

Valuing Home Performance Improvements in Real Estate Markets

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ABSTRACT

Many regions and communities nationwide have adopted residential energy efficiency goals as part of their sustainability plans. Consumer demand for high-performing homes has been increasing during the past decade, and successful energy efficiency programs have contributed to the growing inventory of efficient homes. Yet, energy efficiency is still largely invisible on residential real estate markets, due to a disconnect between program implementers, the real estate community, appraisers and homebuyers and sellers. These gaps prevent high-performing homes from being fairly valued at time of sale and limit the investment potential for residential energy efficiency.

This paper describes existing barriers to integrating energy efficiency data into real estate markets, and illustrates recent efforts to address them. National cross-industry collaborations have resulted in standard data collection and transfer tools that allow home performance data to be shared across industries. Real estate markets in some regions have begun including these data into multiple listing services (MLS), making them visible during real estate transactions.

The authors highlight two initiatives in Chicago and Colorado, two markets that incorporated energy efficiency into the real estate value chain. Both regions leveraged local assets and achieved success through cross-industry collaboration. Lessons from these early adopters can assist other regions in developing a tailored approach to making high-performing homes recognized on real estate markets. Closing this gap could propel a virtuous cycle in which homebuilders, lenders and homeowners are more likely to invest in energy improvements, and can therefore be a key component of regional sustainability strategies.

Introduction

The building science and energy efficiency industries have demonstrated and promoted energy savings and other benefits of energy efficient buildings for decades (Schweitzer and Tonn 2003; Friedrich et al. 2009; WGBC 2013; Kaza, Quercia, and Tian 2013; US EIA 2013). Many communities nationwide have adopted residential energy efficiency goals as part of their sustainability plans. However, the residential sector has not yet reached the large scale that many local or regional energy conservation targets would require.

This paper argues that one of the reasons behind this curbed uptake is that the value of energy efficient high-performance homes is still largely unrecognized on the real estate market. There are no established market mechanisms that enable homeowners to have the financial value of home energy investments recognized at the time of sale (Stovall et al. 2011; Adams 2012). At the same time, there are typically no standard channels that allow home buyers to specifically search for high-performing homes. These barriers stymie the residential investment potential, slowing down the progress toward regional energy efficiency goals.

In recent years, efforts have been undertaken to address these issues that, if successful, could accelerate investment in residential energy efficiency and help communities achieve their sustainability goals. Stakeholders from energy efficiency, utility, real estate, and financial

industries, as well as policy and regulatory agencies have identified several key elements to enable energy efficiency improvements to be valued at time of sale. These include home performance data transparency and standardization, automated data transfer solutions, and training and education opportunities for real estate professionals (Stovall et al. 2011; CNT Energy and National Home Performance Council 2013).

Achieving energy transparency and efficiency goals requires collaboration among a wide variety of stakeholders and across multiple industries. Over the last five years, several initiatives arose across multiple geographies, industries and building sectors (Cluett and Amann 2013). While no single model has emerged, several lessons can be learned from these early adopters. This paper presents the experiences of Colorado and Chicago, two regions that are making remarkable progress in enabling residential energy efficiency benefits to be valued on real estate markets.

Local, state and regional governments can play a significant role in this process by catalyzing and coordinating the efforts of multiple stakeholders. Governments are accustomed to facilitating cross-industry cooperation and balance public and private interests to benefit the community. Local governments routinely take a comprehensive approach to community development. Municipal leaders bring together goals and stakeholders from housing, land use, transportation and economic development sectors. They build on existing community assets and align incentives to achieve multiple community goals in specific geographies. For example, a city might offer incentives or requirements to developers to include affordable housing within a target area. The requirements may come through changes in land use regulations, such as zoning, and the incentives may come through density bonuses. The results of this policy mix then meet both economic development and housing goals. However, such a comprehensive framework has not traditionally been applied to energy efficiency and real estate markets. Recognizing the critical role of residential real estate markets in unleashing the full potential of energy efficiency, communities would benefit from a comprehensive strategy that links these sectors and ties them to their regional energy goals.

Market Trends for Energy Efficient Homes

Demand and Supply

The demand for energy efficient and green homes has held steady with approximately 87% of recent home buyers stating that lower heating and cooling costs were very or somewhat important, a result that has remained constant ever since the National Association of REALTORS (NAR) started surveying this information in 2008 (NAR 2013). In a recent survey of home builders and remodelers, two third of respondents said that customer demand is one of the top drivers of green building. Furthermore, 68% of builders and 84% of remodelers reported that customers are willing to pay more for green homes. These figures show increases over time despite the economic downturn (McGraw-Hill Construction 2014). The demand for green homes remains strong despite lower gas costs in some regions, and arises from many demographics, including millennials and seniors (NAHB 2013).

On the supply side, inventories of energy efficient residential buildings are growing, with steeper growth rates within the last five years. The U.S. Environmental Protection Agency's (US EPA) ENERGY STAR certification achieved a national market penetration of 16% in the new homes sector in 2012 (US EPA 2013). The US EPA's existing home program, Home Performance with ENERGY STAR program (HPwES) has expanded from 76,000 homes in 2009

to 313,000 homes through September 2013 (US EPA 2014). The Residential Energy Services Network (RESNET) cites that the numbers of Home Energy Rating System (HERS) rated homes soared to almost 219,000 in 2013, a 70% increase over 2012 (RESNET 2014). The growth has been supported by federal initiatives; for example, the U.S. Department of Energy's (US DOE) Better Buildings Neighborhood Program invested \$508 million into 41 local and regional programs, delivering energy efficiency upgrades to over 75,000 homes through June 2013 (US DOE 2014).

A Disconnected Market

The above trends suggest that energy efficient and high-performing homes can have an increasing market potential. However, this potential is hindered by a lack of standardization around what constitutes an energy efficient home and how its characteristics are documented, reported and shared throughout the real estate process.

Home performance data and information vary greatly across programs and organizations *within* the same industry. For example, different energy efficiency programs may offer similar home improvement measures, but with different requirements, data tracking and/or reporting standards. Similarly, different multiple listing services (MLSs)¹ include a different set of “green fields” in house sale listings. This plethora of methodologies and the lack of data transfer mechanisms creates an even greater disconnect *across* industries. Real estate agents, for example, are wary of providing information on energy efficiency upgrades due to these heterogeneous standards and potential liability risks. Similarly, home appraisers are often not familiar with all the programs and documentation; even when they are, they cannot incorporate the contribution of energy efficiency features to a home's value unless these features were shared upfront with potential buyers by the home builder and reflected in a purchase contract and terms. These limits affect the willingness and ability of lenders to provide financing for high-performing homes.

This double divide, both within and across industries, ultimately results in an information gap with consumers, who have a hard time understanding the impact and value of energy efficiency improvements and navigating the process.² The disconnect between program implementers, the real estate, appraisal and financial community, and homebuyers and sellers prevents energy improvements from being fairly reflected in the real estate transaction (CNT Energy and National Home Performance Council 2013). Fortunately, several cross-industry collaborations were developed recently to address this gap with the shared goal of data tracking and transfer standardization.

Recent National Efforts

Data Standardization Initiatives

While the energy efficiency, real estate and financial communities have historically addressed home improvements from their own silos and have been disconnected, progress has

¹ Multiple Listing Services are independently owned and operated. In the US, there are ~870 MLS providers.

² While we recognize that the information gap with consumers is very important, the focus of this paper is on the industries and stakeholder initiatives providing energy efficiency information to consumers; specific issues related to consumers' understanding of energy efficiency data are beyond the scope of this paper. Other research compares energy asset ratings of the potential building and operational ratings that feature energy consumption.

been made recently to better align their needs and interests. Data sharing about energy efficient homes is essential to that alignment. In recent years, the home performance, real estate and appraisal industries have created three data standards and information tools, described below, to make data more standardized and accessible within their industries. At the same time these programs, especially the most recent ones, were informed, to a varying degree, by cross-industry collaboration, and together they make data more relevant, accessible and transferable across industries.

The home performance industry standardizes energy data collection and transfer protocols. The *BPI-2101-S-2013 Standard Requirements for a Certificate of Completion for Whole-House Energy Efficiency Upgrades*, from the Building Performance Institute (BPI), was published in the fall of 2013. BPI-2101 defines a standardized method to describe energy efficiency improvements in existing homes in a voluntary “Certificate of Performance.” This standard was subsequently referenced by Home Performance with Energy Star Sponsor Guidelines version 1.5 released in March 2014. The real potential to accurately present efficiency during the real estate transaction and therefore lead to a more accurate valuation of energy efficiency, however, is via two companion standards, BPI-2100, or HPXML (data transfer standard), and BPI-2200 (data collection standard). These have been designed to facilitate easy data transfer from contractors and programs to real estate agents, appraisers, and MLS systems.

The real estate industry standardizes green and high-performance home fields in MLS systems. Around 2008 early adopters in the MLS industry began to introduce fields in their databases to represent high-performance homes. During the first phase of this movement, from 2008-2012, individual MLSs defined custom lists of fields and individually implemented them in their systems. In 2010, NAR estimated that about 15% of MLSs (or about 185 individual operators) had implemented at least one field for high-performance homes. There was no standardization of how green fields were defined or used, however, and this created market confusion. The second wave of the Green MLS movement started at the end of 2012, when the Real Estate Standards organization (RESO) released its first *Real Estate Transaction Standard (RETS) Data Dictionary* that included a standard set of green fields. In 2013 RESO launched a process to test MLS compliance to the data dictionary. In 2014, NAR’s Green Resource Council, working with RESO, issued an update to the Green MLS Toolkit and released a *Green MLS Implementation Guide* that provides technical specifications for MLS IT staff.

The appraisal industry adds an addendum to document energy efficiency and green features of a home. The Appraisal Institute’s *Residential Green and Energy Efficient Addendum* was released in 2011 to home appraisers as a standardized form to document a home’s energy efficiency features to inform property valuation. The addendum supplements Fannie Mae’s Uniform Residential Appraisal Report, also referred to as Form 1004. It includes sections for documenting details on a home’s insulation, envelope tightness, HVAC and solar equipment. It also documents whether a home has earned any home ratings, such as ENERGY STAR or LEED.

The examples above illustrate how initiatives within industries are helping to make data more standardized and accessible *within* their industries. The next section describes collaborations *across* industries. These initiatives are helping to bridge information gaps, and are

making progress to enable home energy improvements to be visible and valued in the real estate market.

Cross-Industry Collaborations

As individual industry-specific standardization efforts were developed and implemented, stakeholders from the energy efficiency, real estate, and financial communities identified the need to coordinate stakeholders more deliberately to create or improve cross-industry tools and processes. The programs and standard described above benefited by collaboration to make data more relevant, accessible and transferable. Additionally, MLSs, real estate agents, appraisers and efficiency programs from seven selected metropolitan areas participated in a Green MLS/Better Buildings Roundtable in 2011. The coordination efforts started at the roundtable evolved into an initiative³ focused on cross-industry interaction and tools that improve the flow of information through the real estate transaction process. One product of this collaboration was a white paper which suggested a step-by-step process to make energy efficiency visible and properly valued in the real estate market (CNT Energy and National Home Performance Council 2013). The initiative focused on the need to document residential efficiency improvements in a format that can be shared across stakeholders. These efforts are enabling energy efficiency data to be incorporated in the real estate value chain, from listing to appraisal and closing.

The Role of the Federal Government

A better integration of the energy efficiency and real estate industries is being encouraged and pursued also at the federal level. For example, one of the priorities for US DOE's residential Building America in 2015 is to accelerate energy efficient homes achieving fair value in the real estate market (US DOE 2013).

The federal government is undertaking efforts to better align its programs and priorities across agencies to limit the systemic and regulatory constraints which limit the capabilities to have energy efficiency reflected during a real estate transaction. For example, The Appraisal Foundation, which is chartered by Congress to manage standards and practices for the appraisal industry, is working on defining the training and competencies required of appraisers to assess the value of high-performing homes, and on streamlining the process to match qualified appraisers with such homes, while still fulfilling related regulatory requirements.

Likewise, the White House Council on Environmental Quality has been encouraging better coordination beginning with mortgage products that are managed by the U.S. Department of Housing and Urban Development (US HUD) with other government-sponsored enterprises, such as Fannie Mae, Freddie Mac and the Federal Housing Finance Agency (Executive Office of the President 2013). Some potential improvements include the publication of alternative valuation methods for high performance homes which meet underwriting guidelines.

³ The Value for High Performance Homes campaign was launched in 2012 by Elevate Energy. The campaign coordinates a learning network of (currently) 10 US markets that are actively implementing ways to incorporate energy efficiency improvements in the real estate transaction process.

Local Initiatives

Lessons from Early Adopters

Some communities are leading the way in helping energy efficient and high performing homes to be more accurately valued in residential real estate markets. There are several regional examples where the real estate and energy efficiency markets have achieved success by collaborating. While these early experiences show a wide range of strategies and processes adopted, some common themes and lessons are emerging.

One critical success factor is the engagement of and collaboration among non-traditional partners, which is necessary to develop cross-industry standards and practices. Another important element is the ability to recognize and leverage local resources and assets. Regions vary greatly in terms of policy landscape, housing stock and/or involved stakeholders. The best strategy to achieve a better integration of energy efficiency in real estate markets will depend on the local mix of strengths and barriers. State, regional and local governments can play a pivotal role in facilitating this strategic process, leveraging existing resources and local assets and balancing the interests of different stakeholders.

The case studies presented below are examples of two regions that are making progress in helping energy efficient and high-performing homes be recognized on the residential real estate markets. Although Colorado and Chicago had different contexts, are following different pathways and are at different stages of the process, both regions were able to build on existing assets through cross-industry initiatives. In Colorado the state government took the lead and leveraged the large inventory of high performance homes to drive data standardization and transfer processes. By contrast, in Chicago the industry-led initiative built on existing processes and updating existing policies to encourage an increase in energy efficient homes.

The experiences of these early adopters can serve as a model for other regions that want to integrate energy efficiency and real estate markets.

Colorado

Colorado is recognized as a residential real estate leader for its collaborative work on MLS design (Stovall et al. 2011; CNT Energy and National Home Performance Council 2013). Colorado's approach reflects its strongest assets: a strong and growing inventory of high-performance homes across the state, and a proactive state energy office. In 2010 the Colorado Energy Office (CEO) formed a working group to reduce barriers to energy efficient building and energy retrofits for existing residential properties. The lack of financing options was quickly identified as one of the main barriers, and while the state had substantial ARRA funds available, the state energy office wanted to identify a long-term strategy. The group recognized the need to work with the real estate community noting that financing requires willing lenders, lenders require appraisals to underwrite their loans, and appraisers need market data to support their valuation estimates; and that residential appraisers look to the local market and Multiple Listing Services for that data (Stovell 2010). The group established a subcommittee that included appraisers, real estate brokers, lenders, a large local electric and gas utility, and retrofit contractors, among many others. The shared goal was to ensure all MLSs in the state were able to properly document and track high-performance homes when they are available for sale. Sixteen independent MLSs collaborated with the working group to identify reliable and verifiable characteristics that could be included into MLS data fields.

The CEO's efforts, including the provision of IT grants, resulted in the implementation of a common set of green fields in a vast majority of MLSs across the state,⁴ predating many of the standards that were created later. These fields include the most common third-party certifications and some energy efficiency features, including those related to solar. At the same time, the CEO worked with appraisers, lenders, home inspectors, builders and sellers to provide training and other resources on the Green MLS (Colorado Energy Office 2013). The state government has also spearheaded research on the impact of energy efficiency on home value and marketability. For example, the CEO worked with local appraisers organizations to develop and release a peer-reviewed study that revealed a positive impact of photovoltaic (PV) systems on home market value and marketability in the Denver area (Desmarais 2013).⁵

The work in Colorado has evolved from data standardization to data sharing. Through an agreement with RESNET, the CEO published average HERS scores⁶ for new homes by zip code, as shown in Figure 1. This tracking and reporting allows home buyers, real estate agents and appraisers to evaluate a home's performance in comparison to neighborhood efficiency norms. By providing this transparency, Colorado is enabling the market to the ability to reward homes that exceed trends.

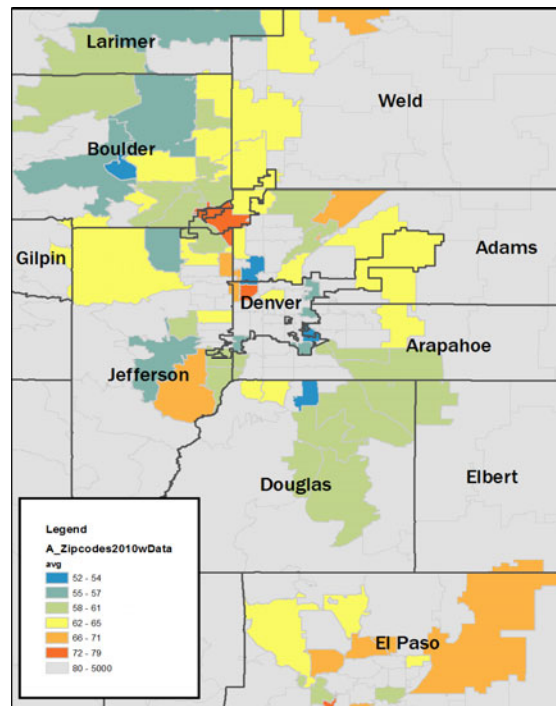


Figure 1. Average HERS scores for new homes by zipcode. *Source:* RESNET data download for the Colorado Energy Office, August 2013.

⁴ Currently covering 96% of the residential properties in Colorado.

⁵ The study analyzed 30 homes in the Northwest Denver Metro area ranging in value from \$200,000-\$680,000 that sold from 2011- 2013. For the vast majority of properties analyzed, the study concluded that PV systems added value and decreased marketing times. This type of analysis is valuable for appraisers, who need small, local studies to make their recommendations relevant and accurate (S. Adomatis, Adomatis Appraisal Service, pers. comm., March 3, 2014).

⁶ Home Energy Rating System Index, a 0-100 score that represents a home's energy efficiency, with lower scores representing more efficient homes.

This strategy has been successful in making energy efficiency more prominent in real estate transactions in Colorado. MLS data show an increasingly widespread use of energy efficiency terms in home sale listings, reflecting broader awareness of the benefits of high-performing homes. As shown in Figure 2, use of the word “energy” in listings has increased from 2008 to 2012: for new home sales, the share has gone from less than one percent to nearly 13% of listings, with the trend accelerating after the launch of the Green MLS initiative in 2010.

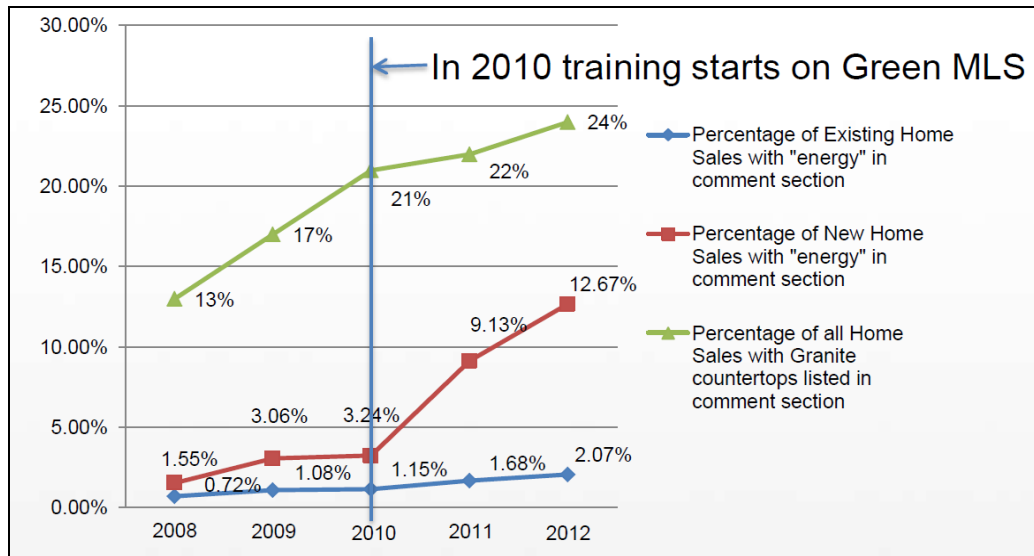


Figure 2. Frequency of the use of various words to describe homes listed for sale in Metrolist and IRES MLS, 2008-12. *Source:* Colorado Energy Office (2014).

This finding reflects a growing preference for energy efficiency features in new construction across the state: in 2012 Colorado was among the strongest Energy Star New Homes states with 19% of homes earning the certification, and following similar or better years in 2010 and 2011 (US EPA 2013); the state average HERS score was 59 at the end of 2013, improved from 63 in the previous year. At the same time, these market trends for new homes have also had a spillover effect on the existing home market, as suggested by the almost three-fold increase in the use of the word “energy” in sales listing for existing homes (Figure 2).

City of Chicago

In July 2013, the City of Chicago became the first municipality in the country to disclose residential energy costs on home sale listings. When a home is listed for sale on the MLS serving Chicago, Realtors can access natural gas and electricity costs for the property from an online, third-party database, in near real-time. The listings display annual and average monthly energy costs by fuel for the previous 12 months. Realtors can also provide potential homebuyers with an optional detailed energy report, which is attached to the listing as a digital file. This first-of-its-kind disclosure happens during the real estate selection process in the MLS so buyers can review energy cost information *before* purchase.

The implementation of this disclosure demonstrates how a cross-industry partnership can be implemented at the local level. In this case, the partnership included six stakeholder groups that consisted of real estate and energy efficiency service providers, and the City. The four main

partners included: Midwest Real Estate Data (MRED),⁷ the MLS provider for the region, which spearheaded the project; the City of Chicago Mayor’s Office which updated an existing ordinance; Elevate Energy in a coordination role; and MyHomeEQ,⁸ an existing energy data tool that verifies, collects, validates, aggregates, and securely transfers energy costs to MRED.

This initiative leveraged an energy disclosure ordinance already in place in the City of Chicago, dating back to 1987. Compliance previously relied on homeowners to mail or fax utility data requests to each utility, and then to disclose energy use to potential homebuyers. This process would often take up to two weeks to complete. Rather than passing new legislation, the City modified the existing ordinance to update and simplify the compliance process, allowing energy data to be collected via the existing MyHomeEQ tool and displayed via the MLS.

The IT implementation consisted of creating the data transfer protocols (APIs) so that data could be passed back and forth between MRED’s realtor database, called ConnectMLS, and MyHomeEQ’s data systems, to securely request, retrieve and display energy data from multiple utilities. When a home in the City of Chicago is listed for sale on MRED, REALTORS can access the utility disclosure lookup for the specific property using the fields shown in their ConnectMLS platform. A lookup function then connects users to the third-party database (MyHomeEQ) which imports energy cost information via a data feed with local utilities, ComEd and Peoples Gas. MyHomeEQ verifies information and then automatically completes fields for the listing agent to report monthly and annual electricity and gas costs, as shown in Figure 3.

The screenshot shows the MRED website interface. At the top, it says 'Welcome Becky R Realtor for Team Becky'. Below that is a navigation menu with 'My MLS', 'Search', 'Listings', 'Reports', 'Forms', and 'Setup'. The main content area is titled 'Search Results - Attached Single' and shows a listing for a 'Detached Single' home. The listing includes a photo of a house, a list of details such as 'Status: NEW', 'List Date: 06/26/2013', and 'List Price: \$399,900'. At the bottom of the listing, utility costs are displayed: 'Utility Costs: Elec. - \$770.60/yr, \$64.22/mo; Gas - \$1198.00/yr, \$99.83/mo'. This line is circled in red. Below the utility costs, there are remarks about the property: 'CHARMING 4 BED+DEN, 1.1 BATH SINGLE FAMILY HOME ON LOT & A HALF IN DESIRABLE LOGAN SQUARE/AVONDALE LOCATION. REMODELED APPROX 10 YEARS AGO W/ NEWER HVAC, ELECTRIC, PLUMBING, H2O HEATER & ROOF. DIAG HDWD FLRS; LARGE EAT IN KITCHN W/ SS APPLS; HIGH CEILINGS; FULL BASEMENT; HUGE FENCED YARD W/ BLUE STONE PATIO; SECURITY SYS OVERSIZED 2 CAR GARAGE. CLOSE TO 90/94 & ALL LOGAN SQUARE/BUCKTOWN SHOPPING & RESTAURANTS!'.

Figure 3. Annual and monthly gas and electricity costs displayed in MRED’s MLS. Source: MRED. <https://www.mredllc.com/>.

⁷ MRED is the real estate data aggregator and distributor providing the Chicagoland MLS to nearly 40,000 brokers and appraisers and 8,000 offices. MRED serves Chicago and the surrounding "collar" counties and provides property information encompassing northern Illinois, southern Wisconsin and northwest Indiana.

⁸ MyHomeEQ was developed in 2011 as an interactive, resource to improve the value, comfort, and energy savings of homes and to help consumers in northern Illinois. MyHomeEQ is partially owned by Elevate Energy.

The entire exchange happens within the listing entry screens, behind MRED’s password-secured system. This mimics the privacy approach defined in the original ordinance. MRED users are then prompted to download an optional detailed energy use report. The report, displayed in Figure 4 below, can be attached to the listing in a few clicks, and makes it easy for potential homebuyers to understand the energy use of a property they are considering.



Figure 4: Sample detailed home energy report generated by MyHomeEQ. Energy consumption is displayed alongside energy costs. Source: MyHomeEQ.

The initiative faced the potential challenge of opposition from the real estate community. To address this, the Mayor’s Office worked in tandem with MRED to build early support from the major real estate brokerages serving Chicago. Four of the five top real estate brokerages supported a tool that improved how agents work and provided better, more immediate information to consumers. With this backing, Chicago Association of REALTORS® (CAR) endorsed the project, even testifying to the City council. By automating the process by which utility companies share energy data on for-sale homes with real estate agents, and reducing processing time from weeks to seconds, the City of Chicago has empowered consumers to use energy costs to make more informed decisions before signing a purchase contract. Home buyers can see energy costs published directly on the MLS listing sheet at the beginning of the transaction process. While normalized energy usage may or normalized energy costs may be

more useful in the long term, this was not feasible to accomplish with the existing ordinance and stakeholders. These issues may be considered in future improvements.

Early results from Chicago indicate that energy data is being included in the transaction process. Elevate Energy aggregated listing information data from MRED's database supplemented with energy cost and usage data accessed through MyHomeEQ. The snapshot analyzed 18,605 single family homes listed from July 1, 2013 to February 19, 2014. The analysis showed that 10% of Chicago single family real estate listings disclosed energy costs.

Home listings that disclosed energy costs spent less time on the market. In aggregate, the difference between the market time of energy cost disclosure homes and non-energy cost disclosure homes is not statistically significant, but it becomes significant when analyzed at the neighborhood level. For example, in one neighborhood, the homes that disclosed energy costs spent a median of 43 days on the market compared to a median of 63 days on the market for homes that did not disclose their energy use. Home listings that disclosed energy costs also had a higher closing rate: 66% for homes that disclosed compared to 53% for homes that did not, during the period analyzed. Unlike market time, in aggregate, the difference between the closing rate of energy cost disclosure homes and non-energy cost disclosure homes is statistically significant at the city level.

While these findings are promising, it is important to note that they do not imply causation and may reflect underlying differences in attributes of the homes that disclosed energy costs versus those that did not. Further analysis will be needed as more data become available. Furthermore, Elevate Energy intends to continue to monitor trends and improve processes so that the number of owners disclosing their energy costs increases.

The energy cost disclosure implementation in Chicago demonstrates how a market solution can transform the process for selling energy efficient homes. Chicago's experience has generated interest to implement energy disclosure modernizations across the country, particularly in other markets with existing energy disclosure requirements. The engagement of and collaboration among key stakeholders including utilities, the real estate brokerages and associations and the local government, proved key to the success of the initiative.

The examples of Colorado and Chicago demonstrate the ability of leaders to recognize and leverage local resources and assets, as well as the ability to engage and collaborate to develop and implement cross-industry practices. Although Colorado and Chicago had different approaches, the experiences of these early adopters can serve as a model for other regions that want to integrate energy efficiency and real estate markets.

Conclusions

Several cross-industry collaborations and initiatives, both at the national and local level, are making progress in enabling residential energy efficiency benefits to be valued on real estate markets. These replicable approaches may be utilized by communities to help achieve their sustainability goals. The specific roadmap to achieve these goals needs to be tailored to each community by leveraging existing resources and assets, and requires collaboration among a wide variety of stakeholders and across multiple industries, including energy efficiency, utility, real estate, and financial industries, as well as government. The best strategy to achieve a better integration of energy efficiency in real estate markets will depend on the local mix of assets and abilities to address barriers.

State, regional and local governments can play a pivotal role in facilitating this strategic process, leveraging existing resources and balancing the interests of different stakeholders. The

experiences of early adopters, such as Colorado and Chicago, reveal the common elements of successful strategies: home performance data transparency and standardization, and cross-industry collaboration. These approaches can serve as a model for other regions to integrate energy efficiency and real estate markets.

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