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# PHOENIX RISING

## Lessons learned from KATRINA

This article is part of an ongoing series covering post-disaster rebuilding in New Orleans and along the Louisiana Gulf Coast.

by Roger Hahn

Julie Groth didn't set out to become a building contractor. Like her father, she intended to become a "land man," oil-patch lingo for a land management executive, the advance staffer who puts together land deals with other oil and gas producers. So she got a degree in petroleum land management from the University of Texas at Austin and went to work right after college. And not long after, the big oil bust of the late 1980s hit, putting her out of work. Not that she minded much.

By the time she got laid off, Groth had purchased a charming Victorian bungalow on Algiers Point, an historic neighborhood nestled in a bend of the Mississippi River directly opposite the city of New Orleans's modern skyline. With plenty of time on her hands, Groth undertook a major remodeling using skills she learned from her father, picking up techniques from how-to books, and trading tips with neighbors.

Before long, friends were hiring Groth to do remodeling jobs, which, in turn, led to bigger jobs and a growing number of new clients. In practically no time, Groth was out in the field most days managing multiple work crews, running a contracting business that presented her with a constant flow of problem-solving challenges and put her back in close touch with the natural and built environment.

This was closer to what she'd expected to find working in the oil patch.

By the time Hurricane Katrina made landfall on the coast of Louisiana at the end of August 2005, Julie Groth had already racked up more than 15 years working in New Orleans and the surrounding region. As a result, she had almost more work than she could handle in the long months and years of rebuilding that followed; in fact, the rebuilding veteran was on quite a roll in the summer of 2007 when a prospective client offered her what Groth thought could be an intriguing assignment.

Longtime New Orleans resident Shannon Cvitanovic was looking to renovate a classic New Orleans "shotgun" house she'd inherited from her grandmother so it could be included in a May 2008 green home-building tour. The tour, which eventually enlisted a total of seven homes, was scheduled to accompany the tenth annual National Green Building Conference sponsored by the National Association of Home Builders,



The soft color palette helps to blend the European design of Global Green USA's three homes in New Orleans's historic Holy Cross neighborhood bordering the Mississippi River.



Substantial daylighting is just one of a host of passive efficiency and comfort strategies used in designing and building Global Green USA's net zero model home and resource center several miles downriver from New Orleans's world-famous French Quarter.

Floors using recycled cypress—once locally plentiful, now a vanishing commodity—highlight the downstairs interior of a net zero model home and resource center constructed by Global Green USA.

which was being held that year in New Orleans. Could Groth do it? No problem, said the self-taught contractor.

But completing the job totally transformed her professional life.

“Right after I said yes,” Groth recalls, “I found myself climbing a much steeper learning curve than I ever could have imagined. And it didn’t take me long to realize this new way of working would mean an entire paradigm shift in the way I thought about building and renovating houses. Once I began to approach building from a systems perspective, I had to admit that even with all the experience I had, I really didn’t know that much about building and renovating houses.”

And, as it turns out, Groth was not alone.

### ADDING SOCIAL JUSTICE TO THE HOME BUILDING EQUATION

Driven largely by money flowing from nonprofits, post-Katrina New Orleans has, in fact, gradually become ground zero for a regional wave of green home building. In the course of what will likely turn out to be a decade or more of intensive post-Katrina rebuilding, a host of architects, contractors, and homeowners throughout the greater New Orleans metropolitan area—and all along the Gulf Coast from the Texas border to the Florida panhandle—are in the process of scaling the green learning curve. (For a wider perspective, see “Rebuilding in a Stimulating Environment.”)

When levees bordering two outfall canals and a major shipping channel gave way after Hurricane Katrina had battered the

city for more than 12 hours, the resulting floodwaters rushed and slowly crept into 80% of the city’s residential and commercial neighborhoods, leaving 20% of the city—primarily the high ground bordering the Mississippi River—relatively untouched. For residents and business owners in those neighborhoods, repairs mainly addressed wind damage that tore off roofing and shattered windows, letting in rain and humidity.

For the vast majority of neighborhoods, however, rebuilding presented a baffling set of choices affected by a host of imponderable factors involving public policy, insurance industry practices, and private resources. And from the very beginning, two forces began to inform the reconstruction efforts. From the top down, planners and rebuilding specialists rushed in to provide a conceptual framework based on the latest in advanced wisdom. From the

bottom up, traumatized residents of a racially divided and notoriously poor Southern city insisted that everyone be included.

The first collision of these competing interests occurred in the postdisaster planning process engineered by City Hall, which established a series of panels offering both professional and citizen input. A single area of contention quickly emerged regarding advice from professional planners suggesting that the city concentrate a gradually diminishing residential base in fewer, more-manageable neighborhoods. Following that advice, of course, would mean choosing not to rebuild several existing neighborhoods, an option residents loudly denounced as unacceptable.

Since then, the post-Katrina reconstruction of New Orleans's badly damaged housing stock has progressed in fits and starts. The lucky ones were those displaced residents who managed to put together a combination of personal resources, insurance reimbursement, and federal disaster relief funding (administered through a state agency hastily commissioned and consistently plagued by incompetence) sufficient to support their rebuilding. For a great many others, negotiating the obstacle course of relocation, reconstruction, and reoccupation has so far been either extremely difficult or practically impossible.

So adopting more sustainable, energy-efficient, and environmentally friendly rebuilding strategies in post-Katrina New Orleans has been either a hassle or an astounding opportunity, depending on your perspective. For those who view post-Katrina New Orleans as an opportunity to advance the cause of energy-efficient and environmentally appropriate rebuilding, the effort to introduce new products, technology-based designs, and advanced construction methods has proceeded in concert with a requirement that has, thus far, not played a major role in the growth of the green building movement: a concern for social justice.

## AIMING FOR SCALABILITY AND AFFORDABILITY

What makes this situation unusual is the convergence of non-profit sponsors working closely with forward-looking builders to establish a precedent for choosing energy efficiency and environmentally appropriate building options— not just because they create a superior setting for life, work, and learning, but, more importantly, because emphasizing durability, environmental awareness, and energy efficiency offers both short- and long-term economic benefits, both for communities at large and for individual residents in those communities.

Based on that assumption, the movement just now beginning to achieve critical mass in post-Katrina New Orleans has become a kind of testing ground for two related criteria: affordability and scalability.

The primary drivers behind adopting these criteria are fairly obvious. According to data compiled in 2006 shortly after the initial cleanup, storm damage had rendered approximately 275,000 homes throughout metro New Orleans unlivable, with roughly half that number inside city boundaries. The city had essentially become, according to an American Institute of Architects report released in late 2006, “a massive redevelopment zone.” A recent survey of 12 neighborhoods reported that approximately one-third of housing lots throughout the city remain abandoned.

In addition, the New Orleans metro region is notoriously one of the poorest in the country, with an average family income in many areas of less than \$25,000 a year.

Nonprofit involvement in rebuilding the housing stock of post-Katrina New Orleans has sought to achieve two goals in the design and construction of energy-efficient and environmentally appropriate homes. The first is to assign top priority to cost-benefit analysis, specifically to producing the best

## Rebuilding in a Stimulating Environment

**R**ebuilding in New Orleans has also been taking place in a larger environment—one that has gradually come to support a variety of alternative building solutions.

In 2008, for example, the state legislature passed a bill providing a remarkably generous 50% tax credit for the installation of residential solar systems (in addition to the existing 30% federal tax credit). That incentive sparked the founding of 25 solar companies in 2008—and another 40 solar companies in 2009. Recently, the legislature has passed bills to extend the state's tax credit policy to include commercial projects, and to authorize the sale of

municipal bonds by sustainable-energy tax districts to fund solar installations, a concept pioneered in Berkeley, California.

A \$71million injection of funding through the 2009 American Recovery and Reinvestment Act is also scheduled to pay for a variety of programs. A total of \$41 million will finance retrofits for university and college buildings; the remainder will help to pay for commercial retrofits, new-home construction, and home renovations. Financing for the last two items extends an innovative program in place since 1999, called the Home Energy Rebate Option. This program offers

rebates to builders and homeowners who hire RESNET-trained auditors to consult on and verify energy efficiency improvement projects.

The city of New Orleans, with assistance from federal agencies and local nonprofits, has been actively pursuing programs to promote renewable energy options and energy-efficient building. In 2007, for example, New Orleans was one of only 13 Solar American cities selected in the first round of DOE funding. The city along with its utility, Entergy New Orleans, and other partners was chosen because it has shown a commitment to help accelerate

the adoption of solar technologies. And in addition to a host of other initiatives, the city plans this summer to roll out an ambitious \$3.1million-a-year program funded by the local utility Entergy New Orleans, and monitored by the New Orleans City Council. The program encompasses a range of solar and energy efficiency incentives aimed at residential and commercial buildings; its goal is to “transform the local marketplace” by creating demand for energy efficiency products and services, and by stimulating workforce development to meet this demand.

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## In September 2009, the U.S. Green Building Council officially recognized Brad Pitt's Make It Right as "the largest and greenest single-family community in the world."

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performing home for the absolute lowest cost. The second is to find a model for development that includes all aspects of home building: project management, client involvement, design and engineering, construction, performance validation, and homeowner satisfaction.

This pursuit of a replicable model for home building that delivers the maximum economic benefit at the lowest cost to homeowners is still evolving. In the end it may prove to be one of the most valuable results of the focused effort to rebuild housing stock across the Gulf Coast.

Post-Katrina rebuilding thus has the potential to do two things. First, it can add to lessons learned about market development and cost-benefit analysis. Second, it can help to expand specific markets. Rebuilding here is based on inner-city and small-neighborhood redevelopment; on subsidized efforts to supply low-cost housing for low-income populations; and on counteracting the general perception that energy-efficient and environmentally appropriate home building is a luxury—and one that ignores overall cost, widespread consumer interest, or mainstream homeowner satisfaction

### HIGH-PROFILE PROJECTS WITH HIGH-FLYING AMBITIONS

The two energy-efficient housing projects that have attracted the most national attention are Make It Right, an experiment in futuristic architecture sponsored by celebrity actor Brad Pitt, and Global Green USA's triple-pronged approach to energy-efficient, affordable housing; green school construction; and homeowner outreach and education. Both are being run by publicity-savvy groups; both have set a high bar of achievement for themselves; and both have been proceeding at a somewhat slower pace than expected.

Pitt's nonprofit enterprise was actually inspired by a concept Global Green was interested in establishing: advanced-design living space constructed in recovering, low-income neighborhoods as part of a focus on neighborhood renewal.

Global Green USA's president and CEO Matt Petersen originally brought the idea to former president Bill Clinton's 2006 Global Initiative conference, where he shared it with Pitt. A dedicated proponent of advanced architectural design and enlightened construction approaches, Pitt offered to underwrite a national design competition to develop an affordable, replicable, and community-approved home building model that would showcase state-of-the-art energy strategies and environmentally friendly building materials.

Global Green was in the process of establishing operations in New Orleans while moving forward with its housing initiative, as well as its green schools and its education and resource

activities, when Pitt announced his own Make It Right concept in September 2007 at that year's Clinton Global Initiative conference. Matching producer Steve Bing's \$5 million contribution with a \$5 million contribution of his own, Pitt laid out a world-class plan to build a neighborhood full of futuristic houses for displaced residents, using the most progressive techniques and materials possible.

Soliciting design contributions from some of the world's most prestigious architectural firms, Pitt's Make It Right has committed to building 150 homes in New Orleans's Lower Ninth Ward, an outlying neighborhood previously occupied mostly by working-class black families. Placing computer age designs in a ruined landscape of decidedly low-profile housing, Make It Right has been moving forward slowly but deliberately, embracing all manner of building advances, from using pervious concrete for road building to completing the first floating-house design to be officially licensed in the United States

In September 2009, Pitt returned once again to the Clinton Global Initiative conference to accept honors from the U.S. Green Building Council, which officially declared Make It Right "the largest and greenest single-family community in the world," a citation based on 13 certified LEED Platinum homes built and occupied, with 37 more in the construction pipeline.

Global Green's efforts are equally ambitious. An offshoot of Green Cross International, Global Green counts actor/celebrities Leonardo DiCaprio and Edward Norton among its board members. The organization began its neighborhood development by constructing a two-story, net zero model home adjacent to the Mississippi River and not far from the Make It Right project, in the historic Holy Cross neighborhood, several miles downriver from New Orleans's French Quarter.

Currently used as a visitor/resource center, the Global Green home is the first of five the organization plans to build, all located in a single row and occupying a square city block. The block will also contain a 17-unit multifamily project and a mixed-use community/retail center. With six planned school projects also under way and a robust education effort to nurture, the organization has so far completed only two more homes, both less costly and slightly less ambitious than its net zero model.

In the race to create a replicable model based on the most cost-effective solutions to the devastation in housing in New Orleans and surrounding areas, both Make It Right and Global Green may have had their attention distracted by their pursuit of other, allied goals. These goals include introducing high-tech design and advanced building techniques to the area; establishing a community anchor; promoting the establishment of green

schools; and playing a robust resource-and-education role in the community. It may turn out in the long run, however, that the pursuit of these allied goals advances our understanding of re-making communities based on the use of energy and on other environmental concerns.

### AN INCUBATOR FOR DESIGN INNOVATION

While the Make It Right and Global Green projects have been proceeding with a fair amount of media scrutiny, another home-building effort, Project Home Again, has been quietly but effectively working out ways to build intelligent homes, bring back residents, and repair the torn fabric of community. The effort received initial sponsorship from Barnes & Noble Chairman Leonard Riggio, who donated \$20 million from his family foundation.

With significant input from both the National Renewable Energy Laboratory and the Building Science Corporation, Project Home Again, with a HERS index score of 65–67, quickly built what is now the state of Louisiana’s first Builders Challenge housing development. So far, an integrated cluster of 20 homes has been certified, and the organization already has plans and funding in place to build a total of 60 more—these on scattered neighborhood sites.

Project Home Again houses come fully landscaped and fully furnished, with details like back-porch floodlights already installed, making them not just well-made houses, but well-made

houses specifically designed for occupants who have, in recent years, faced innumerable difficulties and now want nothing more than simply to come home. Having successfully created what the organization believes is a “tight, streamlined model,” Project Home Again now rests on the threshold of a fourth stage of development: the recruitment of funding partners and the expansion of its production line.

(A full-length feature on Project Home Again’s operation and building designs will appear in the next issue of Home Energy.)

Joining the effort to explore aesthetic and functional boundaries, Tulane University’s School of Architecture began sponsoring a two-semester design/build course in which students plan a cutting-edge, energy-efficient prototype house in one semester and build it themselves in the next. Each design explores a different construction method (wood frame, steel frame, modular, structural insulated panel), generating design insights that have contributed to both Make It Right and Project Home Again.

So far, the program has constructed half a dozen modernist houses in some of the city’s bleakest and most devastated neighborhoods. And the innovative architecture course has attracted media attention of the sort that’s bound to influence younger consumers: the Sundance Channel followed the design and construction of the program’s third house in 2008, resulting in *Architecture School*, a six-part documentary series.

Media spotlighting has no doubt played a role in the recruitment of world class talent to post-Katrina New Orleans. That talent includes Make It Right’s roster of international architectural firms, as well as signature architects like Frank Gehry and visionary urban planners like Andres Duany, both of whom dropped by to work new twists on time-honored New Orleans traditions.

In the first case, Gehry helped convert the narrow, extended shotgun home prevalent in New Orleans working-class neighborhoods by adding touches to the reconfiguration of its long, rectangular shape as a series of roughly square modules. The “Modgun” was intended to provide a flexible solution to the city’s oversupply of empty, narrow lots. Global Green likes the design but it hasn’t built any of these houses yet.

Similarly, Duany was commissioned by the state of Louisiana to produce a temporary-housing alternative to the ubiquitous FEMA trailer that occupied so many New Orleans front lawns during the early stages of post-Katrina rebuilding. Borrowing from the city’s indigenous architectural style, he combined historic decorative elements with a compact, conservatively styled bungalow, calling it the Katrina Cottage.

Unfortunately, Duany ran into his own hurricane of bureaucratic red tape, and the design is now solely available as a Lowe’s build-it-yourself kit.

While outside attention elicited by this flurry of low-cost, sustainable, energy-efficient home building has focused largely on architecture and design issues, some of the opinions being expressed could easily be more widely applied. These are best summed up in a recent article in the *Atlantic Monthly* that sur-



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veyed a broad spectrum of rebuilding approaches. Titled “House of the Future,” the article concludes:

In the absence of strong central leadership, the rebuilding [of post-Katrina New Orleans] has atomized into a series of independent neighborhood projects. And this has turned New Orleans into something of a Petri dish for ideas about housing and urban life ...

In the city today, notions of modern design, advances in green materials, and the technical imperatives of sustainability are all converging toward a great leap forward in urban architecture ... spurring design innovations that may redefine American architecture for a generation.

This process is unfolding in a city where the effects of environmental disregard—from disappearing wetlands to rising temperatures to encroaching seas—seem more palpable by the day, and where sustainability seems less like an annoying buzzword and more like a moral imperative.

### PROPOSING NEW SOLUTIONS SUSTAINS MOMENTUM

From that perspective, it’s possible to imagine New Orleans emerging as a leader in three related areas: in coastal flood management; in advanced construction techniques that address storm- and flood-prone communities; and as a central

hub in a growing worldwide network of manufacturers, developers, and architects pushing for residential and commercial solutions that emphasize affordability in energy-efficient design and construction.

In that case, progressive homebuilders like Julie Groth can be counted among both the drivers and the beneficiaries of a post-Katrina building renaissance.

While her remodeling business began to suffer in the middle of 2008, when the initial wave of New Orleans reconstruction subsided and the economy at large spiraled into a major recession, the resourceful contractor continued on her journey to master the steep learning curve of building science, becoming more and more adept at understanding fundamental concepts and creatively applying appropriate solutions.

After gutting the classic New Orleans shotgun house she was working on for the May 2008 green home-building tour, Groth couldn’t figure out how to rebuild the walls to create the most moistureproof barrier possible.

The remaining shell featured open-balloon framing and weathered wood siding. One important lesson New Orleans builders learned in the wake of Hurricane Katrina was that the prevailing practice of relying on conventional batt insulation in a hot-humid environment would have to be discarded. Home after home, gutted down to its shell, demonstrated the moisture-

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## Retrofit of a Drainage Plane

**M**any of the houses in the New Orleans area were gutted after Katrina. Therefore, the studs and the inside of the siding are exposed on the inside.

To correctly renovate an old house to be “green”—with its enhanced energy efficiency requirements—is new territory. When I started with the open walls and we decided to do the house green, I thought that the information about how to do that would be easy to find. Instead, after a lot of research, I discovered that the standard practices for insulating the walls (in an existing house) did not measure up. Each standard method—batt insulation, spray foam, and cellulose—fell short. As far as I know, Paul LaGrange, with colleagues, invented what we did to create a proper drainage plane (see photos). We took best practices from new construction and retrofit them to an old house.

In our hot/humid climate, managing moisture is important. In the open walls of an old house with balloon framing and leaky cypress siding, managing bulk water takes on new meaning. Wind-driven rain just pours into the wall cavity. The drainage plane LaGrange and others developed manages moisture very well. In addition to managing moisture, the wall assembly also achieved good thermal insulation required for energy efficiency. The following description is how we renovated the rain screen at 217 N Gayoso.

### Starting from the inside

1. Against the cypress siding, we installed a rain screen made by Homeslicker next to the siding (the yellow mesh in the photos). This created an air gap of about  $\frac{3}{8}$ – $\frac{1}{2}$  inch.
2. On top of the rain screen, we installed  $\frac{1}{2}$ -inch rigid foam board. This helped complete the drainage plane, added air sealing and thermal properties. (When the spray foam was later sprayed into the wall cavity from the inside, the rigid foam acted as a stop so that the spray foam did not squeeze out of the siding and look bad from the outside.)
3. Finally, we sprayed open-cell spray foam. This completed the air sealing and added a great deal of R-value to the entire wall assembly—close to 3 inches of spray foam and  $\frac{1}{2}$  inch of rigid foam.

— Julie Groth



We installed a rain screen made by Homeslicker next to the siding.



On top of the rain screen, we installed  $\frac{1}{2}$ -inch rigid foam board, then sprayed foam into the wall cavity.



**Julie Groth** is the owner of *Step by Step Construction* in New Orleans, Louisiana. Contact her at [julie1groth@gmail.com](mailto:julie1groth@gmail.com) or through her Web site, [www.StepbyStepConstructionCo.com](http://www.StepbyStepConstructionCo.com).

trapping attributes of batt insulation, with discoloration, mold, rot—or a combination of all three—almost universal.

Looking for answers, Groth turned to the Louisiana House and Landscape Resource Center at Louisiana State University, a statewide clearinghouse for the most advanced information on energy-efficient and environmentally aware home building. The Resource Center referred her to Paul LaGrange, a local energy consultant generally recognized as one of the state’s leading authorities on energy-efficient home building.

He confirmed Groth’s suspicion that an effective and efficient moisture barrier for historic retrofits on balloon-frame housing common to the area had yet to be fully developed. So, Lagrange and a team from the Resource Center set out to design one. Groth used the design on her retrofit and further improved it on a later project. To make the technique available to others, she also posted it on her Web site (see “Retrofit of a Drainage Plane”).

The experience of delving into a problem with no obvious solution and applying building science principles to devise a solution only served to increase Groth’s enthusiasm for learning more building science, and for sharing her education and insights with others, especially those just beginning to familiarize themselves with whole-system home building and renovation.

### >> For more information:


Curtis, Wayne. “Houses of the Future.” *Atlantic Monthly*, November 2009.

You can read the article online at [www.theatlantic.com/magazine/archive/2009/11/houses-of-the-future/7708/](http://www.theatlantic.com/magazine/archive/2009/11/houses-of-the-future/7708/).

Not long after her renovation business in New Orleans began to falter, Groth took a job as construction manager for a local chapter of Habitat for Humanity located in the heart of the bayou country, midway along Louisiana’s Gulf Coast. Her local chapter, like many in the Gulf Coast region, has been moving forward assertively in adopting a range of greener building approaches.

And Groth intends to help push that movement along.

In addition to managing contractors and volunteers at local building sites, she has been spending time on a set of sustainable, energy-efficient designs intended for a large housing development currently in the works. She’s especially interested in learning how to produce a large number of energy-efficient homes using the most cost-effective methods and materials possible.

It’s a challenge that has animated Groth’s professional life beyond anything she imagined working in the oil fields. In her current pursuit of constructing more and more low-cost, well-built homes to meet the rebuilding needs of Gulf Coast residents, she has become, like dozens of others involved in Gulf Coast reconstruction, both a problem solver and the solution itself. 

**Roger Hahn** is a freelance writer and editor based in New Orleans. His work has appeared in *Civil Engineering*, *Historic Preservation*, and *American City & County*.