The perfect shade of green

A Kentucky log home incorporates green measures in its design  By Cheryl Kenny

green was not the color Clarence and Janice Jenkins had in mind when they contacted Jeff Owens to design their family retreat home. In fact, the intended color was brown — the warm russet of the log home they planned to build in Monticello, Kentucky. “Janice and I started looking at log homes about five years ago and we were mesmerized,” explains Clarence, who has built private residences and owns an industrial/commercial construction company.

The Jenkins asked Owens, a Kentucky architect who had worked on their commercial projects, to develop their initial sketches for a lakeside vacation haven they would share with their children and grandchildren. The frontier farmhouse

Architect Jeff Owens created several renderings of the proposed Jenkins green home using Building Information Model (BIM) technology. Top is the front entry area, the rear of the home faces a lake. The open floor plan can be seen in the design for the first floor (left), while the height of the vaults can be seen in the second floor plan (middle). The expansive deck area can be seen in another 3D rendering (right).
style home would have three levels, an open floor plan with outdoor decks and porches, and plenty of space for guests. Most importantly, both inside and out, it would capture the magic of log construction.

Owens, certified by the U.S. Green Building Council as a Leadership in Energy and Environmental Design (LEED) design professional, suggested the couple also make their log home green. “Green is a holistic design approach to create an inspired healthy environment for the family to enjoy,” Owens explains. The family could get the mystique and amenities of a log home while incorporating a healthier lifestyle and creating a family legacy of good earth stewardship. And, rather than limiting their design, green measures could actually open other possibilities.

The couple liked the idea. “We’re concerned about rising energy costs — we don’t want to have utility bills larger than our mortgage payment,” Clarence notes. “We also want to be good citizens and be environmentally conscious.”

To create the allure of a traditional log home with the benefits of green construction, the couple chose chinked, hand-hewn pine log siding adhered to Structural Insulated Panels (SIPs).

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Planning is paramount

The most important step in green construction is planning ahead to ensure everything works together. "You have to know in the beginning what is possible and what is available, not just apply a few green strategies," Owens says.

A basic consideration was orienting the home on the site to enhance green concepts such as passive solar energy. This process was facilitated by Owens's use of Building Information Model (BIM) technologies that let him create 3D digital images of the house on the Jenkins' land. With BIM, Jeff developed a simulation of how sunlight would penetrate the home with different sittings on the property, and with different overhangs and sizes and placements of windows. He also considered the property's topography and vegetation (for wind and sun buffers), prevailing weather patterns, and how window placement could create a "chimney effect" to naturally ventilate hot air from lower levels to the top of the house and out.

In arranging interior space, Owens positioned less-used areas such as closets on the north side to buffer extreme temperatures and frequently used spaces with a southern exposure to maximize passive solar energy. Finally, Owens took into account aesthetics such as views and how the interior would connect to the outdoor environment.

Green remodeling

The National Association of the Remodeling Industry (NARI, www.nari.org) has some tips for people looking to remodel through improved energy and water efficiency, with sustainable materials, and looking for reduced maintenance concerns.

Efficient Heating & Cooling

New insulation technologies, such as spray-in cellulose insulation, is made from 80% post-consumer recycled newspaper and will effectively seal homes from harsh heat and cold. Thermal solar energy is a non-polluting energy source that is easily captured and used for water and space heating. Although solar water heaters can be expensive ($1,000-$4,000), they can show paybacks of four to eight years, according to Austin Energy, of Austin, TX, considered by Popular Science magazine as one of the top 10 greenest cities in the U.S. Space heating systems can vary from $800 for wall heaters to $4,000 and more for large central systems. Qualified remodelers can help homeowners choose the right combination of insulation and energy-saving heating and cooling systems to reduce energy costs.

Reducing Water Consumption

Many parts of the country are now experiencing rising water costs and seasonal water shortages due to diminishing supplies. Selecting the right appliances, such as water-conserving washers, dryers and dishwashers, and installing low-flush toilets and showerheads can reduce the amount of water needed and help trim water bills. In addition, approximately 1,000 gallons of water per household each year are lost while waiting for hot water to come from the tap. Positioning a home's water heater as close as possible to the points of use for hot water will help conserve water.

Healthy Indoor Air

Homeowners today are concerned about maintaining a healthy indoor environment, particularly if they have sensitivities to airborne irritants. Modern building materials, such as construction adhesives, paints and treated woods, can have toxic VOCs (Volatile Organic Compounds) that adversely affect indoor air quality. Today, there are new non-toxic materials that will improve the overall health of a home. Air filters, such as those installed in a home's central HVAC system, can also improve the quality of indoor air.

Sustainable Materials

Reduce the environmental impact of your remodel by choosing flooring and countertop materials made from local or regional sources. There are many products on the market today that are either made of recycled materials or produced in an eco-friendly way. "Green" surfaces, such as reclaimed hardwood, bamboo flooring, and recycled glass countertops, leave a lighter footprint on the environment.

Quality Over Quantity

Many homeowners today are opting for slightly smaller homes in exchange for smarter planning and design. "Instead of the big formal rooms, many of our clients request multifunctional spaces, such as a home office that doubles as a guest bedroom," says architect Stewart Davis, Green changes to this remodeled kitchen include use of EnergyStar appliances, reclaimed wood cabinets, water-conserving dishwasher, and use of a solar water heater: design director for CG & S Design-Build in Austin, Texas.

Recycle Construction Waste

Eco-conscious remodelers recycle as much project waste as possible during a home renovation project. For example, CG & S Design-Build will bring four waste containers to a project site — for paper, metal, wood and concrete — in an effort to recycle more efficiently. "We are very aware that so much waste is traditionally put in a landfill and we are trying reduce that as much as we can," Davis says.
"We’re concerned about rising energy costs — we don’t want to have utility bills larger than our mortgage payment," Clarence notes. “We also want to be good citizens and be environmentally conscious.” — Clarence Jenkins

Just the basics

To create the allure of a traditional log home with the benefits of green construction, the couple chose chinked, hand-hewn pine log siding adhered to Structural Insulated Panels (SIPs). Using SIPs, made from solid foam insulation between sheets of oriented strand boards, saved wood (including logs), created a super insulated shell, and limited wall thermal and moisture problems. Clarence was delighted to learn the SIPs and siding system would eliminate the maintenance and adjustment issues he feared with full log construction. Using SIPs on the exterior walls and roof also increased the volume of open space inside (no attic was needed) and allowed interior walls of log siding — as the Jenkinses chose for most rooms — or other finishes.

The couple chose low maintenance, cement-based siding and cornice products that incorporate recycled materials, and pre-manufactured integrated concrete forms (ICFs) for foundations walls to reduce concrete and provide good insulation. Inside the 4,630-square-foot home, they used engineered lumber (including laminated veneer lumber for headers and beams and TJI floor joists), which is made of recycled or reconstituted fast-growth woods and glues. Engineered lumber is up to 30% stronger than natural wood, and saves on use of old-growth timber.

The inside of the home features engineered lumber, which is up to 30% stronger than natural wood. Windows were located a “chimney effect” to naturally ventilate hot air from lower levels to the top of the house and out.

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Careful choices
While building green is a simple concept, execution is a bit more complicated — particularly if you're adhering to LEED standards. There are numerous green products available and often homeowners have to weigh competing considerations in choosing the right product for them. "For example, a local tile could be a better choice than a tile with a high recycled content that must be shipped across the country because of the carbon impact from transportation," Owens says.
Figuring out which products have green benefits that will work for your home takes time. "You shouldn't rely only on the opinions of others, some of whom may know how to put pieces together but not understand how those pieces function together. You should also check on products yourself," cautions Clarence, who was the general contractor for his home construction. "For us, finding the products and matching them with the concept of our house was as big a job as raising the structure. For example, just to find out if a product was formaldehyde-free required a tremendous amount of research. But you don't want to throw up a white flag simply because you don't know about something."
Some choices seemed simple: choosing EnergyStar appliances, compact fluorescent lamp lighting, and low flow plumbing fixtures. Others posed a dilemma.
"You need to consider your knowledge, your budget, and whether the finished product will complement your lifestyle," Clarence says. "Have a vision of your end product, and take time to figure out what complements your floor plan and day-to-day family needs."
That meant the family budget played a role in some choices, such as whether to use metal roofing comprised primarily of recycled materials or less costly asphalt.

More Green Choices
Clarence and Janice used dozens of green products and materials in their second home on Cumberland Lake. Among them are:
- Motion control light switches for bathrooms and closets
- Metal ductwork with exterior insulation to ease duct cleaning and improve indoor air quality
- Rainwater collection receptacles to supplement landscaping irrigation
- Reclaimed materials such as twigs from their property for loft and porch railings
- Air to air heat exchanger to control fresh air changes with minimal energy loss
- Zoned heating/air conditioning so that unused rooms won't consume energy for climate control
- Exhaust fan systems with timer switches, and other humidity control systems, to optimize humidity levels and save energy
- Low VOC finishes, sealants and adhesives
- Chimneys of man made stone, which requires less energy to manufacture and transport than does natural stone
- Programmable thermostats
- Prefabricated chimney and fireplace that better manages heat loss through thermal-controlled flue openings

Green continued on pg. 116
and fiberglass shingles made partly from petroleum products. The couple chose the shingles. But when it came down to a tankless water heater or a cheaper, traditional heater, the couple chose the greener but costlier option, concluding that saving water and costs from lower energy consumption made it worthwhile.

Lifestyle came into play when the couple decided on flooring. They used passive solar-enhancing concrete floors and walls in the lower level, but a more barefoot-friendly carpeting for their bedroom. They went with hardwood floors on the main level — an attractive complement to the interior log siding and the pine timber accents — but chose hickory, which was available locally.

Clarence emphasizes that building green did not require him to compromise on his vision for the home. The bottom line, he says, is deciding

Five Important Considerations in Building Green

Building green can get tricky when strategies conflict. Keeping in mind these five basic goals can help sort things out:

1. Minimize the carbon footprint and other human impact on the natural environment. Examples: Use materials that don’t require long-distance transportation, thereby reducing exhaust emissions; sparingly clear your site of healthy trees, which reduce your carbon footprint because they are oxygen producers.

2. Reduce reliance on dwindling natural resources. Examples: Use products that contain recycled materials; choose log siding over full log to potentially halve the amount of wood required.

3. Create a healthy indoor environment. Examples: Use materials that do not create off-gasses such as formaldehyde; include timed exhaust fans that help inhibit mold growth.

4. Reduce energy consumption. Examples: Maximize use of passive solar energy; keep your home’s size — and therefore its energy consumption — to the minimum.

5. Reduce water consumption. Examples: Use low-flow plumbing fixtures; landscape wisely and with indigenous plants to minimize water run-off and the need for excessive irrigation.