# Really selling efficiency: Leveraging existing home inspections at timeof-sale to promote energy upgrades

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### **ABSTRACT**

The very beginning of the home ownership cycle, a time when homeowners do significant planning for future remodeling projects (Siniavskaia 2017), is an ideal time for focusing efforts on promoting energy upgrades. However, without information about what energy upgrades their home needs, homeowners will focus on more visible and obvious upgrades; but if they know right away what energy upgrades are needed, they can add those to their remodeling plan. Since approximately 90 percent of prospective homebuyers conduct a home inspection prior to closing on a house (Pipitone 2011), this inspection could be an ideal moment to encourage energy upgrades. With this hypothesis in mind, during the spring and fall of 2017 the authors conducted a pilot of 38 homes in the Twin Cities metro area, training home inspectors in basic energy assessment methods and assisting them in creating a separate energy report for their clients. After completing the pilot, these inspectors participated in a focus group and we completed a phone survey with participating homeowners. Our initial findings suggest that home inspectors in this market can serve as trusted messengers to prospective homebuyers for recommending energy upgrades. While our research also indicated some barriers and potential pitfalls to working with home inspectors, overall we conclude that this is a promising channel for utility-funded efficiency efforts — with the potential to increase (by an order of magnitude) the number of customers currently reached by home performance programs.

## **Background**

## **Energy Disclosure**

Residential energy disclosure provides information to homeowners and potential homebuyers at key times, such as the time-of-sale of a property. When executed well, it can be a powerful tool to make visible what is generally not visible — the energy efficiency aspects of a home. A common and standardized metric for disclosure can then 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, influence owners to invest in efficiency, and allow sellers to recoup the value of efficiency investments they have made. Figure 1 illustrates these effects on the market and how it can lead to energy savings and reduced CO<sub>2</sub> emissions.

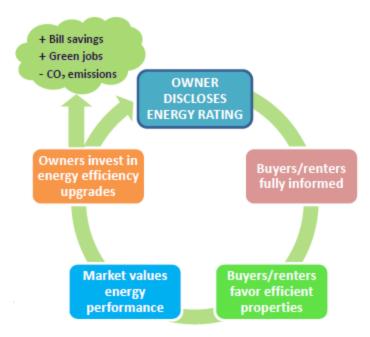


Figure 1. How energy disclosure can affect the market and lead to energy savings. *Source:* Hill and Dunsky 2013

There have been various efforts nationally around introducing disclosure through 'greening' the Multiple Listing Service (MLS) to include energy inputs, and engaging and educating stakeholders like realtors and appraisers. This is typically through a voluntary approach, and steps for achieving this have been laid out well in CNT Energy's *Unlocking the Value of an Energy Efficient Home* (CNT Energy¹ and NHPC 2013). Minnesota has some green fields in their largest MLS, but they are often used incorrectly or only for homes that are already energy efficient². This disclosure approach can be effective, but it misses an opportunity to educate the homebuyer and make recommendations for improving the energy efficiency of the home they purchased. When energy bills or a HERs score are disclosed, it informs the homebuyer about whether or not a home is energy efficient but doesn't tell them how to improve the home's efficiency.

Homebuyers of existing homes typically spend \$4,100 more on home improvements than similar homeowners who have not recently purchased their home. This spending occurs in the first year of ownership and the majority of it goes toward remodeling projects (Siniavskaia 2017), which makes the time of purchase an ideal time to inform new owners about energy saving opportunities, and to recommend potential projects. We believe that if homebuyers have this information they are more likely to complete recommended upgrades or otherwise include energy efficiency in their home improvement projects. This pilot evaluated the feasibility of adding an energy assessment and report with recommendations to the home inspection process in the Twin Cities metro area.

<sup>&</sup>lt;sup>1</sup> CNT Energy has changed their name to Elevate Energy since this publication.

<sup>&</sup>lt;sup>2</sup> CEE completed outreach with realtors and searched the MLS to gather information on how the MLS is being used.

## **Twin Cities Metro Home Inspection Market**

The Twin Cities inspection market is unique in that 12 cities, including Minneapolis and St. Paul, require a Truth in Sale of Housing (TISH) inspection prior to listing a home on the market. This inspection covers a checklist that is largely related to health and safety items in the home. Depending on the condition of these items, repairs may be required prior to the sale of the home. Some examples of items covered in this inspection are electric wiring, plumbing, roofing, smoke and CO detectors, etc. This process begins by sellers selecting an inspector from a list of qualified inspectors provided by the city. The inspector visits the home and generates a report that is displayed at open houses and reviewed at the closing. To become qualified, an inspector must meet certain eligibility requirements laid out by the city, attend required training, and pass a TISH exam. These programs differ slightly from city to city, but the overall concept is the same.

In addition to the TISH inspection, the majority of homebuyers complete their own inspection (Pipitone 2011), typically called a buyers inspection. This is a voluntary inspection that is more detailed than the TISH inspection and includes a report and discussion of the current status of the home. Homebuyers are most interested in the 'big ticket' items, like the roof, that may require a large investment in the near term. Energy data and related information isn't a priority during these inspections, and it is rarely covered.

Given the current policies requiring inspections prior to sale, plus the large majority of voluntary buyer inspections occurring on purchased homes, we set out to assess the possibility of adding a form of energy disclosure to these inspections. This has the potential to have a large impact, with 51,622 homes sold in the Twin Cities metro in 2017 (MN Realtors 2018). Providing energy information and recommendations during these inspections would result in a more informed market place and, ideally, lead to investment in energy improvements.

# **Pilot Design**

Center for Energy and Environment (CEE) implemented this pilot with funding from the City of Minneapolis and CenterPoint Energy. The purpose was to assess the feasibility and value of adding an energy assessment to the scope of work of two home inspections: 1) a mandatory Minneapolis TISH inspection and 2) a buyer's voluntary inspection. This energy assessment provided disclosure of the home's energy assets, recommendations for improving those assets, and actionable next steps. The pilot informed potential changes to the TISH process, including how to better collect and report on energy-related information, as well as how to provide energy data and reporting during voluntary buyer inspections. The goals for the pilot were to:

- Gain feedback from pilot participants (inspectors and homebuyers) to help inform any changes in the TISH inspection and reporting for the City of Minneapolis.
- Assess two different protocols for gathering energy data, one robust and one simplified method<sup>3</sup>.
- Assess the training needs of home inspectors and how accurate they perform the assessments.
- Determine the level of extra effort required for inspectors to perform each of the two protocols<sup>3</sup> and the related costs.

<sup>&</sup>lt;sup>3</sup> Further detail on the two inspection types can be found in the training and inspection types section below.

- Gain insights from inspectors and homebuyers on the value of the energy assessments, and assess the potential impact on energy upgrade motivation and decisions.
- Gain feedback that could be useful for the creation of a voluntary tool for home inspectors.

This was a small scale pilot with a relatively short timeline; in part because of funding, but we also believed that this scale would allow us to quickly gauge the feasibility of this process and think about the next steps and larger investment.

## **Pilot Implementation**

**Inspector recruitment.** Outreach was completed through Minneapolis's list of qualified TISH inspectors. Inspectors were notified of the pilot, compensation levels for participating, and an upcoming training that was required. The training included an introduction to building science, a hands-on blower door demonstration, and information regarding the pilot itself. The idea was to gauge inspector interest and knowledge of building science, and to prep them for required data collection.

**Training and inspection types.** Two different inspection protocols were developed for this pilot. The basic inspection involved simple data collection on the heating system, windows, and attic insulation; the wall insulation levels were assumed from the home's age. Inspectors were compensated \$75 for this data, and the only training needed was part of a two-hour classroom training required for participation.

The enhanced inspection included data from the basic inspection, with the biggest addition being a blower door test. This inspection also required square footage measurements and data on current ventilation systems. A blower door demonstration was included as part of the classroom training, but onsite training was provided as well. Blower doors were lent to inspectors who were interested, and onsite training was completed when the equipment was dropped off at their first enhanced inspection; They could also call with any questions that they had when they were in the field. Inspectors were paid \$125 for this inspection.

**Pilot process.** Given the scale of this pilot, the majority of the processes were manual and paper-driven. Inspectors filled out paper inspection forms that contained the required data, and had their clients sign a participation agreement. This agreement informed them about the pilot program and gave CEE approval to contact them. Inspectors were able to take pictures of these forms with their smart phones and email them to CEE. The data was recorded and a simple energy report was generated and sent to their clients.

Inspectors recruited participants through their already scheduled buyer's inspections. Although there was a focus on incorporating this data into the TISH process, we wanted to ensure that the energy report and data got to the homebuyer, so we implemented the pilot through the voluntary inspections. We were still able to gauge the feasibility of adding this data collection to the TISH process, even though it was collected during a buyer's inspection.

**Energy reports**. The report was intended to be simple and comparable to other homes, while including clear recommendations for needed energy upgrades and next steps. A different report was generated depending on if it was a basic or enhanced inspection. Each report was a single page and focused recommendations on four key energy upgrades — attic insulation and air-

sealing, wall insulation, heating system, and windows.<sup>4</sup> The basic report used a simple tier system, 1-5, to indicate where the home was and what needed to be improved. The enhanced inspection generated a more detailed score for the home, as seen in Figure 2.

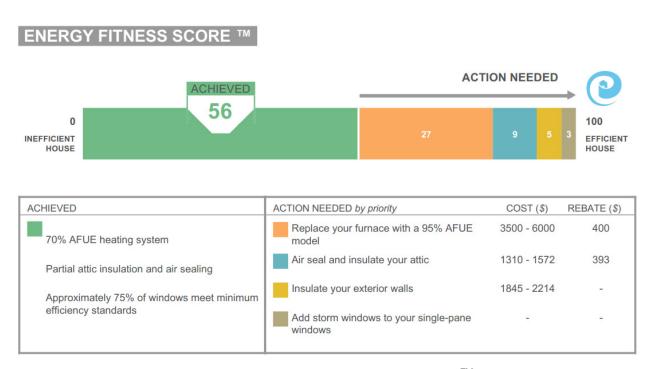


Figure 2. Example of the enhanced inspection report with the Energy Fitness Score<sup>TM</sup>. The report included further details not shown here.

Utility bill data was not included in the report. Although this can be useful, we wanted this report to focus on the energy assets of the home. Usage data alone does not tell a potential buyer what needs to be improved or how to improve it. It also includes a number of behavioral factors, such as thermostat set point, that can skew the data higher or lower than 'average'. It is important to start with the asset information and recommended next steps, then bill data can be used to support these recommendations. Incorporating usage information into this pilot would have been an intensive process that did not fit within the scope.

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<sup>&</sup>lt;sup>4</sup> Windows were included because homeowners often think windows are the most important energy upgrade. Although windows save energy they are the least cost effective upgrade (unless you are adding storms to single pane windows), so we inform homeowners of this and prioritize more cost-effective upgrades before windows.

**Homeowner communication.** Reports were generated by CEE and emailed to the potential homebuyers. Reports were also mailed out 4-6 weeks after the inspection. This served as a reminder of the information, with the intent of it arriving after the buyer had moved in. CEE also completed a brief phone survey with participants.

# **Findings**

## **Participation**

Five home inspection companies participated in the pilot, completing 38 inspections over a 3-month period. Trainings were offered in July 2017 and the majority of inspections were completed in August and September. Of the 38 inspections, 33 were basic inspections, as only one company elected to utilize the blower door and complete the enhanced inspection.

#### **Data Collection**

Enhanced inspection. Through discussions with the inspectors during the pilot and in the focus group, it became apparent that the enhanced inspection was beyond the scope of their inspections. One inspector saw this as a market differentiator, but it was unclear if clients would be willing to pay for this. For most inspectors their buyer's inspection is already four hours long, so adding something significant to the scope would need to be justified by a large cost. Inspectors were also hesitant to 'go down the rabbit hole' of a detailed energy assessment, as they realize the complexities of these recommendations and how they affect the whole home. They see themselves as home experts that can evaluate many aspects of the home, but they mainly gather data and refer clients to applicable contractors or resources to fix identified issues. Energy data collection could fit well within this model, but it is not currently incorporated in an efficient or organized manner.

**Basic inspection.** The basic inspection proved to be a better fit for incorporating into the inspection process. The data that is needed for this inspection is in areas that are already inspected as part of TISH, as well as voluntary inspections. As stated previously, the goal was to assess 4 major areas for energy improvements — attic insulation, wall insulation, heating system, and windows. In order to make recommendations in these areas inspectors collected 9 data points, 5 of which are already collected for TISH. Table 1 compares the TISH data points to the additional data that was needed for the basic inspection.

Table 1. TISH data collection compared to basic inspection

		Additional info needed for basic
Category	TISH data points	inspection
Attic Insulation	<ul><li>Insulation type</li><li>Inches of insulation</li></ul>	- Attic type: Unfloored, slant, peak, kneewall, etc.
Heating System	- Heating system type - Evaluate venting size	<ul><li>Venting type (natural draft, sealed, etc.)</li><li>Age: over/under 20 years old</li></ul>
Windows	- Evaluate for screen and/or operating storm	- Determine if single-pane windows w/out storm are present (yes/no)

Walls	- Evaluate structural	- None: recommendation based on year
	condition	built

**Training.** As illustrated in Table 1, the additional data required to make these energy recommendations are 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. This meant that little training was needed to ensure proper data collection from inspectors for the basic inspection; although an orientation will always be needed to clarify terminology and ensure proper data entry.

The enhanced inspection required more extensive training, as expected. On-site training was provided to ensure proper use of the blower door. We also received several calls with questions about the proper use of the gauge and verifying that cfm50 outputs were within reason. Inspectors also had trouble verifying ventilation systems, and whether or not fans were rated for continuous use.

**Inspector time and effort**. Inspectors reported that collecting the basic inspection data fit well within their inspection process, so it added little time to their inspections. The part of the pilot that required the most work for the inspectors was recording this data on a paper form and emailing it to CEE. This added some time in the field, but it was more of an administrative burden for the inspectors. If this burden were reduced this data could be provided at a relatively low cost.

As stated previously, the inspectors did not think the extra effort and training required for the enhanced inspection justified the cost. Inspectors received \$50 more for these inspections, which required an average of 30 additional minutes on-site. We thought some inspectors would be interested in learning this skill, but that proved to be untrue.

## **Energy Report and Recommendations**

It is important to clearly report the status of the energy assets of the home so it can be compared to others on the market, but the recommendations and next steps are the most critical portion of the report. These are often projects that homeowners have never completed before, so it is important to make clear recommendations and inform the homeowner of next steps. This includes an explanation of why the upgrade is important and how it will improve the home, as well as an estimated price. There also needs to be a clear call to action, so if a homeowner decides that they would like to move forward, they know what to do. A resource for homeowners to contact if they have questions is also beneficial. Homeowners need guidance through this process, as it is new to them.

The recommendations that are outlined in the report should also be cost-effective and achievable for the homeowner. It is counterproductive and unrealistic to ask a homeowner to spend a lot of money on a project that will result in little savings or benefits. One example is recommending that the owner of a home with no insulation in a 2x4 wall cavity insulate their walls to meet Minnesota's current new construction code, R-21. In such a case the homeowner could achieve significant and cost-effective savings by dense-packing the wall cavity to R-13. There is no need to recommend anything beyond this as it would be difficult to achieve and the savings beyond R-13 would not be cost-effective. Table 2 shows an abbreviated version of the recommendation criteria that was used for the pilot. These recommendation limits were

determined by what could achieve a simple payback of 10 years or less when estimating the energy savings and cost for the recommendations. This information was also outlined on the report, so the homebuyer could take this information into account when thinking about completing a recommended upgrade.

Table 2. Recommendation decision tree for energy report.

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

If the home met the recommendation criteria then a recommendation was made. Further details on the recommendations were given on the report.

Access issues. Home inspections cannot be intrusive, so some inaccessible areas cannot be visually verified. This makes verifying wall insulation levels difficult, as there is typically not a good way to do this without drilling into the wall (which cannot be done during an inspection). For the pilot we used the age of the home to make a recommendation for wall insulation. CEE utilized data from thousands of prior home visits to determine this recommendation, and when reported to the homeowner, it could read: "Homes built during this time period typically have 'xx' of insulation, we recommend..." We felt that this achieved the report's goal of informing the homeowner of likely insulation levels, even if they were not visually verified. We also outlined a clear path forward by recommending either an energy audit or contacting an insulation contractor if the home likely did not have sufficient wall insulation (built prior to 1945).

Similarly, inspectors will not always have access to every attic area. For these cases we used the year the house was built and the attic area to determine the recommendations. Again, we based these recommendations on data and experience from conducting thousands of previous home visits. For example, a 1.5 story or Cape Cod home with no access to the side attics (kneewall area) typically has not been treated with insulation (based on CEE data). As with wall insulation, we can make a recommendation to the homeowner while also stating these caveats. This gives the homeowner a starting point when considering energy upgrades and a recommendation for how to move forward. If this reporting were adopted as an energy disclosure policy the home-seller could potentially provide additional documentation, either from a more detailed energy audit or from insulation improvement work, to verify the state of attic or wall insulation.

## **Inspector and Homeowner Feedback**

**Inspector focus group.** The inspector focus group was a very valuable tool for gathering input from the inspectors after the pilot was completed. The focus group was administered by a third-party consultant, and the session and report were content rich. Here are some of the major

takeaways from the focus group, including quotes from inspectors and content directly from the report (Nelson unpublished)<sup>5</sup>:

- Homebuyers are an engaged audience: "These inspectors told us that homebuyers are eager to learn about their houses from an expert, and prepared to soak up the advice and direction they give them. They described the buyers as a 'blank canvas' ready to have the details of their home fill that space."
- Inspectors are a trusted expert: "These prospective homeowners are engaged in the output of the audit and perceive the inspector as an expert, indicating that even simple advice like, 'Look into an energy audit because I noticed a few things that could be addressed and improve your home,' would likely be taken seriously."
- Inspectors are ok with touching on energy, but like to stay within their scope and refer homeowners from there: "I see a lot of houses where I think, 'Boy, if it was doing an energy thing I could point out all kinds of things where they should seal this up', but I don't have that kind of time. I'm there for a certain amount of time to do my specific job. I've got to stay within my scope it's beneficial for us to have somebody else that can tackle that part of it."
- Basic inspection info was easy to collect: "Our inspectors pretty consistently reported back that the data collection required for these pilot inspections was easy, primarily because they are already capturing nearly all of the necessary information during their own appointments."

**Homeowner survey.** It was more difficult to get feedback from homeowners. Of the 38 participants, 8 completed the survey. This was a busy time, as they were buying a home and we didn't have the budget to incentivize participation. It was a short survey and several questions asked homeowners to respond on a scale from 1 to 5, with 1 being "not important or helpful" and 5 being "very important." Here are some of the results:

- Homeowners were interested in energy efficiency info. The average rating was 4.125 (helpful) when asked if they would like energy asset ratings for a home, similar to the MPG of a car.
- Homeowners stated that energy efficiency would have been an important factor in their buying decision, with an average rating of 3.75.
- The majority of homeowners said they would have been willing to pay for the energy data collection and report produced from the basic inspection. When asked how much, the response ranged from \$25 to more than \$100.
- When asked how likely they were to complete any recommendations, the average rating was 3.25.

## **Conclusions**

The basic inspection process fits well within both the mandatory TISH inspections and voluntary buyer's inspections. It added little time to the inspections, and minimal training was needed for home inspectors to collect quality data. This is not a detailed energy audit, but it gives

<sup>&</sup>lt;sup>5</sup> Information contained in quotes in the bullet points are from a focus group report. This report will be part of a white paper that will be released later this year by CEE.

homebuyers enough detail to evaluate and compare the energy assets of the home, and provides information on how to improve them. This report should be viewed as a gateway to educate homebuyers about a home's energy efficiency needs and possible projects. It provides them with a path to move forward on, and next steps for improving energy efficiency, while also helping with benchmarking. Keeping the inspection and report simple allows for easier implementation and can be viewed as a starting point that can be built upon. For example, if this is implemented through TISH and well received by the market, home-sellers or buyers could eventually begin requesting a more detailed energy assessment, and these results could be provided to prospective homebuyers. The initial goal is to start informing homebuyers about the basic and most impactful energy assets of the home, and how they can be improved. This info can be used to benchmark and improve the existing housing stock.

For successful implementation, the administrative burden of collecting data and creating reports needs to be reduced. This process worked for a small scale pilot, but recording this data and creating a report will need to be moved to an online platform. This will help lower costs, increase the efficiency of the process, and improve the effectiveness of this process.

The enhanced inspection proved to be beyond the scope of the inspection process. This inspection was closer to an energy audit and the majority of the inspectors did not see the value of adding this to their inspection process. They do not want to compete with the energy audit offerings, as they are highly subsidized, and would rather refer their clients to an energy audit when applicable.

The home inspections that occur during the time-of-sale appear to be an ideal time to make energy upgrade recommendations. Homebuyers are engaged and interested in the results of their inspection. They also view the home inspector as an expert and heed their advice. Inspectors can be utilized to begin the conversation around energy upgrade opportunities and point homeowners toward resources and next steps. Currently, this is an underutilized market, and leveraging it for both energy disclosure and recommendations could have a large impact on the market.

### **Future Work**

## **Incorporate Basic Inspections into TISH**

The basic inspection fits well within the Minneapolis TISH inspection process. However, incorporating this data collection and report will require city resources, which can be hard to come by. Even though this is a relatively simple process the city will need to make changes to their current operations. For example, they would need to add a minimum of 4 data points to their TISH database, and may need to change a few others for clarity. Changes that require city resources, whether a revised policy is needed or not, will likely require city council direction.

Getting the city council to change a policy or pass a directive is not an easy task, but this aligns well with the city's climate goals. Specifically, the City of Minneapolis Climate Action Plan outlines a strategy of getting 75 percent of homeowners to participate in an energy retrofit program by 2025 (City of Minneapolis 2013). This will likely not be achieved without policy levers and incentives offered by Minneapolis and/or utility companies. Incorporating the basic inspection into the TISH process is likely the best way to achieve this goal.

Proper implementation will also be key. For example, a separate report specific to energy will be the most impactful. If the energy data and recommendations are incorporated within the current TISH report, this information could get lost and overlooked by the homebuyer. The

design of the report, recommendation language, and next steps are key. It will be important to work closely with the city on these efforts so that this is implemented in the most effective way possible.

# **Large Scale Pilot**

A larger scale pilot is needed to test how effective this strategy is at spurring participation in utility energy retrofit programs. This pilot was a feasibility study, and it proved that it was feasible to incorporate basic energy data collection and a report into the inspection process. It also appears to be a good time to engage homeowners and introduce energy upgrade opportunities. However, the scale of this pilot was too small to gauge how effective this approach is. In order to properly test this theory a larger scale pilot is needed. Such an effort would need to:

- Develop a more automated approach for collecting data and generating the report
- Update the report with findings from the pilot
- Recruit additional inspectors and test the price point needed to incentivize inspector participation
- Track savings linked to customers who receive an inspection
- Determine the utility cost effectiveness of this approach
- Incorporate financing options like on-bill and PACE (Property Assessed Clean Energy) that will soon be available to Minnesota residents

Home inspections could prove to be a low cost way for utilities to engage with customers about rebate opportunities and energy improvements on a larger scale. Currently this industry is relatively fragmented, with little organization around data collection and reporting processes. However, incentivizing inspectors to collect energy data could create a unified approach around collecting, reporting, and referring energy information to their customers. This has the potential to have a very large impact. As noted previously, there were 51,622 homes sold in the Twin Cities metro area in 2017 (MN Realtors 2018), so this information could reach a large number of customers. Once implemented, the report could become a market expectation and the utility may be able to reduce the inspector incentive or not need one at all. This process could potentially transform the inspection market and be utilized as a blueprint for other areas around the country.

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