



## FEDERATION OF AMERICAN SCIENTISTS

T: 202.546.3300 1725 DeSales Street, NW 6<sup>th</sup> Floor Washington, DC 20036  
F: 202.675.1010 www.fas.org fas@fas.org

# Rebuilding Mortgages for Energy Efficiency

By Todd Gerarden

*Federation of American Scientists*

Residential energy consumption accounts for over twenty percent of global energy use.<sup>1</sup> In 2001, American homeowners spent approximately 160 billion dollars per year on energy costs, averaging almost 1,500 dollars per residence.<sup>2</sup> In order to moderate domestic energy use and defray these costs, the 102<sup>nd</sup> Congress established the Energy Efficient Mortgage (EEM) Pilot Program in 1992. Despite its potential to address these issues, this program has effected virtually no change in national home energy consumption. On May 15<sup>th</sup>, 2008, Representative Ed Perlmutter (D-CO) introduced the GREEN Act of 2008 to correct some of the deficiencies in the EEM program. This article discusses the shortcomings of the EEM program, first addressing the confusing statistical record on past participation and then identifying barriers that have affected its performance since inception. It also reviews the relevant sections of the GREEN Act of 2008 and proposes additional steps necessary to advance the EEM program in order to impact domestic energy use significantly.

## Findings and Recommendations

The EEM program has not gained market share in the residential housing market. Despite misleading participation statistics suggesting otherwise, the number of mortgages issued under this program pales in comparison to the number of total annual mortgages. Many barriers to successful implementation exist; these include a lack of public awareness, initial costs, financial risk, and a lack of incentives for industry representatives. In order to overcome these barriers, this article recommends the following steps, to be discussed in more detail later:

### **Recommendations for Program Promotion and Improvement**

- *The apparent fact that the EEM program has never gained a substantial market share should be addressed by a formal study.*
- *National, state, and local governments should use appropriate media to disseminate information about and market EEMs.*
- *Explicit goals or requirements for 'green banking' centers should be set before these centers are established (pursuant to Rep. Perlmutter's bill).*
- *The government should cooperate with private enterprise (beyond the media) to publicize and market this product.*
- *The standard for Energy Efficient Homes should be updated to the most recent and ambitious building energy code.*

### **Recommendations for Program Expansion**

- *The government should adopt a mandatory national home energy rating system devised by industry experts.*
- *The federal government should also require energy audits concurrent with home sales.*

### **About Energy Efficient Mortgages**

The concept of Energy Efficient Mortgages first appeared in the late 1980's. However, due to perceived financial risk, the program received little attention from mortgagors until the federal government recognized the market potential of this product.<sup>3</sup> Beginning in 1992, the Department of Housing and Urban Development (HUD) offered EEMs to participants in five states through the Federal Housing Administration (FHA). Borrowers could qualify for more expensive but energy efficient homes or roll the cost of energy audits and recommended improvements into their mortgages without additional credit assessments. Ideally, lower utility bills would offset higher mortgage payments and save the mortgagee money while raising his or her standard of living. The pilot program expanded to ten states in 1994 and became available nationally in 1995.<sup>4</sup> Meanwhile, the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac) began supporting the EEM concept in their operations.

While the implementation of this program varies among these three lenders, the FHA standards illustrate the program's mechanics.\* The Federal Housing Act insures properties under Title II of the National Housing Act.<sup>†</sup> The FHA offers two types of EEMs: Energy Improvement Mortgages (for existing homes) and Energy Efficient Homes mortgages (for new homes).

In order to obtain an Energy Improvement Mortgage, home buyers must first qualify for a loan under the National Housing Act. While this does not include income limits, there are maximum prices on homes purchased through the FHA. Then, the potential borrower must hire an energy auditor to evaluate energy use and potential savings, make recommendations for cost-effective retrofits, and produce a home energy rating report. An eligible home buyer may then roll an additional \$4,000 to \$8,000 into their mortgage to make these improvements (including limited funds for the energy audit) without credit reassessment.<sup>5</sup> The lender places this money in an escrow account, where it remains until the energy efficiency improvements are completed (up to 90 days).<sup>6</sup> This system diminishes financial risk to both borrower and lender while guaranteeing completion of the energy efficiency improvements.

The FHA Energy Efficient Homes program offers mortgage incentives for new homes. In order to obtain this mortgage product, the purchaser must prove the property meets the 2000 International Energy Conservation Code through an energy report that includes a physical inspection.<sup>7</sup> This makes the buyer eligible for an increase of two percentage points in their qualifying ratios.<sup>8</sup>

---

\* This summary consists of information found in a 2003 HUD publication.

<sup>†</sup> See National Housing Act, 12 U.S.C. §1707 et seq.

## Limited Success

Following the national expansion of this program, EEMs *appeared* to grow in popularity. According to multiple HUD publications, the FHA program reported an average of over 26,000 mortgagees each year between 1998 and 2003.<sup>9</sup> In contrast, the FHA reported only 441 EEMs to Congress in 2005.<sup>10</sup> While this report emphasized the EEM program as a “priority loan product,” it included no goals or metrics to promote or evaluate the product. By 2007, HUD reported 1,066 EEMs.<sup>11</sup> Although over double the number from two years prior, this is little improvement over 2005 data when compared to the eight million total home sales annually in the United States.<sup>12</sup> Meanwhile, industry executives say less than one percent of all home loans are EEMs.<sup>13</sup>

New, more accurate reporting procedures used by the Department of Housing and Urban Development in 2005 explain the apparent decline in participation since 2003.<sup>14</sup> These new statistics raise questions about the historically high participation *reported* for the program. For example, both new homes and those with energy improvements have been included in the aggregate numbers reported, obscuring the prevalence of each mortgage classification. In addition, the Energy Efficient Homes program seems to have offered considerable flexibility concerning compliance before the change in reporting procedures. For that reason, lenders may have mistakenly classified some inapplicable home loans as EEMs.

While EEMs are issued by Fannie Mae, Freddie Mac, and the FHA, these widely published statistics represent only FHA-insured mortgages. Fannie Mae and Freddie Mac do not consistently report EEMs; the scope and variety of their operations complicate this challenge. For instance, Fannie Mae reported “more than 40,000 unsecured energy improvement loans between 1995 and 1998.”<sup>15</sup> In written testimony in June, 2008, Fannie Mae reported an average of 61 energy efficient loans annually between 2005 and 2007.<sup>16</sup> Meanwhile, some private lenders offer similar benefits that are not considered in the usage statistics of this program. These mortgages vary significantly and lenders are not required by law to report their characteristics or differentiate between these and other mortgages.<sup>17</sup> Although these explanations remove some concern about a possible recent dramatic decline in EEM usage, no extensive study of program participation has been undertaken. Accurate reporting is essential to evaluating the performance of the EEM program; government and lending institutions should overcome this barrier before the program proceeds.

## Barriers to Successful Implementation

Several obstacles preventing wider success of the EEM program include: a lack of public awareness, the need for consumer initiative, prohibitive initial costs, lack of incentives for industry representatives, and undue risk.

A lack of customer and professional awareness is the most prominent obstacle to market success. Barriers to information transfer slow the implementation of energy-saving technologies.<sup>18</sup> This market failure demands government attention and intervention. In part due to this market failure, participation in the EEM program requires both significant initiative and initial investments (time and

money) from the customer. For many homeowners who struggle to afford down payments, this small additional cost could prevent their consideration of this program.

To compound this lack of awareness, industry representatives have no clear incentives to promote the EEM program. Cost barriers to energy efficient homes prevent builders from constructing high performance buildings because they are not guaranteed profitable sales. Meanwhile, real estate agents rely on volume to produce profits. Therefore, requirements of the EEM program could serve as disincentives to realtors, preventing them from promoting mortgage alternatives that would slow sales.

A National Renewable Energy Laboratory report stated that energy audits are widely available but seldom uniform, demonstrating the need for government and industry action.<sup>19</sup> An article in *Energy and Buildings* reinforces this need, emphasizing that informing the homeowner of the relative energy performance of his house enables rational decision-making.<sup>20</sup> This article also asserted the importance of guaranteeing the effectiveness of energy performance projects.<sup>21</sup> Policy alternatives could simultaneously address these two needs. Financial incentives are the third component of a successful residential energy efficiency program.<sup>22</sup> Of these three components, the EEM program effectively offers only financial incentives, leaving homeowners to assume much risk.

## **Recent Developments**

While these obstacles have persisted since the program's inception, policymakers also need to consider changing conditions affecting the nation and incorporate appropriate responses to them in current and future legislation. With its ability to reduce energy use and simultaneously reduce carbon emissions, the EEM program should also serve as an instrument to combat higher consumer energy costs and climate change. According to the Energy Information Administration, residential CO<sub>2</sub> emissions grew more than any other sector in 2007, accounting for 1242 million metric tons of carbon.<sup>23</sup> These emissions and the potential for cost-effective efficiency improvements combine to create a favorable environment for this mortgage incentive program. Meanwhile, American household energy expenditures have steadily increased over the past twenty years.<sup>24</sup> Between 1997 and 2001, total annual energy expenditures for homes rose over 17 percent, from 136 to 160 billion dollars.<sup>25</sup> Although a report from the National Renewable Energy Laboratory cited low utility prices as a "barrier to progress" in 2000, impending climate change legislation and rising energy prices could change this.<sup>26</sup> The EEM program would financially assist homeowners facing higher energy bills, potentially broadening the consumer base interested in EEMs.

## **Solutions Offered by the GREEN Act of 2008**

The GREEN Act of 2008, sponsored by Rep. Perlmutter and introduced in May of 2008, attempts to mitigate some of the barriers to successful implementation of the EEM program.<sup>‡</sup> The act includes provisions on reporting requirements, public awareness initiatives, and goals for program participation.

---

<sup>‡</sup> See Green Resources for Energy Efficient Neighborhoods Act of 2008, H. R. 6078, 110<sup>th</sup> Cong. (2008).

The GREEN Act of 2008 addresses unclear usage statistics through more accurate information collection. Section 9 of this bill modifies the Home Mortgage Disclosure Act of 1975 to track EEMs precisely. This should prevent these mortgages from being neglected or, conversely, incorrectly included in aggregate data. In turn, these results will help determine the effectiveness and appropriateness of the EEM program.

As mentioned earlier, a lack of public awareness deters widespread use of this program. Section 8 of the GREEN Act of 2008 calls for an interagency “campaign to inform and educate residential lenders and prospective borrowers regarding the availability, benefits, advantages, and terms of energy efficient mortgages.”<sup>27</sup> Later, Section 25 of the GREEN Act establishes ‘green banking’ centers that would provide information to prospective borrowers. These centers would educate consumers about energy audits, cost-effective home improvements, and mortgage incentives, furthering efforts to publicize the EEM program.

In addition to dedicated provisions to improve public awareness, the GREEN Act of 2008 mandates promotion by Fannie Mae and Freddie Mac. The bill amends the charters of Fannie Mae and Freddie Mac to include EEMs in their activities, sending a clear message about their increased responsibilities and greater role in effecting energy policy. Quantifiable goals for the program outlined in Section 6 reinforce this message. In a similar manner, Section 7 of the GREEN Act of 2008 requires the FHA to insure at least one billion dollars in mortgages for energy efficient homes after 2012. While not all these mortgages must fall under the EEM program, this provision will likely increase participation in the program. With proper promotion, the EEM program could assist the FHA in fulfilling this mandate. It is imperative that legislators set such goals to ensure energy efficiency improvements and convey their expectations to federal agencies.

## **Future Steps**

While education policies must change, it is clear that outreach alone will not energize this program. In order to ensure the effectiveness of the EEM program, other measures should be taken in parallel with those advocated by Rep. Perlmutter. Both the current bill and future legislation should consider the following alternatives to improve and expand the EEM program, alleviate the financial burden of energy bills on American citizens, and reduce national energy consumption:

## **Recommendations for Program Promotion and Improvement**

➤ ***The apparent fact that the EEM program has never gained a substantial market share should be addressed by a formal study.*** Given that eight million home sales occur annually in the United States, the residential market continues to be a relatively untapped resource for the EEM program.<sup>28</sup> Simultaneously, this high volume of sales presents a chance to affect national energy consumption significantly. However, the lack of penetration of this market by EEMs thus far must be analyzed and then addressed by policy changes in order to promote energy efficiency successfully. This should begin with a formal study to explain both errors in reporting and low participation rates.

➤ **National, state, and local governments should use appropriate media to disseminate information about and market EEMs.** The legislation *allows* for contracts with the appropriate media, but it should *require* such publicity. The Canadian government successfully improved a similar program by disseminating information through regional newspapers and television broadcasters, analyzing participation and verifying its effectiveness.<sup>29</sup> The federal government should study prior media use for similar products and initiate an advertising campaign implemented both nationally and locally. This campaign should use a combination of broadcast and print media. Such a framework for education would maximize the public knowledge of this program.

➤ **Explicit goals or requirements for 'green banking' centers should be set before these centers are established.** This would bolster the program's competitiveness with other federal priorities. This initiative could also expand the breadth of EEM program awareness, augmenting the education campaign in the GREEN Act of 2008.

➤ **The government should cooperate with private enterprise (beyond the media) to publicize and market this product.** Collaboration with industry representatives, such as realtors, lenders, builders, energy auditors, and lenders could increase the visibility of this product. This could be in the form of periodic training that includes updates on the status of mortgage qualifications and incentives. Another step would be to offer incentives to industry members for promoting this product. With incentives, builders could invest in energy efficiency with a guarantee of greater returns. Similarly, real estate agents would take time to sell EEMs, feeling less rushed to finalize sales. This could stimulate the private sector to offer these mortgages widely, removing the need for government administration and funding in the future.

➤ **The standard for Energy Efficient Homes should be updated to the most recent and ambitious building energy code.** In 2005, HUD updated the requirement to receive a stretch in qualifying ratios. Homes must meet the 2000 International Energy Conservation Code, now outdated by two code revision cycles. In order to modernize the energy efficiency requirements of this program and continue to raise the bar for new home construction, the most recent edition of the appropriate code should be used. In the future, subsequent editions of this code should be adopted after their development.

## **Recommendations for Program Expansion**

➤ **The government should adopt a mandatory national home energy rating system devised by industry experts.** Although HUD issues guidelines for energy audits under select programs, the federal government should issue a single uniform system for all energy audits completed in the United States.

Such a federal mandate would boost participation in the EEM program by providing prospective homeowners with a concrete and uniform system for evaluating the energy performance of their homes. In addition, appraisers often ignore energy performance because no conclusive evidence quantifies the market value of energy efficiency measures.<sup>30</sup> A uniform rating system would facilitate accurate house pricing that includes energy performance, reinforcing efforts in the GREEN Act of 2008 to include energy efficiency in appraisals. This would further financial incentives to consumers for completing energy efficiency improvement projects and reduce risk to both lenders and borrowers.

➤ ***The federal government should also require energy audits concurrent with home sales.*** This would enable buyers to account for energy use and lifecycle costs in their financial decisions, removing the barriers of unfamiliarity, inadequate initiative, and lack of resources. Monetary incentives could reduce the financial burden of home energy audits. For instance, the federal government could follow states such as New Jersey, New York, and Connecticut by directly subsidizing energy audits.<sup>31</sup> This policy would stimulate growth in the energy rating industry. However, a system of mandatory home energy audits would require careful orchestration to avoid technical barriers for both private companies and governments. For instance, mandatory audits could exacerbate existing inaccuracy in home ratings due to inadequate training of industry personnel.<sup>32</sup> One possible solution to this problem, a tiered scheme of requirements for energy audits concurrent with home inspections and corresponding mortgage incentives, could ease the transition from our current system. Although this system would need to be developed, it would allow for incentives scaled to match consumer demand. Mandatory home energy audits could benefit as many as eight million consumers annually with equal access to accurate information.<sup>33</sup>

## Conclusion

The success of the EEM program demands a combination of these recommended alternatives and provisions like those found in Rep. Perlmutter's GREEN Act of 2008. These efforts will assist up to 250,000 new mortgagees who could qualify for, but do not obtain, EEMs each year.<sup>34</sup> The policy recommendations in this article would mitigate this lack of participation and could present new opportunities to currently ineligible consumers. Government promotion of the EEM program will result in essential improvements in home energy performance, benefiting current homeowners and future Americans alike.

---

<sup>1</sup> Parker, P., Rowlands, I. H., & Scott, D. (2003). Innovations to reduce residential energy use and carbon emissions: an integrated approach. *The Canadian Geographer*, 47(2), 169. Retrieved February 17, 2008, from <http://find.galegroup.com>.

<sup>2</sup> Energy Information Administration. (2001). *Residential Energy Consumption Surveys: 2001 Consumption and Expenditure Tables*. Retrieved June 11, 2008, from <http://www.eia.doe.gov>.

- 
- <sup>3</sup> Farhar, B. C. (2000). Pilot states program report: home energy rating systems and energy-efficient mortgages. Golden, CO: National Renewable Energy Laboratory.
- <sup>4</sup> Housing Choice and Community Investment Act of 1994, S. 2281, 103<sup>rd</sup> Cong., 2<sup>nd</sup> Sess. (1994).
- <sup>5</sup> Cranston-Gonzalez National Affordable Housing Act, 42 U.S.C. §12712.
- <sup>6</sup> U.S. Department of Housing and Urban Development. (2003). *Handbook 4155.1 REV-5*. Washington, DC: U.S. Government Printing Office.
- <sup>7</sup> U.S. Department of Housing and Urban Development. (2005). *Mortgagee Letter 2005-21*. Washington, DC: U.S. Government Printing Office.
- <sup>8</sup> U.S. Department of Housing and Urban Development. (2003). *Handbook 4155.1 REV-5*. Washington, DC: U.S. Government Printing Office.
- <sup>9</sup> U.S. Department of Housing and Urban Development. (2008). *Energy Efficient Mortgages: FHA Mortgage Insurance*. Retrieved February 9, 2008, from [http://www.hud.gov/offices/hsg/sfh/eem/eem\\_prog.cfm](http://www.hud.gov/offices/hsg/sfh/eem/eem_prog.cfm).
- <sup>10</sup> U.S. Department of Housing and Urban Development. (2006). *Report to Congress (Submitted under Section 154, Energy Policy Act of 2005)*. Retrieved February 13, 2008, from <http://www.huduser.org>.
- <sup>11</sup> Freedberg, M. (2008). Written statement of Michael Freedberg. Retrieved June 18, 2008, from [http://www.house.gov/apps/list/hearing/financialsvcs\\_dem/hr061108.shtml](http://www.house.gov/apps/list/hearing/financialsvcs_dem/hr061108.shtml). [print version of hearing not yet available]
- <sup>12</sup> U.S. Department of Housing and Urban Development. (2005). *U.S. Housing Market Conditions*. Retrieved March 18, 2008, from [http://www.huduser.org/periodicals/ushmc/winter04/USHMC\\_04Q4.pdf](http://www.huduser.org/periodicals/ushmc/winter04/USHMC_04Q4.pdf).
- <sup>13</sup> Tedeschi, B. (2006, September 10). Saving both money and energy. *New York Times*. Retrieved February 10, 2008, from <http://www.nytimes.com>.
- <sup>14</sup> U.S. Department of Housing and Urban Development. (2006). *Report to Congress (Submitted under Section 154, Energy Policy Act of 2005)*. Retrieved February 13, 2008, from <http://www.huduser.org>.
- <sup>15</sup> Plympton, P. C. (2000). National status report home energy rating systems and energy-efficient mortgages. Golden, CO: National Renewable Energy Laboratory.
- <sup>16</sup> Federal National Mortgage Association. (2008). Written testimony submitted for the record: Hearing on H.R. 6078: Green Resources for Energy Efficient Neighborhoods Act of 2008. Retrieved June 18, 2008, from [http://www.house.gov/apps/list/hearing/financialsvcs\\_dem/hr061108.shtml](http://www.house.gov/apps/list/hearing/financialsvcs_dem/hr061108.shtml). [print version of hearing not yet available]
- <sup>17</sup> Plympton, P. C. (2000). National status report home energy rating systems and energy-efficient mortgages. Golden, CO: National Renewable Energy Laboratory.
- <sup>18</sup> Jaffe, A. B., & Stavins, R. N. (1994). Energy-efficiency investments and public policy. *The Energy Journal*, 15(2), 43. Retrieved February 10, 2008, from <http://find.galegroup.com>.
- <sup>19</sup> Plympton, P.C. (2000). National status report home energy rating systems and energy-efficient mortgages. Golden, CO: National Renewable Energy Laboratory.
- <sup>20</sup> Calla, R., DePani, S., Fazio, P., & Zmeureanu, R. (1999). Development of an energy rating system for existing houses. *Energy and Buildings*, 29(2), 107. Retrieved February 10, 2008, from <http://www.sciencedirect.com>.
- <sup>21</sup> Ibid.
- <sup>22</sup> Ibid.
- <sup>23</sup> Energy Information Administration. (2008). *U.S. Carbon Dioxide Emissions from Energy Sources 2007 Flash Estimate*. Retrieved June 6, 2008, from <http://www.eia.doe.gov>.
- <sup>24</sup> Energy Information Administration. (2007). *Annual Energy Review 2006*. Washington, DC: U.S. Government Printing Office, 50.
- <sup>25</sup> Ibid.
- <sup>26</sup> Farhar, B. C. (2000). Pilot states program report: home energy rating systems and energy-efficient mortgages. Golden, CO: National Renewable Energy Laboratory.
- <sup>27</sup> Green Resources for Energy Efficient Neighborhoods Act of 2008, H. R. 6078, 110<sup>th</sup> Cong. §8 (2008).
- <sup>28</sup> U.S. Department of Housing and Urban Development. (2005). *U.S. Housing Market Conditions*. Retrieved March 18, 2008, from [http://www.huduser.org/periodicals/ushmc/winter04/USHMC\\_04Q4.pdf](http://www.huduser.org/periodicals/ushmc/winter04/USHMC_04Q4.pdf).

---

<sup>29</sup> Parker, P., Rowlands, I. H., & Scott, D. (2003). Innovations to reduce residential energy use and carbon emissions: an integrated approach. *The Canadian Geographer*, 47(2), 169. Retrieved February 17, 2008, from <http://find.galegroup.com>.

<sup>30</sup> Nevin, R., & Watson, G. (1998). Evidence or rational market valuations for home energy efficiency. *Appraisal Journal*, 66(4), 401. Retrieved February 9, 2008, from <http://find.galegroup.com>.

<sup>31</sup> Wald, M. L. (1982, May 30). Energy efficiency: how to gauge it. *New York Times*. Retrieved February 10, 2008, from <http://www.nytimes.com>.

<sup>32</sup> Stein, J. R. (1997). Accuracy of home energy rating systems. Berkeley, CA: Lawrence Berkeley National Laboratory.

<sup>33</sup> U.S. Department of Housing and Urban Development. (2005). *U.S. Housing Market Conditions*. Retrieved March 18, 2008, from [http://www.huduser.org/periodicals/ushmc/winter04/USHMC\\_04Q4.pdf](http://www.huduser.org/periodicals/ushmc/winter04/USHMC_04Q4.pdf).

<sup>34</sup> U.S. Department of Housing and Urban Development, HUD USER. (2006). Several roads to increased energy efficiency. *Research Works*, 3(3), 1. Retrieved February 10, 2008, from [http://www.huduser.org/periodicals/ResearchWorks/ResearchWorks\\_Mar06.pdf](http://www.huduser.org/periodicals/ResearchWorks/ResearchWorks_Mar06.pdf).