

Clean, Comfortable

# Buildings

FOR THE 21ST CENTURY

U.S. DEPARTMENT OF ENERGY  
OFFICE OF ENERGY EFFICIENCY  
AND RENEWABLE ENERGY



As a nation, we pride ourselves on our high standard of living. Nowhere is that standard more evident than in the buildings that serve as our homes, schools and businesses. Walk into one of the new Village Green Homes in Sylmar, California, or the impressive 4 Times Square office building in midtown Manhattan, and you'll see and feel how the U.S. Department of Energy (DOE) and its Office of Building Technology, State and Community Programs (BTS) are working to improve our quality of life while helping to sustain a healthy environment.

Residential and commercial buildings cost us \$240 billion a year to operate, account for more than one-third of the nation's total energy use, and consume about two-thirds of the nation's electricity. Within DOE's Office of Energy Efficiency and Renewable Energy (EERE), BTS supports public- and private-sector partnerships with the building industry to improve energy efficiency and increase the use of renewable energy. Energy efficient and renewable energy technologies can save home and business owners money and create more comfortable and productive buildings.

BTS sponsors basic and applied research on whole or "integrated" building systems. The integrated approach takes every aspect of the building into account, from the materials used in construction to weather and siting considerations; from heating and cooling systems to lighting, appliances, and equipment; from financing and insuring to reuse and recycling. By considering all aspects of the building structure, the indoor environment, and how they interact in determining energy performance, BTS strives to develop technologies and strategies that will help the U.S. building industry and building owners save energy in our nation's buildings.

## Mapping Research for the New Millennium

Three BTS teams—residential, commercial, and building equipment—work with industry to develop the strategic course that will carry BTS research and technical assistance into the 21st century. BTS has already begun implementing plans with the commercial whole buildings, lighting, and windows industries. The goal is to have technology development plans for all sectors of the building industry, which will help BTS to better align its research, development, and deployment (RD&D) agenda with the industry's specific needs.

This planning expands on past successes of several BTS programs:

- **Building America** is a private/public partnership that provides energy solutions for large home builders in production housing. Program partners build homes on a community scale that use 30% to 50% less energy and reduce construction time and waste by as much as 50% with little or no added cost. Building America forms teams of home builders, architects, engineers, equipment manufacturers, material suppliers, community planners, mortgage lenders, and building trades. These teams bring together many different companies to work on projects in subdivisions around the country.



NREL/PX 06458, KISS & CATHCART ARCHITECTS

*4 Times Square, a 48-story skyscraper in New York City, is a showcase of renewable technologies and energy efficient construction. The building incorporates daylighting, fuel cell and photovoltaic energy generation, and a chlorofluorocarbon-free heating, ventilation, and air conditioning system.*

## Benefits for 21st Century Buildings

BTS research and programs benefit the building construction, equipment, and appliance industries and the nation's citizens. Some of those benefits include:

- Reducing construction costs and waste by as much as 50%
- Reducing energy use and lowering utility bills
- Creating new product opportunities for manufacturers and suppliers
- Practicing energy-efficient manufacturing and construction techniques
- Creating jobs in the building industry
- Improving building performance and comfort
- Leveraging federal, local, and private funds
- Protecting the environment.



These energy-efficient homes built in Sylmar, California, were constructed as part of DOE's Building America program. The 186 homes include efficient HVAC systems, high performance glazing, advanced framing, and walls with R-19 insulation.

## THE OFFICE OF BUILDING TECHNOLOGY, STATE AND COMMUNITY PROGRAMS



NREL/PIX 07726, D&amp;R, INTL., LTD.

ENERGY STAR® appliances such as this washer and dryer save energy and cut residential electric bills by reducing the amount of water required to wash clothes, and the amount of time needed to dry them.

*"This is a different way to save money for all. As Henderson grows, so will the need for more power. If we can reduce local energy costs by just 1%, we will have redirected \$8,000,000 back into the local economy."*

**HENDERSON CITY COUNCILWOMAN AMANDA CYPHERS COMMENTING ON THE REBUILD HENDERSON, NEVADA PROJECT, JUNE 1998**

### Contacts

Office of Building Technology,  
State and Community Programs

[www.eren.doe.gov/buildings](http://www.eren.doe.gov/buildings)



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- **Rebuild America** is a network of community partnerships that saves money by improving the energy efficiency of commercial, school, and multifamily residential buildings. The program supports the partners with business and technical tools and customized assistance, as well as by linking partners to shared resources. Throughout the nation, Rebuild America has hundreds of partnerships at work—in almost every state, the U.S. territories, and within several Native American communities—that have already saved more than \$100 million.
- The **Weatherization Assistance Program** is the nation's primary program for delivering energy efficiency services to low-income Americans. The weatherization upgrades reduce heating and cooling costs for low-income families—particularly those with elderly members, persons with disabilities, and children. The program has weatherized the homes of more than 4.7 million families since its inception in 1976.
- The **State Energy Program** (SEP) provides funding to state and territory energy offices to design and carry out energy efficiency and renewable energy projects tailored to locally specific needs and opportunities, while helping to address national energy priorities. Since the program's inception in 1976, more than 8,000 projects have been completed nationwide with state energy offices, and approximately 70,000 energy efficiency retrofits have been completed for school and hospital buildings.

### BTS Partnerships Pay Off

Through BTS, DOE is working with the U.S. Environmental Protection Agency to promote the use of energy efficient equipment. They award the ENERGY STAR® label for appliances and electronic equipment that significantly exceed the minimum national efficiency standards. The label helps consumers easily identify these efficient products. Businesses and organizations participating in the ENERGY STAR® program are continually setting examples of environmental leadership by manufacturing, selling, and using efficient appliances. The typical U.S. household spends about \$1,300 on home energy bills. ENERGY STAR® appliances and heating and cooling equipment can reduce those bills by up to 40%.

DOE is also working with industry and government through the Partnership for Advancing Technology in Housing (PATH) initiative, a multi-agency effort launched by President Bill Clinton in 1998. PATH links key agencies in the federal government with leaders from the home building, product manufacturing, insurance, financial, and regulatory communities in a unique partnership to radically improve the quality, durability, environmental performance, energy efficiency, and affordability of our nation's housing. BTS supports PATH through R&D in energy efficient technologies and practices; by developing codes, standards, and guidelines that increase the minimum efficiency of homes; and by encouraging the use of BTS technologies through technology transfer and financial assistance.