



A bridge linking housing research and practice

Volume 3, number 3

Several Roads to Increased Energy Efficiency

Winter heating costs are forcing many Americans to look for ways to improve their homes' energy performance and reduce overall utility expenses. The average homeowner spends close to \$1,300 annually on utility bills, but an energy-efficient home can lower utility bills by 10 to 50 percent, depending on energy improvements and the local climate.

One mortgage loan option is helping homebuyers save energy, save money, and qualify for larger loans. Energy-efficient mortgages (EEMs)—or *green mortgages*—are available to Americans who buy new energy-efficient homes or upgrade existing homes. Borrowers can fold the cost of energy-efficient upgrades—replacement windows, high-efficiency appliances and furnaces, solar hot water heaters, and more—into the total EEM amount.



Energy-efficient upgrades can help homeowners significantly reduce their utility costs.

FHA's Energy-Efficient Mortgage Program

The energy-efficient mortgage program began as a Federal Housing Administration (FHA) pilot demonstration in five states in 1992. Expanded as a national program in 1995, FHA insured 26,600 EEMs in FY 2003 and the numbers appear to be increasing as more people learn about this mortgage option.

Eligible properties include 1- to 4-unit existing homes and new construction. Under Section 203(b) of the National Housing Act, borrowers can finance up to 97 percent of the cost and can fold closing costs and a mortgage insurance premium into the total mortgage. In addition:

- The energy-efficient improvements must be cost effective. The total improvement cost is less than the total present value of the energy saved over the useful life of the energy upgrade.
- The cost of energy-efficient improvements eligible for financing is the greater of \$4,000 or 5 percent of the property's value, not to exceed \$8,000.
- The cost of the energy improvements and estimate of energy savings must be determined by a home

contents

Abundance of Housing Data from HUD USER	3
Aging in Place: Obstacles and Solutions	4
Community Mapping Strengthens San Jose Neighborhood	6

Several Roads to Increased Energy Efficiency continued from page 1

energy rating report, performed by a home energy rating system (HERS) or other qualified energy consultant.

- The maximum mortgage amount for a single-family unit, adjusted annually, depends on its location. The cost of the energy-efficient improvements is added to the mortgage amount, which can exceed the maximum mortgage amount by the amount of the energy upgrades. Energy improvements are installed after the loan closes; money is placed in an escrow account by the lender and released to the borrower after the improvements are verified.

According to a study by the Joint Center for Housing Studies, taking into account the savings on monthly utility bills when determining how large a mortgage a household can afford, as many as 250,000 additional new homebuyers could qualify each year. An EEM used to purchase a new home, or to refinance an existing FHA loan, eliminates the need for borrowers to get a separate loan for energy improvements.

Additional EEM Options

The Energy Star mortgage is designed to encourage homebuyers to purchase homes certified by the federal Energy Star program. These homes are certified to be at least 30 percent more energy efficient in comparison to the 1993 National Model Energy Code standards, or 15 percent more efficient than required by the state energy code, whichever is the higher standard. It includes most features of an EEM, plus additional features such as closing cost discounts, interest rate discounts, or coverage of HERS ratings costs.



Energy-efficient appliances reduce energy usage and utility bills.

EEMs are also available from Fannie Mae. The Fannie Mae EEM program allows several approved energy rating methods and programs to evaluate a home's energy efficiency. The cost of improvements to an existing home is limited to 15 percent of its total cost. There is no limit on the cost of energy improvements for new construction.

Tax Credits and Rebates

The Energy Policy Act of 2005, signed in August by President Bush, offers tax credits on 2006 and 2007 tax returns to homeowners who make energy conservation improvements to their homes by adding energy-efficient windows or appliances. Many states offer a variety of state and local loan incentives for homeowners interested in energy-efficient upgrades and solar technology. To find current loan/tax credit programs in your state, visit the Database on State Incentives for Renewable Energy at www.dsireusa.org.

continued on page 5

How An Energy-Efficient Mortgage Works		
	Older Home	Same Home with Energy Improvements
Home price (90% mortgage, 8% interest)	\$150,000	\$154,816
Loan amount	\$135,000	\$139,334
Monthly payment*	\$991	\$1,023
Monthly energy bills	\$186	\$93
Total mortgage+energy	\$1,177	\$1,116
Monthly savings		\$61

** Estimated mortgage payments are based on principal and interest only, and do not include taxes and insurance. Value indicated here is for comparison only and will vary from home to home.*

Sure, the HUD USER website houses over 850 top-quality research publications, but did you know that we also offer a wealth of useful housing data? Visitors to the site's data section (www.huduser.org/datasets/pdrdatas.html) will find links to electronic data sets covering 17 unique subject areas. Let's take a brief look at several of these data sets—the American Housing Survey, Fair Market Rents, Geographic Information Systems, Low-Income Housing Tax Credit, and Comprehensive Market Analysis Reports—to see what you might have been missing.

American Housing Survey

American homes—in what condition are they? How large are they? What equipment and amenities do they typically contain? Why do Americans change homes and neighborhoods? How do they choose where they will live? What do Americans pay for housing, for utilities? How do they fuel their homes? You can learn about these and many other aspects of how and where we live from the American Housing Survey (AHS) (www.huduser.org/datasets/ahs.html).

This national survey is conducted for HUD every two years by the U.S. Census Bureau. The survey collects a wealth of information about homes in the U.S., including data on apartments, single-family homes, mobile homes, and vacant homes, as well as housing size, conditions, and costs. Survey results supply details such as the equipment, fuels, water supply, amenities, and deficiencies of housing units. Characteristics of the people living in these homes are described in terms of family composition, size and source of income, owner vs. renter status, and tenure. Neighborhood characteristics reflect street noise, traffic, crime and police protection, schools, public transportation, shopping facilities, security, community activities, recreational facilities, odors, trash and litter, and other relevant information.

Researchers can extract AHS data on a single metropolitan area or compare data from multiple areas. The survey results serve as the basis of a broad variety of longitudinal and cross-sectional studies. Recently, *Transportation Research* featured an article based on the use of AHS data to identify characteristics of SUV and light-truck commuters. Another recent application of AHS data is demonstrated in an article in *The Journal of Housing Economics*, which analyzes homeowners' 'own or rent' and 'move or stay' decisions.

Fair Market Rents

Fair Market Rents (FMRs) (www.huduser.org/datasets/fmr.html) are estimates made across a given housing market that provide a basis for determining the subsidies for rental housing under the Section 8 Housing Choice Voucher program. Each year, HUD estimates FMRs for all counties across the country. Landlords, real estate agencies, and Section 8 voucher program participants use these data. Others use FMRs to evaluate wage rates in particular labor markets.

Geographic Information System

HUD cooperates with the U.S. Department of Interior, U.S. Geological Survey, and Mexican agencies to provide a binational, Internet-based Geographic Information System (GIS) (www.huduser.org/datasets/gis.html) for four urban areas, paired sister cities straddling the U.S.–Mexican border: Eagle Pass, Texas, and Piedras Negras, Coahuila; El Paso, Texas, and Ciudad Juárez, Chihuahua; Douglas, Arizona, and Agua Prieta, Sonora; and Nogales, Arizona, and Nogales, Sonora. For each area, the GIS offers statistical and spatial analysis tools that enable planners and researchers to explore scenarios for future growth, estimate infrastructure development costs for disadvantaged neighborhoods, and access demographic data for growth modeling. Local organizations use the system to locate boundaries, parks, enterprise zones, police/fire/school/voting/irrigation/solid waste districts, and data they can use in preparing grant and loan applications for community projects.

Low-Income Housing Tax Credit

The Low-Income Housing Tax Credit (LIHTC) Database (www.huduser.org/datasets/lihtc.html) covers more than 22,000 low-income housing projects and nearly 1.1 million housing units placed in service between 1987 and 2002. It's the only complete source of information on individual LIHTC projects. The data include details on each low-income housing project, such as its construction or rehabilitation history and financing sources. It is especially useful to affordable housing, academic, and business researchers. Typical research published in the *Journal of the American Planning Association*, *Journal of Housing Economics*, *Housing Policy Debate*, *Hastings Law Journal*, and the *Industrial & Labor Relations Review* demonstrates the data's use in exploring the impact of LIHTCs on the

continued on page 7

From now until the year 2030, the number of Americans age 65 and over will increase from 12 to 20 percent of the population. Nine of ten older Americans regularly tell surveyors they wish to continue to age and live independently in their own homes. But, according to the Joint Center for Housing Studies (JCHS), most existing homes have *no* accommodations for the physical limitations associated with aging. Even so, aging in place seems feasible for a growing number of people. Older Americans are growing wealthier, healthier, staying active, and living longer. They also enjoy the benefits of advancing technology. These factors suggest that an increasing number of seniors will be able to age in place with the help of design changes and modifications to existing homes.

At the Center for Universal Design at North Carolina State University (NCSU), researchers are systematically identifying the physiological and behavioral changes that occur with aging, and are working to develop home modifications that accommodate changes in hearing, vision, the sense of smell, the sense of touch and dexterity, strength and range of motion, mobility and agility, balance and coordination, and cognition. Knowledge of human factors, such as those being advanced by researchers at NCSU, the State University of New York at Buffalo, the University of Southern California, and other research centers, is incorporated into an approach called 'universal design.' The principle underlying universal design is that products and

places can be designed so that anyone— young or old, disabled or not— can use them without the need for adaptation or customized design. This means that features like multi-level counters, walk-in showers, wide doors, no steps, and non-skid tiles could become commonplace in all new housing.

In the meantime, modifications to existing homes can go a long way toward enabling seniors to remain in their own homes. Some modifications are simple, while others are more complex and costly. All make the home environment safer and more comfortable for any inhabitant and certainly for the elderly person. *ResearchWorks* recently spoke with a local real estate agent and Seniors Real Estate Specialist, who reports that home modifications and the right financial strategies do lengthen the tenure of aging individuals in a conventional home by at least 10 to 15 years.

Responses to the expressed wishes of seniors to age in place are emerging across the spectrum of researchers, housing professionals, realtors, governments, and advocacy groups. For example, the American Association of Retired Persons and the National Association of Home Builders jointly train housing consultants, carpenters, builders, and remodelers as certified aging-in-place specialists (CAPS). Realtors are focusing on the senior market; over 12,500 now hold the Senior Real Estate Specialist designation and assist elders in the physical and financial adjustments necessary for aging in place. Remodelers are specializing in aging-in-place modification, repair, and maintenance services. Advocacy and governmental agencies offer technical assistance to communities for improving livability for older citizens, conduct consumer awareness/ education campaigns to promote proactive planning for future housing needs, provide checklists of aging-in-place modifications to consider when remodeling, and sponsor demonstration projects that incorporate universal design features.

Can Seniors Afford to Age in Place?

Wealth and income disparities mean that millions of aging Americans are unduly burdened by the cost of housing. It is sobering to see the 2003 American Housing Survey reveal a median annual income of \$25,633 (for owners) and \$13,831 (for renters) in the age 65 and over cohort. The housing cost-to-income ratio is, of course, lower for homeowners. A majority



Images courtesy of the NAHB Research Center, Upper Marlboro, MD.

Raising the height of a dishwasher enables seniors to load and unload dishes without undue back strain.

continued on page 5

Several Roads to Increased Energy Efficiency continued from page 2

The state of Maryland offers a 20-percent rebate or up to \$3,000 on the cost of a residential solar-electric (photovoltaic) system, and a 20-percent rebate or up to \$2,000 on the cost of a solar water heater. Wisconsin's Focus on Energy program offers zero-percent 10-year loans of up to \$20,000 to finance photovoltaic or wind power systems. Oregon offers a Residential Energy Tax Credit to residents who purchase premium-efficiency appliances, heating and cooling systems, duct systems, solar water and space heating systems, photovoltaics, wind power systems, and much more.

For more information about EEMs available from FHA, visit HUD's website at www.hud.gov/offices/hsg/sfh/eem/energy-r.cfm. Visit the Energy Star website at www.energystar.gov and search under New Homes Partner Locator to find lenders who offer Energy Star incentives. For more information about conventional EEMs, visit the Fannie Mae website at www.fanniemae.com/homebuyers/findamortgage/mortgages/energyefficient.jhtml?p=Find+a+Mortgage&ts=Mortgage+Solutions&t=By+Alphabetical+Listing. **HLI**

Energy-Efficiency for Manufactured Homes

Owners of manufactured homes can make their homes more energy efficient and reduce utility bills. According to *Manufactured Homes: Saving Money by Saving Energy*—recently released by the Partnership for Advancing Technology in Housing (PATH)—an energy upgrade or retrofit will lower energy and homeownership costs and increase a home's resale value. The energy-efficient retrofit ideas in this publication produce significant energy savings. *Manufactured Homes* divides retrofit techniques into 10 categories and indicates the cost and required skill level of each technique, depending on climate. *Manufactured Homes: Saving Money by Saving Energy* is available for a nominal fee by calling 1.800.245.2691 or as a free download from the HUD USER website at www.huduser.org/publications/pdf/SaveEnergy_SaveMoney.pdf.

Aging in Place: Obstacles and Solutions continued from page 4

of elderly owners (71%) pay under 30 percent of their income for housing, whereas housing for the majority of elderly renters (70%) requires 30 percent or more of their income. Although the cost of staying in a conventional home is usually less expensive than other options, elderly homeowners may be unable to afford the renovations, maintenance, and other in-home services that aging demands. Most seniors grow increasingly cash-poor as incomes gear down and spending priorities shift with age to other goods and services, such as health care.

Ideally, remodeling for aging in place should happen before retirement, when it's easier to finance. Financial options for seniors can be limited, although small grants or low-interest loans may be available to low-income seniors for home repair or improvements through local governments and nonprofit agencies. Homeowners can also borrow against home equity or adopt a reverse mortgage (see *ResearchWorks*, Vol. 2, Issue 9 in 2005 for more on reverse mortgages). According to the National Resource Center on Supportive Housing and Home Modification, since

aging-in-place options make sense from a practical standpoint, they are worthy of public investment. Options that enable the aging to stay in place, and out of costly long-term care facilities, can save money while improving the quality of life.

The following reports are available from HUD USER for a nominal fee by calling 1.800.245.2691: *A Blueprint for Action: A Resource for Promoting Home Modifications; Homes for Everyone: Universal Design Principles in Practice; and Residential Remodeling and Universal Design: Making Homes More Comfortable and Accessible* (can also be downloaded at www.huduser.org/Publications/PDF/remodel.pdf). Other resources on aging in place, universal design, and home modifications include *Home Modifications and Products for Safety and Ease of Use* at http://design.ncsu.edu/cud/built_env/housing/article_hmod.htm; *Fixing to Stay: A National Survey of Housing and Home Modification Issues* at http://assets.aarp.org/rgcenter/il/home_mod.pdf; and *Housing America's Seniors* at http://www.jchs.harvard.edu/publications/seniors/housing_americas_seniors.pdf. **HLI**

According to Professor Malu Roldan of San Jose State University (SJSU), "The community is our textbook." And this textbook is still a work in progress that, when finished, will help residents better address their health concerns, give decisionmakers detailed spatial data, and provide students with real-world applications of the theories they've been learning about in the classroom. Through a partnership among the city of San Jose, the Health Trust, SJSU, and Hewlett-Packard, students are engaged in a community mapping project that aims to explain how the cityscape affects public health in the eastside neighborhood of Five Wounds-Brookwood Terrace. "We wanted to use mobile computing technology as a tool to break down the barriers between the university and the community while addressing the serious health concerns of the neighborhood residents," said Roldan.

Scaling the Ivy-Covered Walls

For the past several years, SJSU professors have been looking for meaningful ways to expand learning outside the university walls and extend learning opportunities for students by engaging local organizations. SJSU faculty wants to ensure that service-learning projects benefit the neighborhood residents in the short and long run. To break down the barriers between the university and the community, the team of professors and partners created a community mapping project that spans multiple disciplines, including urban planning, management and information systems, and community health.

SJSU students interviewed residents of Five Wounds-Brookwood Terrace about neighborhood needs. They noted local landmarks and recorded the location of community assets and deficiencies using Global Positioning Systems (GPS) receivers. The students then used Geographic Information Systems (GIS) technology to examine the patterns evident in the community mapping project and made suggestions about how the neighborhood's environment and infrastructure could be modified to meet changing needs. As a result, the city added streetlights, repaired sidewalks, and installed traffic signals that make the neighborhood safer for pedestrians and more attractive to new commercial investors.

Building Partnerships

With approximately \$320,000 in donations from Hewlett-Packard plus \$120,000 from the National Science Foundation, Dr. Roldan and other SJSU faculty approached representatives from the Health Trust (a local nonprofit that promotes health and wellness for people in need), the city of San Jose, and residents to discuss how the team could address the health of the community. The interdisciplinary team leveraged the money and expertise to design data collection methods, perform spatial analyses, and create interactive presentation methods that help the Health Trust broaden its reach and create or refine programs that meet the health needs of underserved communities.

"Community-mapping is a vibrant way of telling a neighborhood's story," according to PolicyLink, a national advocate of policies that achieve economic and social equity. "It can highlight the rich array of neighborhood assets, analyze the relationship between income and the location of services, or document vacant buildings or lots."

Strengthening a Community

Originally settled by Portuguese immigrants early in the twentieth century, the neighborhood is now home to Vietnamese, Latino, and Cambodian families, many of whom speak little or no English. The neighborhood does not have a large supermarket or medical center, adding to the difficulty of obtaining appropriate nutrition and quality healthcare. According to one student, the portion of the neighborhood he surveyed contained five liquor stores, but not a single supermarket where residents could buy fresh fruits and vegetables. In these areas, residents buy most of their food from convenience stores and gas stations that primarily stock processed foods containing refined grains, sugar, and fat. "The neighborhood is also filled with torn up pavement, poor lighting, and weed-filled lots that make it difficult and dangerous for residents to walk in their neighborhood," states Roldan.

Now with the additional data from the SJSU student interviews, the spatial analysis conducted by the team, and recommendations from residents and other partners, the city of San Jose is better prepared to make informed policy changes and encourage specific community development projects that will address the

continued on page 7


Abundance of Housing Data from HUD USER continued from page 3

supply of housing, nearby property values, the effects of prevailing wage requirements on the cost of low-income housing, the competition between for-profit and nonprofit developers for LIHTCs, and the relationship between race, ethnicity, and the siting of assisted housing projects.

Comprehensive Market Analysis Reports

Finally, the Comprehensive Market Analysis Reports (www.huduser.org/publications/econdev/mkt_analysis.html) assist HUD operations and public researchers. HUD economists regularly consider changes in the economic, demographic, and inventory characteristics of a selected housing market for three timeframes: from 1990 to 2000, from 2000 to the date of the analysis, and from the date of analysis to a given forecast date. The reports include data and estimates for employment, population, households,


and housing inventory. Reports are available for 75 markets; the most recent are Akron, Ohio; Appleton-Oshkosh, Wisconsin; Buffalo-Niagara Falls, New York; San Diego, California; and Vallejo-Fairfield, California.

For more details and comprehensive coverage, please refer to the *Guide to PD&R Data Sets*, which introduces most of the data accessible on the HUD USER website. The *Guide to PD&R Data Sets* helps researchers identify the most pertinent sets of data available for their studies. For each data set, the *Guide* lists its source, geographic coverage, background, time periods covered, media format, intended users and uses, scheduled updates, and related resources. The Guide is free as a download at www.huduser.org/Datasets/datasets.pdf and in print by calling 1.800.245.2691. 

Community Mapping Strengthens San Jose Neighborhood continued from page 6

needs of its changing neighborhoods. "The patterns are very evident," states Roldan. "The addition of streetlights, sidewalks, and traffic signals in the neighborhood is just the first step in strengthening the area and helping our partner agencies address the health needs of the citizens they serve."

The project has also changed how residents and city officials view the neighborhood. The residents now have a voice in their community through the Strong Neighborhoods Initiative. Once residents are engaged in a conversation about the neighborhood, existing problems become clearer to all. "By allowing residents to ask important questions about their neighborhood through the community mapping project, they can provide us with compelling answers to problems that have troubled their communities for decades," states Kip Harkness, director of the Strong Neighborhoods Initiative.

For additional information about the SJSU mobile computing project, contact: Dr. Malu Roldan, San Jose State University, Department of Management and Information Services, One Washington Square, San Jose, CA 95192 or at 408.924.3539. 



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In the Next Issue of... ^{research} **works**

- In the past five years, HUD has awarded \$6 billion in funding to state and local communities to support the housing and service needs of homeless persons and families. We will discuss these efforts, see how they are alleviating homelessness, and introduce the recently published study *Strategies for Preventing Homelessness*.
- The Homeownership Alliance recently surveyed the nation's largest metropolitan statistical areas, inquiring how local officials are expanding opportunities for affordable homeownership in their communities. The result is a report that highlights viable strategies for making homeownership more affordable in 12 communities. We'll look at how these strategies are taking shape in the responding areas.
- In 1990, the U.S. Senate Appropriations Committee directed HUD to "resume the annual compilation of a worst case housing needs survey of the United States... [to estimate] the number of families and individuals whose incomes fall below 50 percent of an area's median income, who pay 50 percent or more of their monthly income for rent, or who live in substandard housing." This article will cover the major findings of the ninth in a series of Affordable Housing Needs reports.
- Architectural design projects and programs around the country reflect a developing interest in meeting the pragmatic and affordable needs of communities and individuals most in need. We will look at how architectural design is evolving 'on the ground' to meet the challenge of providing homes that hard-working Americans can afford.

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