

NEW GUIDE TO ENERGY EFFICIENT HOMES

by
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The Louisiana State Energy Office (LA SEO) is pleased to announce the completion and availability of the new *Energy Efficient Homes in Louisiana*. Since the last revision, the State of Louisiana has adopted the 2006 version of the International Residential Code (IRC). The adoption of this code, specifically the energy efficiency provisions of chapter 11, has necessitated this revision.

Taking these code requirements into consideration, information was revised and baselines for comparison were increased to the stringency of the code. As well as updating existing chapters to agree with the IRC 2006, new chapters on Roofs and Site Selection have been added. To view or download *Energy Efficient Homes in Louisiana*, please visit:

http://dnr.louisiana.gov/sec/execdiv/techasmt/programs/residential/builders_guide_2009/index.htm.

The purpose of this book is to help the homeowner understand that if his home is energy efficient; not only will they benefit by lower energy bills, but the offshoot of using less energy will be a healthier environment, and more time for their family to utilize present energy resources.

This book is to help consumers become more conscious and capable of conserving energy resources. The more energy each family conserves, the less utility companies have to spend for plants and distribution facilities to provide for their customers' energy requirements. This translates into less disturbance and destruction of the natural environment, less use of its nonrenewable resources (such as natural gas and coal), and less pollution.

LA SEO hopes that updating and publishing the *Energy Efficient Homes in Louisiana* will enable homeowners and building professionals to make Louisiana homes as energy efficient as possible.

A History Lesson

The first edition of the *Builder's Guide to Energy Efficient Homes in Louisiana* was published in February 1999. In October 2002, the first revision was printed.

On November 11, 2005, Governor Kathleen Blanco signed Act 12 of the 2005 First Extraordinary Session into law, creating the Louisiana State Uniform Construction Code. The 2006 International Residential Code was officially adopted on January 1, 2007. This was a major step forward for the state, as Louisiana jumped to the forefront of energy code adoption. However, it meant major changes for home designers, builders, and other associated trade groups. In order to help homeowners and builders understand how the new code requirements affect the performance of a home, the LA SEO undertook this latest revision.

New and Revised Content

It does not take long to find changes to *Energy Efficient Homes in Louisiana*. The name has been shortened to incorporate a wider audience. The LA SEO understands that home improvements are

not always made through traditional resources, and as such, wants this book to help all homeowners save on utility costs.

Chapter 1 is a brand new chapter on Site Planning to start the book. Site planning is important to the success of any new construction. This goes beyond finding the best-looking lot. It is important for anyone choosing a site for a new home to match the location with the individual's or family's needs. Also, it is important to consider things like drainage, site access, and soil quality. After the site is selected, the design should take solar positioning very seriously. Louisiana is considered a cooling climate, so steps should be taken to reduce the amount of heat entering a home. To do so, the house should be oriented to reduce the amount of summer sun directly striking walls and windows.

Chapter 2 has been changed to The House as a System. This chapter incorporates portions of the old chapter on Natural Cooling. Because of the hot-humid Louisiana climate, natural cooling has limited applications. As such, a chapter dealing with the interactions between different systems in the home seems more beneficial. Because the chapter discusses issues that are prevalent in our climate, this chapter is important to anyone with home.

Chapter 3 introduces the reader to Energy Efficient Features. Along with describing overall energy efficiency techniques for the hot-humid climate, this chapter also discusses economics of many of the energy efficient improvements. The tables discussing the energy savings and broader economic impacts have been adjusted to current prices. The chapter also compares the requirements of the Energy Star Home program with the 2006 IRC.

Chapter 4 deals with one of the most important features of any home, Air Leakage Sealing. Air leakage can contribute more than 30% of the home's heating and cooling costs, as well as allowing moisture and other pollutants to enter the living area. The chapter discusses the different causes of air leakage, or infiltration. In order to best illustrate this, many of the figures have been recreated with improved image quality. After providing a list of common air leakage sites, a number of sealing techniques are provided. By using the materials and techniques in this chapter, a homeowner can help ensure that his home is efficient and provides a healthy environment for the inhabitants.

Chapter 5 deals with the different Insulation Materials and Techniques. Insulation works hand-in-hand with air sealing to provide a comfortable living space. Selecting the right insulation material for the application is only part of the equation. Proper installation of insulation materials is paramount to their effectiveness. Studies have shown that improper installation can reduce the performance of the insulation by over 30%. Because of this issue, a lot of emphasis was put on providing clear and accurate figures to demonstrate proper installation of the different materials. Many of the figures have been recreated and provide a clearer view of the correct installation techniques. The tables in the chapter were updated to take into consideration the provisions of the 2006 IRC.

Chapter 6 describes the impacts of Windows and Doors. These are necessary additions to any home, but they can have severe impacts on energy costs. A window typically allows heat to pass through it over 5 times as easily as the surrounding wall. Although the overall area of windows in a home may be small, the amount of heat passing through that area is considerable. This chapter describes the different ways in which a window allows heat to enter or exit the home, conduction, and radiation. However, windows also help save energy at times by reducing the amount of electric lighting needed. New windows have been designed to manage radiant heat transfer and the transmittance of visible light. By understanding the different aspects of business performance, a person can make a much more educated window

selection.

Doors also have relatively low insulating values. However, not all doors are created equally. A lot of decorative doors perform very poorly. However, manufacturers have been making great improvements to these products with new materials, including insulated metal and fiberglass doors.

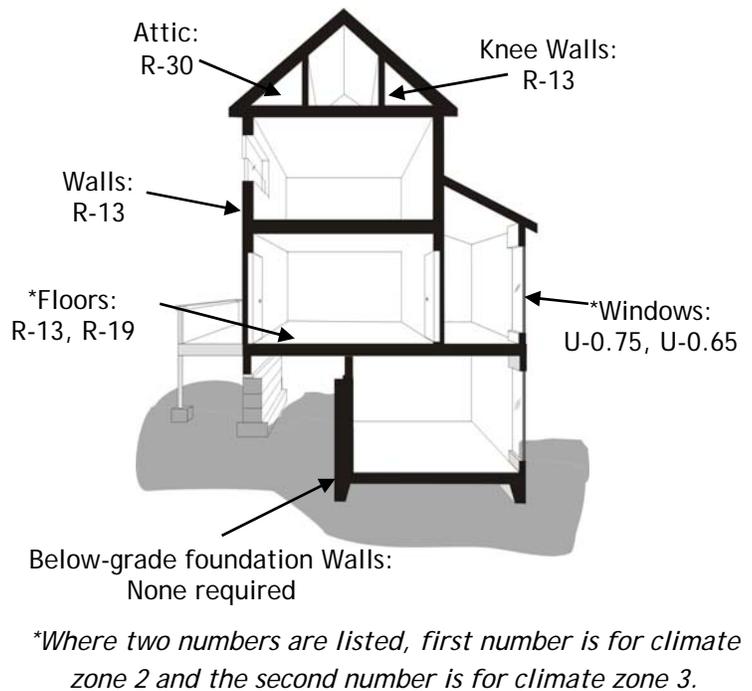
Chapter 7 discusses Heating, Ventilation, and Air Conditioning systems. Since the publication of the last edition, the federal government has increased the minimum efficiency of air conditioning units. As of January 1, 2006, all residential air conditioning units sold in the United States are required to have a Seasonal Energy Efficiency Rating (SEER) of 13, a significant increase from the prior standard of SEER 10. Along with making the changes associated with this higher SEER rating, the chapter was slightly reorganized to provide better flow between subject matter.

Several tables discussing economics of different systems were removed because costs can vary greatly depending on system types, brands, and installation. Also, savings will vary depending on the way the system is used. For instance, if a person uses a programmable thermostat properly, the savings associated with installing a higher efficiency unit will be significantly reduced. The chapter closes with discussion of ventilation and indoor air quality.

Chapter 8 is dedicated to Duct Design and Sealing. In Louisiana, ductwork is typically installed in the attic of the home, which can get above 125°F on an average summer day. Working under these conditions, it is not hard to understand the importance of duct insulation and sealing. Duct leakage can result in the loss of over 50% of the efficiency of the unit. The chapter discusses several key locations to inspect for duct leakage, as well as describing the testing used for duct leakage. The design of the ducts is also an important subject. Undersized ducts can restrict air flow and force the blower to work extra hard to move the air.

Chapter 9 contains a discussion of Water Heating, Appliances, and Lighting. The chapter begins with a discussion of water heating and several simple techniques that can be used to reduce the energy consumption. The different types of water heaters are described, as well as their benefits and any problems associated with them. In discussing plug-in appliances, simple savings were found by comparing the typical energy costs of several off-the-shelf units. This information can be found on the Energy Guide label required for any model, which is also discussed. A quick list of important factors to consider when shopping for a new appliance is also included for convenience. Finally, the chapter concludes with a discussion on lighting systems. This section was updated to take into account the increased prevalence and significantly reduced cost of compact fluorescent lamps. A short section was added to discuss the concerns about mercury in fluorescent lighting, which has been exaggerated at times.

Figure 1. Insulation Requirements



Chapter 10 is a new chapter on Energy Efficient Roofing. There are a large number of roofing options available. This chapter discusses many of the most common materials used in Louisiana, as well as newer materials which are taking their own place in the market. Tables 10-1 and 10-2 discuss cooling performance and annual savings associated with the different roofing materials. A subject that has never been discussed in the Guide is the “green roof,” or “landscaped roof system.” Green roofs incorporate landscaping on top of a waterproof membrane. Green roofs are being installed in an increasing number of buildings. However, they have not been widely used in residential construction.

Energy Efficient Homes in Louisiana concludes with Chapter 11, Fingertip Facts. It provides quick information such as common abbreviations, energy and power conversions, as well the heat content of many common fuels. Generalized insulation values, R-value per inch, are given for many common building materials. This chapter is nearly identical to the previous version. However, the climatic data was updated using weather data from more recent years. The changes are relatively small, but the tables are slightly more accurate.

Moving Forward

The Louisiana State Energy Office believes that this revision can help homeowners save precious dollars in these times of economic distress. Homeowners need to be educated to make the best decisions when building or renovating a home. By providing this guide, LA SEO can positively affect the level of energy efficiency throughout the Louisiana housing stock. By following the guidance provided, homeowners will be more prepared to weigh the costs and benefits of energy efficiency systems.

Louisiana law provides for regular adoption of new codes and standards. As new codes are adopted and new information becomes available, necessary changes will be recognized in this version. It is our goal to continue providing up-to-date information for the citizens of Louisiana.