

Buildings and homes use more than 73% of the electrical energy consumed in the United States. They also consume 40% of the nation’s total energy, with an annual energy bill of \$430 billion. These energy bills can be cost effectively reduced by 20%–50% or more through various energy-efficient technologies and techniques. The Building Technologies Office (BTO) will continue to develop and demonstrate advanced building efficiency technologies and practices to make buildings in the United States more efficient, affordable, and comfortable.

### What We Do

BTO uses an integrated, three-pronged approach to deliver energy and consumer cost savings:

- ✓ **Research and Development (R&D)** of innovative technologies and techniques that enable energy-efficient building systems.
- ✓ **Market Transformation** activities to overcome barriers to “speed and scale” technology adoption.
- ✓ **Standards and Codes** that use transparent public processes to expand the portfolio of energy-efficient appliances, equipment, and buildings.

### Program Goals/Metrics

BTO will develop and promote the adoption of technologies and practices, that when fully deployed, will reduce U.S. building-related energy use by 50% from the 2010 Annual Energy Outlook baseline.

Achieving this goal would decrease annual energy use by approximately 20 quads—which is equivalent to almost 1 billion metric tons of carbon dioxide—and save consumers and businesses roughly \$200 billion in annual energy costs.

### FY 2016 Priorities

- **The Emerging Technologies (ET)** program will introduce a new effort in advanced building materials R&D that capitalizes on advances in high-performance computing and high-throughput experimental techniques to rapidly design new and improved materials for (1) non-vapor-compression refrigeration systems and (2) high-performance envelope materials. In addition, ET R&D will pursue technologies that support advanced automated building systems that cost effectively transact with the grid.
- **The Commercial Buildings Integration (CBI)** program will continue to demonstrate a 2%-per-year, portfolio-wide energy savings in buildings operated by its Better Buildings market partners and will issue a Small and Medium Sized Commercial Building funding opportunity in pursuit of market partners to nationally scale, energy efficiency solutions.
- **The Residential Buildings Integration** program will pursue high-value technology solutions for new and existing homes through Building America; expand its existing retrofit programs to a wider range of housing types (not just single family homes) through staged upgrade measures; and continue its Zero Energy Ready Home initiative for new homes and its whole house retrofit programs.
- **The Equipment Standards** program will continue to meet all of its mandated deadlines for covered appliances and equipment and enforce its existing standards. In 2016, the goal is to issue 14 standards final rules.
- **Building Energy Codes** will issue a Commercial Energy Codes funding opportunity to develop and field test methodologies to establish state baselines. In most states, there are no reliable baselines to determine compliance with the state’s adopted codes, or the potential benefits that could accrue from increasing those compliance rates.

(Dollars in Thousands)	FY 2014 Enacted	FY 2015 Enacted	FY 2016 Request
Emerging Technologies	55,862	55,740	112,500
Commercial Buildings Integration	30,782	27,643	32,000
Residential Buildings Integration	24,390	22,758	48,000
Equipment Standards and Building Codes	55,840	53,359	69,000
Penn State Consortium for Building Energy Innovation	9,994	10,000	0
NREL User Facility	1,000	2,500	2,500
<b>Total, Building Technologies</b>	<b>177,868</b>	<b>172,000</b>	<b>264,000</b>

## Key Accomplishments

### Emerging Technologies

- The Philips Lumileds LUXEON TX LED package lowered solid-state lighting manufacturing costs to a record 150 lumens per dollar, surpassing the previous 115 lm/\$. Representing the next rung on the evolutionary ladder of the Lumileds product family, the LUXEON TX offers extreme efficacy and an industry lowest forward voltage.
- Hillphoenix’s Second Nature “Advansor” supermarket refrigeration system uses no hydrofluorocarbons, reduces greenhouse gas emissions by 78%, and lowers energy consumption by 25% compared to existing systems. The system already has 12 applications in the United States.
- Dow’s LIQUIDARMOR Flashing and Sealant protects homes and commercial buildings from moisture and air leakages, significantly reducing HVAC loads and their CO2 emissions.

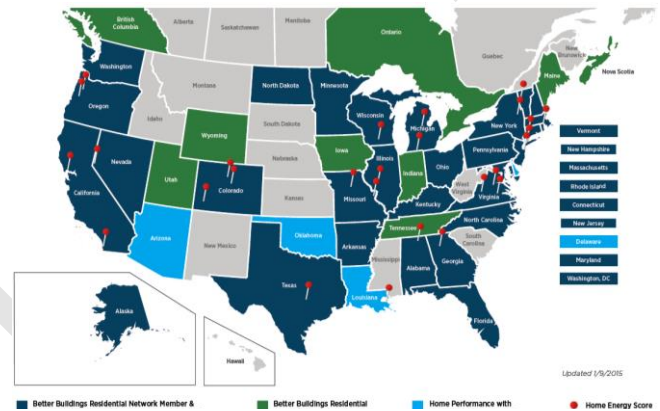


### Commercial Buildings Integration

- The Lighting Energy Efficiency in Parking Campaign recruited nearly half a billion square feet in commitments. The energy savings seen by partners—sometimes up to 90%—inspired a proposed change to ASHRAE’s 90.1 code, which is estimated to save 0.241 quads annually.
- The Standard Energy Efficiency Data Platform was launched and is used by major cities with disclosure laws, saving communities on program implementation costs and driving consistency in building energy data nationally.

### Residential Buildings Integration

- Retrofitted 450,000 homes through the DOE Better Buildings Residential and Home Performance with ENERGY STAR programs, providing homeowners up to 25% savings on energy bills across the seven major climate zones and 43 states—offering homeowners 20% to 25% savings on home energy bills.
- Home Energy Score added more than 30 partner locations and has completed more than 16,500 energy efficiency evaluations since program launch in 2012.



BTO Better Buildings Residential Network

### Equipment Standards

- Standards for Electric Motors are projected to save more than \$50 billion in electricity bills over 30 years.
- Standards for Walk-in Coolers and Freezers are projected to save more than \$30 billion in electricity bills over 30 years.



### Building Energy Codes

- Since 2010, there have been more than 850,000 projects uploaded using REScheck and COMcheck compliance software.