

## Better Buildings, Brighter Future

### Innovative Building Technologies and Practices Save Energy and Money

Buildings use more energy than any other sector of the U.S. economy, consuming more than 70 percent of electricity and over 50 percent of natural gas. Investing in energy-efficient buildings yields:

- Cost savings for American homeowners and businesses;
- Reductions in peak demand, providing the energy needed for a strong economy with fewer new power plants; and
- Expedient and sustained reductions in carbon dioxide emissions—with fast paybacks and positive economic returns.

By speeding market adoption of today's proven energy-efficient technologies and by researching new technologies that will drive up performance and drive down costs, our nation can profoundly transform the energy footprint of the built environment, and lay the foundation for a sustainable energy future.

Partnering with the building industry, state and local governments, academia, and manufacturers, the U.S. Department of Energy's (DOE) Building Technologies Program (BTP):

- Leads research, development, and deployment of energy-efficient building technologies and practices;
- Works to strengthen and improve building codes, appliance and equipment standards, and guidelines for efficient energy use; and
- Educates homeowners, builders, and developers about the benefits of embracing energy-efficient technologies and practices.



With new technologies and practices, energy-efficient buildings will be the new standard for residents in all U.S. climate zones. DOE and its partners are pursuing a portfolio of research to make it happen.

### Delivering on the Promise of Energy- Efficient Buildings

Ultimately, BTP's R&D and deployment efforts drive toward these bold goals: affordable, energy-efficient homes by 2020 and high-performance commercial buildings by 2025. These grid-connected buildings will be 60 to 70 percent more energy efficient than today's typical buildings, with renewable energy providing a portion of the power needs. They will combine energy-smart "whole building" design and construction, appliances and equipment that minimize plug loads, and cost-effective photovoltaics or other on-site energy systems.

High-performance buildings will even be capable of generating power back to the grid, making them a domestic energy asset and resource in the future.

#### Already underway:

- Homes being built today using best practices from BTP's Building America research program can use 40 percent less energy than comparable new homes. These proven and

affordable approaches are being documented in the next generation of Building America's Best Practices Guidelines.

- By training contractors, and working closely with retailers, the Home Performance with ENERGY STAR® program is making it easier for homeowners to improve the efficiency of their homes with comprehensive energy audits and effective improvements. Twenty-seven partners in 22 states currently operate Home Performance programs.
- DOE's EnergyPlus software allows calculation of the savings potential of a variety of building energy options. Since 2001, more than 100,000 copies have been downloaded.
- DOE sponsors the Solar Decathlon, where 20 teams of university students compete every two years to showcase the powerful combination of solar energy, energy efficiency, and the best in home design. BTP invests in innovations highlighted during the competition, ranging from energy-efficient "whole building" design approaches, to efficient window



Natural daylighting is one of the many means for dramatically reducing energy use in buildings.

and envelope technology, heating and cooling equipment, appliances, and lights. All of these—along with advances in renewable energy technology—are transforming today’s homes and offices into “smart” buildings that use far less energy.

**On the horizon:**

- DOE’s cost-shared R&D and demonstration efforts are helping to speed the development of solid-state lighting, an exciting technology with the potential to more than double the efficiency of today’s general lighting systems.
- BTP research is laying the groundwork for improved appliance and equipment standards. Dozens of new or updated standards are being developed on an aggressive timeline.
- The DOE Builders Challenge will inspire a wave of high-performance new home construction. Participating builders agree to use the Energy Smart Home Scale—or E-Scale—to show buyers exactly where their homes rate in energy use.

- Today’s windows lose as much as 30 percent primary energy or 4.1 quads. But, DOE has established an aggressive research goal: to turn windows and skylights into net energy providers—making them valuable contributors to energy-efficient buildings.
- BTP is working with states and partner organizations to achieve 30 percent improvement in both commercial and residential codes in the United States. Partners include the International Code Council (ICC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
- DOE is facilitating the Commercial Building Energy Alliances, which bring leading businesses together to improve the energy performance of their new and existing facilities. Sectors addressed include retail, commercial real estate, and institutions. An industry-led steering committee sets the priorities for each alliance.
- DOE will begin verifying the performance of ENERGY STAR products currently available in the United States market by conducting verification testing on a random sample of appliances from the product categories. If a model fails to meet the ENERGY STAR specifications, DOE will notify the states, make the product ineligible for federally funded rebates, and refer the model to the U.S. Environmental Protection Agency for removal from the ENERGY STAR qualified product list.
- DOE will direct development of ENERGY STAR criteria for new categories of products coming on the market—including solid-state lighting, small wind, and

photovoltaics—adding to the roster of appliances, windows and doors, and other products already labeled with DOE’s oversight.

**Benefits for Our Homes, Our Businesses, and Our Nation**

Energy-efficient buildings use less energy, cost less to operate, and improve comfort, saving money for homeowners and businesses. Reducing the need for new power generation and decreasing harmful emissions improves the environment and strengthens America’s energy security. The Building Technologies Program’s investments in innovative technologies and practices are creating better buildings today and ensuring a brighter future ahead.

**For More Information**

Contact the EERE Information Center at 1-877-EERE-INF or 1-877-337-3463 or visit [www.buildings.energy.gov](http://www.buildings.energy.gov).

For additional information on specific BTP initiatives, please visit the following Web sites:

- [www.buildings.energy.gov/energystar.html](http://www.buildings.energy.gov/energystar.html)
- [www.energystar.gov](http://www.energystar.gov)
- [www.energysmartschools.gov](http://www.energysmartschools.gov)
- [www.appliancestandards.energy.gov](http://www.appliancestandards.energy.gov)
- [www.ssl.energy.gov](http://www.ssl.energy.gov)
- [www.commercialbuildings.energy.gov](http://www.commercialbuildings.energy.gov)
- [www.buildingamerica.gov](http://www.buildingamerica.gov)
- [www.energyplus.gov](http://www.energyplus.gov)
- [www.energycodes.gov](http://www.energycodes.gov)
- [www.solardecathlon.org](http://www.solardecathlon.org)

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