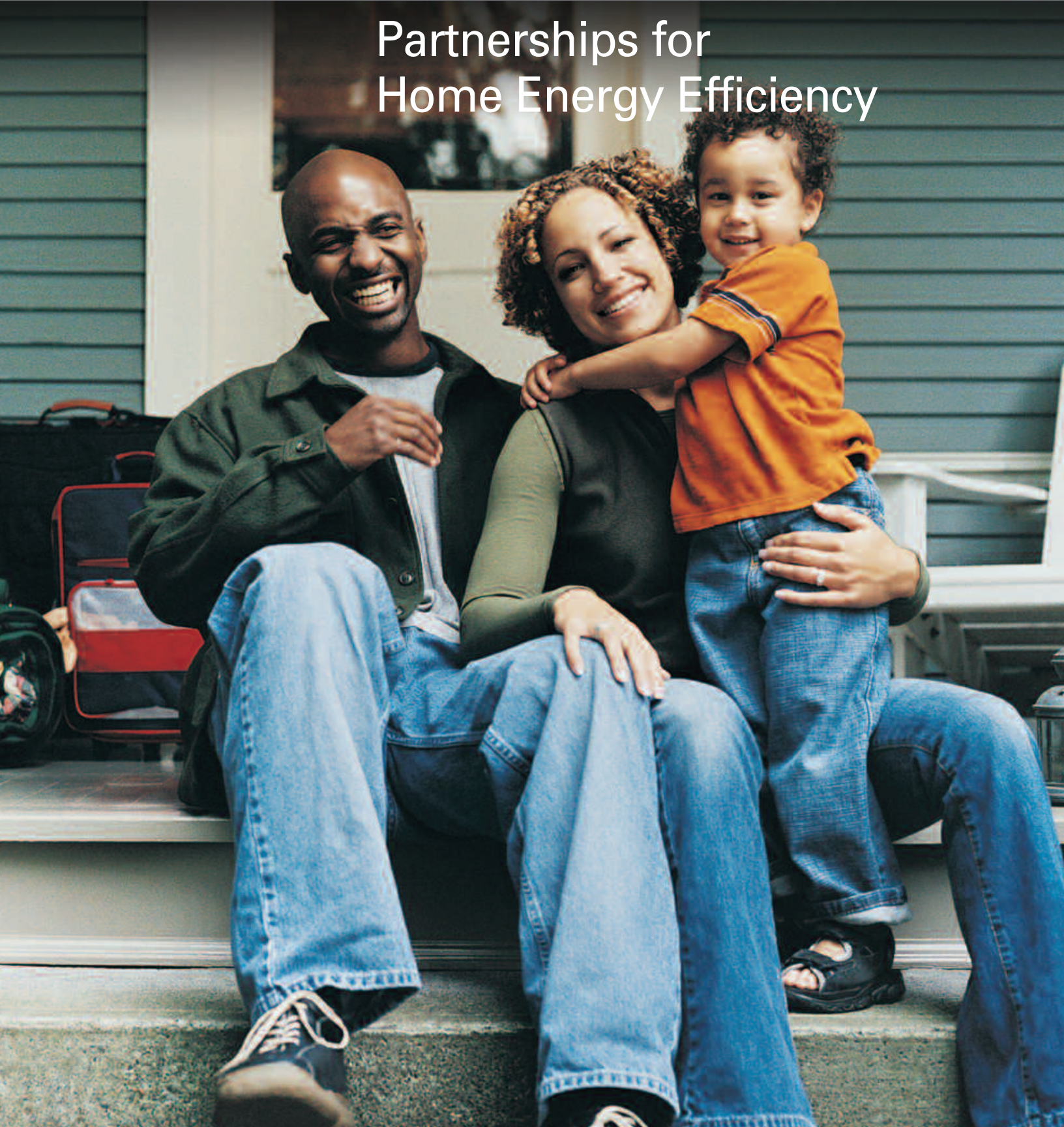




Partnerships for Home Energy Efficiency



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Partnerships for Home Energy Efficiency



EXECUTIVE SUMMARY

If, through greater energy efficiency, American households saved 10% on their home energy bills in the next 10 years, that would

- ▶ *total almost \$20 billion a year in savings,*
- ▶ *increase the affordability and comfort of homes,*
- ▶ *reduce demand for natural gas by more than 1 quad,*
- ▶ *avoid the need for more than 40 power plants, and*
- ▶ *prevent the greenhouse gas emissions equivalent to those from more than 25 million vehicles.*

Introduction

Americans spend more than \$160 billion a year to heat, cool, light, and live in our homes. This energy represents about 21 percent of the national total and includes significant demands for electricity and natural gas. Without additional efforts to improve the efficiency of home energy use, our national home energy bill is expected to rise to \$200 billion by 2015 and expend more of our natural resources.

The energy used in our homes also contributes about 17 percent of U.S. emissions of greenhouse gases. The President has committed to a national goal of improving the greenhouse gas intensity of the country by 18 percent by 2012. And he has called on all companies to voluntarily take action to help reduce emissions of greenhouse gases.

With these challenges in mind, three Agencies of the federal government are coordinating the Partnerships for Home Energy Efficiency to make U.S. homes more energy efficient and help households cost-effectively save 10 percent or more on their energy bills over the next decade. This cross-agency initiative will build on existing policies and programs that involve partnerships with manufacturers, retailers, home contractors and remodelers, utilities, states, financial organizations, and educational institutions, among others, to leverage the power and creativity of the marketplace. The initiative also will build new coalitions and undertake new programs.

The U.S. Department of Energy (DOE), Department of Housing and Urban Development (HUD), and Environmental Protection Agency (EPA) are convinced that together with our partners we can significantly improve the efficiency of America's housing stock in the coming decade by bringing better information and cost-effective services, technologies, products, and practices to all sectors of the housing market. The Agencies and their partners will promote adoption of the



many available, but as yet under utilized, options for improving home energy efficiency and educate households about the benefits of an energy-efficient home. Helping families improve the efficiency of their homes is one way for all Americans to be part of the solution.

The Partnerships for Home Energy Efficiency primarily focuses on existing homes—both owned and rented. The initiative provides support to homeowners who have a personal incentive to invest in energy efficiency, as well as to rental property owners wishing to make improvements in their properties. The initiative addresses market rate, private sector housing as well as federally assisted or financed housing.

Progress in improving the efficiency of U.S. housing has, in fact, been made in the past 30 years through policies such as building codes and appliance efficiency standards and through improvements in building materials, designs, technologies, and construction practices. New refrigerators, for example, require just one-third the electricity they did 30 years ago. However, great opportunities remain to improve efficiency even further by expanding on these accomplishments and leveraging the power of the market.

Advances in energy efficiency will play an important role in our energy future. Greater efficiency is a key element of our National Energy Policy and national efforts to reduce the risks of global climate change. By helping to make U.S. housing more efficient, the Partnerships for Home Energy Efficiency will contribute to these efforts. At the national level, increased energy efficiency addresses energy security, environmental concerns, and energy supply issues. At the personal level, increased energy efficiency can lower Americans' home energy bills, reduce the cost of housing, and help improve the quality of our lives.

The Opportunities

Many households could save 20 to 30 percent on their household energy bills through cost-effective household improvements such as:

- ▶ Selecting products distinguished by the ENERGY STAR label, the government-backed symbol for energy efficiency, when in the market to purchase products such as refrigerators, clothes washers, dishwashers, and home electronics, among others,
- ▶ Paying special attention to using ENERGY STAR qualified light fixtures and bulbs in the most frequently used areas of the home,
- ▶ Improving the home's "envelope" by applying appropriate amounts of insulation combined with home air sealing and choosing high-efficiency windows when looking for replacements,
- ▶ Improving the efficiency of heating and cooling systems through better maintenance of equipment, sealing the ducts carrying the conditioned air, installing modern thermostats, and hiring a qualified expert to ensure the replacement unit is properly sized and installed to deliver the rated efficiency, and
- ▶ Remodeling with an eye on energy efficiency when household improvements or renovations are underway.

Many low income and subsidized housing households could see similar savings with assistance from the appropriate weatherization and public housing energy programs. Households, as well as housing agencies, that take these measures would see sufficient savings within the first several years of a purchase or home improvement project to offset any additional initial investment.

The three Agencies involved in the initiative understand that a number of economic, institutional, and practical obstacles can inhibit families and individuals from pursuing these energy efficiency opportunities on a large scale. Market barriers, such as lack of information and split incentives, limit expenditures on what are, in fact, attractive investments when examined with full information. The initiative will work to overcome these barriers.



Partnerships for Home Energy Efficiency

DOE, HUD, and EPA already are partnering with leading organizations across the country to overcome market barriers to achieving greater home energy efficiency. Together, they are bringing information and cost-effective, energy-efficient services, technologies, products, and practices to our homes.

Through the initiative, the federal government is extending existing partnerships and building new ones that will increasingly promote cost-effective, efficient products, develop and promote a new suite of energy efficiency services built on industry best practices that offer additional home energy savings, promote energy efficiency to low income and subsidized housing markets, and continue to integrate the results of innovative research into residential construction and remodeling practices.

The Partnerships for Home Energy Efficiency will

- ▶ Provide greater public education on the value and availability of energy-efficient products and services,
- ▶ Give clear, credible information on efficient products to consumers through the Energy Guide label and the ENERGY STAR program,
- ▶ Develop training in energy-efficient remodeling techniques for home remodelers,

- ▶ Establish new credentialing programs and quality assurance/quality control (QA/QC) mechanisms for home contractors and home improvement professionals,
- ▶ Create a new energy efficiency service for the installation and verification of cooling equipment, which will be available to credentialed contractors who agree to employ industry best practices and have their work verified,
- ▶ Expand the new standardized home improvement service—Home Performance with ENERGY STAR—to be offered by credentialed home professionals who agree to follow industry best practices for efficient home retrofits and have their work quality controlled,
- ▶ Create educational materials on energy-efficient building science for career professionals and contractors,
- ▶ Provide access to financing, where possible, to different segments of the housing market,
- ▶ Extend energy efficiency products and services into the low income and affordable housing market through Weatherization Assistance Programs, HUD’s Energy Action Plan, and partnerships with affordable housing providers and intermediaries, and
- ▶ Invest in research on innovative building science technologies, practices, and policies and disseminate the research results to benefit residential equipment manufacturers, builders and remodelers, homeowners, and others in the home energy transaction chain.

CURRENT AND EXPANDING FEDERAL PARTNERSHIPS INVOLVE THE FOLLOWING ORGANIZATIONS:

	CURRENT WORK	FUTURE WORK
MANUFACTURERS	More than 1,400 product manufacturers across some 40 product categories for the home currently distinguish their products that are energy efficient and cost-effective with the ENERGY STAR label.	Expand the ENERGY STAR program to qualify more home products, to increase consumer awareness of the ENERGY STAR, and to increase understanding of the cost savings available to homeowners through their product choices.
RETAILERS	Working with national, regional, and specialty retailers to provide consumers with clear, credible information on cost-effective energy-efficient solutions when they are making purchasing decisions.	Expand partnerships with national, regional, and specialty retailers to bring a broader set of energy efficiency solutions to more consumers.

CURRENT AND EXPANDING FEDERAL PARTNERSHIPS INVOLVE THE FOLLOWING ORGANIZATIONS:		
	CURRENT WORK	FUTURE WORK
UTILITIES AND OTHER ENERGY EFFICIENCY PROGRAM SPONSORS	Many utilities, state and local governments, and other organizations administer residential energy efficiency programs as a cost-effective way to slow the growth in energy demand and avoid the need for new power plants, among other objectives.	Continue to partner with these organizations and help them deliver clear, credible information on cost-effective, energy-efficient products and services.
HOME BUILDERS	By the end of 2004, almost 10 percent of housing starts earned the ENERGY STAR label. These homes are significantly more efficient than those built to code, are less costly to own and maintain, and are more comfortable.	Help more home builders integrate building science technologies and practices into new homes, while seeking to reduce energy use by close to 50 percent through DOE's Building America Program. Continue to assist current partners, and help new partners, in promoting their ENERGY STAR qualified homes to build consumer interest in and demand for energy-efficient homes.
HOME CONTRACTORS, HOME IMPROVEMENT PROFESSIONALS, AND REMODELERS	Working with states, local governments, energy efficiency program sponsors, and trade industries to offer services that help homeowners obtain properly sized and installed heating and cooling equipment, as well as home improvement services that apply industry best practices to whole home retrofit projects.	Help establish new training and credentialing programs for home contractors, home improvement professionals, and remodelers. Develop the requirements for two new energy efficiency services that can be offered by credentialed contractors. Provide "Best Practices" guidelines to assist the more than 200,000 home remodeling firms in the United States in incorporating cost-effective, energy-efficient features into their projects.
FINANCIAL ORGANIZATIONS	A key incentive to improving energy efficiency is financing. Fannie Mae, Freddie Mac, the Federal Housing Administration (FHA), the USDA, and other organizations offer energy-efficient mortgages with partner lenders, which help owners finance cost-effective, energy efficiency improvements in their homes.	Work with these financial organizations as well as local lenders to promote these mortgage products. Facilitate the use of attractive, easy-access loan packages for remodeling existing homes.
AFFORDABLE HOUSING PROVIDERS	An extensive set of partnerships exists among local public housing authorities, community action programs, state housing financing offices, Habitat for Humanity, and the federal government.	Work to improve the energy efficiency of the nation's affordable housing stock, hoping to reduce HUD's estimated annual utility bill of \$4 billion for the approximately 5 million units of affordable housing throughout the country. Continue to offer weatherization services to thousands of low income households through DOE's Weatherization Assistance Program. Work with Congress, Building America, and Habitat for Humanity to design and build affordable energy-efficient houses.
EDUCATIONAL INSTITUTIONS	The Agencies and their partners have developed a program plan for educational outreach for building professionals.	Develop partnerships with the land grant universities and community colleges to transfer federal research and development results to career professionals and contractors interested in advanced building science practices.

NATIONAL ENERGY POLICY RECOMMENDATIONS

The Partnerships for Home Energy Efficiency helps fulfill three recommendations of the National Energy Policy.

- ▶ Extend the ENERGY STAR® labeling program to additional products, appliances, and services.
- ▶ Strengthen public education programs relating to energy efficiency.
- ▶ Implement a strategy to increase public awareness of the sizable savings that energy efficiency offers to homeowners across the country. Typical homeowners can save about 30 percent (about \$400) a year on their home energy bill by using Energy Star-labeled products.

From the National Energy Policy, 2001



CURRENT AND FUTURE ENERGY USE IN AMERICAN HOMES

Introduction

Energy efficiency is the ability to use less energy to produce the same amount of lighting, heating, and other energy services. For individuals and families, using less energy means lower energy bills, lower housing costs, and a better quality of life. For the country as a whole, greater energy efficiency helps us make the most of U.S. energy resources, reduces energy shortages, decreases the need for new power plants, lowers our reliance on energy imports, mitigates the impact of high energy prices, and reduces pollution and emissions of greenhouse gases. Energy efficiency is an important element of a sound energy policy and our national efforts to reduce the risks of global climate change.

Improved energy efficiency in our homes is the result of many individual decisions, including those of consumers, manufacturers of appliances and other products, home builders and remodelers, and officials in state, federal, and local government agencies. The federal government, through the Partnerships for Home Energy Efficiency, can help facilitate more decisions to pursue energy efficiency by improving the dissemination of timely and accurate information regarding the energy use of consumers' purchases, by setting standards for more energy-efficient products, and by encouraging industry to develop more efficient products and homes. The federal government can promote energy efficiency through programs such as ENERGY STAR®, Weatherization Assistance, and public housing, as well as through research into and demonstration of innovative technologies and practices for improving home energy efficiency.



Progress has been made over the past 30 years to improve the efficiency of U.S. housing. However, great opportunities remain to improve home energy efficiency even further by leveraging the power and creativity of the market to build on the nation's progress.

The Partnerships for Home Energy Efficiency is a coordinated effort of the U.S. Department of Energy (DOE), Department of Housing and Urban Development (HUD), and Environmental Protection Agency (EPA) in partnership with leading organizations across the country to improve the energy efficiency of U.S. homes significantly over the next decade. The three Agencies, together with manufacturers, retailers, utilities, state and local governments, home contractors and remodelers, financial organizations, and educational institutions, among others, will leverage the power of the marketplace to improve owners' and renters' access to energy efficiency information and cost-effective services, technologies, products, and practices. This initiative fulfills recommendations of the National Energy Policy and allows us all to be part of the national effort to reduce emissions of greenhouse gases.



Energy Use in American Homes

We Americans spend more than \$160 billion a year to heat, cool, light, and live in our homes. Our 110 million homes currently use 22 quads of energy (21 percent of the national total). These homes account for 17 percent of total U.S. electricity use and a significant amount of natural gas. Natural gas is used directly by households for heating and cooking and at the generating plant to make peak electrical power for services such as air-conditioning. Generating the energy used in our homes also contributes about 17 percent of U.S. emissions of greenhouse gases (Figure 1).

The cost of energy is a sizable household expense; the average household pays approximately \$1,500 a year. Single family homeowners pay an average of more than \$1,600 per year, and the approximately 33 million households eligible for federal assistance pay about \$1270, on average, per year.¹

Our monthly energy bills pay for the following common home energy end-uses:

- ▶ Space heating,
- ▶ Space cooling,
- ▶ Water heating,
- ▶ Lighting,
- ▶ Refrigerators,
- ▶ Large appliances (clothes washers and dryers, cooking equipment, freezers, and dishwashers), and
- ▶ Small appliances (televisions, other home electronics, and home office equipment, among others).

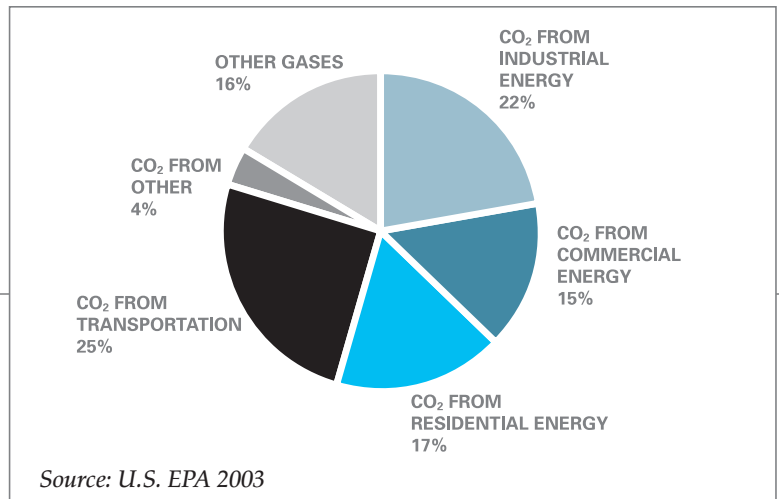


FIGURE 1. U.S. GREENHOUSE GAS EMISSIONS

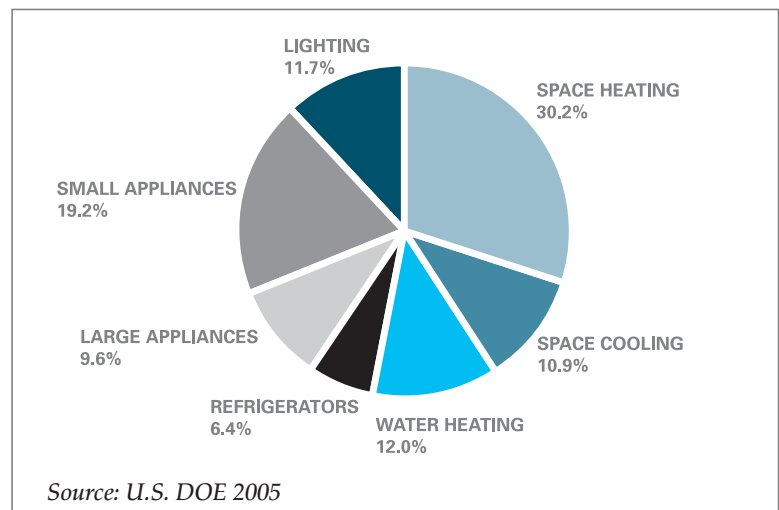


FIGURE 2. MAJOR HOME ENERGY END-USES

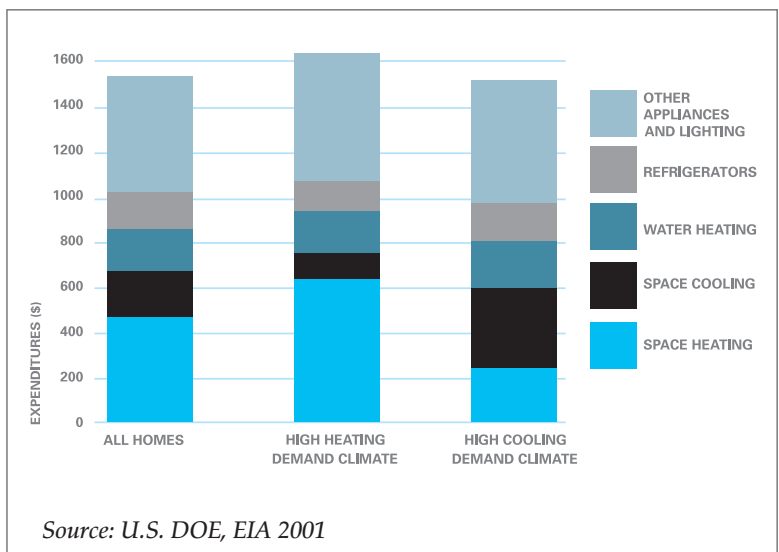


FIGURE 3. HOME ENERGY BILLS IN DIFFERENT CLIMATES

¹ U.S. DOE, EIA 2001, Table CE1-4e.

Our homes consume 21% of our national energy use and contribute 17% of U.S. greenhouse gas emissions.

Nationally, space heating represents about 30 percent of home energy use, the single largest category, followed by small appliances as a group and then water heating and home lighting (Figure 2). While the amount of energy for heating and cooling varies with climate conditions across the country, most homes have either a significant bill for heating, for cooling, or for a combination of the two, which averages about 40 percent of the total energy bill nationally (Figure 3).

Much progress has been made over the past 30 years to improve the energy efficiency of U.S. housing. Energy use per person has remained fairly constant since the 1970s even though house size has increased, and the number of energy-consuming appliances within our homes has gone up.² This stability in energy use per person is due primarily to market and government responses to rising

energy prices over the years. Americans have adopted conservation measures at home, while Congress has demanded increased energy efficiency standards for products and appliances, and states have included energy efficiency in building codes. Manufacturers are supplying more energy-efficient products, and builders are applying better building practices in new home construction.

Future Home Energy Use

Between now and 2020, if no significant additional efforts are made to improve home energy efficiency, energy use in U.S. homes is expected to increase as the number of homes grows by one-fifth to more than 130 million. This growth is expected to spur demand for electricity and natural gas, resulting in more emissions of greenhouse gases.

TABLE 1. ENERGY USE IN AMERICAN HOMES				
	2000	2010	2015	2020
NUMBER OF HOMES (MILLIONS)	105	122	129	136
ENERGY CONSUMPTION (QUADS)	20.4	23.5	24.5	25.6
NATURAL GAS CONSUMPTION (QUADS)	5.1	5.7	5.9	6.1
CARBON EMISSIONS (MMTCE)	317	369	387	405
ELECTRICITY SALES (Billion kWh)	1140³	1471	1584	1696
TOTAL ENERGY BILLS (BILLION 2003 \$)	162	182	199	216

Source: U.S. DOE 2005

² U.S. DOE, EIA 2004

³ Electricity sales for 2001

The increase in home energy demand will occur even though the energy required for particular end-uses will decrease. Below are several major trends through 2020 for key home energy end-uses:

- ▶ Heating and cooling will continue as a significant part of the home energy bill, representing about 40 percent of annual energy use in the average home;
- ▶ Electricity use for smaller home appliances and other products (televisions, other home electronics, and home office equipment, among others) will grow by more than 70 percent, representing about 27 percent of home energy use;
- ▶ Electricity use for home lighting will grow by 30 percent;
- ▶ Energy use for larger home appliances will grow by about 10 percent; and
- ▶ Electricity use for home refrigeration will decrease by more than 20 percent.

Although overall energy use per square foot has decreased by 30 percent since 1970, this decrease has not been sufficient to overcome the increase in residential energy use due to the higher number and larger size of homes. Increased energy use is expected to continue through the next two decades unless there is a much greater emphasis on cost-effective, energy-efficient products and services in new and existing homes.

Opportunities for Greater Savings from Energy Efficiency

Many opportunities exist for improving home energy efficiency. The federal government estimates that many households could save 20 to 30 percent cost-effectively on their energy bills, by taking the following steps:

- ▶ Selecting high-efficiency products when shopping for refrigerators, clothes washers, dishwashers, and home electronics, among others,
- ▶ Using high-efficiency light fixtures and bulbs,



- ▶ Improving the envelope of the home by applying appropriate amounts of insulation, sealing air leaks in the home, and choosing high-efficiency windows when looking for replacements, and
- ▶ Improving the energy efficiency of heating and cooling systems through improved maintenance of equipment, sealing and insulating the ducts carrying the conditioned air, installing modern thermostats, and hiring a qualified expert to ensure the replacement unit is properly sized and installed to deliver the rated efficiency.

These energy efficiency measures pay for themselves, meaning that households can see sufficient savings within the first several years of a purchase, which offset any additional initial investment. These steps can reduce the 40 percent share of residential energy bills that goes toward heating and cooling, and they offer additional savings as homeowners purchase energy-efficient appliances or undertake major home renovations. The steps also address the rising energy bill associated with small household products. If more Americans took advantage of these cost-effective, energy-efficient solutions, they could reap significant home energy savings, contribute to natural gas and electricity savings, reduce the number of new power plants needed, improve their quality of life, and help reduce emissions of greenhouse gases.



OVERCOMING BARRIERS TO MORE EFFICIENT HOMES

To understand how the marketplace can improve the energy efficiency in the existing housing stock, as well as new homes, it is helpful to consider the range of barriers or impediments to achieving the goal and to identify steps for mitigating or eliminating those barriers. The current marketplace includes many product and system choices that have the potential to reduce home energy use and save households significant amounts of money. However, a number of economic, institutional, and practical obstacles inhibit their larger scale use. Common market barriers include:

HIGHER INITIAL COSTS. Energy-efficient products often cost more than their less efficient counterparts, and some people do not have the extra dollars available when they make an expensive purchase, such as a major appliance. So, even if a better appliance would pay for itself fairly quickly through lower energy bills, buyers tend to purchase the lower priced product without determining the savings the product may soon provide.

UNCERTAIN BENEFITS. Consumers may be unsure about the credibility of the energy-savings and cost-effectiveness claims of individual manufacturers, sales staff, or remodeling designers. Unless consumers are assured of the potential savings, they may be reluctant to pay the additional costs. Businesses that adopt labeling programs that spell out energy savings may be more successful in selling more efficient, yet initially more expensive, products.

INSUFFICIENT INFORMATION. Monthly energy bills generally report the total electricity or natural gas used, leaving families unsure about the expense of individual energy-using equipment or products and which investments could best help them reduce their costs. This incomplete information is a market imperfection that hinders purchases of cost-effective, energy-efficient products and investments in cost-effective, energy-efficient services.

LACK OF INCENTIVE. Decisions about the energy efficiency of new homes and rental properties are not usually made by the consumer who will ultimately pay the energy bills. To keep costs down, builders and landlords are more likely to install the least expensive and generally least efficient products that are heavily stocked and discounted by suppliers as part of volume ordering. The builder or landlord does not have an incentive to choose the designs, equipment, or materials that would be judged most cost-effective by homeowners or tenants if they were making the decision themselves.

Approaches exist for overcoming many of the market barriers limiting greater energy efficiency in our homes










LACK OF INFORMATION ABOUT FINANCING.

People without the extra dollars to purchase an energy-efficient major appliance, buy an efficient home, or undertake a home improvement project often are unaware of the mortgage instruments and other loan options that could help them afford the efficient choice. In addition, they may not realize that they can afford the efficient choice because savings from their lower energy bills will more than offset the initial cost within a few years.

LACK OF AVAILABILITY. Frequently, the most energy-efficient products are less widely available, especially in smaller communities.

LACK OF AUTOMATION. People often walk out of their homes with the lights on and the air conditioner running. Turning off all unused appliances, electronics, and lights can be inconvenient and time consuming. Lack of automation (e.g., occupancy sensors) means that conservation mostly depends on people consciously choosing to turn switches off. Moreover, some appliances and electronics, such as stereos, video tape players, and televisions, continue to use electricity even after they are turned off.

TABLE 2. MARKET BARRIERS TO IMPROVING HOME ENERGY EFFICIENCY AND APPROACHES FOR ADDRESSING THEM

BARRIERS		APPROACHES
Lack of awareness about cost saving options and links between energy efficiency and comfort, value, and quality of homes		Public education to establish the connection between energy efficiency and its benefits
Poor or conflicting information on product and home energy performance		Clear, credible information on cost-effective, energy-efficient products and home energy performance
Lack of performance standards that identify quality contractors		Contractor training and credentialing programs
Limited quality assurance/quality control (QA/QC) programs to safeguard against poor workmanship.		QA/QC mechanisms to be used by contractors
Lack of standardized home energy performance services offered by the contractor trade		Whole home energy performance services offered by qualified professionals
Lack of knowledge about energy efficiency financing		Dissemination of information about energy efficiency financing tools
Lack of information in the affordable housing sector and a process to make energy efficiency improvements		Implementation/expansion of HUD's Energy Action Plan to reach the 5 million units under HUD's programs
Need for continued technological advances to improve energy efficiency in new and existing homes		Continuation of innovative research linked with real world practitioners
Lack of financial incentives for adoption of energy efficiency in homes		Exploration of financial incentives

These market barriers leave homeowners with many questions, such as:

- ▶ Which products (or homes) will deliver the claimed energy savings?
- ▶ Which products of those that initially cost more offer a reasonable return on the additional cost?
- ▶ Which products offer the desired features or performance in addition to greater energy efficiency (i.e., is a sacrifice required)?
- ▶ What design and installation issues are important to obtaining the claimed energy performance of a product?
- ▶ How does one find a heating and cooling contractor or home improvement professional who is well versed in the best practices for home energy efficiency?
- ▶ Is there money available to help cover the higher initial cost that can be paid back once the savings are in hand?

In addition, many manufacturers, retailers, home contractors, and others find it difficult to sell energy-efficient products and services due to the market barriers mentioned previously. The lack of consumer information and consumer skepticism about claims for future savings make it difficult to sell higher priced products and services.

Approaches do exist for overcoming many of these market barriers and helping the marketplace offer and deliver energy-efficient products and services to households across the country. These approaches, which build on existing energy efficiency policies, codes, and standards as well as other programs, include:

- ▶ Educating the public on energy use in the home and on the potential savings and other benefits from energy-efficient products and home improvement projects,

- ▶ Clearly and credibly defining which products are cost-effectively energy efficient and offer attractive reductions in energy bills,
- ▶ Establishing training and credentialing programs for professionals who can offer quality services for heating and cooling installations and whole home improvement projects,
- ▶ Offering greater access to financing for energy efficiency improvements where needed,
- ▶ Providing energy efficiency measures to low income households and through public housing programs,
- ▶ Continuing to undertake research to further develop lower cost technologies and practices for cost-effectively improving home energy efficiency and continuing to disseminate these results to manufacturerer, builders, remodelers, homeowners, and others in the home energy transaction chain, and
- ▶ Continuing to conduct reseach to improve our understanding of market barriers and the solutions to them.

The common barriers to improving home energy efficiency and the broad approaches available for overcoming these barriers are summarized in Table 2.

The next section outlines how the three federal Agencies involved in the Partnerships for Home Energy Efficiency are working in a coordinated manner and collaborating with leading organizations across the country to overcome market barriers and pursue these approaches.



PARTNERSHIPS FOR HOME ENERGY EFFICIENCY

Improved energy efficiency is the result of many individual decisions, including those of consumers; manufacturers; home builders and remodelers; and state, federal, and local government officials. The Partnerships for Home Energy Efficiency is a coordinated effort of the federal government to build on existing energy efficiency policies and programs and to work in partnership with leading organizations to affect many of these decisions and leverage the power of the marketplace. The initiative is designed to improve the access households have to energy efficiency information and cost-effective services, technologies, and practices with the goal of significantly improving the efficiency of U.S. homes over the next decade.

To overcome the market barriers to greater home energy efficiency, the federal government is extending existing partnerships and building new partnerships that

- ▶ Provide more public education on the value and availability of energy-efficient products and services,
- ▶ Give clear and credible information on cost-effective, energy-efficient products to consumers by building on the Energy Guide label and the ENERGY STAR program,
- ▶ Develop training in cost-effective, energy-efficient remodeling techniques and provide sets of best practices and technical protocols to home remodelers,
- ▶ Establish new credentialing programs and quality assurance/quality control (QA/QC) mechanisms for home contractors and other home professionals,
- ▶ Develop new energy efficiency services for the installation and verification of cooling equipment, which will be available to credentialed contractors who agree to employ industry best practices and have their work verified,
- ▶ Expand the new standardized home energy efficiency service, called Home Performance with ENERGY STAR, to be offered by credentialed home professionals who agree to follow industry best practices for efficient home retrofits and have their work quality controlled,
- ▶ Create educational materials on energy-efficient building science for career professionals and contractors,
- ▶ Facilitate access to financing, where possible, to different segments of the housing market,

- ▶ Provide tools and information to the affordable housing market through HUD's Energy Action Plan and assist low income households with home weatherization, and
- ▶ Continue to invest in innovative research in building science technologies, practices, and policies and in the dissemination of results to manufacturers, builders, remodelers, and homeowners.

The next section illustrates how the three federal Agencies are partnering with thousands of leading organizations to implement the ambitious projects in this initiative.



TABLE 3. NATIONAL RETAILERS BRINGING ENERGY EFFICIENCY SOLUTIONS TO CUSTOMERS

LOWE'S	Lowe's is broadly educating its customers about energy-saving products and practices through in-store promotions, broadcast advertising, and Web outreach under its branded environmental education message, "Together, We're Saving More Than Money." This fall, Lowe's will feature the benefits of energy-efficient lighting as part of the "ENERGY STAR Change a Light, Change the World" campaign and plans to launch a special fall promotion of all ENERGY STAR qualified products and practices to help customers prepare their homes for winter.
THE HOME DEPOT	The Home Depot has stepped up its efforts to bring the benefits of energy efficiency to its customers by making a 28-page ENERGY STAR educational brochure available at all of its stores. It is a strong supporter of the national campaigns on appliances, "Spring Into a World of Savings"; cooling products, "Cool Your World with ENERGY STAR"; and lighting "ENERGY STAR Change a Light, Change the World" all of which include special displays and in-store signage. And, The Home Depot is planning a high-profile push on ENERGY STAR home sealing to help its customers improve the comfort and efficiency of their homes.
SEARS	Sears sells more ENERGY STAR qualified appliances than any other retailer in addition to integrating ENERGY STAR into its Home Services for HVAC and windows. By expanding its line of ENERGY STAR qualified Kenmore products and conducting ENERGY STAR targeted promotions such as 12-month, 0% financing, Sears is helping bring energy efficiency to all income levels. Sears' appliance departments also include a broad array of ENERGY STAR promotional materials to educate customers on the benefits of ENERGY STAR, including signs and informative collateral.
ACE HARDWARE	ACE Hardware stores are helping bring ENERGY STAR to American homes by displaying ENERGY STAR educational materials, providing sales associate training, and clearly identifying and promoting the ENERGY STAR qualified products they offer. Hardware stores in the ACE family allow ENERGY STAR to reach customers in large cities and small towns across the country so everyone can benefit from lower utility bills and cleaner air.



Promote Energy-Efficient Products

Selecting more energy-efficient products when making choices for the home is an important opportunity for consumers to reduce their home energy bills. Cost-effective, energy-efficient choices exist for many of the products we use daily at home, including heating and cooling systems, major appliances, home electronics and office equipment, and lighting products. Many of the smaller products offer energy savings with no additional initial cost; for the larger products, the reduced energy bills can quickly offset any higher initial cost. The Partnerships for Home Energy Efficiency will provide households with more information on and access to cost-effective, energy-efficient products in cooperation with retailers, manufacturers, states, energy efficiency program sponsors, and many others.

MANUFACTURERS. The federal government partners with more than 1,400 product manufacturers across more than 40 product categories for the home to clearly distinguish those products that are energy efficient with the ENERGY STAR label—the government-backed symbol for energy efficiency. This label is now recognized by more than 60 percent of the public, and one in three people report using the label as part of a purchase decision in the last year. Products earning the ENERGY STAR are 10 to 90 percent more efficient than standard models, and the energy bill of a home fully equipped with ENERGY STAR qualifying products can be 20 to 30 percent lower, which adds up to \$450 in savings each year for a typical homeowner. EPA and DOE will expand this program to additional energy-using products in the home, work to increase consumer awareness of the ENERGY STAR, and help increase consumer understanding of the potential cost savings available to them.

RETAILERS. The three federal Agencies will build on their partnerships with national, regional, and specialty retailers so that stores across the country provide consumers with clear, credible information on cost-effective, energy-efficient solutions for the home. It is in stores where many people gather the information they need to make purchase decisions. Among other efforts, the federal government will coordinate national outreach campaigns on key products during the seasons in which many people make these purchases.

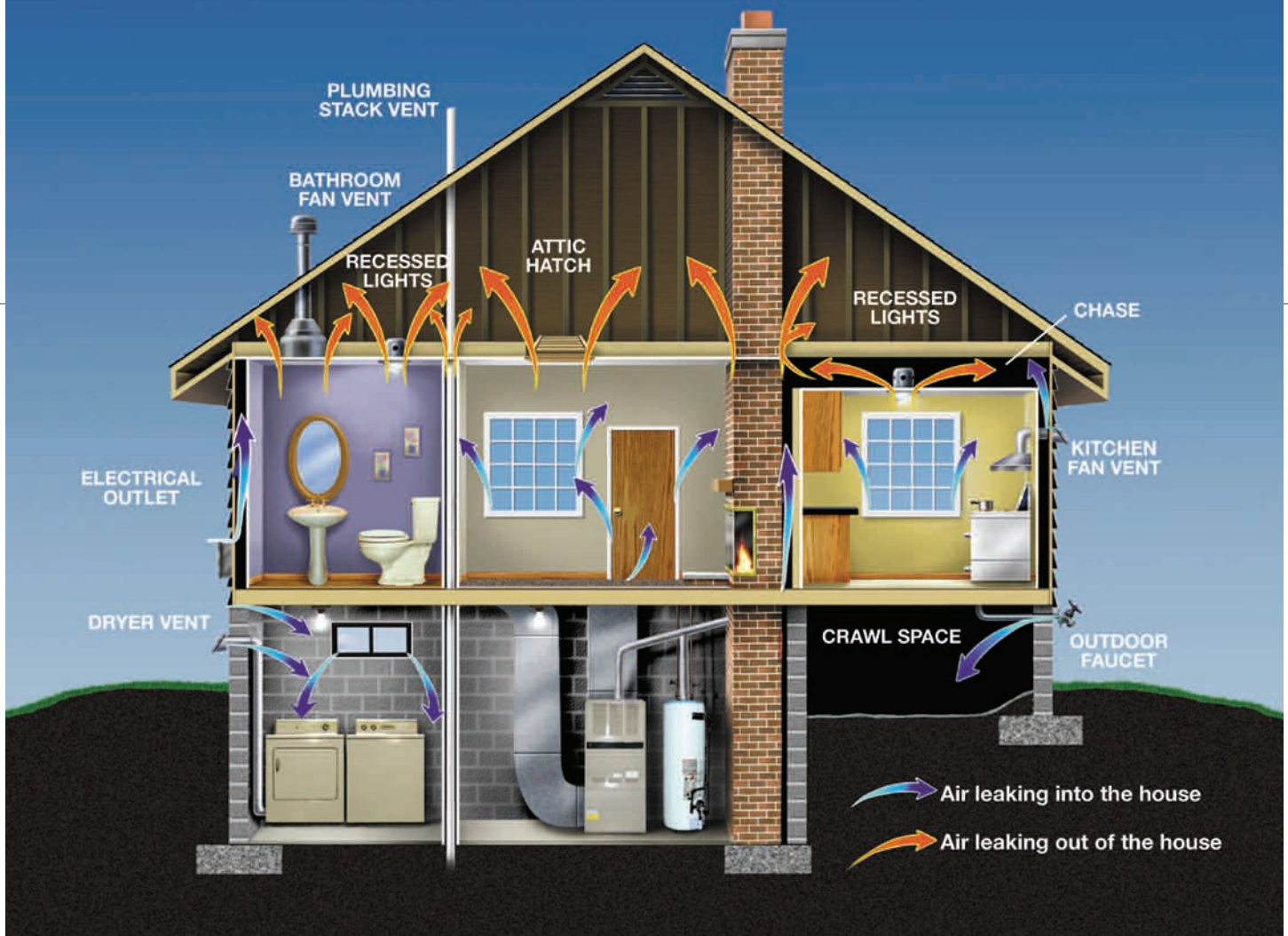
The campaigns will highlight the savings from

- ▶ energy-efficient heating and cooling equipment,
- ▶ energy-efficient appliances,
- ▶ energy-efficient lighting, both bulbs and fixtures, and
- ▶ energy-efficient home electronics.

The federal government will further assist interested retailers as they seek to expand their efforts to provide broader cost-effective home energy efficiency solutions to their customers. The efforts that certain national retailers are undertaking as part of this partnership to provide energy-efficient solutions to their customers are highlighted in Table 3.

UTILITIES AND OTHER ENERGY EFFICIENCY PROGRAM SPONSORS. Many utilities, states, and other organizations across the country administer residential energy efficiency programs as a cost-effective means for slowing the growth in energy demand and avoiding the need for new power plants, among other objectives. The three federal Agencies will continue to form partnerships with these organizations so that they can bring clear, credible energy efficiency information and services to their residential program participants and spread their energy efficiency dollars further.

HOME BUILDERS. Energy-efficient homes are more comfortable and more affordable over the long term. The federal government will expand its partnerships with home builders to help them distinguish and sell homes that are verified to be significantly more efficient than homes built to code as ENERGY STAR qualifying homes. In 2004, almost 10 percent of new homes were ENERGY STAR qualified, and in certain markets ENERGY STAR homes represent 20 or 30 percent of new housing starts. In other regions of the country, however, only a few such homes exist. The federal government will continue to build consumer interest in energy-efficient homes through current partners and expand efforts into more areas of the country. The federal government will also expand its work with home builders to help them integrate cost-effective building science technologies and practices into new homes, while seeking to reduce energy use by close to 50 percent through DOE's Building America Program.



AFFORDABLE HOUSING NETWORKS.

HUD has formulated a 21-point Action Plan with the following goal: Every building assisted, financed, or insured by HUD will be a model of cost-effective energy efficiency, either by qualifying for the ENERGY STAR label for new construction or substantial rehabilitation, by encouraging the purchase of ENERGY STAR qualified products and appliances, or by adopting energy-efficient maintenance and management practices. HUD will pursue this goal in partnership with state, local, and federal public housing authorities, state housing financing agencies, national intermediaries, affordable housing developers, faith-based and community-based organizations, and owners and managers of assisted housing. In addition, DOE through its R&D teams will continue to develop and disseminate cost-effective, energy-efficient products and building practices for affordable homes (see the affordable housing section below).

New Energy Efficiency Services

In addition to building awareness and providing access to information on energy-efficient products, the three Agencies in the initiative are collaborating with a number of organizations nationwide, including many mentioned above, to develop new energy efficiency services that provide homeowners with greater opportunities for energy savings.

These cost-effective, energy-saving opportunities for a home go beyond the choice of products and equipment. They entail efficiency improvements to the outer “envelope” of the home and the heating and cooling system. Common structural or mechanical factors that lead to higher energy bills include

- ▶ Air conditioning systems and heat pumps suffering from improper refrigerant charge, leading to problems that range from reduced operating efficiency to system freeze-up,
- ▶ Duct leakage that adversely affects overall HVAC system efficiency, especially when the leakage occurs in unconditioned or semi-conditioned space,

- ▶ Oversized cooling equipment that increases on/off cycling leading to poor dehumidification, and
- ▶ Air infiltration through the home's envelope (see cutaway drawing of home), which leads to comfort problems and reduces the effectiveness of insulation. Under certain conditions, the influx of warm, humid air through a poorly sealed envelope allows water to condense on cool surfaces and cause moisture damage and mold.

New energy efficiency services built on best practices can address these factors cost-effectively. Well-defined, quality services delivered by trained professionals, which improve the comfort of a home while reducing energy costs, could help many households. Each year, millions of homeowners spend billions of dollars on home renovations and remodeling. Many more projects would deliver improved comfort and energy savings if home contractors, remodelers, and home professionals offered cost-effective energy efficiency services as part of these home projects. For example,

- ▶ When a furnace or central air conditioner is being replaced, on-site technicians can potentially seal or insulate the duct system at lower cost than if this work were performed in isolation.
- ▶ When siding is replaced, insulation, foam sheathing, and house wrap can be added underneath.
- ▶ When an unfinished basement is converted to finished space, insulation can be installed in the walls and air leaks can be stopped.

As part of the initiative, the federal government in partnership with leading organizations is working to define these services and assist in training the contractors and others who will be offering them.

EDUCATIONAL AND TRAINING PROGRAMS. The federal government has already developed a training program to help remodelers understand cost-effective, energy-efficient remodeling. DOE's Building America Program will help educate remodelers, document the energy savings, and continue to refine and promote remodeler training. Additionally, the federal government will develop educational materials for the banking, appraising, and realtor sectors to help them understand and market energy-efficient homes and services.

FIGURE 4. HOME PERFORMANCE BENEFITS

Many homeowners are not getting the comfort they are paying for. Their homes suffer from rooms that are too hot or too cold, drafts, moisture problems, and mold and mildew. Skilled contractors, under Home Performance with ENERGY STAR, can

- ▶ Fix rooms that are too hot or too cold,
- ▶ Eliminate drafts,
- ▶ Correct conditions that lead to mold or mildew,
- ▶ Ensure combustion appliances are venting properly,
- ▶ Prevent ice dams,
- ▶ Solve underlying problems that lead to rot or peeling paint,
- ▶ Keep outdoor pollutants from entering the home, and
- ▶ Save energy and lower monthly utility bills.


These improvements make a home more comfortable and more durable.

CREDENTIALING PROGRAMS AND QUALITY ASSURANCE MECHANISMS.

The federal government will work with state and local governments and industry partners to establish new or support existing credentialing programs to help home owners identify quality technicians. In addition, key partners, with the assistance of the federal government, will develop QA/QC procedures for monitoring the work performed by contractors. Market-wide implementation of these procedures will help reassure home owners of the quality of the technician's work.

ENERGY STAR INSTALLATION GUIDELINES FOR HEATING AND COOLING EQUIPMENT.

The federal government will partner with leading organizations to offer new services for the installation and verification of heating and cooling equipment. This work will build on best practices in the industry and the work of states, utilities, and others that have demonstrated the cost-effectiveness of these services. The federal government



HOME PERFORMANCE WITH ENERGY STAR

continues to support the North American Technician Excellence (NATE), which tests HVAC contractors on proper installation, maintenance, and repair or service of heating and cooling equipment.

HOME PERFORMANCE WITH ENERGY STAR. The federal government already is partnering with several organizations around the country to pilot test a home retrofit program called Home Performance with ENERGY STAR. In it, trained professionals provide homeowners with detailed home energy audits and make cost-effective recommendations to improve efficiency and comfort of the home (see Figure 4). At the homeowner's request, they will also make the improvements. Work performed by these home performance contractors is quality controlled by a sponsoring organization, such as a state or local government or utility energy program. A number of organizations have been testing this program with significant success (see Table 4).

To further develop the services of this program so that they become more broadly available across the country and are attractive to the service providers and homeowners, the federal government will

- ▶ Quantify the energy savings from these home energy efficiency improvements,
- ▶ Continue to educate consumers on the cost-effective opportunities for improved comfort and energy savings through home improvement,
- ▶ Enable the service providers to perform well by giving them training, credible credentials, and a recognized marketing platform, and
- ▶ Provide protocols for QA/QC mechanisms so that the service is reliable and of high quality.



BEST PRACTICE GUIDES AND PROTOCOLS FOR REMODELERS.

In recent years, home remodeling has grown into a \$200 billion dollar industry in the United States. This growth is driven by an aging U.S. population, aging housing stock, strong economic growth, and growth in homeownership. The trend toward remodeling provides many opportunities to incorporate energy efficiency features into remodeling jobs. For example,

- ▶ A remodeled kitchen could easily include energy-efficient lighting as well as ENERGY STAR qualified appliances.
- ▶ A room addition could include ENERGY STAR qualified windows and lighting and be properly air sealed and insulated.

Remodelers, however, must be aware that any changes they make to one or two rooms in the home may adversely affect the overall heat flow and air control for the whole home. The federal government will work with professional groups to develop best practices guides that show how energy efficiency improvements may be successfully incorporated into remodeling jobs. Lastly, the federal government is supporting the development of technical protocols that contractors and remodelers can use to assess the opportunities for improving home energy efficiency and guide the installation of recommended improvements in a way that delivers the potential energy savings. These protocols are designed to carry out a key recommendation of HUD's Partnership for Advancing Technology in Housing (PATH) Roadmap for Energy Efficiency in Existing Homes. Providing guidance to remodeling contractors and homeowners, the protocols will be developed with significant input from remodelers, energy specialists, consumers, and technical experts.

TABLE 4. LEADING EXAMPLES OF HOME PERFORMANCE WITH ENERGY STAR

NEW YORK	The New York State Energy Research and Development Authority has helped improve the efficiency of more than 8,000 homes through its Home Performance with ENERGY STAR program. Homeowners have reaped substantial savings, and the market has accepted a comprehensive, building science-based approach to improving homes. Homeowners are willing to pay for real solutions, backed by quality assurance. And contractors are thus able to sustain robust businesses based on delivering reliable information and quality work.
WISCONSIN	The Wisconsin Focus on Energy program has shown that remodeling contractors can be convinced of the value of bringing in third-party home performance consultants to provide recommendations for, and independent validation of the quality of, energy and comfort related home improvements. Wisconsin helped improve more than 1,000 homes in 2004 under Home Performance with ENERGY STAR.
AUSTIN, TEXAS	Austin Energy is enhancing its residential program by helping contractors qualify for certification by the Building Performance Institute (BPI), thus establishing a recognizable credential for quality home energy-related improvements. Austin's use of BPI serves as a national model for technician certification and contractor accreditation and lends technician credibility to homeowners in the market for retrofits. In 2004, Austin Energy's Home Performance with ENERGY STAR program helped improve 1,350 homes.
CALIFORNIA	In a project funded by the California Public Utility Commission, the California Building Performance Contractors Association has shown that contractors can successfully deliver services that embrace home performance contracting principles and practices, even in the absence of special homeowner or contractor incentives or rebates. This bolsters the immediate viability of the approach on a national scale, recognizing the federal, state, and utility support for a program can help bring this approach to market more quickly. This Home Performance with ENERGY STAR project based in the San Francisco Bay Area is anticipated to help improve more than 1,200 homes in 2005.

Financing

Fannie Mae, Freddie Mac, the Federal Housing Administration (FHA), and other federal and state agencies offer Energy Efficient Mortgages (EEMs) that help homeowners finance cost-effective, energy-efficient home improvements when they are remodeling existing homes or help them finance the purchase of new energy-efficient homes. The federal government will work with these financial organizations as well as other lenders to promote these mortgage products. Already, FHA has issued a new Mortgagee Letter clarifying its procedures, and as part of HUD's Energy Action Plan, it is committed to publicizing EEMs. The initiative will also facilitate the use of attractive, easy-access loan packages for remodeling existing homes. Financing has proven to be important for contractors offering whole house retrofits under Home Performance with ENERGY STAR. These jobs typically range in cost from \$5,000 to \$15,000. The availability of financing for

such jobs can be pivotal in the homeowner's decision to retrofit or not. In addition, low interest rates can entice homeowners to make an energy-efficient improvement. Through its Climate Vision program, DOE will investigate the impact of lower interest rates on the inclusion of energy efficiency in remodeling projects, as well as on new home buyers' decisions to purchase energy-efficient homes.

Affordable Housing

The most affordable homes are those that are also energy-efficient, with lower monthly energy bills. Such a home is more comfortable and easier to maintain. It places a smaller burden on limited monthly incomes. Cost-effective energy efficiency improvements to affordable housing can either reduce demands on federal, state, and local funds where such funds are used to pay energy bills or make these funds available to more households. The initiative



will build on the work being done by DOE, HUD, and other agencies. DOE will continue its successful Weatherization Assistance Program, which completes more than 100,000 retrofits of low income houses each year. DOE also is working through its Building America project to design and construct Habitat for Humanity houses that meet or exceed the ENERGY STAR new homes specification. HUD will continue to implement a wide ranging Energy Action Plan to reduce energy use in the approximately 5 million units of affordable housing that it subsidizes or insures.

During the coming year, HUD is conducting department-wide training on energy efficiency, streamlining its energy performance contracting procedures within public housing, establishing ENERGY STAR as the standard for HOPE VI new construction as well as housing for the elderly and disabled persons through its competitive grant awards. HUD also will promote the purchase of ENERGY STAR qualified products wherever they are cost-effective. HUD is encouraging communities to adopt ENERGY STAR guidelines for new construction or substantial rehab financed through the HOME or CDBG programs. DOE and HUD have entered into a weatherization partnership for multifamily apartment buildings, and the two Agencies have invested in R&D and home designs that make energy efficiency more cost-effective. While continuing work on these efforts, the

Agencies will explore ways to bring new energy efficiency services such as Home Performance with ENERGY STAR to affordable housing in partnership with state and local organizations. EPA is working with the Weatherization, Rehab & Asset Preservation Partnership (WRAP) to explore ways to integrate Home Performance with ENERGY STAR into low income assistance programs. And, DOE will explore other ways to improve the energy efficiency of multifamily affordable housing.

Innovative R&D

DOE and HUD continue to conduct robust building science research programs. These programs already have helped industry improve the energy efficiency of many important household appliances, equipment, and lighting systems; developed energy performance improvements in building systems, practices, and designs; and set the stage for future energy performance gains. While most of the research results apply to new home construction, many of the results can be readily adapted to existing homes. DOE's Building America Program and HUD's PATH have demonstrated the energy savings potential of new products and innovative building and remodeling practices and provided the results of their research to building professionals in the field. DOE and HUD provide technical assistance, training, and best practices manuals to a range of building professionals. By linking their Web sites for this initiative, the Agencies will facilitate the dissemination of these research results. DOE also will undertake policy research to explore what steps best mobilize action by public and private stakeholders to invest in energy-saving innovations in the new and existing housing markets. Also, as part of the initiative, the federal government is investigating performance monitoring meters that measure the rate of household energy consumption in real time. With such meters, homeowners could monitor their hourly electricity consumption rate and adjust it, given the right incentives or under the right conditions.



KEY MILESTONES FOR PARTNERSHIPS FOR HOME ENERGY EFFICIENCY

Fall 2005

- ▶ National outreach on energy-efficient lighting
- ▶ National outreach on energy-efficient heating equipment and do-it-yourself guidance for consumers on home sealing
- ▶ Expansion of Home Performance with ENERGY STAR to new regions
- ▶ Revised energy efficiency specifications for ENERGY STAR new homes
- ▶ Protocols for energy-efficient remodeling of existing homes initiated
- ▶ HUD Phase II Energy Action Plan for single and multifamily homes initiated
- ▶ DOE release of HVAC Best Practices guides for home remodelers

Winter/Spring 2006

- ▶ New accreditation standards and quality assurance criteria for home contractors
- ▶ DOE release of 30% HVAC Best Practice Builder Guides
- ▶ New ENERGY STAR guidelines for proper installation and verification of HVAC equipment
- ▶ DOE release of Energy Efficient Remodeler Training

Summer/Fall 2006

- ▶ Fall ENERGY STAR campaigns for energy-efficient lighting, heating equipment, and home sealing
- ▶ Expansion of Home Performance with ENERGY STAR to new regions
- ▶ HUD release of home improvement protocols for remodeler industry
- ▶ DOE research on homes that achieve 30% whole home energy savings completed
- ▶ DOE launch of research on homes that achieve 50% whole home energy savings



BENEFITS OF PARTNERSHIPS FOR HOME ENERGY EFFICIENCY

Many environmental and economic benefits will come from our successful efforts to improve the energy efficiency of U.S. housing. These benefits include

- ▶ Significant savings on energy bills,
- ▶ Improved affordability of housing and home ownership,
- ▶ Avoiding the need for new electric power generation,
- ▶ Reduced demand for natural gas and reduced natural gas price volatility,
- ▶ Reduced demand for electricity, and
- ▶ Avoided emissions of air pollutants and greenhouse gases.

If each household across the country were improved by 10 percent over the next decade, as a nation we would see the following results:

- ▶ Energy bill savings of more than \$20 billion,
- ▶ Reduced demand for natural gas of more than 1 quadrillion BTU,⁴
- ▶ Reduced demand for electricity of 160 billion kilowatt hours (kWhs),
- ▶ Avoided need for more than 40 new electric power plants, and
- ▶ Avoided greenhouse gas emissions equivalent to those from 25 million vehicles.

In addition, many Americans would be living in more comfortable homes.

⁴ These natural gas savings include savings in direct use and savings from lower electricity demand.

OVERVIEW OF COORDINATED AGENCY WORK PLAN

The coordinated Agency work plan draws on the strengths and resources of the U.S. Department of Energy, Department of Housing and Urban Development, and Environmental Protection Agency to pursue the broad objective of improving the access of homeowners and others to cost-effective, energy-efficient services, technologies, products, and practices and to continue to overcome market barriers to greater home energy efficiency. The work plan shows how the Agencies will pursue projects in the near-term, building on existing policies and programs. The projects are organized under the following broad areas:

- ▶ Support energy service providers, contractors, and remodelers. Planned projects will educate and train contractors, remodelers, and home professionals to be successful in delivering energy efficiency to the homeowner; develop new credentialing and quality assurance programs; and develop new services that they can offer, which are backed by the ENERGY STAR program, among other efforts.
- ▶ Educate and motivate consumers to seek cost-effective energy efficiency improvements. Planned projects will educate the public on the benefits of energy efficiency, promote cost-effective, energy-efficient products, and condition the marketplace for new home energy efficiency services.
- ▶ Continue innovative research in building science technologies, practices, and policies and demonstrate new product and building practices that provide cost-effective energy efficiency in new and existing homes.

The schematics on the following pages provide an overview of the work planned by the three Agencies.

SCHEMATICS

JOINT INITIATIVE TO IMPROVE THE ENERGY EFFICIENCY OF EXISTING HOMES

A ENABLE & MOTIVATE SERVICE PROVIDERS	B EDUCATE & MOTIVATE CONSUMERS	C TECHNICAL & POLICY RESEARCH
A 1.0 Assess National Market for Home Improvement	B 1.0 Identify and Quantify the Benefits of Energy Efficiency Improvements to Homes	C 1.0 Obtain Industry Feedback to Identify Research Needs
A 2.0 Identify Business Models	B 2.0 Gauge Consumer Knowledge of the Value of Energy Efficiency	C 2.0 Conduct Technical Research
A 3.0 Develop Protocols for Home Remodeling	B 3.0 Craft and Develop Uniform Messages for Consumers	C 3.0 Communicate Research Results Broadly and Directly to Key Players
A 4.0 Establish Information Base	B 4.0 Facilitate Consumer Knowledge of Incentives	C 4.0 Conduct Research that Enhances Program Effectiveness
A 5.0 Conduct Education and Training		
A 6.0 Establish Credentialing Programs		
A 7.0 Develop Award Programs		
A 8.0 Outreach to Service Providers		
A 9.0 Expand Home Performance with ENERGY STAR Nationally		

A ENABLE & MOTIVATE SERVICE PROVIDERS

D = DOE | E = EPA | H = HUD

A 1.0	Assess National Market for Home Improvement	A 2.0	Identify Business Models	A 3.0	Develop Protocols for Home Remodeling	A 4.0	Establish Information Base	A 5.0	Conduct Education and Training	A 6.0	Establish Credentialing Programs	A 7.0	Develop Award Programs
A 1.1	Perform analysis on national impact of program (E/D/H)	A 2.1	Assess market transformation drivers (E/D)	A 3.1	Develop auditing protocol (H/D/E)	A 4.1	Promote DOE as source of technical information (D)	A 5.1	Develop materials for architecture and engineering programs (D)	A 6.1	Develop necessary technician certification programs (D/E/H)	A 7.1	Promote ENERGY STAR Awards program (E/D)
A 1.2	Develop contractor success stories and define contractor market (E/D)	A 2.2	Develop contractor business guides (E/D)	A 3.2	Develop quality assurance audit (H/D)	A 4.2	Promote ENERGY STAR solutions (E/D)	A 5.2	Pilot appraiser training (E)	A 6.2	Promote NATE certification (E/D)	A 7.2	Develop state and locally based recognition programs (D)
A 1.3	Develop analysis on the benefits to local sponsors (E/D)	A 2.3	Develop contractor models for HVAC and Home Sealing (E)	A 3.3	Review software models (D)	A 4.3	Research how industry learns information (E/D/H)	A 5.3	Work with retailers to develop training for subcontractors for in-house staff and external contractors (E/D)	A 6.3	Promote RESNET certification (E/D)	A 7.3	Promote Solar Decathlon Awards (D)
A 1.4	Develop inventory of green building programs (E/D)	A 2.4	Conduct vintage home analysis (H)	A 3.4	Review and refine web tools (E/D/H)			A 5.4	Develop training for CEU credits (D)			A 7.4	Promote Energy Value Housing Awards program for builders (D)
		A 2.5	Determine motivators for allied industries (D)					A 5.5	Collaborate with community colleges and trade schools (D)				
								A 5.6	Develop materials for remodelers, realtors, financial institutions (EEMs), and home energy raters (D/E)				

A 8.0	Outreach to Service Providers
A 8.1	Promote information developed under A1-A7 to contractors (E/H/D)
A 8.2	Promote ENERGY STAR Home Sealing and HVAC (E)
A 8.3	Outreach to Weatherization Assistance Program (D)
A 8.4	Outreach to Rebuild America Program (D)
A 8.5	Outreach to Building America Network (D)

A 9.0	Expand Home Performance with ENERGY STAR Nationally
A 9.1	Provide on-going support of state and local Home Performance with ENERGY STAR Programs (E/D/H)
A 9.2	Recruit additional Home Performance with ENERGY STAR sponsors (D/E/H)

B EDUCATE & MOTIVATE CONSUMERS

D = DOE | E = EPA | H = HUD

B 1.0	Identify and Quantify the Benefits of Energy Efficiency Improvements to Homes	B 2.0	Gauge Consumer Knowledge of the Value of Energy Efficiency	B 3.0	Craft and Develop Uniform Messages for Consumers	B 4.0	Facilitate Consumer Knowledge of Incentives
B 1.1	Research monetized value of energy efficiency (E/D/H)	B 2.1	Survey recognition of energy efficiency annually (E/D)	B 3.1	Develop and promote Energy Efficiency in Homes PSA (D/E/H)	B 4.1	Promote awareness and availability of EEMs (E/D/H)
B 1.2	Assess non-energy benefits of energy efficiency improvements (E/D/H)	B 2.2	Conduct literature search on consumer choice models (H)	B 3.2	Implement ENERGY STAR regional and seasonal campaigns (E/D)	B 4.2	Post state-by-state information on financial incentives on web sites (E/D)
B 1.3	Compile case studies on completed retrofit work (D/E/H)	B 2.3	Compile and evaluate information from existing consumer surveys (E/D/H)	B 3.3	Develop future communication strategies (E/D/H)	B 4.3	Incorporate tax credit information in program materials (D/H/E)
B 1.4	Assess value of energy efficiency in low-income housing (H)	B 2.4	Survey of home buyers and how they value energy features (D)	B 3.4	Develop communications targeting low-moderate income home owners (H/E/D)	B 4.4	Convene workshop to develop easy-to-use financing for home improvements (E/D)
				B 3.5	Develop and implement outreach strategy for ENERGY STAR Home Sealing (E)	B 4.5	Develop revolving loan model (E/H/D)
				B 3.6	Develop and implement outreach strategy for HVAC quality installation (E)		
				B 3.7	Continue ENERGY STAR retailer campaigns (E/D)		
				B 3.8	Convene working group with NGOs to discuss future communication strategies (E/D/H)		
				B 3.9	Promote Energy Savers revised publications (D)		
				B 3.10	Promote consumer fact sheets through agency clearinghouses, web site, conferences, etc. (D/E/H)		
				B 3.11	Develop clearinghouse web page (D/E/H)		

C TECHNICAL & POLICY RESEARCH

D = DOE | E = EPA | H = HUD

C 1.0	Obtain Industry Feedback to Identify Research Needs	C 2.0	Conduct Technical Research	C 3.0	Communicate Research Results Broadly and Directly to Key Players	C 4.0	Conduct Research that Enhances Program Effectiveness
C 1.1	Review recommendations in June 2002 PATH Report "Volume 1: Technology Brainstorming" (H/D)	C 2.1	Determine applicability of energy efficiency strategies for new homes to existing homes (D)	C 3.1	Present findings at conferences (D/E/H)	C 4.1	Identify and involve missing players to fill product systems gaps (D)
C 1.2	Conduct sessions at conferences to develop list of potential research projects (H/D)	C 2.2	Determine unique needs for existing homes (D)	C 3.2	Post results of research on web sites and commercially available documents (E/D/H)	C 4.2	Validate component and whole house energy efficiency via monitoring (D)
		C 2.3	Refine systems research on whole house model (D)	C 3.3	Include results of research into materials for service providers, consumers, and other key players (D/E/H)	C 4.3	Policy analysis on transaction chain involved in home improvement. Develop, test, and evaluate options that affect chain in NY, TX, and CA (D)
				C 3.4	Incorporate research results into educational and training materials and programs and certification processes (D)	C 4.4	Evaluate overall effectiveness of transaction chain process (D)
						C 4.5	Develop specifications for new products (D)
						C 4.6	Develop and disseminate report on research results (D)

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