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DEFINING GREEN

FAITHFUL STEWARD

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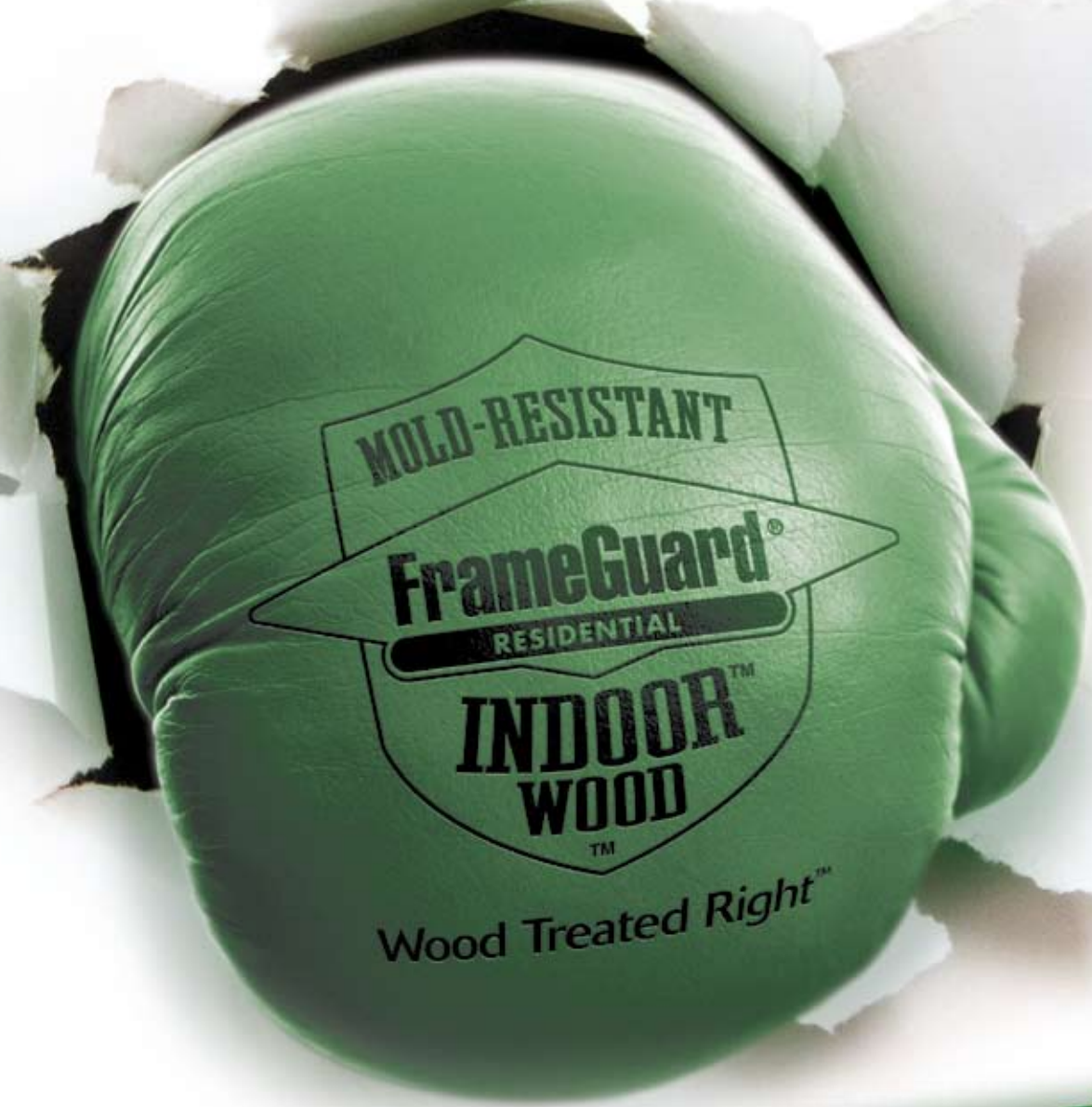
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Multiple LEDs provide the firepower to replace traditional household bulbs.

Waiting for the Light

LEDs for residential use have arrived. If these early adopter lamps last as long as the 50,000 hours promised, builders should be able to justify their high purchase price. **By Matthew Power**

The technology of light-emitting diodes (LEDs) has been used for years to light home electronics such as alarm clocks and stereo equipment. Now manufacturers finally are introducing LED lighting intended for household use.

Why hasn't this happened before? Because of the twofold challenge of bringing LED lighting to homes. Manufacturers had to develop LEDs that would generate sufficient light to effectively replace incandescent or florescent bulbs, and, according to Kevin Orth of Beta/Kramer Lighting, also determine how to dissipate the heat produced by the LEDs.

"The same LED could last 100,000 hours in one fixture or it could last 10,000 hours in another, depending on how the heat is managed, the design of the fixture, and the type of LED," says Orth, national sales manager for Beta/Kramer, which is located in Sturtevant, Wis.

What constitutes "good" heat management? "How it's built," Orth answers. "You don't want a plastic housing. You want a material like aluminum, with good heat transfer."

While many companies are exploring LED technology, the biggest advances

on the residential side have come from small, entrepreneurial firms. The potential market (and environmental benefit) is enormous, with LEDs offering energy savings up to 90 percent compared to standard incandescent fixtures.

The upfront cost is significant, though. LED bulbs suitable for home use run close to \$60, making this an early adopter product at the moment. But for green-minded clients building upscale homes they might be pitched as a cutting edge energy investment.

For example, Better Life Goods (based in Tucson, Ariz.) is selling a Par 38 bulb, similar to the featured product at top left. Company spokeswoman Barbara Burns notes that LED bulbs tend to produce specific types of light. "This is white light, not full-spectrum lighting," Burns explains, which makes the lamps most appropriate for task lighting. "We're working on a full-spectrum version."^{GB}

HOW LEDS WORK



Source: "How Stuff Works"

Light-emitting diodes produce light when power is applied to a junction between two types of material: one that is electron-rich and one that is electron-deficient. The combination creates light. To produce a household LED light bulb, about 150 diodes are arranged to send light in various directions.

Resources

> Ledtronics

www.ledtronics.com/markets/25mm_med_index.htm

> GBL LED Lighting (omni-directional bulbs)

www.gbl-led.com/products.php?id=24&type=bulbs

> Commercial LED Lighting

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www.beta-kramer.com



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Cover photography
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Coulie



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Looking for back copies? How to submit stories? How you can participate in our show homes? Look no further. This page has all the contact information you need to get your questions answered. In addition, we'll also give you a little insight into the people of Green Builder Media through a monthly question answered by all staffers. Enjoy!

October's question: If money were no object, what environmental upgrade would you make to your house?

Green Builder Media Company Leadership

(www.greenbuildermedia.com)



Sara Gutterman
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Sara lives in the San Juan Islands, where she incorporates sustainability into all aspects of her life. An entrepreneur and recovered venture capitalist, she helps companies become more sustainable and profitable.

A: Because it is of paramount importance that we decentralize our energy infrastructure (so that every rooftop becomes a generator of at least part of a building's own power), I would install a solar system that would produce energy for my household needs with enough left over to sell a portion back to the grid (net metering).



Ron Jones
Editorial Director
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Ron secretly longs to be a cowboy. He keeps a saddle in his office to remind him of where he'd rather be.

A: In many ways, the greenest house is one that already exists because the biggest chunk of environmental cost has already been paid. But the best area for environmental improvement is usually energy consumption. If I could wave a magic wand, I would take my house off the grid and make it totally energy-independent.



Brian Strombotne
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Brian lives in Raleigh, N.C., and sees inspirational, yet urgent, examples of green and sustainable practices in his hometown, which is now living under its first mandatory year-round water restrictions.

A: I would install complete geothermal and solar upgrades to move to a near-zero energy home as energy costs are skyrocketing.

Magazine Staff



Cati O'Keefe
Editor in Chief
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Cati, who lives with her husband and three children in Cincinnati, recently completed an Energy Star audit of her 30-year-old house that resulted in 37 energy-efficiency suggestions, most of which were fairly easy and inexpensive to do.

A: I would like to create a net-zero home using the services of a seasoned energy consultant who would take all the legwork and guesswork out of the process for me.



Alison Rice
Managing Editor
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Alison lives with her husband and daughter in Arlington, Va., in a townhouse just footsteps from a bike trail, her husband's preferred commuting route. She recently painted her home office with no-VOC paint.

A: I would install zoned heating and air conditioning in my townhouse so that in the summer, the bedrooms are not 80 F while the first floor is 70 F and the basement is 60 F.



Matthew Power
Senior Editor
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Matt lives in a drafty, 150-year old home in Maine and is keenly aware of energy issues. The more hands-on remodeling work he does, the more he appreciates the need for new homes to be built smart, using durable, energy-efficient materials and systems.

A: I would lift my 1879 house off the ground and install a new, insulated foundation built with insulating concrete forms, which would cut my energy bills in half.

VISION House Series



Rhys Stucker
National Director, VISION House
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Rhys wonders why the government isn't reallocating big oil subsidies to alternative energy development.

A: I would install photovoltaics and solar hot water. I would remove the siding and apply foam insulation to seal all of the leaks. Since this c. 1790 house has hand-hewn boards as sheathing, I would apply a more solid product as a replacement sheathing, followed by fiber cement siding. I'm looking to make this house stand another 200 years.

Advertising Sales



Michael X. Stein
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Michael lives in Philadelphia with his wife and two children. He is doing his best to educate his children on good green practices and hopes that every parent will be responsible for this education. He loves to garden organically and composts all of his yard waste to minimize the impact on local landfills.

A: I would install a radiant heating system that would run off a geothermal HVAC system. This could offer a great saving on my monthly heating and air conditioning bills.



Karrie Laughlin
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Karrie, who lives outside Tucson, was founder of *Green Office* and founding publisher of *Green @ Work*, which allowed her to work closely with global sustainability leaders and Fortune 500 companies.

A: I'd install a solar tile roof. I wish all homes in Arizona could spec this product and sell energy back to the utility companies.

Website and Green Builder College



Anita Quintana
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Anita Quintana lives in Santa Fe, N.M., and learned about conservation from her parents, who lived a traditional lifestyle that included growing crops and raising animals.

A: I'd take advantage of the New Mexico sunshine and install solar panels.

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Green Builder has reduced its environmental impact by its participation in ZeroFootprint Offsets (www.zerofootprintoffsets.com). Almost all the natural resources used to produce *Green Builder* will be returned to the environment by planting trees and restoring watersheds. Also, greenhouse gas emissions resulting from the production of the magazine will be mitigated through carbon offsetting. (Printed on recycled paper.)



Friends of the Magazine and Contributors

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“Wash Me— But Don’t Get Me Wet”

The headline of this column is borrowed from a popular saying in Germany. It refers to people who are less committed privately to something that they publicly profess. In this industry, we call it greenwashing, and it no longer refers to just products and manufacturers, but to builders as well.

To be sure, green’s popularity is bringing the old-school green builders and the newbie sustainable builders to the same dance, but cutting in (always at the most inopportune moment) are the greenwashers who have the potential to ruin the party for everyone.

Both the good and the bad were out in force at the recent GreenBuild conference in Chicago, which was a rather unbelievable event in terms of crowds. People waited in line for more than three hours to get registered (without complaint!), so excited were they to enter the jam-packed show floor or join the overflow crowds sitting cross-legged in the halls like preschoolers, eyes glued to monitors broadcasting the

sessions that didn’t even have standing room.

While walking the show floor, I watched manufacturers and attendees both shake their heads as they walked through the exhibit floor, muttering, “That’s not green.”

But this column isn’t about products and manufacturers who aren’t up to sustainable snuff. Even a new green builder can quickly learn about and avoid some of the worst sins in residential building (formaldehyde, old-growth wood, paint that isn’t low- or no-VOC) and use this magazine and our newly retooled website at www.greenbuildermag.com to help spec environmentally correct products.

Rather, this column is about you, the builder, who runs the greatest risk of being labeled a greenwasher because home buyers interact directly with you, not the manufacturers, and if you are making green claims that are false or exaggerated, you run a great risk of having your credibility dashed.

There’s a great blog on greenwashing at <http://lisagalley.blogspot.com>. In it, Lisa Galley asks a devil’s advocate question: What if we are confusing a company’s incremental progress on a complex long-range strategy with hypocrisy? In other words, what if you have a great plan to green your company, but you don’t articulate its methodical execution to buyers? They probably won’t see you as an authentic, sustainable green builder.

Galley offers a list of questions that would make a great talking points for a “we’re shifting to green practices” meeting at your company:

- > Can you compartmentalize the business of green building away from your personal beliefs about sustainability?
- > Do you embed sustainability into your personal lifestyle?
- > Do any of your peers and employees?
- > Is favoring green building a moral or business choice or a political necessity?
- > What are the economic and political realities of embedding sustainability in your company?
- > What business trade-offs are you prepared to make?
- > What trade-offs will you absolutely not make to go green?
- > How will you engage your employees, customers, and other important stakeholders in your efforts?
- > Are you retaining any other business practices alongside your green building efforts that may be in conflict?
- > How can you reconcile those issues?

Making necessary business decisions about green building requires a clear understanding of personal and organizational commitment. A company greened in a proactive way after thoughtful planning is far better equipped to garner an “authentic green builder” label from its employees, builder colleagues, city planners, and buyers. In a decelerating housing market with fewer but more educated buyers, it just might be the only label that counts. GB

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THE CONTRIBUTORS

Meet the people behind the bylines

Jennifer Popovec says volatile organic compounds, also known as VOCs, give her a headache. She knows this because her first job after college required her to work in a new building complete with new paint and carpet. Woefully ignorant of off-gassing at the time, she thought job stress was giving her headaches—until they disappeared after an office move. Popovec, who specializes in writing about commercial and residential real estate trends, lives in Texas.

Tracy Fox began writing on green housing after receiving her green building certificate from Sonoma State's Environmental Technology Center in California. For her, it's an issue that unites her professional work and her passion for writing in a personally rewarding

way. Fox's background is in construction and interior design, and she has long been interested in environmental issues. She lives in Portland, Ore.

The money **Jim Hackler** makes from renting his loft parking space in downtown Atlanta pays for his Flexcar use, Marta pass, and occasional bicycle repairs. He's been helping the industry communicate the benefits of green living and sustainable home construction for nearly two decades.

Got a story for *Green Builder*? Send your pitch to cati@greenbuildermag.com. Please include a selection of relevant clips and a resume that covers your writing experience. **GB**

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Theodore Roosevelt



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Imagine a building products supplier where green choices are standard, not a special order, and where sustainable products are warehoused locally, significantly reducing shipping costs for green-minded buyers.

That would be Green Depot, a fast-growing company based in Brooklyn, N.Y., that delivers sustainable products to residential and commercial projects from Maine to Virginia. While it's true that Green Depot was established just a few years ago, in 2005, its roots go back nearly three decades; Green Depot is a specialized outgrowth of MarJam Supply Co., a Northeast building materials supply firm founded in 1979.

"At MarJam, we saw a real need for helping people make [green] happen," explains Carmen Arguelles, Green Depot's president. "It was confusing, and people were coming and saying, 'We're not even going to try to do this project.'

This market needed more focus, more hand-holding, and more attention and education than the conventional channel."

The solution proved to be Green Depot, which stocks more than 1,000 sustainable, earth-friendly products in lighting, flooring, paint, ceiling, soundproofing, and more. Materials are evaluated for toxicity and performance. "The first thing I entertain is the level it performs at," says Arguelles. "I don't think people should give up on that." Green Depot staffers have even gone so far as to drive over products with a truck as part of their assessment. "We're just a supplier—we're not a licensed lab—but this is our reputation," Arguelles says. "We just want to be honest with our customers."

Those customers include residential and commercial builders, contractors, architects, and even homeowners with chemical sensitivities or environmental health issues. "The people driving the projects are the clients," Arguelles says. "The client is the one who has to say 'This is how I want to live, and I'm willing to pay a certain percentage more.'"

Many people are doing just that. Green Depot, which had 21 employees in late October, has been hiring a person a week to meet



Green Depot and its showrooms (left) stock more than 1,000 sustainable building products, according to President Carmen Arguelles (above).

demand and expand Green Depot's offerings. "When you join the company, you take on a category," says Arguelles, who projects Green Depot's four current Northeast locations to expand to 20 in the coming year.

That extended showroom and distribution network will address a major obstacle for many would-be green customers. "The Internet is a great help [to people seeking to use green products], but they were paying a lot more for shipping," Arguelles says. "Now they have quantity and selection available locally, so those people are better served. People on the fence [about green products] are also better served, because now they'll say, 'I'll try this thing,'" because the hassle and expense has been lowered.

Green Depot has been working with customers and manufacturers alike to overcome such obstacles. The company's "Flip It Green" program takes a project spec sheet and transforms it, switching as many products as possible to earth-friendly options, which can help project to boost LEED points or a develop green marketing edge. When that has revealed categories with limited or nonexistent sustainable alternatives, Green Depot has told interested manufacturers about the market opportunity. "The big guys have gotten religion," Arguelles says. "They're asking us, 'What do you need? Where's the void?'"

Resources

- > Green Depot
www.greendepot.com
- > MarJam Supply Co.
www.marjam.com

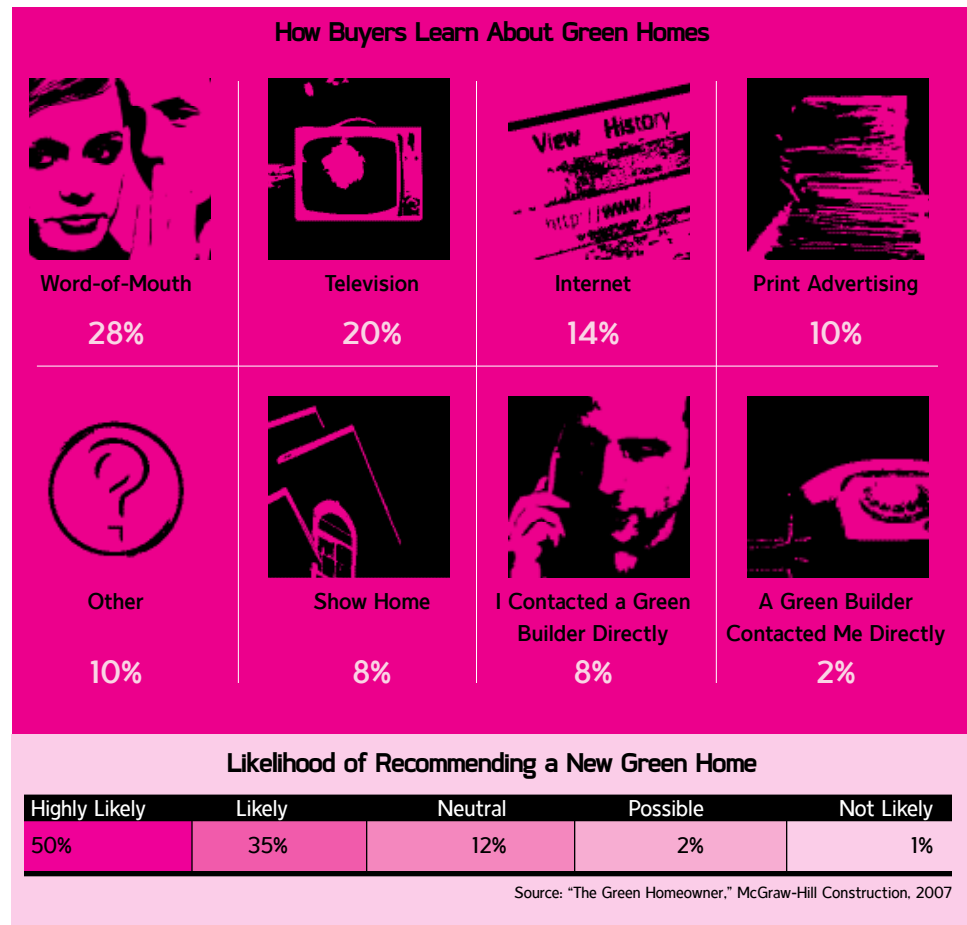
Data Points

McGraw-Hill survey reveals importance of referrals in green home-buying.

What's the second-most common way for buyers to hear about green homes? Surprisingly, it's television, according to a recent report by McGraw-Hill Construction, which says 20 percent of home buyers learn about sustainable homes through TV.

As high as that figure is, though, the popularity of television as a green information source waned in 2006, as word-of-mouth overtook the top spot. Personal conversations and contacts provided 28 percent of buyers with information on green building, making referrals an important source of business for green builders. Even better, these satisfied customers deliver extra benefits to a builder by being likely to actively promote their green home building experience to others. Half said it was "highly likely" they would recommend building a new green home.

Given the importance of individual connections and television in this process, green builders could stand to do more outreach. While many builders



see themselves as important sources of information on sustainable, energy-efficient homes, survey respondents said they were more likely to reach out to a green builder for

information than vice versa.

To order "The Green Homeowner" (\$149) from McGraw-Hill, visit www.analyticsstore.construction.com.

Faucet Facts

EPA releases new standard for bathroom faucets.

With water restrictions a worry from the Southwest to the Southeast, a new high-efficiency bathroom sink faucet WaterSense specification from the EPA may give builders and homeowners alike a shortcut to achieving more efficient water usage at home.

"EPA's WaterSense program just made it easier for consumers and communities to save money, energy, and

water one tap at a time," says Benjamin H. Grumbles, assistant administrator for water at the EPA. "Water efficiency is the wave of the future, and WaterSense bathroom faucets will turn a trickle into a stream of savings without sacrificing performance."

To qualify for the WaterSense label, a faucet must have a maximum flow of 1.5 gpm and a minimum of .8 gpm, which translates into a 30 percent water savings compared to traditional bathroom faucets. An independent lab must certify the results.

The WaterSense program, which was established in 2006, also indicates high-efficiency toilets.

Plumbing Fixtures Most Likely To Be Replaced With Green Products

Bathroom Fixtures

34%

Kitchen Fixtures*

16%

* Does not include dishwashers.

Source: "The Green Homeowner," McGraw-Hill Construction, 2007



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Green Scene

Where housing and the environment connect

Cycle of Life?

A free tool lets builders measure the environmental impact of a building over its life cycle.

Building a sustainable structure involves numerous trade-offs. Which is better (or less bad) for the environment: a low-density zero-energy new home development with bioswales and pervious pavement in an exurban greenfield or a conventionally built apartment property near transit? That question could probably be debated indefinitely, but luckily real-world projections for a planned building's environmental impacts are much easier to determine, thanks to a new software tool called the EcoCalculator.

There are trade-offs around materials. We need to be aware of those impacts."

"There are trade-offs around materials," says Wayne Trusty, president of Athena Institute, which developed the tool in conjunction with the University of Minnesota and Morrison Hershfield Consulting Engineers, which, like Athena, operates in the United States and Canada. "We need to be aware of those impacts, and use those materials to their best advantage in specific situations."

The EcoCalculator (available at www.athenasmi.ca) does just that. Users download the program and enter information regarding the climate of the planned building and assembly details for the roof, interior and exterior walls, windows, and intermediate floors.

The tool then calculates the building's eco-impacts, including its global warming potential, contribution to air and water

pollution, its embodied energy (i.e., the energy required to construct the building), and its weighted resource use, which takes (imperfectly, given the complexity, Trusty acknowledges) into account the project's land use.

As valuable as such results are, the program itself is free to users, thanks to the Green Building Initiative (www.thegbi.org). The group funded the effort to develop the EcoCalculator and then donated the intellectual property so that the tool could be widely available.

"The whole idea is to get stuff out there," Trusty says. "Life-cycle assessment is too important to be held close to anyone's vest. We wanted to make it easy to generate environmental performance relative to a building's assemblies." GB



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Feb. 13	Green Building 101
Feb. 13	Focus on Green Building: Latest Findings of the Housing Research Consortium
Feb. 13	Green Building Legal and Liability Issues
Feb. 13	Green By Design: Real, Relevant, and "Doable" Green Building
Feb. 14	The Promise of Cradle-to-Cradle Design: Sustainable Architecture for the 21st Century
Feb. 14	Getting Started With Cradle-to-Cradle Design
Feb. 14	An Introduction to the National Green Building Program
Feb. 14	Greenwash vs. Green Integrity
Feb. 15, Feb. 16	Green Building, Defined
Feb. 15	Green Building for Light Commercial: Stay Ahead of the Curve
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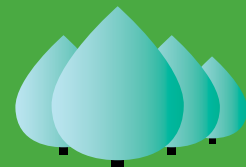
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GREEN BUILDER
MAGAZINE

Busy Season

NAHB and green builders don't have a moment to spare as the housing industry eagerly seeks information on building resource-efficient homes.



Honestly, it's enough to make your head spin.

> As you read this, about a dozen local green building programs and production builders are in the home stretch of the NAHB National Green Building Program pilots. They're trying out the certification tool and verification process, making sure that the whole system works well. In fact, you can look over their shoulders and try the tool out yourself at www.nahbgreen.org.

> I just got back from a speaking engagement to green builders in Minneapolis, where I joined former National Green Building Conference Chair Matt Belcher of Missouri

and NAHB Senior Officer Bob Jones of Michigan, who champions "all things green" for our association. Bob and I also worked to present a special session on green building for the NAHB State and Local Government Affairs Conference in early November. Volunteers and staff continue to meet with trade and government groups to discuss our green building initiatives, and they are listening carefully.

> Our NAHB University of Housing Staff is getting ready to introduce the "Certified Green Professional" designation, based on the two-day Green Building for Building Professionals course and an eight-hour business management class, with requirements for continuing education thrown into the mix.

Shall I go on about all the good green things that are happening? Okay.

> The National Green Building Standard Committee just finished three grueling days of hearings in Washington and is preparing for two more in December so the group can release the second draft of this first consensus standard for single-family and multifamily homes, site and lot development, and residential remodeling before the holidays. The commitment of these industry professionals and their willingness to listen carefully to all sides

WITH SO MANY EXCITING PROJECTS IN THE WORKS,
I DON'T WANT TO GO BACK TO THE DAYS WHEN
GREEN BUILDERS WERE A NICHE GROUP.

of the debate so that cost considerations are balanced with resource efficiency and durability is something to behold.

> Entries are arriving for the 2008 NAHB National Green Building Awards from builders, developers, green building programs, remodelers, and more. I have taken a peek at the projects entered, and as always, the entries are impressive.

> The committee of volunteers looking at the educational sessions, keynote addresses, service activities, special events, house tour, press conferences, trade show—in fact, all the components that make up the 2008 NAHB National Green Building Conference (our tenth annual event!) are going like gangbusters, and the conference is still six months away.

With so many exciting projects in the works, I don't want to go back to the days when green builders were a niche group, appealing only to eco-conscious clients or those willing to pay for the latest technologies and practices.

I am certainly looking forward to "Green Day" at the International Builders' Show in Orlando, when on Feb. 14, 2008, we will celebrate the launch of the NAHB National Program, the new Certified Green Professional Designation, listen to noted green architect William McDonough, and more.

But sometimes, given how fast things are moving, it seems like we have skipped a few intermediate steps, doesn't it? Thank goodness for the volunteers

on the NAHB Green Building Subcommittee and other members who continue to blaze the trail for us—not to uncharted territory, but to civilization, which in this case is the mainstream home builder.

It's nice to see so many joining us for this trek.

Ray Tonjes is the chairman and founder of Ray Tonjes Builder, a custom construction company in Austin, Texas. He is also chairman of the National Association of Home Builders' Green Building Subcommittee. His company is an active member of the City of Austin Green Builder Program.



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How Much Is Too Much?

A writer turns to religion and philosophy to answer the question of what level of consumption is morally defensible.

Author Robert Jensen says “moral” sustainability will require Americans to live at a level that can be applied to the other 6 billion people on our planet.

GB: Bringing morality into the environmental conversation is pretty bold. You must catch a lot of heat.

RJ: Oh, yes. You get insults hurled at you. People will look at you and pick at things where you don't meet your own standards. But you have to be willing to reject that cynicism and speak about what you know is true and difficult.

GB: And acknowledge that none of us is perfect?

RJ: Of course. We were born into a system we didn't design. The majority of consumers are responding to the world in which they were propagandized. After World War II, the people running the country decided the society would be one based on mass consumption.

GB: Won't resource shortages force us to reduce consumption anyway?

RJ: I believe so, yes. It's not a question of “Do we want to move to a different consumption level?” but “How are we going to do it?”

GB: So what's a moral level of consumption? Where do we draw the line? Is it near the low end of today's middle class?

RJ: Oh, no. It's well below that. We can't say what the real carrying capacity of the earth is. We know Donald Trump's level of consumption is fundamentally immoral. That's easy. But to generalize to the rest of us, we have to go back to a foundational ethical principle in human history—that we can't live at a level we can't generalize to others.

GB: So the key is to change ourselves?

RJ: Not just that. Large-scale political and economic change has to happen. The most obvious change is transportation. We need to change how we get around. And there's no one right way. We need people to focus on different aspects of the problem. People who are best at political organizing should not be building rainwater systems and vice versa.

GB: People won't give up their middle class comforts easily.

RJ: On one level, everybody knows mass consumption isn't making us happy. Friends, family, connection, community—these are the things that matter. We are made for something more: To find meaning in a world that makes it hard to find meaning.


GB: Where does this concept overlap with green building?

RJ: By offering people ways they can live better. Think about communal structures and communities, for example, which tend to consume far fewer resources.

GB: In other words, imagine alternatives to what we have now.

RJ: Exactly. We suffer from a failure of imagination. My parents live in a world that turned them into mass consumers in a generation. We have to imagine what it's like not to go back, but to live basic values. You spur imagination by doing things in a new way, not by accepting the definitions of success that come from advertising. **GB**

Robert Jensen is an author and journalism professor at the University of Texas at Austin and board member of the Third Coast Activist Resource Center <http://thirdcoastactivist.org>. He can be reached at rjensen@uts.cc.utexas.edu. His articles can be found online at <http://uts.cc.utexas.edu/~rjensen/index.html>.



New communities built around horseback riding, walking trails, and organic farming have tapped into an eager niche of "back-to-the-land" buyers.

BUYING THE FARM



By Matthew Power



Fascination with food, farming, and horseback riding are fueling interest in rural urbanist development.



The Oaks, a new 1,200-acre equestrian community in North Florida, applies green thinking to all aspects of its equestrian-focused design. From fencing to gutters to siding materials are durable, recycled, or both.

Today, the U.S. population is moving in the opposite direction: out of the country and into the city. But other forces—rising energy costs, gridlock, and a teetering economy—could reverse that trend almost overnight. If author and futurist James Howard Kunstler (*The End of Suburbia*) is right, the close of the oil age may be near (\$81 per barrel at this writing). If the resource-intensive economy of today becomes a historical footnote, home building could also change profoundly, with renewed emphasis on sustainability and rural self-sufficiency.

A few builders and developers are far in front of that curve. They're already building

rural lifestyle communities using principles of "rural urbanism," creating communities around working farms, preservation areas, and horseback riding trails. Almost all of these developments aim to raise the environmental bar over cookie-cutter alternatives.

"Horse trails are not golf courses," notes Michael Donovan, of Equestrian Services in Charlottesville, Va. His firm helped develop a community called The Oaks, in Lake City, Fla., around equestrian activities and trails.

"You're not manipulating the land, not covering it with pesticides," Donovan says. "At the same time we have dedicated sacrifice

areas—what we call a dry lot, where if it's especially wet, the horses are kept on an engineered surface. That way we can prevent the horses doing a year's worth of damage to a sensitive area."

Environmental purists may turn up their noses at this new spin on rural development because it touts environmental conservation at the same time opening up more land to construction. But rural urbanist designers tend to take environmental impacts far more seriously than the typical gated golf community with cul-de-sac streets.

"Our clientele are not on top of



The giant barn/equestrian center at The Oaks includes recycled metal roofing, fiber cement siding, and “green” angle, which is a special high-tech sand that requires less water (to control dust) than natural sand.

environmental awareness, but they’re climbing the hill,” Donovan acknowledges. “We’re aware that earth moving and grading can easily outweigh the fact that we’re using recycled fence material. But our philosophy is this: Let’s tread lightly all the way through the construction process. That’s why we have features such as gutterless streets and rainwater collection.”

Testing Grounds

According to the *Wall Street Journal*, farm-focused developments are taking shape in Georgia, Vermont, Virginia, and Florida. The best-known Florida site, Babcock Ranch, will include 23,000 homes and will be built on 73,000 acres, with a farm and cattle ranch as its centerpiece. (For more on Babcock Ranch, see *Green Builder*, July 2007, page 19.)

Do most people moving into these communities expect to go to work planting vegetables and feeding cows? No. So why the fascination with rural lifestyles? One answer: The new emphasis on healthy food choices that match healthy lifestyles.

“People are gravitating toward rural amenities,” notes Tucker Berta, marketing director for Serenbe Community, a 900-acre upscale development about 32 miles south of Atlanta. “We’re located in Chattahoochee hill country,” she adds. “We’re an upscale community, with three gourmet restaurants; those have really put us on the map.”

The community, she says is built on the “basic tenets of new urbanism, and includes 15 miles of walking trails, waterfalls, and a “biodynamic” farm, meaning it grows many different crops.

And, as Donovan points out, the fact that many residents don’t take part in the rural amenities at these sites doesn’t negate the fact that they preserve land and bring buyers to the table. “We only bank on 20 percent of the people being active participants in the equestrian center [at The Oaks],” he says. But there’s plenty to satisfy the emotional interests of the other 80 percent.”

Advocates of the rural urbanist movement recognize that pampered Americans don’t expect to make sacrifices when they consider



FARM COUNTRY CAVEAT

Rural urbanism hasn’t caught on as quickly in heavy farming states such as Iowa. One study found that Iowans, who are surrounded by farms and agriculture, prefer water features, biking, or golf as amenities.

Survey highlights:

- > The quality-of-life amenity was a major influence on the decision to purchase a lot and build a home. Only 13 percent of respondents indicated that the amenity was not a factor.
- > The housing developments attracted an equal number of new residents from other parts of Iowa as they did from the nearest community. Less than 15 percent of the residents came from out of state.
- > More young, working families than retired citizens were attracted to the housing developments. Fewer than 20 percent of residents were retired.
- > Family size remains small. Only 30 percent of the reporting households had students in grades K-12.

Source: “Amenity-Related Housing: A Development Tool for Rural Communities,” Homeward Inc., 2004

relocating to the country. They want to exchange urban stress for a lifestyle that Donovan describes as “a simpler time.”

As he explains: “They will find it easier to connect with neighbors while also maintaining their privacy,” yet “while leaving behind the hectic pace of city life, and constant stimuli, people still crave satellite TV, mobile phone coverage, and high-speed Internet and gourmet shopping. These are the epitome of new ruralist living.”

Proximity Matters

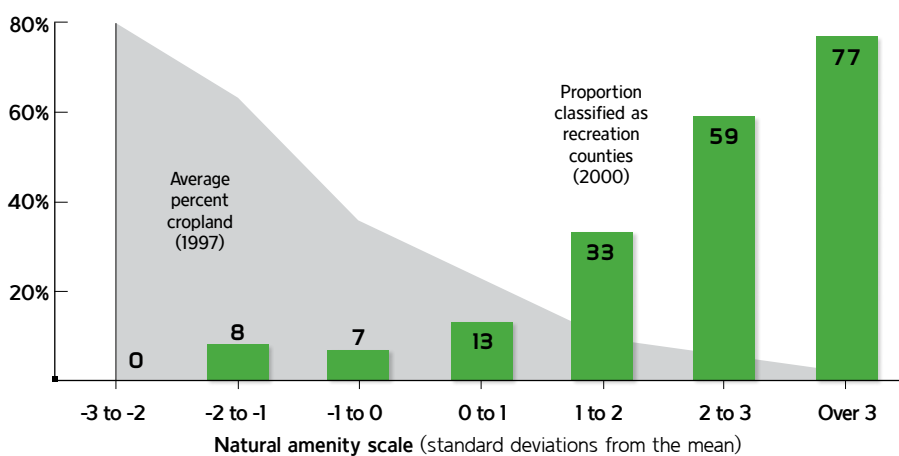
The rural urbanist concept may not work everywhere. Several of the most successful communities so far tend to lie a short commute from large cities, not in the middle of Midwestern farm country.

That doesn’t mean some hybrid of rural urbanism can’t make it in isolated rural areas, but the formula for success has to be different. In Iowa, for example, where farming is a way of life—developers look to other types of amenities to attract people to rural living.

“We noticed a trend, that if there was an



AND A LACK OF NATURAL AMENITIES ...



Agricultural regions tend to be short on “natural” amenities such as waterfront or hiking trails, so offering those amenities makes rural developments more desirable.

Source: USDA

amenity connected to housing [in rural areas], it seemed to build out a lot faster,” notes Bob Bauman, CEO of Butler County Electrical Cooperative in Allison, Iowa. “But we had only anecdotal information, so we decided to conduct our own study.”

That study (see “Farm Country Caveat,” page 23) found a clear correlation between communities with amenities and speed of buildout and home sales.

“In Iowa, we have a strong agricultural community so there’s a reluctance to take land out of production,” Bauman notes. “The feeling is that if it’s good for growing crops we shouldn’t be using it for housing. As a result, housing tends to go up on land less valuable for agriculture, which offers other types of natural amenities.”

Retail Therapy

Like new urbanist developments, rural urbanist communities need a retail component to make the neighborhood feel like more than just a fancy bedroom community.

But the magic density-per-acre of residents needed to sustain even a small store, as any city planner will tell you, exceeds what most homeowners see as acceptable density.

To get around that problem, successful rural urbanist communities have turned to upscale, boutique stores, and restaurants that appeal far beyond a community’s geographic boundaries.

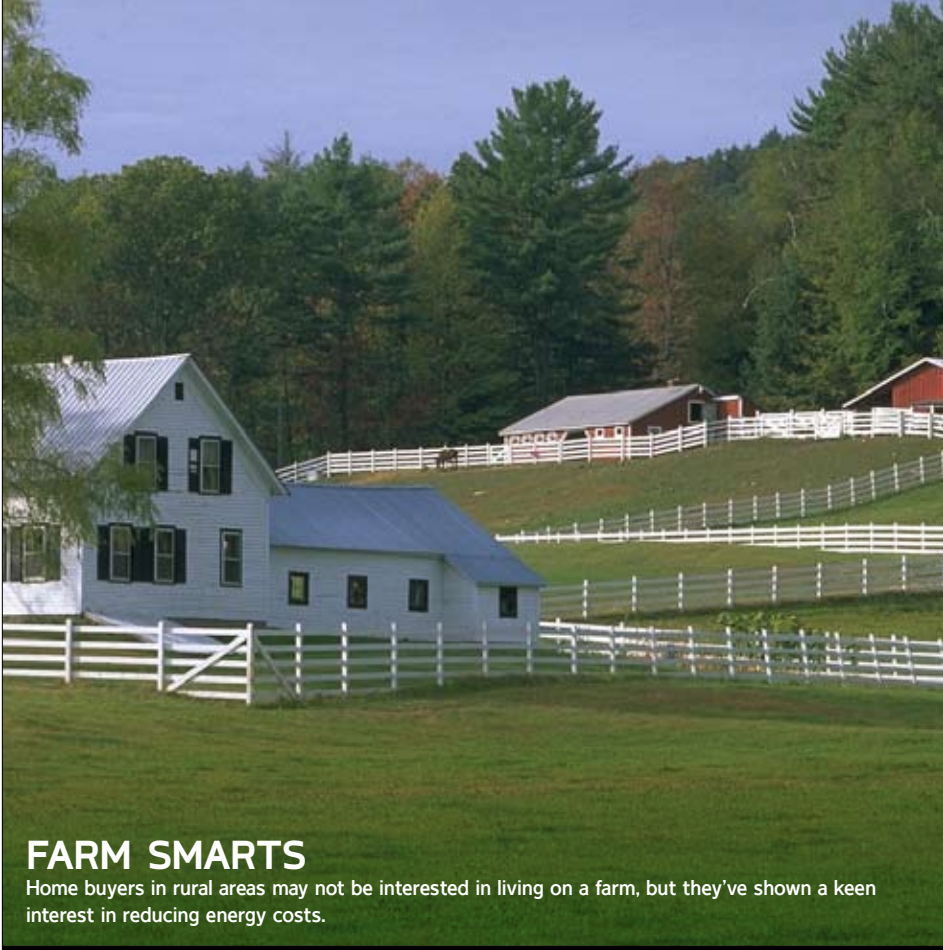
Serenbe, for example, has grabbed a place on the map by promoting world-class dining, complete with famous chefs, a culinary festival, and a gourmet grocery store. People who visit the community for a luxurious dinner have been known to buy a home in the community.

But even high-end stores need foot traffic. So Serenbe is not gated—in fact it’s set up as a destination, not a private enclave. That’s another secret to rural urbanist communities: Make them a destination for non-residents.

“We did some market research and found that about 80 percent of our retail business is done with people from outside the community,” Serenbe’s Berta says. “That’s always been part of the equation.”

Rural Urbanist Pros and Cons

On the whole, rural urbanist communities carry the environmental flag much farther up the hill than traditional suburban developments, although they are not perfect. Houses tend to be built durable and highly efficient, but not



FARM SMARTS

Home buyers in rural areas may not be interested in living on a farm, but they've shown a keen interest in reducing energy costs.

"We have seen a big increase in energy-efficiency loans," notes Bob Bauman, who along with his work as CEO of Iowa electric cooperatives, is president of Homeward in Clarion, Iowa. Homeward provides financial and other services to rural home buyers. "In 2004 we started offering loans for geothermal; there was quite a bit of demand. We came up with a below-market rate to assist rural residents, and we've loaned over \$1.1 million since then for geothermal and heat pumps. Bauman says local electrical

cooperatives helped spread word of the program, marketing it through their newsletters. Loans are 3 percent for five years, 5 percent for 10 years. "These systems were approved by HUD, which is unusual, and allowed us to offer some nice funding," he says.

FOR MORE INFORMATION

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www.homewardiowa.com

energy-neutral, meaning they don't supply their own heat or electricity.

Also, the question of land use is complex. Rural urbanist sites developed far from public transportation may add to problems of automobile pollution and traffic. Serenbe Farms, for example, has no rail or bus service direct to Atlanta, although many residents work in the city.

By contrast, Prairie Crossing, a community 40 miles northwest of Chicago, was built within walking distance of rail service to the city, which greatly reduces future environmental impacts. (For more on Prairie Crossing, see "New Traditions" on page 34 of this issue.)

Another hidden advantage of rural urbanism is written into the subdivision planning as agricultural. That not only protects

it from fast track development, but also allows residents (and those after them) to create community gardens or other agricultural activities in keeping with rural traditions.

Of course, developing virgin sites that were previously uninhabited or used for farming inevitably changes the local ecosystem. But the amount of disruption can be minimized if the planners respect the rural landscape and buyers embrace rural lifestyles as more than quaint novelties. The sounds and smells of a working farm or stable may require adaptation from those fleeing urban stress.

As a first step toward a less resource-intensive future, however, both builders and home buyers could do worse than getting involved with rural urbanism, which tends to embrace green building principles as a core value. **GB**

GREEN WATCH

Products and land development in rural urbanist communities go above and beyond on environmental choices.

> Less intensive land use

Typically, 20 percent to 30 percent of the total parcel in a rural urbanist plan will be developed. The rest is preserved as farmland or wilderness, for walking or riding trails, water features, or wildlife sanctuaries. Most communities also minimize cutting of trees when planning and excavating.

> Energy-efficient homes and businesses

Buyers in rural urbanist communities tend to expect eco-friendly homes and materials. All of the homes built at Serenbe, for example, will be EarthCraft certified.

> On-site recycling and composting

Rural urbanist communities tend to ratchet up recycling options. At Serenbe, for example, homeowners not only recycle all trash, but have separate "biobags" for food wastes. This material is used on the community's organic farm.

> Water management

At "The Oaks" in Lake City, Fla., 10,000 gallons of water annually is collected from the roof on the riding facility alone. And the developer purchases polymer-coated sand for use in the horse riding ring (which, unlike its counterparts, does not need to be sprayed down with water repeatedly to control dust) saving hundreds of gallons daily. Serenbe has no lawns to irrigate, instead relying on native xeriscaping for yards and green spaces.

RURAL URBANIST GREEN PRODUCTS

In our conversations with these communities, developers and others mentioned several green products they're using that might be of interest.

- > Polymer-Coated Sand (water-conserving)
 Atwood Equestrian Surfaces
www.equestriansurfaces.com/index.php?docid=10
- > Lifetime Lumber (durable fencing)
www.lifetimeproducts.com/html/fencing.html
- > Envirosafe Lumber
 Envirosafe Products Corp.
www.envirosafe@aol.com



Durano Custom Homes

www.duranoconstruction.com

Founded: 1994

Headquarters: Albuquerque, N.M.

Leadership: Dee Durano, founder and CEO

Employees: 2

Markets: Albuquerque and its suburbs

Closings: 3 to 4 annually

Certification: Follows NAHB's Model Green Home Building program (gold level)

Recent awards: Single-Family Luxury Home of the Year 2007 (NAHB National Green Building Awards)

Company philosophy: "I want my homes to be a legacy. Twenty years from now, I want them to still stand true and strong and still be saving money."—Dee Durano

By Jennifer Popovec
Photographs by Patrick Coulie

New Mexico's **Dee Durano** makes a life-long commitment to green building.

Faithful Steward



When Dee Durano visited Africa this past summer, he brought along several bags of old clothes so he could donate them to a local orphanage. “I had owned some of those clothes for 20 years—since the first days of being married,” says Durano, founder and CEO of Albuquerque, N.M.-based Durano Custom Homes. “I believe in the old saying ‘Waste not, want not.’ I’ve been rich, and I’ve been poor, and I don’t want to go back to a life of want. So, I don’t live a wasteful life.”

Durano’s philosophy of frugality is the foundation for his business. “I appreciate nature because it’s something God created,” he explains. “And part of appreciating nature means I have to be a steward of it. As a builder, I have a responsibility to take care of nature and conserve our resources.”

All of Durano’s homes are built to the green standards and have won numerous green building awards from NAHB, including 2007 Single-Family Luxury Home of the Year in the National Green Building Awards.

“Dee is quite sincere about his commitment to green,” says Jim Folkman, executive vice president with Home Builders Association of Central New Mexico. “He’s very dedicated and a

visionary in the sense that he sees trends and translates those trends into a product that can sell.”

Humble Beginnings

Durano grew up in the Philippines, but left home when he was just teenager. He ended up toiling in the fields in California as a migrant worker, a life that he knew would make him an old man long before his time. So, when a recruiter for the U.S. armed forces encouraged him to enter the military—even paid for him to take the Graduate Education Development (GED) test—he jumped at the chance.

The Air Force gave Durano a way up and a way out of the

All Durano homes are certified “Gold” based on the NAHB’s Model Green Home Building program and achieve the highest levels of resource and water efficiency, indoor air quality, and home-owner education.



Dee Durano, founder and CEO of Durano Custom Homes, built his first green home in 2001 and builds three to four homes each year. The homes, starting at \$185 a square foot, usually exceed 3,000 square feet.

fields. He spent 17 years in the Air Force, moving eight times and taking on a number of management jobs that would eventually prepare him to run his own business. He also earned a bachelor's degree and a master's in business administration while enlisted. When he retired from the military in 1994, Durano was stationed at Kirtland Air Force Base in Albuquerque and managing the base's \$95 million budget.

After his retirement, Durano found himself at loose ends. As an avid investor in the stock market, he even considered becoming a stockbroker, but decided against that because he didn't want to relocate to New York or Boston. Durano didn't start thinking about home building until he met a man at church who owned a construction company. Durano worked out a deal where he would work construction for free and get "paid" in experience, he says.

As an apprentice, Durano learned how to draw plans, deal with vendors, frame houses, and finish them from the ground up. Within a few months, he tapped into his savings to buy some land and started working on his first spec house, doing everything himself, from framing to trim carpentry to painting. Although that first home wasn't built to green standards,

Durano says it sold to the first couple who looked at it.

Over the next seven years, Durano built two homes per year, and, in 2001, he discovered green building through Department of Energy training for the Building America program. "From that point on, I knew I could never go back," Durano says. "If a person knows the right thing to do and still doesn't do it, he just committed a sin. Now that I know how to build a better house, I must do it."

Whole-House Focus

Driving around Albuquerque, it's hard to pick out which are the Durano homes. Scattered throughout different neighborhoods, the houses each have an individual presence rather than a cookie-cutter look. "I want people to know it's a Durano home when they walk into it because it's more comfortable than any other home," Durano says. "I don't want to build homes that all look alike."

Durano's homes, which start at \$185 a square foot (not including land), tend to be larger than 3,000 square feet and feature Mediterranean-style, Mission-style, and more traditional architecture. Currently, Durano is working on a





Durano's homes feature unique designs that offer plenty of room for families to gather. He also makes sure that his homes provide healthy environments by using low-VOC or no-VOC paints, stains, and varnishes, and formaldehyde-free cabinetry.

\$2.5 million home, one of three other homes he plans to build this year. (On average, he builds three to four homes annually.) And, after visiting Morocco this past summer, he has dreams of building a Moroccan-style home.

"Dee builds with an Old World sort of flair. His homes have extraordinary style and features," explains Folkman of the Home Builders Association. "He marries that style with green building concepts, which is difficult to do. It's that marriage that sets him apart."

Architects who have worked with Durano agree. "Dee is the most meticulous green builder I know and one of the best builders in New Mexico when it comes to quality of construction and paying attention to detail," says Armando Cobo, an Albuquerque-based architect who specializes in green design.

"Dee really makes sure that each of his houses outperforms the ones that he's built before," says Cobo, who has worked with Durano on eight homes over the past several years. "He's always trying to figure out what else can he do to make things better."

Durano approaches green building holistically, taking the entire house into consideration. "The house is a system, and when you do one thing, there are reactions and consequences in other parts of the house," he explains, making the analogy of a person who takes multiple prescription drugs that may effect each other—sometimes detrimentally.

Going for NAHB Gold

Durano's homes are certified gold based on the NAHB's Model Green Home Building program (only about 5 percent of homes achieve gold status) and achieve the highest levels of resource and water efficiency, indoor air quality, and homeowner education, Durano says.

Durano starts out every home with advanced framing techniques, framing each house by using 2' center stud spacing instead of 16". "This way, you use 25 percent less wood for studs, and when you use fewer studs, the stud is replaced by insulation, which means that the house stays cooler in the



summer and warmer in the winter," he notes.

Air quality is also a big focus for Durano, who performs tests on all duct work to make sure the ducts have less than 2 percent leakage. Overall, Durano's homes have just a .06 enve-

lope leakage (.35 is allowable). He also installs central vacuum systems to eliminate noise pollution and dust, and uses paints, stains, and varnishes with low or no VOCs and formaldehyde-free cabinetry.

Given Albuquerque's desert climate, Durano concentrates on energy efficiency. He orients homes to take advantage of the sun in the winter and to avoid it in the summer. His homes, which feature considerable glazing, boast low-E windows and approximately 60 percent fluorescent lights. He installs super-efficient heating and cooling systems in his homes, all of which undergo third-party testing and energy rating calculations to determine how much energy the house is consuming.

Durano also pays attention to water conservation. Tankless water heaters, low-flow plumbing fixtures, and xeriscaped outdoors are staples in his homes. However, Durano has yet to do rainwater or graywater recycling. "It's still a little too expensive, and the payback is too long," the builder says. "I don't put anything in my houses that doesn't have a payback within two years in cost savings in operation and maintenance."

Diego Ruiz, president of Albuquerque-based Diego Handcrafted Homes, says Durano sincerely cares about his clients. "Incorporating green elements into a high-end, custom home requires much more care and complexity than incorporating green into production homes," Ruiz says. "With custom homes,

Although most of Durano's homes feature traditional design, the building techniques and materials he uses are cutting edge. He uses recycled materials, including cork flooring and floors made from old tires and super-efficient heating and cooling systems.



Durano's houses feature water-conserving technology, including tankless water heaters and low-flow plumbing fixtures. He has decided against rainwater and graywater recycling for now because he doesn't install any technology that doesn't have a payback within two years.

you have to be more intricate because each space is different, and the approach is different. Dee really tries to give each customer the best product he can."

Durano takes green building a step further by educating homeowners after move-in. Each homeowner receives a hefty user manual that covers everything from air conditioning to recycling to public transportation. The manual tells homeowners when to replace filters, what to do with humidifiers, and how to maintain their homes so they increase in value.

Spreading the Word

Durano is not just educating homeowners, he's spreading the word to the housing industry.

"Dee never misses an opportunity to talk to people about green building," says Melanie Teeter, director of government affairs for the New Mexico Home Builders Association. "He is a role model, and when anyone has questions about how to put this in action, I refer them to Dee because he's always a source of information for people."

Durano is heavily involved in Build Green New Mexico, which was chartered in October 2006. He was one of the founding members, after heading up a group of home builders that evaluated different green building programs including the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) pilot program for single-family homes.

Durano and his group decided to adopt the NAHB's





National Green Building Program and modify it for New Mexico. This year, Durano took on the chairman position at Build Green New Mexico, and under his leadership the organization has doubled its members and now has a budget that operates in the black.

“Dee volunteers his time so Albuquerque is leading with green building rather than following,” Ruiz says. “He is encouraging other builders to embrace green.”

As the chairman of Build Green New Mexico, Durano

makes frequent trips to Santa Fe to talk to the state government about green building, even influencing recent green building legislation approved by New Mexico’s Congress.

“There are a lot of politicians who are pushing mandates, and as a person who came from a country that was under martial law, I hate mandates because they inhibit creativity and free enterprise,” Durano asserts. “We are the builders, so why not be a catalyst for change and stay ahead of mandates?” GB

Durano orients homes to take advantage of the sun in the winter and to avoid it in the summer. Many of his homes have photovoltaic panels on the roof and most feature a lot of glazing with low-E windows to maximize daylight. Xeriscaped landscaping helps to minimize water usage.

GREEN FAVORITES

At Durano Custom Homes, spec'ing the right products is essential. Here are some of the company's sure-bets.

➤ **Rinnai Tankless Water Heaters.** These water heaters only come on when homeowners turn on their hot water. When the hot water is turned off, so is the heater, ensuring that energy is not wasted. www.foreverhotwater.com

➤ **Rheem ECM Modulating Furnaces and 2 Stage 16 SEER Condensing Units with Humidifier.** These heating and cooling systems by Rheem are energy efficient and maintain steady levels of humidity, improving air quality. www.rheem.com

➤ **Variance Interior Plaster.** The Variance line is comprised of highly dynamic 100-percent acrylic-based plasters with select marble and limestone aggregates. Variance can achieve many dif-

ferent looks over a wide variety of substrates, interior or exterior. www.variancefinishes.com

➤ **Sanyo HIP-195BA3 Photovoltaic Panels.** These solar cells are hybrids of single crystalline silicon surrounded by ultra-thin amorphous silicon layers. The panels are ideal for grid-connected solar systems, areas with performance-based incentives, and renewable energy credits. www.us.sanyo.com

➤ **Demilec Foam Insulation.** Applied as a liquid, this foam expands within seconds to 120 times its volume to fill every nook and cranny providing superior energy efficiency and improved indoor air quality by eliminating air movement through walls. www.sealection.com

➤ **Benjamin Moore Eco-Spec Interior Paint.** A low-odor, low-VOC, 100 percent acrylic latex semi-gloss enamel with spatter-resistant properties. www.benjaminmoore.com

NEW ENTRANCE TRAD

By Jim Hackler

Today's TNDs blend environmental sensitivity with a popular and thoughtful planning approach.





ITIONS

For a significant number of home buyers, the American Dream is no longer the big house in the suburbs. A 2006 study of housing preferences by Arthur Nelson, director of urban affairs and planning at Virginia Tech, found that nearly 40 percent of today's consumers prefer attached housing, compared with 25 percent in the past. And while a little more than 50 percent of today's occupied homes are single-family detached on large lots, the percentage of consumers who say they actually want that type of housing is as low as 25 percent.

"We have more 'McMansions' than there is a market for," says John Norquist, president and CEO of the Congress for New Urbanism (CNU), a nonprofit membership group that advocates traditional neighborhood development (TND) as the alternative to sprawl. "Because of a demographic shift to smaller families, single parents, and no-

kid households, there's more of a demand for urban products such as condos and townhouses."

Given such trends, Norquist (who is also the former mayor of Milwaukee) asserts that a well-designed TND is not only desirable, it's more environmental. "Tightening up the development pattern, encouraging density that's pleasant to live in, and creating more walkability means less energy consumption and less CO₂ production," he says.

The CNU estimates there are more than 200 TNDs built or under construction in the United States. While all of them are inherently environmental based on Norquist's assertion, we've profiled six TNDs that combine appealing site plans with earth-friendly features such as geothermal heating and cooling, natural stormwater retention plans, and energy-efficient home designs.

COMMON TND FEATURES

- > Integrated residential and commercial zones in the community
- > Town center that is often a square or green
- > Streets laid out in a grid pattern with no cul-de-sacs
- > Buildings in the neighborhood center with little or no setback
- > Elementary schools within walking distance of all residences
- > Small parks or playgrounds scattered throughout



ALYS BEACH, FLORIDA

Noted planning firm DPZ creates a second-generation TND.

Alys Beach is only six miles away from Seaside, Fla., where the first “new” traditional neighborhood development became a reality in 1981. Like Seaside, Alys Beach is designed by noted planning firm Duany Plater-Zyberk and Co., which was asked to create a “dream community.” The architects and planners drew inspiration from the whitewashed buildings of Bermuda and Antigua, Guatemala, and then added modern construction techniques to help the homes withstand a major hurricane.

“Beauty and durability are the two main guiding forces that make it a more sustainable community,” says Christian Wagley, Alys Beach’s environmental program manager. “When you build something of beauty, it doesn’t get torn down. The other thing is by building very well-made masonry structures, we’re building things that are very durable and

are meant to last for centuries.”

Wagley joined the project three years ago to help Alys Beach achieve new levels in green design and construction. He’s been working with the U.S. Department of Energy’s Building America program to establish Alys Beach as a demonstration project for hot and humid climates. Thanks to advanced products such as spray foam insulation and low-E windows, the homes are 25 percent more energy efficient than others in the area, Wagley says.

The Alys Beach homes also use a new practice that Building America is advocating: sealed attics. By eliminating vents to the exterior, it makes it easier to control air leakage at the top of the homes as well as prevent moisture-laden outside air from entering the attic and causing condensation problems.

While new products and techniques are making the homes more environmentally

Alys Beach’s breezy courtyard-centric designs were inspired by homes found in Antigua, Guatemala.





friendly, Wagley says something as simple as color choice is having a big impact. “When you look at our town, it’s all white. In the heat of the sun, the buildings just stay cooler.”

The homes at Alys Beach also feature white tiles on the roofs, a standard practice in Florida before the introduction of air conditioning. A study by the Florida Solar Energy Center found that switching a house from black asphalt shingles to white tiles reduced energy use by an average of 19 percent.

The next project on the to-do list is an edible landscape. “One of the things I want to do in some of our little park spaces is to



introduce orchards,” Wagley says. “We have some plans to put in blueberries, figs trees, and cold hardy citrus such as persimmon and kumquats to try to introduce the idea that our landscape can not only be beautiful, but feed us as well.”

TNDetails: Alys Beach **Built:** 5% **Acres:** 160 **Mix:** 600 homes, 177,000 square feet of commercial space, and a 60-room inn **Sales prices:** \$1.2 million to \$1.9 million **Community space:** Environmental center, 18 acres of town parks, 21-acre wetland preserve, a health and fitness club, an amphitheater, a non-denominational church, recreational facilities, a town center, and 1,500 feet of beachfront **Designer:** Duany Plater-Zyberk and Co. **Developer:** EBSCO Industries **Builders:** Artisan Builders, Breaux Construction, Elliott Construction, Ficarra Builders, Koast Builders **Under construction:** Broke ground in 2004 with a projected 15-year buildout **Online:** www.alybeach.com

All homes and streets in Alys Beach are carefully oriented to allow residents to enjoy passive heating from the sun and cooling from the Gulf breezes.

Alys Beach’s “Caliza Pool” is a 50’ x 100’ pool (shown under construction at left) that uses salt instead of chlorine to disinfect the water. It’s the largest of its kind in the area.

Development Features: Alys Beach

- > Certified by the Institute for Business and Home Safety, a national nonprofit that works to incorporate the latest disaster-resistant features, enhancements, and construction technologies in new homes.
- > Built to Florida Green Building Coalition standards.
- > 21-acre preserve contains wetlands and a longleaf pine forest.
- > Employs a full-time on-site environmental program manager.
- > Passive solar design. Homes are also oriented to capture Gulf breezes, with every street an open thoroughfare to the Gulf of Mexico.
- > White exterior walls and rooftops reflect the sunlight.
- > Pavers hand-set in gravel minimize stormwater runoff from parking lots and streets by allowing 35 percent of rainfall to filter directly into the ground.



GRAYSLAKE, ILLINOIS.

Prairie Crossing preserves a sense of community while conserving land.

Prairie Crossing demonstrates that a conservation community can embrace the same principles as a TND. Located an hour northwest of Chicago in Grayslake, Ill., the project was just a stretch of farmland bordering the 5,800-acre Liberty Prairie Reserve when it broke ground in 1992.

“We set out to save as much open land as possible,” says Vicky Ranney, president of Prairie Holdings Corp. “We have been able to save more than 60 percent, which is now functioning as an organic farm, restored prairie, and wetlands.”

Ranney says the planning principles of a TND are very compatible with land conservation plans because homes and a town center are generally clustered close together, allowing larger areas of green space. She says the movement also places importance on creating connections by establishing “third places,” which are locations beyond home or work. In the case of Prairie Crossing, a restored 1885 dairy barn serves as a community center, and an extensive network of trails and a beach are popular gathering spots for residents.

“We swim in the lake and use it for

all kinds of water sports that are not mechanized, like canoeing and sailing,” says Ranney. “We have very little runoff into the lake because of our stormwater management plan that uses swales and a variety of plants that keep toxins from the water. Our lakes are so clean that the Illinois Department of Natural Resources uses them for raising endangered species of fish.”

Prairie Crossing’s newest phase revolves around the project’s two rail stations. The first station opened in 1996 and the second eight years later. Ranney says they’re building shops, restaurants, and condos that will offer an urbanized setting and an easy train ride to downtown Chicago or O’Hare International Airport. “At one point we had an American Airlines pilot here who would bike to the station, take the train to the airport, and then take his 10 a.m. flight to San Francisco.”

Sales continue to be strong, even with the area’s housing downturn. Ranney says a market study showed Prairie Crossing homes getting 34 percent more per square foot, which shows the demand for this type of development.

TNDetails: Prairie Crossing **Built:** 95% **Acres:** 675 **Project cost:** \$170 million **Residential units:** 395 **Sales prices:** \$179,900 to \$600,000-plus **Green space:** 470 acres **Design team:** William Johnson, Peter Schaudt, and Steven Apfelbaum of Applied Ecological Sciences; Peter Calthorpe of Calthorpe Associates, and Phil Enquist of Skidmore Owings and Merrill; Margaret McCurry, Rick Phillips, and James Nagle **Developers:** Charles Shaw, Frank Martin, and Prairie Holdings Corp. **Builders:** Shaw Homes and Prairie Holdings Corp. **Under construction:** 1992–2008
Online: www.prairiecrossing.com

In 1996, Prairie Crossing became the first community-scale Building America project in the country. A study for the Department of Energy estimated the additional upfront costs on each home to be \$1,500, but that the homeowners would save \$500 a year in reduced energy costs.



Development Features: Prairie Crossing

- > Transit stations with service to downtown Chicago and O’Hare International Airport
- > A rehabbed 1885 timber-frame barn that serves as a community center
- > 60% of development is legally protected open land.
- > 10 miles of walking, biking, and horseback riding trails
- > Energy-efficient homes designed under the Building America Program
- > LEED-certified charter school
- > Stormwater treatment with native plants flows into swales.
- > 90-acre certified organic farm with rentable garden plots

NORTH CHARLESTON, SOUTH CAROLINA

Noisette launches an economic and riverside renaissance.

One of the largest traditional neighborhood developments in the country is Noisette in North Charleston, S.C. Covering more than 3,000 acres, the project is redefining the role between developer and city.

“Noisette operates at the social, the environmental, and the economic level,” says John Knott, the president, CEO, and co-founder of the Noisette Co. “It isn’t just about green building and energy efficiency; it’s really about healing and creating a ‘just’ community that works on every level.”

In a public-private partnership, the Noisette Co. and the city of North Charleston teamed up in the late 1990s to revitalize the city. In exchange for the right to purchase 350 acres of the old Navy base, Noisette agreed to launch a comprehensive planning effort on an unprecedented scale. “We met with more than 4,000 residents to create a footprint for the redevelopment and revitalization of North Charleston,” Knott says. “It took us two and a half years to fully engage the community to understand what they liked about the area, what they didn’t like, and what they thought was missing.”

Thanks to this input, the Noisette master plan received strong community support, Knott says, and the project also has attracted more than \$900 million in public and private investment. “The economic turnaround has been way faster than we expected,” he says. “Existing housing that used to sell for \$54 a square foot and stay on the market for 270 days is now going for \$170 a square foot and selling in about 45 days.”

While it’s rare for a developer to be so closely involved in an entire city’s economic future, the investment is paying off for the Noisette Co. “Our plans for the old Navy



Yard got approved in eight weeks—with no opposition,” Knott says. “So the money we spent in rebuilding the neighborhood organizational structures was cheaper than what we’d spend on your average zoning fights with this type of density. That could have taken three years—in some places, seven—and often what you end up with is a lot of people who are pretty angry.”

Knott believes master community developers have the unique multidisciplinary experience to transform economically and socially depressed communities into vibrant and prosperous places to live. “That’s when sustainability really starts to work,” the North Charleston developer says.

One of Noisette’s most attractive natural features is the Cooper River, which residents can enjoy through the new Riverfront Park.

The Noisette Co. was contracted by the city to redevelop Century Oaks. All of the homes at the newly named Oak Terrace Preserve will be EarthCraft homes.

Development Features: Noisette

- > 15-acre riverfront park
- > 100 acres of green space
- > Restored powerhouse now houses the city’s cultural arts department
- > Navy Yard Historic District and Navy Yard Officers’ Housing Historic District
- > Chicora Park, which was designed in 1890s by Frederick Law Olmsted
- > Bioswales, green roofs, pervious pavement
- > Participant in LEED-ND (Neighborhood Development) pilot program

TNDetails: Noisette **Built:** 5% **Acres:** 350 (old naval yard) and 3,000 for Noisette planning overlay **Uses:** 50% residential, 50% commercial **Residential units:** 5,400 **Sales prices:** \$200,000 and up **Design team:** Burt Hill; BNIM Architects; Davis & Floyd **Developer:** Noisette Co. **Under construction:** 2003 and beyond **Online:** www.noisettesc.com

LAKWOOD, COLORADO

Belmar reinvents an aging shopping mall, creating a new residential, commercial, and cultural hotspot in suburban Denver.

Belmar is a lesson in how to reinvent an obsolete shopping mall into the cultural and business focal point of a city. Named after the Lakewood, Colo., estate of heiress May Bonfils, Belmar is becoming so popular that it's drawing residents away from Denver's trendy Lower Downtown Historic District, which is known as "LoDo."

"We're getting empty-nesters looking to scale down," says Matt Stokes, Belmar development director. "We're also attracting the 'urban hipster' which is somebody who can afford a loft in LoDo, but they can get something with as much square footage for almost half the cost that's also new construction."

Stokes says he's also been pleasantly surprised at the response to Belmar's commercial space. With more than 200,000 square feet of office space, Belmar is 100 percent leased and getting some of the highest rents in the area. "Businesses like the fact that their employees can work in the area and spill out onto the streets for lunch and then come back to work," he says. "It's a very convenient experience."

There's a lot to experience at Belmar after work, too: restaurants, shops, a movie theater, and a central plaza that turns into an ice skating rink in the winter. One of the community's most unique cultural features is The Lab, a contemporary art center that hosts exhibitions, lectures, publications, and activities exploring contemporary art and ideas. Stokes recounts a recent "mixed taste" presentation at The Lab that began with a look at Walt Whitman and ended with the lowdown on whole-hog cooking.



The streetscape experience is equally important to the cultural arts sense. "You want to have the streets and retail storefronts engage the pedestrians as they walk down the street," Stokes



says. "We're using a lot of brick and masonry."

The project also pays homage to green principles. "With respect to the green products, we're trying to keep everything sourced within a 50-mile radius," says Stokes. "We're also looking at deploying 1.8 megawatts of solar power that would be located on top of the parking garages. It's not definite yet, but it's a goal. We're constantly pushing ourselves to make Belmar a better place to live."

The annual Festival Italiano is one of the most popular events held at Belmar. It includes flag throwers from Florence, Italy; regional Italian wine tastings, chef demonstrations, and a children's grape stomp.

Belmar includes a small urban wind farm. Located on fourteen light poles, the turbines collectively generate approximately 400 watts of power at a wind speed of 28 mph.

Development Features: Belmar

- > The Lab, a contemporary art and ideas institution
- > Streets designed to accommodate routine closure for public markets.
- > New city hall, library, cultural facility, and heritage center across the street
- > LEED-certified commercial buildings
- > 200,000 tons of concrete and two million square feet of asphalt recycled on-site
- > 10 acres of parks and green space
- > Transplant and reuse of 150-plus mature trees
- > Energy Star-certified townhomes

TNDetails: Belmar **Built:** 70% **Acres:** 104 **Project cost:** \$850 million **Residential units:** 782 **Sales prices:** \$180,000 to \$1 million-plus **Designers:** Elkus Manfredi Architects; QPK Design; Van Meter Williams Pollack; ArchitectureDenver; Civitas; EDAA; Fehlman LaBarre; Belzberg Architects; MB Consulting **Developers:** Continuum Partners **Builders:** Continuum Partners, McStain Neighborhoods, TCR, Harvard Communities, New Providence Co., Sunburst Design **Under construction:** 2004-2009 **Online:** www.belmarcolorado.com

TACOMA, WASHINGTON

HOPE VI development Salishan opens TND living to more than wealthy buyers.

Salishan dispels the myth that traditional neighborhood developments only cater to upscale or exclusive clients. Originally built during World War II as temporary housing for Tacoma, Wash.'s military workers, Salishan's infrastructure began to fail and its homes fall apart. Owner Tacoma Housing Authority (THA) decided to replace the 855 substandard homes with an equal number of new affordable units while adding a mix of market-rate housing. Thanks to HOPE VI funding, the authority made the project happen.

"One goal was to increase the number of dwelling units," says Janet Rice, director of housing development for the Tacoma Housing Authority. "We committed to homeownership mixed with rental, and mixed-income housing, which we saw as essential to create economical stability for the community." Salishan will also include special housing for seniors and the homeless.

Demand has been strong, with phase one of the rental and for-sale units completed. "They're all sold," Rice says. "They're all occupied, and they look lovely."

In addition to providing new homes, the redevelopment of Salishan is employing many community residents. Rice, who calls it "spending your dollar twice," says the housing authority has exceeded its hiring goals, with more than 90 percent of its workers coming from public housing or tax credit communities in Tacoma.

Another important objective is smart building, which means green principles and practices. "We feel green is a tool that will



help us build better buildings," Rice says. "As a housing authority, we are committed to Salishan at a minimum for 55 years, so we approached our development as a long-term owner. We have a real responsibility to use these public dollars in a prudent manner and to create a project that is well-designed and long-lasting." Rice's favorite green feature at Salishan? The network of bioswales that serve as the community's stormwater management system. "They have beautiful rocks with trees surrounding them, so it really integrates nicely into the neighborhood," she says.

Rice hopes to do similar things with other housing projects in the area. "We know this is an area that there are too few participants, but Tacoma Housing Authority has made a commitment to be a leader in the region for green development."



Salishan's homes are designed to accommodate people and families throughout all stages of their lives, so they include living space and floor plans that would work for elderly or extended family members.

Salishan features family parks with bioswales, which reduces runoff into a neighborhood salmon stream.

Development Features: Salishan

- > Affordable and subsidized housing
- > Medical and dental clinic
- > Senior housing
- > 12.2 acres of parks and green space
- > Homes certified by the Master Builders Association of Pierce County and Energy Star
- > Bioswales

TNDetails: Salishan **Built:** 30% **Acres:** 200 **Project cost:** \$225 million **Residential units:** 1,175-1,380 **Sales prices:** \$225,000 average **Design team:** Torti Gallas and Partners **Developers:** Tacoma Housing Authority, Lorig Associates **Builders:** Habitat for Humanity, Quadrant Homes, Tacoma Housing Authority (rentals) **Under construction:** 2004-2011 **Online:** www.salishan.net

ATLANTA

Glenwood Park creates eco-friendly living in the heart of the city.

As you walk along the shops and grand porches that line the homes in Glenwood Park, it's hard to imagine that less than a decade ago this development was a concrete recycling plant. Glenwood Park is notable for other reasons as well. Located fewer than two miles from downtown Atlanta, it is the first TND in the Georgia capital's city limits.

"It was a real challenge to get through the permitting process," says Walter Brown, vice president of Green Street Properties. "We wanted narrower streets and tighter corners that weren't allowed under the current regulations. After some lengthy discussions with city officials, we were able to get approval that resulted in a new TND city ordinance."

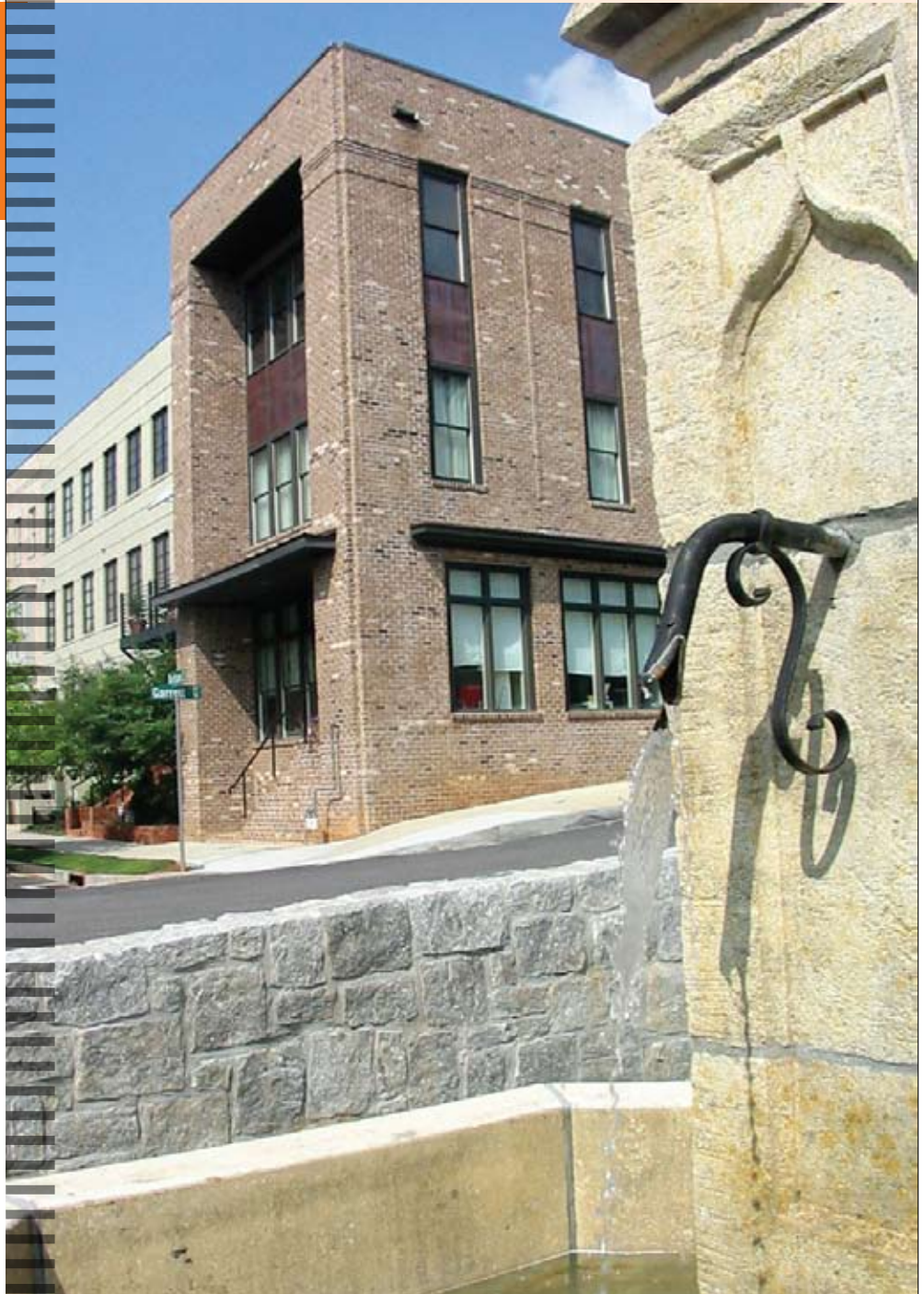
Green Street knew what they were doing. Today, Glenwood Park is winning industry awards and is cited as an example of how to develop an infill site. It represents the first project by Green Street, established by MindSpring Internet service provider Charles Brewer. Designed as a showcase for green building, Glenwood Park requires 100 percent of its homes to be certified EarthCraft Houses, the green building program of the Southface Energy Institute and the Greater Atlanta Home Builders Association. The developers were concerned about that requirement at first, but it hasn't been a problem.

"We ended up bringing on home builders that were either already doing EarthCraft, or were familiar with it," says Brown. "We really have to give credit to the strength of the program and how supportive they've been."

Glenwood Park's other environmental features include geothermal heating and cooling and a stormwater retention pond that also provides a water feature in the neighborhood's central park. It also uses pervious pavement to slow stormwater runoff, but Brown cautions

that the project's tight urban design has been a little difficult to integrate with the product. "Timing is everything," he says. "If you put it in before all of your utilities and telephone lines are in, it winds up being whacked and chopped up. Pervious pavement is probably more appropriate for a strictly single-family residential application where there is less pressure on the land around where you're working." GB

According to traffic statistics, Glenwood Park's urban setting and high density will save 1.6 million miles of driving per year over what residents would have driven if they lived in a "typical" new Atlanta development.





Brasfield Square's design is patterned after European villages. It's become a popular gathering spot not only for Glenwood Park residents, but those who live in nearby neighborhoods too.



Glenwood Park was chosen as one of the top greenest places to live by *Organic Lifestyle* magazine.

Development Features: Glenwood Park

- > Membership-based pool open to the surrounding community
- > Town center that includes shops, restaurants, and services
- > Two parks with community garden and dog run
- > All homes are required to meet EarthCraft House standards.
- > Roads are paved with recycled materials.
- > Recycled stormwater irrigates public areas.
- > More than 1,000 trees planted

TNDetails: Glenwood Park **Built:** 75% **Acres:** 28 **Project cost:** \$150 million **Residential:** 375 **Sales prices:** \$140,000 to \$1 million **Project designers:** Stevens & Wilkinson Stang & Newdow; Surber Barber Choate & Hertlein; Smith Dalia Architects; Historical Concepts; Dover, Kohl & Partners; Tunnell-Spangler-Walsh and Associates **Developers:** Green Street Properties **Builders:** Green Street Properties, Hedgewood Homes, Capstone Partners, and Whitehall Homes **Under construction:** 2001-2008 **Online:** www.glenwoodpark.com

High-Performance House



Fair Play

This green show home gained tremendous visibility, thanks to a popular state fair. **By Matt Power**

Builder Greg Holst of Northwoods Custom Homes in Elk River, Minn., has found a unique showcase for green building: the annual Minnesota State Fair, which attracts more than 1.5 million people during its 10-day run. This year, he pumped the home up with every green bell and whistle he could find.

"We tried to get everything in it and make it as green as you can build," Holst says. "We used FSC lumber, Marmoleum flooring inside, and James Hardie siding on the exterior."

Last year, Holst says, he designed a less sexy home for the fair, which resulted in modest foot traffic, but great media coverage. This year he hired an architect and got both media attention and 350,000 interested fair-goers who walked the house.

"The first year, we drew people who were green-minded already," Holst notes.



To streamline foot traffic (350,000 visitors) through his showcase home, builder Greg Holst modified the plan and removed some indoor wall partitions.

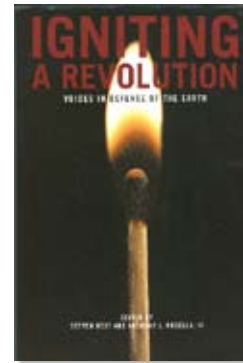
"This year, we drew many more from the middle, mainstream crowd. We wanted to show people they can have a beautiful green home that doesn't look like an igloo."

Other green products in the house included Ainsworth engineered lumber, which provided skins for the Extreme Panel SIPs, along with the sub-flooring, and stair risers.

To learn more about the house, visit the Minnesota Pollution Control Agency's "Eco Experience" website at www.pca.state.mn.us:80/ecoexperience/ and click on "Green Buildings."

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- Transit-Friendly Development 53



Book of the Month ... Forget everything you think you know about "radical" environmentalists. *Igniting a Revolution* offers a collection of thought-provoking essays that ask intriguing questions about our relationship with the natural world. Is over-consumption immoral? Is it time to recognize animals as more than meat? Are the "Earth Liberation Front" (ELF) arsonists really the crazed "terrorists" portrayed by the media and the feds? (Warning: You may find yourself agreeing with their world view, if not their tactics.) Read for yourself, and you'll better understand the motivation behind efforts to throw a wrench in our view of land, water, and sky as resources to be exploited for commerce.

Coal Apocalypse?... A new study on the impacts of global warming warns that even a one-meter sea level rise could devastate many U.S. cities. The report, organized by Architecture 2030, is backed by the work of 47 scientists from around the country. The key finding: Global warming has a "tipping point" at which point massive glacial melting and sea level rise will occur. That level is 450 parts per million (ppm) carbon dioxide (CO₂) in the atmosphere. The primary culprit likely to push civilization past that point of no return? Coal-fired power plants, according to the report. To avoid global disaster on an unprecedented scale, "we will need to call for an immediate halt to the construction of any new conventional coal-fired power plants and the phasing out of existing and aging coal plants over time," it says.

Dry System Radiant Flooring



Once this Uponor radiant heating system is installed, homeowners can take advantage of energy-efficient heat.

We're all familiar with radiant heat in the warmth we feel from the sun on a cool day or the comfort felt in front of a fire during a cold night camping. Radiant floor heating uses a subtle form of this same radiant energy—it warms the surfaces of objects in the room, and then the air in the room is warmed when it touches the heated objects, notably the floor. Heat loss is reduced, and the radiant heat remains in the lower part of the room—warmer near foot level and slightly less so at head level creating the perfect climate for comfort.

Most people are used to homes being heated by air, either forced air, which is blown from a duct by a fan, or air that is heated by a baseboard heater or wall radiator, which is then distributed by convection.

The advantage of a radiant system is because the entire floor surface is so large, the temperature can be quite a bit lower than that of baseboard or wall radiators. Radiant Panel Association guidelines require that radiant floors should not exceed

85 F in high traffic areas. To give you a feel for how moderate that temperature is, touch your own forearm. Human skin temperature is usually between 85 F and 90 F.

Floor Heating

Almost any well-built home, regardless of climate, can be heated with a radiant floor heating system as its sole heat source.

There are three types of radiant floor heat: radiant air floors (air is the heat-carrying medium); electric radiant floors; and hot water (hydronic) radiant floors. All three types can be further subdivided by the type of installation: those that make use of the large thermal mass of a concrete slab floor or lightweight concrete over a wooden subfloor (these are called “wet installations”); and those in which the installer “sandwiches” the radiant floor tubing between two layers of plywood or attaches the tubing under the finished floor or subfloor (“dry installations”).

Dry system radiant flooring, which we're addressing in this article, is radiant heat

AT A GLANCE

Benefits >

> By heating the space directly above the floor, the space may feel warmer than a forced air system, where the heated air tends to rise, making the lower area seem cooler. In this way, the thermostat settings remain stable and not as much energy is used.

> The system doesn't have a hum or whistle of a forced air system.

> Forced air systems can spread dust, pollen, and germs. Dust mites and molds love carpet but don't like warmth. European research performed in 21 households shows a 50 percent to 80 percent reduction in domestic dust mite populations in the households with radiant floor heating, thereby improving the quality of life (particularly for allergy sufferers).

Drawbacks <

< Some estimates put the system at almost double the cost of a forced air system (see costs below).

Initial Cost

> Prices for panels attached to the subfloor are \$10.80 and \$12.70 for the 7" x 48" and 10" x 48", respectively. The accordion style panels are \$74 and \$87 for the 7" x 48" and 10" x 48", respectively. Also, 180-degree return panels cost \$16 for 7" and 10" widths. The dual function panel costs approximately \$125 for straight grooved panels and \$130 for curve grooved panels.

U.S. Code Acceptance

> The Radiant Panel Association has Standard Guidelines for the Design and Installation of Residential Radiant Panel Heating Systems available on its website. Warmboard, dual function panels have been tested and stamped by the APA—The Engineered Wood Association. They have been evaluated by the ICBO, report number ER-5525.

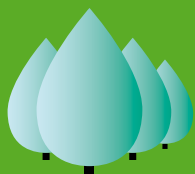
Warranty

> Anywhere from 10 to 25 years can be found for the entire system, depending on manufacturer. The boards and fittings can differ; the boards are sometimes warranted for the life of the structure and the fittings from 18 months to 2 years.

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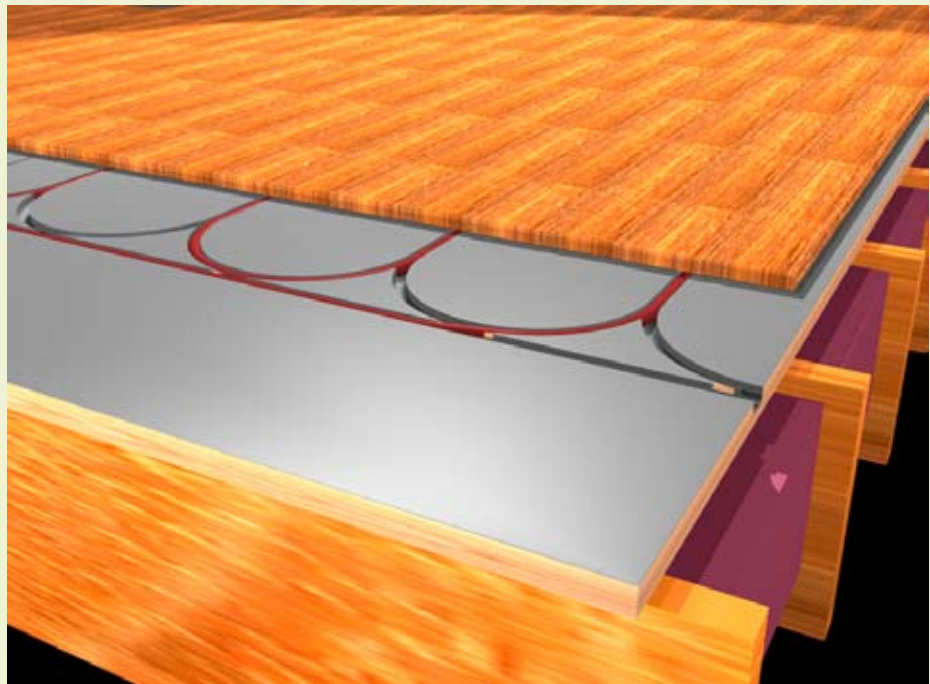
Information Sources

> Advanced Buildings
www.advancedbuildings.org

> Case Study: Schenectady Habitat for Humanity Home: Schenectady, N.Y.
www.toolbase.org/FieldEvaluations

> Radiant Panel Association
www.radiantpanelassociation.org

> U.S. Department of Energy's Energy Efficiency and Renewable Energy
www.eere.energy.gov/consumer/your_home/space_heating_cooling/index.cfm/mytopic=12590



installed beneath a finished floor without material poured over the tubing. Several manufacturers offer dry radiant systems that position radiant floor tubing above floor, between two layers of plywood, or below floor under the subfloor. Hydronic radiant floor systems pump heated water through tubing positioned in loops beneath the finished floor. The heated water flowing through the tubes heats the surrounding air and flooring material. The floor emits energy as a result of its temperature.

Above-floor systems are installed above the subfloor and below the finished floor. These systems use a grooved wood panel installed beneath the finished floor. The dimensions of the panels may vary depending on manufacturer. Cross-linked polyethylene tubing (PEX) is inserted in the grooves of the panels and sets flush with the panel surface. Manufacturers claim their panels work under a variety of floor coverings: tile, vinyl, wood, and carpeting.

Below-floor systems are installed under the subfloor. These systems include attaching the PEX tubing to the bottom of the subfloor or suspending the tubing from the subfloor. This system is popular for retrofits and is less costly to install than the above floor systems. Below floor systems require a higher source temperature to

Several manufacturers, including Warmboard, whose product is detailed here, offer dry radiant systems that position radiant floor tubing above the floor, between two layers of plywood, or below the floor under the subfloor.

perform equivalently to an above-floor system.

An above-floor system uses 7" x 48" x 1/2" or 10" x 48" x 1/2" panel. These panels can be purchased individually or accordion-style. Accordion-style is six panels of desired width adhered together with fiber tape, which unfolds to cover a larger surface area. This floor system is grooved for 5/16-inch PEX tubing, and panel bottoms are covered with aluminum. And, 180-degree return panels are available in 7" and 10" widths.

Another system is considered to have a dual-function panel. This panel offers the structural requirements of a subfloor diaphragm in conventional construction, as well as a radiant floor heating system. The 4" x 8" x 11/8" engineered Comply panel is tongue-and-groove. It has a top surface with a modular groove pattern 12" on center. The panel is designed for 1/2" PEX tubing. A sheet of .025" thick alloy aluminum that contours with the groove pattern is permanently bonded to the surface. These panels come in three variations, panels with straight grooves, 90-degree or 180-degree turns.

PRODUCT SOURCES

> Rehau
<http://na.rehau.com/construction/index.shtml>

> Roth
www.roth-usa.com/usa

> Uponor
www.uponor-usa.com

> Viega
www.viega-na.com

> Warmboard
www.warmboard.com

> Watts Radiant
www.wattsradiant.com



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CASE STUDY

A Habitat for Humanity home in Schenectady, N.Y., a 1,344-square-foot, two-story house built on a basement.

MECHANICALS

Two-zone radiant floor heating with a sealed combustion, natural gas furnace and conventional, hard-ducted forced air heating and cooling. All ducts within conditioned space and heating equipment are located in semi-conditioned basement.

SIGNIFICANT RESULTS

> Occupants preferred the comfort of the radiant heating system.

> It was extremely difficult to find a small-capacity, high-efficiency, moderately priced boiler or furnace for a tightly-constructed, energy-efficient home.

> A cast-iron boiler in combination with a dry hydronic heating system is more sensitive to oversizing than a furnace in a ducted, forced-air heating system.

> There was no significant difference in energy consumption between the two heating systems when the data was normalized to adjust for the different operating efficiencies of the systems and basement temperatures.

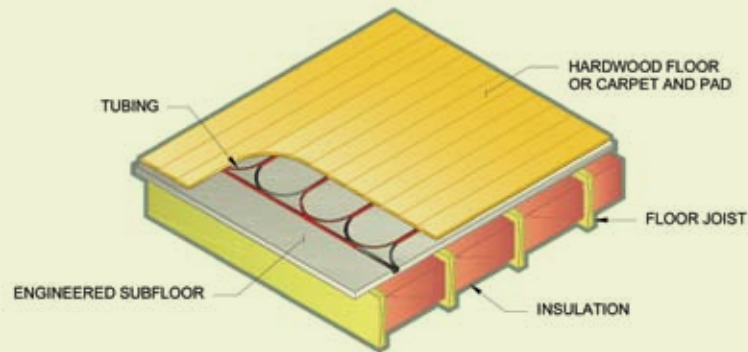
> The installed cost of the radiant floor system was nearly double that of the forced air heating system.

> Temperature distribution throughout the home was more uniform with the radiant heating system than with the forced air heating system. Evaluating daily average temperatures taken at 8 locations, on average, the difference between the maximum and minimum was 3 F for the radiant system. For the forced air system, the difference was 6 F.

Bio

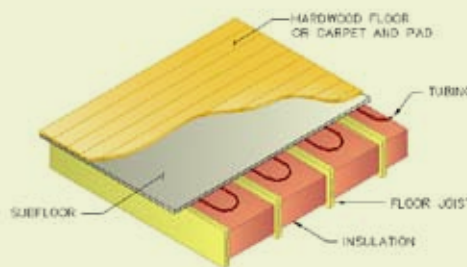
Research data was provided by the NAHB Research Center in Upper Marlboro, Md., a resource for technical information on building products, materials, and technologies (www.toolbase.org).

Engineered Subfloor



These isometric views show different installation methods for dry mount radiant systems.

Hanging in joist space



Staple-up

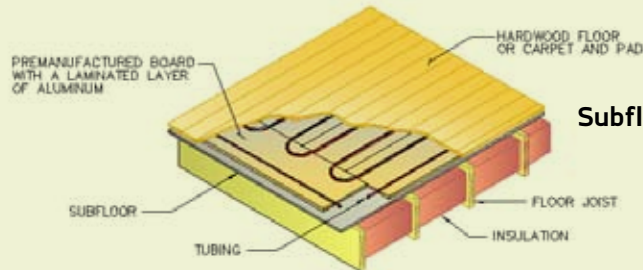
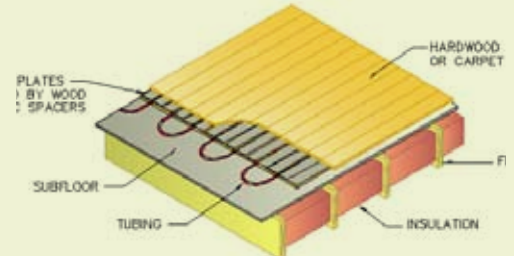


IMAGE COURTESY OF RADIANT PANEL ASSOCIATION

Installation

Panels should be attached to the subfloor using approximately 10 screws per panel. A bead of caulk should be placed in the grooves before the tubing is installed. The tubing is laid in the grooves and pressed down flush with the surface of the panel.

The dual function panel is suitable for joists spaced at 12", 16", 19.2", and 24" increments. Manufacturer recommendations include screwing and fastening adhesive when installing the panel. An elastomeric bonding material is placed in the grooves before tube installation. The tube is pressed into the groove flush with the surface of the panel. There are two common below floor installation procedures.

The first installation is inserting the PEX tubing in a grooved aluminum sheet. The

aluminum sheet with the tubing is attached to the bottom of the subfloor with staples. The second installation procedure requires hanging the PEX tubing several inches beneath the subfloor. Insulation is installed beneath the tube with a 2" to 4" air space between the top of the insulation and the bottom of the subfloor.

These below-floor systems require drilling holes in the floor joists for the tubing to pass through. Floor thermostats control many radiant floor systems. Some systems are designed to constantly circulate water through the pipes while the thermostat controls the burner. Other systems regulate the flow of hot water through each loop using zoning valves to control room temperatures.

See diagrams above to understand the various options for radiant flooring. GB

ENERGY INTENSITY OF TRAVEL METHODS

Vehicle Type	Load (persons per vehicle)	Energy Use*	Energy Intensity#
Cars	1.6	5,489	3,496
Personal trucks	1.7	7,447	4,329
Taxi and van	1	14,952	14,301
Vanpool	6.4	8,226	1,294
Bus	8.7	38,275	4,318
Airline	90.4	358,000	3,959
Rail (Amtrak)	17.9	51,948	2,760
Rail (light and heavy)	22.4	70,170	2,750
Rail (commuter)	32.9	91,525	2,569

* BTU/vehicle-mile

BTU/pass-mile

Source: U.S. Department of Transportation—Transportation Energy Data Book (2004 data)

People Movers

Alternatives to automobiles belong in every green builder's planning process. **By Matthew Power**

Americans burn more than 20 billion gallons of gasoline in their cars and light trucks each year. What does that have to do with green building? Plenty. An energy-efficient home built in a walkable development or location close to transit delivers a quantum leap in energy economy for homeowners.

Researchers refer to the way people get around as transit "modes." But unlike building in the 'burbs, where cars are often the only realistic travel option, planning housing near bus or rail requires an understanding of how people view ways of getting around.

"The second [most popular] mode after cars isn't transit. It's walking," notes Reid Ewing, a research professor with the National Center for Smart Growth at the University of Maryland, in College Park. "If you look at all modes, walking's share is 9 percent, and transit is 2 percent. People actually like to walk, if you provide them with the right environment. They don't have that same attitude towards transit, which is seen as more utilitarian."

In metro areas such as Los Angeles, transit's share tends to be higher, reaching almost 5 percent. Is transit's piece of the pie growing nationally? Yes, modestly, according to the National Center for Smart Growth, but

the pace of that growth is affected by how nearby neighborhoods are planned.

Trains and buses, like other means of transportation, require a minimum number of riders to economize energy use and reduce pollution. (See "Energy Intensity of Travel Methods," above). Only walking and biking offer energy savings that are not dependent on the number of people traveling.

Planning Principles

What constitutes good planning? The integration of key variables such as density, house orientation, and street layout. Walking should come first, planners say, because a transit hub that can be reached on foot delivers the best energy-saving and traffic-reducing bang for the buck.

"We tend to talk about a quarter-mile being the distance people will walk to transit," notes Kelly Clifton, associate professor of urban studies and planning at the University of Maryland. "But that's a poor rule, because it depends on what the environment looks like. You want good pedestrian infrastructure—sidewalks, alternative routes to major arterial roads, gridded street networks. For it to work, pedestrians should have a lot of options."

Ewing also acknowledges that getting people

What Gas Prices Tell Us

Will rising automobile fuel costs change people's willingness to consider alternate transit modes?

Researchers have studied the "elasticity" of travel and gasoline during previous oil hikes, indexing vehicle miles traveled (VMT) to price per gallon of auto fuel. Their findings: "Over the short term, if you double the price of gas, you get a 10 percent reduction in vehicle miles traveled," says Reid Ewing of the National Smart Growth Center at the University of Maryland. "If that price stays at double over the long term, you might see a 30 percent reduction."

But this rule is not hard and fast, and times have changed since the 1980s, when the best data was collected. "Now there's a debate about whether people are less responsive than they once were to fuel prices," Ewing says. "In recent years, when VMT has dropped off, it returns pretty rapidly to the original level (of miles traveled)."

Reconnecting America, a pro-transit group in Oakland, Calif., concurs, noting that VMT in most parts of the country (except Portland) has increased at three times the pace of population since the 1980s. They blame increased vehicle use on sprawling development patterns.

Resources

> **Reconnecting America**
www.reconnectingamerica.org

> **National Center for Smart Growth**
www.smartgrowth.umd.edu

> **Original Report**
"Growing Cooler: The Evidence on Urban Development and Climate Change"
www.smartgrowthamerica.org/gcindex.html

Transportation Modes: The D Variables

Researchers have developed a short list of the features that encourage walking or traveling by transit. The highest transit use happens when nearby residents can walk easily to the station.

Density. For transit such as light rail or bus lines, optimal density is about 12 units per acre. But walkability is viable at much lower, near-suburban densities.

Diversity. A variety of land uses contributes to walkability, such as when homes face the street and connect to usable sidewalks.

Destination accessibility. How many jobs, restaurants, and shops can residents reach on foot or by transit, not just in the neighborhood, but regionally?

Distance to transit. Research suggests that people will walk about a quarter mile, on average, to use mass transit, and that they will walk farther for rail access than for bus. But they may walk up to a mile if the route is pedestrian-friendly.

Development scale. The size of the community impacts the amount of walking or likely transit use.

Demographics. Income and social status impact all aspects of transportation. Less affluent owners are more likely to own only one car, for example, and are more likely to use bus than rail.

Source: National Center for Smart Growth

to use transit is not easy, but it can be done with thoughtful planning. (See “Transportation Modes: The D Variables,” left). For example, a 1995 study found a “modal shift” of 25 percent from motorized to non-motorized modes of travel in communities built using new urbanist principles (versus conventional planning). In other words, people in these communities drive less than their counterparts in traditional suburbs, choosing to travel by foot or bike instead. (Many new urbanist principles overlap with transit-oriented design guidelines.)

Get on Board With Transit

Given the modest gains in transit use in recent years, should green builders rush to develop transit-oriented, walkable sites?

Yes, says Ewing, who believes builders have three good reasons to get in the business of transit-oriented homes. First, they’ll be building in locations where the demand for homes is likely to be strong, even in a down economy or slow housing market. Second, new urbanism and its pedestrian-friendly approach is no temporary trend; the design philosophy is now influencing zoning and subdivision regulations nationwide. Third, serious concerns about climate change are gaining ground.

“The driver for planning and development will be climate change,” Ewing says. “The science is solid. There’s no reason to doubt any more that we are warming as a planet and the consequences will be catastrophic if we don’t change what we’re doing.”^{GB}

Walking: What’s in the Way?

Some urban planners have inventoried the helps and hindrances to walking or biking. They call these the “Pedestrian Level of Service” (LOS), and the Bicycle LOS. Their goal? To smooth the way for more people-powered transportation in the future. Here are the items they evaluate to determine an area’s suitability for bikers and walkers.

- > Number of through travel lanes
- > Lane configuration (divided, undivided, one way, center turn lane)
- > Posted speed limit
- > Width of outside travel lane
- > Width of paved shoulder
- > Width of bicycle lane
- > Presence of on-street parking
- > Pavement condition of travel lane
- > Buffer width between curbface and sidewalk
- > Width of sidewalk
- > Spacing of street trees along the roadway
- > Roadside profile (a rated area on the side of the roadway on how easy it would be to construct a sidewalk or path)

Source: Pedestrian and Bicycle Data Collection in the United States 2005. U.S. Department of Transportation

For more information: www.pedbikeinfo.org/pdf/casestudies/PBIC_Data_Collection_Case_Studies.pdf

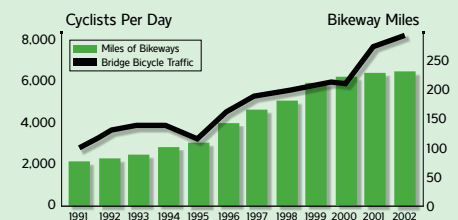
Time for a Bike Ride

Bicycle usage in the United States remains far below that of many European and Asian countries. In the Netherlands, for example, the government encourages bicycling and discourages automobile usage, so more than 28 percent of people ride bikes to work. And Paris’s new “Velib” (for “bicycle freedom”) rental bicycle program helped the city keep moving during a recent transit strike. Interest in bike transportation is growing in the United States, though, and many city planners now include bike path dollars in their infrastructure budgets.

This analysis of bicycle usage conducted in Portland, Ore., shows how public extension of available bikeways was accompanied by a 190 percent rise in bicycle use over 10 years.

Source: City of Portland, Ore.; U.S. Department of Transportation

Portland Goes For a Spin





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Door to Door

Energy Star-rated and reclaimed wood entry doors could seal the deal with your next customer. **By Tracy Fox**

The moment I saw the understated elegance of the arched rustic front doors with their distinct iron detailing, I knew I'd found the perfect home. Front doors enhance a home's curb appeal and make a big first impression on home buyers. It turns out that doors play a key role in energy effi-

ciency as well. Exterior doors account for 11 percent of a home's total air leakage, according to government statistics.

Doors made from steel and fiberglass usually have foam cores, which make them highly durable and energy efficient. Energy Star-rated doors include the entire entryway system, not just the door slab or glass. They are divided into four climate zones and labeled by the National



Fenestration Council for solar heat gain coefficient (SHGC) and U-factor.

Wood doors are a lower embodied energy product (which means they use less energy in the extraction of natural resources and manufacturing process) though they are not typically the best choice for energy efficiency.

Green builders will want to consider low-VOC highly durable stains and finishes for unfinished doors. (For more information, see "Super Shields," *Green Builder*, August 2007, page 65.)

Steel Strength

Jeld-Wen's line of steel entrance doors are constructed with custom-fitted polystyrene cores that lead to this product's Energy Star-rating. The entryway system can be Miami-Dade County-code approved for hurricane zones in addition to Energy Star rated when used with the proper components. Several door and sidelight designs are available, including a six-panel door with glass insert (shown). 877.535.3462 www.jeld-wen.com

Old World Doors

Albany Woodworks' handcrafted solid wood entryway systems and interior doors are available in reclaimed heart pine and heart cypress last felled in the 1920s. The manufacturer provides unfinished slab or prehung doors in a wide variety of architectural styles. Durable low-VOC paints and stains can be specified. 800.551.1282 www.albanywoodworks.com



Knock on Wood

Humabuilt Wheatcore Doors are made from rapidly renewable resources and are available in a wide selection of premium-grade veneers. According to the manufacturer, Humabuilt Healthy Building Systems, the doors are free of synthetic formaldehyde and are manufactured with low-VOC water-based adhesives and recessed lag bolts to secure stiles and rails. 541.488.0931 www.humabuilt.com

Rescued Wood

Avision manufactures reclaimed wood doors in a variety of designs primarily made from aging barns in the Pacific Northwest. The doors, which can be custom-ordered in any size and thickness, are made in Nampa, Idaho. Avision will ship anywhere in the country and will order FSC-certified and other types of lumber upon request. 208.412.7823 www.avisionllc.com



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Quick Time

ICI Paints Wonder-Pure zero-VOC odor-free interior latex paint includes a primer, flat, eggshell, and semi-gloss product. The interior flat finish provides a dry time of two hours, touch up in 30–60 minutes, and no-sanding adhesion properties, according to the manufacturer. Contractor and architect links can be found on homepage. 866.391.1955 www.devoepaint.com



Clear the Air

High-quality water-based latex paints with low toxicity maximize performance while minimizing harm to the environment and your health.

By Tracy Fox

The chemicals in some materials make them anything but green. One such product is conventional paint, which is full of harmful chemicals, including VOCs and fungicides. While the EPA regulations define volatile organic compounds as those that react to sunlight to generate smog, paints labeled as

“low-VOC” can contain non-photoreactive organic compounds, which are toxic and have serious health and environmental impacts.

Greener paint products are widely available online and through local distributors. These include water-based latex paints and nonconventional products such as milk paints.

According to the Responsible Purchasing Guide for Paint (www.responsiblepurchasing.org), the reported VOC content of a paint product is based

on white or non-tinted paint. The addition of tinters and colorants to achieve deeper colors may negate the benefits of using a low-VOC product in some paint lines. For example, using 15 ounces of the average tinter adds 180 g/l of VOCs.

Greener paint options can be found through third-party environmental certifiers, but standards vary for VOC-content limits and other hazardous compounds, making it worthwhile to review each certifier’s standard and the manufacturer’s Material Safety Data Sheet.

Visual Virtues



PPG Architectural Finishes Pure Performance zero-VOC interior latex paint is Green Seal-certified and offers a home builder support program and painter tools and resources. Pure Performance latex interior eggshell and semi-gloss are also certified by the Master Painters Institute under Green Performance Standard Products. 888.774.7732 www.ppgaf.com

Light of Day

Yolo Colorhouse recently introduced Outside, a new high-performance, zero-VOC Green Seal-certified exterior paint. According to the manufacturer, each ingredient was screened against green qualifiers, including the impact on human and environmental health. Available in 36 colors and three sheens, Outside is packaged in 100% recycled plastic quarts and gallons. The company currently has more than a dozen centralized warehouse hubs throughout the country. 877.493.8275 www.yolocolorhouse.com



Green Guards



were originally developed by the polymer scientists at the University of Mississippi for the U.S. Department of Defense and meet the performance standards of the Master Painters Institute. American Pride Paints are Green Seal-certified zero-VOC and are free from suspected carcinogens, according to the manufacturer. 888.714.9422 www.americanpridepaint.com
To order online: www.safepaint.net

Resources

- Green Seal www.greenseal.org
- GreenGuard Environmental Institute www.greenguard.org
- Scientific Certification Systems www.sccertified.com
- Master Painters Institute www.paintinfo.com
- GreenSpec Directory www.buildinggreen.com
- Responsible Purchasing Guide for Paint www.responsiblepurchasing.org

> For recycled content latex paint standards:
Green Seal www.greenseal.org
EcoLogo www.environmentalchoice.com

The One Word for Land Development Resources:

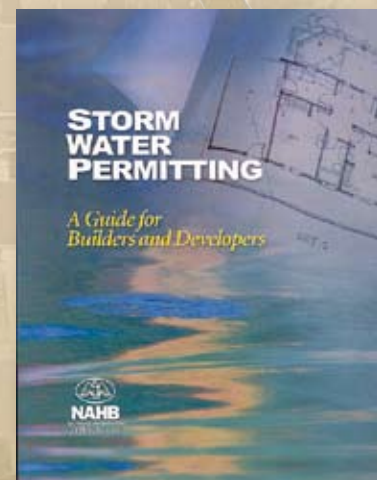
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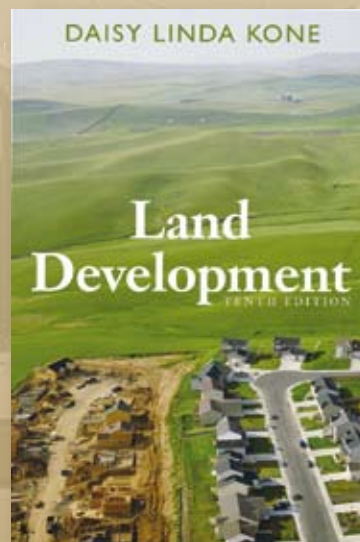
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Good News

GreenFiber cellulose insulation is made from 85% recycled content, including post-consumer newspaper and post-industrial paper. According to manufacturer US GreenFiber, no toxic air emissions are released during the manufacturing process. The product is damp sprayed, effectively sealing cavity spaces, and must be installed at its predicted settled density to achieve its R-value of 3.7 per inch. 800.228.0024 www.greenfiber.com



Big Swell

Biobased Systems' Biobased 501 Insulation is an open-cell spray foam product that is made from soybean oil, a rapidly renewable resource, and emits no VOCs or CFCs. Biobased 501 is installed by certified installers and expands to 100 times its original liquid size, conforming to and filling cavities. Its R-value of 3.83 per inch does not diminish over time, according to the manufacturer. 800.803.5189 www.biobased.net



True Blue

Bonded Logic UltraTouch Insulation is now available in 8"-thick R-30 batts made from post-industrial recycled denim and cotton fibers. The product causes no skin irritation and is made without fiberglass and contains no formaldehyde-based binders. The product is Class-A fire rated and is treated with an EPA-registered fungal inhibitor, according to the manufacturer. 480.812.9114 www.bondedlogic.com



Material Matters

Inspired insulation options provide builders with the chance to upsell to buyers who want to save on energy costs. **By Tracy Fox**

Have you noticed the demand for high-performance insulation products is growing? Global warming is one good reason—the average home is responsible for twice the amount of greenhouse gases as the average car—but home buyers also respond to financial reality. Given the

information that nearly half the monthly energy bill for a typical home is spent on heating and cooling, according to the U.S. Department of Energy, your home buyers will be more motivated to upgrade their insulation options once they know the benefits. A well-insulated home provides a continued payback.

Builders interested in going a deeper shade of green can incorporate insulation products now available with green features, including those

with recycled-content and reduced off-gassing, and loose-fill products with non-ozone depleting blowing agents. We've covered just a few below, so when evaluating an insulation product with or without green attributes, look for long-term performance data, R-value, moisture content (products that use water for installation), and health and safety testing. (For more information on insulation, see "Barriers to Entry," *Green Builder*, September 2007, page 32.) GB

It's a Wrap

Johns Manville Corp.'s ComfortTherm formaldehyde-free fiberglass insulation is completely wrapped in plastic (as opposed to the more traditional kraft paper-faced product) to provide a more comfortable installation process. Builders may specify non-vapor or vapor-retarder option depending on the climate or building code.

R-values range from 11 to 38 for this product, which is available in batts or rolls. ComfortTherm contains 20% post-consumer and 5% post-industrial recycled glass. 800.654.3103 www.jm-builder.com



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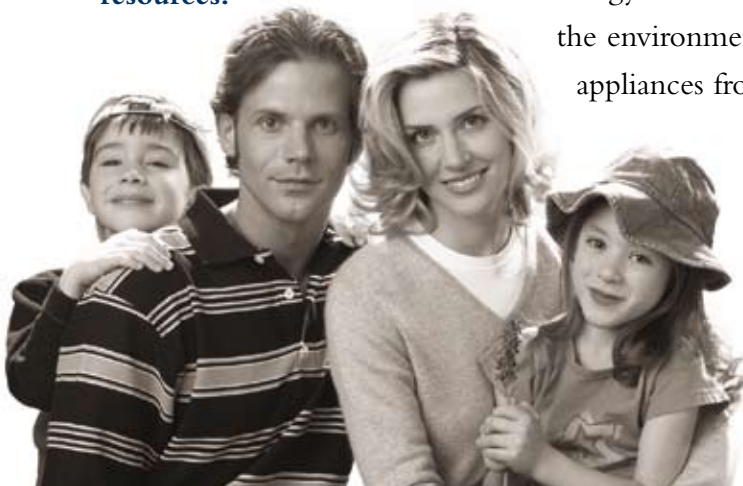
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POWERFUL BRANDS • INNOVATIVE PRODUCTS
CONSUMER INSIGHT • TARGETED SERVICES

Sustainable Work



Craig Flynn
President and CEO
Windsor Mill

Q: Describe your company's approach to sustainability.

A: 100 percent proactive, from source to sales. We've made the investment to vertically integrate ourselves, thereby giving us complete control of the manufacture of WindsorONE; from the timber harvest of sustainable tree stands, to recycling and energy conservation at all levels of plant manufacture.

Q: What are your company's sustainable products?

A: Raw material for all of our products is harvested from sustainably grown timber stands. WindsorONE S4SSE boards are smooth on all sides, while S1S2E boards feature reversible, rough sawn, and smooth surfaces. Our moldings collection consists of four historically accurate styles and includes rich, detailed profiles not found in many of today's moldings. All of our products meet LEED certification requirements and have a gold indoor air quality rating.

Q: When did you introduce them?

A: Windsor Mill was founded in 1972. Since this time, we have been a producer of high-quality trim boards and moldings.

Q: Why were you motivated to do so?

A: We saw a market in need of high-quality trim boards and moldings. Because of our focus on quality, we have been able to eliminate many issues our customers may have experienced, such as claims and callbacks, with other products.

Q: What do you see as sustainable opportunities in the future?

A: In the future, we see ourselves taking a bigger role in responsible forestry management by owning a larger portion of the timber stands from which we procure our lumber.

Q: How does Windsor Mill support sustainability in other ways?

A: The process we use to manufacture also is environmentally responsible. We ensure all materials are controlled to reduce, reuse and recycle waste. The plastic packaging we use to wrap the boards for delivery is collected and sold to exterior decking manufacturers; the packing straps for pallets are reused in the plant; and all sawdust and shavings are recycled to be used as bedding for household pets.

American Clay

American Clay uses natural clays, recycled and reclaimed aggregates, and vibrant natural pigments in three finishes to create environmentally conscious surfaces.
www.americanclay.com
page 15

Arch Wood Protection, a subsidiary of Arch Chemicals

Arch works with its parent company to produce treated wood products for construction use.
www.wolmanizedwood.com
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GMC

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Green Builder College

Want to learn even more about green building? Get online with Green Builder College, an exciting new educational opportunity with workshops, Web casts, and more to help you build high-performance and energy-efficient homes.
<http://greenbuildercollege.com>
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Henkel

Henkel produces adhesives, sealants, and surface treatments for consumers and craftsmen.
www.henkel.com
page 1

International Builders Show

Register now to attend the biggest home building gathering in the country, which will be Feb. 13-16, 2008, in Orlando, Fla.
www.buildershow.com
page 16

NAHB Green Building Conference

Mark your calendars for this conference, scheduled for May 11-13, 2008, in New Orleans.
www.nahb.org
page 14

NAHB's National Green Building Program

Make your homes greener and more energy-efficient with NAHB's National Green Building Program.
www.nahb.org/greenbuildingprogram
page 55

New Society Publishers

The New Society publishes books on ecology and more.
www.newsociety.com
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Nisus Corp.

Nisus provides environmentally friendly pest control products.
www.nisuscorp.com
page 20

Premier Building Systems

Premier Building Systems manufactures structural insulated panels (SIPs).
www.pbssips.com
page 3

Propane Council

This group provides information on using propane in the home.
www.usepropane.com
page 19

Sealection 500

DEMILEC USA produces Sealection 500, a spray foam insulation.
www.sealection500.com
page 17

Sherwin-Williams

Sherwin-Williams manufactures interior and exterior coatings and paints, including the zero-VOC Harmony and low-VOC Duration Home paints.
www.sherwin-williams.com/pro/
page 5

Superior Walls

Superior Walls offers precast concrete walls and energy-efficient construction building material for dry basements and residential homes.
www.superiorwalls.com
page C4

Titebond

The Titebond GREENchoice Adhesive line includes construction adhesives, wood glues, flooring adhesives, caulks and sealants, and specialty adhesives
www.titebondgreenchoice.com
page 10

Velux

Velux produces skylights, solar panels, and more.
www.velux.com
page 13

Vinyl Siding Institute

The Vinyl Siding Institute is the trade association for manufacturers of vinyl and other polymeric siding and suppliers to the industry.
www.vinylsiding.org
page 7

Whirlpool

Whirlpool offers appliances for kitchen, laundry and whole home use.
www.whirlpool.com
page 61

Windsor Mill

Windsor Mill manufactures high-quality specialty lumber, molding, and millwork.
www.windsorone.com
page 9

CertainTeed WeatherBoards™ FiberCement Siding features a new "green" proprietary, patented formula that creates a



lighter-weight, lower-density product with authentic-looking grains and textures. It contains more than 30% post industrial recycled material, which makes WeatherBoards environmentally sound and sustainable. Lighter boards mean faster installations and better handling on the jobsite. Its recycled content can also help contribute toward LEED and NAHB credits.

Call 800-233-8990 or visit ctfibercement.com for more information.

CertainTeed 

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FiberCement Siding

Introduced in 2006, Leaf is an LED (light emitting diode) table-top light—a result of collaborative engineering and design development between Herman Miller and Yves Behar's San Francisco-based studio, fuseproject.



Leaf's design allows the user to choose the intensity and color of light. Its LEDs consume less than eight to nine watts of power, carry a lifespan of over 60,000 hours, and cut energy use by 40 percent compared to a 13-watt compact fluorescent bulb.

Visit www.hermanmiller.com for more details.

 **Herman Miller**

Raw materials for WindsorONE™ wood trim boards and moldings are harvested from plantation grown, sustainable timber stands.



The Moldings Collection reflects rich, detailed profiles not found in many of today's moldings.

WindsorONE S4SSE boards are smooth on all sides, while S1S2E boards feature reversible, rough sawn and smooth surfaces. Because the health of the home is important, WindsorONE triple-primed boards have low VOCs and a Gold Indoor Air Quality rating, making them perfect for all interior and exterior trim projects.

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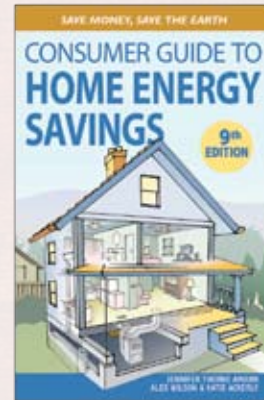


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FROM THE TAILGATE

Sage advice from the trenches

By Ron Jones

Year of the Crane

On a recent trip from the Pacific Northwest, I flew north of the Great Salt Lake and its namesake city as the setting sun slipped behind the western horizon, leaving a stain on the lower levels of the atmosphere that ranged in fiery tones from raspberry to pale salmon.

The colors reflected on the lake in a blaze of orange-red, and I was lost in the beauty, until I remembered that the source of those lovely hues is found in the air pollution that now practically encircles the entire Northern Hemisphere.

It made me think of China, where I recently had spoken at a Green Building Forum presented by the International Housing Association and the China Real Estate Chamber of Commerce.

The Beijing event had been enlightening and enjoyable, but my most powerful memories of China are the images of air so thick with pollution that, even from my sixteenth-floor hotel room, the visibility was usually less than a quarter-mile in any direction. I saw miles and miles of traffic on Beijing's streets and highways, and massive construction projects surrounded me everywhere I went in this city of more than 16 million people.

According to the traditional Chinese calendar, this is the year of the boar, but it must also be the decade of the crane, or rather, the construction crane. Towering cantilever cranes defined the Beijing skyline during my visit, a reminder of the



work happening as China rushes toward the opening of the 2008 Summer Olympic Games and the rest of the 21st century.

I do wonder how the alarming condition of the air in China will affect the performance and health of the athletes, not to mention the millions of Chinese who navigate through that toxic soup 365 days a year. It makes me think of the long-forgotten lyrics from a Cat Stevens song: "Tell me, where do the children play?"

As I understand it, Beijing's continuous band of brown air is largely the result of emissions from internal combustion engines and coal-fired plants generating electricity, about three-fourths of which is consumed in buildings ... including homes such as the ones we build.

China isn't the only place in the world with air-quality issues, though.

I have read that trout that live high in the American Rockies can no longer reproduce naturally because the runoff

from melted snow contains more pollutants than the fish can tolerate. I have a photo (taken from an airplane window) of a remote region of the Himalayas that clearly shows a brown cloud from horizon to horizon. Global winds circumnavigate the earth, carrying the eruptions of Mount St. Helens and Krakatoa, clouds of wood smoke from wildfires, airborne dust from desert storms in the Sahara and Gobi, and acid rain from human activities.

While the automotive and aircraft industries are endlessly researching and developing alternative technologies and fuels aimed at environmental improvement while maintaining the personal mobility we all rely upon, I truly believe that the next real frontier in environmental stewardship has opened to those of us who design, construct, and operate buildings. We, more than anyone else, may hold the answer to where the children will play. GB

James Kealey

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