



Feathering a Green Nest on Greenbury Point

An Adventure in Building Green

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and Ken Green

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Environmental scientist Dr. Kenneth Green is not easily intimidated. Green was a Peace Corps wildlife biologist in Colombia, participated in a Venezuela mammals and tropical ecology project, and conducted the first scientific study of Brazil's Golden Lion Tamarin (a endangered species of monkey) in its only protected reserve. For the past 35 years, he has worked in over 40 countries, focusing on the environment, natural resources, health, water and sanitation, agriculture, rural development, energy and more.

He thought his varied experiences and expertise prepared him to plan and build a truly green house on the water near Annapolis' historic Greenbury Point, a 231-acre peninsula at the mouth of the Severn River used by Naval Academy midshipmen for tactical training exercises. He was wrong. Nothing could quite prepare him for his "adventure" which took approximately three and a half years, including two and a half years just to obtain building permits. He researched almost every material, system, appliance, and technology available or related to green building and, though his mind is trained to process data, still found an almost bewildering array of products. Some alternatives were completely environmentally sustainable, some less so. He did exhaustive cost-to-benefit studies before making choices, far more than the average homeowner would do, trying to determine which was best suited to his purposes – and that he could afford. He shares his journey to help others navigate their own way through what can be a confusing, though ultimately rewarding, process.

Green's first big task was finding a lot to build on. He chose a narrow lot on Martin's Cove, an estuary he was thoroughly familiar with, having kept his sailboat there for many years. It is a quiet, well-protected tidal cove

near Greenbury Point and only minutes from the Bay by boat, lined with residences on wooded lots. His lot presented several challenges right off the bat. It is very narrow and on a steep slope, cut in two parcels by the county road, and is the discharge channel for the local micro-watershed – every time it rained, a river ran through it.

He solved the drainage issue by building a coastal outfall, probably the only privately maintained one in the county. Planned to greatly exceed County code requirements for storm water management, it is a deep ditch lined with several tons of gravel and sand, then with soil, mulch, and large rocks. Its design has several catch pools to slow and filter the water. The outfall is planted with native species, integrated to bloom consecutively to maximize their attractiveness to insects and other wildlife. It's similar to a rain garden but can handle heavy storm flows easily. Where it meets the cove, a lush growth of native plants helps filter the water further.

Anne Arundel County provides water to the community but not sewer services, so the next hurdle was to figure out how to handle the septic outflow. Since the house had to be built on the lower portion of the lot, a system of piping was drilled up the hill, under the county road, to pump wastewater to the upper lot where a FAST (Fixed Activated Sludge Treatment) system reduces nitrogen through biological, bio-chemical and physical processes. Green had originally planned to put in composting toilets, but by County code he would have had to also put in a conventional system, so what would be the point? He also had planned a separate gray water system, using water from showers, tubs and sinks for watering the landscape, but the current County code does not allow for that either.



This page and opposite: Dr. Ken Green reports, as of this writing, that his utility bill for all systems in his home, including filling up his propane tanks, averages approximately \$210.00 per month. This includes operating his hot tub 24/7.



This little summer fishing shack came equipped with a working outhouse when Dr. Ken Green purchased the lot in 2006. Both outhouse and cottage were torn down to make room for GreenNest



To trim costs, Dr. Kenneth Green lived at the end of his dock on his sailboat, Garza Grande, a 40' Tashiba. He moved in on March 1st just in time for a rare record-breaking cold front. When he woke up that first morning, his hatch was frozen shut. "I wondered what the heck I had gotten myself into," he recalls.

Green investigated solar systems for hot water and electricity. He discovered that solar power would handle only about 65% of his hot water needs, 75% of the house's summer electrical needs, and 50% of the winter needs, but would add \$50,000 to his construction budget. A geothermal heating and cooling system would have cost the same or more. The additional cost was out of his reach and, even if he could finance it, it would have taken over 20 years to break even. He opted for a Rinnai on-demand tankless hot water system that runs on propane and supplies the entire home's hot water needs. The system cost \$2,300. For heating and cooling, he chose a ductless Sanyo minisplit system with a heat pump outside and 6 air handlers for individually zoned heating and cooling – 3 upstairs and 3 downstairs – for \$16,000.

When it came to designing his home and choosing materials, Ken turned to Timberpeg, a company specializing in post and beam construction and building green. He chose one of their floor plans and customized it to fit his particular needs. Timberpeg then fed the final plans into their computers to cut all the timbers precisely to specifications. The pieces were all dry-fitted and hand adjusted for perfect fit, then shipped and assembled on site. All the timber meets sustainable certification standards and includes Douglas fir from the Hopi Indian Reservation in northern California, western red cedar from British Columbia, spruce from Finland and ipe from Brazil. All the woods were finished or sealed with low VOC products, including a wood floor finish made from cow cheese whey proteins. It's a matte finish that leaves a soft glow to the wood and feels fantastic under bare feet.

Other materials used to complete GreenNest were Hardiplank composite exterior siding, Wilsonart countertops of wood and recycled paper, Energy Star windows, doors and appliances, two energy efficient propane fireplaces, water-saving fixtures and CLF bulbs in the majority of lighting, and low VOC paints from Benjamin Moore.

During construction, Green was the unofficial general contractor but, because he does not have an official license, was required to choose a builder to oversee the project. He chose Lundberg Builders to oversee the job. "They were just fantastic and the arrangement worked out well," he says. He persevered through a two and a half year permitting process before he could even start building. He was obliged to change some of his plans due to building codes that have not kept up with changing technologies.

Green wound up living on his boat last year to help reduce his expenses while building GreenNest and also so he could supervise its construction. In the winter, after running errands, he would sit shivering below deck while heaters worked hard to warm



This gas fire helps to warm the room, along with an air handler attached to the upper portion of the wall. The air handler is part of a ductless Sanyo minisplit system. The house has six air handlers, three upstairs and three downstairs.

things up. And of course, he picked a winter with record-breaking snowfalls to start living aboard. When the weather finally warmed up, he found himself retreating to the local library or a Whole Foods to find a cool, quiet place to work on his laptop.

When reflecting on his journey, Ken observes two things that cause him concern for the future of green building. First and foremost he laments that building codes lag far behind evolving technologies and make no allowance for them. He found several systems that he would have liked to incorporate in his new home that weren't covered by the current codes, although they have proven themselves in other jurisdictions. He could have put them in place but would still have had to install the more conventional systems dictated by the code – a costly and ultimately useless redundancy.

He also worries that individual homeowners and builders are not doing more to implement green building practices. He looks at nearby lots with bulkheads and heavily manicured lawns (essentially sterile environments, biologically speaking) and wonders why more people aren't actively trying to improve the ecology of the Chesapeake watershed. He knows that if more people make even a few changes each, it will make a vast difference in the overall health of the Bay and, ultimately, the health of the world.

But, is he happy with GreenNest? Absolutely. Would he do it again?

Sitting on his deck, looking out at the cove in the late afternoon sun, he smiled and replied, "In a heartbeat."

For more information on GreenNest, visit www.susdevtech.net and click on Green Design. ■

So You Want to Build Green?

Many people nowadays are more ecologically aware and wish to build green. But do you really know what it means? How can you tell if a product is truly green or if it just says so on the label? Where do you go for information? Who can you trust?

Dr. Ken Green shares several recommendations to help guide you through your own adventure in building green.

1. Decide what's your acceptable GREEN "standard" and/or "certification." When you choose products, how much verification will you accept, or are you willing to take all labels and third party notices for granted?

2. How much time are you willing to spend to do detailed research to understand where the materials originated, what are individual ingredients (e.g., toxic glues in cabinets and countertops, certification for timber lands management and harvesting, amounts of VOCs in paint and sealer products), how were they made, is there any supply chain verification of stewardship? There are national standards such as LEED (Leadership in Energy and Environmental Design) and Energy Star, as well as regional and local programs.

3. Know your key GREEN design and building techniques to save energy and reduce water use, improve indoor air quality, and incorporate environmentally friendly building materials. If properly planned, green building will save you money on utility bills, decrease maintenance costs, and enhance your health and well-being.

4. Always take a deep breath when dealing with local authorities. Building code is the code is the code. Whatever your local jurisdiction specifies, and whether or not it actually makes sense, the legal code is the final word in any permitting process. Dealing with bureaucrats and their red tape is an arduous, often frustrating, downright insanity-inducing process. They rarely have a vision that equals yours and all they can ultimately deal with is the code. Remain calm and keep going.

5. Know your spending limits. Balance your budget between your desires and your ability to pay for them. Look at as many options as you can. You will probably have to make compromises – just try to be informed about the alternatives available.