Reduce, Reuse, Recycle!

By Roberta Baxter

You probably learned that slogan in first grade when you celebrated Earth Day. But beyond recycling aluminum cans and newspaper lies the building of an environment-friendly home. Builders across the country are competing to design and build green homes. Not greenhouses, for growing plants—green homes, meaning environmentally responsible homes and construction practices. The idea is to reduce waste in the building process, create energy-efficient, water-saving homes, and promote the use of sustainable materials.

Sustainability is a hot buzzword in the “green” arena, but what does it mean? The U.S. Environmental Protection Agency (EPA) defines sustainability as “the ability to achieve continuing economic prosperity while protecting natural systems of the planet, providing a high quality of life for its people.” This calls for everyone taking responsibility for solving the problems of today and caring for the planet for the generations of tomorrow.

The U.S. Green Building Council (USGBC) has created a pilot program called LEED, or Leadership in Energy and Environmental Design. The program is an effort to move the home-building industry toward high-performance, sustainable practices. Certain criteria are used in giving a home-building project the “green building” label, using a common standard of measurement. For example, homebuilders can earn points by these actions, along with others:

- reducing construction waste to less than 2.5 pounds per square foot of home;
- reducing energy costs by using efficient appliances;
- building a well-insulated structure;
- installing energy-efficient lighting, heating, and cooling systems; and
- reducing water usage with high-efficiency toilets and natural landscaping.

Homes receiving the highest number of points receive a platinum rating, followed by gold, silver, and certified ratings. The USGBC hopes to increase consumer awareness of the benefits of green building, stimulate green competition, and transform the practices of the building industry.

Reduce

The residential construction industry generates 58 million tons of waste per year, according to a study conducted for the EPA. Home renovation projects account for 55% of the waste, demolition accounts for 34%, and new construction accounts for 11%. Any reduction in the amount of this waste is a step in the right direction.
A home in New Mexico was chosen as the VISION House 2006 for Green Builder Magazine. This is one of over 1 million homes using a geothermal system to reduce the cost of conditioning indoor air. The concept behind a geothermal heating system is to use the heat energy of the earth to moderate the air temperature in our homes: geo (earth) + thermal (heat). Over most of our planet, the top 10 feet of the surface stays consistently in the 50–60 °F range (10–16 °C). That means there is a giant, mostly un tapped heat and power source right below our feet.

A geothermal system runs a refrigerant or a water and antifreeze mixture through pipes buried in the ground below frost depth. A pump and compressor circulate the mixture through a heat exchanger. In the winter, when the temperature underground is warmer than the surface, the thermal energy of the earth is drawn up through the pipes, moved into the home, and is allowed to disperse into the rooms. Usually, duct fans distribute the heat throughout the house. The process is reversed in the summer when the ground temperature is cooler than the surface, helping to cool the house. Unwanted heat is concentrated, sent on down the line and absorbed by the earth, while cool air is returned.

Geothermal systems are quiet and, compact, and they emit no gases so they can be placed indoors. A side benefit is that they provide inexpensive hot water throughout the summer. Best of all, the heat source is renewable—a sustainable system that uses no fossil fuels and emits no greenhouse gases.

In the early 1990s, the U.S. Department of Energy contributed significantly to the development of low-E window coatings. Also referred to as low-emissivity, these windows use tin or silver metallic oxides that greatly reduce the amount of energy needed to heat or cool a home. The coatings can be applied into the molten glass, sprayed on, or added as a thin film pressed between layers. The windows are designed to be solar selective, admitting as much daylight as possible while blocking transmission of the infrared, or “heat” radiation. Low-E windows are more insulating than normal windows because they reduce radiative heat transfer. They cut down on solar heat gains in the summer and prevent loss of interior heat in the winter.

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The “reuse” part of the slogan also comes into play in green homes. Contractors are working hard to reuse pieces of wood and drywall to cut their costs during new home construction. Several companies reclaim old wood from demolished houses, buildings, and barns. Some lumber is even dredged up from river bottoms where logs have sunk during logging operations. The wood is cut and sanded and fashioned into wood flooring. Using the hardwood from these reclamations saves trees and uses wood that would otherwise be headed for landfills.
Recycle

Recycling is a vital part of any green home. Environment-friendly contractors search for materials that have been recycled and those that can be easily recycled at the end of their use.

One popular product made from recycled materials is carpet. About half of the polyester carpet in the United States is made from recycled plastics. It takes five two-liter bottles to make one square foot of carpet, so there might be 500 recycled bottles on your living room floor.

Plastics are synthetic polymers, and polymers are long chains of repeating molecules linked together (“poly” means many, and “mer” means unit, or part). The typical two-liter bottle is made of a polymer called polyethylene terephthalate, or PET for short. You might have seen this familiar logo on the bottom of some plastic product. PET is a thermoplastic, meaning it can be repeatedly reheated and reshaped. Once a bottle is used, it can be recycled by cutting it into pieces, then cleaning and remelting the pieces. Once it has been warmed, the plastic can be either molded to make new bottles or spun into fibers to make items such as carpet and even clothing.

PET is made via a condensation reaction, in which molecules are joined together while a molecule of water is split out. Another important aspect of the carpet story is keeping old carpet out of landfills.

Recycling: part of Green Living includes sustainability, taking responsibility for the protection of our natural resources.

Representatives of the carpet industry estimate that 3.5 billion pounds of carpet waste goes to landfills each year. Mostly, it is old carpet that cannot be reused, but industry giants DuPont and Antron are implementing carpet-recycling programs. If carpet can be cleaned and reused, it is donated to charity or sold. If reuse is not possible, the carpet is recycled into new plastic products, such as filtration devices, furniture, and automotive parts.

Another homebuilding material that is often made of recycled plastic is composite lumber. Used for decks and window and door frames, this material is a 50/50 mixture of wood fibers from sawdust and recycled plastic. The wood fibers reinforce the plastic lumber, so that it is stronger than 100% recycled plastic. Furthermore, the plastic protects the wood from rotting. So the combination of natural and synthetic materials brings out the positive characteristics of both wood and plastic.

A huge advantage for the homeowner is that plastic lumber does not have to be painted. Color can be added during the manufacturing process. As a further blessing to the environment, composite lumber is made of plastic and sawdust that would otherwise end up in a landfill.

Glass winds up in landfills about as often as plastic, and concrete waste places a huge burden on landfills. Kitchen countertops for the VISION 2006 house were made from 75% recycled concrete and glass. The material looks like natural stone.

As homebuilders and the public become more aware of the possibilities of building green homes, more innovative products will come along. Your next home may be green enough to save thousands of dollars in construction and maintenance costs. Just think what you could do with that green!

Ways To Be Green

Many techniques for being green were presented to you way back in first grade or were offered by your parents. Here are a few ideas:

1. Turn off lights and electronics when not in use.
2. Recycle anything possible: paper, aluminum, glass, and plastic.
3. Close curtains on sunny summer days and open them on sunny winter days.
4. Buy energy-efficient appliances and electronics when possible.
5. Use appliances wisely; for example, it’s usually more efficient to heat with a microwave than an oven, and run clothes and dishwashers only when full.
6. Set thermostats at 68° in winter and 72° in summer.
7. Caulk around doors and windows.
8. Use fluorescent light bulbs.
10. Use indoor plants like Golden pothos or English ivy to remove indoor air pollutants.
11. If you are an outdoor gardener, use ladybugs rather than chemical insecticide to get rid of plant-eating insects.