

# Energy Codes Create Better Homes

- Lower energy bills
- Greater value
- Comfort
- Health & safety

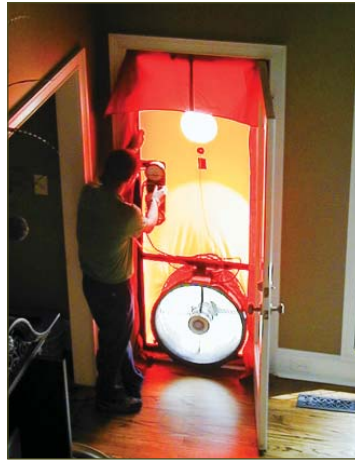


## Home buyers win with energy codes

Energy codes can help:

- Lower utility bills = more money in your pocket
- Increased home value
- Improved comfort
- Improved health and safety
- Reduced maintenance costs

Energy codes benefit home buyers by requiring contractors to provide a standard level of quality. This quality will be assured by the inspection and testing process required for each new home. Increasing the energy efficiency of homes does not have to add greatly to construction costs, nor require special materials or construction skills.

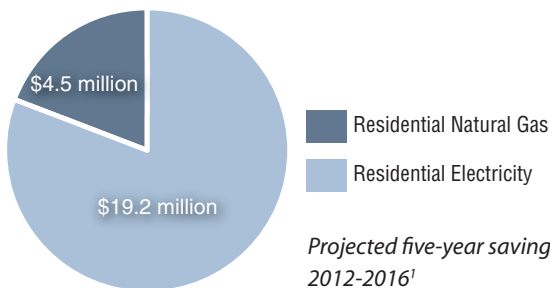


A technician performing blower door test to determine "tightness" of home.

### Boosting building performance helps everyone's bottom line

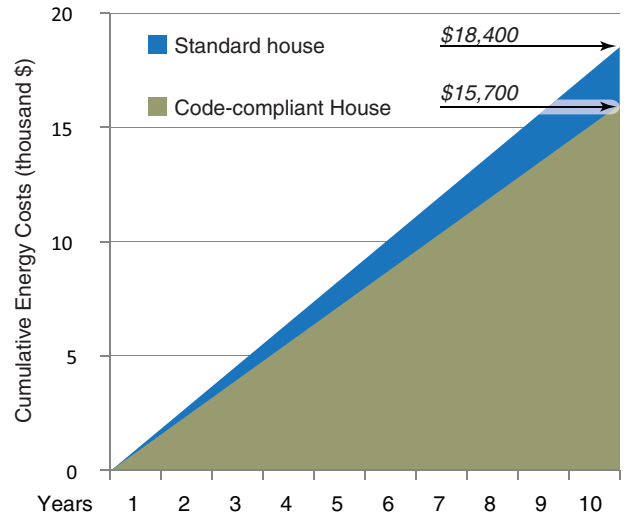
With the adoption of the 2009 International Energy Code Council (IECC) energy code, Mississippi will be investing in long-term energy savings for home buyers and the state. Energy code adoption will result in more purchasing power for individuals, resulting in economic growth within the local economy. Over a five-year period, it is possible to save up to \$10.2 million through residential energy efficiency measures.

#### Projected Mississippi Energy Savings



Projected five-year savings, 2012-2016<sup>1</sup>

#### Home Buyer Savings



Over a 10-year period, a code-compliant house can save an estimated \$2,700 in energy costs. This savings will increase as energy costs rise.

### Advantages of energy codes

#### Financial Benefits

The incremental cost increase of an energy-efficient home is modest, but the savings are significant, and their value increases as energy prices rise. The initial cost increase for a new home often will pay for itself in 12 months or less. An energy code compliant home will also increase resale value. Home buyers will get greater comfort, durability, health, and safety, plus lower monthly utility bills, starting with the first day in their new, energy-efficient home.

#### Improved Comfort

Homes which are built to energy code standards provide greater year round comfort. An energy-efficient home can help alleviate these common problems:

- Outdoor noise
- Stuffy/muggy air
- Condensation
- Excessively dry air
- Hot and cold areas

### Improved health and safety

Inefficient buildings can contribute to serious health concerns, especially for children, the elderly, and those suffering from illness. Energy-efficient buildings can reduce health risks such as:

- Mold
- Dust and dust mites
- Radon
- Pollen
- Rodents
- Insects
- Combustion by-products

Buildings are not thought of as causes of pollution-related health risks, but the electricity, fossil fuels, and other energy sources they use contribute to climate change, acid rain, smog, and other serious environmental problems. These environmental pollutants, in turn, can cause respiratory, reproductive, and pulmonary health issues.<sup>2</sup>

### Reduced maintenance costs

Energy-efficient homes can reduce maintenance problems such as:

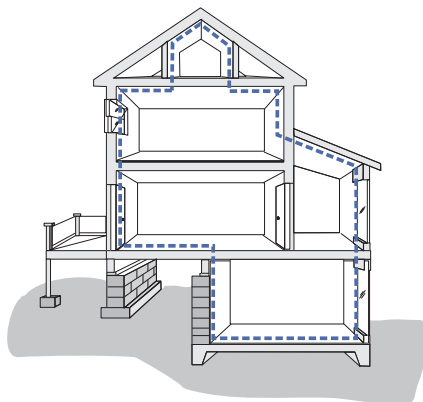
- Mold growth and rot from condensation
- Heating and cooling equipment maintenance/replacement due to excessive run times
- Insect, rodent, and other pest infestation due to improper sealing
- To fix these common problems after construction can cost a homeowner more than five times the cost of doing it right the first time.

### The House As a System

The energy code looks at the house as a system whose overall energy performance is dependent on the performance of its individual components. When one component performs poorly, the entire system can suffer. A description of the criteria for these energy components follows:

#### Insulation

Most new homes have moderate to good levels of insulation, but improper installation often cuts performance by 25% or more. Insulation must be installed so that it is continuous and has no gaps, voids or compressed areas. Energy codes help you get what you pay for ensuring that the insulation is continuous and installed according to manufacturer's specifications.



Overlooked areas contribute to energy loss. Some examples are:

- Attic hatches
- Band joists
- Exterior wall intersections
- Kneewalls
- Vaulted ceilings
- Areas behind tubs



### Air Sealing

Using sealants such as caulk and spray foam to seal cracks and gaps in the building envelope—the roof/ceiling, exterior walls, floors/crawl spaces - is key to preventing air leaks in a house. Air leaks can cause a loss of as much as 35% of heating or cooling energy, increasing utility bills and stressing the heating and cooling system. A stressed heating and cooling system can cost more to operate due to more frequent maintenance and replacement needs. Leaks also allow contaminants such as pollen, dust, and moisture inside.



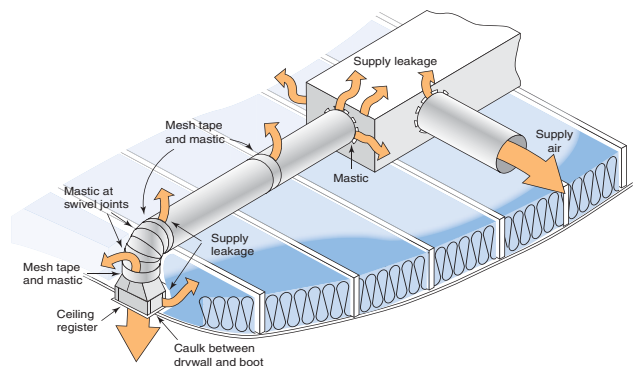
*Air sealing with caulk around an electrical*

The energy code requires either thorough visual inspection during critical phases of the construction process or an air tightness test using a blower door to ensure that the house is properly sealed.



### Heating and Cooling Systems

In addition to costing less to operate, energy-efficient heating and cooling systems can be quieter, better maintain indoor humidity, and improve the overall comfort of a home. With Mississippi's long, humid summers, it is critical to size air conditioning equipment correctly. Oversized equipment may not adequately dehumidify the home. In addition, it also costs more to buy and will experience more wear due to cycling.

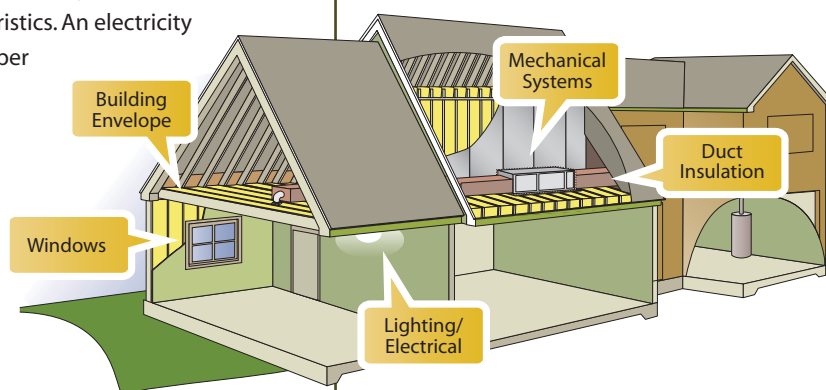


*Duct leakage can account for up to 25% total energy loss*

*(Continued on page 4)*

## CASE STUDY

This case study estimates savings in an energy-efficient and code-compliant home by comparing it to a standard home. This comparison accounts for differences in initial cost, mortgage payment, and energy bills. A wood-frame, single-family detached, all-electric home in Jackson, Mississippi was modeled. Energy savings for homes using natural gas or propane are comparable. Based on regional information from the U.S. Census Bureau, the typical home was assumed to be 2,000 sq.ft., two-story on a slab with three bedrooms, priced at \$176,000.<sup>1</sup> A regional survey was conducted to determine typical construction and cost characteristics. An electricity rate of 9.97 cents per kwh was used.<sup>2</sup>



### HOUSE SYSTEMS



**Insulation** – must be continuous and have no gaps, voids, or compressed areas



**Air sealing** – critical leakage points in the building envelope should be sealed to block air leaks, moisture and pests



**Windows** – must meet the minimum performance specifications defined by climate zone



**Heating and Cooling System** – must meet minimum equipment efficiencies and perform mandatory duct leakage testing



**Lighting** – at least 50% of installed lights must be high efficiency

| Features                      | Standard House                                    | Code Compliant House                             | Cost Difference                |
|-------------------------------|---|--|--------------------------------|
| Air Sealing                   | Minimal (10 ACH <sub>50</sub> )                   | Extensive and tested (7 ACH <sub>50</sub> )      | \$350                          |
| Wall Insulation               | R-13 <sup>3</sup>                                 | R-13   | \$0                            |
| Ceiling Insulation            | R-30 <sup>3</sup>                                 | R-30   | \$0                            |
| Windows                       | Double-pane metal:<br>U-value (0.65), SHGC (0.66) | Double-pane low-E:<br>U-value (0.5), SHGC (0.30) | \$312                          |
| Duct Sealing                  | Minimal<br>(15% leakage to outside)               | Extensive and tested<br>(8% leakage to outside)  | \$350                          |
| Duct Insulation               | R-6 (attic) <sup>3</sup>                          | R-8 (attic)                                      | \$120                          |
| Equipment                     | 13 SEER, 8.1 HSPF, 3.5 ton <sup>3</sup>           | 13 SEER, 8.1 HSPF, 3 ton<br>(Manual J)           | -\$100                         |
| Water Heater                  | 50-gallon electric (0.92 EF) <sup>3</sup>         | 50-gallon electric (0.92 EF)                     | \$0                            |
| Lighting                      | 10% efficient                                     | 50% efficient                                    | \$60 <sup>4</sup>              |
| Total Cost and Expenses       | Standard House                                    | Code Compliant House                             | Cost Difference                |
| Price of Home                 | \$176,000 <sup>1</sup>                            | \$177,092  | +\$1,092                       |
| Annual Mortgage (5% interest) | \$9,072   | \$9,126  | +\$54                          |
| Annual Energy Cost            | \$1,826   | \$1,557  | -\$269                         |
| Total Annual Expenses         | \$10,898  | \$10,683   | -\$215                         |
|                               |   |  | <b>Annual Savings of \$215</b> |



## Heating and Cooling Systems

(Continued from page 2)

Leaks in the duct system are a major source of energy waste in new houses. Duct leakage can account for as much as 25% of total energy loss and prevent a heating and cooling system from doing its job properly, resulting in hot or cold rooms as well as humidity problems. Duct leaks can create air quality problems by pulling pollutants and irritants directly into the house.

The energy code requires a performance test of the duct system that allows contractors to identify and correct any problems on the front end.

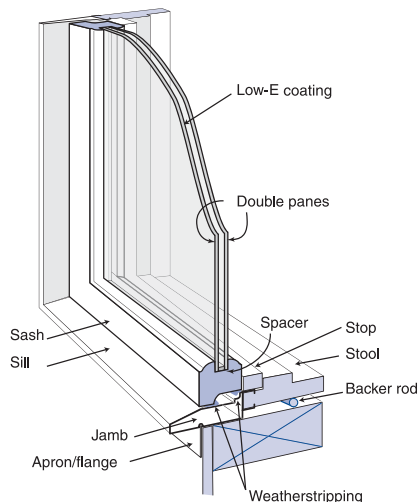


This technician is performing a duct leakage test that ensures the integrity of the duct system.



## High-performance windows

Energy-efficient windows have double glazing, low-emissivity (low-E) coatings, and improved frames to keep heat in during winter and out during summer. These windows minimize condensation which reduces mold growth, and also block damaging ultraviolet sunlight that can discolor carpets and furnishings.



Profile of an energy-efficient, double-pane low-E window



## Lighting

Choosing more efficient light bulbs or light fixtures can make a difference on utility bills and the environment. The energy code requires 50% of the permanent lighting in the home to be compact fluorescent, linear fluorescent or LED.

### Resources:

[www.mississippi.org](http://www.mississippi.org)

[www.southface.org](http://www.southface.org)

[www.energycodes.gov](http://www.energycodes.gov)

[www.bcap-ocean.org](http://www.bcap-ocean.org)

### Footnotes

- 1 U.S. Department of Energy. "Impacts of the 2009 IECC for Residential Buildings at State Level; Sept 2009.
- 2 U.S. Census Bureau. Characteristics of new Single Family Houses Completed. [www.census.gov](http://www.census.gov)
- 3 Energy Information Administration. Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State. [www.eia.gov](http://www.eia.gov)
- 4 Energy Information Administration. Natural Gas Prices. [www.eia.gov](http://www.eia.gov)
- 5 ACCA. Manual J Residential Load Calculation, 8th edition.
- 6 Based on a regional survey of design and construction professionals conducted by Southface in May 2011
- 7 Department of Energy. Lighting Market Characterization: National Lighting Inventory and Energy Consumption Estimate, Volume I. [apps1.eere.energy.gov](http://apps1.eere.energy.gov)

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