Boulevard  
Minneapolis, MN 55409

Improve your score by lorem ipsum dolor sit amet, consectetur adipiscing elit. Cras quis neque pharetra, rhoncus lectus sit amet, metus.



#### COMPLETED AT THIS HOME



☒ **Wall Insulation:** Walls are the largest area of your home protecting you from the hot and cold of the outdoors. Once completed your house will be less drafty and you will be more comfortable in your home.



☒ **Windows:** Installing a storm window on the exterior of single-pane windows can cost-effectively reduce your energy usage. Although it is generally not justified by energy savings alone, replacing single-paned windows with double-paned, high efficiency, ENERGY STAR rated windows is another option.

#### RECOMMENDED UPGRADES



☐ **Attic Insulation and Air-Sealing:** Air leaks in your ceiling allow air from inside your house to enter the attic, causing ice dams and moisture issues. Sealing these leaks improves durability and saves energy. After air sealing is complete, insulation can be added to help keep your home warm in the winter and cool in the summer.

Typical Cost:  
\$1,750 – \$2,250

Rebate Available:  
\$500



☐ **Heating System:** Replacing your old heating system with a new energy-efficient model will maximize your energy savings. We recommend a minimum 95% efficient (AFUE) furnace equipped with an ECM motor.

Typical Cost:  
\$3,000 – \$6,000

Rebate Available:  
\$400

#### Get Started Today

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Vivamus vulputate pretium turpis id suscipit. Morbi ultricies est non dolor mattis, sit amet malesuada lacinia.

emailaddress@url.org  
612-000-0000