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GreenBuilding2016-17

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Welcome to the directory

What you hold is a tool for education, outreach and growth of the green building industry in Western North Carolina. Through a partnership between WNC Green Building Council and The Smoky Mountain News, we offer this free resource on green building to the public and building professionals. The articles in the publication span the range of very technical to the very basics and provide you keys to successfully reducing energy and water use, improving indoor air quality, choosing the best materials, and being a steward of your home site.

For those of you ready to either build a new green home or green your existing home, the business listings will connect you with the many great local companies that are greening Western North Carolina each day. To prevent green washing, as much as possible, all businesses must meet minimum criteria to be listed in this guide and all are members of the WNCGBC.

Over the past 15 years, the WNC Green Building Council has made incredible strides in expanding the know-how of green building in our region through the certification of more than 1,450 new homes, organizing more durable, and healthier to live in, than their traditional neighbors, and the planning and individual members’ continued support. We hope that you find the Green Building Directory a valuable resource and support its continued publication through membership with the WNCGBC.

Your home or buying or selling a house, consider our Green Gaage Assessment tool. As a membership-supported nonprofit organization, the WNCGBC is here to serve the community thanks to our business and individual members’ continued support. We hope that you will connect with your home site.

We are an organization of people who care about where we live, in our homes, neighborhoods, and the planet. Founded in 2001 by a group of building professionals who wanted to craft homes that were easier on the environment, had lower utility costs, were more durable, and healthier to live in, the WNCGBC continues to serve our region with sustainability programs and education. We are accomplishing our mission to increase sustainability in the built environment through community education, measurable standards, and regional action by building a network of engaged building professionals and citizens who desire to have healthy homes, successful businesses, and participate in the movement of sustainability.

We are currently working on: • Expanding Green Built NC and LEED for Homes: With more than 1,450 certified homes and counting, these successful programs are being used by builders of affordable and market-rate housing throughout the region and state. • Implementing Green Gaage: Green Gaage helps existing homes go green by showing how a home can improve energy and water efficiency, indoor air quality, the use of green materials, and a sustainable site. • Revising Appalachian Offsets: This local solution to global pollution allows residents and businesses to offset their carbon footprint while supporting affordable housing and nonprofit organizations through energy efficiency upgrades. • Running the Living Building Challenge Design Competition beginning in September 2016.

How to use the Guide:
This Directory has something for everyone. Inside, you will find case studies of specific regional projects, feature articles on a variety of themes in green living, and technical articles on emerging technologies for professionals. In the back of the Directory, you will find a vast directory of local green businesses that are there to help you live a more sustainable life. There are specific requirements for many of the business categories in an effort to keep high standards and provide a truly valuable resource.

Of course, the Directory — both current and archived articles from past issues — is always available online at www.wncgbc.org.

Sister best in growing in popularity in the region. Thanks to all local businesses and professionals that are making Western North Carolina a truly valuable resource.

Sam Ruark-Eastes, Director WNCGBC

Who is the WNCGBC?

We are an organization of people who care about where we live, in our homes, neighborhoods, and the planet. Founded in 2001 by a group of building professionals who wanted to craft homes that were easier on the environment, had lower utility costs, were more durable, and healthier to live in, the WNCGBC continues to serve our region with sustainability programs and education. We are accomplishing our mission to increase sustainability in the built environment through community education, measurable standards, and regional action by building a network of engaged building professionals and citizens who desire to have healthy homes, successful businesses, and participate in the movement of sustainability.

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Sam Ruark-Eastes, Director WNCGBC

Year in Review Accomplishments of the WNCGBC:
• Hired a new Executive Director
• 148 Green Built Certifications
• 186 LEED for Homes certifications
• 9 Green Gaage assessments
• Net Zero Energy certification and Green Built Version 2 launched
• Obtained $25,000 in grant funding to relaunch Appalachian Offsets
• Obtained $9,000 from the Blue Ridge Sustainability Institute for Green Gauge marketing
• Partner of GDCC to deliver Home Energy Score throughout North Carolina
• Trained 51 Assessors in Home Energy Score
• Exhibited at four trade shows (Home garden and green living show, Build and Remodel Show, IBBA Trade show, Mother Earth News Fair)
• Two Building Green Real Estate Classes
• Quarterly classes with On Track Financial to help homeowners save money and energy
• Joined the Energy Innovation Task Force with City, County, Duke, and nonprofit, educational, and business leaders
• Annual Membership Appreciation Party at Highland Brewing
• Green Homes Tour
• 25,000 copies of the Directory distributed
• Hosted our third Annual Ciderfest for 800 attendees
• Producing high quality educational workshops and trainings.
• Providing educational resources through this directory, our website and hotline.
• Promoting green building professionals and sustainability businesses to the community.
• Throwing CiderFest, a fun-filled fundraiser celebrating our local community (this year October 15, 2016, at Salvage Station).

Thank you to our members for all the hard work you do for the community. We hope this year’s guide will be a valuable tool for the residents of Western North Carolina.
Green communities emerge in WNC

Creating the world you envision

By Garrett K. Woodward

In Western North Carolina, the green-built movement has transitioned from scattered dots of sustainable construction into pockets of sincere interest and activity, with the scene itself shifting into its next phase of operation – green communities.

“Not about the biggest house you can build, it’s about building a thoughtful home – making all of these small changes in hopes of creating a large impact,” said Lesley Groetsch. “How do you get people the maximum energy-efficiency benefits with the smallest investment? Because, frankly, people are about the bottom line.”

Groetsch is the director of sales and marketing for Olivette, a 346-acre planned community right outside downtown Asheville along the French Broad River. With the first of 40 homes to break ground later this year, the “greenhood” property is where sustainability and livability intersect.

“There’s a desire and a will within this community to propel us forward,” Groetsch said. “There are a lot of options now. You can build that sustainable dream house of yours, with all kinds of these different aspects available to meet or exceed rating standards to achieve net zero – the tool box is big these days.”

Within Olivette, there are solar energy and geothermal heating/cooling initiatives, which complement the physical features of edible landscapes, local grown produce and sustainable building practices. That sentiment is something Barry Byrne shares too.

“You realize we need to do something different,” he said. “It’s solar and wind energy. It’s keeping as many trees on the property as possible. It’s being responsible with your water and the land itself, and not destroying the land like other commercial developments do.”

Owner and developer of Mountain Meadows, a 58-acre green community in Mars Hill, Byrne is all about working with the contours of the land, something that’s at the heart of the green communities movement.

“I walked the land, and I listened to the land,” he said. “It’s making that real connection to the earth, to the soil and your surroundings. The ‘greening of America’ was an overall concept, not only for homes, but also about recycling and also treating each other well.”

Within the 28 lots on the Mountain Meadows project, nine are already sold. The infrastructure is complete and one house has been built, as that number will steadily increase over the next year. For Olivette, the mountain village already has a 46-acre working farm at its core, which features an array of produce, vegetables, flowers and bees, something that sits inline with the project’s values and mission.

“We recognize you can’t just give lip service about localizing our food source,” Groetsch said. “And what’s really resonating with our homeowners is the farm, having access to food virtually grown in their backyard, having access to a farmer with our community garden, who also serves as an advisor to community members setting up their own gardens.”

That keen attention to detail, with food and with community connections between neighbors, is something that speaks to Byrne, who himself grew up on a working farm in small-town Iowa.

“It’s about eating real food,” he said. “Everything changed in the 1960s and 1970s when it comes to how food was grown and gathered. It went from the fields to the factories, and now we’re turning that practice back around.”

In terms of green building, Mountain Meadows requires its homeowners to stick within the Green Built NC guidelines, whereas Olivette looks to residents to hit a HERS rating of 55 or lower.

“And we let the homeowners work with their builder to get to that HERS rating,” Groetsch said. “Instead of one way or option to build, we let the homeowners decide what path is best, and what path they’d like to create, to get to that rating.”

But, with all of the interest in green building and communities in Western North Carolina, Groetsch is quick to point out how the state’s laws and guidelines are still “behind the curve” compared to other places around the country, which is something to keep in mind knowing that many folks relocating to this region are coming from out of state.

“People who are moving here are coming from states with more stringent codes that we have in North Carolina, so we have to be ahead of the game here because they expect that coming here,” she said. “If you’re not ahead of the current state codes here, you might be selling them an inferior product compared to where the prospective homeowners are from.”

And as Olivette and Mountain Meadows each push forward with their respective projects, the idea of green communities is a growing, bountiful seed in the minds of builders and developers around Western North Carolina and greater Southern Appalachia.

“When you move into a community that is planned around a set of values you relate to, you’re going to find that you’re doing the right thing – by the environment, by localizing your food supply,” Groetsch said. “And you will also find the intangible aspect of making a connection, with the people and the land, where you focus on the fundamentals of the vision and the values.”

“We as people have a chance to do something special – with each other, all while taking care of each other,” Byrne added.
The Road to Net Zero

BY GARRET K. WOODWARD

It’s beyond aesthetics and aiming to be sustainable — it’s the inevitable.

“The way everything is going in our world, people are starting to appreciate being sensitive to resource consumption,” said Emily Boyd. “People these days, who are going to build and buy homes, they’re more in tune with sustainable building — it can only be a growing segment of the market.”

Co-owner and designer at Mountain Sun Building & Design in Asheville, Boyd built a net-zero certified spec home in West Asheville. The house was the winner of the 2015 AIAHA Parade of Homes “Green Home Award,” and “Gold Craftsmanship Award.” And amid recognitions — the ENERGY STAR, EPA Indoor Air Plus and Green Built NC certifications.

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- Rinnai condensing on-demand water heater, natural gas
- Waterwise certified toilets
- HERS 14 index = 86% more efficient than home built to code
- 2x6 exterior walls
- Open-cell spray foam insulation in wall cavities, band joists and roof deck
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The West Asheville net-zero spec home features a modern farmhouse design coupled with sustainable elements that give it a HERS index of 14.

“We want the site to respond to our design — what is the site telling us, and what do the homeowner ultimately want?”— Emily Boyd

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Finding balance — Asheville Yoga Center

BY GARRET K. WOODWARD

Sunny Keach wanted more. “You get in this reality of what you can actually do with your business; what builders can actually do these days, and what banks are willing to work with you in terms of your vision,” he said.

Co-owner of Asheville Yoga Center, Keach is at the helm of the almost-20-year-old business that pushes forth an agenda of yoga and community all wrapped in a sustainable mindset.

“It’s minimal waste with maximum efficiency,” he said.

Located on Liberty Street, the original building (occupied since 2001) was a work-in-progress as the center refurbished the structure, implementing green initiatives (such as solar panels) while growing the brand as one of the premier yoga facilities in the country. But Keach was looking to expand, and expand smartly.

Seeing what Earthhaven ECO-ville in Black Mountain (an intentional community) was doing in terms of sustainable living and edible landscapes, Keach decided he wanted to pursue something similar with the new center.

“When it came time to construct the second building, I wanted to go that route, which was a low carbon footprint within a design that was functional and efficient,” he said. “We geared the new facility to move towards long-term sustainability, one that will use the least amount of energy over time.”

“You get in this reality of what you want to see in the world?” Keach said. “One of our core values is high quality, and we’ve always done our best for high quality with our service, but now we can also offer high quality in the facilities and the location. The building creates and nurtures the spirit of yoga, which is one of calming and centering, with no distractions. And it creates a space for the location, and the community all wrapped in a sustainable mindset.”

Keach also went with Superior Walls, “They care about green features — people vote with their dollar.”

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A case study in ‘Right Size’ Design

The Rhodo Renovation

BY SEAN SULLIVAN

My wife Laura and I decided to buy a 1960’s rancher in downtown Black Mountain to renovate for ourselves. We liked the feel of downtown and wanted to be close in to the lake, park, pool and center of town. We had our work cut out for us though since the home hadn’t been touched in nearly 40 years!

The 900-square-foot shack sat on a crawl space situated nicely on a corner lot near the golf course. Believers in making all things beautiful, and the desire to give every home we touch “curb appeal,” we first nailed down the floor plan.

We wanted to keep as much of the original structure as possible, leaving the two exterior door locations, existing room layout (virtually the same), as well as the original location of the hallway and common bath. Because we had to combine the two end bedrooms into a master suite, we needed to design a small addition on the back to replace the lost bedroom and give the home a proper kitchen.

We enlisted the help of an architect-partner to create the new style, passive solar design, and get the exterior elevations just right. After that was nailed down, we set out to make this the most efficient use of space we could create. Since most of our clients end up building homes larger than they had originally intended (due to having lower levels on sloping lots), we wanted to show what it meant to “right size” a home.

“Right sizing” a home means that you prioritize “quality over quantity,” rather than the premise that “bigger is better.” As green designers and builders, we also wanted to show that saving a home is better than building a new one.

For my wife who is not only an interior designer, but also an artist, we designed it to be a separate art studio for my wife who is not only interior designer, but also an artist.

The crawl space that adjoined the existing one-car garage was dug out by hand in order to create space for the mechanicals, storage, extra bathroom, and TV room/bedroom for the occasional visit from the college student. We intentionally did not include an interior staircase so these overflow spaces could be used when there was need, but not out of need.

Now that the spaces were identified, Laura went about designing each space for maximum use and aesthetic value, while I worked with our Energy Rater to make this the most energy-efficient and green project we possibly could. We began with saving the existing (skinking) foundation by having helical piers rammed into the earth beneath the south corner. We also discovered the previous tenant had been an earnest gardener so we gave away most of the plants in the yard that we couldn’t use to interested neighbors and the adult children of the now-deceased previous tenant.

Saving as much of the structure as possible while still being able to get the home certified, we left the exterior 8-foot walls, but raised them to 9-foot, 6-inches by running beams around all the top plates. The exterior walls were then wrapped with foam board insulation to seal off any air infiltration and add maximum insulation values.

Wanting a new contemporary look to the home, we opted for a glass garage door as an entrance to the art studio. The only calculated energy loss to the project, we felt it was important to get light and ventilation into the space.

Most visitors get caught up in the details of the architecture, interiors and furnishings while others can’t believe the home is only 1,450 heated square feet on the main level. The “doubling up” spaces are connected to the home by the use of glass sliders, and wrap-around porches and patios.

True energy connoisseurs like myself are all about the “performance” of the home through. The mechanical room contains the air handler for the geothermal HVAC system, Energy Recovery Ventilator (ERV), dehumidifier, built-in floor drain and electrical panel that pipes in the solar from the roof. You wouldn’t know that the home had solar because the panels are cleverly hidden behind the butterfly roof facing due south.

之前，我们说过

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Before the remodel:

One of the biggest surprises has been the “wine room.” It started out as just a wine closet in the corner of the basement next to the mechanical room. However, when we decided to use the “jal house” door that was given to us by Laura’s aunt, it became an all-out cellar clad with stone all the way up to the 7-foot ceiling. We took a slab of oak from a recently trimmed tree (to create a table top) and created wine bottle holders by building a plywood box beneath it and a shallower one above it with 1-inch holes in it to hold the “nicks.” Lastly, we ducted in the cool exhaust air from the heat pump water heater in the room next door to “chill” the bottles.

As construction draw to a close we/have/framed/timbered and furnishing details. The leftover trim materials were recycled to create a “lazier trim” detail for the base of the island and as an accent wall in the master bedroom. Saved slabs of walnut were used to make the dining room table that we designed, as well as miscellaneous shelving. Our middle son’s bed was built from shipyard siding that was left over and Laura’s art hanging wall was made from the recycled stained tongue and groove soft material.

A lot of thought, planning and ingenuity went into getting the Plat-inus certification was received from the Green Built NC as well as the low HERS index of 30. It is very satisfying to see how well the stonework on the lot, how effective the spaces have become, and how comfortable the house is. However, the greatest satisfaction that we have achieved through this exercise in “right size” design is that we get to call this place home.

Stant Sullivan is president of Living Stone Construction, a local Design-Build firm located in Black Mountain. As past president of the AIBS (NC) NCIBS, and Chair of AIA NC Design Committee, Stant’s position for leadership in design has propelled his business to become the leader in his local market.

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**Case Studies**

**Company specializing in edible and ecological landscaping**

Benjamin Portwood, chief manager and “purveyor of food on your own property,” said, “It’s about sustainable landscaping, and being able to grow all types of food on your own property.” Portwood said. “A lack of water infiltration into the ground is responsible for both droughts and flooding. The water running off the property will cause drought-like conditions because it’s not infiltrating the ground. With the collection systems and edible landscaping, we’re now able to have water stored in the soil, and in the cistern, to be used when drought conditions affect the region.”

Portwood noted that municipalities around the country are already instituting green ordinances focusing on rainwater collection, seeing as droughts are projected to become more frequent and stick around much longer (and storms that do occur to become more aggressive) as we push further into the 21st century.

“Because Asheville is already on track to someday have these green ordinances,” he said, “and with collecting the stormwater from your own property, you’re not only saving on your water bill and having a fresh source of rainwater, you’re also saving your local municipalities money at the fact there would be a decreased need for expensive earth and stormwater mitigation projects.”

Just like solar energy, Portwood pointed out that the upfront cost for rainwater collection systems is becoming more and more of an affordable option for homeowners and commercial businesses. That upfront cost will lead to long-term savings, and with that, the technologies and initiatives themselves can be tailor-made to each customer.

“There are expensive and inexpensive options,” Portwood said. “It’s about what your needs are, what your budget is, and what you ultimately want out of your system – it’s making what was once a nuisance into an asset for your home.”

“A swale created along the property’s hillside captures the stormwater overflow, keeping the water on the land.”

For the rainwater harvesting collection here, we do what I call an ‘active’ process, which is rainwater harvested through the cistern that has a pump-distribution system with an irrigation timer that manages the garden,” he said. “The overflow from the system goes into the earthworks, in this case swales, that are also known as ‘green gardens’ and ‘basins,’ all of which prevents the rainwater from leaving the property.”

Within their low-maintenance edible landscaping and rainwater collection designs, the company installed more than two-dozen species of plants and trees on the Woodfin property – blueberries to pears, apples to chestnuts, mulberries to asparagus. And that, they also planted a natural wildflower meadow mix where more than 30 species of the picturesque blooms are showcased for looks and for purpose.

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Fontana Lake Residence

A case study in beautiful efficiency

By MARGARET CHANDLER

The Fontana Lake Residence is a great demonstration of design elegance harmoniously integrated with environmental sustainability. This handsome home achieved LEED for Homes Gold certification with a total of 75 points, and earned Green Built NC certification. Located on Fontana Lake, the home has a strong emphasis on outdoor living, featuring a tree-filtered westerly view of the Fontana train trestle and mountains beyond.

The owners selected the location for quick access to lake activities – boating, kayaking, swimming, as well as lakeside campfires and gatherings. Both the site and house provide great lake views and easy walking to the boat dock and lakeshore.

Serious consideration was given to the lakeshore site, and special emphasis was placed on blending the home harmoniously with its mountain surroundings, to preserve the view quality for other lake enthusiasts. The understated Asian-influenced design nestles unobtrusively into the topography, and the materials and color palette recede into the wooded hillocks.

Newly installed, mature landscaping further integrates the house into its setting. It is nearly invisible from the lake, despite being the closest house to the water. All of the plants are native and drought-tolerant, dramatically reducing the home’s potable water requirements.

Rainwater permeates through a strategic system of catchment, filtration, and slow percolation back into the ground; care was taken to prevent direct stormwater runoff from causing shoreline erosion or further burdening the lake.

Unique to the project, a pre-Depression-era concrete road – on site since before Fontana Lake was dammed – was broken into stackable pieces and used to build the retaining wall along the driveway. The driveway follows the approximate route of this old roadbed, re-purposing an existing feature of the site and limiting further disruption of the property.

The driveway leads directly and simply divided into two zones: two levels of bedrooms at the north end, and the kitchen and gathering spaces on the south end. Separating these zones are the transparent main-level entry and the stairs to lower lakeside level.

The entry is a contemporary glass-enclosed interpretation of a “dogtrot” – a traditional breezeway connecting two enclosed spaces. The material palette of the entry interior “brings the outdoors in” to the bluestone floor continues the exterior entry walkway material through to the lake-view balcony, where the walls and ceilings are a continuation of the exterior stained cedar shingle siding. A generous lakeside screened porch provides the primary outdoor living and dining space during the temperate seasons. The porch opens to the outdoor fire pit and entertaining terrace, and connects with the kitchen via doors and a pass-through window.

The interior of the home embraces the attitude of the exterior. Due to chemical sensitivities, the homeowners requested that special attention be paid to low- and no-VOC materials and finishes and all doors and windows have an average U-factor of about 0.24. The geothermal HVAC system is SEER 15, and the cooling equipment uses no HCFCs.

Environmentally preferable materials were used whenever possible, including masonry made of 30 percent fly ash, gypsum wall board made with 95 percent post industrial recycled content, roofing made of 25 percent post-consumer recycled content, and FSC-certified wood. Material efficient, increased-span framing techniques comprise the building’s shell. In a near-perfect example of both waste reduction and local material usage, an existing concrete road bed running through the site and was broken up and reused on-site as a retaining wall.

This home is an exemplary exercise in blending environmentally responsible design with beauty and function. It is lakeside living at its finest.
Deltec’s Innovation Center

Modeling sustainability

When Leigha Dickens wanders around the Innovation Center, she can’t help feel like she’s in her own laboratory. “The data we’re collecting here is not only for my own knowledge, but also for the knowledge of where the technology is at, and the way that technology affects everything else in the building,” she said.

Green Building and Sustainability Manager for Deltec, a longtime Asheville-based company at the forefront of the green building movement, Dickens is excited about the endless possibilities of the firm’s new center, which is a 1,500-square-foot model home that features the latest green technologies and innovations. The net-zero energy structure provides the company with a physical entity for clients and the curious alike to personally explore and see firsthand just what they can do with their own housing projects and options.

“The most important thing is being able to have this tangible building to show clients just what we’ve all about,” Dickens said. “We’re able to demonstrate the passive solar advantages of the home, and show things like the water heater and how much energy each appliance uses by pulling up the data on an iPad by the front door.”

Though Deltec offers an array of test spaces and homes of all sizes and features, the company was seeing the current market hovering around 1,500 square feet, something that plays into the modern mindset of simplification for younger families and retirees. The buildings combine the company’s acclaimed structural integrity and 21st-century green technology, of which the models are built in their factory and prefabricated for their clients.

“It’s a combination of old school knowledge and new technology,” Dickens said. “Passive solar is the backbone of the design, and we’ve known for a long time that solar works, and now we can pair that with all of those new energy-efficient gadgets — it’s the best of both worlds in terms of human knowledge.”

Within the Innovation Center, there is the passive solar design with a grid-tied 5.12-kilowatt solar photovoltaic array located on a two-pole mount in the yard. The high performance insulation includes R30 spray foam insulation, R24 walls and R10 insulated slab foundation, which ties into the south-facing windows in the open living space with limited glass on the east and west sides of the building.

The center also showcases a mini-split HVAC system and fresh air ventilation (or energy recovery ventilator (ERV)). The ERV has a built-in heat exchanger that preheats incoming air which utilizes heating energy from the outgoing air. And in a heat pump water heater, ENERGY STAR-certiﬁed appliances, efﬁcient lighting, low-VOC paint ﬁnishes, and edible landscapes (of native plants and trees), and you are just touching the tip of the iceberg as to what the model can and will do.

“One of our goals is to show the best features available, but also the ones that work the best for this particular climate,” Dickens said. “We get to demonstrate what works in every climate without going too far into one climate. A lot of studies have been done on these technologies in colder climates, but our varied climate — really hot, really cold, and really humid — and our model center will play into those varying temperatures and elevations.”

During the recent open house for the new center, several hundred folks attended, all in an effort to learn more about what could possibly someday become their cozy, sustainable abode.

“The market is looking for something smaller, and more affordable,” Dickens said. “And, for me, it’s just been fun to see all of this data roll in that will provide us with so much information on where we’re at and where we’re going with green technologies.”
At Jade Mountain Builders, we are sought out by clients who want to hire craftsmen to build their home, instead of an army of subcontractors. These are some of our clients’ dreams that we either have, or are currently taking on:

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Community and sustainability

Cohousing boasts an impressive array of green infrastructure, but as an intentional community, its physical features are also designed to strengthen social connections.

Better Together

Cohousing is an innovative solution to urban sprawl and sprawl's environmental impacts. It is a way to ensure that residents live in a sustainable, healthy, and socially connected environment.

An example of this is High Cove, located in western North Carolina, which is an intentional community that focuses on sustainability and community. The community has implemented practices such as rainwater harvesting, solar energy, and composting, among others.

The community has also implemented a shared space for residents to use for social and cultural activities, such as potluck dinners and community gardens. This has helped to strengthen social connections and create a sense of community among the residents.

In addition to the physical infrastructure, the community has implemented policies and practices to encourage sustainable living. For example, residents are encouraged to use public transportation, and the community has implemented a program to reduce waste and promote recycling.

The success of High Cove is evident in the community that has formed and the strong sense of community that has been created. The community has become a model for other communities to follow, and it is an example of the power of intentional communities to create a sustainable and socially connected environment.

As such, cohousing can be seen as a potential solution to the challenges of urban sprawl, and it is an example of how intentional communities can be a force for positive change.

Resources:
- High Cove Community website: https://www.highcove.org
- Intentional Communities Foundation: https://www.icfounding.org
- The Cohousing Book: https://www.cohousing-book.com

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Community garden and lifelong learning in High Cove features green anderosal communities offer a rich-ness of experience and perspective en.wikipedia.org/wiki/elder_village
- Get together with neighbors to a and buy a common house – Two suburban neighborhoods in Davis, Calif., started by taking down a backyard fence. “If that’s too radical,” says Pocket Neighborhood guru, Ross Chapin, “consider cutting your six-foot fence to four feet to make chatting across the fence easier, or building a gate between yards.”

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Olga Ronay is a city planner and co-founder and resident of High Cove, a West ern North Carolina community focused on art, science, environmental stewardship and building learning. High Cove features green, built houses, a forest preserve, hiking trails, a community garden and lifelong learning on site. At a certain age, members in the center are planned. Olga expects to continue playing basketball until she’s 100 years old.

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For more information about cohousing, visit: https://www.co-housing.org
Green Infrastructure: The Great Shift in Stormwater Management

by Tim O’Connor

T

e has always been a time when green infrastructure was primarily considered a problem to be solved, not an opportunity.

Get off the cognitive roller coaster, the shifting landscape, mixed-use districts, gullies, pipes, ditches and concrete outfalls. Out of sight and out of mind. But that limited view of stormwater management resulted in many unintended consequences, which often worsen over time, especially with increasing population, development and the proliferation of impervious surfaces. These negative consequences include downstream flooding, streambank erosion, polluted receiving waters, impaired ground-water recharge, and degraded ecosystems and wildlife habitats. The light at the end of the storm sewer is that a shift is happening. Just like the great shift we are seeing in the energy sector toward solar, wind and other renewables, a shift is taking place in the way we understand and manage stormwater. This paradigm views stormwater not as a random occurrence but as a valuable and integral part of the interconnected hydrologic cycle that is essential to all life.

Nature as Teacher

Green infrastructure (GI) or green stormwater infrastructure (GSI) are terms now being used to describe an approach to stormwater management that is rooted in the function of natural watersheds. If you’ve ever been for a hike in the woods in the rain, you’ve seen the principles behind green infrastructure in action.

In a natural forested watershed, much of the rainfall is intercepted by the tree canopy and other vegetation, and soaks into the spongy soil. There is therefore a small fraction infiltrating the soil. Much of the green infrastructure, practitioners design systems where stormwater is intercepted, captured, stored, evaporated, dispersed, infiltrated and filtered through natural- and constructed-based systems. And as the vegetation grows, green infrastructure can actually improve in function over time, taking up even more stormwater and removing even more pollutants.

You may already be familiar with some green infrastructure practices, including cisterns for rainwater harvesting, rain gardens and bioretention cells, bioswales, wetlands, green roofs, permeable pavement, street trees, etc. Others may be less familiar, such as simple earthworks, sheet mulching (to build spongy top soil), redirecting downspouts to vegetated areas, daylighting, blue roofs, regenerative step-pool conveyance, stormwater cascades, terraced bioretention, mushroom mycelium filtration, key-lining techniques and many more.

All of these practices employ basic strategies of slowing, spreading and coking stormwater and, in the process, preventing the stormwater from conveying pollutants downstream. Green infrastructure also goes beyond individual practices by approaching stormwater holistically at a watershed scale and considering how combining and integrating these practices can provide even greater benefit. Protecting steep slopes, conserving forest and riparian buffers, preserving trees and open space and preserving drinking water supplies during development are also essential parts of a broad-based green infrastructure approach.

People and Green Infrastructure

In addition to restoring natural hydrologic functions, there are many other benefits to green infrastructure. Many of us who live in Western North Carolina have been drawn here by the stunning natural environment. We come for the mountains and the creeks, rivers and waterfalls which give life to the remarkable biodiversity of our region. A primary reason Asheville has emerged as Beer City is because of our pristine mountain watersheds and pure water resources. People love to be connected to water. Our very bodies are 60 percent water. One of the underlying benefits of green infrastructure is how it reconnects people and communities to the water flowing within our landscape. Researcher Kathleen Wolf at the University of Washington has compiled more than 2,000 peer reviewed, demonstrating the “co-benefits” of green infrastructure, which include everything from better public safety, reduced crime, increased property values, improved mental health and well-being and green job creation.

Opportunities for connecting green infrastructure and local urban food production are also being explored. For example, the East Capitol Urban Farm in Washington, D.C., is harvesting rainwater from a public housing development and using it to create a three-acre community food oasis in the middle of an historic food desert. Climate Change and Resilience

According to the most recent National Climate Assessment, heavy rainfall events are increasing in the U.S. and that trend is projected to continue. Already, very heavy precipitation has increased by approximately 30 percent in the southeastern U.S. over the past 50 years. The mountain region of western North Carolina also has the most variable rainfall patterns in our state, with areas like Weaverville, Mars Hill and parts of Asheville having among the lowest annual rainfall, averaging less than 40 inches per year. And on the other extreme, nearby Brevard receives almost 70 inches and Cashiers almost 90 inches per year on average.

Green infrastructure is a key strategy for providing resilience during both water scarcity (by promoting infiltration to recharge groundwater and stream base flow) and as well as water excess (by capturing and storing stormwater). In fact, many are recognizing that green infrastructure is no longer optional for managing stormwater in our changing climate, but is vital for adapting to climate change in ways that conventional infrastructure cannot. Additionally, green infrastructure improves air quality, acquires carbon, moderates urban heat island effects, and reduces energy consumption for heating and cooling buildings, as well as providing many ecosystem services.

Grey or Green?

Although the need for conventional “gray” stormwater infrastructure will continue as long as we humans live in cities and drive vehicles, green infrastructure can work in harmony with existing conventional infrastructure by helping restore that natural watershed function and improving water quality. In combination, it can also alleviate pressure from gray infrastructure, delaying the need for enlarging and replacing infrastructure and reducing overall costs.

Some major cities in the U.S. have already embarked on ambitious green infrastructure programs. Philadelphia has allocated $2.4 billion to its green infrastructure program, and in the process, it anticipates saving $8.6 billion in gray infrastructure costs over the long-term. To be truly effective, a green infrastructure approach should be applied at many levels, including site scale, neighborhood scale and watershed scale.

Until recently, green stormwater infrastructure was often overlooked as being an essential part of the green building process. Many developers have been unaware of the potential benefits, including cost savings, with green infrastructure. Fortunately, the level of awareness is rapidly changing as well. Applying GI during front-end planning is generally more cost-effective than trying to fit it in later. I’ve been learning that personally. As such, we have redefined green infrastructure retrofit of my own 1920s West Asheville bungalow by incorporating more than 1,800 gallons of rainwater harvesting for edible landscape irrigation, with an integrated edd stormwater wetland, rain garden swales, and permeable driveway all in the works.

Stormwater ordinances in municipalities throughout the country are also becoming more nuanced in their language. In the 1990s-2000s, many municipalities were offering financial incentives such as cost-sharing for residents and businesses interested in applying GI on their properties. Even in the case where no applicable stormwater regulations exist, there can be great benefits for the prospective homeowner and the developer by designing GI measures into the site plan.

The Future is Green

The shift in stormwater management to green infrastructure is here and will continue to grow in the future. Green infrastructure offers numerous benefits for all involved for the property owner, the developer, the neighborhoods, cities and towns, and our entire bioregion. Using our creativity and skills, within a supportive policy framework, we can develop practical, cost-effective strategies to implement green infrastructure and work together to create more healthy, livable, resilient communities, which honor our water. If we act now, the time is still with humanity, people and diverse species that inhabit our planet. Tim O’Connor, PE is a Asheville-based water resources engineer and founder of HYDROCycle Engineering. He is recognized for his expertise in green infrastructure and its application in innovative stormwater solutions.

STORESTORMWATERMANAGEMENTPROJECTINMARS HILL-THEGROUSEPLAINS.png

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Visit our design gallery at the Airport Design Center to peruse thousands of choices for your next project. Our designers will show you what’s trendy and what will work within your budget to give you the space you always dreamed of.
Following Asheville’s lead
Growing green building across the state

Asheville, NC, has been a leader in the green building movement for over a decade. Located in the Blue Ridge Mountains, Asheville has a thriving green building community that is helping to drive the market forward in the state of North Carolina.

Asheville's green building movement has several key features:

- Real estate professionals that are willing to pay for green features.
- Appraisers that attach additional value to homes with green features.
- Lenders that provide lower interest rates for green homes.
- Homebuyers that are willing to pay more for green homes.
- Builders that are willing to invest in green building.
- Appraisers that attach additional value to green homes.

Asheville's green building movement has several advantages:

- It has set a strong example for other cities and regions in the state.
- It has helped to create a market for green building that is growing across the state.
- It has helped to create a financial return on investment for green building, which is attracting more people to the market.
- It has helped to create a more efficient and sustainable building market.

Asheville's green building movement has helped to create a market for green building that is growing across the state. This ecosystem of committed people and companies, all of which you have locally, is one of the reasons why Asheville's green building market is as great as it is.

For starters, Asheville’s green building market is as great as it is due to the people that live there. Your residents understand the benefits of green building, pure and simple. Some of you do it to save money, some to protect the environment and others just to lower your operating costs in that home or building. And because you all have been this way for so long, your real estate, appraisal and lending markets accept that green homes are worth more than others.

Another reason the Asheville movement is important is that a good green building market involves an ecosystem of committed people and companies, all of which you have locally. This ecosystem takes:

• Real estate professionals that are able to sell the short- and long-term features of green homes.
• Appraisers that attach additional value to the home for green features.
• Lenders that provide lower interest rates due to lower mortgage default risks from the buyers of green homes.
• Builders that are willing to invest in green building.

So, how will other North Carolina cities act on your successes to grow their green building market?

The two largest opportunities are to:

- Educate consumers and builders about their available options and the benefits that come with them, and also to create reliable mechanisms for the market, such as financial and transactional security that ensure a higher market value for those homes.
- Foster the development of a sustainable market where the interest rates for green homes are lower, and increase their value as well.

Asheville has set a strong example for other cities and regions in the state. It has helped to create a market for green building that is growing across the state. Our association is leading efforts to create new transaction processes that place green home features and valuation data in the right places to make this happen more accurately, faster and more efficiently.

Asheville is a great example of what can happen when a community comes together to support the green building movement. By doing so, Asheville has helped to create a more efficient and sustainable building market that is growing across the state. This is a great example of what can happen when a community comes together to support the green building movement.

We hope that other cities and regions in the state will follow Asheville's lead and help to create a more efficient and sustainable building market that is growing across the state. This is a great example of what can happen when a community comes together to support the green building movement.

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Up to the Challenge

Asheville’s infill plans support smart growth, multimodal transportation and green building

“Urban living provides many amenities that maintain a healthy and vibrant quality of life while producing fewer carbon emissions and supporting alternative modes of transportation.”

Downtown’s Central Business District provides ample uses for multi-family housing and mixed-use developments. With well over 1,400 parcels of land totaling more than 270 acres and height limits upwards of 145 feet, there is enough developable potential in downtown to accommodate years of Asheville’s growth within this area alone. Urban living provides many amenities that maintain a healthy and vibrant quality of life while producing fewer carbon emissions and supporting alternative modes of transportation.

As the city designs for density it is imperative that it also plans for open space, parks and greenways while providing additional modes of access. Asheville’s commercial corridors also provide significant housing opportunities. Changes to the city’s code in December 2014 have effectively doubled the permitted density for projects that provide 20 percent affordable housing units. For example, the maximum residential density is 25 units per acre, but if 20 percent of the units are made affordable then the maximum permitted residential density is raised to 70 units per acre.

Asheville’s commercial corridors play a role in supporting the city’s affordable housing initiative, allowing for density bonuses. Affordable housing allows Asheville’s workforce to grow more sustainably, enabling those that work within the city to live in the city.

Access to downtown areas is imperative and the city’s Comprehensive Plan update will reach out to our stakeholders, allowing feedback and vision from those who live and work within the area.

Accessibility to downtown opportunities include three categories: the Downtown’s Central Business District, commercial corridors and residential districts.

Downtown’s Central Business District provides ample uses for multi-family housing and mixed-use developments. With well over 1,400 parcels of land totaling more than 270 acres and height limits upwards of 145 feet, there is enough developable potential in downtown to accommodate years of Asheville’s growth within this area alone. Urban living provides many amenities that maintain a healthy and vibrant quality of life while producing fewer carbon emissions and supporting alternative modes of transportation.

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Asheville’s residential districts are a little more challenging as they are somewhat already defined in both character and land restrictions. In 2013, city council adopted new rules allowing for larger size Accessory Dwelling Units (ADUs). ADUs provide practical housing options for the elderly, empty nesters, young students and small families, and can provide additional rental income for homeowners. ADUs are smaller in size, do not require the extra expense of purchasing lots or land, can be developed by converting existing structures, and do not typically require the extension of city infrastructure for the additional housing units.

Because of their smaller size, ADUs are typically more affordable, providing rental units for low- and moderate-income residents. Using alternative modes of transportation to access the downtown corridor, allowing more residents to build accessory dwelling units, and preventing urban sprawl are all ways to support the city’s efforts to grow denser and smarter.

Amber Weaver is with Asheville’s Office of Sustainability and Vaidila Satvika is with Asheville’s Planning & Urban Design Department.

© BY AMBER WEAVER AND VAIDILA SATVIA

Cities across our nation are growing and experiencing urban planning challenges. From 2000 to 2010, Asheville’s population grew more than 14 percent and is expected to continue its progression in the coming decades. Asheville’s growth in population, crunch on housing supply and its inability to annex has left many scratching their heads and asking how to address the challenge of the city’s Planning and Urban Design Department has responded to current housing needs by remaking regulatory barriers and allowing more residential density bonuses. Affordable housing allows Asheville’s workforce to grow more sustainably, enabling those that work within the city to live in the city.

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Question: “If not now, when; if not here, where; if not us, who?”

Answer: The Asheville Collaborative of the Living Building Challenge Design Competition.

It’s on, people; it is so on. The Asheville Collaborative of the Living Building Challenge is hosting an architectural competition to design a mixed-use building based on the incredibly demanding sustainability and resiliency guidelines of the Living Building Challenge (LBC).

The LBC is a design and construction program that stresses the critical work of creating buildings and communities that are not only “less bad” but actually restore the environment, the economy, and the societies in which they exist. The LBC envisions a future that is “ecological restorative, culturally rich, and socially just.” How’s that for a beautiful vision?

A simple flower inspires the LBC. Like a building, a flower doesn’t move. Unlike most buildings, a flower gets all its energy and water from its fixed location, creates habitat and food for animals (including humans), and stabilizes the soil. A flower creates no waste, in fact, the byproducts of a flower are oxygen and nutrients.

And flowers are beautiful! The LBC requires, essentially, that buildings do the same; they must get all their energy and water from on site (or from closed loops), create no waste, and be beautiful.

This inspiring vision of the built environment is based on the work of the biomimicry movement, which invites culture and industry to study and benefit from millions of years of Mother Nature’s research and development. Lessons in sustainability are all around us, we just have to look carefully at what has worked evolutionarily in botany and in the animal kingdom, paying special attention to the interconnectedness of living things.

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The Asheville Collaborative (hosted by WNCGBC) invites teams of students, professional architects and engineers, and other green thinking planners to design a building comprised of affordable housing and other uses on a high-profile site in downtown Asheville. This academic exercise is intended to introduce this exciting and essential vision of the built environment to the community and to demonstrate the viability of the LBC to local and regional planners and design professionals.

A jury of local and regionally renowned green thinkers is being assembled to judge the merits of submissions based on adherence to the program, to LBC imperatives, and to the site’s appropriateness for this high-profile competition. Teams within 500 miles of Asheville are invited to submit designs and to participate in a workshop focused on the LBC and affordable housing. Locals interested in learning more about the LBC in general and the competition in particular can participate (for a small fee) in the workshops even if they do not join the competition or submit a proposal.

Farrell is chief cook and bottle washer at Stephens Smith Farrell Architecture in Asheville. He is Architect of Record for the first LEED Certified Building in WNC and sits on the WNCGBC Board of Directors. He is an ambassador for the Living Building Challenge (LBC) and is a member of the Asheville LBC Collaborative. He lives and gardens in a net-zero energy home.

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Energy Innovation Task Force

This partnership is inspired by concerned community members, including the City of Asheville, the Asheville Beyond Coal initiative and Duke Energy’s Western Carolina Modernization Plan. Asheville Beyond Coal campaign was a key player in successfully advocating Duke to close its Lake Julian coal plant. In 2015, Duke announced its modernization plan that it will replace the coal plant with two new 270-MW natural gas units and a potential 190-MW third “Peaker” unit to be built in the early 2020s. The “Peaker” plant is slated for use during periods of high demand.

Natural gas is a far cry from clean, renewable energy and hopes are high that the Task Force can delay or avoid the construction of the third “Peaker” unit. Duke’s Modernization Plan includes the formation of the Task Force for this exact purpose. Avoiding or delaying the need for the third unit is a primary goal in an effort to transition Western North Carolina to a cleaner, affordable and smarter energy future.

The Task Force includes Sierra Club, Duke Energy, City of Asheville, Buncombe County Board of Commissioners, Green Opportunities, Mission Hospital, Biltmore Farms, New Belgium, Buncombe County Tourism Development Association, UNC Asheville, Self-Help Credit Union, Asheville Chamber, Sustainable Advisory Committee on Energy and Environment, Sundance Power and WNC Green Building Council. The Green Building Council is thrifty to be part of the solution. With 15 years of experience executing programs like Green Built NC, LEED for Homes, Green Gage and Appalachian Offsets, our non-profit mission is making smart choices in creating a greener, healthier community. The Green Building Council’s program’s lower energy use in new and existing homes and bridge the gap between utility programs and what the City offers. WNCGBCC Executive Director Dan Bank-Babcock chairs the Programs Committee, helping to see innovative and accessible energy-efficiency programs come to fruition.

The task force anticipates developing a two-year work plan by sands of miles away to driving gas guzzling vehicles to using inefficient incandescent lightbulbs in homes and businesses. This collaborative partnership is an opportunity to launch clean-energy projects and programs, and to educate our community members on the impact of their actions and how they can make a difference. Make your voice heard. Visit www.ashevillefnc.gov/departments/energyrelations/energyinnovation/taskforce.aspx, for more information on meeting dates and locations.

Katy O’Kelley is the Communications and Marketing Manager at Carolina Mountain Land Conservancy (www.carolinamountainland.org). She is the former Events, E-Membership Coordinator for WNCGBCC. She has a background in events management, fundraising and media relations.

A smarter energy future

The task force anticipates developing a two-year work plan by the end of 2016 to increase energy efficiency and renewable energy and inform and engage the public.

Energy Innovation Task Force Subcommittees

- Programs - Provide increased promotion of and access to clean energy and renewable energy programs, and to improve and expand them.
- Technology - Make deliberate investment in distributed energy resources (DER) working closely with Duke Energy’s DER team. Focus on technical analysis for programs like solar installations, battery storage for energy generated by renewable resources, electric vehicle infrastructure and advanced utility metering.
- Community Engagement - Help the community understand ways to reduce energy use and opportunities to own clean, renewable energy. Develop a branded umbrella campaign, communications templates and communications strategies.
- Peak Reduction - Identify the peak reduction goal needed to delay and hopefully avoid construction of the “Peaker” unit, the date by which this goal must be met and benchmarks to measure progress. Reducing the amount of energy the area uses during periods of peak demand will be a critical aspect.
Sure Foot Builders
Building the Dream
Appalachian Offsets

Nonprofits reduce energy use, use savings to help their cause

By Sam Ruark-Eastes

ue the music... Appalachian Offsets, your local solution to global pollution, is back! Back by popular demand and with the help of two grants, Appalachian Offsets (AO) will reduce climate changing emissions through funding energy efficiency upgrades for facilities used by local nonprofit organizations. This voluntary carbon offset program of the WNC Green Building Council offers businesses, organizations and individuals the option to easily reduce or offset their carbon footprint.

The scientific consensus is in. Climate change is happening and is greatly influenced by the burning of fossil fuels. In our everyday lives, our actions emit harmful carbon. The U.S. has one of the most staggering greenhouse gas emissions rates of any country in the world. Climate change is having massive detrimental impacts throughout the world, causing erratic and destructive weather, severe famine, rising sea levels and crop failures. Appalachian Offsets was set up to address this pressing issue.

The program encourages all of us to reduce our carbon emissions. First, then pay into a fund that collectively helps others do the same. Through upgrading inefficient lighting and supporting clean energy projects, Appalachian Offsets will help us reduce our collective impact on climate change.

The first area of Appalachian Offsets was launched in 2005. From 2005 to 2007, we completed four energy-efficiency retrofits for local nonprofits, with the most successful project being the Asheville Housing Authority (AHA) to switch out 13,000 inefficient incandescent light bulbs with compact fluorescent light bulbs (CFLs). Through this retrofit, the AHA and its residents collectively reduced carbon emissions by more than 1610 tons, saving over $200,000 per year.

With the onset of the 2008 recession, interest in the program waned as building projects were delayed or cancelled and businesses lacked the resources to offset their emissions. Environmental stewardship (and the economy) are once again growing in Western North Carolina. In a survey of our membership, 70 percent of respondents requested that we revive this program to offer a low-cost and community-enhancing pathway to cut emissions. Payments for carbon offsets will be directed to meet the needs of more nonprofits, schools and low-income housing.

Appalachian Offsets is the bridge that matches companies looking to offset their emissions with organizations who need support cutting energy costs and upgrading their facilities. As we revitalize this program, several changes will be enacted to make it more transparent and connective. The previous program did a great job of engaging nonprofits and community members to do specific projects. We will build upon this success and add projects that have significant cost and energy savings. We will partner with organizations like the Land of Sky Waste Reduction Partners who perform energy audits for nonprofits, schools and municipalities. Projects will be transparent to ensure that offset buyers are directly aware of the specific projects they help fund, so all participants know the quality of the offset they are purchasing.

Appalachian Offsets offers a tremendous secondary benefit in that offsets allow the recipients to retain more capital for mission-related efforts. And by keeping those dollars local and with community organizations, these credits will cycle funding through the local economy and yield a positive impact for a much longer time than traditional carbon credits.

The relaunch of their program is made possible by grants from the Kendeda Fund and the Ray Anderson Foundation. As part of the executive director of the WNCGB and Kendeda seeking in the field of sustainability for 18 years with local governments, small businesses and nonprofits. He is a LEED AP and Certified Permaculture Designer.

features
What is a net-zero energy home?  A net-zero energy home is simply a home that produces as much energy throughout the year as it consumes. A home can only truly be considered net zero after the first year and thus utility bills showing that the goal has been met. The inset bar chart shows net monthly energy use and production for our personal house, which generates electricity using solar photovoltaic (PV) panels on the roof. In the spring and fall when we are not heating or cooling, we produce more energy than we use. When we use air conditioning in the summer, we are closer to zero. Production is lowest in the winter when we are also using a lot of energy for heating, so we use more than we produce during those months.

Monthly net energy use and production for a net-zero energy home

Recognizing a need to identify homes with the potential to achieve net-zero energy, the Green Built North Carolina certification defines a new net-zero energy home as one having a HERS index (including solar PV) of less than 15. The HERS rating is like a “miles per gallon” sticker for a home, with a HERS of 100 being approximately code, and a HERS of zero being a net-zero energy home with typical American appliance usage. The Green Built NC program opted to include homes with a HERS 15 or lower because they recognized that individual “mileage may vary”, and many energy-conscious home owners in the area were reaching net-zero performance with less solar than the typical American would need. They also recognize homes that reach a HERS of 55 or lower that don’t have solar but have a conduit and South-facing roof appropriate for future solar (“net-ready”).

The Green Built NC net-zero designation became available in October 2015, and since then 7 homes have completed certification. A net-zero energy home and one home has achieved net-zero ready certification. Prior to the net-zero certification becoming available, we know of at least 15 homes in the area that would qualify with a HERS score of less than 15.

Local strategies to build net-zero energy homes

Not all net-zero homes are small, but it really helps. Smaller homes use less energy and require less solar to become net zero. These net-zero energy “tiny houses” in the program, but there are also several in the 1,200 square foot range. These small homes are able to achieve net-zero status with 4 to 5 kW of solar PV, which at current prices would cost approximately $14,500 to $18,000. There are larger homes in the program, but they require more solar. Typically homes in the 2,000 to 3,000 square foot range have required 6 to 8 kW of PV to achieve net-zero energy status.

Insulation

Many net-zero homes are “super insulated”. All of the net-zero energy homes we’ve worked with have more insulation than the code minimum, but builders and architects have a whole new set of philosophies on how far to go. The building shell and insulation are typically the longest-lived parts of the home so it makes sense to spend more on those since they will save money for a long time. But there is a law of diminishing returns and after a certain point, it makes sense to save some money for solar. Our generic advice would be to exceed code, but you don’t need to use unconventional materials or techniques (unless you want to). It’s helpful to have a design that’s easy to build and air seal and to use spray foam insulation where you may have tricky details. Home designs that allow the water heater and ductwork to be located in conditioned space also pay big dividends. Lean homes use a lot more energy, so all builders of net-zero energy homes pay particular attention to airtightness. A blower door scores of 5 Air changes per hour or less is typical for these homes.

Efficient heating and cooling

Efficient building systems are also important. These systems don’t last as long as the home itself, but heating and cooling systems are critical. Larger homes and those without access to natural gas often use geothermal heating and cooling systems. Minisplit heat pumps are popular for smaller homes. The new variable-speed compressor systems like the Trane Greenspeed offer a great solution for homes in between that need a full-size system but can’t make the jump to geothermal.

Water heating

Water heating is a source of significant energy use, and an easy way to save energy. Heat pump water heaters are the most popular choice in net-zero energy homes. These move heat from the indoor air to the hot water, dehumidifying the air they’re located in and heating water at about three times the efficiency of regular electric water heaters. Natural gas tankless water heaters are also a popular choice, and have about the same operating cost and carbon emissions as heat pump water heaters. Solar domestic hot water systems are still a good choice, but many homeowners find that the heat pump water heater supplemented with more rooftop PV is more cost effective overall and lower maintenance.

The choice of whether to use gas in a net-zero energy home is a complex one. Most homeowners expect ultra-low bills in net-zero energy homes, so it makes sense not to add a second utility. Natural gas services come with a monthly service charge, which can be a significant addition to energy cost. Also, most of the locally available utility buy-back programs for solar PV won’t pay homeowners for generating more electricity than they consume, so simply fueling can make it difficult to get paid for all of the electricity homes generate. If there’s a desire to cook on gas, consider instead an induction cooktop, which are as controllable as gas and have additional safety benefits. There are times it can make sense to add gas to a project. If the home will need to operate on a backup generator, having a gas furnace is desirable. Gas is also one of the few ways to manage long cold weather periods in off-grid homes.

The role of appliances

Lighting is one of the aspects that account for nearly half of the energy use in typical homes, and make up an even greater percentage in homes that are designed for net-zero energy. Using all compact fluorescent or LED (no incandescent, halogen or Edison) light bulbs is something every net-zero energy home should do. Major appliances should be purchased with the ENERGY STAR label. The most important appliances to buy are the refrigerator, the clothes washer, dishwasher, computers and electronics. Limiting the number of items that need to be cooled or frozen to the minimum needed also helps keep energy in check.

The role of occupants

An efficient occupant is the most important part of a net-zero energy home. You don’t have to suffer with uncomfortable thermostat settings and four-minute military showers. But turning off lights and appliances when you’re not using them and being vigilant about finding “phantom loads” (appliances that use energy even when turned off) is absolutely critical to success. The difference can easily be worth 2 to 3 kW of PV on the rooftop, which translates into thousands of dollars of upfront cost. We recommend using a monitoring system like the Energy Detective or the Site Sage. The graphic above is from the Site Sage in my home, which allows me to se which circuits are using the most energy and where my phantom loads are located.

Site Sage monitor to help identify energy use by circuit

Net-zero energy living isn’t a mainstream yet, but it’s also not difficult or out of reach. The most important thing is that energy efficiency isn’t an all-or-nothing proposition. Any of these strategies can be applied to any home, and you will see savings and help the environment. So there’s no need to wait until you can go fully net zero. Any Musser is the founder/principal of Vandemusser Design PLLC, an Asheville-based home energy efficiency company. A certified mechanical engineer, she provides design assistance, certification support and high performance home design services.
During the Green Gauge Assessment, an Assessor will thoroughly examine all areas of the home including the interior, attic, basement, crawl space and exterior. Windows and doors, walls, roof, foundations, heating systems and landscaping will be documented and assessed for energy efficiency. Diagnostic tools such as Blower door analysis, infrared imaging and zonal pressure testing will confirm and quantify areas of air leakage. The assessment is a lot like taking your car to the mechanic; the house is plugged into diagnostic equipment and given a thorough once over.

If the home receives a low score, don’t worry. The assessment will list recommendations to improve the score and increase energy efficiency. Scores can be re-calculated once the improvements are made. In fact, the Green Gauge Assessment will measure the potential carbon footprint reduction made once the improvements are in place. One important outcome of an assessment is the discovery of issues such as mold, water leaks, and foundation problems. Left undiscovered, these findings can cause real and expensive damage to a home and affect the health of occupants. Green Gauge assessors look at a home with an eye for durability, as durability and longevity are an often overlooked sustainable attribute.

A Green Gauge report is a great way for home builders and sellers to document the “green” features and efficiency of a home. A high Home Energy Score is enticing to buyers as it confirms that they are purchasing an energy-efficient home. It can also be a valuable tool for potential homeowners who want to know how factors such as energy and water usage will impact their overall cost of homeownership. Not buying or selling? Green Gauge can help you identify ways to save money, increase comfort and indoor air quality, reduce the home’s carbon footprint and take advantages of local utility rebates.

To learn more or schedule your Green Gauge Assessment, visit www.wncgbc.org. Marcus Renner has worked in most sectors of residential sustainable building for over 22 years. He owns Taras Property Management and renovates houses in Asheville and surrounding areas.

**S**avvy homeowners and buyers realize that a green, energy-efficient home adds value while saving money and resources. What is the best way to find out if a home is efficient and sustainable? Created by the WNC Green Building Council, Green Gauge is a simple, innovative, low cost assessment program working to help residents across North Carolina save money, reduce energy usage and live in homes that are healthier for themselves and the environment.

**Green Gauge** is perfect for existing homes or new homes that don’t use a rating system during construction. During a Green Gauge Home Assessment, homes are rated for energy efficiency based on the U.S. Department of Energy’s Home Energy Score (HES) criteria. Each home receives a score on a scale of 1-10, a score of 10 indicating that it is incredibly efficient. Homes are also evaluated for a variety of other factors including water usage, indoor air quality and building material sustainability. After the assessment, participants receive a straightforward, comprehensive report with recommendations on how to improve upon home efficiency and sustainability.

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The Asheville Habitat ReStore is known for affordable building supplies; from doorknobs to complete kitchen cabinet sets, its worth the stop on your way to the big box stores. If you have items you no longer need or want, Habitat will gladly take them off your hands. In addition to building supplies, the ReStore accepts and sells furniture, appliances, antiques, housewares, art, and much more.

Feel good about shopping and donating with us because the ReStore diverts more than 1,625 tons of usable material from the landfill each year and proceeds provide funding for Habitat’s home building and home repair programs.

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Greening the MLS
Evolving Real Estate systems to meet client needs

By Mary Love

How do we showcase the green features of a home? With an increased understanding of how our actions impact our health and environment and a demand for greener products and services, the Multiple Listing Services (MLS) now offers an efficient way for sellers to show buyers the green features of their homes. This is a great way to meet the expanding desire for greener real estate. The MLS is a collection of private databases used by Realtors®. Realtors® pay to utilize this system and are free to share this information with the public. Numerous websites that are free into the system and shared with agreements to share their listings. A great deal of information can be input into the system and shared with numerous websites that are free to the public.

In 2015, the MLS added energy efficiency and green fields to their system, enabling real estate professionals and home sellers to market properties efficiently. Green features have been shown to increase property values and selling prices. The new matrix system allows more features to be available to Realtors and for the public to efficiently determine just how green features and upgrades that will increase the value of the house. If the green features have not been marked, the improved value will not be noticed by the appraisers and the lenders.

In 2013, the Residential Green and Energy Efficient Addendum was created for appraisers to use for Green Homes. Builders, home owners and third-party verifiers are encouraged to complete and present this Addendum to appraisers, agents, lenders and homeowners. Many of the features listed in the Addendum are also features in the MLS. Now, everyone can truly compare “apples to apples” and create and energy-efficient homes.

WNCGB, Land of the Sky Association of Realtors and Asheville Home Builders Association offers a class for Realtors and builders, “Knowing and Using Your MLS Green Features.” Together, they are increasing awareness that green features are healthier for families, communities and our environment – carrying far greater value than cosmetic features.

Mary Love is a Realtor and the team leader for Love The Green Team. She is a certified HERS rater and teaches the Building Green Real Estate Courses. She can be reached at 828-279-6723 or marylovethegreen@gmail.com.

Going “g”
The Land of the Sky Association of Realtors® matrix MLS system utilizes a large scale program format and has several certification options for “Green Built” homes. The two most utilized programs in Western North Carolina are Green Built NC and ENERGY STAR. Additional features that can be selected include:

**BUILDING FEATURES**
- ■ Modified Framing/Concrete Construction
- ■ Engineered Wood Products
- ■ No-Low Voc Paints
- ■ Photovoltaic-Solar Power
- ■ Recycled Construction/ Household Waste
- ■ Spray Foam Insulation
- ■ Xeriscaping/Drought
- ■ Resistance Plants

**HEATING**
- ■ Active Solar Heat
- ■ ENERGY STAR HVAC
- ■ Fresh Air Ventilation
- ■ Geothermal
- ■ On-Demand Water Heater
- ■ Passive Solar Heat
- ■ Radiant Heated Floors
- ■ Tankless Combination
- ■ Non-light woodstove

**EQUIPMENT**
- ■ Dual Flush Toilets
- ■ ENERGY STAR Clothes Washer
- ■ ENERGY STAR Dishwasher
- ■ ENERGY STAR Freezer
- ■ ENERGY STAR Refrigerator
- ■ Low Flow Fixtures

**DOORS/WINDOWS**
- ■ Insulated Windows

**FLOORING**
- ■ Sustainable Flooring

**WATER HEATER**
- ■ Solar

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Collective impacts of Green Built NC

By Nathan Anderson and Sam Rupe-Eastes

P roviding actionable information is the strength of the WNCGBC as an institution, and the Green Built NC checklist facilitates a more integrated approach to design and construction. If you’re looking for professionals who know how to do this work, what you hold is a list of WNCGBC members who have the experience, holistic thinking, and direct capacity to help.

The WNCGBC has been providing residential green building programs since 2004. The first chapter was called NC Healthy Built Homes, which evolved into Green Built NC when WNCGBC took over administration in 2012. The team here wanted to know, “What is the collective impact and savings of these green homes?” One of the most compelling effects of the Green Built program has been the collective reduction in energy demand and resulting savings the homeowner will experience over the lifetime of their occupancy.

Of the 1,139 completed Green Built homes we analyzed, the average HERS index was 66. For those unfamiliar with HERS (home energy rating system), it is an industry standard that models energy use relative to a theoretical home at the same location. A code-built home in 2016 should theoretically be a HERS 100, while a typical resale home is around a HERS 130. Therefore, Green Built homes are, on average, 34 percent more energy efficient than a brand new, code-built home, and around 50 percent more energy efficient than existing homes.

Taking it one step further, the average home in North Carolina uses 13,632 kWh of electricity annually, and thus the average Green Built home can be assumed to use 7,054 kWh per year. This displaces 5,213,843 kg of CO2 emissions every year across 1,139 homes.

That’s also $308 in annual savings per home on electricity bills at $0.11/kWh for a collective total savings of $578,612 per year. There are a few complications to consider, and occupancy behavior is a deciding factor in energy use. For example, bigger houses use more energy, and a HERS score will not mean the same thing for a 1,000-square-foot house as a 10,000-square-foot one. As it turns out, the average Green Built home is about 3 percent larger than the average home built in 2015 in North Carolina, however it is possible that someone who chooses a Green Built home could be more in touch with their energy use than typical homeowners who are using to make up for that. No guarantee, though, so tack 3 percent back on that bill if you like.

Another issue is age. Our data goes back to 2005, but isolating the last ten years drops the average Green Built NC HERS index further to 55. There are also tiers of Green Built certification. Platinum homes score an average of a 26, saving homeowners around $1,124 per year following the same methodology as above.

The point of all this is that there is an unquestionable statistical correlation with Green Built NC, energy efficiency, and cost savings. If any of our clients are in the market for a home that makes a positive environmental impact, and costs less money to own, Green Built is an absolutely proven system to get you there.

One important strength of the Green Built program is its ability to elevate future building codes and provide a guide of what is possible on a larger scale. Indoor air quality is one such area, and as houses get better at keeping outside air out, they need ventilation to provide fresh air to occupants and control airborne contaminants that can affect respiratory functions. Radon infiltration is one health and safety issue that isn’t currently addressed by our building code despite being the second leading cause of lung cancer in the United States. All Green Built homes in Radon Zone 1 now require radon professional testing or mitigation (with testing required in Radon Zones 2 and 3), again supplying a blueprint for future code development. Green Built also incentivizes protecting our water resources, regarding the selection of low-flow fixtures and appliances, watershed-friendly landscaping, and collection of rain for irrigation. Following Green Built specifications can reduce water consumption by more than 50 percent compared to typical fixtures, which, according to the EPA, equates to about 50 gallons a day per person. That means that if every home in North Carolina were Green Built, we would save 181 billion gallons of water annually, enough to water our state’s potato crop for three-plus seasons.

Another way to protect our water and air is by incentivizing trees preservation and planting. Following Green Built tree planting guidelines would net 2.7 million trees on residential land in WNC, or 139,000 trees in the city of Asheville just in backyards. For perspective, there are about 23,000 trees in central park.

The way we build, and the environment we build in, has a huge impact on the community that emerges from our development. Incentivizing the stewardship, using responsible forest products, and building for energy efficiency and water conservation are clear and available ways to minimize our footprint. Protecting what we have, particularly in such a dramatically beautiful, magnetic and fragile place like Western North Carolina, is a requirement if we want to keep living here.

Fortunately, green building doesn’t cost extra over time, it is an investment that pays off for the community and for us. A rising tide lifts all boats, and if we don’t have to be an environmentalist to appreciate sustainability and its effect on the built environment, the City of Asheville is notorious for natural beauty and open-minded character. However, rampant suburban sprawl and short-sighted development can do major damage to our sense of community. Let’s continue to make this place a beacon of progress, and not a cautionary tale. Be proud of green spaces, pedestrian accessibility, walkable neighborhoods, and front porch conversation. There is always room for improvement, and it starts with whomver has this directory in their hands. Thanks for reading.

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Jackie Tatelman
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Your home as an ecosystem

Seven characteristics of green and healthy homes

Homeowners often take health and wellness for granted. Though the healthiness of a home may seem all bright and sunny on the outside, there are thousands of factors that contribute damage to the building and to occupant health. Rick Bayless

A good foundation for understanding the ecosystem of homes may be found in the seven characteristics set forth by the National Center for Healthy Housing. These guidelines are foundational to the knowledge the indoor air quality industry is built on. Professional environmental health specialists in any field work with these seven considerations when they seek to understand the impact of the built environment on health.

The seven characteristics of the home are as follows:

Safe

Safety is number one among an environmental investigator’s concerns when examining a home. The obvious hazards, such as mold, asbestos, lead paint, carbon monoxide, and cigarette smoke, demand the first consideration when examining any property.

Maintained

The maintenance of the house is critical. Homeowners must address their needs in a timely manner. In the case of the HVAC, or heating, ventilation, and air conditioning system, the timely attention to the system is critical to the healthy environment of the home. The HVAC, or heating, ventilation, and air conditioning equipment is also responsible for the air quality of the home. The HVAC system provides the air pressure that keeps the house sealed and prevents drafts.

Clean

The cleanliness of the home is critical to the health of the occupants. The HVAC system can be an important contributor to the air quality of the home. If the HVAC system is not clean, the air quality can be compromised. The HVAC system must be cleaned regularly to ensure that the air being delivered to the home is clean and free of allergens and other contaminants.

Dry

Dryness is another important consideration. The air in the home should be dry enough to prevent the growth of mold and mildew. This is especially important when the home is heated with a gas or oil furnace. A gas or oil furnace can create a wet environment inside the home. The humidity level in the home should be maintained at a level that prevents the growth of mold and mildew.

Ventilated

The ventilation of the home is critical. The ventilation system must be able to bring in fresh air and remove stale air. The ventilation system must be able to remove moisture from the home and prevent the growth of mold and mildew.

Productive

The productivity of the home is critical to the health of the occupants. The home must be able to provide a comfortable living environment for the occupants. The home must be able to maintain a constant temperature and humidity level. The home must also be able to provide adequate lighting and ventilation.

Maintained

The maintenance of the home is critical to the health of the occupants. The home must be able to provide a comfortable living environment for the occupants. The home must be able to maintain a constant temperature and humidity level. The home must also be able to provide adequate lighting and ventilation.

Healthy

The health of the home is critical to the health of the occupants. The home must be able to provide a comfortable living environment for the occupants. The home must be able to maintain a constant temperature and humidity level. The home must also be able to provide adequate lighting and ventilation.
Assessment, contact the WNC Green Building Council helping you understand the true cost of home ownership.

Buying a home?
Provide buyers with a Green Gauge Assessment in order to highlight your money in your home.

Putting your home on the market?
Have an assessment done and learn about easy ways to save energy, water and sustainable and efficient materials and, with a doctor’s letter, sold to us without any flame retardant. Any fabrics, including sheets and ‘baby bumpers’ were cotton and washed before fabrication and installation. The home’s HVAC system was clean, and there was a big window in the room for natural ventilation. Done! I was confident I had done my best. We finished the job months in advance of her due date to allow for any possible emissions out gassing. I complet-
ed the job, wished them well, and waited to hear from my friend to come see her new little blessing. And so I did. I got word of her little boy’s arrival, and soon was invited to come say “Hello.” I entered the new nursery and was shocked! I was immediately struck by the strong smell of plastic. What had gone so terribly wrong? I looked around, and it was obvious. The room was full of all kinds of baby gifts and stuffed animals, rubber play things, and plastic baby toys from friends and well wishers.

And so we are reminded that the road to a healthy life is a com-
plicated one. It takes our engag-
ing of fine green design and building professionals, our own pro-active research into the fine print of that myriad of materials and products we bring into our homes, and every moral of food or chemi-

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Permaculture
Green Building meets its revolutionary cousin

By Sam Ruark-Eastes

B y now, you might have heard of permaculture. The ecological design system has reached the mainstream consciousness with articles in The New York Times and many other publications. It’s estimated that more than 50,000 people in the U.S. have taken a 72-hour permaculture design course.

Permaculture (from “permanent culture”) is a holistic process connecting site design, ecosystem restoration, food and medicine cultivation, home building, urban planning, and social design. It is a movement to guide sound land use and the building of sustainable communities through the interrelationship of energy, water, soil, plants, animals, and humans. As Graham Burnett says, “Permaculture is revolution diagnosed as organic gardening.”

This system, which emerged in Australia and found its way to Western North Carolina, is an epicenter for permaculture education, resources, projects, and design professionals. Check out these local permaculture organizations:

- Asheville’s Institute: www.ashevillepermaculture.org
- Grass to Greens: www.grass2greens.com
- Organic Growers School: www.organicgrowersschool.org
- School of Integrated Living: www.schoolofintegratedliving.org
- Wild Abundance: www.wildabundance.net

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The Green Built NC guidelines encourage permaculture. Measures and design elements can help evolve green building.

- Do not build in the floodplain or within 100 feet of a body of water.
- Greywater systems.
- Composting toilets.
- Rainwater catchment systems.
- Passive solar design.
- Solar electric and solar hot water heating.
- Use permeable materials for 50 percent of driveways and patios.
- Use permeable materials for driveways (except for required curb cut).
- Vegetated roof system to reduce impervious surface.
- Remove existing invasive plant species from the landscape.
- Preserve existing and plant new trees.
- If trees are removed during construction, 80 percent of them are milled and used onsite.

Additionally, The Green Gauge program encourages the planting of edible landscapes, walkable communities, development, and site restoration to minimize stormwater runoff and create rain gardens and rich, abundant landscapes that retain water, grow food, create habitat, and provide beauty.

Building codes need to evolve to legalize and encourage things like greywater systems, composting toilets, and some natural building techniques and materials. As more people use these products and systems, the familiarity will increase, the precedent will be set, and regulators will get more comfortable seeing them.

If you are searching for a good introduction and overview of permaculture read “Gaia’s Garden” by Toby Hemenway. He is a LEED AP and Certified Permaculture Designer.

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A permaculture landscape transformation with fruit trees, berry bushes, and culinary herbs. Daily Area photo
**Support your local forests**

*Root Cause to connect sustainable forestry to local builders*

By Lang Hornthal

Support your local forests. Root Cause, an advocacy group for the wise management of private forests, is completing his Masters of Science in Sustainability where wise forest management was proven to increase the health of a forest while improving the quality of the trees being grown. There is also a history of abusing our forests, but the beauty seen in our surrounding forests is a reminder that our forests are resilient and renewable. Today, clear cutting and illegal harvests have taken a backseat to invasive species and climate change as the biggest threats to our forests. Regardless of the threat, the need for sustainable forestry remains.

Sustainable forestry means different things to different people. To some, it is more conservation-oriented where a forest’s health is for the benefit of the ecosystem services they provide: clean air and water, biodiversity, and wildlife habitat, just to name just a few. To others, sustainable forestry is the management of forests for increased yield and healthy forests which are shared with the immediate public and end-users. Once again, more money stays in our region under this eye stays in our region under this scenario. This exponentially supports our communities, particularly the more rural counties with a history of relying on forests for survival. We will also begin to see many wood products return to our region after losing market share due to a global marketplace and the most recent economic downturn. While the economy has returned, resulting in a regrowth in the building industry, the competition from outside goods remains. Often, these goods are competitively priced and produced on a scale in which smaller mills cannot compete. But, like all markets, there is more to something than just the lowest price. Like knowing where your wood came from and who cut the tree and turned it into a product with a story behind it and a quality that could be relied upon. By using local materials, you are contributing to an economy that breeds accountability and transparency by creating relationships that go beyond a Google search and an email.

By using local materials, you are contributing to an economy that breeds accountability and transparency by creating relationships that go beyond a Google search and an email.

The complexity of forest ecosystems is incredible and how forests are best utilized will always mean different things to different people. Solitude, recreation, and livelihood are just a few, but all acknowledge that the importance of forests cut across all sectors of society. But, in the end, with the exception of our phenomenal public forests, trees are private commodities that give benefits which are shared with the greater public. The clean air we breathe, water we drink, and view-sheds we enjoy are the direct result of private landowners, many of whom have management plans that benefit their forests health. Without conscientious landowners, Western North Carolina would not likely be the place that it is today.

So, how do we support those landowners and their forests that support our region? One way is by acknowledging the efforts made by landowners to certify their forests. Forest certification is a mechanism for gauging the quality of forest management against a set of standards that are meant to account for many aspects including growth, harvesting and ecological permanence associated with harvesting. Certification not only improves the value of the trees grown, but also signals the level of commitment that the landowner is giving to their forest’s management. These benefits come with an added layer of management, requiring third-party certifiers to inspect and verify the management efforts. But, access to certified wood markets and healthier forests make it worthwhile. Another way to support your local forests is to buy local wood. Not all landowners are in a position to certify their forest, but when local wood markets are vibrant, demand will drive pricing that adequately values local wood and encourages those owners to maintain their forests, rather than converting them to other uses. It also means that more wood stays in our region, creating a smaller carbon footprint, and supporting local sawmills, wood processors, and end users. Once again, more money stays in our region under this scenario. This exponentially supports our communities, particularly the more rural counties with a history of relying on forests for survival.

To learn more about Root Cause and to find more information on local forest products, visit www.rootcausenc.org.

Lang Hornthal is the owner of Appalachian Compliance Path (ACP), a pilot program designed to advance environmentally responsible forest management practices while promoting the use of responsible wood sourcing. ACP seeks to expand the range of responsible forest products for LEED credits by recognizing Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), American Tree Farm Systems, and other programs endorsed by the Programme for the Endorsement of Forest Certification. The intent of the program is to promote wise forest management and minimize the illegal procurement of wood. It will also benefit local forest products. Asheville residents are well known for buying local and supporting local farmers’ markets and local businesses through their Go Local program. Buying local often means keeping up to three times more money in the local economy. It lends greater support to our community and civic needs. Buying local forest products offers the same opportunity, but it is unique in that it also supports the use of a raw material also found in our backyard.

Appalachian Compliance Path is a member of the Alternative Compliance Path (ACP) network, an advocacy group for the wise management of private forests, is completing his Masters of Science in Sustainability where wise forest management was proven to increase the health of a forest while improving the quality of the trees being grown. There is also a history of abusing our forests, but the beauty seen in our surrounding forests is a reminder that our forests are resilient and renewable. Today, clear cutting and illegal harvests have taken a backseat to invasive species and climate change as the biggest threats to our forests. Regardless of the threat, the need for sustainable forestry remains.

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By Lang Hornthal

Support your local forests. Root Cause, an advocacy group for the wise management of private forests, is completing his Masters of Science in Sustainability where wise forest management was proven to increase the health of a forest while improving the quality of the trees being grown. There is also a history of abusing our forests, but the beauty seen in our surrounding forests is a reminder that our forests are resilient and renewable. Today, clear cutting and illegal harvests have taken a backseat to invasive species and climate change as the biggest threats to our forests. Regardless of the threat, the need for sustainable forestry remains.

Sustainable forestry means different things to different people. To some, it is more conservation-oriented where a forest’s health is for the benefit of the ecosystem services they provide: clean air and water, biodiversity, and wildlife habitat, just to name just a few. To others, sustainable forestry is the management of forests for increased yield and healthy forests which are shared with the immediate public and end-users. Once again, more money stays in our region under this scenario. This exponentially supports our communities, particularly the more rural counties with a history of relying on forests for survival. We will also begin to see many wood products return to our region after losing market share due to a global marketplace and the most recent economic downturn. While the economy has returned, resulting in a regrowth in the building industry, the competition from outside goods remains. Often, these goods are competitively priced and produced on a scale in which smaller mills cannot compete. But, like all markets, there is more to something than just the lowest price. Like knowing where your wood came from and who cut the tree and turned it into a product with a story behind it and a quality that could be relied upon. By using local materials, you are contributing to an economy that breeds accountability and transparency by creating relationships that go beyond a Google search and an email.

By using local materials, you are contributing to an economy that breeds accountability and transparency by creating relationships that go beyond a Google search and an email.

The complexity of forest ecosystems is incredible and how forests are best utilized will always mean different things to different people. Solitude, recreation, and livelihood are just a few, but all acknowledge that
The journey to being a better corporation

“A great fit for green building

The built environment comprises a huge component of our daily lives. The green-building industry should be a natural place for B Corporations, as many green building practices have social and environmental aims. From the perspective of a customer who wants to build a green home, all Corp offers a great way to ensure that the company values reflect your values. Some of the practices that are recognized by B Corp certification:

• Provides a living wage for all employees, ensuring that your green home is built by people who are likewise invested in, and can equally afford, to stay in this community.

• Environmental sustainability on a deep level. Products that reduce waste, are made of materials sourced from other suppliers who have programs for sustainability, that do not contain harmful chemicals, and that exceed industry standards for energy efficiency.

• Partnering with local nonprofit and advocacy groups to educate and influence state-level policies supporting green building and energy efficiency in the built environment. In our case, we have partnered with great organizations like the WNC Green Building Council and the North Carolina Building Performance Association.

How it helped us

Sustainability has been a priority for our company since the beginning, so some parts of our B Corp certification process were simple. We had already been producing our personalized home product with 100 percent renewable energy and monitoring our process for waste reduction — with more than 78 percent of excess material diverted from the landfill. Other parts of the certification process forced us to push deeper, a great thing for our growth.

• Better documentation. Since setting out to achieve B Corp Certification, we’ve realized the importance of documenting some of the sustainability policies that as a small business, we had been doing but not thoroughly tracking. For example, how many of our clients exceed our energy-efficiency goals, and by what amount? What feedback do we get adequate consulting on our interior environment? This has helped us see patterns in our projects, maintain knowledge and push for even greater improvements.

• Increased transparency and dialogue with employees. We needed our employees to have a better understanding of where our company stood, and how their efforts were helping move the company forward. Like all companies, we want our employees to stay invested, so we created new programs to give all employees a chance to generate ideas for the company and participate in the process of bringing those ideas to fruition.

B Corporations represent the evolution of capitalism, a recognition that for-profit companies can, and should, use their enterprises to drive positive change.

It has already been clear that this designation has helped us build value with our clients. Although we already offer a unique product, certification gives clients another compelling reason to spring for us over someone else who may be less expensive, but who also offers less. Being a B Corp also lets us into a wide community of other B Corps of all sizes (such as New Belgium and Patagonia), bringing their missions to our work in their own unique ways, with whom we can share ideas and learn ways to keep improving.

Lastly, B Corp Certification gives us a motivation to keep asking deeper questions of ourselves. Are we continuing to live up to our sustainability mission, and how can we see all of our (now well documented) policies and metrics to keep doing better? How do our employees’ needs change? How does our business and our product affect our community in ways that we hadn’t even thought of before?

Leigha Dickens is Green Building and Sustainability Manager for Deltec Homes, a manufacturer of hurricane-resistant, energy-efficient and net-zero homes for more than 40 years. She helped her Deltec homes through the B Corp certification process. She is a RESNET HERS Rater and graduate of UNCA Asheville with a degree in physics.

Learn More

The B Corp movement is growing, and there are numerous ways to take part locally:

• Online at www.bcorporation.net

• Mountain Bizworks has partnered with local B Corps to host educational events for the community. On June 21, 2016, a B Corp Hack-A-Thon was held where interested parties could come ask questions and meet B Labs representatives. www.mountainbizworks.org/ community-planning/start-up- entrepreneur-classes/entrepreneurship-workshop

• B Corp Meetup Group: www.meetup.com/ Asheville-B-Corp

For good.”
Smart practices in water conservation

By: Brian Knight

Water and energy use are connected. Saving energy reduces water pollution. Conserving water reduces energy use. Coal-fired power plants consume extreme amounts of water to produce electricity. Mining and burning coal pollute our streams, lakes, and oceans. Natural gas facilities pollute ground and surface water affecting people’s drinking water. One excellent path for improving our environment’s water quality involves spending for improving our environment’s surface water affecting people’s gas extraction pollutes ground andsume extreme amounts of water.

Energy STAR offers a 2016 review of the most efficient washing machines available. If buying new, or replacing existing, this investment is solid. Extra effort spent sourcing more efficient models has big paybacks. Existing homes should consider replacing older plumbing faucets and choosing the most efficient washing machines and dishwashers. Most of the largest-volume water using appliances are energy intensive, particularly those that are energy-aged. It takes enormous amounts of energy to heat water. That energy can be reduced by improving existing equipment, considering new equipment, and making sure your water heater is efficient.

-redoubling hot water usage. The large toilet consumption being a new home’s hidden opportunities will be available. It’s important to note that water use indoors. Leak-detection devices may be considered for homes looking to cut water use and reduce problems. Most leakages are probably from the common issues associated with a toilet’s upper tank. Learning to fix these simple problems can be a plumber’s easiest task. Improving plumbing can be more cost-effective approaches to water conservation. Hot water always offers the fastest paying investments.

Cost-Effectiveness Starts with Hot Water

It takes enormous amounts of energy to heat water. That energy is typically supplied by nuclear and fossil fuels. The biggest fiscal and environmental benefits start with reducing water usage.

Showerheads

Showerheads use that 2.5 gal-

per minute still represent one of the fastest paying investments in energy and water conservation, especially when compared to older or higher flow heads.

Washing Machines

The No. 2 hot water user and most important appliance invest-

ment for energy and water con-
servation. ENERGY STAR offers a 2016 review of the most efficient washing machines available. If buying new, or replacing existing, this investment is solid. Extra effort spent sourcing more efficient models has big paybacks.

Efficient Plumbing Design

• New construction offers enor-

mous opportunity for a more-

top three ways to improve energy and water conservation,

Dedicated pipes of a smaller diameter run to individual fixtures. Typical trunk-and-branch layouts have larger diameters which take longer to flush with hot water from the water heater. Smaller pipes have less water to flush but need dedicated lines for enough pres-
ture. We find it tough to make cost-effective with the extra material and labor charges. A typical trunk- and branch-system can often be designed to be nearly as effective with reduced costs.

Hot Water Recirculation

Circulating hot loops are more of a convenience but do save water. Most systems exist in big homes with lots of space between home and water heaters. The fastest that sinks and showers require more from circulation or an ad-
nual member appreciation party & cider fest a success!

Thank you to our generous donors

who helped make our Annual Member Appreciation Party & Cider Fest a success!
Sealing the envelope

Small measures can equal great gains in efficiency

Air sealing Checklist

- Sealing is a crucial part of building a healthy, energy-efficient home. Below is a checklist of items to use to ensure proper air sealing when building or renovating a conventional stick-frame home. A leaky home will decrease the R-value of your insulation (the measure of how well your insulation resists heat flow), create unwanted drafts and comfort issues, and bring moisture and pollutants into the home. As the saying goes, “Seal it tight, and insulate it right!”

- All holes or penetrations in the building envelope are sealed with a material capable of stopping air flow, such as caulk, foam or rigid material (fiberglass insulation does not stop airflow).
- Windows and exterior doors are sealed with backer rod, caulk or non-expanding spray foam.
- Electrical, plumbing and HVAC penetrations between conditioned and unconditioned space are sealed with caulk or spray foam.
- The bottom and top plates of exterior walls and walls to the attic are sealed with caulk or ill seal.
- Band joints are sealed with caulk, spray foam, or gasketting between the top plate and band joint, between band joint and subfloor and at any penetration. Any joints or other cavities that span from conditioned to unconditioned spaces are blocked off and air sealed.
- All Chase ways that would allow unconditioned air to enter into the conditioned building envelope are capped and sealed.
- Exterior walls behind tub and shower enclosures are insulated. Prior to installing the tub or shower, a rigid, durable air barrier is placed in direct contact with the insulation.
- Insulation wind baffles to block windwashing at all attic eave bays in roof assemblies with soffit vents are installed.
- An air barrier is blocking any exposed edges of insulation, particularly for cantilevered floor systems and floors above a garage.
- Porch roof and exterior wall.
- For dropped ceilings, a rigid air barrier is fully aligned with the insulated framing in the framed shaft behind the fireplace and any gaps are fully sealed with foam, caulk or tape.
- Porch roof, a rigid air barrier is installed at the intersection of the porch roof and exterior wall.
- For dropped ceilings, a rigid air barrier is fully aligned with insulated framing and any gaps fully sealed with caulk or foam.
- Recessed light fixtures (if installed) in insulated cavities, such as the ceiling between the house and the attic are rated ICAT (Insulation Contact Air Tight). Once installed, they are sealed to the drywall with gasket, caulk or foam.


HVA C Checklist

A home can be heated or cooled using electricity, gas, geothermal energy, solar energy or a combination of energy sources. Radiant floor-heating systems are an inherently efficient way to heat, since there is no heat lost through ductwork, but a forced-air heating system can also be a very efficient option if designed and installed properly. The items on this checklist should be considered when installing any type of ducted system.

First off, a room-by-room manual heat-loss/heat-gain calculation must be completed. The maximum-oversizing limit for air conditioners and heat pumps is 15 percent. Adhering to the maximum-oversizing limit both ensures that you are not paying for more capacity than you need and that the system will properly dehumidify the home and run efficiently.

- Heat pumps and air conditioners have a Seasonal Energy Efficiency Ratio (SEER) rating and a Heating Season Performance Factor of at least 7 HSPF. Gas furnaces used with either primary heat or backup heat have a rating of at least 90 Annual Fuel Utilization Efficiency.
- Ductwork is located and the mechanical unit in the conditioned space, if possible. All ductwork has an insulating value of R-8. Use rigid-metal ductwork for increased durability and air quality. Rigid metal is easy to clean, and will not trap dust or absorb moisture.

- Building cavities, such as floor joists, are not used as part of the forced-air supply or return system.
- All joints/seams in the air-distribution system are sealed using fiberglass mesh tape and duct mastic. This includes duct connection to metal boots (in subfloor), trunk lines and air-handler units. The insulating liner of the ducts is also sealed with mastic.
- Indoor and outdoor HVAC units are matched according to the Air-Conditioning & Refrigeration Institute Directory or the manufacturer’s listings.

The correct charge of refrigerant has been installed per the manufacturer’s specifications.

- Registers and diffusers have proper throw and spread to keep rooms properly conditioned as the load specifies.
- Duct dampers are installed and accessible on supply vents. The dampers make it possible to adjust the flow and spread of air from the registers.
- Ducts are sealed and tested by a Home Energy Rater to have no more than 5 percent leakage.
- If installing a heat pump, an outdoor thermostat is installed to control when the electric heat strip power is on. This will maximize your efficiency.

A programmable thermostat is installed.


“Leaky home will decrease the R-value of your insulation, create unwanted drafts and comfort issues, and bring moisture and pollutants into the home.”
The contents of this directory are approved by the WNC Green Building Council Board of Directors and are intended for informational purposes only. The WNGC does not endorse or recommend the products or services mentioned herein, and disclaim any and all warranties, express or implied, in any way related to advertisements, events, businesses, organizations or other information presented within the Green Building Directory.
“Climate change is not just a matter of survival. It is a matter of health, of the very core of our lives.” — Vandana Shiva

#DidYouKnow:
- Climate change is not just a matter of survival. It is a matter of health, of the very core of our lives. (Vandana Shiva)
- Green Building 2016-17
- Energy saving tips: energy.gov/energysaver

“Climate change is not just a problem for the future. It is impacting us everyday, everywhere.” — Vandana Shiva
Crawlspace Sealing

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Crawlspace Sealing
Ready Homes! Now providing verification for Homes and Duke/Progress Rebates.

### Insulation

- **Green Built Environments**: 2308 Old Haywood Rd, Asheville, NC 28805 828.925.4884
- **Dakota Builders Insulation**: 5988 Pinnacle Rd, Asheville, NC 28805 828.283.8800
- **Luber Insulation**: PO Box 923, Asheville, NC 28812 828.648.8060

### HVAC Installers

- **D & J Properties**

### Landscaping

- **SEED**: 79 Sylva Ave, Asheville, NC 28803 828.530.2300
- **Fireplaces of N.C.**: 35 W. Asheville Hwy, Asheville, NC 28803 828.707.2919
- **MudStrawLove LLC**: 512 Old Haywood Rd, Asheville, NC 28806 828.551.8656
- **ROXUL Insulation**

### Lenders

- **Prime Mortgage Lending**: 74 Hendersonville Rd, Asheville, NC 28806 828.258.1290
- **WNC Mortgage**: 2398 Patton Ave, Asheville, NC 28805 828.259.6200

### Interior Designers

- **Kichney Design Studio**: 344 Eramond St, Asheville, NC 28801 828.327.2401
- **Allard & Roberta Interior Designers**: 38 Old Charlotte Hwy, Asheville, NC 28801 828.277.4330
- **Shut it down**: 36 Old Haywood Rd, Asheville, NC 28803 828.789.4668

### Shuttering

- **Thermacraft**: 1017 Valley Rd, Asheville, NC 28803 828.232.9500

### Shopping

- **MudStrawLove LLC**: 512 Old Haywood Rd, Asheville, NC 28806 828.551.8656

### Stone

- **RockStar Marble & Granite**: 69 Old Haywood Rd, Asheville, NC 28803 828.789.9281

### Sustainable Design

- **Kichney Design Studio**: 344 Eramond St, Asheville, NC 28801 828.327.2401

### Sustainable Development

- **G4S**: 225 Hendersonville Rd, Asheville, NC 28803 828.235.8400
- **Green Environmental Services**: 17 Haywood St, Suite 100 Asheville, NC 28801 828.253.8955

### Technical Services

- **VandeMusser Design**: 38 Old Charlotte Hwy, Asheville, NC 28801 828.232.4723

### Technology

- **Dakota Builders Insulation**: 5988 Pinnacle Rd, Asheville, NC 28805 828.283.8800
- **Luber Insulation**: PO Box 923, Asheville, NC 28812 828.648.8060

### Testing

- **Fireplaces of N.C.**: 35 W. Asheville Hwy, Asheville, NC 28803 828.707.2919

### TV Installation

- **WNC TV Installation**

### Ventilation

- **Bull Mountain Heating & Cooling**: 18 Clingman Road, Asheville, NC 28805 828.258.9283
- **Dakota Builders Insulation**: 5988 Pinnacle Rd, Asheville, NC 28805 828.283.8800

### Water Filtration

- **Dakota Builders Insulation**: 5988 Pinnacle Rd, Asheville, NC 28805 828.283.8800

### Windows

- **Fireplaces of N.C.**: 35 W. Asheville Hwy, Asheville, NC 28803 828.707.2919
- **MudStrawLove LLC**: 512 Old Haywood Rd, Asheville, NC 28806 828.551.8656

### Winterize Your Home

- **WNC Home Energy Raters**: 225 Hendersonville Rd, Asheville, NC 28803 828.232.9500

### Written Word

- **VandeMusser Design**: 38 Old Charlotte Hwy, Asheville, NC 28801 828.232.4723
If you plan to design or build your own house or do an extensive remodel on an existing house, optimizing home energy efficiency is crucial. If you plan to design and build a new home or do an extensive remodel on an existing house, optimizing home energy efficiency is crucial. If you plan to design and build a new home or do an extensive remodel on an existing house, optimizing home energy efficiency is crucial. If you plan to design and build a new home or do an extensive remodel on an existing house, optimizing home energy efficiency is crucial. If you plan to design and build a new home or do an extensive remodel on an existing house, optimizing home energy efficiency is crucial. If you plan to design and build a new home or do an extensive remodel on an existing house, optimizing home energy efficiency is crucial. If you plan to design and build a new home or do an extensive remodel on an existing house, optimizing home energy efficiency is crucial. 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Roofer services continue — Sustainable Wood Products

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Pam Tanis @ duke-energy.com
www.duke-energy.com/wholesale
Customers Home Services is committed to improving the quality of life for people and the environment. Their team of highly trained and experienced professionals focuses on sustainable construction, green building practices, and energy efficiency. With their expertise, they aim to create a more sustainable future for all. Duke Energy Progress offers a wide range of services, including energy management programs, solar power, and renewable energy solutions. Their experienced team of professionals is dedicated to providing efficient and effective solutions to meet the energy needs of their customers. Duke Energy Progress is committed to leading the transition to a clean energy future.

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Brenner Tunnel is a comprehensive service provider with a diverse range of services. They specialize in energy management programs, solar power, and renewable energy solutions. Their team of professionals is dedicated to providing efficient and effective solutions to meet the energy needs of their customers. Brenner Tunnel is committed to leading the transition to a clean energy future.

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Kee Molding & Surveying is a valuable resource in the construction industry. They offer services such as surveying, mapping, and land planning. Their team of professionals is dedicated to providing accurate and reliable survey data to meet the needs of their customers. Kee Molding & Surveying is committed to providing high-quality services to create a better future.

The Asheville Habitat Re-Store
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The Asheville Habitat Re-Store is a nonprofit store dedicated to helping individuals and families in need. They sell donated items to the public, with proceeds used to support Habitat for Humanity programs. The removal of usable materials from construction sites can reduce waste and help improve environmental sustainability. The Re-Store offers a wide range of items, including furniture, appliances, and building materials. They strive to provide quality items to those in need.

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Robert Jacobelly
www.surefootbuilders.com
Sure Foot Builders Inc. is a dedicated team of professionals focused on providing top-quality services for their clients. They are committed to creating a sustainable future through their transparent business practices. Their team is dedicated to honesty, integrity, good communication, and transparency in their work. With a focus on artistic and creative design, Sure Foot Builders Inc. aims to enhance the quality of life for people and the environment.

High Country Timberframes & Gallery Woodworking Co.
200 Ridge
Asheville, North Carolina 28802
828.216.9549
michaelstageman@gmail.com
www.ashevillehabitat.org
High Country Timberframes & Gallery Woodworking Co. is a leading manufacturer of high-quality, sustainable wood products. They strive to improve the quality of life for people and the environment by creating beautiful and functional products. Their commitment to sustainability is evident in their range of products, including Locally made cabinets, doors and energy star rated windows. High Country Timberframes & Gallery Woodworking Co. is dedicated to making a difference in the world of sustainable and reclaimed wood products.

Habitat for Humanity
68 West Chapel Road
Asheville, North Carolina 28814
828.698.2051
darby@habitatnc.org
Habitat for Humanity is a global nonprofit organization dedicated to eliminating poverty housing. They work alongside families in need to build homes and improve the quality of life. Habitat for Humanity Asheville has a mission to provide safe and affordable homes to families in need. They operate in a transparent and efficient manner, ensuring that every dollar is used to its full potential.

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DESIGN FOR EFFICIENCY
Reducing energy use in your home saves you money, increases your energy security, and reduces the pollution that is emitted from non-renewable sources of energy. There are many ways you can reduce electricity use in your home:

- Appliances and electronics: Purchase energy-efficient products and operate them efficiently.
- Lighting: Purchase energy-efficient products, operate them efficiently, and incorporate more daylighting into your home. Consider high-efficiency windows and skylights.
- Electric space heating and cooling: Purchase energy-efficient electric systems and operate them efficiently. Incorporate passive solar design concepts into your home, which include using energy-efficient windows. Properly install and seal your home.
- Water heating: Purchase an energy-efficient water heater and operate it efficiently. Or select an energy-efficient water heater that doesn’t use electricity.

As the owner of a firm that builds Green-certified homes, above all I value keeping the Appalachian ecology whole. By building energy-efficient homes on modestly sized, urban infill lots, we offer smart designs and a small footprint.

The added beauty of our business model is that our clients are protected from unexpected costs.

As a family man and community member, it’s important that my firm is built on a solid foundation of trust, effective communication, and lasting results, with respect for the natural landscape. - BEACH HENSLEY, OWNER
Homes built by Blue Ridge Energy Systems are often passed down like treasured heirlooms. And why not? They’re beautiful. Affordable to build. And can be heated and cooled for approximately $200 annually. We’d be delighted to show you how our super-energy efficient homes will deliver several lifetimes of comfort and cost-savings. Visit us at BlueRidgeEnergySystems.com or call (828) 775-8665.