Energy Conservation in the Home

RENEWABLE ENERGY
THE INFINITE POWER OF TEXAS

HIGHLIGHTS

- **Heating and cooling are the biggest part of an energy bill**
- **Insulation and high performance windows save energy and money**
- **Air leaks waste energy**
- **Overhangs are effective shading devices**
- **Choose high efficiency appliances**
- **Venting the attic saves cooling energy**

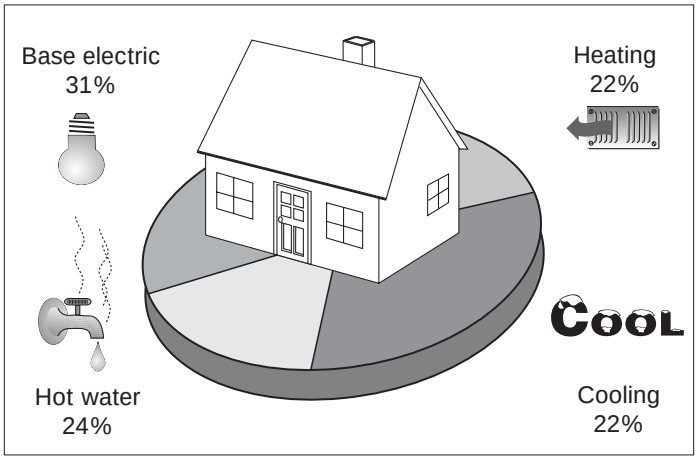


FIG. 1. ENERGY USE IN TYPICAL TEXAS HOME: *45% for heating and cooling, 24% for heating water, 31% for base electric use (fridge 10%, cooking 5%, clothes dryer 5%, other 11%)*

SUMMARY

Did you know that heating and cooling a home in Texas accounts for about 45% of a household's annual energy bill? (See Fig. 1) There are many products available that allow you to save energy in your home. Saving energy is far easier and often cheaper than producing it. Saving energy can be done by installing energy efficient appliances and high performance windows, sealing unwanted gaps or openings and adding the right type of insulation.

INSULATION

Insulation is one way to save energy. Whether the insulation is made of fiberglass, shredded newspapers or foam, it is one of the best investments a homeowner can make. Homeowners can install proper insulation in the ceiling, walls and floor. During the summer, insulation will minimize the amount of hot air from outside that enters the home, and it can keep the cool, air-conditioned air inside. Similarly, in the winter, insulation minimizes the cold air from outside that enters the home and keeps the warmed air inside. Insulation is rated by the R-value, which is determined by how well the insulation resists or slows the transfer of heat. The greater the R-value, the more effective it is at slowing heat transfer. Experts recommend using at least R-30 in the ceilings, R-13 in the walls and R-11 in the floor, but the best R-value depends on the climate in which you live. (See Table 1 for specific R-values in different Texas

BEST INSULATION VALUES FOR NEW HOMES	
Location	**Walls / Ceilings**
Dallas and Fort Worth	R13 / R38
Amarillo	R13 / R38
San Antonio	R11 / R30
Corpus Christi	R11 / R30
Brownsville	R11 / R30

TABLE 1. *Best insulation values for new homes based on climate.*

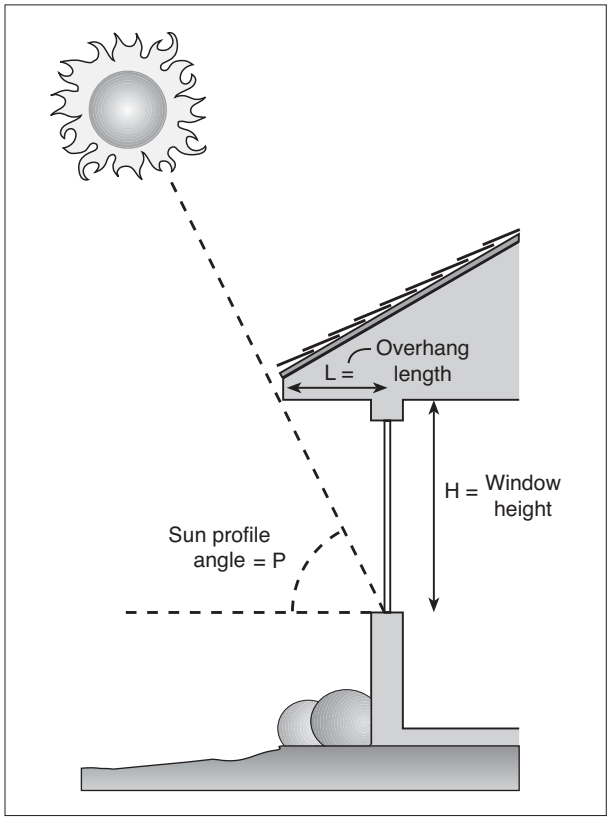


FIG. 2. *Sizing overhang*

climate zones.) Insulation is most easily installed when a home is being built. For existing homes, the easiest and most effective place to add extra insulation is in the attic. If your home has less than 3 inches of insulation in the attic, extra fiberglass batts can be laid on top of the existing insulation or additional material can be blown into the attic. It is just as important to put insulation around the attic ducts and hot water pipes. This will save heating and cooling energy in the ducts and could help prevent pipes from freezing and bursting in the winter.

SEALING

Whether the season is winter or summer, air can leak out of a house in many ways. These air leaks waste energy and can account for nearly half of all heating and cooling costs in a home. Outside air can enter the home wherever different materials meet. One such place is where the door and the doorjamb meet. Fortunately, sealing air leaks is an easy and inexpensive task that requires little or no special equipment. Caulk is one of the cheapest and most effective materials for saving energy and should be applied around every window and doorframe. Even places in the walls where electrical wires and water plumbing enter the home can be a source of air leaks. Seal all electrical and plumbing connections that enter the home and fill any gaps in electrical outlets with foam insulation. Air ducts in your home that are pathways for heated and cooled air can also be a source of air leaks. Insulating and sealing ducts can be one of the most cost-effective means to save energy.

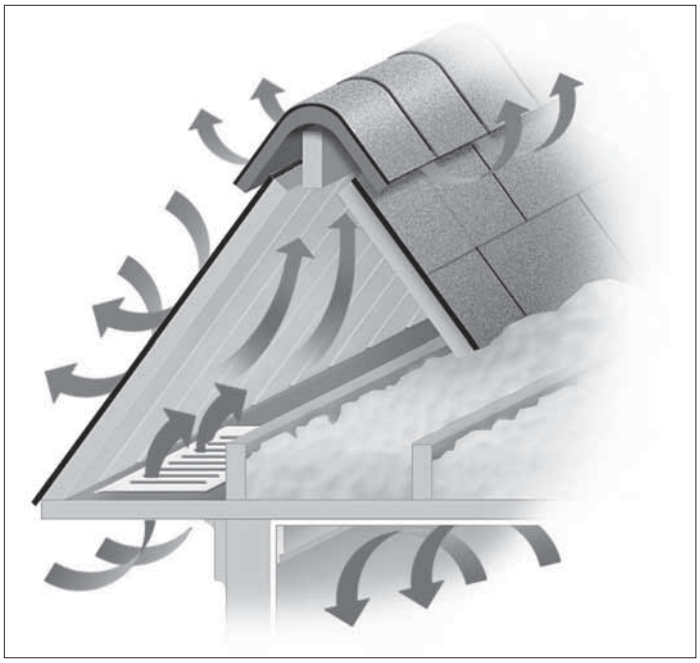
KEEPING THE HEAT OUT

Preventing the hot summer sun from entering the home during the summer is not easy. Installing high-performance windows, radiant barriers and solar shades can minimize heat from the sun that enters your home. In this way, homeowners can reduce the amount of sun-generated heat that enters the home.

WINDOWS

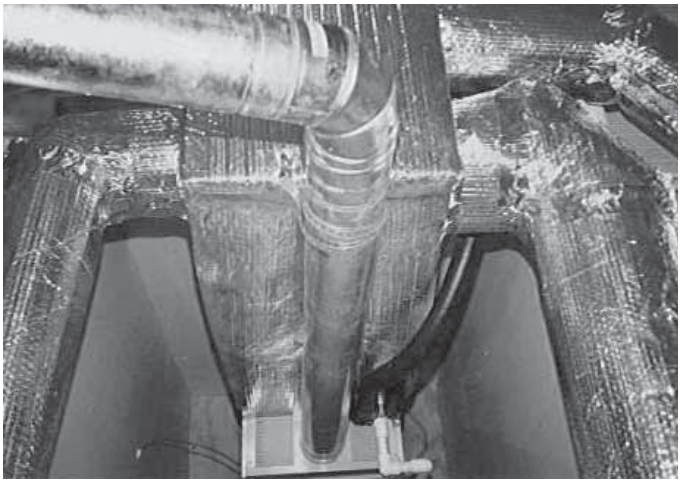
In the summer months in Texas, about 40% of the unwanted heat that enters your home comes in through your windows. Windows can now be made using special materials and design that minimize the amount of heat passing from outside the home to the interior. The amount of heat that a window allows to pass through it is rated by the U-value. A window with a lower U-value means that it allows less heat to pass through it.

What allows less heat to pass through a window? Windows can be coated or glazed with special materials that reduce heat transfer. The material framing the window can be designed in such a way and with special materials to minimize air leaks once it is installed in a home. Special windows that are designed to prevent heat from entering



SOURCE: EFFICIENT ATTIC SYSTEMS

ATTIC RADIANT BARRIER *A shiny barrier attached under the attic roof reflects light and prevents heat from entering the home.*



SOURCE: ENERGY $AVER$ OF AMERICA

ATTIC DUCT SYSTEM *Insulating and sealing ducts can be one of the most cost effective ways to save energy.*

your home and that meet certain criteria determined by experts are called high-performance windows.

RADIANT BARRIERS

A radiant barrier can be anything that is very reflective, such as aluminum or other metallic foil, special paint or special roof shingles. Radiant barriers are usually applied under the roof because roofs get the most exposure to direct sunlight. However, radiant barriers can also be installed on walls that get lots of sunlight, too. When a radiant barrier is installed under a roof, it reduces the amount of heat from the sun that passes through the roof to the attic space. This minimizes how hot an attic can become on a hot, sunny day. By reducing the heat in your attic, the amount of heat in your home is minimized, too. When installed correctly and with proper insulation, a radiant barrier can reduce heat transfer through your ceiling up to 25 percent.

SOLAR SHADING

On south-facing walls, properly designed roof overhangs are an effective means to keep out sun in the summer while allowing it to enter the home in the winter. Overhangs can shade a home's windows, doors or walls. (See Fig. 2) On east and west walls, solar screens are more effective. Solar screens look like standard window screens except they prevent direct sunlight from entering the window. When solar screens are installed, they are able to block up to 70 percent of the sunlight that would otherwise go into a building. By blocking the sunlight with solar screens, the heat generated by the sunlight does not enter the home.

ENERGY EFFICIENT APPLIANCES

Next to heating and cooling a house, home appliances use the largest amounts of energy every day. Appliances, particularly refrigerators, consume a great deal of energy over their lifetimes. By selecting energy-efficient appliances, homeowners can dramatically reduce home energy costs. Air conditioners, refrigerators and washing machines are examples of appliances that can reduce home energy bills when efficient models are chosen. Of course, higher efficiency appliances are initially more expensive than less efficient models, but they can quickly pay for themselves. Remember refrigerators last 15 to 20 years, air conditioners about 10 to 12 years, so you will pay to operate the appliance every month for the next 10 to 20 years.

Heating and cooling often account for 45 percent of the average homeowner's annual utility bill. So an investment in high efficiency heating and cooling equipment may be the best move a homeowner can take.

Other investments in things like compact fluorescent light bulbs reduce energy usage. Compact fluorescent light bulbs use a fraction of the electricity used by incandescent bulbs while providing the same amount of light. Finally, install ceiling fans. A ceiling fan makes you feel cooler, and its effect is equal to lowering the temperature by about 4 degrees F. Just be sure to turn it off when you are not in the room.

ATTIC VENTILATION

Texas attics need to have proper ventilation, particularly in the summer. Proper ventilation will help prevent the attic from getting hot and will avoid moisture build-up. The most effective attic ventilation occurs when air is allowed to enter under the soffits and exit at or near the ridge. (See Fig. 3)

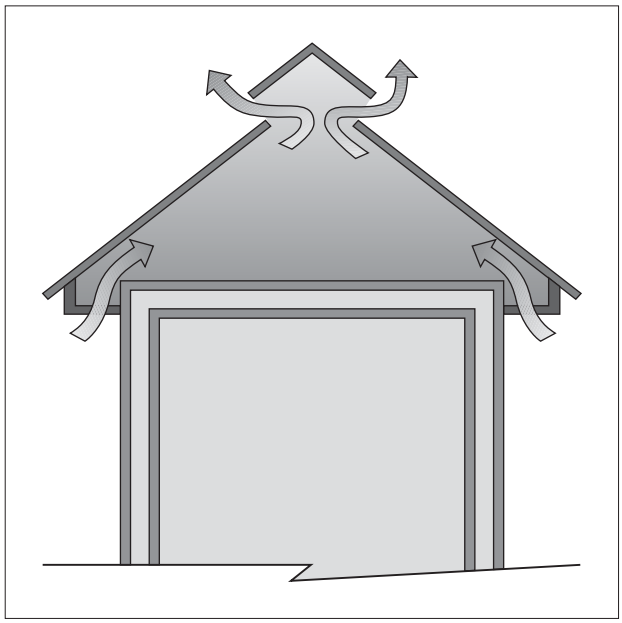


FIG. 3. *Ridge and soffit vents*

ORGANIZATIONS

Alliance to Save Energy
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National Renewable Energy Laboratory
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www.nrel.gov

Passive Solar Industries Council
1511 K Street, Suite 600
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www.sbicouncil.org

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Texas Renewable Energy Industries Association
P.O. Box 16469
Austin, TX 78761
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www.treia.org

RESOURCES

FREE TEXAS RENEWABLE ENERGY INFORMATION
For more information on how you can put Texas' abundant renewable energy resources to use in your home or business, visit our website at **www.InfinitePower.org** or call us at 1-800-531-5441 ext 31796. Ask about our free Teacher Resource Guides and CD available to teachers and home schoolers.

ON THE WORLD WIDE WEB:
The US Department of Energy's Building America, a program to reduce energy consumption in new homes by 50%.
www.eren.doe.gov/buildings/building_america

Efficient windows Web site:
http://www.efficientwindows.org/

ENERGY STAR Program
www.energystar.gov

BOOKS:
Energy efficient building Association Builder's Guide: Hot and Humid Climates. Joseph Lstiburek and Betsy Pettit, Building Science Corporation, 2000.

The New Natural House Book. David Pearson, Simon & Schuster, 1998

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