

## The Glidehouse™

### A PREFABRICATED HOUSE YOU CAN BUILD ANYWHERE

One of the most significant recent developments in housing has been the effort to improve the reputation of prefabricated, or modular, housing. Using powerful design software, a number of architectural firms now combine the cost savings of factory-built homes with the benefits of customized designs. The result is sophisticated architecture that can be offered at remarkably low prices and assembled faster than traditional buildings. The Glidehouse™, designed in 2004 by Northern California architect Michelle Kaufmann, represents this new breed. Working with builders in the U.S. and Canada, Kaufmann has begun selling several variations of the house. A total of 10 have been built, ranging from one to four bedrooms and from 672 to 2,016 square feet. The price, including the cost of the design, trucking materials to the site, and construction, but excluding the solar panels on the roof and the kitchen appliances, begins at about \$132 per square foot. This translates to around \$200,000 for most variations—that's \$83,000 less than the average cost of a new American home in 2005.

We as individuals have the power to set a new course for a more sustainable future.



Glidehouse™, 2004. Michelle Kaufmann Designs, © JMC Photography

### ACKNOWLEDGMENTS

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### IMAGE CREDITS

Inside Front Panel

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Melbourne, Australia, Cocks Carmichael  
© Derek Swalwell, Photographer

Charlotte Residence, 2002  
Charlotte, North Carolina,  
William McDonough + Partners  
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### MUSEUM HOURS

Monday–Saturday,  
10:00 am–5:00 pm  
Sunday, 11:00 am–5:00 pm

### ADMISSION

Admission is free;  
\$5 suggested donation.

### LOCATION

401 F Street NW, between 4th and 5th at the Judiciary Square Metro station (Red Line Metro). Wheelchair access at 4th and G Street entrances.

### MUSEUM SHOP

The Museum Shop, located on the ground floor, is Washington's finest source of design- and building-related books and gifts, including jewelry, home furnishings, toys, and games. Be sure to look for the sustainable products offered in conjunction with *The Green House*, including items seen in the exhibition. Museum members receive a discount on all purchases.

### MEMBERSHIP

Museum membership offers such privileges as invitations to exhibition openings and special events; discounts on Museum Shop purchases, public programs, and tours; and subscriptions to *Blueprints* and the Museum Calendar. To become a member, call 202.272.2448, ext. 3200.

The National Building Museum explores the world we build for ourselves—from our homes, skyscrapers, and public buildings to our parks, bridges, and cities. Through exhibitions, programs, publications and its collection, the Museum seeks to educate the public about achievements in architecture, design, engineering, urban planning, and construction.



NATIONAL BUILDING MUSEUM  
401 F Street NW Washington, DC 20001  
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Red Line Metro, Judiciary Square



The green house

NEW DIRECTIONS  
IN SUSTAINABLE  
ARCHITECTURE & DESIGN

May 20, 2006–June 3, 2007  
National Building Museum Washington, DC

Have you ever thought about living in a “green” house, one that is healthy for you and your family and helps conserve the Earth's resources? Whether you are building a new home, renovating an existing one, or looking to make even just a few changes in your living habits, every household can incorporate features that support the conservation of the environment and improve our quality of life. As environmental concerns continue to mount worldwide, integrating more sustainable practices and products into our lives becomes increasingly important. There is growing popular interest in green living, and the possibilities for achieving it in our homes are rapidly expanding.

Buildings consume enormous quantities of the Earth's resources in their construction and daily operation. Innovative, eco-friendly design not only helps to minimize the negative environmental impact of a given building, but can also lead to significant cost savings for homeowners and occupants. *The Green House* demonstrates that stylish architecture, comfortable interior design, and environmental responsibility are not mutually exclusive, but in fact can be mutually reinforcing. The home is where the movement to “go green” begins—where we as individuals have the power to set a new course for a more sustainable future.

## Contemporary Green Residences

For decades cutting-edge architecture and sustainable design have, to a large extent, existed in separate camps, with little dialogue among the leaders in each field. In the world of contemporary residential design, sustainability often ranked well below considerations of style and cost. Many sophisticated designers seemed resigned to the notion that aesthetics would be compromised if environmental issues or energy efficiency took precedence. The environmental movement, for its part, was suspicious of the world of “star” architects, interior designers, and their style-conscious patrons, and green builders tended to concentrate their energies either on tinkering with their own residences or putting up experimental structures that many architects and critics dismissed as unsophisticated and unattractive. In the 1990s, however, avant-garde designers and the leaders of the sustainability movement began to move toward common ground.

In creating green residences, builders, architects, and interior designers respond to the environmental conditions of different regions and climates.



## City

Cities consume over 75 percent of the world's resources, while occupying only 2 percent of its land. Yet cities—where dwellings often share walls, mechanical systems, green space, and transportation and other infrastructure—are inherently more efficient than rural and suburban regions where these components are replicated for every household. Not only do cities house more people on less land near jobs, shops, and transportation, but urban buildings are also commonly recycled and renewed—a development strategy that minimizes waste and preserves resources. Many successful new green projects are small and dense, but low-impact materials and technologies are also increasingly common in residential high-rises.

## Suburb

Conceived as a utopia where city workers could live in pastoral surroundings, the suburb—with its typical low-rise, low-density development and redundancy of lawns, garages, septic tanks, and mechanical systems—is now generally an anti-green form of development. However, new models aim to provide the comforts of suburban living while avoiding unnecessary waste and replication: suburban houses can be sited for optimal solar exposure and preservation of open space and trees; constructed from local renewable materials; and equipped with efficient heating, cooling, and waste systems. By combining ancient vernacular methodologies with new technologies, architects can now deliver on the suburban promise of a green lifestyle that combines urban proximity with pastoral tranquility.

## Mountainside

More than ten billion acres of the Earth's surface are covered in forest, mostly in mountainous regions. Harsh weather conditions such as snow, wind, ice, freezing temperatures, and torrential rains, as well as exposure to intense sunlight and ultraviolet radiation at high altitudes, compel designers of houses in such areas to deploy a wide range of green strategies. The abundance of wind and sunlight allows builders to incorporate natural energy resources: houses can be oriented for optimal solar energy and minimal cold and wind exposure, while snow accumulations and frequent rainfall permit the harvesting of clean water. Green houses in forests often entail another key precept of sustainability—they use local wood, stones, and boulders, rather than non-indigenous materials that need to be hauled up mountains.

## Waterside

Sensitivity to the beauty and vulnerability of the natural waterside environment has spurred some of the most interesting experiments in rethinking the principles of residential development. Common strategies range from prescribing setbacks and restoring natural shorelines to exploiting solar and wind power and using indigenous building materials such as coral and bamboo husks. Green houses combine responses to extreme heat, wind, sunshine, salt, water damage, and climate change with technologies that allow them to be self-sufficient in their waste disposal and energy and water use. Protection goes both ways in sustainable waterside houses—safeguarding the house from nature and nature from the house.

## Desert

Although deserts cover one-fifth of the Earth's surface, their extraordinary temperatures and lack of natural water provide one of the harshest environments for habitation. The extreme daytime and nighttime temperatures have spurred a robust sustainable architecture, however, based on passive heating and cooling methods and ingenious solutions for ventilation. Architects and interior designers use a range of strategies to reduce the environmental impact of a desert home: siting to minimize solar impact and maximize cooling by natural breezes, dense building materials to insulate against extreme temperatures, roof overhangs to protect against summer sun while letting in winter sun, window placement and configuration to protect against glare and heat gain, and water storage and recycling systems to harvest the minimal rainfall.

## Tropics

The region between the Tropic of Cancer and the Tropic of Capricorn, characterized by epic storms and high heat and humidity, prescribes an indoor-outdoor lifestyle while demanding adaptability and self-sufficiency from inhabitants and their homes. The region's vernacular architecture has provided inspiration for contemporary green architects, who are now interpreting tried-and-true features and inventing new ones to respond to the extraordinarily lush but often destructive tropical conditions: trees harnessed for cool shade and sea breezes for ventilation; siting that responds to natural protective features such as dunes to provide safety against storms; high-pitched roofs to deflect the wind; shutters, covered verandas, and wide eaves to block direct sunlight; and sustainable water, energy, and waste systems that minimize use of natural resources.

Each individual or family can play a direct and important role in the global campaign to slow—and ultimately reverse—the degradation of the natural environment. *The Green House* demonstrates that houses and apartments can be green, comfortable, and stylish at the same time. Thanks to continuing innovations in design and technology, it is becoming easier to ensure that your home not only enhances your own quality of life, but also advances the cause of sustainability.



**Colorado Court, 2002**  
Santa Monica, California, Pugh + Scarpa Architecture  
Angela Brooks, Designer  
© Marvin Rand, Photographer

Colorado Court is the first large residential complex in the United States to bring advanced sustainability measures to low-income housing. With its striking grid of 199 bright blue solar panels, the 44-unit building represents a rare effort to turn solar power into an aesthetic virtue. The panels produce enough energy to satisfy most of the building's own needs and to relieve tenants of utility bills. Additional sustainable strategies include its use of recycled materials, natural ventilation, and anti-sprawl urbanism that houses residents within walking or biking distance of jobs and shops.



**Mill Valley Straw-Bale House, 2001**  
Marin County, California, Arkin Tilt Architects  
© Edward Caldwell, Photographer

Located outside of San Francisco, the Mill Valley Straw-Bale House has a more unusual structural system than its appearance suggests. It does, however, contain a truth window that offers an inside view of the walls constructed of straw bales with a sprayed-earth finish, a structural system that provides efficient insulation, as well as supporting walls.



**Great (Bamboo) Wall, 2002**  
Shuiguan-Badaling, China, Kengo Kuma + Associates  
© Satoshi Asakawa, Photographer

Located in the shadow of China's Great Wall, the Great (Bamboo) Wall is a meditation on a single material: bamboo. The use of bamboo in building is a sustainable choice because it grows quickly, allowing stocks to be easily replenished. The house is as much about the properties of bamboo as it is constructed from it, showcasing its sculptural qualities and its ability to add rhythm, shadow, and texture to façades. Taking its cues from the Great Wall, the house features a wall of its own, made of bamboo stalks arranged in bunches along the longitudinal axis.



**Walla Womba Guest House, 2003**  
Bruny Island, Tasmania, Australia, 1 + 2 Architecture  
Cath Hall, Mike Verdouw, Fred Ward, Designers  
© Peter Hyatt, Photographer

This vacation house on the island of Bruny, Tasmania, sits lightly on its wooded waterside site, set on a raised steel frame to minimize disturbance caused by excavation and to preserve natural drainage patterns. The house is "off the grid," meaning that it is completely independent of local power, water, and sewer connections. Electricity is supplied by photovoltaic panels with backup from a gas generator, water is provided by rainwater, and all waste is handled on site. Power consumption is reduced by high-value insulation, double glazing, and bedroom locations on the cooler side of the house.



**Tucson Mountain House, 2001**  
Tucson, Arizona, Rick Joy Architects  
© Undine Pröhl, Photographer

Set on a remote Sonoran desert site, the Tucson Mountain House represents a new spin on time-honored desert building methods: its rammed-earth walls—a mixture of desert soil from the building site and portland cement—endow the structure with the colors and textures of the desert, while providing valuable insulation against weather extremes. These earthen walls—up to two feet thick and sixteen feet high—absorb daytime heat, keeping the interior cool, as temperatures plummet at night, the walls gradually release the stored-up heat to warm the interior while absorbing the cold.



**Casa de Carmen, 2001**  
Baja California Sur, Mexico, Ledy Maytum Stacy Architects  
© Luis Gordo, Photographer

The Casa de Carmen is a highly self-sufficient reinterpretation of the traditional Mexican courtyard house, built using local materials and construction techniques. Located on a remote site with no public infrastructure for gas, oil, or electricity, the house generates its own power with photovoltaic panels. Features such as sun shading and thick concrete block walls infilled with concrete minimize the need for artificial lighting and mechanical air conditioning. Skylights and clerestory windows increase natural light; pale roof pavers reflect the sunlight and decrease heat-gain; and a trellis on the ocean wall provides shade and protects the house during hurricanes.

## Learn More!

Pick up a *Green Resource Guide* or a *Family Guide* during your visit to the exhibition for additional information and fun activities on going green.

Throughout the duration of *The Green House*, the Museum will offer a variety of complementary education programs expanding on the sustainable principles described in the exhibition, including a series of lectures, films, family programs, school programs, and two symposia on sustainable home renovation and affordable green housing. Visit [www.nbm.org](http://www.nbm.org) or call 202.272.2448 for up-to-date information and details.

## Exhibition Book

Purchase the accompanying publication *The Green House: New Directions in Sustainable Architecture*—a hardcover book featuring the innovative contemporary homes seen in the exhibition. Available in the Museum Shop and online at [www.nbm.org](http://www.nbm.org).