



Renewable Energy Guide for Builders

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RENEWABLE ENERGY
THE INFINITE POWER
OF TEXAS

SECO FACT SHEET NO. 19

HIGHLIGHTS

- ◆ **Insulation and efficient appliances reduce energy needs**
- ◆ **Solar energy for water, space and pool heating**
- ◆ **PV power**

SUMMARY

Builders and future homeowners can easily take advantage of renewable energy sources if they incorporate them in their initial plans. Solar water heaters, photovoltaic systems, passive solar heating and other techniques can be employed by builders who desire a cost-effective and comfortable living space.

INSULATION AND EFFICIENCY

The best-laid energy plans will have little effect if a house is not properly insulated. By installing proper insulation – at least R-30 in the ceilings and R-15 in the walls – homeowners will be much better equipped to uti-

lize renewable energy while at the same time reducing dependence on fossil fuel sources. Radiant barriers, proper duct sealing, high performance windows and other relatively low cost measures will also make a home more livable and efficient.

Appliances, particularly ones that are continual use, like the refrigerator, can consume huge amounts of electricity over their lifetimes.

By selecting the most efficient models of washing machines, dryers, lights and other household goods, homeowners can reduce their energy costs while benefiting the environment.

SOLAR ENERGY

PASSIVE SOLAR

The power of the sun can be harnessed in many different ways to help reduce energy needs in the home. Perhaps the easiest way is through proper orientation of the home. For instance, locating the garage or storage room on the west side of the home – where it will absorb the bulk of the afternoon

RENEWABLE RESOURCE CHECKLIST FOR BUILDERS

- ◆ **Encourage designs that shade the structure to avoid after-the-fact fixes like solar screens.**
- ◆ **Encourage design “buffers” on west walls (like garages and closets) to reduce the impact of afternoon summer sun. Sometimes this is as easy as flipping the elevation so the garage is on the west end of the house.**
- ◆ **Minimize carpet area and make use of the thermal mass characteristics of tile and finished concrete floors.**
- ◆ **Ensure that window placement allows flow-through ventilation, both from prevailing breezes, and by low and high windows that draw air through the house.**
- ◆ **Optimize insulation levels.**
- ◆ **Install or encourage high-efficiency appliances.**
- ◆ **Use high-performance windows where appropriate.**
- ◆ **Minimize electrical needs.**
- ◆ **Reduce hot water needs with water conservation.**



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summer sun – can help reduce cooling costs in the house. In addition, overhangs and porches can be used to limit the amount of summer sun that reaches the interior of the home. During the winter, when the sun is lower in the sky, those same overhangs can allow maximum sunlight to reach the inside of the home. A finished (i.e. stained and finished as the permanent floor) concrete slab or tile floor will absorb the sun's rays during the winter and store the sun's warmth thereby reducing heating bills.

SOLAR LIGHTING

The sun not only provides the best light, it's free. Despite those facts, solar lighting is rarely discussed when talking about energy needs in the home. Well-placed windows that allow indirect light decrease the amount of electricity needed for general and task lighting.

SOLAR WATER/SPACE HEATING

While this option requires a higher initial outlay than gas or electric water heaters, solar water heaters provide a long-term payback. Solar panels can be used to pre-heat the

water. Then, a small gas or electric heater is used to bring the water up to the desired temperature.

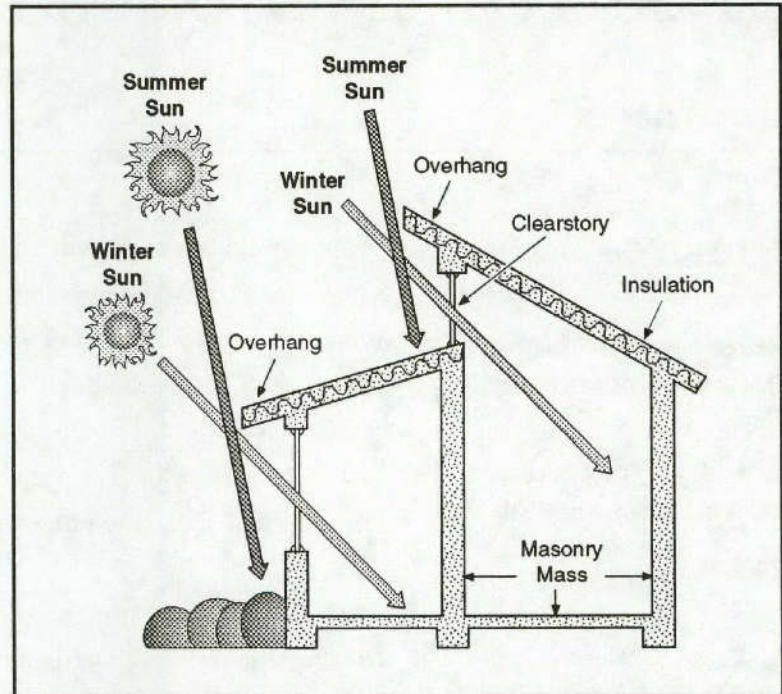
Solar water heaters can also be coupled with heat exchangers to heat the home. These systems usually rely on a large tank of water or other material that has been heated by the sun. That heat source is then used to warm air that is then circulated throughout the home. While these systems can be more complex than conventional heating systems, their fuel requirements can be significant-

ly reduced by replacing gas or electricity with solar heat.

Solar water heating is particularly attractive in homes with swimming pools. Depending on the location, solar pool heaters cost from \$2,000 to \$4,000 installed and can pay for themselves in 2 to 7 years.

SOLAR ELECTRIC POWER

While the cost of photovoltaic (PV) cells continues to drop, the practicality of meeting all or most of the homes' electrical needs with solar is



Natural heating & cooling of the home Low winter sun through south-facing windows helps heat the home in the winter. Overhangs keep the high summer sun out, while still allowing indirect lighting.

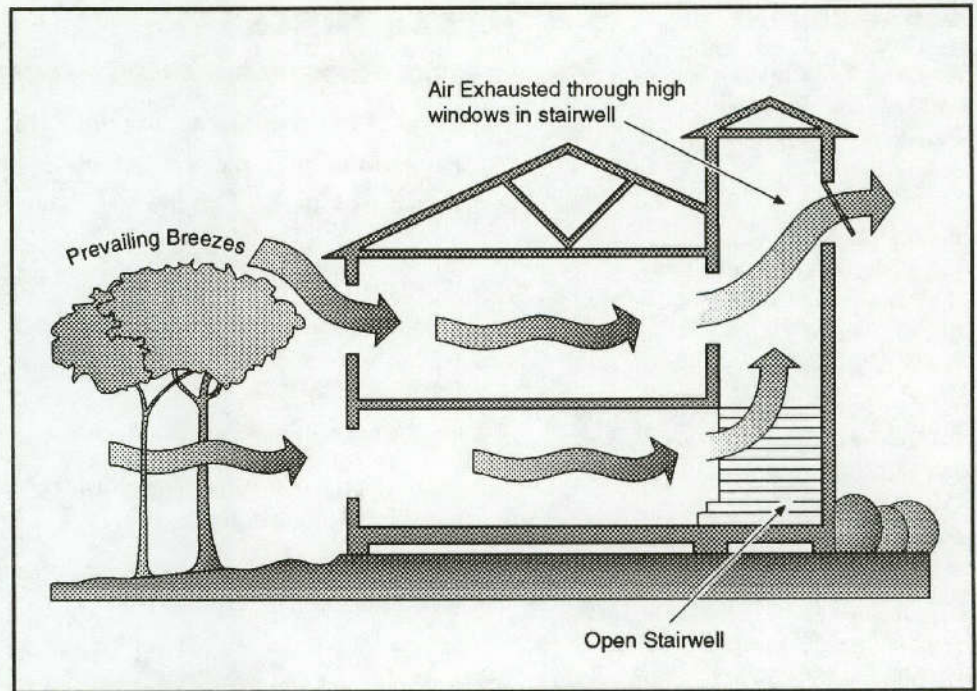
still limited to remote sites miles from an electrical grid.

Innovations continue to emerge, like roofing material made of PV cells, but lower cost options, including solar-powered gate openers, outdoor lighting and water pumps can pay for themselves in a short time, and are more practical applications for solar electric at this time.

WIND POWER

Wind power was always considered a priority on farms and ranches before rural electrification because it was the primary method for pumping water. In many areas of Texas and the Southwest, small wind generators can compete with (and even beat) local electric rates for providing the home's electricity.

While relatively few new homes rely on windmills, homeowners can also take advantage of the wind for cooling if they locate their home perpendicular to the prevailing wind. Window style (i.e. double-hung and casement windows), window placement and home design must allow flow-through ventilation, both from prevailing breezes, and by low and high windows that draw air through the house.



Creating a thermal chimney A thermal chimney is designed to cool using the natural tendency of warm air to rise. Air is warmed by the sun in a stairwell, and as it exits through windows at the top, cooler air is drawn through the home.



Using renewable energy for your home This Central Texas home uses proper orientation, excellent window placement, a metal roof, and other features that not only save energy and water, but also allow it to potentially disconnect from the electric grid.

SOURCE: CITY OF AUSTIN GREEN BUILDER PROGRAM

ORGANIZATIONS

American Solar Energy Society
2400 Central Ave., G-1
Boulder, CO 80301
303-443-3130

Energy Center
University of Texas at El Paso
P. O. Box 645
El Paso, Texas 79968
1-888-879-2887

Florida Solar Energy Center
1679 Clearlake Road
Cocoa, FL 32922
407-638-1000

Passive Solar Industries Council
1511 K Street, Suite 600
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Association
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512 / 345-5446

RESOURCES

TEXAS RENEWABLE ENERGY EDUCATION CAMPAIGN

Texas is in the midst of a major campaign to develop thought-provoking educational materials on renewable energy. The campaign includes: (1) the first-class video, "The Infinite Power of Texas," (2) 20 fact sheets for students and adults, and (3) a powerful World Wide Web site on the Internet. Begin your search for Texas-specific information on renewable energy at:

<http://www.InfinitePower.com>

INTERNET SITES:

<http://www.InfinitePower.com/factsheets/fs19.html>

Renewables, products, sustainable living. A good place to start your search.

<http://solstice.crest.org>

El Paso Solar Energy Association. Lots of good information.

www.epsea.org

Florida Solar Energy Center. Information on solar pool heating and other information.

www.fsec.ucf.edu

Solar heating systems, green building products.

www.oikos.com

City of Austin Green Builder Program's comprehensive guide covering energy water, building materials, solid waste and other topics. A mammoth resource.

www.greenbuilder.com/sourcebook

BOOKS:

The Passive Solar Energy Book, by Edward Mazria

The Sustainable Building Sourcebook, City of Austin Green Builder Program



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