

GAO

Report to the Chairman, Subcommittee on
Transportation, Housing and Urban
Development, and Related Agencies,
Committee on Appropriations, House of
Representatives

October 2008

GREEN AFFORDABLE HOUSING

HUD Has Made
Progress in Promoting
Green Building, but
Expanding Efforts
Could Help Reduce
Energy Costs and
Benefit Tenants





Highlights of [GAO-09-46](#), a report to the Chairman, Subcommittee on Transportation, Housing and Urban Development, and Related Agencies, Committee on Appropriations, House of Representatives

Why GAO Did This Study

Rising energy prices and concerns about the environment have fueled interest in “green building”—resource-efficient construction and maintenance practices that reduce adverse impacts on the natural environment. The Department of Housing and Urban Development (HUD), spends an estimated \$5 billion on energy costs annually in its affordable housing programs and has recently taken steps to reduce its energy costs. GAO was asked to review (1) HUD’s efforts to promote energy efficiency in its programs and the use of performance measures, (2) potential costs and long-term benefits of green building in HUD’s affordable housing programs, and (3) lessons learned elsewhere that HUD could use to promote green building. GAO reviewed HUD program documents and studies on green building, interviewed HUD officials and industry representatives, and made site visits to locations that use green building practices.

What GAO Recommends

GAO recommends, among other things, that HUD ensure the completion of a regulation to require energy-efficient products and appliances in public housing, work to implement updates to the building code for manufactured housing, consider developing a utility benchmarking tool for multifamily properties, and consider providing nonenergy green building incentive points in some grant programs. In written comments, HUD welcomed GAO’s recommendations but had concerns with certain aspects of the report.

To view the full product, including the scope and methodology, click on [GAO-09-46](#). For more information, contact William B. Shear at (202) 512-8678 or shearw@gao.gov.

GREEN AFFORDABLE HOUSING

HUD Has Made Progress in Promoting Green Building, but Expanding Efforts Could Help Reduce Energy Costs and Benefit Tenants

What GAO Found

HUD has taken steps to promote energy efficiency by providing information, training, and technical assistance, but its efforts have limitations. HUD has also provided some financial incentives to promote green building, including energy efficiency, for public housing and for a small segment of the multifamily properties HUD supports. Additionally, HUD has developed some performance measures to track the progress of its energy efficiency efforts. However, HUD has not begun requiring energy-efficient products and appliances in its public housing properties, as required by statute. HUD has also not implemented major energy efficiency updates to the building code for manufactured housing in more than a decade. Without such requirements and updates, public housing authorities may be spending more on utility expenses than is necessary and manufacturers may lack an incentive to build energy-efficient manufactured homes.

Green building practices can increase up-front costs but may also provide long-term benefits, including financial, environmental, and health benefits. But the benefits in rental housing may not go to the party incurring the up-front costs, potentially discouraging the use of green building practices in a significant segment of affordable housing. HUD has partnered with others to develop a utility benchmarking tool for identifying savings in public housing, but only for the public housing portfolio. Utility benchmarking is often used to assess energy consumption and to help identify properties that could improve their energy efficiency. HUD does not collect the data needed to understand its current utility costs or future savings possibilities in some parts of its multifamily housing portfolio. HUD officials told GAO that developing a utility benchmarking tool for this portfolio would be helpful but could be costly to HUD and property owners. However, a 2003 study by Harvard University—and funded by HUD—found that collecting consumption data in insured privately owned multifamily housing would not be unreasonably burdensome. Without such a tool, HUD cannot fully understand the utility costs for over 1.6 million units in its portfolio and may be missing opportunities to reduce utility expenses for some properties.

HUD has focused its attention on incentives that encourage energy efficiency but has few financial incentives, such as those used by states, to encourage other green building practices such as water conservation. Many state and local governments have used financial incentives to promote the development of green affordable housing. For example, in the scoring systems for some competitive funding, applicants are awarded additional incentive points for energy and nonenergy green building practices. Without financial incentives for nonenergy green building, HUD is likely missing opportunities to make its affordable housing more resource efficient and environmentally friendly.

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Abbreviations

CDBG	Community Development Block Grant
DOE	Department of Energy
ECM	energy conservation measure
EEM	Energy Efficient Mortgage
EPA	Environmental Protection Agency
ESCO	energy services company
FHA	Federal Housing Administration
GSA	General Services Administration
HUD	Department of Housing and Urban Development
LEED	Leadership in Energy Efficiency and Design
LIHTC	Low-Income Housing Tax Credit
LISC	Local Initiative Support Corporation
NOFA	Notice of Funding Availability
OAHP	Office of Affordable Housing Preservation
OGC	Office of General Counsel
PATH	Partnership for Advancing Technology in Housing
PHA	public housing authority
PIH	Office of Public and Indian Housing
VOC	volatile organic compound

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United States Government Accountability Office
Washington, DC 20548

October 7, 2008

The Honorable John W. Olver
Chairman
Subcommittee on Transportation, Housing and
Urban Development, and Related Agencies
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

Rising energy costs and concerns about health and the environment have fueled interest in “green building”—resource-efficient construction and maintenance practices that reduce adverse impacts on the natural environment—in both the private and the public sectors. Residential buildings in the United States accounted for an estimated 22 percent of the nation’s total energy consumption and an estimated 18 percent of the country’s total carbon emissions in 2005, a fact that could contribute to long-term global climate change. The costs associated with this energy usage are particularly significant for low-income individuals. According to HUD officials, the Department of Housing and Urban Development (HUD) spends an estimated \$5 billion—more than 10 percent of its budget—on energy costs, either directly in the form of public housing operating subsidies or indirectly through utility allowances and contracts for assisted multifamily housing. Many of these expenditures are for older properties, which often have higher energy-related operating costs than newer ones. Residents of some HUD-assisted housing who are responsible for their own utilities are also affected by high energy prices.

Energy efficiency and other forms of resource conservation are relevant to most HUD housing programs, which incur energy costs as well as other resource expenses (such as water expenses and building materials for new or existing housing units). For example, HUD administers federal aid to local public housing authorities (PHA) that manage public housing developments for about 1.2 million low-income households. In addition, HUD assists privately owned and operated properties to help provide affordable housing for over 3 million households. This housing includes properties that get some form of rental assistance from HUD, properties whose mortgages are insured by HUD, and properties that are financed by HUD. HUD also administers billions of dollars in grant programs to local jurisdictions that support a range of activities, including the development

of housing and rental assistance, and federally regulates all new manufactured homes under a national building code.

In 2001, HUD established an Energy Task Force, which adopted an Energy Action Plan aimed at promoting energy efficiency in public and assisted housing and in housing financed through its competitive and formula grant programs. As part of this plan, HUD has disseminated information and provided training on energy efficiency, offered incentives for green building practices in some programs, and tracked energy performance measures for some of its programs. In 2006, HUD outlined its Energy Strategy, which updated the Energy Action Plan in compliance with a provision in the Energy Policy Act of 2005 that directed the agency to develop a department wide strategy for reducing energy costs in assisted and public housing.¹

In light of the opportunities associated with green building for HUD and residents of HUD-sponsored housing and interest in HUD's efforts to promote green building practices, you asked us to review the actions that HUD has taken to promote green building and issues related to those efforts. Specifically, we examined (1) the status of HUD's current efforts to promote energy efficiency and the performance measures the agency uses to assess these efforts; (2) the potential costs and long-term benefits of incorporating green building practices into HUD's affordable housing programs; and (3) lessons learned elsewhere that HUD could apply to promoting green building practices in its programs. We also examined HUD's legal authority to incorporate mandatory green building requirements into its affordable housing programs (see app. II).

To address these objectives, we reviewed relevant program documentation and interviewed officials from a number of HUD program offices, including three HUD field offices (Boston, San Francisco, and Seattle). We also reviewed studies on green building and interviewed knowledgeable individuals from building industry associations, affordable housing organizations, and environmental organizations. We reviewed legal documents and interviewed officials from HUD's Office of General Counsel. Finally we conducted site visits (Austin, Boston, Oakland, San Francisco, and Seattle), and interviewed five state housing finance

¹See Pub. L. 109-58, Section 154.

agencies (California, Massachusetts, Vermont, Virginia, and Washington).² We selected the five site visit locations based on several factors, including (1) discussions with knowledgeable individuals in the field of green building, (2) a review of literature on local and state efforts to promote green building, (3) active green building efforts at the state or local level, and (4) proximity to HUD regional offices.

We conducted this performance audit from October 2007 to September 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. More details about our scope and methodology appear in appendix I.

Results in Brief

HUD and its program offices have taken steps to implement most of the actions in the agency's Energy Strategy, but this strategy includes few requirements that promote energy efficiency and relies to a large extent on voluntary actions taken by program participants. HUD has also provided information, training, and technical assistance; formed partnerships to leverage resources; and offered incentives to promote green building in some of its programs. For example, about 100 HUD assisted privately owned multifamily properties are eligible for financial incentives each year to promote green building. Additionally, HUD has developed some performance measures to track the progress of its energy efficiency efforts. But some of HUD's efforts have limitations. HUD has yet to implement a regulation requiring PHAs, which manage about 1.2 million housing units, to purchase energy-efficient products and appliances. HUD's Office of Manufactured Housing, which regulates the construction of all new manufactured homes in the United States, has not implemented major energy efficiency updates to its code for more than a decade. Without such requirements and updates, public housing authorities and manufactured housing residents may be spending more on utility expenses than is necessary. Also, HUD has not updated information about energy

²Housing finance agencies are state-chartered authorities established to help meet the affordable housing needs of residents of their states. They serve as lenders and resource providers.

efficiency in public housing and multifamily handbooks, which include important guidance on administering these programs.

Green building practices tend to increase up-front construction costs but often provide long-term benefits that may offset these increases. However, HUD does not collect the data necessary for many of its programs to understand how much these practices could save the department or its stakeholders over time. The up-front costs of green building practices can add to a project's total costs, although these costs differ by project. Some green building practices—such as hiring building contractors with experience in green building—can minimize some of the up-front costs. When used in affordable housing projects, green building practices can result in long-term financial and health benefits for residents and could save money for HUD. For example, energy efficiency improvements can provide significant long-term savings on utility costs. According to the Environmental Protection Agency (EPA) and the Department of Energy (DOE), Energy Star Qualified Homes, which HUD has actively promoted building in a number of its affordable housing programs, use approximately 30 percent less energy than standard homes and can save homeowners approximately \$200 to \$400 per year. However, in rental housing the party that makes the initial investment in green building may not see the immediate benefits, a fact that could discourage the use of green building practices in affordable housing. For example, a building owner that pays a higher cost for an energy-efficient boiler may not see the savings, which instead accrue to the tenant (if the tenant pays the utility bills). As a result, the building owner may not want to invest in higher cost green building practices. HUD paid an estimated \$5 billion in utility costs in 2007 but does not have the data necessary to understand the breakdown of these costs or the potential savings opportunities of green building for many of its programs. HUD has partnered with EPA and DOE to develop a utility benchmarking system that identifies savings opportunities in public housing. However, HUD does not collect the data on utility consumption that would be necessary to establish or use a benchmarking system in its privately managed assisted housing portfolio. HUD officials told us that developing a utility benchmarking tool for its privately owned assisted multifamily portfolio would be helpful, but could be costly to HUD and the property owners. However, a 2003 study by Harvard University—and funded by HUD—found that collecting consumption data in privately owned multifamily housing would not be unreasonably burdensome. Without such a tool, HUD cannot fully understand the utility costs for over 1.6 million units in its portfolio, and may be missing opportunities to reduce utility expenses.

Standards and financial incentives used elsewhere to encourage green building could provide lessons for HUD. National and regional green building standards are often used to provide a framework for how to build green. Developers we spoke with expressed the need for flexibility when choosing a green building standard, because some national standards may not be appropriate for all affordable housing projects. Regional standards provide guidance that takes into account local characteristics such as climate and regional regulatory conditions. Some state and local jurisdictions have developed their own regional standards because the existing green building standards did not meet their needs. In addition, HUD has few nonenergy incentives to encourage green building. States, cities, and nonprofit organizations currently use a mix of financial incentives to encourage the use of green building practices in their affordable housing programs. For example, many states use programs, such as the Low-Income Housing Tax Credit (LIHTC), to provide incentives for or to require the use of green building practices.³ The LIHTC is a prominent source of federal funding for building and rehabilitating affordable housing. It is administered at the state level, where developers compete for limited funds based on a review of their applications, in which a point scoring system is used to determine those that will be funded. HUD has focused its attention on creating incentives to encourage energy efficiency, but it provides few financial incentives to encourage broader and more comprehensive green building practices—such as water conservation and indoor air quality. For example, HUD assigns in its scoring systems one incentive point (out of a total of 100 or 120 points) for energy efficiency in its competitive housing grant programs, and offers few incentives for incorporating nonenergy green building practices. HUD cannot demonstrate that 1 incentive point is sufficient to promote energy efficiency. While HUD’s competitive grant programs are occasionally used to build green affordable housing, the decision to do so is typically made at the local level.

This report contains recommendations to HUD designed to improve and expand its efforts to promote green building in HUD-assisted properties. We recommend that HUD ensure the completion of a regulation to require the use of energy-efficient products and appliances in public housing, reach out to DOE about energy efficiency updates to manufactured

³LIHTC is an indirect federal subsidy used to finance the development of affordable rental housing for low-income households. LIHTC is an Internal Revenue Service program based on Section 42 of the Internal Revenue Code and was enacted by Congress in 1986 to provide the private market with an incentive to invest in affordable rental housing.

housing, and update handbooks to include current information on energy efficiency and green building. We also recommend that HUD consider developing a utility benchmarking tool for multifamily properties, assess the impact of the point awarded for energy efficiency in competitive grant programs, and consider providing nonenergy green building incentive points for these programs.

We provided a draft of this report to HUD for review and comment. We received written comments from HUD, which are discussed later in this report and are reprinted in appendix VI. We also received general and technical comments from HUD, which have been incorporated as appropriate. In its response, HUD welcomed our recommendations and said that the agency would give serious consideration to their implementation with the resources it has available. However, the agency made comments suggesting that we did not provide enough information describing HUD's progress in implementing green building practices or provide enough direction in how HUD should manage its programs. For example, HUD stated that activities of some offices were not sufficiently highlighted and that we had not fully addressed the work that HUD has initiated on transit-oriented development. We were not intending to provide a complete listing of all of HUD's efforts and we have made that clear in our scope and methodology section. Further, we have ongoing separate work on transit-oriented development. HUD also stated that we did not fully address staffing or resource issues, but that is an internal management issue which we leave to HUD's discretion. Additional HUD comments and our response are discussed later in this report.

Background

HUD's Energy Task Force, which is tasked with developing and monitoring the implementation of the department's Energy Action Plan, is made up of representatives from several HUD program offices. The Energy Task Force is cochaired by representatives from HUD's Office of Policy Development and Research and Office of Community Development and Planning. Also, an energy coordinator representing each HUD regional office on the task force is responsible for a range of energy-related activities, including hosting trainings and identifying local opportunities to promote energy efficiency. All members of the task force participate on a part-time basis and have other full-time responsibilities in HUD.

Several HUD program offices play a role in the implementation of the Energy Action Plan, including the following:

-
- The Office of Public and Indian Housing (PIH) oversees about 3,300 PHAs. PHAs are typically local housing agencies that manage public housing units. HUD supports over 1 million public housing units, which represent about 25 percent of HUD's total rental assistance units. HUD provides PHAs with operating subsidies to assist in funding the operating expenses of their dwellings, including utilities, and capital funds to modernize existing public housing developments. PIH also administers the Urban Revitalization Demonstration Program, commonly known as HOPE VI. HOPE VI seeks to improve the living environment of residents in severely distressed public housing by redeveloping obsolete public housing, revitalizing public housing sites and their surrounding neighborhoods, and providing housing that avoids or decreases the concentration of poverty. The HOPE VI program has awarded 239 grants totaling approximately \$5.7 billion dollars, between fiscal years 1993 and 2006. PIH also administers the Housing Choice Vouchers Program, which supports over 2 million housing units. This program provides rental vouchers to low-income tenants for use in the private rental market through the local PHA. Tenants are responsible for finding a suitable housing unit that the owner agrees to rent under the program. Rental units must meet minimum health and safety standards set by the PHA. The PHA pays a housing subsidy to the landlord, and the tenant pays the difference between it and the actual market rent. PIH also seeks to provide decent, safe, and affordable housing for Native American, Alaska Native, and Native Hawaiian families.
 - The Office of Multifamily Housing administers a number of rental assistance programs that deal with new construction, preservation, property assistance, and finance programs. These programs support over 1.6 million housing units. The Office of Multifamily Housing manages competitive grant programs that include the Section 202 and 811 programs. These programs provide capital advance grants for the development of elderly housing under Section 202, and persons with disabilities under Section 811. Both 202 and 811 projects receive operating assistance through Project Rental Assistance Contracts. In addition, HUD also administers mortgage insurance to multifamily properties under a multitude of programs through the Federal Housing Administration (FHA). These programs seek to enhance the credit for rental housing developments through the provision of federal loan guarantees that provide a financing option in addition to those available in the private conventional market. Through these programs, FHA supports the construction of new apartment projects and the refinancing of the rehabilitation of older ones.
 - The Office of Community Planning and Development administers the Community Development Block Grant (CDBG) and the HOME Investment

Partnerships (HOME) programs. These are formula grant programs that divide billions of dollars across local jurisdictions and numerous activities on an annual basis using funding formulas established through statute and by HUD. Activities funded by CDBG can include housing, economic development, neighborhood revitalization, and community development. CDBG funds can be used by local jurisdictions to support a range of eligible activities, including energy conservation and renewable energy resources. The HOME program provides federal assistance to participating jurisdictions for housing rehabilitation, rental assistance, homebuyer assistance, and new housing construction. Recipients of CDBG and HOME funding have a great deal of flexibility in how they use these grants, and must submit an annual action plan to HUD.

Other HUD program offices play a role in the implementation of the energy action plan. The Office of Single Family Housing administers a program to insure private lenders against losses from borrower defaults on mortgages that meet certain criteria for properties. HUD's Office of Healthy Homes and Lead Hazard Control provides funding for the development of programs to address and study the effects of lead-based paint and other home health hazards on children and families. The office is also responsible for enforcing HUD's lead-based paint regulations. The Office of Policy Development and Research conducts housing research for HUD and coordinates the Partnership for Advancing Technology in Housing (PATH). PATH focuses on accelerating the development and use of technologies to improve the quality, durability, energy efficiency, environmental performance, and affordability of housing nationwide. HUD's Office of Manufactured Housing regulates the production of manufactured housing in the United States. The National Manufactured Housing Construction and Safety Standards Act of 1974 directed HUD to establish a national building code, known as the HUD Code, for manufactured housing. HUD monitors industry compliance to ensure that every manufactured home is built to this code.

Energy Star[®] is a joint program of EPA and DOE that aims to protect the environment by promoting the use of energy-efficient products and practices. The Energy Star labeling program was created to identify energy efficiency standards for several categories of household products and appliances without sacrificing performance. Manufacturers are permitted to apply the Energy Star label to qualified products that meet EPA or DOE criteria. The Energy Star for Qualified Homes program provides an Energy Star label for newly built homes that meet strict guidelines of energy efficiency set by EPA. Energy Star homes certified under this program are

at least 15 percent more energy efficient than homes built to the 2004 International Residential Code.⁴

Green building is the practice of creating structures and using practices that are environmentally friendly and resource efficient. There are a number of green building standards that builders and developers can use to certify whether a particular structure is a green building. These standards include the Leadership in Energy Efficiency and Design (LEED) rating system, which is a nationally accepted standard developed and administered by the U.S. Green Building Council. Many of these standards use a system that assigns points for a variety of practices and certify a building at various levels of “green” depending on the number of points acquired (see table 1). While energy conservation is an integral part of green building, these standards also include several other categories of green building measures such as water conservation, sustainable site selection, building material conservation, and enhanced occupant health. Since 2003 the U.S. General Services Administration (GSA) has required that all new federal buildings under its authority be constructed using green building practices.

⁴The International Residential Code is a stand-alone building code that provides minimum regulations for one- and two-family dwellings of three stories or less. The code covers all building, plumbing, mechanical, energy, and electrical systems. The International Residential Code provides both prescriptive (measures) and performance (energy modeling) approaches to determine compliance.

Table 1: Examples of Green Building Standards

Green building standards	Administering organization	Locations covered	Levels of green	Third party verification required	Type of building
National standards					
Energy Star for Qualified Homes	EPA	Nationwide	1	Yes	Single-family new construction Existing retrofitted homes Multifamily (under 3 stories)
Green Communities Criteria	Enterprise Community Partners	Nationwide	1 ^a	No	Single-family new construction and rehabilitation Multifamily new construction and rehabilitation Affordable housing
Leadership in Energy and Environmental Design™ (LEED)	U.S. Green Building Council	Nationwide	4	Yes	Commercial new construction Multifamily new construction Single-family new construction Schools
Model Green Home Building Guidelines	National Association of Home Builders	Nationwide	3	Yes	Single-family new construction and rehabilitation
Regional					
EarthCraft House™	Greater Atlanta Home Builders Associations & Southface Energy Institute	Southeastern region of the United States	3	Yes	Single-family new construction and rehabilitation Multifamily new construction and rehabilitation Community development
Evergreen Sustainable Development Criteria	Washington Department of Economic Development and Trade	Washington State	1 ^b	Yes	Single-family new construction and rehabilitation Multifamily new construction and rehabilitation Affordable housing
SeaGreen Guidelines	Seattle Office of Housing	Seattle, Wash.	1	No	Multifamily new construction and rehabilitation Affordable housing

Source: GAO analysis.

^aIn meeting the Green Communities Criteria, a project must meet all of the criteria's mandatory categories and obtain 35 points for new construction and 30 points for moderate rehabilitation in the nonmandatory categories.

^bIn meeting the Evergreen Sustainable Development Criteria, a property must meet all of the mandatory categories and obtain 50 points for new construction and 40 points for rehabilitation in the nonmandatory categories.

HUD Has Taken Positive Steps to Promote Energy Efficiency, but Efforts to Encourage Voluntary Actions Have Limitations

HUD's energy efficiency efforts, which have focused primarily on the voluntary adoption of various measures, have included positive steps such as promoting the use of energy performance contracts in public housing, developing a benchmarking model that allows for the identification of public housing authority properties that consume comparatively more energy, and piloting a green initiative. But some of HUD's efforts have limitations. HUD has sought to promote energy efficiency by providing information, training, and technical assistance; offering program incentives; and leveraging resources outside of HUD. However, HUD has not instituted certain requirements that were set forth in its Energy Action Plan and Energy Strategy, and some HUD program areas offer limited program incentives to promote energy efficiency. For example, HUD has not implemented a regulation requiring PHAs to purchase energy-efficient products and appliances, and its Office of Manufactured Housing has not implemented major energy efficiency updates to its code for more than a decade. The lack of requirements and limited incentives could mean that program recipients are not taking advantage of opportunities to reduce energy consumption and expenses. Also, HUD's efforts to provide information about energy efficiency opportunities are limited by outdated program guidance. For a further review of the status of HUD's planned actions for implementing its Energy Strategy, see appendix III.

HUD Has Made Progress in Implementing Its Energy Strategy and Offering Some Incentives

HUD has demonstrated progress in implementing elements of its Energy Strategy. This strategy focuses primarily on encouraging the voluntary adoption of energy efficiency measures, a significant component of green building. The Energy Action Plan and Energy Strategy included specific actions in support of objectives and HUD has taken steps to implement many of these actions. Table 2 illustrates the objectives included in HUD's Energy Strategy. HUD's efforts to promote energy efficiency have focused on areas including providing information and technical assistance, offering program incentives, and leveraging outside resources.

Table 2: Objectives in HUD’s Energy Strategy

Objective 1: Strengthen partnerships with federal agencies and local communities to promote Energy Star and energy efficiency in the residential sector
Objective 2: Strengthen incentives and implement new statutory requirements for energy efficiency through HUD programs
Objective 3: Provide training and technical assistance on energy efficiency to homeowners, renters, and property owners
Objective 4: Establish measures to track progress in reducing energy consumption and ensure accountability
Objective 5: Support further research and technology development

Source: HUD Energy Strategy.

HUD provides information, training, and technical assistance on energy efficiency to HUD staff and program participants to promote greater awareness and voluntary adoption of energy-efficient practices. In partnership with DOE and EPA, HUD committed to expand the use of Energy Star products in public and assisted housing. HUD publishes information on its Web site, and some HUD program offices provide information specific to the needs of their program participants through newsletters and brochures. For example, on its Public Housing Environmental and Conservation Clearinghouse Web site, PIH posts information on promoting energy conservation in public housing properties and information about HUD policies related to energy efficiency. PIH also has a monthly newsletter, “EcoWise,” covering utility conservation issues for PHAs. According to HUD officials, PATH’s Roadmap for Energy Efficiency in Existing Homes identified a variety of strategies for increasing energy efficiency in the existing housing sector, including the development of uniform protocols for energy-efficient remodeling. To increase awareness about energy efficiency and available HUD informational resources, regional energy coordinators and other HUD staff have incorporated energy efficiency into presentations to and discussions with program participants. For example, in presentations to HOME and CDBG grantees, HUD has encouraged construction to the Energy Star standard for new homes. HUD provides training and technical assistance resources that can also increase awareness and in some cases help to build greater expertise with certain energy-efficient practices. Examples of this training have included the development of an Internet-based training curriculum on energy efficiency for its staff and HOME grantees, and HUD has launched a Web tool, the Energy Efficiency Rehab Advisor, that provides homeowners and HUD program participants with guidelines on incorporating energy efficiency into rehabilitation projects. HUD’s Office of Native American Programs has also sponsored training

opportunities targeting Native American tribes and related to green building that have included a focus on energy efficiency. HUD officials told us that Regional Energy Coordinators have also assisted with hosting training workshops and identifying local opportunities and informational needs in their respective regions.

Some HUD programs offer incentives for energy conservation measures. PHAs receive funds from HUD's capital fund that may be spent on energy conservation measures, but HUD officials told us that these funds are generally insufficient to cover both the up-front cost of many energy improvements and ongoing repair needs.⁵ HUD's operating fund standard rules provide a disincentive to implementing high-cost energy improvements. According to HUD officials, a PHA's annual operating subsidy is based in part on the prior 3 years of utility consumption, which would be expected to fall in the years following such improvements. This "3-year rolling base" policy allows PHAs to retain 75 percent of savings from reducing utility consumption over a 3-year period, but according to HUD officials, PHAs cannot retain enough savings over this short time to recoup the up-front cost of many large energy efficiency improvements such as high-energy-efficiency boilers.⁶ Two HUD incentives can enable PHAs to overcome these challenges by allowing them to capture energy savings over a longer period and use these savings in lieu of capital fund dollars to finance energy efficiency improvements. First, under certain conditions, HUD will freeze the 3-year rolling base utility consumption for up to 20 years at the level that existed before the energy improvements were made, enabling the PHA to finance expensive energy improvements with the longer stream of energy savings it can retain. Second, HUD can approve an incentive by increasing a PHA's operating subsidy for up to 20

⁵HUD provides funding to PHAs to operate and repair public housing units through both the operating fund and the capital fund. The operating fund provides annual subsidies to PHAs to make up the difference between the amounts collected in rent and the costs of operating the units. The capital fund provides grants to PHAs for the major repair and modernization of the units.

⁶Under the 3-year rolling base policy, the utility component of a PHA's operating subsidy is based on the average utility consumption for the prior 3 years. Following utility conservation measures, this 3-year average will fall over time, but will not reflect the new, lower utility consumption level until 3 years have passed. For example, 1 year following utility conservation measures, 2 of the 3 years included in the operating subsidy calculation will reflect the previous, higher level of utility consumption, and the 3-year average and operating subsidy will fall as 1 year included in the average will reflect lower utility use. But the PHA may retain some savings as the utility component of its operating subsidy will be based on a utility consumption level that exceeds its expected utility use.

years. The additional operating subsidy is then used to pay off the loan that financed the energy conservation improvements. When actual energy savings exceed debt payments under both incentives, PHAs can retain a portion of these savings for eligible operating expenses. HUD officials told us that a PHA may employ both incentives, but no single energy conservation measure may double dip, using both incentives for the same measure.

PHAs using either of these two incentives can identify and finance improvements through energy performance contracting. An energy performance contract is an agreement with an energy services company (ESCO) that in exchange for a fee, the ESCO could identify, finance, and oversee the installation of energy conservation measures.⁷ To reduce the burdens on PHAs seeking to engage in energy performance contracts, HUD officials told us that PIH has made progress toward streamlining its review approval process for energy performance contracts through field office and PHA workshops and technical assistance contractor support to field offices and PHAs.⁸ HUD has published guidelines instructing field offices to complete the review of energy performance contracts within 45 days and has begun training field office staff to develop the expertise needed to oversee and support these contracts.⁹ To speed up and standardize the process for selecting a contractor for a performance contract, HUD plans to pilot a program similar to the Federal Emergency Management Program, which provides a preapproved contractor list and a document that standardizes the aspects of contracting with each of the included contractors. HUD officials acknowledged that energy performance contracting has limitations, but said that contracting with ESCOs had helped to effect energy efficiency improvements and also water conservation measures that might not have been implemented otherwise. HUD officials said that water conservation savings were significant and among the biggest potential opportunities for financial

⁷Typically, an ESCO guarantees a certain level of consumption savings. According to HUD officials, several large PHAs have acted as their own ESCOs and HUD provides guidance to PHAs considering whether this option is appropriate for them.

⁸For example, a PHA contracting with an ESCO will pay certain fees to the ESCO that could be avoided if the PHA identified and implemented the improvements on its own.

⁹The field office must complete its review and issue its decision or required changes within 30 business days. If a revised submittal by the housing authority is required, the HUD field office has 15 business days after the receipt of the revised energy services agreement to review and issue a decision.

savings. As of 2007, 195 energy performance contracts were in progress, achieving gross savings of about \$50 million annually.

The transition to asset management in PHAs may provide stronger market-based incentives for energy efficiency.¹⁰ Under asset management, HUD has discontinued the practice of collecting utility consumption and expenditure data at the PHA level (which might have numerous properties), and has begun collecting these data for individual public housing properties. According to HUD officials, to the extent that this information facilitates the identification of particularly energy-inefficient properties, the switch to asset management will result in greater opportunities to improve energy efficiency. HUD has contracted with a third party to pilot using energy and water consumption data collected from PHAs to develop a benchmarking model that may help HUD and PHAs to identify properties that are not energy efficient. Benchmarking compares utility consumption data among comparable properties to determine potential utility savings opportunities.

In addition, the Mark-to-Market program of the Office of Affordable Housing Preservation (OAHP) has created unique incentives for green building. The Mark-to-Market program reduces rents on multifamily properties participating in the Section 8 program. The Section 8 program subsidizes the rent of low-income individuals and multifamily property owners that have contracts with HUD through which HUD is committed to continue to subsidize rents in their properties or units until the contract expires. The Mark-to-Market program restructures the mortgages on properties to a level that can be supported by lower rents. According to HUD officials, restructurings under the Mark-to-Market program generally take place when Section 8 contracts are renewed.

In 2007, OAHP launched its Green Initiative, a pilot program designed to incorporate green building principles, including energy efficiency, into the rehabilitation and ongoing maintenance of project-based Section 8 properties undergoing Mark-to-Market restructurings. Through a Mark-to-Market restructuring, the owner is able to add to the debt on his or her property the cost of any rehabilitation of the property. In exchange for choosing a Mark-to-Market restructuring, owners virtually always receive

¹⁰Each PHA has a certain number of properties for which it is responsible, and each of the properties has a certain number of units where tenants live. Under asset management, PHAs with 250 or more units will convert to a management approach that includes project-based budgeting and accounting, instead of budgeting and accounting at the PHA level.

a new project-based Section 8 contract with HUD. OAHP identified Mark-to-Market restructurings involving property rehabilitation as an opportunity to offer incentives to encourage the adoption of energy-efficient and other green building practices. For property owners voluntarily participating in the pilot, HUD has offered to reduce the amount that must be initially paid towards rehabilitation costs from 20 percent to as little as 3 percent if the property owners make certain green improvements. HUD created the Green Initiative pilot program within existing statutory authority by determining that certain green building improvements to a property are eligible “significant additions,” as was already allowed in the relevant statute for the Mark-to-Market program. Property owners participating in a Mark-to-Market restructuring are eligible to receive a payment from the program. Under the new pilot program, property owners may also be eligible for an increase in the amount they will be paid by the program if they take advantage of all opportunities that HUD identifies during a special assessment of green building characteristics of their properties, meet certain threshold green principles, and provide evidence that a professional with a LEED accreditation—or equivalent green building accreditation—has been actively involved in the project.¹¹ HUD officials noted that while this initiative sets a positive example in incentivizing energy efficiency and other green practices in Section 8 properties, the restructuring event is unique to the Mark-to-Market program. Moreover, HUD officials estimated that only about 100 Section 8 contracts become eligible for these Mark-to-Market green incentives each year, a small portion of the total project-based Section 8 portfolio of over 31,000 contracts.

Finally, HUD has leveraged existing energy efficiency resources outside of the agency through partnerships and other efforts in an effort to direct program participants toward such resources. Some state and local governments, utility companies, nonprofit organizations, and other groups have resources that can supplement HUD’s efforts to promote energy efficiency. HUD field offices have entered into partnerships with several such groups to educate HUD program participants about ways to reduce energy costs. For example, in September 2005, HUD’s Fort Worth Regional Office partnered with the University of North Texas to cohost a regionwide conference that provided information and technical training on

¹¹LEED accreditation is for professionals who have demonstrated a thorough understanding of green building practices and principles and familiarity with LEED requirements, resources, and processes.

green building practices. The 260 conference attendees included officials from public housing authorities, community development entities, city leaders, home builders, and many other members of the housing industry. In addition to these partnership efforts, some HUD regional energy coordinators and field office staff have helped HUD program participants identify existing funding, informational, and technical resources available within their states or localities for green building. Staff in HUD's San Francisco Regional Office developed comprehensive state directories of energy efficiency resources to facilitate access to financial incentives, rebates, services, and tools. HUD officials said that leveraging these outside resources not only helped to expand the reach of HUD's energy programs but also promoted more efficient use of HUD's resources by avoiding unnecessary duplication of existing efforts.

HUD Is Beginning to Address Limitations in Program Incentives and Management for Energy Efficiency in Certain Program Areas

While program incentives for its public housing, multifamily housing, and mortgage insurance programs have limitations, HUD officials told us that they are working to address some of these limitations. HUD is also working to improve its program management and monitoring related to energy efficiency efforts.

Public Housing

HUD is making efforts to streamline the energy performance contracting process that may encourage broader use of the operating subsidy incentives, but such contracting may remain a challenge for many small PHAs (HUD categorizes PHAs with fewer than 250 units as small) that lack the size necessary to attract interest from ESCOs.¹² The majority of public housing authorities are small. According to HUD officials, as of June 2008, 53 small housing authorities out of a total of about 3,200 PHAs have an energy performance contract agreement in process. HUD has encouraged smaller PHAs to pursue aggregated energy performance contracts or to use the additional operating subsidy incentive for specific improvements. HUD officials told us that in two instances, small PHAs have banded together with other nearby small PHAs in aggregated contracts. These

¹²According to HUD officials, some ESCOs have determined that it is not financially feasible to work with PHAs with fewer units. HUD officials told us that smaller housing authorities generally lack the expertise to manage the execution of major energy improvement packages without the assistance of an ESCO.

contracting arrangements can be complicated to execute.¹³ According to HUD officials, the agency is working on a pilot program that will support contracting for small PHAs. For the pilot program, HUD is considering streamlining its current energy performance contract process by using specific measures and incentives to simplify energy performance contract procedures for small PHAs.

Multifamily Housing

HUD officials told us that the criteria for awarding the incentive point for energy efficiency in some of their multifamily competitive grant programs have not always been clear and they are clarifying the criteria. In the Notice of Funding Availability (NOFA) for the Section 202 and Section 811 programs, HUD awards one rating point to projects that describe their plans for promoting energy efficiency in the design and operation of their proposed projects, but the NOFA does not define specific energy efficiency measures that must be taken. As a result, some grantees may have earned this point without implementing significant energy efficiency improvements. According to HUD officials, the Office of Multifamily Housing is currently developing more detailed criteria based on a list of specific energy efficiency measures.

According to HUD officials, in 2007, the Office of Multifamily Housing convened a task force composed of staff from its 11 field offices to draft recommendations to implement new energy efficiency incentives for its programs. Thirteen of the task force's 15 recommendations have been approved, including proposed actions for the Office of Multifamily Housing's rental assistance programs, mortgage insurance programs, and Section 202 and Section 811 programs. To provide greater energy efficiency incentives to multifamily property owners, the task force recommended increasing owner distributions for energy efficiency for some projects and creating new opportunities for management companies to share in the cost savings from reductions in utility usage.¹⁴ The Office of Multifamily Housing is currently in the process of revising regulations and guidelines to implement new energy efficiency incentives, but these efforts will take time, and incentives requiring revisions to regulations may

¹³In an aggregated energy performance contract, multiple public housing authorities agree to group their properties together in a single energy performance contract to achieve the scale necessary to make the project economically attractive to an ESCO. According to HUD officials, housing authorities may find it challenging to agree on the terms of the contract, including what improvements will be installed at which properties.

¹⁴Owner distributions are those funds available to ownership after the payment of debt service and all defined property-related expenses.

encounter opposition in the rulemaking process. Appendix IV provides an overview of the approved Office of Multifamily Housing’s task force recommendations.

Mortgage Insurance Programs

HUD’s tool to promote energy efficiency through its mortgage insurance programs, the Energy Efficient Mortgage (EEM) product, has not been widely used. To date, activity in this program has been very small (just over 1,000 of these mortgages have been reported as of 2007). EEMs are mortgage loans insured by FHA that borrowers can use to finance energy efficiency improvements. Homebuyers, or homeowners when refinancing, may use the EEM program to borrow a minimum of \$4,000 and a maximum of 5 percent (up to \$8,000) of the home’s appraised value to finance these improvements. HUD officials we spoke with cited numerous obstacles to this product, including the additional time associated with the required home energy inspection—such as a Home Energy Ratings System inspection—and loan limits.¹⁵ HUD officials said that EEM loan limits on the amount that can be financed for energy efficiency improvements may be set too low to attract many potential users. According to HUD officials, FHA’s 203(k) streamlined product, which has a higher loan limit of \$35,000 and does not require a home inspection, overcomes some of the limitations of the EEM product. However, in contrast to the EEM, borrowers must qualify for the loan funds used for energy efficiency improvements. Moreover, the 203(k) streamlined product faces some of the same obstacles to market acceptance. EEM loan limits were recently raised by the Housing and Economic Recovery Act of 2008. According to HUD officials, HUD will implement the new loan limits based on this statute. HUD officials also noted that FHA loan products have lost market share over the last decade in regions where FHA mortgage limits are below most home prices and said that adding additional steps to mortgage transactions could give lenders an additional reason not to use FHA products.

HUD officials explained that they cannot provide incentives for energy efficiency by offering lower mortgage interest rates in current FHA programs, as these rates are established between FHA-approved lenders and borrowers. But these same officials said that HUD does have some flexibility to reduce mortgage insurance premiums, although using this

¹⁵The Home Energy Rating System inspection, which determines the cost of potential energy improvements and estimates energy savings, is a standard measurement of a home’s energy efficiency.

flexibility to provide incentives for energy efficiency would require HUD to study the risk implications for FHA's portfolio. HUD officials told us that they have not performed an analysis that addresses the risk associated with energy costs, because too few of these loans have been issued to provide an adequate sample to study.

Energy Performance Measures

HUD has taken steps to improve its energy program management and monitoring through the development of performance measures to track and assess the progress of its energy efficiency efforts. According to HUD officials, program office staff, in coordination with members of the Energy Task Force, developed several energy performance measures to track the progress of HUD's energy efficiency efforts. HUD promotes accountability in its energy efficiency-related programs by including some of these measures as goals in its Management Plan (see table 3).¹⁶ In addition to the measures included in the Management Plan, a program office may collect other data to track progress in promoting energy efficiency. For example, HUD officials told us that the Office of Multifamily Housing tracks the number of replacement reserve requests used for energy efficiency measures. Some properties are required to maintain replacement reserves that are used throughout the life of the mortgage for the replacement of major physical and component parts. HUD officials told us that HUD continues to explore how to strengthen its performance measures to track and assess HUD's energy efficiency efforts.

¹⁶HUD issues a management plan annually that includes some goals for agency programs.

Table 3: HUD Fiscal Year 2008 Annual Management Plan Goals

Management plan goals	Fiscal year 2008 target
Reduce utility consumption by PHAs and residents by increasing the overall investment in energy conservation measures (ECM) by 5 percent over the fiscal year 2007 baseline, and by ensuring that all energy contract investments are cost-effective during the expected life of the equipment.	5%
To implement the Secretary's Energy Task Force Initiative and the Energy Star memorandums of understanding among HUD, DOE, and EPA, HUD will increase the number of Energy Star certifications in new construction and gut rehab in the CDBG and HOME programs.	10%
Provide training on how FHA single-family programs can be effectively used to promote energy efficiency (9 per Home Ownership Center).	36
Feature the Energy Efficient Mortgage (and other FHA products) that promote energy efficiency improvements in single-family housing.	Not applicable ^a
Continue improved tracking and evaluate performance of Energy Efficient Mortgages.	Not applicable
Implement Phase II of HUD's plan for increasing the energy performance and reducing utility costs in HUD-supported housing.	Not applicable
Continue to process Manufactured Housing Consensus Committee proposals that are not in rulemaking (including appliance efficiency and improved duct insulation).	Not applicable
Promote energy efficiency in assisted multifamily programs by promoting the HUD Energy Action Plan to external partners.	Not applicable
Promote energy efficiency by encouraging housing providers to utilize energy-saving devices and number of industry presentations, including Energy Plan discussions.	To be decided ^b
Increase and preserve Decent Affordable Housing through promotion of HUD's Departmental Initiatives (i.e., Energy Action Plan, America's Affordable Communities Initiative, Preserve America, etc.).	To be decided

Source: HUD fiscal year 2008 Annual Management Plan.

^aA fiscal year 2008 target of Not Applicable indicates that there is not a specific numeric goal associated with the performance goal.

^bA fiscal year 2008 target of To Be Decided indicates that HUD has not established specific targets for the goal.

Of the 10 performance measures HUD includes as performance goals in its fiscal year 2008 Management Plan, 2 go beyond summarizing program activities to identify desired outcomes (i.e., measurable energy savings). The Office of Management and Budget has identified the tracking of program outcomes, which describe the intended results of carrying out a program activity—such as energy savings—as the most informative measures about performance, because they are the ultimate results of the program. For example, HUD's Office of Community Planning and Development has set a goal to increase the number of Energy Star-certified new homes by 10 percent in its HOME and CDBG programs, and PIH has targeted a 5 percent increase in overall investment in energy conservation measures in public housing. The other eight HUD performance goals track outputs, such as whether certain activities outlined in HUD's Energy Strategy are taking place. For example, Single-Family Housing set goals to continue improved tracking and evaluation of EEMs.

HUD Has Not Implemented the Statutory Requirement for Energy-Efficient Products and Appliances in Public Housing

PIH has not implemented Section 152 of EPAct 2005, which requires PHAs to purchase Energy Star products and appliances when it is cost-effective to do so. HUD has issued a notice encouraging PHAs to purchase Energy Star products and appliances, but has not issued a regulation making this a requirement.¹⁷ According to HUD officials, HUD planned to draft a regulation that would have included this requirement. In the interest of streamlining, HUD intended to combine this draft regulation with updates to provisions governing contracting terms for energy performance contracts. Before proposing this draft regulation, in early 2007, concerns were expressed about a potential change to energy performance contracts in a different but related draft regulation. HUD officials said that this second draft regulation governed operating fund subsidies available to PHAs for energy performance contracts. Because of these concerns, HUD chose to delay publishing either draft regulation for comment, including the new proposed regulation that would have required energy-efficient products and appliances for PHAs. While HUD could have separately issued a proposed regulation to implement the statutory requirement for energy efficient products and appliances for PHAs, it chose not to do so at that time.

Subsequently, HUD officials told us that they have initiated a draft regulation requiring energy-efficient products and appliances for PHAs. HUD officials said that the controversy regarding the regulation related to operating fund subsidies in energy performance contracts had been resolved with the passage of the Consolidated Appropriations Act of 2008. According to HUD officials, HUD is developing a draft regulation that includes the energy-efficient products and appliances requirement for PHAs as well as references to energy performance contracts. The draft regulation is currently being reviewed by PIH officials before it will be sent out for review throughout the agency. While the controversy regarding energy performance contracts may have been resolved, the statutory requirement for PHAs to use energy-efficient products and appliances has been in place since 2005. Based on the information provided to us by HUD officials, it is unclear how long HUD's regulatory development process may take for the proposed regulation. The delay in issuing what could have been a separate regulation requiring energy-efficient products and appliances has allowed PHAs to purchase less

¹⁷The Energy Policy Act of 2005 also states that PHAs can purchase products and appliances that meet Federal Energy Management program guidelines.

energy-efficient products and appliances that could result in higher energy expenses than necessary.

The Office of Manufactured Housing Has Not Updated Its Code to Incorporate Energy Efficiency Requirements

The Energy Strategy includes an action for HUD's Office of Manufactured Housing to update the code regulating the construction of manufactured housing to incorporate the energy efficiency recommendations of the Manufactured Housing Consensus Committee.¹⁸ HUD officials said that some energy standards for manufactured housing remain antiquated, with the last major set of updates occurring in 1994. HUD officials also stated that the energy standards were so outdated that the products meeting current manufactured housing code are no longer available. A member of the Consensus Committee has outlined certain energy efficiency requirements that could be incorporated into HUD's manufactured housing code. For example, the proposed requirements include changes to insulation standards and raising standards for the use of energy-efficient light bulbs. But HUD has not established a clear timeline for making a decision on incorporating the recommended energy efficiency changes to the manufactured housing code.

HUD officials explained that recent legislation directed DOE to develop new energy efficiency standards for manufactured housing by 2012. HUD's Office of Manufactured Housing is the only HUD program office that has a responsibility to regulate construction housing standards. According to HUD officials, this new legislation has created uncertainty about their role in setting energy efficiency-related codes for manufactured housing as well as the process by which these codes will be implemented and enforced. HUD officials told us that they are considering letting DOE go forward with its implementation of this legislation before it takes any further action related to updating energy efficiency standards for manufactured housing. HUD officials said that they were concerned that overlapping responsibilities between DOE and the Office of Manufactured Housing could complicate how energy efficiency standards are developed and monitored in manufactured housing in the future. According to HUD officials, they have convened one meeting with DOE to discuss the implementation of a new energy efficiency standard. However, HUD

¹⁸The Manufactured Housing Consensus Committee is a statutory Federal Advisory Committee body charged with providing recommendations to the Secretary on the revision and interpretation of HUD's manufactured home construction and safety standards and related procedural and enforcement regulations. The Consensus Committee was also charged with developing proposed model installation standards for the manufactured housing industry.

officials stated that next steps were not established in this meeting to ensure that new energy efficiency standards could be considered and implemented. To the extent that the implementation of stronger energy efficiency standards for manufactured housing are delayed by not resolving uncertainty about overlapping agency responsibilities and a process to move forward in considering new energy efficiency standards, manufacturers may lack an incentive to build manufactured homes that are energy efficient.¹⁹

Some Updates to Guidance about Energy Efficiency Opportunities Are Incomplete

HUD has not completed updates of certain program handbooks and guides to provide HUD staff and program participants with current information on energy efficiency. HUD's Office of Public and Indian Housing has issued interim energy efficiency guidance through Notices 2008-25, 2008-22, and 2007-30 in order to provide HUD staff and program participants assistance until updated handbooks are published. Handbooks for which updates related to energy efficiency are needed and for which HUD staff told us there are planned updates include the following:²⁰

- *PIH Utility Allowance Guidebook*: Last updated in 1998, this guidebook describes how PHAs should establish utility allowances for residents. According to HUD officials, 21 percent of PHAs that they interviewed said that they did not like or utilize the guidebook due to difficulty in following or understanding it. HUD officials told us that numerous updates to the guidebook are in process, including adding PIH notices regarding energy efficiency and information on gathering consumption data.
- *PIH Energy Performance Contracting Handbook*: This handbook, which provides information about PIH incentives for energy efficiency, energy conservation opportunities, and guidance for engaging in an energy performance contract, has not been updated since 1992. PIH officials we spoke with said that they were revising the handbook to incorporate guidance on a broader range of green building practices but noted that completing the revisions required changing a program rule. They said that they hoped to publish the revised rule and updated handbook by January 2009.

¹⁹Some manufacturers do build to an Energy Star standard.

²⁰HUD's fiscal years 2007-2008 Implementation Plan for its Energy Action Plan includes planned updates for the *Energy Performance Contracting Handbook* and the *Multifamily Handbook*.

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- *Multifamily Handbook*: HUD's Energy Action Plan also includes an action for the Office of Multifamily Housing to develop informational guidelines for possible incorporation in a revised chapter on energy conservation in the Multifamily Handbook. The Office of Multifamily Housing has not updated this chapter since September 1992, when HUD had fewer energy conservation efforts under way. HUD officials said that the chapter had been revised and was making its way through internal departmental clearance.

HUD officials in PIH and the Office of Multifamily Housing said that they were revising these materials to reflect current information on energy efficiency. Given the apparent lack of priority to complete these updates previously, it will be important for HUD to finalize these handbooks and keep them up to date in the future. Without updated handbooks that reflect current guidance on green building, HUD staff and program recipients may be unaware of opportunities to make properties more energy efficient and sustainable.

Green Building Can Raise Up-front Costs and Provide Long-term Benefits, but HUD Lacks the Data to Identify Current Costs and Future Savings

Although green building practices can raise up-front costs, the results could provide long-term financial and health benefits for residents and HUD. However, the lack of immediate benefits for developers or owners, coupled with the additional costs, creates a potential disincentive for using green building practices in affordable housing. HUD pays an estimated \$5 billion in utility costs annually but has not collected the data that would be necessary to understand its current utility costs or the financial benefits that these practices could provide for many of its programs. As a result, HUD is limited in its ability to take advantage of the possible savings opportunities green building affords. HUD has partnered with EPA and DOE to develop a system that can identify savings opportunities in some of its programs, but this system is not available to its entire assisted housing portfolio.

Green Building Can Add to the Up-front Costs of Developing Affordable Housing

The use of green building practices can add to the up-front costs of green building, and these costs can vary from project to project. One study on the costs of building multifamily green affordable housing found that it added an average of 2.42 percent to the total development costs of projects, while another study on the costs in commercial buildings—such as office buildings and schools—found an average costs increase of 1.84

percent.²¹ In 2004, GSA estimated construction costs of building a new courthouse using green building standards ranged from saving 0.4 percent to adding 8.1 percent, depending on the level of green building certification. A number of factors can increase the costs of green building. These include “hard” costs for building supplies and labor, the “soft” costs of nontraditional activities such as obtaining certification, and regional differences such as climate. The contribution of each type of factor to project costs varies, so the overall cost increases also vary. In order to minimize the additional costs some green building professionals recommend incorporating green building measure early in the design process.

Hard Costs of Green Building

Hard costs including building materials, equipment, and labor can add slightly to overall construction costs, or they can be prohibitively expensive, especially for affordable housing developments. For example, Energy Star-labeled dishwashers do not cost any more than standard dishwashers and can save both water and electricity costs. However, some renewable energy technologies, such as solar photovoltaic panels that convert the sun’s energy to electricity, can be costly, presenting significant challenges to their use in affordable housing developments. For example, we visited a number of affordable housing developments that utilize solar energy, and found that nearly all of these properties were located in states that provided financial incentives such as rebates and tax credits to offset up-front costs. Many developers of these projects told us that they would not have been able to use solar energy in their projects without the rebates and tax credits.

Use of Solar Panels in Affordable Housing



Source: GAO.

The Plaza Apartments are located in San Francisco, California, and have been certified LEED Silver. The property provides studio apartment housing and on-site supportive services for formerly homeless individuals. The San Francisco Redevelopment Agency is the owner and developer of the Plaza Apartments, and provided much of the project’s development funding. The solar photovoltaic panels on the roof of the building were funded in part through the California’s Rebate for Renewable Energy Program, which provides financial support to developers in California that use renewable energy.

Hiring contractors with little experience in using green building practices can also result in adding to hard costs. In a recent report, we identified similar challenges in incorporating energy efficiency practices into the federal Gulf Coast rebuilding efforts following Hurricanes Katrina and

²¹William Bradshaw and others, “The Costs and Benefits of Green Affordable Housing,” (2005), and Greg Kats, *The Cost and Financial Benefits of Green Buildings: A Report to California’s Sustainable Building Task Force*, (October 2003). The study on the costs and benefits of affordable housing reported an added cost for 16 affordable housing properties across the country. The other study reported the added cost of green building for 33 LEED registered buildings in California. Due to the limitations of these studies, the results cannot be generalized to a broader population. Due to limited research on the costs and benefits of building green affordable housing, we also reviewed literature that focused on other building types, such as schools, office buildings, hospitals, and other commercial structures, in carrying out this portion of the analysis. For a description of how we selected the literature we reviewed, see appendix 1.

Soft Costs of Green Building

Rita.²² Building professionals we spoke to stated that inexperienced contractors often increased their prices in order to offset the cost of the learning curve associated with using newer materials and unfamiliar building practices. By using experienced professionals to build green affordable housing, developers could minimize their up-front costs.

Some up-front soft costs of green building, such as obtaining a green building certification can also add to the overall costs. Some of the green building organizations, such as the U.S. Green Building Council, which administers LEED and Southface, which administers EarthCraft, collect fees for certifying green buildings.²³ The size of these fees can vary depending on the level of green building certification. For example, GSA found that the soft costs associated with building either a federal courthouse or an office building to various levels of LEED certification—from LEED Certified to LEED Gold—could add \$0.35 to \$0.80 per square foot. In addition to the fees, administrative costs associated with documenting the completion of each point category within an organization's green building standard can add to the costs of certification. The affordable housing developers we spoke to expressed mixed opinions on the cost-effectiveness of obtaining green building certification. Some stated that achieving green building certification was useful, but others stated that gaining certification was an unnecessary expense or that it was not cost-effective.

Using different green building standards or achieving various levels of green can also affect costs. The GSA study estimated that the additional construction costs of building a new federal office building at the LEED-certified level would be 1.4 percent, but constructing the same building to meet the LEED Gold standard would likely increase construction costs by 8.2 percent.²⁴ Similar variations in green building costs were reported in a California study that found that a sample of green buildings in the state had average cost premiums of 0.66 percent at the LEED-certified level and

²²GAO, *Energy Efficiency: Important Challenges Must Be Overcome to Realize Significant Opportunities for Gulf Coast Reconstruction*, GAO-07-654, (Washington, D.C.: June 26, 2007).

²³Certification is obtained after submitting an application documenting compliance with the requirements of the rating system as well as paying registration and certification fees.

²⁴LEED levels are Certified, Silver, Gold, and Platinum, with Certified being the lowest and Platinum the highest level of green building certification.

6.5 percent at the LEED Platinum level.²⁵ Another study comparing the costs of green building and traditional buildings found no statistically significant difference in the square footage cost between the LEED-rated and non-LEED buildings, and observed a high level of cost variation among the buildings studied.²⁶ Additionally, the study found that when comparing the costs of the LEED buildings—from LEED Certified to LEED Platinum—the square footage costs were scattered among all buildings studied in no discernable pattern of distribution.

Building commissioning, which is a third party verification process that seeks to ensure that a building's systems are well designed, can also add to the soft costs of green building. The added costs of commissioning can vary and can depend on a particular building's specific characteristics. For example, one study we reviewed found that the costs of basic commissioning could range from \$1.50 to \$3.00 per square foot in the buildings reviewed in the study.²⁷ As with green building certification, developers had mixed opinions about the cost-effectiveness of building commissioning. For example, one building professional we spoke to stated that while building commissioning could add value, not all systems may need to be tested. This developer added that testing only major systems—such as the heating and cooling systems—could be more appropriate for an affordable housing development with a tight budget. Those who use the Green Communities criteria are not required to perform commissioning. Thus, green commissioning costs may not be accrued by entities that use the Green Communities standard.

Regional Differences and Green Building

Regional differences, such as climate variations and the level of regional experience, can also affect the up-front costs. Climate differences can influence how building systems are designed as well as the costs of using

²⁵Kats, *The Cost and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force*.

²⁶Lisa Matthiessen and Peter Morris, *Costing Green: A Comprehensive Cost Database and Budget Methodology*, Davis Langdon, (July 2004).

²⁷Lisa Matthiessen and Peter Morris, *Costing Green Revisited: Reexamination of the Feasibility and Cost Impact of Sustainable Design in the Light of Increased Market Adoption*, Davis Langdon, (July 2007), p. 16.

those systems.²⁸ For example, DOE recommends the use of electric heat pumps for heating and cooling equipment in some cold weather climate zones, but in very cold regions—that often fall below 30 degrees Fahrenheit—some heat pumps cannot comfortably heat a home without using costly equipment not needed in warmer climates. Limited regional experience using certain green building technologies can also increase the costs of green building. For example, in areas where there are more contractors with experience building green, contractors may be more willing to take on the cost associated with the risks of a project rather than passing those costs on to the client, in order to remain competitive with other contractors.

Green Building Practices Can Provide Long-term Financial Savings and Health Benefits

Some green building technologies that have higher up-front costs can provide savings that cover those added costs over time. For example, a 2005 study on the costs and benefits of green affordable housing estimated that 14 of 16 properties reviewed by the authors would experience a net financial benefit that includes utility savings and lower product replacement costs.²⁹ There are several ways of calculating potential savings from green building. One way involves assessing the “life-cycle” costs of certain green building practices. Life-cycle costing assesses not only the initial costs of materials and equipment but also the operating costs associated with them. Using this type of calculation, green building products with higher up-front costs may provide financial benefits over time. For example, using highly durable linoleum flooring may cost more than using sheet vinyl flooring initially but can actually cost less over time because the flooring may not have to be replaced as often. A second method of calculating the savings opportunities from using green building materials is to assess the amount of time required to “pay back” the added up-front costs through the operational savings generated by a particular green building practice. For example, compact fluorescent light bulbs pay back their initial added costs in less than 1 year (see table 4 to view the payback period for Energy Star-labeled products and appliances). Acceptable payback periods can vary depending on the situation.

²⁸Mattiessen and others, *Costing Green: A Comprehensive Cost Database and Budget Methodology*. This study analyzed the added green building cost of projects in five different climate types, and found that the cost varied by climate and level of green certification—from Platinum to Silver. According to the study, the cost variation can be explained by differences in the type of mechanical systems used in different climates.

²⁹Bradshaw, *The Costs and Benefits of Green Affordable Housing*.

Table 4: Payback Period for Energy Star-labeled Products and Appliances

Energy Star-labeled products	Green premium	Payback period (years)
Appliances		
Dishwasher	0	0
Refrigerator	3%	4.3
Washer	67%	4.4
Heating and cooling		
Programmable thermostat	26%	0.1
Furnace	41%	1.1
Central air conditioning	8%	1.6
Boiler	20%	3.0
Heat pump	18%	3.5
Lighting		
Compact fluorescent light bulbs	600%	0.3
Fixtures	63%	1.3

Source: Energy Star Cost Calculator.

Energy efficiency and water conservation measures can reduce utility costs and provide relatively quick payback on their initial investment. Measures such as properly installing insulation, using energy-efficient heating and cooling equipment, and using efficient products and appliances can reduce a building's overall energy use and lower its utility bills. The Energy Star program estimates that a certified home uses approximately 30 percent less energy than an uncertified home and can save homeowners from \$200 to \$400 per year. Additionally, the utility savings achieved from these practices can be used to pay the additional costs associated with these products and lower a building's ongoing operating costs over time. One green building cost and benefits study estimated that energy cost savings alone accounted for an average \$5.79 per square foot financial benefit in LEED-certified buildings studied in the report.³⁰ Water conservation measures, such as low-flow fixtures, front-loading Energy Star clothes washers, and capturing rainwater for landscaping, can also lower a building's utility use significantly. For example, high-efficiency toilets use approximately 20 percent less water

³⁰Kats, *The Cost and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force*. This report assesses the cost and benefits of 33 LEED certified green buildings by different factors such as energy, water, emissions, and occupant health.

per flush than a standard toilet. According to officials we spoke to from the Seattle Housing Authority, the agency has saved approximately \$800,000 per year by replacing the toilets in its properties with higher-efficiency models. Attention to building operations and maintenance is essential to ensure that the benefits of green building are maximized for the long term. Green building practices such as performing regularly scheduled (and unscheduled) maintenance of equipment can sustain original energy savings investments over the life span of the building's equipment. DOE reports that a building operations and maintenance program that targets energy efficiency can save 5 percent to 20 percent on energy bills with little capital investment. Equally important is tenant education, so that building occupants understand how to operate the equipment within their units in the most efficient manner.

Green building practices can also improve health for residents and benefit the environment, but these benefits are difficult to measure. Health benefits can result from building practices that improve the indoor air quality of a building and its units. For example, using material—such as carpet and furniture—free of volatile organic compounds (VOC) can decrease incidents of health problems such as respiratory illnesses. Also, many green building standards place a high priority on the design of ventilation systems that improve indoor air quality by replacing contaminated indoor air with fresh outdoor air. It has been acknowledged for some time that the condition of buildings can have an effect on occupant health. According to the Centers for Disease Control, an array of health ailments have been linked to substandard housing nationwide. Also EPA cites indoor air pollutants such as mold, radon, formaldehyde, and tobacco smoke as contaminants that can lead to a variety of health ailments, such as asthma, respiratory illness, and some forms of cancer. However, according to a representative from a national health organization we spoke to, evidence documenting the benefits of particular green building improvements is lacking due to limited research funding. Currently, the National Center for Healthy Homes is conducting a study of the health benefits of green building on an affordable housing development in Minnesota, but the results are not expected until 2009. One study we reviewed acknowledged that assessing the health benefits of green buildings can be complicated.³¹

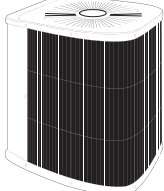




³¹Kats, *The Cost and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force*.

Green building practices such as using lower carbon-emitting energy and resource-efficient building materials, and managing rainwater in a way that limits the contamination of local waterways, can improve the overall environment. For example, capturing rainwater on site can reduce the amount of contaminants that run off the property into local waterways and limit a building's impact on a city's storm water and sewer system. Other practices, such as using sustainably harvested wood products, can reduce a building's global impact by limiting the environmental effect of extracting natural resource—e.g., wood products—for use in building construction. Also, lower carbon dioxide emissions from energy use in buildings can improve human and environmental health.

The financial benefits of green building improvements in a residential building are typically directed to the party responsible for the long-term costs. A 2005 study found that tenants living in the multifamily green affordable housing properties reviewed would benefit the most because they typically do not pay the up-front costs, but accrue most of the benefits through lower energy and water bills.³² On the other hand, the developers and owners of these buildings paid most if not all of the initial costs, but receive little benefit from the improvements. For example, in a property where rents are established through contracts with HUD, if a building owner assumes the up-front costs of installing a more expensive and energy-efficient boiler, the direct utility savings that may result will be primarily experienced by the tenant rather than the owner if the tenant is responsible for paying the energy bills. Such challenges can occur when the party responsible for the initial investment does not capture the benefits associated with that investment. This dynamic is referred to as the presence of “split incentives” in multifamily housing, which can create disincentives for owners and tenants (see fig. 1 for an example of how these costs and benefits can be distributed).

³²Bradshaw, *The Costs and Benefits of Green Affordable Housing*.

Figure 1: Example of Possible Distribution of Costs and Benefits for Green Building Practices

		More expensive heating and cooling system installed in building with rental units 		
		Costs	Benefits	
		Initial cost of new heating and cooling system	Lower utility bills over the life of the system	Lower use of carbon-emitting energy sources
Entities affected	Scenario A: Tenant pays utility bills	 Owner	 Tenant	 Environment
	Scenario B: Owner pays utility bills	 Owner		

Sources: GAO (analysis); Art Explosion (images).

Utility allowance policies—related to HUD supported properties—can exacerbate these split incentives. For example, when assisted multifamily housing building owners reduce their energy use by making energy efficiency improvements to a property, HUD policy requires that the utility allowance be adjusted to account for the energy savings. By decreasing the utility allowance, HUD captures the utility savings, and neither the tenant nor the owner receives the benefit. This leaves the owners and tenants with little incentive to make energy efficiency improvements or adjust their behavior, because they are not made better off by the green building improvements.

HUD Invests Significant Resources in Utilities, but Only Benchmarks Utility Use in a Portion of Its Assisted Housing Portfolio

HUD invests significant financial resources in utilities, health, and safety in assisted housing properties. Utility allowances and utility subsidies are HUD's primary method of supporting the payment of utility expenses in its private assisted multifamily and public housing portfolios.³³ In 2007, HUD reported almost \$5 billion in utility expenses in multifamily and public housing properties (see table 5). HUD currently collects data on utility costs in its public housing program and a portion of its assisted housing programs.³⁴ However, according to HUD officials, the agency does not know exactly how much utility assistance it provides to assisted multifamily properties where the building owners are responsible for paying the utility expenses. In a 2006 report to Congress, HUD reported that buildings in this category had approximately \$900 million in total utility expenses, part of which was paid by HUD. The officials told us that they could not accurately determine how much HUD contributed to the utility expenses in these buildings because some of the data collected by HUD are not broken out to show the share of utility expenses that may be paid for by HUD.³⁵ In addition, HUD does not currently collect either utility costs or utility consumption data in a number of its assisted multifamily properties.

³³Utility allowances are provided to building owners, who provide the funds to tenants of assisted multifamily and public housing when the tenant is responsible for paying the unit utility expenses. Tenants in these programs are required to pay 30 percent of their income toward their rental costs. Utility subsidies are provided to the owners of assisted multifamily housing and PHAs when they are responsible for the entire buildings utility expenses. In public housing, the subsidy is provided in the form of a payment to the PHA, and in assisted multifamily housing, the utility subsidy is a component of the rent charged to the tenant and HUD.

³⁴In properties that receive a utility allowance, HUD collects data on the number and size of the allowances provided to tenants in public and assisted multifamily housing. It also collects data on the utility expenses in public housing that it pays through utility subsidies.

³⁵All properties with FHA insured mortgages, with or without Section 8 contracts, file audited financial statements. However, a number of noninsured properties with Section 8 contracts are not required to file financial statements. HUD does not have utility expenditure data for these properties. Also, the financial statement data received by HUD cover the entire property. For those properties that are partially subsidized, the data do not reflect what portion was paid by HUD and what portion by residents. In addition in the Section 8 program, residents pay 30 percent of their income toward their rent. The Section 8 subsidy pays the remaining portion up to the total rent payment. Financial statement data do not reflect what portion of any expenditure was covered by Section 8 and what portion was covered by the resident's payment. The resident portion of the total rent revenues will be different in each property, as residents' incomes vary from resident to resident.

Table 5: HUD Utility Expenses for 2007

	Number of subsidized units	Total annual expense (dollars in millions)
Utility allowance provided to tenant		
Public housing	1,194,747	\$421
Tenant-based Section 8 (housing choice vouchers)	2,204,426	\$2,500
Project-based Section 8	1,625,210	\$663
Total	5,024,383	\$3,584
Utility subsidy provided to PHA		
Public housing ^a	-	\$1,321
Total HUD utility expense (provided to tenant and PHA)		\$4,908

Source: HUD.

^aPublic housing subsidy data covers a 9 month period from September 30, 2006, to June 30, 2007. This reflects utility costs associated with the most recent reporting period in HUD's Financial Assessment Subsystem data collection system

Utility benchmarking has been used in commercial building management for a number of years to assess energy use in properties and help to identify properties that could improve their energy efficiency. Since 1999, the Energy Star program has rated commercial buildings—such as office buildings, schools, hospitals, and hotels—by using a utility benchmarking tool that compares energy and water consumption in a particular building to that of similar buildings across the country.³⁶ High-performing buildings that use this tool can earn recognition from EPA and be labeled as Energy Star buildings. Commercial buildings that are Energy Star rated use on average 35 percent less energy than standard commercial buildings and generate one-third of the carbon dioxide. HUD has recently worked with EPA and DOE's Oak Ridge National Laboratory, through an existing interagency agreement, to develop energy and water benchmarking systems that can be used to identify savings opportunities in public

³⁶Portfolio Manager, which is administered through the Energy Star program, is an interactive energy management tool that allows you to track and assess energy and water consumption across your entire portfolio of commercial buildings. Users of the tool can rate their facilities' energy performance on a scale of 1-100 relative to similar buildings nationwide. The comparative analysis is based on the energy performance of buildings captured in the Commercial Building Energy Consumption Survey (CBECS), which is a national survey of buildings performed by the Department of Energy.

housing across the country.³⁷ HUD believes that this tool will allow it to establish a fair and measurable basis to accurately assess energy use in public housing by comparing a given public housing property's utility consumption with consumption at other public housing properties with similar characteristics such as age, number of units, and location. HUD has posted this tool on its Web site and in the future plans to use it to set program policies related to utility consumption in public housing.

While HUD has taken steps to benchmark utility use in public housing, it has not done so in its privately owned assisted multifamily housing programs. As a result, HUD is in a better position to understand its utility use and identify future savings opportunities in its public housing than it is in other multifamily buildings in its portfolio. According to HUD officials, it does not have any plans to use benchmarking in its privately owned multifamily housing programs—such as Section 8. In 2005, privately owned multifamily housing constituted approximately a quarter of the HUD-assisted housing units. HUD officials told us that they cannot benchmark utilities in these programs, because they do not collect or store utility consumption data—which are needed to benchmark utilities—for privately owned assisted multifamily housing properties. HUD officials told us that collecting these data and developing a benchmarking system could be useful to understand the energy use and savings opportunities in its multifamily housing portfolio, but that it could be costly to HUD and the property owners. A 2003 study by Harvard University—funded by HUD—found that collecting consumption data in FHA-insured privately owned multifamily housing would not be unreasonably burdensome.³⁸ Additionally, benchmarking systems exist for other types of properties, such as corporate real estate, hotels, schools, and dormitories. Also, the HUD officials responsible for developing the benchmarking system for public housing told us that this tool was developed through an existing

³⁷Oak Ridge Laboratory is a science and technology laboratory managed by DOE. Oak Ridge conducts basic and applied research and development to strengthen the nation's leadership to increase the availability of clean and abundant energy, restore and protect the environment, and contribute to national security.

³⁸Harvard University Graduate School of Design, *Public Housing Operating Cost Study: Final Report*, Cambridge, MA (June 2003)

interagency agreement and at minimal cost to HUD.³⁹ By not benchmarking utility costs in its multifamily portfolio, HUD is missing an opportunity to target less efficient multifamily properties for green building improvements, an action that could reduce the resource consumption and utility expenses for HUD and its funding recipients.

Standards and Financial Incentives Used Elsewhere for Green Building Could Provide Lessons for HUD

Standards and financial incentives that are used by states, cities, and nonprofit organizations to encourage green building could provide lessons for HUD. National and regional green building standards are often used to provide a framework for how to build green, and state and local jurisdictions have even developed their own regional green building standards. HUD has focused its attention on incentives that encourage energy efficiency, but it provides few financial incentives to encourage more comprehensive green building practices—such as water conservation and indoor air quality. For example, HUD provides one incentive point for energy efficiency in its competitive housing development grant programs, such as Section 202, but according to HUD officials, the strength of this incentive is unclear. According to HUD, it has not assessed whether the single incentive point is sufficient to stimulate higher levels of energy efficiency in HUD-funded projects. This lack of understanding makes it difficult for HUD to know if this incentive is strong enough to encourage energy efficiency in its programs. In addition, while focusing on energy efficiency, HUD does not currently have many incentives that focus on the nonenergy green building practices. While HUD funding is used occasionally to promote green building, the decision to do so is typically in response to state and local requirements or incentives, not HUD's policies. Many state and local governments have used financial incentives to encourage the use of green building, including nonenergy green building practices, in their affordable housing programs. The lack of nonenergy green building incentives could make it less likely that HUD funding will be used to build green affordable housing.

³⁹The public housing benchmarking system was developed in partnership with the Oak Ridge National Laboratories through the DOE, EPA, and HUD Energy Star® memorandum of understanding. The model was developed using building characteristics and consumption data collected from 3,342 public housing properties and was found to predict at a high level the relationship between properties being compared using the model. According a HUD official the department did not bear much in the way of additional cost for developing the system. HUD simply provided data to DOE for use in developing this and another benchmarking system used by the New York State Energy Research and Development Authority in its green affordable housing program.

The Use of Green Building Standards by State and Local Governments, as Criteria for Affordable Housing Programs, Could Provide Lessons for HUD

The use of national and regional green building standards by state and local governments could provide lessons for HUD. State and local governments use national and regional standards to provide the framework for how to use green building practices, to provide minimum criteria for green building incentives, and to establish eligibility requirements for receiving affordable housing funding. The state and local government officials we spoke to report that setting a green building standard for funding programs is important to support green affordable housing. Some officials we spoke to emphasize the importance of flexibility in determining which green building standards or practices should be used as criteria. For example, the City of Seattle, through SeaGreen, provides a menu of 101 green building measures—such as easy access to public transportation, water-conserving plumbing fixtures, and using Energy Star windows—as options for developers to choose from when applying for city affordable housing funding. According to the Seattle officials, the flexibility is emphasized in order to recognize the variation in costs associated with some green building practices. Some states have worked with organizations with experience in green building to promote green affordable housing in their regions. For example, Southface—which administers the EarthCraft Green building standard—has worked with Virginia and Georgia to incorporate green building into each state’s LIHTC program.

National standards are used to provide guidance on how to build green affordable housing. LEED and Enterprise Green Communities are identified as national green building standards.⁴⁰ Many of the developers we spoke to stated that the cost-effectiveness of using some green building standards varies significantly. LEED was cited by affordable housing developers and other professionals we spoke to as difficult to incorporate into the constrained budget of an affordable housing development. The LEED certification fees and administrative costs of documenting the completion of LEED points were cited as financial barriers for affordable housing developers. However, building professionals we spoke to stated that they found value in using LEED, because of the third party

⁴⁰National Association of Home Builders (NAHB) is in the process of developing a new green building standard in coordination with the International Code Council and the American National Standards Institute. According to officials from NAHB, the certification costs of completing this standard will be much lower than those of LEED. These officials also stated that the standard will be more flexible than LEED, and be appropriate for use in affordable housing. Currently, NAHB publishes the *NAHB Model Green Home Building Guidelines*, and provides information on green building on its website.

verification process that ensures that the final product actually developed used green building practices. Enterprise's Green Communities was designed specifically for use in affordable housing developments, but it lacks third party verification requirements required by other standards. The Green Communities contains a number of mandatory items. People we spoke to thought that Green Communities was a good standard for affordable housing. However, others believed that the inflexible nature of the criteria and the lack of third party verification render it inappropriate for some types of projects.

Regional green building standards such as EarthCraft, Green Point Rated, and Evergreen provide green building guidance that takes into account the regional characteristics of the location where the housing is built—such as the local climate and regulatory structure. Some state and local officials use regional green building standards, because these standards took into account local climatic and regulatory conditions. Some local jurisdictions have even developed their own regional green building standards, because existing standards did not meet their specific needs. For example, Washington State worked with Enterprise to develop the Evergreen Sustainable Development Standard to allocate their LIHTC and housing trust fund dollars.

The Impact of HUD's Energy-Related Incentives Is Unclear and HUD Offers Few Nonenergy Green Building Incentives

HUD efforts to use green building incentives have focused primarily on energy efficiency, but it is unclear whether these incentives truly encourage greater energy efficiency, and few encourage nonenergy green building practices, such as water conservation and indoor air quality measures. HUD's primary incentive is provided through its competitive housing development grant programs such as HOPE VI, Section 202, and Section 811, which provide 1 incentive point for energy efficiency through its NOFA. In addition, in the Section 202 program, HUD also awards 15 points for the applicant's experience and 5 points for ties to the local community. HUD officials asserted that competitive grant applicants had strong incentives to seek every possible point in the application, but the strength of the existing energy efficiency point incentives for these programs is unclear. HUD data indicate that a majority of applicants for the HOPE VI, Section 202, and Section 811 programs earned the point in fiscal year 2007, and it is unclear what impact, if any, the single incentive point may have had on funding decisions. Because almost all applicants that were deemed eligible to receive funding received the point, it does not appear to have been a determining factor for most applicants that received funding. We did not examine the extent to which applicants believed 1 point (out of a total of 100 or 120 points) would make a significant

difference in their prospects for success. According to a HUD official, it generally does not verify that planned improvements have been implemented; the impact of this incentive on energy efficiency also remains unclear. According to HUD, it has not assessed whether the single incentive point is sufficient to stimulate higher levels of energy efficiency in HUD-funded projects, and does not verify the installation of all energy efficiency improvements. When providing an incentive in a competitive grant process, it is important to understand whether the incentive point is having its intended effect. This lack of understanding makes it difficult for HUD to know whether these single point incentives are strong enough to encourage energy efficiency in its programs.

Example of Green HOPE VI Project



Source: GAO.

High Point, located in the Delridge neighborhood in Seattle, Washington was originally a 716-unit public housing project built during World War II. With over \$37 million in HOPE VI funding, the Seattle Housing Authority converted this blighted public housing property into a mixed income community that covers 34 city blocks and has 1,600 home ownership and rental units—half affordable housing, half market rate. The green features of the homes in High Point include the following: Energy Star appliances, water-conserving fixtures, use of paints with no and low volatile organic compounds, and durable hard flooring instead of carpeting. Also, a natural rainwater drainage system was created for the property to prevent toxins—such as motor oil—from running off the site into a creek near the neighborhood.

Although green building practices can provide long-term benefits and savings opportunities, HUD has focused its attention primarily on energy efficiency and currently has few incentives to encourage nonenergy green building in its affordable housing portfolio.⁴¹ Occasionally, HUD funding is used to build green affordable housing, but according to PHA officials we spoke to, these decisions are typically made at the local level and not in response to HUD incentives or encouragement. For example, the Boston Housing Authority used HOPE VI funding to build a LEED-certified redevelopment project. According to officials from the housing authority, the decision to build green was influenced primarily by the city's overall housing and environmental strategies. A number of building professionals we spoke to stated that their decision to build new green affordable housing was in response to state and local requirements or incentives—such as the LIHTC—but not HUD's policies. However, some of HUD's affordable housing portfolio may not participate in programs such as the LIHTC.

Many state and local governments have used financial incentives to encourage the use of green building practices in their affordable housing programs. Currently, nearly all states have used competitive funding to encourage some level of green building in affordable housing.⁴² The most prominent program in this regard is the LIHTC. LIHTC dollars are

⁴¹Some HUD incentives that focus on nonenergy components of green building include the Market-to-Market Green Initiative and energy performance contracts.

⁴²James Tassos, *Greener Policies, Smarter Plans: How States are Using the Low-Income Tax Credit To Advance Healthy, Efficient, and Environmentally Sound Homes*, Enterprise Community Partners, (2007). This author has been monitoring the extent to which state housing finance agencies have incorporated green building practices into their LIHTC Qualified Allocation Plans.

provided to local developers in accordance with state Qualified Allocation Plans that states are required to develop and that outline the competitive processes that will be used to award these funds. Most states employ a competitive point system to award LIHTC funds and have provided incentive points for projects that agree to use green building practices.⁴³ For example, Virginia’s Qualified Allocation Plan provides 30 points to applicants that agree to build to the EarthCraft or LEED green building standards. Applications that don’t meet a threshold of a total of at least 450 points will not be considered for the tax credits. California also provides competitive points for green building and offers additional LIHTC funding for projects that agree to build green. In addition to the LIHTC, states have used other funding sources to encourage green building. For example, Washington State requires that all projects receiving state housing trust fund dollars agree to use green building practices, and Texas has developed a Green Building Revolving Loan Fund that is self-sustaining and provides financial support to projects that agree to build green.

California Low-Income Housing Tax Credit

California administers federal and state low-income tax credit programs. Through its Qualified Allocation Plan (QAP) the state provides two incentives to encourage the use of green building practices. First, the state provides a maximum of eight competitive incentive points for applicants that agree to either choose from an array of green building practices or commit to certify the property under a green building standard—such as LEED or Green Communities. Second, projects can obtain a 4 percent increase in the amount of funding they are eligible to receive if they agree to meet a higher energy standard—35 percent above the state’s energy code—or choose three green building practices from a list of higher cost practices listed in the QAP—such as agreeing to recycle 75 percent of the project’s construction waste.

City government and nonprofit organizations have also used a mix of financial approaches to encourage green building practices, which could provide examples for HUD. For instance, the City of Seattle required that applicants for the city’s affordable housing funds submit a sustainability plan that incorporates elements of its SeaGreen Green Building Guide. However, the city recently retired SeaGreen and currently requires projects funded through the city to incorporate the Washington State Evergreen Sustainable Development Criteria.⁴⁴ City officials told us that green building practices are not required to remain competitive for city funds. However, these developers must incorporate elements of the SeaGreen guide. Nonprofit groups like the Local Initiative Support Corporation (LISC) and the Enterprise Community Partners have also developed strong financial incentives to support green building. At the local level, the California Bay Area LISC chapter has developed a “green loan fund.” Eligibility for loans from the fund is contingent upon demonstrating that projects will meet minimum green building standards.

⁴³There is no federal requirement that a state incorporate green building practices into its QAP. States that have either required or mandated green building practices have made the policy decision to do so independent of federal requirements.

⁴⁴In the summer of 2008, the City of Seattle retired its SeaGreen Program. In order to maintain consistency with the state affordable housing program, the city will adopt the Evergreen Sustainable Development Standard, administered by the Washington State Department of Community, Trade and Economic Development for its affordable housing programs.

Enterprise Community Partners provides loans and grants to affordable housing projects that follow its Green Communities Criteria. These programs include a predesign grant program meant to support the early planning and adoption of green building practices—energy and nonenergy—at the design stage of development (see app. V for a list of sample state, local, and nonprofit green building financial incentives). However, the lack of nonenergy green building incentives in many of HUD’s programs makes it less likely that HUD funding will be used to support the development of green affordable housing.

Conclusions

Energy costs account for a significant portion of HUD’s expenditures for assisted housing, and these costs are expected to rise as the cost of energy increases. To offset these costs and benefit from the growing body of knowledge about the environmental and health effects of buildings, HUD could benefit from expanding its efforts to support the building and rehabilitation of sustainable, healthy, and energy-efficient housing. While HUD has made some progress in encouraging green building practices, more remains to be done to ensure that the agency itself, its grantees, and program recipients are benefiting to the extent possible from the advantages that green building offers. In part because of a decision to delay the issuance of a proposed regulation due to concerns about a separate proposed regulation, a statutory requirement to require energy-efficient products and appliances in all public housing has not been met, and this may result in housing authorities purchasing products and appliances that are not energy efficient. Although manufactured housing is an area in which HUD has significant influence because it has been responsible for establishing manufactured building code requirements since 1974, HUD has not made significant energy efficiency updates to code for this program since 1994. HUD officials told us that they intended to wait to make energy efficiency updates to the code due to their concerns about overlapping agency responsibilities between DOE and the Office of Manufactured Housing. However, the current energy efficiency-related codes are antiquated by HUD’s own description, and DOE is not required to develop its energy standards for manufactured housing until 2012. Waiting for DOE to take action when DOE has until 2012 to do so and when the current code is already so outdated could result in additional years of some manufactured homes being built without improved energy efficiency standards. As a result, the agency has missed an opportunity to reduce the energy costs and other green building impacts associated with manufactured housing. Program handbooks have not been updated to reflect current guidance on green building, so that

many staff may be unaware of opportunities to make properties more energy efficient and green.

While some green building practices can add to up-front costs, they can also provide long-term financial and health benefits. HUD invests significant resources in support of utilities in multifamily properties, but does not fully understand the differences in utility consumption across these properties. HUD's public housing office has shown leadership and initiative in partnering to develop a utility benchmarking tool that could be used to identify properties with high levels of utility consumption, but HUD's multifamily assisted housing has no such tool. In the absence of such a tool, HUD cannot target certain multifamily properties for green building improvements, which could result in benefits, including reduced resource consumption.

A number of state and local governments provide targeted green building financial incentives that have helped to support the development of green affordable housing, but HUD has few such incentives. HUD's incentives for its competitive grant programs have focused entirely on energy efficiency through the awarding of one incentive point, but the impact of these incentives is unclear. Recognizing that HUD awards incentive points in numerous competing priority areas in its application, HUD's lack of understanding about the impact of the single incentive point for energy efficiency makes it difficult to assess whether these incentives are strong enough to sufficiently encourage greater energy efficiency in its programs. In recent years HUD has devoted limited resources to financing green building efforts or studying the costs and benefits of green building. Additional resources may expand HUD's reach in green building beyond its current efforts to include an improved understanding of national and regional green building standards as well as the costs and benefits of green building practices. Models for targeting resources to green building exist in a number of states and localities. For example, Texas has created a self-sustaining revolving loan fund that provides initial funding for green building. Such HUD green building programs could provide affordable housing developers with financial assistance to deal with the added costs of green building and HUD with the data it needs to understand the relationship between the up-front costs and long-term benefits of green building. HUD's public housing and Mark-to-Market programs are able to promote green building, in part because they provide financial incentives to program participants. Participants in other HUD programs may not build green without incentives similar to those provided by state and local governments. Without green building-focused incentives, HUD may be

missing an opportunity to stimulate higher levels of resource-efficient and environmentally friendly housing.

Recommendations for Executive Action

In order to better promote green building practices, we recommend that the Secretary of HUD direct the appropriate program offices to take the following actions:

- ensure completion of the regulation that would require the use of energy-efficient products and appliances for public housing as directed by the Energy Policy Act of 2005,
- proactively work with DOE to expeditiously implement energy-efficiency updates to the HUD Manufactured Housing Code,
- ensure that updates to handbooks are regularly completed in a timely fashion to provide more current guidance on energy-efficient and other green building practices,
- consider working with DOE's Oak Ridge National Laboratory and EPA to develop a utility benchmarking tool for multifamily properties, and
- assess whether the single-point incentive awarded for energy efficiency is sufficient to stimulate higher levels of energy efficiency for its competitive grant programs and consider providing nonenergy green building incentive points for these programs.

Agency Comments and Our Evaluation

We provided a draft of this report to HUD for review and comment. In written comments, HUD's Deputy Secretary stated that HUD welcomed our recommendations and that the agency would give serious consideration to their implementation with the resources it has available. The Deputy Secretary's letter is reprinted in appendix VI. We also received general and technical comments from HUD that provided additional detail on issues discussed in the letter that we have incorporated as appropriate. HUD made comments suggesting that we did not provide enough information describing HUD's progress in implementing green building practices or provide enough direction in how HUD should manage its programs. Discussed below are a number of concerns HUD had with certain aspects of the report and our response.

First, HUD stated that we did not sufficiently distinguish between energy-related and non-energy-related green building strategies and the costs and

benefits associated with them. While we did distinguish between energy-related and non-energy-related green building strategies and also describe the potential costs and benefits for a variety of green building practices, we did not compare the costs and benefits of the different approaches. As we note in the report, energy efficiency is one of a number of important elements of green building. We continue to believe that other non-energy-related measures, such as conserving water and improving indoor air quality, may also provide important benefits and thus merit HUD's consideration. As discussed in the report, HUD officials we interviewed identified water conservation savings as significant and among the biggest potential opportunities for financial savings.

Second, HUD stated that we did not sufficiently distinguish among the different strategies that would be needed to expand green building in the wide array of HUD programs. Our report is not intended to suggest that HUD adopt any particular green building criteria or strategy but rather aims to point out that a variety of strategies are available and that HUD may want to consider some or all of them for its programs. We recognize the diversity of HUD's programs and have emphasized the fact that many green building strategies are available for HUD's consideration.

Third, in acknowledging that we identified the potential added costs of green building, HUD also commented that we had made no recommendations on how to address these costs. In additional comments provided to us, HUD stated that such higher costs would translate into fewer units that would be assisted or subsidized by HUD. While we agree that these costs may vary across HUD programs, sufficient data were not available to perform the type of cost-benefit analysis necessary to make such recommendations. The limited availability of data such as utility cost and consumption information was one of the reasons that we recommended that HUD work with DOE's Oak Ridge Laboratory and EPA to develop a utility benchmarking tool for multifamily properties. HUD could consider whether the agency needs to address the potentially higher costs associated with green building incentives or requirements in every program. For example, some state housing finance agencies that administer programs supporting affordable housing told us that they had not observed a drop in the number of affordable housing units built after incentives or requirements for green building were added to their programs. As a result, these agencies did not need to address the issue of higher costs.

Fourth, HUD commented that in describing the growing number of state and local green building standards and initiatives, our report did not say

whether HUD should set standards of its own or defer to the state and local initiatives. Our report did not seek to make such a determination for the wide array of diverse housing programs that HUD administers. Rather, it was intended to present the experiences of other governments and nonprofits in developing their green building efforts as useful practices for HUD to consider in developing its green building efforts.

Fifth, HUD noted that we did not fully address staffing or resource issues. We acknowledge in our report that additional dedicated resources may be needed if HUD is to continue harnessing the potential benefits of green building. However, the extent to which additional staffing or resources would be needed is an internal management issue that we leave to HUD's discretion.

Sixth, HUD noted that our report did not highlight the activities of certain offices or programs, such as HUD's efforts to support affordable housing in transit-oriented development. In this report we did not provide a complete listing of all HUD's efforts related to energy efficiency and green building and we have added language to our scope and methodology to clarify this point. HUD itself has provided a description of its efforts in its original Progress Report to Congress on the status of its energy efficiency efforts and is scheduled to provide an updated report soon. As an overview of HUD's efforts, we have provided highlights of HUD's efforts, targeted descriptions, and examples that reflect the scope of these efforts in the areas of energy efficiency and green building. Appendix III, which was included in the draft report, provides additional information on all of the actions items identified in HUD's Energy Strategy. Finally, we have ongoing work on HUD's efforts to support affordable housing in transit-oriented developments, and we may conduct more focused work on other particular areas of HUD's green building efforts in the future.

In addition, HUD noted that our report misstates the extent of the authority that Congress has given HUD to require green building practices other than those related to energy efficiency. We did not mean to suggest in our report that Congress had given HUD specific authority to require green building measures. In fact, HUD is currently promoting green building practices in programs for which the underlying statutory authority does not explicitly authorize those practices. For example, in the Mark-to-Market program, HUD is relying on its authority to require "the addition of significant features" to a housing project's rehabilitation plan to induce eligible owners to participate in the program's Green Initiative. Further, in the HOME program, HUD is relying on the statutory provision that mandates the competitive reallocation of \$1.5 million dollars

previously allocated but never spent to jurisdictions that agree to build green affordable housing. In addition, in support of the goals of the President's National Energy Policy, HUD recently issued Public and Indian Housing Notice 2008-25, "Renewable Energy and Green Construction Practices in Public Housing," which "strongly encourages Public Housing Agencies (PHAs) to use solar, wind, and other renewable energy sources, and other 'green' construction and rehab techniques whenever they procure for maintenance, construction, or modernization." Finally, through its authority under the Native American Housing Assistance Act to provide block grants for the "new construction . . . of affordable housing" (25 U.S.C. § 4132), HUD allows costs for "incorporating green building, energy efficiency or other innovative practices" into such housing (Public and Indian Housing Notice 2006-17). These examples demonstrate that a particular program's authorizing legislation can provide HUD the discretion to mandate green building measures.

Finally, HUD disagreed with GAO's characterization of HUD's implementation of the Energy Policy Act requirement mandating the purchase of energy-efficient appliances in public housing. In our draft report, we provided a narrative of events at HUD that described a "miscommunication" between HUD officials as contributing to the delay in HUD implementing the Energy Policy Act requirement. HUD stated in its technical comments that GAO's narrative of events was not accurately portrayed by the term "miscommunication." We removed the discussion of the miscommunication, as it was not necessary to support our finding that HUD has not yet implemented this Energy Policy Act requirement from 2005. As stated in our report, HUD said that it had not implemented this requirement because the agency wished to consolidate related rules and save clearance and process time for the public. However, we continue to believe that a single rule could have been implemented to address the statutory requirement to purchase energy-efficient products and appliances in public housing. Given that HUD's process has thus far resulted in a 3-year delay in implementing this statutory requirement, in our view, it would have been appropriate to promulgate a single rule rather than incurring a delay by trying to develop a consolidated rule. Without such a rule, public housing authorities may be purchasing products and appliances that are not energy efficient. We also noted in our report that HUD had issued a notice encouraging the purchase of energy-efficient products, but such a notice does not take the place of or have the same effect as a requirement. Further, of the 52 percent of public housing authorities that responded to a HUD survey on the issue of purchasing energy-efficient appliances, only about half of the respondents, or about one-quarter of all PHAs, specifically identified plans to make such

purchases. Given these results, it is unclear whether three-quarters of all PHAs are purchasing the required appliances, which can provide significant savings on energy and water costs.

We are sending copies of this report to the appropriate congressional committees and the Secretary of Housing and Urban Development. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report or need additional information, please contact me at 202-512-8678 or shearw@gao.gov. Contact points for our Office of Congressional Relations and Office of Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix VII.



William B. Shear
Director, Financial Markets and
Community Investment

Appendix I: Scope and Methodology

To examine the status of the Department of Housing and Urban Development's (HUD) current efforts to promote energy efficiency and the performance measures the agency uses to assess these efforts, we obtained and analyzed documentation on HUD's programs that support energy efficiency and related performance measures. We also interviewed HUD officials at HUD headquarters who are responsible for managing HUD programs as well as members of HUD's Energy Task Force, including the cochairs of the task force. In addition, we conducted site visits to three HUD field offices (Boston, Massachusetts; San Francisco, California; and Seattle, Washington) and conducted interviews with HUD officials, including staff responsible for the numerous HUD programs that were included as part of our review. We also obtained perspectives of the Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), nonprofit organizations, developers, and energy efficiency practitioners on HUD's efforts to incorporate energy efficiency and sustainable building practices into its affordable housing programs. We did not seek to provide a complete listing of all of HUD's efforts related to energy efficiency but instead to provide an overview of HUD's efforts that reflects the scope of its efforts in this area.

To describe the potential costs and long-term benefits of incorporating green building practices into HUD's affordable housing programs, we reviewed relevant research and interviewed individuals with experience in the area of green building. In order to identify the studies we reviewed, we searched with a variety of Internet and library search engines. Because there is limited research available on the costs and benefits of green affordable housing, we reviewed studies that assessed the costs and benefits of green building in a variety of building types—such as affordable housing, office buildings, schools, and hospitals. Due to limitations in the studies we reviewed, none of the findings could be generalized beyond the sample of properties reviewed in each study. In order to gain a perspective for the costs and benefits of building green affordable housing specifically, we also interviewed individuals with experience financing green affordable housing projects—such as green building organizations, affordable housing developers, and affordable housing funding providers. The knowledgeable individuals we interviewed represented organizations that included Global Green USA, Home Depot Foundation, U.S. Green Building Council, National Association of Home Builders, Enterprise Community Partners, and Local Initiatives Support Corporation.

To provide information on lessons learned at selected sites that promote green building practices; we conducted interviews and site visits in

locations that have incorporated green building practices into their affordable housing programs. To select these locations, we interviewed knowledgeable individuals in the area of green building and reviewed relevant literature on government and nonprofit green building efforts. From a list of 23 locations, we selected a judgmental sample of 4 locations with active green affordable housing initiatives: Austin, Texas; Boston, Massachusetts; the California Bay area;¹ and Seattle, Washington. We also conducted interviews with two state housing finance agencies in Virginia and Vermont, but did not visit these locations. These sites were selected because they each had green building practices taking place in state and local governments and in the nonprofit and for-profit housing development sector, and represented regional diversity in locations. We also sought to choose sites that were located in proximity to HUD regional offices. During these site visits we interviewed local and state government officials, and nonprofit and for-profit developers, and conducted site visits to green building properties.

¹Through this visit we spoke with government officials from Alameda County, the City of Oakland, and the City of San Francisco.

Appendix II: HUD's Legal Authority to Incorporate Green Building Requirements into Its Affordable Housing Programs

HUD has the legal authority to implement green building requirements. Provisions of the Energy Policy Act of 2005, the Energy Security and Independence Act of 2007, and other relevant statutes grant HUD the authority to incorporate and update green building-related requirements in its housing programs. As described earlier, Section 152 of the Energy Policy Act of 2005 requires public housing authorities (PHA) to purchase energy-efficient appliances when doing so would be cost-effective. Section 153 of the act amended Section 109 of the Cranston-Gonzalez National Affordable Housing Act to require that all public and assisted housing rehabilitated or constructed with Urban Revitalization Demonstration Program (HOPE VI) funds must meet the 2003 International Energy Conservation Code.¹ HUD implemented this provision by incorporating this requirement into the 2007 HOPE VI Notice of Funding Availability (NOFA).

The Energy Security and Independence Act of 2007 required that HUD update energy efficiency standards for new construction and rehabilitation projects in public and assisted housing. Section 481 of this act amended Section 109 of the Cranston-Gonzalez National Affordable Housing Act again to require that all new construction and rehabilitation in HUD “public and assisted housing” meet the 2006 International Energy Conservation Code. This requirement applies to public housing, the project-based Section 8 program, and other programs providing grants and rental assistance, such as the Section 202 and Section 811 programs. The Energy Security and Independence Act provides HUD with the authority to incorporate this requirement into the regulations for the HOME program as the authorizing legislation for HOME references Section 109 of the Cranston-Gonzalez Act. The HOPE VI program, which provides funds for the rehabilitation and construction of public housing, has incorporated this requirement into its fiscal year 2008 NOFA.

HUD has the authority to implement energy efficiency requirements beyond those explicitly authorized in statute for most of its competitive and formula grant programs. In the 2008 NOFA for its competitive grant programs, HUD stated it was reviewing whether to require grantees in fiscal year 2009 to incorporate “energy efficiency measures in the design, construction, rehabilitation, and operation of properties designed, built,

¹The International Code Council, a membership association, develops the codes used to construct residential and commercial buildings. The 2003 International Energy Conservation Code provides energy conservation provisions for residential and commercial buildings.

rehabilitated, or operated with funds awarded through HUD's NOFAs," as well as to require grantees that provide counseling and training to include information on Energy Star products as part of those services. HUD officials noted that adding green building-related requirements to the Community Development Block Grant (CDBG) program (a formula program) would represent a major change to the program, and should preferably occur with specific support from Congress.

HUD imposes most new requirements, including energy efficiency requirements, on grantees through rulemaking. The rulemaking process usually incorporates an opportunity for the public to comment on the new requirements before they are finalized in regulations. For example, in the 2008 NOFA for its competitive programs, HUD stated that it would provide the public with advance notification and the opportunity to comment before mandating energy efficiency requirements in its programs for fiscal year 2009. While the HOPE VI program does not have program regulations, HUD attorneys said that HUD would nevertheless incorporate energy efficiency requirements into the HOPE VI NOFA through rulemaking. HUD attorneys observed that HUD may have to go through the rulemaking process to implement point incentives for energy efficiency that effectively serve as requirements. For example, HUD may not have the authority to significantly increase the one-point NOFA incentive for energy efficiency without going through rulemaking.

Appendix III: Overview of Planned HUD Actions in Energy Strategy and HUD Reported Status

Action number	Planned action	Status ^a
1	Provide incentives for energy efficiency in housing financed through HUD's competitive grant programs	<ul style="list-style-type: none"> Numerous competitive HUD programs provide a rating point for energy efficiency-related activities in applications for funding.
2	Include energy efficiency performance measures in the annual performance plan and management plans	<ul style="list-style-type: none"> Energy efficiency performance measures have been included in the annual performance plan and the management plans but the measures have been primarily focused on outputs (i.e., activities) and not outcomes (i.e., energy savings).
3	Promote the use of Energy Star products and standards through HUD's partnership for home energy efficiency with DOE and EPA	<ul style="list-style-type: none"> HUD has promoted the use of Energy Star products, through HUD's participation in the Energy Star Change a Light Campaign, and HUD's partnership with EPA's Energy Star program.
4	Conduct training on energy-efficient housing for building residents and organization building or rehabilitating affordable housing	<ul style="list-style-type: none"> HUD has conducted training but has not yet developed standardized training modules in many programs. According to HUD officials the HOME program has developed a standardized training module for Green Building and Energy Efficiency.
5	Establish residential energy partnerships with cities, counties, states, and other local partners	<ul style="list-style-type: none"> HUD has established numerous partnerships with state and local governments.
6	Encourage energy efficiency in HOME- and CDBG-funded new construction and housing rehabilitation projects	<ul style="list-style-type: none"> HUD has reported promoting energy efficiency for both programs in numerous workshops and presentations. HUD has begun to track the number of units built to Energy Star standards under both programs, reporting significant numbers of HOME-funded units that meet the standards.
7	Identify opportunities and assist with feasibility analysis for combined heat and power in multifamily housing	<ul style="list-style-type: none"> Feasibility assessments have been conducted for 20 multifamily properties. Combined heat and power has been promoted at conferences and in some HUD informational materials.
8	Base appliance and product purchases in public housing on Energy Star standards unless not cost-effective	<ul style="list-style-type: none"> HUD has a notice that encourages housing authorities to purchase energy-efficient appliances but has yet to put forward a requirement for housing authorities to do so, as is required through statute.
9	Build Hope VI developments to a high level of energy efficiency	<ul style="list-style-type: none"> HUD has encouraged the adoption of Energy Star and provided a rating point incentive. Recent statutes have set certain minimum energy efficiency standards that must be met by HOPE VI projects.

**Appendix III: Overview of Planned HUD
Actions in Energy Strategy and HUD Reported
Status**

Action number	Planned action	Status^a
10	Improve tracking and monitoring of energy efficiency in public housing	<ul style="list-style-type: none"> Public housing authorities have begun to report utility consumption data for individual properties. HUD has developed through a partnership a benchmarking tool that can be used to identify public housing properties that use large amounts of energy to operate.
11	Streamline energy performance contracting in public housing	<ul style="list-style-type: none"> HUD has required field offices to review energy performance contract proposals within 45 days and has contracted with an outside company to provide technical support related to energy performance contracts.
12	Promote energy conservation for federally assisted housing on Indian lands	<ul style="list-style-type: none"> HUD offers a one-point rating incentive for applications to its Indian Community Development Block Grant program that address Energy Star goals. HUD allows a waiver to total development costs for additional costs associated with energy efficiency and green building. HUD has instituted a series of national and regional training workshops on green building in Indian housing.
13	Feature the energy efficiency mortgage as a priority loan product	<ul style="list-style-type: none"> Little progress has been made on this action item.
14	Provide training on how Federal Housing Administration single family programs can be effectively used to promote energy efficiency	<ul style="list-style-type: none"> Some training has been provided but the extent of this training is unclear.
15	Continue improved tracking and evaluate performance of energy efficient mortgages	<ul style="list-style-type: none"> HUD has made improvements to the tracking of energy-efficient mortgages but has not evaluated their performance due to a lack of available research funds.
16	Promote energy efficiency in assisted multifamily housing and multifamily programs	<ul style="list-style-type: none"> HUD has made some efforts to promote energy efficiency for multifamily housing but there is no evidence of the outcome of these actions.
17	Continue HUD-DOE multifamily weatherization partnerships	<ul style="list-style-type: none"> Early efforts to explore weatherization partnerships nationally yielded limited results, but some state and local initiatives have been implemented.
18	Encourage the use of Energy Star new home standards in the design, construction, and refinancing of Section 202 and 811 projects	<ul style="list-style-type: none"> HUD provides a one-rating point incentive to applicants who indicate they will use energy-efficient measures in their properties. The point does not currently require that any specific measures are met. HUD has developed more detailed specifications for future funding awards.

**Appendix III: Overview of Planned HUD
Actions in Energy Strategy and HUD Reported
Status**

Action number	Planned action	Status^a
19	Explore incentives for energy efficiency through FHA multifamily insurance programs	<ul style="list-style-type: none"> • HUD's Office of Multifamily Housing convened a task force that recommended incentives for increasing energy efficiency in its insured housing programs. • The incentives are currently being considered and have not yet been implemented. • The Mark-to-Market program has implemented a green initiative that offers financial incentives for owners to adopt green building practices.
20	Explore asset management strategies and guidance for energy efficiency in HUD-subsidized multifamily properties.	<ul style="list-style-type: none"> • HUD has issued guidance to Multifamily Field Offices encouraging the use of Energy Star appliance and methods in conjunction with disbursements from Reserve for Replacement funds. No action to date has been taken on developing specific informational guidelines for staff and property owners.
21	Support energy-efficient training for multifamily managers and maintenance staff	<ul style="list-style-type: none"> • A four-part training series was offered in 2007, and specialized on-site training was offered in 2005 in a number of locations, but additional specialized training has not been provided.
22	Implement energy efficiency recommendations of the Manufactured Housing Consensus Committee in HUD-code manufactured homes	<ul style="list-style-type: none"> • Recommendations have not been implemented and HUD is not moving forward with the recommendations because of a new statute that provides DOE with the authority to establish energy-related regulations for HUD code homes.
23	Partner with local energy efficiency groups, HUD program offices, and other agencies to educate HUD customers about reducing energy costs	<ul style="list-style-type: none"> • HUD has established numerous partnerships with state and local governments.
24	Conduct energy-related policy analysis and research to support the department's energy goals	<ul style="list-style-type: none"> • HUD has utilized limited research funds to support the development of uniform remodeling protocols, as well as demonstrations and field evaluations of energy efficient technologies through the Partnership for Advancing Technology in Housing (PATH) program, but continued research efforts have been limited by severe funding constraints.
25	Develop a computerized tool for integrating environmental and energy retrofits	<ul style="list-style-type: none"> • Through HUD's Office of Healthy Homes and Lead Hazard Control, HUD expects to implement this measure in 2005.

Source: HUD.

^aStatus of actions items is as reported by HUD officials. Independent documentation of status was not conducted by GAO for all action items.

Appendix IV: Multifamily Task Force Energy Conservation Recommendations

- Reduce application and/or inspection fee by half for properties using energy conservation techniques and/or achieving an Energy Star certification by returning one-half of the fee after closing.
- Extend the maximum term of the mortgage for a project that receives an Energy Star certification.
- Allow installation of certain combinations of Energy Star products to be considered a major building component for determination of Substantial Rehabilitation in order to use 221(d)(4) (90 percent mortgage) instead of 223(f) (85 percent mortgage)
- A notice is to be placed in the Real Estate Management System (on the Reserve Tracking Screen) that this project used Energy Star; future replacement items should contain at least the same energy conservation.
- Expand existing Section 241 Supplemental Loan into Section 241-e loan available only for properties that are master-metered and, are currently insured by HUD and only for energy-efficient systems.
- Add new wording in Rating Factor 3 to define Energy Conservation (for Section 202 and Section 811 programs)
- Allow for an increased owner distribution through increasing the amount of the initial equity by the cost of the Energy Conservation Methods/Upgrades implemented.
- Allow nonprofit owners (except cooperatives) a distribution based on energy conservation for use in furthering the housing needs of the community; and allow the amount of the new energy conservation methods/upgrades to increase the original amount of the initial equity of the property with the appropriate distribution percentage applying to a “new” equity position.
- Allow the management company to share in the savings of energy conservation (for a certain period—say 5 years) through the use of a “Master Plan” created by the agent and approved by HUD.
- Encourage the use of Energy Star for replacement of lighting, fixtures, and appliances through normal servicing contact with owner and agent.
- Allow the management company to share in the savings for reduction of total utility usage. The shared savings will be through use of a management fee add-on. Usage is an owner option.

- Request the Office of Policy, Development and Research to facilitate an amendment of the memorandums of understanding between DOE and HUD to delegate the authority to HUD for qualifying residents as part of the DOE Weatherization program.
- To be most accurate in what energy conserving methods are needed in a given property currently in HUD's portfolio, HUD should encourage the owner to utilize an energy audit from a recognized professional energy evaluator.

Appendix V: Examples of State, Local, and Nonprofit Green Building Affordable Housing Programs

State governments	
Massachusetts	<p>The Massachusetts Low-income Housing Tax Credit (LIHTC) program awards a variety of points for green building practices through its Qualified Allocation Plan, such as creating housing near public transportation.</p> <p>The Massachusetts Housing Finance Agency provides targeted funding to promote the construction of green affordable housing, and requires that housing built with this funding meet the Energy Star standard.</p> <p>The Massachusetts Technology Collaborative provides a rebate that pays 70 percent of the cost for renewable energy technologies for affordable housing developments.</p>
Virginia	<p>The Virginia LIHTC program provides 30 incentive points to developers that agree to build to the EarthCraft green building standard.</p> <p>The Virginia LIHTC program has partnered with Southface to provide green building technical assistance to local developers and builders.</p>
Vermont	Vermont has developed green building standards that developers must use to receive LIHTC funding.
Washington	Washington is in the process of requiring that all affordable housing developments using state Housing Production Trust or LIHTC funding meet the Evergreen Sustainable Development Criteria. ^a
Local governments	
Boston, Mass.	<p>The City of Boston has passed a zoning ordinance that requires that all large buildings—including affordable housing—be built to meet the LEED certified green building standard.^b</p> <p>The City's Green Affordable Housing Initiative requires that affordable housing projects that use city funding meet the LEED Silver or the Energy Star for Qualified Home standards.</p> <p>The city has partnered with the Massachusetts Technology Collaborative to provide renewable energy rebates, such as solar photovoltaic.</p>
San Francisco, Calif.	The San Francisco Mayor's Office of Housing and the city's Redevelopment Agency require projects applying for affordable housing funding to meet the GreenPoint Rated green building standard. ^c
Seattle, Wash.	<p>Seattle has developed the SeaGreen Guidelines that provide a menu of green building options for developers to choose from when applying for city affordable housing funding.</p> <p>Compliance with SeaGreen is officially voluntary; however projects applying for funding must address whether or not elements of the guidelines are included in their development's sustainability plan submitted to the city when applying for affordable housing funding.^d</p>
Nonprofits	
Enterprise Community Partners	<p>Enterprise Community Partners has invested \$555 million—in grants, loans, and LIHTC equity—marked for use over a 5-year period to build 8,500 green affordable housing units across the country.</p> <p>Enterprise developed the Green Communities Criteria, which is the first national green building standard, to provide a clear and cost-effective framework of green building, and to support funding decisions.</p>
Local Initiative Support Corporation (LISC)	<p>LISC's Green Development Center provides financial resources, technical assistance, partnership opportunities, and education to accelerate the use of green building practices in low-income communities.</p> <p>Through this national initiative several local LISC chapters have developed local green building programs focused on promoting green building in their communities.</p> <p>The Bay Area LISC chapter recently launched the Green Connections program, which provides a green loan fund to support the creation of green affordable housing.</p>
Home Depot Foundation	<p>The Home Depot Foundation invests millions of dollars each year in nonprofit organizations whose missions are to support the production and preservation of green affordable housing.</p> <p>In 2007, the foundation supported the production of 12,223 green affordable housing units.</p>
National Housing Trust	National Housing Trust recently established the Green Affordable Housing Preservation Loan Fund to provide predevelopment and interim development loans to affordable housing developers seeking to incorporate green building practices in the rehabilitation of existing affordable housing.

**Appendix V: Examples of State, Local, and
Nonprofit Green Building Affordable Housing
Programs**

^aThe Evergreen Sustainable Development Criteria was developed by the Washington Department of Community, Trade and Economic Development, and is based on Green Communities, which was developed by Enterprise Community Partners.

^bBoston's green building zoning ordinance requires that applicable buildings meet a LEED certifiable standard. This means that buildings subject to this ordinance must be planned, designed, and constructed to achieve the level LEED certified under the rating point system, but the Boston Redevelopment Authority will review the LEED certifiability of projects under its jurisdiction.

^cGreenPoint Rated is a regional green building standard developed by the Build It Green organization for use in the state of California.

^dAccording to an official we spoke to, most developers understand that projects that incorporate elements of the SeaGreen guidelines are better positioned to complete for city funding.

Appendix VI: Comments from the Department of Housing and Urban Development



U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
THE DEPUTY SECRETARY
WASHINGTON, DC 20410-0050

September 12, 2008

Mr. William B. Shear
Director, Financial Markets and Community Investment
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Shear:

Thank you for the opportunity to comment on the Government Accountability Office (GAO) draft report GAO-08-943, entitled "Green Affordable Housing: HUD Has Made Progress in Promoting Green Building, but Expanding Efforts Could Help Reduce Energy Costs and Benefit Tenants."

The focus of this report was to review HUD's efforts to promote energy efficiency in its programs and the use of performance measures; assess the potential costs and long-term benefits of green building in HUD's affordable housing programs; and identify lessons that could be learned elsewhere that HUD could use to promote green building.

The draft report finds that HUD has made progress in bringing energy efficiency to significant segments of its public or assisted housing stock, but recommends additional actions: that HUD require energy-efficient products and appliances in public housing; work with the Department of Energy to implement updates to the building code for manufactured housing; consider developing a utility benchmarking tool for multifamily properties; and consider providing non-energy green building incentive points in some grant programs. HUD welcomes these recommendations; the Department will give serious consideration to their implementation with the resources that are available to us.

HUD previously provided extensive comments on the draft report. Our broader comments on green building in the affordable housing sector include the fact that GAO does not sufficiently distinguish among energy-related measures (which often pay for themselves) and non-energy green building practices (which may not), and among the different strategies that will be needed to expand green building in the wide array of HUD programs. GAO correctly identifies the issue of the "green premium," but does not provide recommendations on how to address these higher costs (through, for example, higher Total Development Cost limits), or on whether HUD should set standards of its own or defer to the growing number of state and local green initiatives that are noted in the report.

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**Appendix VI: Comments from the Department of
Housing and Urban Development**

The report also does not fully address staffing and resource issues, and the work that HUD has initiated, in part at the direction of Congress, on transit-oriented development as a key element of green building. The report also misstates the extent to which Congress has given HUD specific authority to require green building beyond energy efficiency.

In addition to these general comments, our technical comments identify several areas in the draft report that HUD found to be inaccurate, ambiguous, or require further clarification. Activities of some offices were not sufficiently highlighted, and progress in some areas was overlooked. We also disagree with GAO's characterization of HUD's implementation of the Energy Policy Act's requirement for Energy Star products in public housing. HUD is of course committed to publishing a regulation on this matter; however, with 53 percent of all PHAs reporting that they are buying Energy Star, we are making progress in that area. HUD's complete comments will be posted at www.hud.gov/energy.

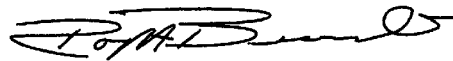
Given the growing interest in Congress and in the affordable housing industry about this issue, HUD welcomes GAO's assessment of the potential for green building in federally assisted housing. We believe that we have made significant progress through the work of our Energy Task Force, primarily in the area of energy efficiency. The Energy Task Force is a unique Departmentwide effort that has significantly raised the awareness of this issue among HUD's customers and partners, as well as among HUD staff. We will shortly be submitting a progress report to Congress describing our accomplishments so far, as required under Section 154 of the Energy Policy Act of 2005.

We are also pleased with the work that is underway at HUD to promote green building beyond energy efficiency, including: water conservation through energy performance contracting in public housing; training and capacity building in Indian country; HUD's first grant competition for green building, recently announced by the HOME Investment Partnerships program; and the Green Remodeling Initiative in the Mark-to-Market multifamily housing arena.

There are also several important initiatives at the field office level: in Region 9, for example, a partnership has been developed to install solar energy in CDBG- and HOME-funded projects. Region 6 hosted a conference in Texas on the "next frontier" of greening affordable housing. Similar activities are to be found in other regions. We are also greening HUD's own Robert C. Weaver Headquarters building, with photovoltaic panels and a green roof.

Please be assured that the Department takes both the discussion in your report and your recommendations very seriously. Energy costs are a critical element of housing affordability, and the building sector can play a critical role in addressing climate change. We will consider your findings carefully as we continue our efforts to reduce HUD's energy costs, and to address the interests of Congress and the affordable housing industry in green affordable housing.

Sincerely,



Roy A. Bernardi

Appendix VII: GAO Contact and Staff Acknowledgments

GAO Contact

William B. Shear, (202) 512-8678 or shearw@gao.gov

Staff Acknowledgments

In addition to the contact named above, Andy Finkel (Assistant Director), Emily Chalmers, John Fisher, Jeremie Greer, John McGrail, Marc Molino, Luann Moy, and Andy Pauline made key contributions to this report.

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