

White Paper on Using Home Energy Ratings to Improve Energy Code Implementation

**Residential Energy Services Network (RESNET)
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I. Introduction

The Residential Energy Services Network (RESNET) is a national network of mortgage finance companies, state energy offices, accredited home energy rating providers, certified energy raters, utilities, and other residential energy efficiency and housing industry professionals. RESNET's mission is to increase the opportunity of homeownership and improve the energy efficiency of the nation's housing stock through mortgage finance options and increased building energy performance. The network is guided by a mortgage industry steering committee composed of the chief executive officers of the nation's leading private mortgage finance institutions. For more information on RESNET visit www.natresnet.org.

RESNET supports the adoption and effective implementation of building energy codes because they provide a critical function by establishing a "floor level" of energy efficiency below which homes should not be legally built. The U.S. Department of Energy (DOE) working with the states has done an excellent job in having the recent updates of the Model Energy Code (MEC) and International Energy Conservation Code (IECC) adopted as state standards.

Despite these efforts, the fact is that today a new home does not necessarily mean an energy efficient home. In far too many cases, the benefits of an energy code are not being realized because of implementation and enforcement barriers. In 1999, the Arkansas energy office conducted an energy performance evaluation of newly constructed homes in the state. The evaluation found that 45% of the homes evaluated failed to meet the state's energy code (CABO MEC 1992). In 2000 the Massachusetts code office conducted an assessment of the residential energy code in the state and found that 54% of the homes failed to meet the state's energy code thermal performance requirements (CABO MEC 1995 based).

In 2001 RESNET formed a task force on code compliance. The task force is composed of representatives of state energy offices and residential energy performance professionals. The purpose of the task force is to identify barriers to effective code compliance and develop recommendations to address the barriers. More information on the task force and the listing of its members can be found at www.natresnet.org/codes/taskforce.htm.

This analysis was prepared by the task force to assist the administrators at the U.S. Department of Energy in designing effective residential energy efficiency programs especially those that address energy codes and standards. Its conclusion is that home energy ratings can be an effective tool to increase code compliance and create market recognition for builders to increase the energy efficiency of the homes they build.

II. Barriers to Effective Energy Code Compliance

The RESNET task force has compiled a list of barriers that impede successful compliance to residential energy codes. These barriers are:

Local/County Code Officials

- In many communities code enforcement staff is limited and code officials must focus on the health, safety and structural integrity of the building. The Pacific Northwest National Laboratory has found that the average time spent by a local code official on energy code compliance is ten minutes.
- Local code officials often do not conduct on-site field inspections to verify the level and installation of energy features, i.e., insulation, HVAC equipment, windows, etc. as compared to the original compliance documentation.
- Many code officials have limited knowledge and understanding of energy efficiency and sound building science principles, nor the tools (Blower doors, duct testing equipment) to test the systems that impact the impact of the energy performance of the home.
- Local code officials are often not allocated adequate resources for the needed training on energy efficiency and building science.
- Many of the energy features of a home are covered in the walls or ceilings and are not able to be visually inspected.
- Many local code officials perceive energy codes as too complex, which further imposes difficulties on interpretation and inspection.
- Though a state may have adopted an energy code, local adoption by ordinance can be voluntary, or interpretation by the local enforcement official could undermine code requirements.
- Plan review is often sketchy – not all metropolitan areas have such staff. In addition, even if there is a plan review, the critical on-site inspection may not be detailed. In smaller communities plan review often is not available due to limited staff and resources.
- Rural areas often have little or no inspection process.
- For insurance purposes, a city's or town's rating does not consider the adoption and effective enforcement of energy codes. The Building Code Effectiveness Grading Scale (BCEGS) used by the insurance industry has a lack of emphasis on the energy factors of buildings.

- Local code officials often accept MECcheck compliance documentation without adequate plan reviews to verify the energy aspects of the building.

Builders

- A widespread perception exists among many builders that meeting the minimum energy code would require great up-front investment that adds little value to the consumer that can recaptured in the sale of the home. Energy efficiency is often viewed as an invisible attribute.
- Builders often do not understand the building science relationship between energy efficiency, quality, home performance, health, safety, structural integrity, and call-backs. In addition many builders are not aware it is no possible to build an energy efficient home with minimal added construction cost.
- Builders often do not have the time or expertise to properly supervise their subcontractor's (HVAC, insulation, etc.) work, and ensure proper quality assurance, yet frequently rely on them to calculate and properly install the features.
- Builders often view regulations as an impediment to business success.
- Builders are often not aware of energy efficient mortgages and their ability to finance energy efficiency without additional income qualification or down payment.
- There is a widespread perception exists among builders that consumers are not willing to pay for energy efficient upgrades.
- There is a widespread perception that a cursory plan review is all that is necessary to “ensure” that the home will be energy efficient.

Consumers

- A perception exists among consumers that all new homes are energy efficient.
- The energy efficient features of a home are not visible to the consumer.
- There is a lack of awareness that a home energy ratings can provide a “yardstick” that will provide an understandable measurement of the home’s relative energy efficiency.
- There is a lack of awareness of the availability of home energy ratings and energy efficient mortgages that will provide independent performance analysis of the home and finance the energy upgrade of a home without additional income qualification.

III. The Trend to Incorporate Building Energy Performance into Codes Creates an Additional Challenge

The trend in the revision of residential energy codes is to incorporate building energy performance into the code. An example of this trend is Chapter Four of the International Energy Conservation Code. A performance-based standard recognizes the house as a system and sets a goal for the overall energy performance of the home rather than setting R-values for insulation and U-values for windows. This trend toward performance-based codes creates a challenge to building code officials to enforce energy codes.

The following is an excerpt from the *Alternative Code Implementation Strategies for States*” a report by DL Smith and JJ McCullough prepared for the U.S. Department of Energy:

“... determining code compliance is further complicated when compliance is performance-based as opposed to prescriptive. Prescriptive measures can be observed individually and verified during jobsite inspections [assuming there is jobsite inspection for energy measures]. Performance-based compliance approaches, which are increasing in popularity, involve the interdependence of various measures and are not easily verified at the jobsite. Computer software programs are often required to determine either code compliance or “deemed-to-comply” status. Even building departments with advanced plan review capabilities are often hard-pressed to find the time to determine energy code compliance. It is unrealistic to expect code enforcement officials, without hardware, software, training, or adequate time, to perform plan reviews and determine code compliance in the field as part of a jobsite inspection.”

The report’s conclusion advocates the use of third party compliance, which home energy raters can provide.

IV. Home Performance Analysis is the Best Option to Address the Barriers to Effective Code Implementation

Through the Market Force of Home Energy Ratings and Energy Efficient Mortgages Energy Efficient Homes are More Affordable

The effort to ensure the energy efficiency of new homes through improved building energy codes has raised concerns within the housing industry that improved energy codes will cause higher construction costs which will in turn, reduce housing affordability. Home energy ratings coupled with energy efficient mortgages provides an opportunity to turn this perception around. The added value of energy efficiency greatly exceeds the added cost of the upgrades and thereby actually increases the number of qualified homebuyers. It also increases consumers’ “buying power” for higher quality, more comfortable and more affordable energy

efficient homes. Through the market force of home energy ratings and energy efficient mortgages, investing in making homes more energy efficient will have the positive effect of making housing **more** affordable. Energy efficiency should also be considered an economic development activity and a “recession proof” investment.

Secondary Mortgage Market Recognizes Benefit of Energy Efficiency

The secondary mortgage market recognizes that with lower utility bills, homebuyers can afford to have higher mortgage payments. An energy efficient mortgage allows a homebuyer to finance the energy upgrade of a home in the mortgage loan without additional loan qualification nor, in most cases, any additional down payment. A home energy rating is the documentation required by the mortgage industry to quantify the energy savings of the home.

Home Energy Ratings: The Key to Unlocking the Market for Energy Efficiency

A home energy rating involves an on-site inspection of the home conducted by a specially trained and certified residential energy professional. The inspection includes diagnostic performance testing of the major energy features of the home.

A national infrastructure for mortgage financing and home energy ratings is now in place. The secondary mortgage markets of FHA, Fannie Mae, Freddie Mac, and VA have adopted mortgage financing products that add the home’s projected energy savings to the borrower’s income in the mortgage qualification process. The projected energy savings are documented through a nationally accredited home energy rating provider. Working with the mortgage industry and the nation’s state energy offices, RESNET has developed a set of national standards that ensures the national consistency and accuracy of home energy ratings.

Home Energy Ratings Will Improve Energy Code Performance

This same infrastructure developed for the mortgage industry can serve as a third party, market-driven verification method for demonstrating energy code compliance.

In August 1997, an analysis completed by the National Conference of State Legislatures found that, “... home energy ratings tied with energy mortgages can help state and local governments increase compliance with building energy codes and standards such as the Model Energy Code.”

A total of ten states have incorporated or merged home energy ratings or have specifically approved use of home energy rating software into their energy code compliance process:

- Alaska
- Arkansas

- California
- Connecticut
- Florida
- Indiana
- Iowa
- New York
- Massachusetts
- Vermont

According to the U.S. Census Bureau, the states that incorporated home energy ratings into their codes represent 26% of the housing starts in 2000.

Market-Driven Programs such as Home Energy Ratings will Improve Builder Performance

While incorporating home energy ratings into code compliance will serve to improve minimum compliance (and perhaps even more, result in even greater energy performance), another opportunity is presented. The ENERGY STAR Homes Program has demonstrated that market-driven home energy ratings and energy mortgages present the market recognition and mortgage financing incentives for builders to achieve maximum performance.

Savvy builders have also learned that ratings also serve as a quality control tool for ensuring that the purchased energy efficiency features are the most cost-effective and that their subcontractors properly install the energy features.

IV. Blue Print for Action

While the infrastructure of home energy ratings and energy efficient mortgages has been developed and is available in every state in the union, there are steps that RESNET believes that the U.S. Department of Energy can take in support of incorporating this market mechanism into effective code compliance:

- **Allow states to undertake code-directed home energy rating activities under the Building Energy Codes category of the State Energy Program Special Projects Grant Program.** Currently the U.S. Department of Energy usually will not fund state projects aimed at promoting and growing the home energy rating infrastructure as a code compliance tool in their states. This is caused by a lack of understanding how market mechanisms such as home energy ratings can be linked to effective code performance efforts.
- **Assist the home energy rating industry and state energy offices in modifications to the home energy rating guidelines and making proposals to the International Code Council's International Energy Conservation Code**

(IECC) Committee. There are currently inconsistencies between the home energy rating technical guidelines adopted by the National Association of State Energy Officials (NASEO) and the performance method of the IECC. Through RESNET, the home energy rating industry and the state energy offices are working to quantify the effects of these differences and recommend necessary changes. The U.S. Department of Energy can provide much needed assistance in this area. This could include providing resources to NREL to update the BESTEST software compliance protocol so that it can be used for home energy ratings and the IECC. The Department of Energy should also assist RESNET in developing and submitting proposals to the IECC for consideration as amendments to the current code.

- **Provide a leadership role in encouraging state and local governments to incorporate third party performance compliance such as home energy ratings into their energy codes compliance process.** Ten states have already incorporated home energy ratings or have specifically approved use of home energy rating software into their code compliance process. RESNET is interested in working with the Department of Energy in assisting other states to incorporate performance compliance into their energy codes.