



This New Old Green House

The house of the future may look traditional, but its methods of construction, materials and systems will distinguish it from most houses built today. *By Barry Katz*

I have a theory about what the house of the future will look like. For many people, the phrase “house of the future” conjures up visions of *The Jetsons*, or of a curvilinear glass-and-concrete construction by John Lautner, perched on an Acapulco cliff, or the 1969 Charles Deaton house in Colorado, which was prominently featured in Woody Allen’s movie *Sleeper*.

But is Modernism the future or the past? The best Modernist houses are, to my mind, objects of great beauty; though much as we might admire them on a purely aesthetic level, we don’t seem to actually want to live in them. If we did, there would certainly be a whole lot more of them. I could be wrong about this, but the market is a pretty reliable indicator of what people like, and it’s not *The Jetsons*.

So what will the house of the future look like? I predict the house of the future will look, in a word, old. But not ersatz old. There are far too many poor pastiches of historic styles being slapped up today with no evident regard for scale, proportion or appropriate detail. Everywhere I go I see a disheartening number of houses that, I can only surmise, must have been built by someone who had never actually seen a house before, but who had heard one described over the telephone.

And not functionally old either. The house of the future may look traditional, but it will also have to serve the needs of owners who inhabit a world very much changed from that of their forbears. Its methods of construction, materials and systems will be different from most homes built today.

What will be so different about it? It will be green. It will have to be. It will have to be because we can no longer ignore the strain that buildings place on our environment. Homes are responsible for 21% of greenhouse gas emissions in the U.S. The average new single-family home consumes a huge amount of lumber, much of which is wasted; the

amount of scrap lumber sent to landfills from the construction of six average homes is enough to construct one more. Water shortages are becoming acute around the world and yet our homes continue to consume more of it than ever.

We can no longer build homes that squander resources and run on fuels that are increasingly scarce and expensive, that are poisoning the air, altering the climate and shifting the geopolitical balance of power in ways very much to our disadvantage. And we can no longer remain blithely unconcerned that generating the electricity our homes consume is pushing atmospheric CO₂ levels ever closer to the brink of environmental catastrophe.

Inspired by the Past

When I first started building spec houses almost 20 years ago, I asked myself what kind of house I wanted to build. I was generally appalled by what passed for new luxury housing in my market area. Builders were busy inventing something new – the McMansion – which, to me, is the visual equivalent of fingernails scraping on a blackboard. I knew that wasn’t the answer. And though I tried for a while, I soon discovered that the answer didn’t lie in analyzing what was wrong with those homes and trying to improve on them. I needed a positive role model.

The answer, it turned out, was in plain sight. In New England, where I live, the woods are fairly dotted with beautiful and still highly prized old houses, many more than 200 years old. The more I looked at them the more I liked them. Their forms were simple and honest. Their proportions were graceful and natural. They never seemed contrived. And they looked like they belonged where they were. Nothing sets off fall foliage like crisp white clapboard.

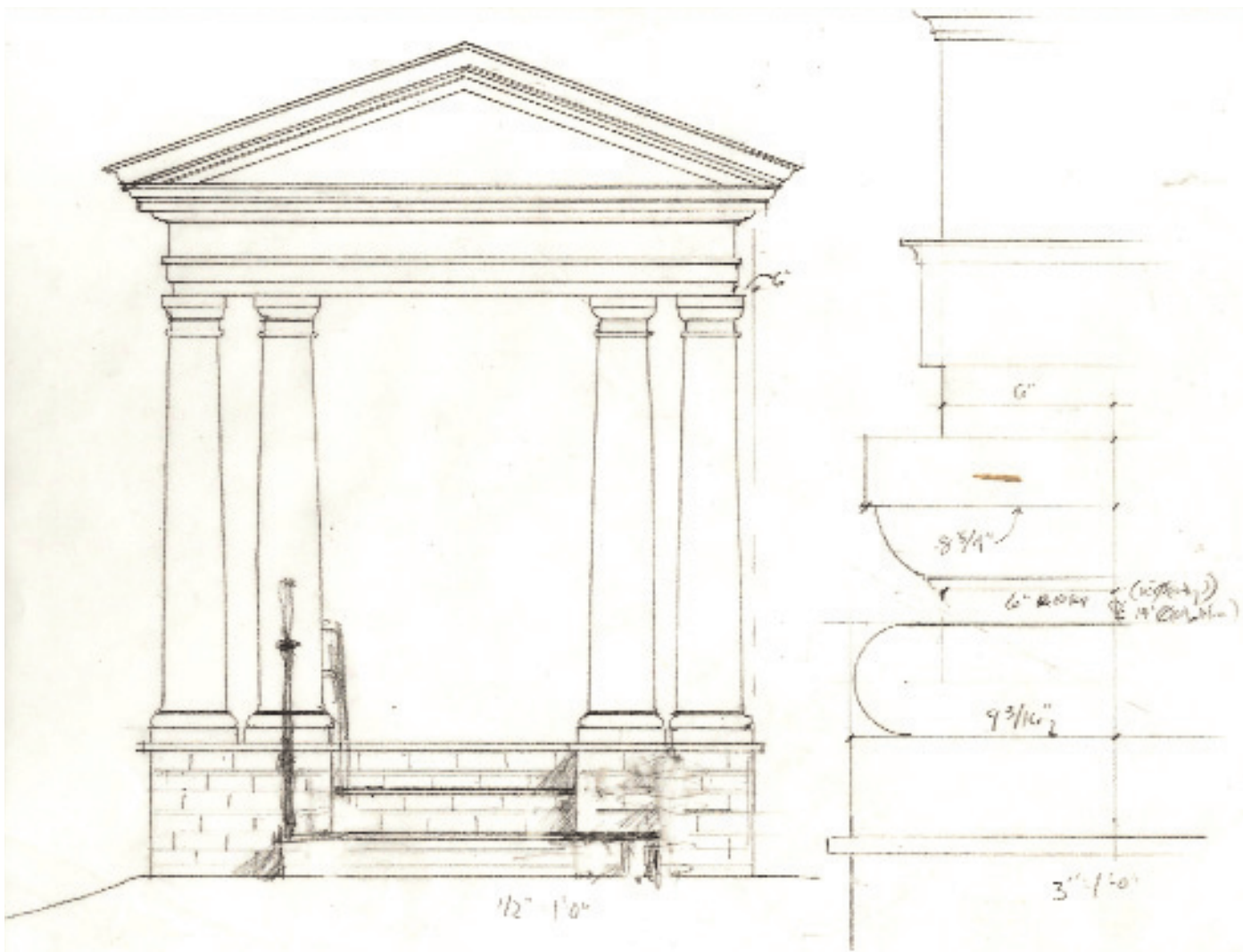
I didn’t want to make slavish copies or reproductions. But these venerable, elegantly simple structures spoke to me, and still do. They have much to teach, and I had much to learn. I wanted to learn their language, not by rote, but by internalizing the vocabulary and syntax of their architectural style – to become fluent in the same way one might come to speak a foreign language well enough to be able to perfectly express original ideas.

What I wanted to build, I decided, was a modern house – one that served the needs of a contemporary American family – expressed in a neglected but still beautiful language. Not an obscure or dead language, but our very own American language – unbastardized, grammatically correct and spoken with clear diction, organized thoughts and respect for the listener’s sensibilities. Leaning heavily on a variety of resources I succeeded

Top: This house in Westport, CT, was designed and constructed by Barry Katz Homebuilding and recognized by the Home Builders Association of Connecticut with its 2007 HOBI Award for Best Green House. *All photos: courtesy of Barry Katz Homebuilding unless otherwise noted*

Left: Sources like this photo of a 1790s house in New Hampshire suggested general proportions and massing for the Westport house. *Photo: Historic American Buildings Survey, Gerda Peterich, photographer, June 1965*





A close study of Classical precedents provided inspiration for the home's front portico, made entirely from stock moldings.

(to greater or lesser degrees) in building a number of what have come to be termed “new old houses.” It was in many ways deeply satisfying.

But around the turn of the millennium I began to be bothered by the way houses functioned – even those at the highest level of quality and craftsmanship. If houses, as Le Corbusier famously stated, are machines for living in, these machines have evolved at a positively glacial pace. Had automobiles, since the first Model T Ford rolled off the assembly line, evolved at a similar pace, we would today be driving cars every bit as backward as the 1927 Model A.

Building for the Future

In December 2004 I came home from a design conference in Los Angeles and told my wife I was turning green. I had been listing in that direction for several years, but it was then that a line was crossed. From that point on I would only build energy-efficient, healthy, environmentally friendly homes.

Her response was not as enthusiastic as I'd hoped. She thought it was too soon. “It's going to cost you more money and customers aren't going

to care,” she said. But less than a year later, when I acquired a piece of land for my next spec project, she had detected a change in the zeitgeist. “You know,” she said, “I think it has gotten to the point where if you don't do this customers are going to start asking, ‘why not?’”

Flying into Los Angeles for that conference, what I saw below me was distinctly non-angelic – a tangle of multi-lane highways, each jam-packed with cars. With fascination and growing alarm, I watched unending lines of white headlights and red tail lights stretching away into the distance as far as I could see and thought, “How can there possibly be enough oil in the world to fuel all this? And for how much longer?”

On the last day of the conference, the final presenter concluded his remarks by saying, “We have got to start telling our clients that it's insane to keep building houses that burn enormous amounts of oil when in 25 years there isn't going to be any more frigging oil! And,” he pointedly told the audience, “you cannot drive up to that meeting in a big honking SUV that gets 12 miles to the gallon.”

The day after I got home, I put down a deposit on a hybrid.



The home's traditional exterior gives passersby no hint that beyond its Palladian entry lives a high-performance green home built for the 21st century.

The Green House

A green house is in many ways similar to a hybrid car; it combines multiple strategies that add up to big savings and low emissions. And, like a hybrid car, a green home will perform all the functions you would expect from a conventional model, only better. Unlike hybrid cars though, green homes are now frequently referred to as high-performance homes.

As I sat at my drawing board to start designing what would be the first true high-performance, luxury spec house in Westport, CT – and possibly in Fairfield County – I was determined not to abandon my passion for the houses of the past. The vast majority of green homes published in books and magazines appear unconventional in one way or another. This has led to a popular misconception about what green looks like.

I wanted to change that. I wanted to build a true 21st-century house that was nonetheless entirely in the tradition of the Classically infused New England Colonials that had become my models. But while nothing in its appearance would tip off passersby, every part of the house would be re-thought. I began to conceive of it as a stealth house. Without appearing to do so, it would conserve natural resources like timber and water, slash energy consumption, reduce greenhouse-gas emissions, and provide a healthier, more comfortable living environment.

At the outset, I wanted to divert as much debris as possible from landfills. So the small split-level house that had sat on the property since 1960 was largely deconstructed prior to demolition. Its windows, doors, hardwood flooring, cabinets, appliances, plumbing fixtures, copper tubing and more were given away and found new life in other buildings.

Working from the ground up, I next considered the foundation. Concrete production is responsible for 10% of greenhouse gasses, so instead of poured concrete I settled on an engineered, pre-cast foundation system made by Superior Walls. It uses a fraction as much concrete, yet is structurally sound, naturally waterproof and fully insulated.

Next on the list was lumber. The average new home consumes two to three acres of forest, and we build a million new homes per year in this country. Do the math and you will understand why things need to change. Much of the home's structure employs engineered lumber made from small diameter, fast-growing trees and wood scrap, reducing the strain on old-growth forests.

The hardwood floors are made from bamboo, a rapidly renewable resource that is both beautiful and three times as hard as oak. Much of the bamboo flooring on the market has a characteristic look that is not in keeping with the spirit of traditional interiors. But a new type, which I saw for the first time at the 2006 GreenBuild Expo, has a much more natural appearance. This "strand-woven" bamboo, as it is called, is made by shredding the stalks and reassembling the fibers into boards that are milled like any other hardwood flooring.

For purists, an alternate – but also very green – flooring choice is reclaimed lumber, now available in a wide variety of sizes and species. Another attractive, rapidly renewable flooring option is cork, which I installed in the mudroom with a non-toxic adhesive. Made from scraps left over from the production of wine-bottle stoppers, cork has been used for flooring since the 19th century. It's easy to care for, comfortable to walk on and extremely durable.

To maximize energy efficiency, the home's shell is designed to minimize heat loss. Most heat is lost through convection – air flowing through small gaps in the home's thermal envelope. The average home insulated with fiberglass batts has enough small gaps in its insulation to add up to the equivalent of leaving one window open all the time. To combat this, I chose BioBased sprayed-foam insulation (made from soybeans), which provides high R-values and ensures a virtually airtight enclosure. The insulated glass in the high-performance Marvin windows and doors is filled with argon, a dense gas that slows heat transfer, and the glass has an invisible low-E metallic coating that deflects excess heat in the summer and reflects heat back into the house in the winter.

To help reduce the cooling load, I selected asphalt shingles coated with special 3M granules that deflect solar radiation and easily release absorbed heat. (Asphalt is not especially environmentally friendly, but choosing a product with a 40-year life expectancy helps reduce the strain.)

Standard incandescent bulbs convert just 5% of the electricity they consume into light. The other 95% is wasted in the form of heat, increasing



The dining room (foreground) is separated from the living room (background) by the entry hall. A butler's pantry at left leads to the kitchen. The wall sconces are fitted with energy-saving compact fluorescent bulbs.



The living room's Classically detailed columns and entablature are seen alongside a programmable digital thermostat that controls the home's geothermal heat pumps.

cooling loads. All the lighting in the house comes from compact fluorescent light bulbs (CFLs) that use 75% less energy than standard incandescent bulbs, burn cooler and last several times longer. Many people dislike the cool bluish cast usually associated with fluorescent lighting, but choosing CFLs with a color temperature of 2700k provides soft, warm light, indistinguishable from standard bulbs.

All those CFLs won't get used much during the day though, because the house was designed and sited to capture the maximum amount of natural light. Large, south-facing expanses of glass are shaded in the summer by a stand of mature deciduous trees and admit full sunlight in the winter. Every important space has light entering from at least two, and in some cases three or even four, sides. Even on a cloudy day, it's bright inside.

Energy Star-rated appliances, such as the Thermador Freedom Collection refrigerator and freezer, consume a lot less electricity than comparable unrated models. We've all been reading about water shortages lately. In this house, dual-flush toilets will save thousands of gallons of water per year, as will the efficient Whirlpool washing machine and Bosch dishwashers, all carrying the Energy Star label.

In most homes, we have to wait up to several minutes for water from the tap or showerhead to get hot, sending tens of thousands of gallons down the drain every year. I equipped this house with an on-demand hot water recirculating system by Metlund Systems. When anyone enters a bathroom, a motion sensor in the ceiling activates a small pump that provides virtually no-wait hot water as needed while saving a considerable amount of energy. Continuously operating recirculating loops requires running an electric pump constantly as well as keeping the water in the line hot all day long.

Heating and air conditioning are provided by geothermal heat pumps that burn no fossil fuel, emit no CO₂, and keep the house comfortable year-round for a fraction of the energy costs of conventional systems. Water circulating through a 1,000-ft.-deep well in the backyard transfers



Daylight enters every room from at least two sides. Placing windows close to an adjacent wall reflects additional illumination into the space.

the earth's heat into the house in the winter. In the summer, the system runs in reverse, extracting heat from the house and putting it back in the ground. As a bonus, geothermal systems require no outdoor compressors, eliminating an eyesore we have come to accept as inevitable in a green home.

Ventilation is crucial in tightly sealed homes, so energy recovery ventilators (ERVs) provide eight complete air changes daily. ERVs extract thermal energy from the exhaust air and use it to precondition the fresh air as it is drawn into the house. In other words, they replace the air but conserve the energy that went into heating or cooling it. Simultaneously, high efficiency electrostatic air cleaners remove airborne allergens like dust, pollen and mold spores, and even most bacteria and viruses, ensuring pristine indoor air quality.

To further ensure a healthy living environment, I banished potential sources of toxic off-gassing; all paints and finishes in the house contain zero VOCs (volatile organic compounds) and the cabinets and millwork are made from formaldehyde-free plywood. To prevent the migration of automotive fumes into living spaces, the garage is all but a separate structure, connected to the house only by a small, tightly sealed vestibule. Treating the three-car garage as a separate structure has another, purely aesthetic, advantage – it helps break down the scale of the house. Rather

than presenting the unwelcome specter of an oversized garage, the impression is of a small, picturesque barn.

Building a house like this on spec took a leap of faith, but that faith has been rewarded; most recently it was recognized by the Home Builders Association of Connecticut with the 2007 HOBI award for Best Green House.

There is no longer any reason to sacrifice environmental concerns in the name of historical integrity. And having started down this path, I can see that there's no turning back. Once you know how to build a house that consumes less energy and fewer natural resources, pollutes less, and is safer, healthier, more comfortable and more economical to live in, it would seem almost criminal to do it any other way. ■

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WEB ONLY: For a list of products used in this home, as well as supplier contact information, go to www.period-homes.com/extras/jan09green.htm



The kitchen lies at the heart of the house, with cabinets made from formaldehyde-free plywood and energy-efficient lighting and appliances. An efficient floor plan, with a centrally located stair (visible at left), reduces wasted square footage without compromising living space.