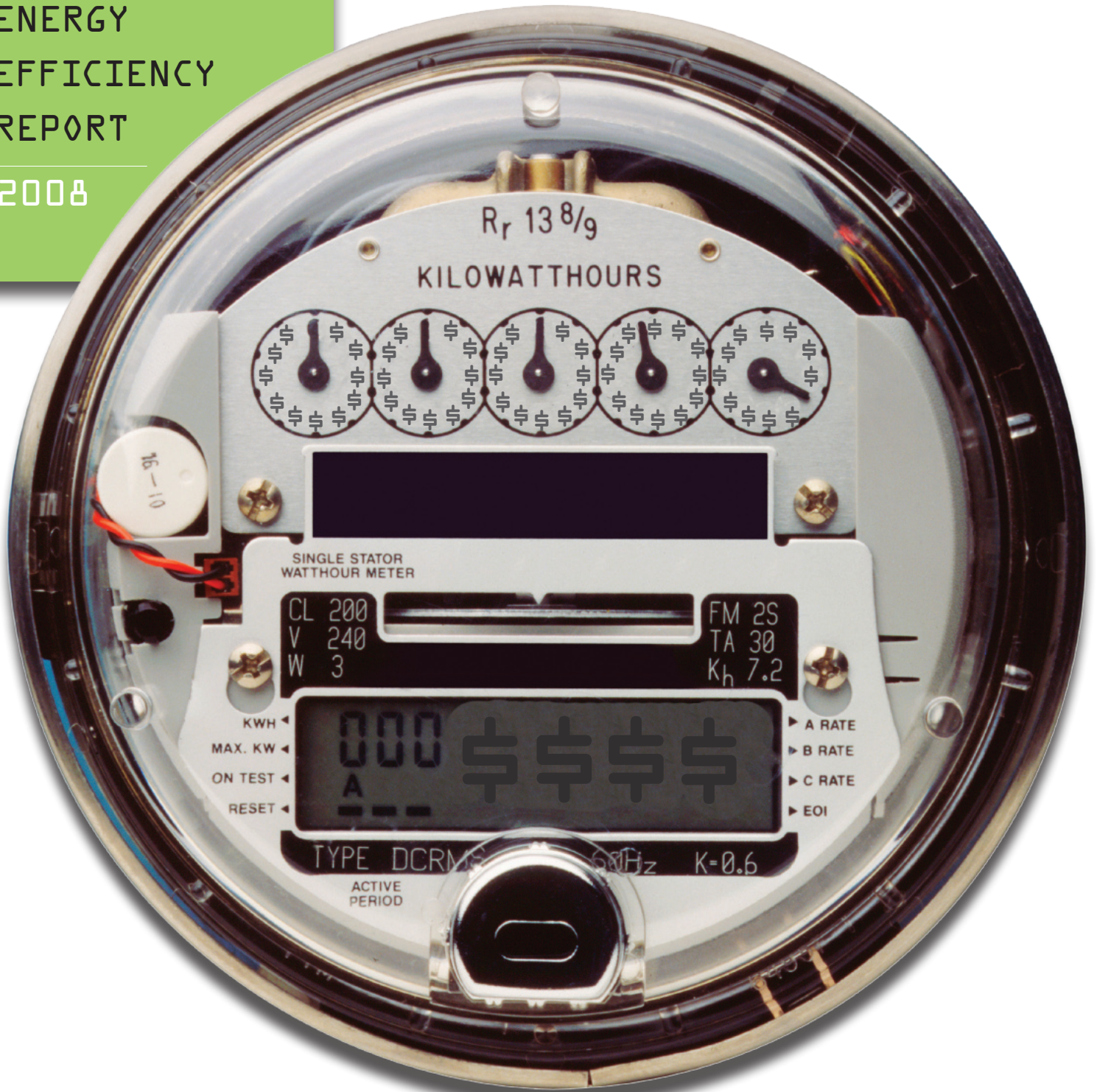




Susan Combs
Texas Comptroller
of Public Accounts

THE HOME ENERGY EFFICIENCY REPORT

2008



October 1, 2008

Ladies and Gentlemen:

Energy fuels Texas' growing economy. It also cools our homes, powers our cars and lights the night. With population projections showing a nearly 50 percent increase in Texas by 2030, ensuring access to reliable, affordable energy is critical.

Texas leads the nation in energy production, producing more crude oil, natural gas, electricity and wind power than any other state. However, we also lead in consumption. To mitigate the impact of higher energy costs, the state is systematically improving the energy efficiency of its facilities and now considers fuel efficiency a key criterion in all vehicle purchases.

Homes account for 14 percent of the energy used in Texas each year. Most of that energy is electricity. And Texans are paying the price — 56 percent more each year for electricity than the national residential average.

With a booming population, a home ownership rate of 66 percent and an estimated 500,000 residential real estate transactions a year, even small gains in home energy efficiency will create a sizeable impact in Texas.

Informed consumers empowered with credible home energy efficiency information that is both easy to understand and actionable can make better energy decisions when weighing efficiency upgrades or when evaluating a home for purchase. With 87 percent of Texas' 6.3 million homes valued at \$200,000 or less, a potential savings of \$1,791 to \$2,507 on electric bills over a five- to seven-year period with just a 20 percent efficiency gain represents significant savings to most Texas families.

As required by HB 3070 passed by the 80th Texas Legislature, the Comptroller's State Energy Conservation Office (SECO) conducted a comprehensive study to identify potential methods for providing home energy efficiency information to Texas consumers. An advisory committee comprising state and local government agency representatives, homebuilders, building code officials, utility providers, real estate agents and mortgage lenders provided key subject matter expertise in this effort.

We are pleased to provide the study findings in this report. With typical Texas ingenuity and know-how, the Lone Star State will again lead the nation in exploring and harnessing the "newest" energy resource — energy efficiency.

Sincerely,

Susan Combs





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Executive Summary

Texas leads the nation in energy production and in energy consumption.¹ While industry represents half of that consumption, homes account for 14 percent of demand.² Most of that energy is electricity, more electricity than the average U.S. home, for which Texans are paying the price: The bills add up to 45 percent more each year than neighboring states, and 56 percent more each year than the national residential average.³

With 8.1 million occupied housing units, even small gains in home energy efficiency will create a sizeable impact.⁴ Energy efficiency, therefore, becomes an energy resource.

An informed consumer can make better energy decisions when weighing efficiency upgrades or when buying a home. That home purchase is the single largest investment for most consumers. Location, price and square footage are key decision drivers. Few consider energy efficiency or its impact on lifetime operating costs and resale value.

According to the U.S. Department of Energy, in addition to the benefits of resource conservation and emissions reductions, many households can save 20 to 30 percent on their home energy bills by implementing energy efficiency solutions.⁵

With the 2006 average monthly bill for residential electricity in Texas averaging \$149.29, an efficiency gain of the minimum average projection of 20 percent at 2006 rates represents a savings to consumers of \$1,791 to \$2,507 over the typical home ownership period of five to seven years.⁶ That potential savings represents a significant savings to most Texas families, with 87 percent of Texas homes valued at \$200,000 or less.⁷

Electricity cost savings for the more than 5.5 million single-family household units in Texas with a 20 percent gain would exceed \$1.9 billion annually, for \$9.8 billion in savings over five years or more than \$13.7 billion over seven years.⁸

These figures do not include savings for mobile home or multi-family units, savings on other utilities or potential tax credits available for some specific improvements. And savings would be offset by the cost of any improvements or upgrades.

While recently constructed homes benefit from more stringent code requirements for energy efficiency, 69 percent of Texas homes were built prior to 1990; potential savings for these homes would be higher than the average.⁹

Research indicates consumers will invest in energy efficiency home upgrades when:

- (1) energy costs are perceived as a long-term, burdensome problem;
- (2) costs, return and payback periods can be estimated;
- (3) income is sufficient; and
- (4) a credible source of advice on the most cost-effective improvements is available.¹⁰

As a state, we promote energy efficiency in our government buildings, our schools and our businesses because it makes economic sense. The same principle applies to residential real property.



This report provides a basic overview of the resources currently available to empower consumers with practical information that can objectively rate home energy use and assess the potential for energy efficiency gains and reductions in home operating costs.

Key findings include:

- Two home energy rating systems are considered viable for rapid, low-cost implementation: The Home Energy Rating System from the national Residential Energy Services Network, and Texas A&M University Energy Systems Laboratory's proposed home energy evaluation system.
- New residential construction in Texas already requires inspection prior to sale to ensure compliance to the energy code.
- Requiring mandatory home energy ratings on the state's 8.1 million occupied housing units would be difficult to implement.
- Under a voluntary energy rating system, market forces can drive participation.
- Incentives for voluntary residential energy ratings may range from market pressure to tax incentives.
- Dedicated energy efficiency fields in the Multiple Listing Service are not well received or widely used; however, a voluntary comment field could be added for past utility bills or energy ratings.
- Though Energy Efficiency Mortgages (EEM) have lost favor in the past several years, increased consumer awareness of EEMs can play a valuable role in encouraging home energy efficiency.
- The key to a concerted effort for energy efficiency lies with consumer education and the ability to provide consumers with relevant and accurate information. The power to save is then in the hands of the consumer.
- Introducing energy rating information into the marketplace should increase the average energy efficiency of residential real property.



Introduction

From the first gush of oil in Nacogdoches County back in 1866, energy has been the very lifeblood of Texas, fueling the state’s growth.

That expansion shows no signs of slowing for the world’s 12th-largest economy.¹¹ Job growth in Texas has exceeded 1 million over the past four years.¹² The state’s population is projected to continue growing to more than 33 million by 2030, roughly equivalent to adding another Dallas-Fort Worth and another Houston metropolitan area.¹³ And if the average employment-to-population average is maintained as expected, the state will add another 4.5 to 5.8 million jobs during the next 25 years.¹⁴

CONSUMER IMPACT

- Texas leads the nation in per capita residential consumption of electricity.
- Texans pay 24 percent more per kilowatt-hour than the national residential average.
- Texans pay 56 percent more each year for electricity than the national residential average.

Now more than ever, ensuring access to reliable, affordable energy is critical to the economic health of our state and to our standard of living.

Texas leads the nation in energy production, producing more crude oil, natural gas, electricity and wind power than any state.¹⁵ However, we also lead in consumption.¹⁶ Texas’ energy use in 2005 represented 11.5 percent of U.S. energy consumption, ranking us ahead of all other states.¹⁷ The confluence of population, climate and energy-intensive industry drive this seemingly disproportionate share.

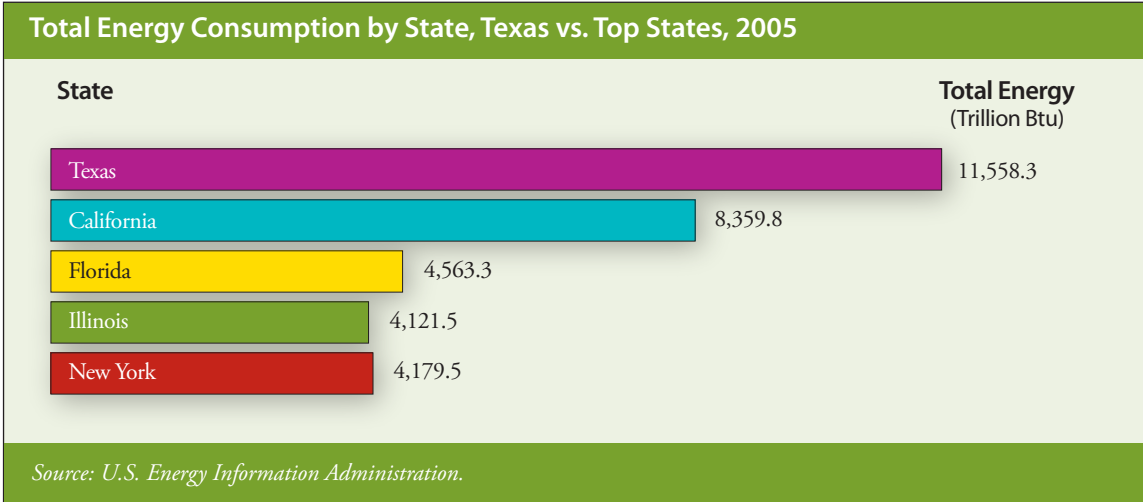
While industry is by far the biggest energy consumer, Texas homes account for 14 percent of the energy used in the state each year.¹⁸ Most of that energy is electricity. Texas’ per capita residential consumption of electricity is higher than the national average, due to cooling demand and a greater use of electricity for heating than other states.¹⁹

Moreover, Texans are paying the price. The average retail price per kilowatt-hour in Texas was almost 24 percent higher than the national average in 2006.²⁰ For the average family, those dollars and cents add up. The average annual bill for residential electricity in the Lone Star State totaled \$1,791.48, or 45 percent more each year than neighboring states, and 56 percent more than the national average in 2006.²¹

Population Projections, July 2005 to July 2030, Texas vs. U.S.

Geographic Area	Projections July 1, 2005	Projections July 1, 2010	Projections July 1, 2015	Projections July 1, 2020	Projections July 1, 2025	Projections July 1, 2030
Texas	22,775,044	24,648,888	26,585,801	28,634,896	30,865,134	33,317,744
United States	295,507,134	308,935,581	322,365,787	335,804,546	349,439,199	363,584,435

Source: U.S. Energy Information Administration.



With 8.1 million occupied housing units, a burgeoning population and a home ownership rate holding at 66 percent, even small gains in home energy efficiency could make a big difference.²² Though new homes in Texas are built to current, higher energy efficiency standards, 69 percent of homes in Texas were built prior to 1990; the potential for improved energy savings on existing homes is greatest.²³

This report is intended to provide policymakers with a basic overview of the resources available today to empower consumers with practical information that can objectively rate home energy use and assess the potential for energy efficiency gains and reductions in home operating costs.

About The Home Energy Efficiency Study Report

As directed by HB 3070, Comptroller staff with the State Energy Conservation Office (SECO) studied how to objectively rate and communicate the energy efficiency of new and existing homes as part of the home-purchase process. With extensive primary and secondary research already completed for *The Energy Report 2008*, Comptroller staff specifically reviewed opportunities for home energy efficiency gains for consumers.

Cost Per Residential Kilowatt Hour, Texas vs. National Average, 2006

State	Average Retail Price (Cents per Kilowatthour)
Texas	12.86
United States	10.40

Source: U.S. Energy Information Administration.

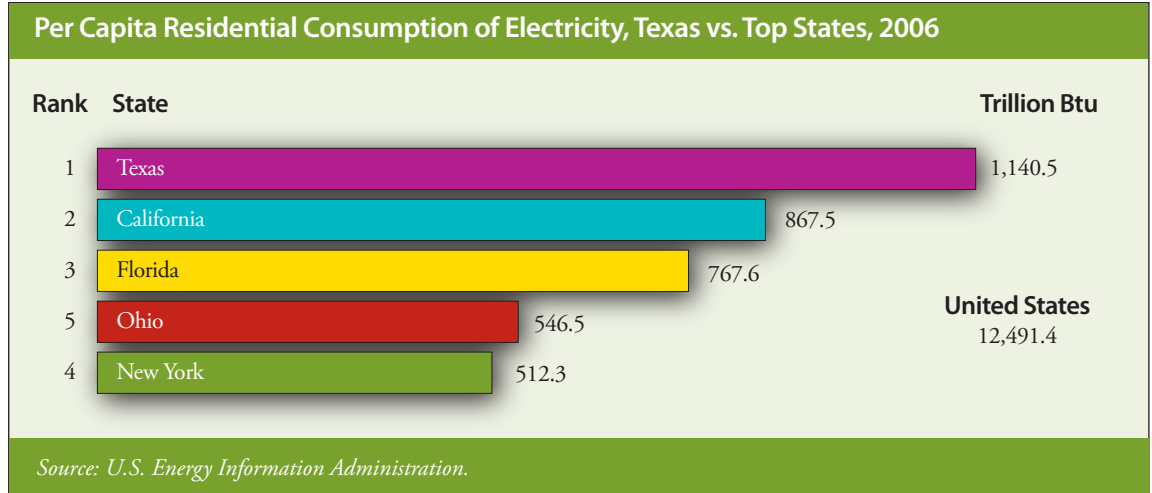
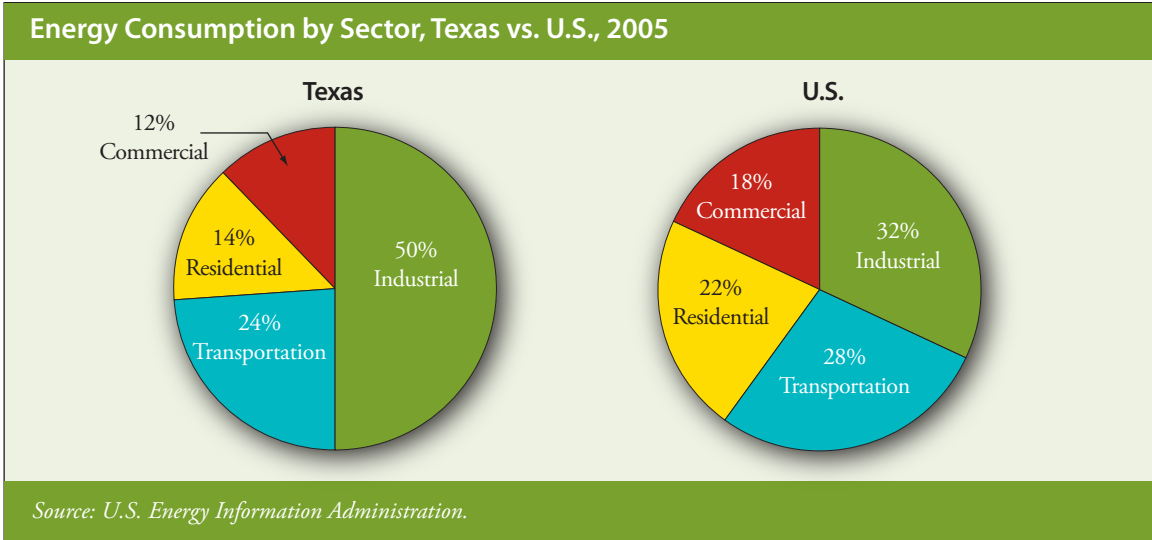
Annual Residential Electricity Cost, Texas vs. National Average, 2006

State	Average Monthly Bill (Dollar and cents)	Average Yearly Bill (Dollar and cents)
Texas	149.29	1,791.48
United States	95.66	1,147.92

Source: U.S. Energy Information Administration.



The Residential Energy Efficiency Advisory Committee, comprising state and local government agency representatives, homebuilders, building code officials, utility providers, real estate agents and mortgage lenders, provided subject matter expertise. The committee also was charged with studying how to educate both home buyers and lenders (mortgage brokers and financial institutions) on energy efficiency mortgages. Finally, the committee was charged with determining whether having information about energy efficiency at the point of home purchase is likely to lead to more energy-efficient homes — whether consumers are likely to act on the data provided.





With the understanding that a more-informed consumer can make better energy decisions, the market was surveyed for existing whole-home energy efficiency resources and rating systems. Consideration was given to consumer acceptance, ratings standardization, impacts on the real estate processes, adoption incentives, implementation speed and costs and benefits. The report frames the issues, assessing both opportunities and limitations, and provides key findings for consideration.



Study Overview

With 7.3 percent of the nation's housing units and about half a million residential real estate transactions a year in Texas, even small gains in home energy efficiency could result in sizeable energy savings.²⁴

But what is the potential energy costs savings for consumers? What resources are available to empower consumers with actionable information that can help reduce home energy use? What tools can consumers use to calculate energy costs and savings when evaluating a home for purchase or before making efficiency upgrades?

Home Energy Efficiency Benefits for Consumers

Buying a home can be a stressful process. The information overload can be overwhelming. But do consumers have the right information at the right time to make the right decision? The home's location, price and square footage are typically the key decision drivers. Few home buyers consider, or have access to, the home's energy efficiency rating or its impact on lifetime operating costs and resale value.

As energy costs escalate, and as concerns for national energy security and the environment heighten, consumer awareness is changing.

Research indicates consumers will invest in energy efficiency home upgrades when:

- (1) energy costs are perceived as a long-term, burdensome problem;
- (2) costs, return and payback periods can be estimated;
- (3) income is sufficient; and
- (4) a credible source of advice on the most cost-effective improvements is available.²⁵

According to the U.S. Department of Energy, in addition to the benefits of resource conservation and emissions reductions, many households can save 20 to 30 percent on their home energy bills by implementing energy efficiency solutions.²⁶

With the 2006 average monthly bill for residential electricity in Texas at \$149.29, 56 percent higher than the national average, an efficiency gain of the minimum average projection of 20 percent at 2006 rates represents a \$29.86 monthly savings for electricity alone.²⁷

With the typical home ownership period of five to seven years, that \$29.86 monthly savings realistically represents a savings to consumers of \$1,791 to \$2,507 over that period if just 20 percent efficiency is gained, more if 30 percent savings is realized.²⁸ With 87 percent of the state's 6.3 million homes valued at \$200,000 or less, that savings can make a big difference for Texas families.²⁹

In 2006, Texas had a total of 8.1 million occupied housing units, with 68 percent being single-unit structures, 24 percent multi-unit structures and 8 percent mobile homes.³⁰ Electricity cost savings for the more than 5.5 million single-family household units in Texas with a 20 percent gain would exceed \$1.9 billion an-

Energy efficiency is an energy resource. And a more-informed consumer is empowered to make better energy decisions when evaluating homes for purchase and efficiency upgrades.



nually, for \$9.8 billion in savings over five years or more than \$13.7 billion over seven years.³¹

These figures do not include savings for mobile homes or multi-family units, savings on other utilities or potential tax credits available for some specific improvements. And savings would be offset by the cost of any improvements or upgrades with varying payback periods.

While recently constructed homes benefit from more stringent code requirements for energy efficiency, 69 percent of Texas homes were built prior to 1990. Potential savings for these homes would be higher than the average.³²

Home Energy Efficiency Benefits for the State

Energy production and consumption affect the environment. A typical household, for example, contributes twice the amount of greenhouse gases to the environment as an average car.³⁴

Efficiency plays a role in meeting emission standards for the state by reducing per capita energy use. And in light of a rapidly growing demand for power, higher energy prices and increased awareness of environmental and energy availability concerns, the concept of doing more with less offers an approach that is both feasible and affordable.

CHARACTERISTICS OF HOME BUYERS

According to research by the National Association of Realtors:

- The typical home buyer is 39 years old; the typical repeat buyer, 46.
- The 2006 median household income of buyers was \$74,000; repeat buyers, \$85,700.
- Buyers typically plan to stay in their home for 10 years, but average tenure is five to seven years.
- Eighty-four percent of home buyers used the Internet to search for homes.
- The typical home buyer searched for eight weeks and viewed 10 homes.³³

Consumers will invest in efficiency upgrades when energy costs are perceived as a burden; when the cost, return and payback period can be estimated; when income is sufficient; and when a credible source of advice is available.

Efficiency improvements can be considered as investments with upfront costs and some level of return in cost savings or avoided costs for added capacity. While investments in increased energy efficiency produce subtle and diffuse benefits, spread out among millions of consumers, those results are quantifiable and justify the promotion of energy efficiency policies, tools and education.

Efficiency gains have already made a strong impact on Texas' energy use. Per capita energy use in Texas has declined in recent years as prices have climbed.³⁵ Furthermore, our energy "intensity," a measure of the amount of energy required to produce each dollar of economic output, has been in steady decline for more than 30 years.³⁶ These are indications that Texas has already benefited substantially from efficiency improvements, a trend that is likely to continue.

Energy efficiency can provide Texas with the opportunity to minimize emissions, save on consumer energy costs and further reduce per capita energy demand, protecting Texas' leadership role as one of the most housing-affordable, livable and high-growth states in the nation.³⁷



And while overall consumer confidence across the nation is weak, the Texas index is the highest in the nation.³⁸

Home Energy Evaluation Tools³⁹

Home energy evaluation tools fall into two basic categories: Do-it-yourself energy evaluation systems designed for consumer use, and more extensive home energy audits performed by trained and certified energy rating professionals. Professional energy audits may qualify homes as Energy Star and/or certified for low-interest loans, Energy Efficiency Mortgages (EEMs), Energy Improvements Mortgages (EIMs) tax credits and other incentives.

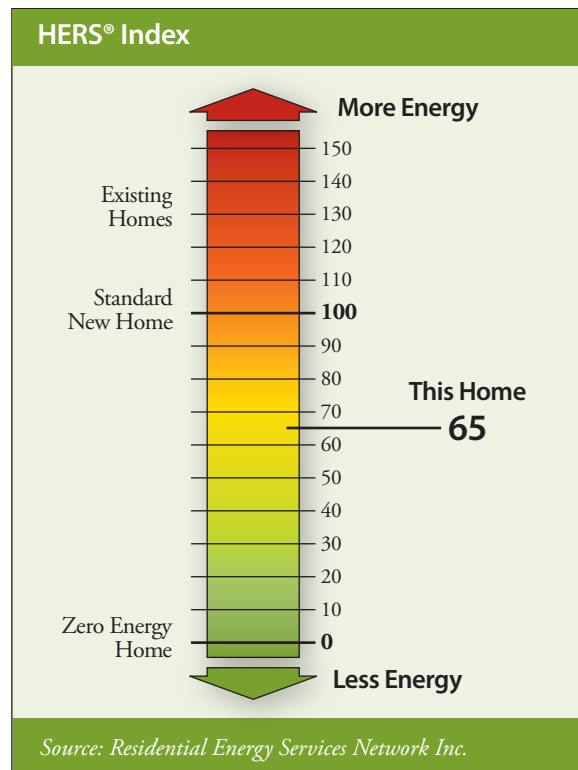
These systems vary further in applicability to existing homes versus new construction. In addition to the fees paid, if any, the value of the energy rating varies based on the quality of the data input, the specificity to the region and climate zone, and the depth of prescriptive information provided.

To meet the specific needs of Texas homeowners and provide a standardized objective system for comparing home energy efficiency across the state for both new and existing construction, the committee identified two home energy evaluation systems that are considered viable for rapid, low-cost implementation: The Home Energy Rating System (HERS) offered by the Residential Energy Services Network, and a system being developed by the Energy Systems Laboratory (ESL) of the Texas Engineering Experiment Station, Texas A&M University System. Other rating tools may be available at a later date.

HERS Index

For a home to earn Energy Star certification, it must be tested for energy efficiency using the Home Energy Rating System (HERS). The resulting HERS Index is an objective and standardized measurement of how much energy a home uses. Homeowners can use the HERS energy rating to evaluate and pinpoint specific, cost-effective improvements. And home buyers can easily compare the energy performance of HERS-rated homes being considered for purchase.

A HERS rating assigned prior to construction or improvement is called a “projected” rating. A “confirmed” rating is assigned using data gathered from an on-site inspection of the home. The energy rater reviews the home’s energy characteristics, such as insulation levels, window efficiency, wall-to-window ratios, heating and cooling system ef-





efficiency, the solar orientation of the home and the water heating system. Performance testing, such as a blower door tests for air leakage and duct leakage, is usually part of the confirmed rating.

In existing homes, inspectors trained and certified by the Residential Energy Services Network conduct the energy audits. The data gathered by the professional rater for a comprehensive HERS energy audit is entered into a proprietary modeling program and translated into a rating score. The home receives an energy usage score, or index, between zero and infinity; the lower the number the better. A home with a score of zero uses no “net energy,” which means it produces as much energy as it uses (through solar panels, for example). A “standard new home” benchmark score is 100. Most existing Texas homes will fall between 150 and 225 on the HERS Index.

An estimate of the home’s energy costs also is provided, and a typical HERS report includes a spreadsheet or “audit” listing the current rating of the home and a number of available energy upgrade alternatives. For each alternative, the spreadsheet calculates a change in the energy rating, the cost of the upgrade, the estimated payback period and a number of other details.

Though costs and the availability of professional energy raters vary across the state, this comprehensive energy audit requires two to four hours to complete with a typical cost of \$500 to \$750.

Two other levels of energy audits are available from HERS raters with costs and services varying again by location.

A simple “clipboard audit,” similar to what a utility company might conduct, takes 30 to 45 minutes to complete with a typical cost of \$75 to \$120. This basic audit tells the homeowner “where the home is today” — how much insulation is present and what types of windows are installed, etc. There are no diagnostic tests performed. The audit does not make any recommendations nor provide costs for energy efficiency upgrades.

A supplementary component can be added to the clipboard audit requiring another 45 minutes to 1.5 hours to complete. Diagnostic blower-door or duct tests measure the actual energy performance of the home. The

THE TEXAS ADVANTAGE

Texas is known as a great place to live and work, with a business-friendly attitude and a cost of living among the nation’s lowest. And a big component of our low cost of living is a healthy and affordable housing market.

- According to the Census Bureau’s 2006 American Community Survey, among the 10 most populous states Texas had the lowest median cost — \$114,000 — about one-fifth of California’s price and a little more than one-third of New York’s.
- Despite phenomenal growth, both Austin and Dallas appeared in Forbes magazine’s 2007 ranking of the nation’s 10 most affordable metro-area housing markets.
- A November 2007 Coldwell Banker study concluded that Texas had three of the 10 most affordable housing markets, more than any other state.
- Lower housing costs translate to a lower cost of living for you and your family. According to the Missouri Economic Research and Information Center, Texas had the fourth-lowest cost of living among states in the first quarter of 2008.
- And most recently, Texas dominated Forbes magazine’s July 2008 list of Ten Best Cities to Buy a Home, nabbing four spots: Houston ranked first, Austin second, San Antonio fifth and Dallas sixth.⁴⁰



HOUSING HEALTH CHECKUP

Texas is weathering the national real estate crunch. The state has avoided the boom-and-bust cycle experienced in other states, racking up solid and lasting gains in value.

- While permit totals for new Texas single-family homes fell by 31 percent over the last year (June 2007 to June 2008), the estimated mean average value of those permits rose by 7 percent.
- Prices of Texas' existing homes held steady. Sales are slowing, but not as much as for the nation as a whole. In the 12 months ending in June 2008, total Texas sales of existing homes fell off by 12 percent, versus a national 17 percent decline.
- As of June 2008, Texas permits for multi-family units had risen by 9 percent total over the year as compared with totals for the preceding year.
- The Texas foreclosure rate has remained stable for the last three years. As of June 2008, the Texas rate was one in every 891 homes. Comparable rates in other states include Nevada's one in 106; California's one in 182; and Arizona's one in 195.
- Texas is avoiding the worst effects of the nationwide mortgage crisis. A May 2008 study by Realtytrac, a nationwide property information service, found Texas was one of just seven states — and the only one of the 10 most populous states — that saw a decrease in foreclosure activity in the year ending in April 2008. Over that time period, foreclosure filings across the nation rose by nearly 65 percent.

typical cost is another \$150 to \$250. Again, no recommendations are made nor costs projected for energy efficiency upgrades.

ESL System

Texas A&M University Energy Systems Laboratory's proposed home energy evaluation system offers an objective, accurate and adequate energy evaluation alternative for consumers at a low cost. With a state-recognized and developed energy efficiency evaluation tool, homeowners and home buyers will be able to compare homes at the time of sale.

The proposed Energy System Laboratory (ESL) system is based on existing technology created by ESL to calculate emissions reductions for residential code compliance for new construction in Texas. By combining the emissions calculator with the previously described HERS system, this calculator has already been adapted in partnership with the city of Austin for use as a professional energy efficiency certification tool. ESL estimates that with a few modifications to further adapt the tool for use with existing as well as new homes, they could create a consumer accessible, Web-based interface, with simplified data fields to match basic homeowner knowledge. ESL could create a registry of completed evaluations or ratings by adding a database function.

The online ESL tool would allow a homeowner or home buyer (or their realtor) to enter the necessary parameters for the home or potential home(s) and receive an energy comparison score. This score is not a rating in the true definition of the word but an estimated energy use per square foot. The fields will have assumptions that will allow for a "score" based on whatever the homeowner enters, even if they don't have all of the information requested. This would compare one house with another, objectively, taking all behavioral differences out of the equation.



As a Web-based offering, the ESL system could be utilized at any time, allowing for real-time assessments of a home's efficiency. This would also provide homeowners with "what-if" suggestions for specific energy efficiency upgrades with demonstrated values and links to available incentives or rebates. But unlike the HERS Index, the ESL tool would not calculate the cost of energy upgrades or the estimated payback period. However, developing an educational piece would be the key to encouraging homeowners and buyers to choose to invest in efficiency.

The proposed system could be developed to produce a number of different products, such as a "Home Energy Score" certificate to be included with the homeowner's disclosure at time of sale. The certificate could include a list of options for upgrades, specifically based on their input. For those who may not have the knowledge required or access to a computer for online service, realtors, inspectors, builders or energy service providers could assist the consumer with a home energy evaluation, with little or no additional education or training.

ESL could provide crosschecking, software maintenance, updates and server support for this system, assuming funding could come via a user-fee cost-recovery model and/or other funding source(s).

Other Systems

The Environmental Protection Agency (EPA) and the U.S. Department of Energy also offer two online tools for consumers. The Energy Star Home Energy Yardstick compares monthly or annual utility costs, which are input by the homeowner, with other homes across the country. The Energy Star Home Advisor provides general energy efficiency suggestions based only on energy types used and ZIP code location.⁴¹

For a newly constructed home to earn the official Energy Star designation, the home must meet strict guidelines for energy efficiency set by the EPA and be rated using the HERS system. These homes are at least 15 percent more energy efficient than homes built to the 2004 International Residential Code.⁴²

Some utility companies provide various types of energy audits, including HERS ratings, to help consumers qualify for rebates and low-interest loans on whole-home, select systems and appliance upgrades. Promoted typically through utility statement stuffers, response and participation rates vary. Austin Energy's Home Performance with Energy Star program has grown yearly with a 64 percent increase in participating households in 2007 compared to 2004. Consumer demand is also credited for this year's 30 percent increase in the number of HVAC contractors enrolled.⁴³

Consumers must independently research options for incentives and rebates. Although North Carolina State University maintains a national database of state, local, utility and federal incentives for renewable energy and energy efficiency, no other central repository of Texas-specific information exists.⁴⁴

Procedures⁴⁵

While a more-informed consumer might make better energy decisions, particularly as energy costs escalate, requiring an energy rating on a home six months prior to sale may be impractical. However, real-time rating systems may offer a better solution.



For new homes, the construction period is often less than six months. An energy rating six months prior to sale would be a projection based on plans and specifications, not on the finished product. Additionally, mandatory inspections of new homes are required for energy code compliance per the 77th Texas Legislature's Senate Bill 5 (SB 5), which amended Chapter 388 of the Texas Health and Safety Code. This requirement should ensure new homes in Texas are constructed in an energy-efficient manner.

For existing homes, there is no consistency in the length of residential listings or in the length of the buying or selling decision process. Job transfers, family obligations and other life circumstances are not always predictable. Requiring an energy rating on an existing home six months prior to sale is impractical.

Rating tools such as the model proposed by ESL will allow ratings to be generated at any time based on buyer market demand. These real-time ratings may provide the most reliable information as technological changes over time could revise requirements to attain a particular rating. For example, a home with an energy efficiency score acquired in 2010 might register a different score in 2015, even if no changes were made to the home. Accordingly, the potential home buyer should consider the amount of time that has elapsed since the rating was assigned. An energy efficiency rating older than four years is deemed invalid for comparison purposes.

Incentives⁴⁷

Mandatory Rating

If the state were to mandate home energy ratings, incentives would not be as necessary to promote adoption. However, a mandatory energy rating on all homes requires, at a minimum, compliance enforcement, education and licensing to certify inspectors and raters on the selected rating system, added costs for homeowners and a multi-year implementation period.

With the SB 5 amendment to the Texas Health and Safety Code, the Legislature determined an effective building energy code was essential to controlling energy costs. For new construction of single-family residences, the state adopted the energy efficiency chapter of the International Residential Code as it existed on May 1, 2001. For all other residential construction, the International Energy Conservation Code was adopted. While not a mandatory energy rating, this legislation ensures all new residential construction in the state conforms to the adopted energy code.

ENERGY SAVINGS IN THE NEWS

The Austin Energy Refrigerator Recycling Program, the first in Texas and one of only about two dozen programs nationwide, reached a major milestone six months ahead of schedule: the recycling of its 10,000th appliance. And at the current pace, the program can expect to reach the 20,000-unit mark in another three years — a year earlier than originally projected.

Recycling 10,000 units has prevented the generation of 9.2 million kilowatt-hours (kWh) of electricity, enough energy to power almost 800 average homes for a year. For Austin Energy customers turning in the units, the reduced energy usage translates into \$830,000 of savings on their electric bills. Participating customers receive a \$50 rebate.

Source: Austin Energy, News Release, May 7, 2008.⁴⁶



As previously noted, with 69 percent of Texas homes built before 1990, and an estimated 500,000 residential transactions each year, plus Texas' diverse economic conditions and population density variances, the establishment of a mandatory home energy rating system on new and existing homes would be difficult to implement.

A mandatory rating of all new and existing real property before the time of sale, with a certification of values and results, also would require a decision concerning the appropriate party to gather data. Access to qualified raters, depending upon the location of the property, could be costly to acquire.

The listing real estate agent with on-site access to the home could enter the required data following training on the proposed, more basic rating tool. Certifying the information, however, may increase the agent's liability if the data was not entered correctly or if the home did not "perform" as estimated. Real estate agents may also reject the idea since home energy efficiency is not their area of expertise. Additionally, new homes and for-sale-by owner transactions are frequently carried out without the use of a real estate agent.

The homeowner or seller could enter the information into the proposed rating system. This may create a conflict of interest with no one to validate the accuracy of the information entered. In addition, there is the probability that some homeowners will not have the knowledge or computer equipment to utilize the rating tool.

Alternatively, licensed real estate inspectors could certify energy ratings using either proposed system. However, while many home sales are predicated on a home inspection generally paid for by the home buyer, energy efficiency is not currently an area of expertise for many inspectors. Additional training on either system could be made available to the home inspectors, but additional compensation — less for the ESL model, more for the detailed HERS — would be expected for the additional inspection duties performed. Home inspectors may reject the idea if compensation is not sufficient to cover time, training and increased liability and insurance costs.

According to the national Residential Energy Services Network, there were almost no professional energy raters in Texas before the passage of SB 5 in 2001. Today just less than 50 certified energy rating providers are listed on the network's directory for the state. Outside of code-required energy inspections, consumer demand is not yet high.

Using professional energy raters and/or certified home inspectors to certify the estimated 500,000 homes sold each year in Texas would require a minimum of 500 fulltime field inspectors working at full capacity. This is assuming a two-hour inspection, with four inspections per day, five days a week and 50 weeks per year, to conduct 1,000 inspections each per year. A more reasonable number may be 1,000 inspectors with a two-year ramp-up period for training. The homeowner would pay the costs for the professional energy rating.

California, Nevada, New Jersey, New Mexico and Massachusetts are considering legislation that would mandate that homes receive an energy rating at the time of sale. Currently, no state has such a law.

Voluntary Rating and Market-Force Incentives

Under a voluntary energy rating system, market forces can drive participation. Higher utility costs create an incentive for homeowners to consider energy efficiency upgrades to reduce their utility bills or potentially increase the resale value of their home.



Though not supported by reality in today's Texas real estate marketplace, research suggests home values increase \$11 to \$21 for every dollar saved in annual utility expenditures due to energy efficiency features.⁴⁸

Those same studies propose the following:

- The rational home buyer should be willing to pay more for an energy-efficient home. While home buyers are not likely to make present-value calculations, they may look at average utility bills before buying a home. As long as the reduction in monthly utility bills is greater than any after-tax increase in the monthly mortgage payment, the homeowner would enjoy a positive cash flow.⁴⁹
- The homeowner should expect to recover a portion of their investment in energy efficiency when they sell the home. The appraised value, also known as market value or "value-in-exchange" based on what the next buyer will pay, of energy-efficient homes could understate the actual resale value if the comparables used in the appraisal do not reflect the value of a cost-effective energy efficiency investment.⁵⁰
- Owners of a more energy-efficient home should benefit from both increased value-in-exchange at resale and increased "value-in-use" through lowered utility bills.⁵¹

However, many homeowners and even builders have been hesitant to invest in energy efficiency fearing added costs cannot be recaptured. As noted previously, research shows homeowners' decisions to invest in energy efficiency upgrades hinges on four key factors, including rising and burdensome energy costs, the ability to estimate a return on investment, sufficient income and credible sources of information on cost-effective improvements.⁵²

During the early 1970s energy crisis, consumers first cut back on consumption to produce quick energy savings without spending any money on upgrades. By lowering thermostats and cutting back on appliance use, consumers chose a reduction in living standard over an investment in energy efficiency.

In a 1983 study, consumers were asked to state the maximum amount of time they would be willing to wait to recover an investment in energy efficiency. Those with less than \$10,000 in income were willing to wait six months for a \$100 investment and up to 18 months for a \$500 investment. Those making more than \$10,000 per year were willing to wait 18 months and up to four-and-a-half years to recoup those same dollar amounts.⁵³

A 2006 follow-up study reports similar findings: The cost of home energy has a limited impact on energy efficiency retrofits, and these efficiency investments tend to occur years after price increases in home energy. This confirms high utility bills must be perceived as a long-term and burdensome problem.⁵⁴

Though market forces felt through higher utility costs are one incentive for increased energy efficiency and increased use of energy ratings, higher energy costs are not sufficient by themselves to motivate homeowners to act. Other incentives and consumer education may be required to drive demand.

Other Incentives

Incentives for voluntary energy efficiency ratings and improvements might include the following:



- State, county and local taxing entities (includes school districts) could exclude the cost of documented energy conservation measures for new construction, renovations and remodels in the property tax appraisal of one- and two-family dwellings. This tax credit could remain with the original owner until the dwelling is sold or title is transferred.
- County and local government jurisdictions could discount or waive building permit and inspection fees on energy conservation work of \$10,000 or more in existing one- and two-family dwellings that is completed by registered builders and remodelers. Energy-related landscaping improvements could also be included in this amount.
- Power companies could provide a special rate or a credit on utility bills where evidence indicates at least a 15 percent reduction in energy consumption after a one- or two-family dwelling has undergone energy-saving renovations of \$10,000 or more.
- The state could waive state/local sales tax on the purchase of any materials associated with new construction or energy-saving renovation work. This could include the purchase of equipment directly related to energy conservation and used by registered builders or remodelers.
- The state could promote an annual tax-free day on the purchase of materials, service or labor associated with any new construction or renovation work directly involving or related to energy conservation. This could apply to all consumers, not just builders and remodelers.

Real Estate Disclosures⁵⁵

There are more than 400 Multiple Listing Services (MLS) across the country. Their geographic area of coverage varies widely and may include a portion of one state, one whole state or parts of a number of states.

A phone survey was conducted of MLS systems and/or real estate brokers in 30 states to determine whether MLS systems outside of Texas include a field for an energy rating in the property listings. Though the sample size is less than 10 percent, a number of respondents represented the largest systems.

A Dedicated Field for an Energy Rating

Alaska and Washington are the only two states with a dedicated field for an energy rating, when available, for both new and existing homes. Neither state, however, mandates that a home energy rating be entered. Alaska appears to more heavily promote increased residential energy efficiency; building consumer awareness in the state has driven homeowner investments in energy-saving home improvements.

Colorado listed energy ratings around 1995, but the reporting was discontinued in 2004 due to lack of interest. The state encouraged sellers to obtain an energy rating on the assumption it would aid in the marketing of a home. Few raters were available to conduct energy ratings at the time. Sellers considered the \$150 energy-efficiency inspection fee as too high, because buyers rarely considered the energy rating in their decision to purchase. This bias may have stemmed from real estate agents who did not understand the rating system and rarely used it to market a property. Further, Colorado had no checks in place to verify rating accuracy or completion.



History of Past Utility Bills

None of the respondents reported any history of past utility bills in MLS listings. Systems in Colorado and Wyoming reserve a field for a “monthly average” over the last 12 months, if known. Utah, meanwhile, reserves fields for the reporting of the highest and lowest utility bills during the previous 12 months.

A variety of reasons were given for not listing historical utility bills:

- (1) Concern the numeric values could be entered into the MLS listing incorrectly, resulting in an error in disclosure that could result in a lawsuit against the real estate agent;
- (2) State disclosure laws or utility company guidelines prohibiting or restricting parties other than homeowners from obtaining such information;
- (3) A lack of interest by real estate agents due to their belief that potential buyers rarely consider utility costs when making a decision to buy a home; and
- (4) A desire by some real estate agents to draw attention away from utility costs if they are high.

Check Boxes

Oregon and Washington offer “check boxes” for newly constructed homes with Energy Star or “green” certifications. Use is not widespread since the checkboxes were added to the MLS listings one year ago. Many real estate agents and consumers are still largely uneducated about the benefits of energy efficiency, although a two-day training program offered by a private Oregon firm for real estate agents, inspectors and appraisers for certification as an “Earth Advantage S.T.A.R. Accredited Professional” is gaining in popularity.

General Energy Features

Seven MLS systems reported offering check boxes or extra fields for energy-related features such as the amount of insulation, type of windows and presence of solar hot water systems. However the specific features listed in each state differ substantially; there is little conformity across MLS systems. The seven states include Arizona, Arkansas, Hawaii, Indiana, Louisiana, Minnesota and Oregon.

Virtually all MLS systems reported energy efficiency features may be entered in the “Remarks” section of the listing.

Changes

MLS providers typically answer to local or state realtor associations. If associations want a field to be added for an energy rating, a request can be made to the MLS provider. Real estate agents and home buyers currently give energy ratings little consideration in the home purchase process. If entering an energy rating in a MLS listing is not a requirement, little participation should be expected unless this information is driven by consumer request and takes on increasing importance in home buying decisions.

Energy Efficiency Mortgages⁵⁶

Initially, energy efficient mortgage (EEM) qualifying ratio “stretches” found a niche in the new home construction market as builders realized they could qualify more buyers for their code-compliant and, therefore,



already energy-efficient homes. Energy improvements mortgages (EIMs) were less successful, largely due to the problem of appraisal value.

As originally developed by Freddie Mac and Fannie Mae, energy improvements of up to 5 percent of a home loan's value were allowed to be added into a borrower's loan if the improvements could be justified in the appraiser's market value "comparable sales" analysis. If appraisers did not have adequate market data, they used a "present value" calculation of the projected energy savings from the retrofit.

Two major difficulties with this initial approach made it almost impossible for buyers to add energy improvements into their loans.

First, since there was no way to compare the relative benefits of one home's energy package with another, appraisers could not evaluate whether a buyer's proposed energy improvements would have the same or similar resale value.

Appraisers asked to evaluate the benefits of such improvements generally gave them little or no value. For example, a home buyer wanting to add \$3,000 worth of improvements and pay for them over the life of a mortgage might have to pay this amount "out-of-pocket" once the costs of the improvements were evaluated by the appraiser.

Second, while appraisers were allowed to calculate and add the present value of the savings to the mortgage, the market generally did not recognize the extra costs to appraisers in time and money to do this work. Even appraisers who wished to help a prospective buyer by doing the analysis found it difficult to recover their costs.

These barriers resulted in EIMs being used only rarely, although the states of Alaska and Vermont had innovative programs that fully integrated EIMs into their state Housing Finance Agency (HFA) lending programs. These HFAs built requirements for energy ratings into their existing lending programs to spur demand for ratings. Equally important, they created an awareness within the appraisal community of the need to use the energy rating data in their "comparable sales" analysis.

Research in Alaska has shown voluntary consumer investment in energy efficiency improvements has outpaced the cost of establishing and maintaining Alaska's program by an eight-to-one margin because homeowners, provided with clear information about their home's energy efficiency status and potential for improvement, have proved willing to invest in energy savings and comfort.

Fannie Mae and Freddie Mac Energy Efficient Mortgage Programs

Freddie Mac is effectively out of the EEM business. Fannie Mae reported handling an average of 61 energy efficient loans annually from 2005 to 2007.

VA Energy Efficient Mortgage Program

The Department of Veterans Affairs' (VA) national EIM program allows energy improvements of up to \$6,000 to be added to the mortgage loan without requiring an appraisal of the energy features. The VA program was used as the model for the Energy Policy Act of 1992 and the Housing Authorization Bill, which required the Federal Housing Administration to develop an EEM/EIM program using somewhat similar features.



The VA's EEM is available to qualified military personnel, reservists and veterans for energy improvements when purchasing an existing home. No origination numbers are available for this EEM program.

FHA Energy Efficient Mortgage Program

The subprime meltdown, recent troubles at Fannie Mae and Freddie Mac, and FHA's attractive down-payment requirements have all led to a renewed interest in FHA loans. That interest has not carried over to their EEM products.

FHA EEMs have been available in all 50 states for more than a decade. Only 441 FHA-insured EEMs, however, were originated in the United States in 2005. This had increased to 1,066 by 2007.

The Housing and Economic Recovery Act of 2008 (HR3221), passed by Congress in July 2008, includes a provision to stimulate further usage of FHA's energy efficient mortgages. The details, found in Section 2123 of the bill, primarily address increases in the amount of money FHA can loan for energy efficiency improvements to an existing home. The previous cap was \$8,000. The new legislation raises the cap to a flat 5 percent of the maximum allowable FHA mortgage in the specified region.

Conventional Lenders Have Shown Some Interest in Energy Efficient Mortgages

There has been some recent press about conventional lenders offering a number of consumer incentives for green or energy efficient mortgages. A Sept. 12, 2007, article in *The Wall Street Journal* outlined the following details:

- Citigroup Inc.'s mortgage division is offering \$1,000 off closing costs on energy efficient mortgages.
- Bank of America Corp. is offering \$1,000 off closing fees for Energy Star qualified homes.
- JPMorgan Chase & Co.'s mortgage division is offering \$500 off closing costs for homes insulated with a high-efficiency spray foam insulation.
- Indigo Financial Group allows consumers to borrow more to finance energy efficiency upgrades.

Many lenders believe the energy efficient mortgage products offered today are too much trouble, considering the amount of extra time and effort it takes to originate them, for which they receive no added compensation. Lenders are often responsible for handling the additional energy efficiency funds while making sure all repairs and improvements are carried out within mandated time constraints.

Mortgage insurance companies are driving the decisions on mortgages now via debt-to-income ratios. Encouraging EEMs could be difficult in the short term given the current crisis in the financial market; however, future potential does exist.

To revitalize EEMs, it will be necessary to encourage FNMA and others to re-engage in the practice of offering mortgage incentives for energy savings and encourage local governments to exempt energy efficient improvements to homes.



Consumer Awareness⁵⁷

The Housing and Economic Recovery Act of 2008 (HR 3221), passed by Congress in July 2008, includes a provision directing Federal agencies to:

- (1) identify barriers preventing widespread adoption of energy efficient mortgages;
- (2) give recommendations to Congress to alleviate obstacles if found; and
- (3) authorize a public education and marketing campaign for energy efficient mortgages.

The details can be found in Section 2902 of the bill.

Where to Focus Public Awareness Efforts

Energy ratings and EEMs have existed for years and the public is still largely unaware of their (previous or current) existence. The critical questions may be:

- (1) Would it be more effective for home buyers to put pressure on real estate agents and lenders to promote energy ratings and energy efficient mortgages as important elements in the sales transaction?

Alternative home construction techniques have gained popularity through this ground-up approach. In addition to stick-built homes, more home buyers are demanding builders provide them with options such as insulated concrete forms, structural insulated panels, steel-framed homes and straw-bale construction. Builders are being forced to learn new building techniques to satisfy the customer. If this is the best approach, home buyers must first be targeted in a public awareness campaign.

- (2) Would it be more effective to first sell real estate agents and lenders on the benefits of EEMS and energy ratings via some educational process — for example, mandatory MCE courses — and then expect them to advocate their use to home buyers?

This top-down method was used in the promotion of alternative mortgage products until the 2007 credit crunch occurred. Real estate agents and lenders were more than happy to promote a mortgage product that qualified more people and closed more deals. Their motivation was increased transactions, leading to increased income.

If this is the best approach to public awareness, agents and lenders must be provided with an incentive to promote the ratings and EEMs to home buyers.

If energy efficient mortgages were widely used, increased familiarity with energy ratings should be expected as well, since EEMs require an energy audit — which contain a HERS or similar energy rating — to estimate the dollar amount of energy savings.

Whether a top-down or bottom-up strategy is employed to increase voluntary adoption of a home energy efficiency rating system and demand for EEM/EIM products, investments in public awareness will be required and potentially improved with incentives as proposed earlier in this report.



Marketing Home Energy Efficiency Ratings and Mortgages

The success of implementing a voluntary home energy efficiency rating system relies on a successful outreach and education campaign to promote the value of energy efficiency upgrades. Awareness and education are powerful tools to drive demand. To maximize voluntary adoption rates, the campaign must target each of the stakeholder groups: home buyers and home sellers; lenders and real estate professionals; and utility providers and home improvement retailers. The most critical audience for an immediate impact on market demand is consumers.

Effective components of this outreach and education effort could include the following:

Creating a high-profile Texas brand for home energy efficiency in Texas to use on all public awareness materials. This brand could also be used to spotlight energy efficiency rating scores of homes for sale as an add-on to the “For Sale” signage, similar to the fuel efficiency ratings posted on cars for sale.

Building a comprehensive Web site to promote home energy efficiency with Texas-specific information, tips and resources. The site address would be featured on all public awareness materials, and would include direct and high-profile links to the proposed ESL rating system to put the power directly into consumers’ hands to determine energy efficiency scores. The site would also provide a database linking to utility-provided rebates and incentives available throughout the state.

Partnering with realtors and lenders to raise awareness of EEMs, EIMs and other incentive programs for home energy efficiency. Developing consumer-friendly materials could provide new customers with helpful information such as “10 Features to Look for in an Energy Efficient Home.” Additional materials could be sent with mortgage applications.

GREEN BUILDING IN THE NEWS

Sixty-nine percent of homes in Texas were built prior to 1990.⁵⁸ That means the majority of the home inventory was built before today’s more-stringent building code standards for energy efficiency. However, an increasing number of new homes being built today use green-building technology to conserve resources and save homeowners on energy costs.

- **Austin Green Builder Wins Affordable Home Award:** Green Builders Inc. has been selected as the 2008 Single Family Affordable Home of the Year by the National Association of Home Builders for their homes, priced beginning in the \$180,000s, which incorporate energy efficiency, resource conservation, sustainable and/or recycled materials, and indoor air quality control.
Source: Green Builders Inc, News Release, May 12, 2008.
- **“Green” Is New Building Standard In Dallas:** The Dallas City Council today unanimously adopted a green construction ordinance which aims to reduce energy and water consumption in all new houses and commercial buildings constructed in the city.
Source: City of Dallas, News Release, April 9, 2008.
- **National Green Building Program Open For Business:** The National Association of Home Builders today launched the NAHB National Green Building Program featuring a dynamic online scoring tool which shows the builder how to accrue points in seven categories including water, energy and resource efficiency.
Source: NAHB, News Release, Feb. 14, 2008.
- **Texas One of 15 States Leading the Nation in Energy Star Homes:** In 15 states, more than 12 percent of new homes are meeting Energy Star standards. These homes have locked in annual savings of more than \$180 million for homeowners.
Source: Environmental Protection Agency, News Release, July 12, 2007.⁵⁹



Partnering with home improvement retail stores to offer rebates and incentives for energy efficient upgrades and consumer education. The home energy efficiency brand could be extended to mark shelves for energy efficiency upgrade materials to spotlight at the point-of-sale. Links to efficiency calculators and the proposed ESL rating system could be added to big-box retail Web sites as a resource.

Expanding the Energy Star tax-free weekend on Memorial Day to include materials for home energy efficiency upgrades.

Partnering with utility companies to produce bill inserts promoting the proposed ESL rating system, directing the public to go to the Web site to rate their home and conduct “what-if” scenarios for energy efficiency upgrades. Also, encouraging utility companies to provide a link from their Web site to a state educational Web site supporting energy efficient mortgages and energy ratings.

Leveraging the reach of home and garden television networks by partnering to produce content related to the value of energy efficiency in the home over the long-term. Provide success stories from Texas.

Inviting “Extreme Home Makeover” to do a show in Texas that focuses on energy efficiency as a key component for long-term savings.

Partnering with interior design magazines and do-it-yourself magazines to promote energy efficiency ratings and improvements. Provide links to the Texas home energy efficiency Web site as a resource for calculators, rating tools and tips.

Participating in builder shows and garden shows to distribute information and/or conduct seminars promoting the benefits of energy efficient mortgages and energy ratings.

Partnering with Texas home listing search engines and portals to promote the home energy efficiency Web site and rating tools to educate consumers about the value of seeking energy efficiency and to promote realtors as their partner in this effort.

Partnering with other state agencies and local governments in Texas that promote energy conservation directly to consumers or that help regulate lending and real estate transactions.

Impact

Introducing energy rating information into the marketplace regarding energy efficiency of residential real property should increase the average energy efficiency of residential real property in this state. Though there is some experiential data to quantify adoption rates or the expected increase, it is not sufficient to fully calculate the anticipated impact.

To launch a voluntary rating-based home energy efficiency program, no statutory changes are needed. However, the success of this program will require a focused and comprehensive outreach and education campaign to raise awareness on the long-term value of home energy efficiency, drive market forces and encourage stakeholders to take action for measurable results.



Additional Resources

HERS Index

Residential Energy Services Network

www.natresnet.org/

Environmental Protection Agency, U.S. Department of Energy

www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_HERS

ENERGY STAR

Environmental Protection Agency, U.S. Department of Energy

www.energystar.gov/

Energy Efficiency Mortgages

Environmental Protection Agency, U.S. Department of Energy

www.energystar.gov/index.cfm?c=bldrs_lenders_raters.energy_efficient_mortgage

Federal Housing Authority

www.fha.com/energy_efficient.cfm

Manufactured Housing Research Alliance

www.mbrahome.org/pages/es_lender.htm

ESL

Energy Systems Laboratory, Texas Engineering Experiment Station, Texas A&M University

<http://esl.eslwin.tamu.edu/>

Other

State Energy Conservation Office

www.seco.cpa.state.tx.us/

Texas Comptroller of Public Accounts

www.window.state.tx.us/

Texas A&M Real Estate Center

<http://recenter.tamu.edu/>

U.S. Energy Information Administration

www.eia.doe.gov/

Database of State Incentives for Renewables and Efficiency

www.dsireusa.org



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