

**HABITAT FOR HUMANITY INTERNATIONAL
AND
GLOBAL GREEN USA**

BRIEFING BOOK

ENVIRONMENTAL INITIATIVE SYMPOSIUM

**Omni Hotel at CNN Center, Atlanta
Friday & Saturday, December 8-9, 1995**



Presented in partnership by:



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Habitat for Humanity International
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Environmental Initiative Symposium

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Dear Symposium Participant,

It is with great pleasure that I welcome you to the Habitat for Humanity & Global Green USA Environmental Initiative Symposium. These sessions bring together some of the finest minds and practitioners in the field of environmentally sustainable building with some of Habitat for Humanity's best home builders. This is the beginning of a momentous undertaking.

It is the stated mission of Habitat for Humanity to eliminate poverty housing from the face of the earth. The impact of this massive undertaking on our planet is not insignificant. Every house we build re-forms and relocates the earth's elements. We are committed to finding and employing ways of doing this work that minimize damage and maximize resources.

Habitat works with the world's poor, those least able to afford expensive innovation and most in need of resource efficiency. The houses that we build are simple in design and we build them well, but at the least possible cost so that the limited resources available to us can be stretched ever further. Finding ways of bringing the best materials, innovations and systems to the work that we do while maintaining affordability is one of the challenges we face.

We welcome your involvement in this pioneering effort. Together we can find ways of building houses that are sensitive to the environment both in their construction and their maintenance. It is my hope and prayer that the work that we do will serve not only the purposes of Habitat for Humanity but also others engaged in housing. This work should become as a beacon to builders around the world. May God bless our efforts.

In exciting and challenging partnership,

Millard Fuller
President & Founder
Habitat for Humanity International



**GLOBAL
GREEN
USA**

Dear Symposium Participant:

Thank you for your commitment of time and energy to the Habitat for Humanity and Global Green USA Environmental Initiative Symposium. Our work together will provide a foundation for changing how we value and use the earth's precious resources. Living in harmony with the earth is essential to our collective future.

GG USA supports Habitat for Humanity's commitment to the environment and future generations through the application of responsible and resource efficient building practices. Our two organizations will work together to develop tools and resources to promote resource efficiency among HFH affiliates. With your help, we look forward to advancing these priorities at Habitat and throughout the world.

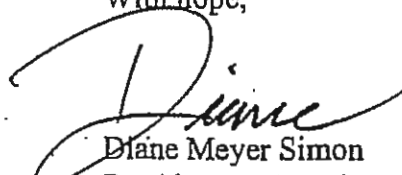
What began as a conversation between David Snell and Matt Petersen, whose friendship was born at Habitat, has become a strong partnership that represents an important part of GG USA's work. We are proud to collaborate with Habitat for Humanity on a program that takes tangible steps toward our common goals.

I have spent many years trying to "green" commercial and residential structures. Because of these efforts, I recognize the obstacles and opportunities ahead of us. Through the Environmental Initiative, this work continues on a scale that helps humanity rethink its relationship with nature.

It is especially fitting that we launch the Initiative at the home of the Turner Foundation and Ted Turner's enterprises. Without the early and generous support of Ted and Jane, the Turner family and staff, the vision of Mikhail Gorbachev for the Green Cross would not be what it is today in the United States.

Global Green USA cannot begin to express its gratitude for your contribution to this event and the work that follows. I wish you strength as we embark on this historic path.

With hope,


Diane Meyer Simon
President & Founder

In Partnership with
Green Cross International
President
Mikhail S. Gorbachev

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Environmental Initiative Overview

Since 1976, Habitat for Humanity International (HFHI) has worked to eliminate poverty housing through the construction and rehabilitation of simple decent houses worldwide. Currently, Habitat is active in more than 40 nations and constructs about 10,000 houses a year. As one of the world's largest house builders, Habitat recognizes an extraordinary opportunity to foster affordable, resource efficient housing.

In 1993, HFHI established its Department of Environment as a division of Education Ministries to explore better ways of building in harmony with the earth. In an effort to catalyze this work, HFHI partnered with Global Green USA (GG USA) -- the American affiliate of Green Cross International, led by Mikhail Gorbachev -- to create the Environmental Initiative. The mission of the Initiative is:

to identify and share ways of building simple decent houses that are resource efficient and responsible in their construction and maintenance, while working in partnership with God's people in need to eliminate poverty housing worldwide.

The partnership began at the 1995 HFHI Jimmy Carter Work Project in Watts, California, where GG USA helped coordinate the most extensive recycling effort of any Habitat blitz build, touching on all aspects of the solid waste stream. Beginning with the Environmental Initiative Symposium on December 8-9 in Atlanta, GG USA will work with HFHI's Department of Environment to build the capacity of Habitat for Humanity by:

- Facilitating the redesign of resource efficient house plans and environmental building guidelines;
- Helping educate and train Habitat staff and volunteers at the national, regional and local levels;
- Developing and facilitating the network of technical experts and the Environmental Initiative Advisory Council;
- Sharing models of success with the building world and related industries to increase opportunities for responsible, resource efficient affordable housing.

Many Habitat affiliates in such states as Florida, Georgia, Texas, North Carolina and Missouri already are putting into practice resource efficient building techniques. As a result of the partnership, affiliates will be further equipped with the tools and infrastructure they need to accomplish the mission of the Environmental Initiative.

The work of the partnership will also be integrated into the 1996 Jimmy Carter Work Project in Hungary and Habitat's 20th anniversary celebration in September 1996. The following page outlines the six program components of the Environmental Initiative.

Environmental Initiative Program Elements

- ***Environmental Initiative Symposium, December 8-9, Atlanta, GA***
The primary goal of the symposium is to bring together HFHI regional and area directors, key affiliate representatives and sustainable design experts to develop designs and guidelines that are environmentally responsible and resource efficient, affordable and volunteer-friendly.
- ***Habitat for Humanity Planbook***
The resource efficient house plans and guidelines resulting from the symposium will ultimately be published in an updated *Habitat for Humanity Planbook*.
- ***Environmental Initiative Network and Advisory Council***
HFHI and GG USA are assembling a national network of environmental building professionals to provide technical and design assistance to Habitat affiliates on a variety of topics, including site planning, energy efficiency, materials, landscaping and construction waste recycling. Habitat and Global Green USA also will assemble a smaller Advisory Council that will provide guidance to the Department of Environment on long-term strategic planning issues.
- ***Affiliate Training Program***
Application of resource efficient design practices at the local level will require extensive outreach to Habitat's 1,200 U.S. affiliates. HFHI and Global Green USA, through the Environmental Initiative Network, will develop and implement a training program that will help integrate environmentally preferable materials and building techniques into the Habitat house building process.
- ***Application of Resource Efficient House Plans***
Beginning in 1996, HFHI and GG USA intend to identify sites within four different climate zones to test the practical application of affordable, environmental building practices. HFHI will partner with institutions such as the Georgia Tech Center for Sustainable Technology and the University of Florida Shimberg Center for Affordable Housing to assist in the research and testing of energy efficient housing systems.
- ***Communications***
The Environmental Initiative has an opportunity to create models for resource efficient housing that will have broad application for affordable housing worldwide. A communications program is being created to inform targeted stakeholders (government agencies, professional associations, builders, designers, financial institutions, manufacturers, etc.) about the Initiative and the results of the program.

The Symposium Objective

This symposium officially kicks off the Habitat for Humanity and Global Green USA Environmental Initiative. The primary objective of the symposium is to bring together key Habitat local and national representatives and other experts from the fields of architecture, urban planning, energy efficiency, residential and low-income housing construction, and landscape design to revise existing house plans. The resulting plans and guidelines, which will ultimately be published in a new *Habitat for Humanity Planbook*, will be used to promote environmentally sensitive building practices among the 1,200 U.S. affiliates, as well as other affordable housing providers across the country.

Additionally, the symposium will serve as a forum to:

- Educate Habitat for Humanity regional directors and affiliates about "green" building techniques;
- Establish the Environmental Initiative Network, a database of sustainable building professionals, to provide technical assistance to Habitat affiliates;
- Identify obstacles and opportunities to constructing affordable, resource efficient housing and discuss strategies for incorporating environmental building practices at the affiliate level.

The symposium agenda is outlined on page 33.

The Habitat for Humanity House

The following provides an outline of the Habitat for Humanity house building process:

Pre-build, Family Selection and Materials Acquisition:

- The Habitat for Humanity affiliate obtains land through purchase or private/government donation. (Inner city rehabs are a slightly different process.)
- Local board of directors approves house project, seeks house sponsors or co-sponsors to assist with financing and outlines basic timetable for construction.
- Family selection committee chooses the families to receive the Habitat houses using criteria based on need, ability to pay on no-interest loan, and willingness to fulfill the necessary "sweat equity" hours. The committee determines the monthly payments to be made on a no-interest mortgage and notifies the selected family.
- Where possible, the affiliate uses architectural designs approved by HFHI at the national level and seeks commitment of donated time from attorneys and subcontractors, such as plumbers and electricians.
- Affiliate leadership contacts HFHI to determine availability of donated materials from national sponsors, arrangements for delivery, and coordination with local construction committee.
- Where materials cannot be obtained through donation, construction committee arranges for purchase.
- Affiliate holds groundbreaking ceremony, with dedicatory prayers and introduction of the homeowner family to the community.
- Pre-build work begins -- land cleared, foundation poured, arrangements finalized for infrastructure including utility lines, sidewalks, and streets where needed.

Construction, Post-Build and Family Nurturing:

- Construction begins; if the schedule is a blitz-build pace, the house is expected to be completed in one week with the family moving in shortly thereafter; otherwise affiliate schedules longer-paced plan, which can extend the house construction up to a year.
- Family selection committee monitors homeowner family's commitment of required sweat equity hours and fulfillment of these hours in the pre-build and throughout the construction process.
- Construction committee supervises the work of volunteers at site and arranges for hiring and scheduling of professionals where necessary; in some cases arranging for professionals and subcontractors to come on the site after volunteers have completed their day's work.
- The house is completed, and the affiliate schedules a dedication ceremony with the homeowner family. This includes the transfer of house keys and presentation of a Bible as a gift from Habitat.
- After move-in, Habitat staff and volunteers provide on-going assistance to families to help build homeowner skills.

Design Review Team Assignments

Beginning Friday afternoon, symposium participants will break into five house plan design review teams. Four teams are organized by climate zone and will focus on new house designs. A fifth team will focus on rehabilitation projects. Each team will be led by an experienced facilitator who will guide participants through the charrette process. Each team will have a group of technical experts and Habitat for Humanity representatives who will remain together throughout the design review process. Other technical experts, because of their particular expertise, will rotate from team to team as needed. These individuals are referred to as "rotators." Additionally, "floaters" have been identified to assist teams with the charrette process.

The following outlines the team assignments and identifies rotators and floaters:

Team 1: Hot/Humid Zone		
Facilitator	Gail Lindsey	
TE*	Dennis Creech	
TE	Subrato Chandra	(Friday only)
TE	Janet McIlvaine	
TE	Earnest Hooks	
TE	Dagmar Epsten	
TE	Mark Eisen	(Saturday only)
TE	Peter Bahouth	
HAW*	Dick Weber	
AFLT*	Royce Knight	
AFLT	Sara Coppler	
AFLT	Tony Vendana	
AFLT	John Shanley	
AFLT	Robin Adair	

*TE = Technical Expert

*HAW = Habitat Affiliates Worldwide

*AFLT = Affiliate

*HFHI = Habitat for Humanity International staff

Team 2: Hot/Dry Zone

Facilitator	Bob Berkebile
TE	Laurence Doxsey
TE	Barbara Harwood
TE	Peter Yost
TE	J. Edward Seiber
TE	Lynne Elizabeth
HAW	Daniel Lopéz
AFLT	Mark Harvey
AFLT	Andy Andrews

Team 3: Temperate Zone

Facilitator	Lynn Simon, Architect
TE	Mike Horst
TE	George Brewster
TE	Laura Heery (Saturday only)
TE	Arnie Katz
HAW	Rich Bell
AFLT	Al Maddox
AFLT	Bob Calhoun
AFLT	Cheryl Wallace
AFLT	Paul Farrell
AFLT	Peter Waller

Team 4: Cold/Dry Zone

Facilitator	John Connell
TE	Perry Bigelow
TE	Jerry Ingersoll
TE	Dan Cautley
HAW	Marty Kooistra
AFLT	Walter LaFleur
AFLT	Bruce Sharpe
AFLT	Henry Warren
AFLT	Tom Rondeau

Team 5: Rehabs

Facilitator	John Knott
TE	LeRoy Troyer
TE	Marc Rosenbaum
TE	Don Watson
TE	Charles Buki
TE	Mike Myers
AFLT	Graham Davis
AFLT	Adam Houtz
AFLT	Toni Griffin

Rotators

Elizabeth Plater-Zyberk	Site Planning and Landscape
Bernadette Cozart	Landscape
Carol Franklin	Landscape
Colin Franklin	Landscape
Gary Petersen	Waste Recycling
Alex Wilson	Appliances
Joe Lstiburek	Materials, Indoor Air Quality
Steve Loken	Materials
Margaret Howard	Materials
Chet Chaffee	Materials
Rick Fedrizzi	Energy Systems
Randall Godwin	Heating and Air Conditioning
Larry Blackburn	Water Efficiency
Greg Franta	Daylighting (Saturday only)
Nadav Malin	Writer
Frank Purvis	HFHI
Peter Dalva	HFHI
David Ewing	HFHI
Karen Young	Director, Urban Initiative, HFHI

Floaters

Bill Browning	RMI
Lisa McManigal	RMI
Gunnar Hubbard	RMI
Jenifer Uncapher	RMI
April Smith	GG USA/ReThink, Inc.
Sid Wales	GG USA/ReThink, Inc.
Matt Petersen	GG USA
Kristin Coates	GG USA (event logistics)
Emily Keyes	HFHI (event logistics)
Tony Lent	Environmental Advantage

Team Guidelines

1. The final result of the design review process will be written guidelines, recommendations and design sketches that HFHI will use to modify the existing *Habitat for Humanity Planbook*. Technical experts should have received the existing *Planbook* by mail. Additionally, some new Habitat house designs will be distributed to the charrette teams at the symposium.
2. Please familiarize yourself with the existing house plans and the *Briefing Book* materials before the event so that we can use our time together as productively as possible. These materials will help you understand the Habitat for Humanity house building process and the charrette objectives.
3. In addition to gathering ideas and designs for how to maximize the resource efficiency of Habitat house plans, we also want to use the symposium as a vehicle for capturing insights about barriers and opportunities to implementing sustainable design principles at the affiliate level. Facilitators and floaters will work with each group to help gather these ideas.
4. Team facilitators will assign roles to charrette participants as needed (note takers, time keepers, etc.) in order to document ideas and monitor the team process.
5. Design team breakouts begin on Friday at 2:00 PM. Please refer to the agenda in the back of your *Briefing Book* for your room assignment. We anticipate Friday's session to extend late into the evening. We will provide you with plenty of caffeine and snacks to get you through the night! Each team will make a brief 5 minute report on Saturday morning.
6. Final presentations are scheduled for Saturday at 4 PM. Each team will have 20 minutes to present their recommendations, followed by 5 minutes of questions from the audience.

Design Review Criteria

The following criteria are intended to guide the design review team process. Habitat for Humanity Houses need to be:

- **Affordable**
- **Simple and decent**
- **Accessible and adaptable**
- **Volunteer-friendly**
- **Site, climate and context specific**
- **Designed with homeowner needs in mind**
- **Resource efficient**

1. Affordable

Historically, Habitat has viewed “affordability” as having two components. First, Habitat houses are affordable to build using volunteers, simple designs with adequate square footage and donations of land, labor and materials. Secondly, Habitat’s no-interest, no-profit mortgages make houses affordable to buy. These measures of affordability have resulted in a typical 1,050 square-foot three-bedroom house that costs an average of \$34,300 (an average square-foot cost of about \$33).

Through this symposium, Habitat for Humanity is adding a third component to define affordability: affordable to operate. It is Habitat’s goal that improving efficiency will make houses less expensive to live in by reducing utility and maintenance costs.

2. Simple and decent

House designs should reflect the Habitat philosophy of building simple, decent houses as defined in the *Habitat House Design Criteria*:

- The living space provided, not including stairwells (except to a basement) and exterior storage, should not be more than:
 - 900 square feet for a two-bedroom house
 - 1,050 square feet for a three-bedroom house
 - 1,150 square feet for a four-bedroom house
- The basic house should have only one bathroom. This may be compartmentalized for increased usefulness, or additional baths can be added by the family as part of their budget.
- Each family should have an opportunity to affect the design of their house as much as possible. A budget should be established with a

predetermined limit (e.g., \$1,000) to allow the family to personalize their home with such things as picture windows, fencing, 1/2-bath, etc.

- Each house should have a covered primary entrance.
- Homes should have no garages or carports.

3. Accessible and Adaptable

According to the *Habitat for Humanity Planbook*, an accessible house is one that can be approached, entered and used independently by people with mobility impairment. An adaptable house is one that has certain basic accessibility features and other features that can be easily changed when required to further aid a person with disabilities. The *Habitat House Design Criteria* outlines the following guidelines:

- When feasible, at least one entrance to the home should be accessible to persons who have difficulty with mobility.
- All passage doors, including the bathroom door, should be 3'0" minimum width, and halls should be 3'4" minimum frame to frame. These standards allow for simple access for persons with disabilities and elderly persons and increase the cost only slightly. Further adaptations may be needed if a family member is disabled.

Please refer to the Habitat for Humanity Planbook, pages 31-40 for further information about accessibility and adaptability.

4. Volunteer-friendly

Volunteers are a vital part of Habitat for Humanity, and their participation is essential in developing partnerships, respect and understanding within the larger community. Habitat has two goals in working with volunteers. The first goal is to use volunteers effectively in the house building process, thereby reducing construction and administrative costs. The second goal is to make the volunteer experience a meaningful one.

Volunteers make up the primary labor force for Habitat house construction, and their involvement ranges in time commitment and skill level. Some volunteers are design and construction professionals, some are skilled laborers and others are unskilled. Because of this range in involvement and expertise, most affiliates build with materials and systems that require a minimum level of knowledge and skill.

5. Site, climate and context specific

Page 4 of the *Habitat for Humanity Planbook* outlines "site, climate and context" considerations. The following is an excerpt from this reference:

- **Site:** The site on which the house is to be built is a major influence in the selection of a particular house design. The affiliate should consult with relevant local authorities regarding utilities, zoning and other legal

restrictions relating to issues such as set-backs, sewage disposal, flood plains, wetlands and earthquakes to ensure that a particular design is suitable.

- **Climate:** Consideration of the climate also influences the design selection. Certain designs that have an enclosed entry way and provide for a ducted heating system have been included to suit the colder regions of North America. Basements have not been shown on the architectural drawings and should be included only when necessary for climatic reasons. Other designs that facilitate cross-ventilation and shading from the sun are more suited to warmer environments.
- **Context:** Additionally, one should consider the context in which the house is to be built. It is important that the house is in harmony with the neighborhood. Within the parameters of Habitat's principles, affiliates are encouraged to alter designs to best suit local conditions and to be compatible with the styles of nearby houses.

6. Designed with Homeowner Needs in Mind

Habitat for Humanity houses must be built with homeowner needs in mind. When designing for resource efficiency, it is important to remember that if Habitat houses use alternative materials, appliances and equipment, these features must be convenient and affordable to replace, repair and maintain. Even with low mortgage payments, these features may not be affordable for homeowners. For example, replacing a broken window pane from an argon-filled double-hung window or even compact fluorescent light bulbs may be beyond homeowner means. Also, keep in mind that affiliates need to train homeowners about various procedures, such as how to light a gas water heater pilot light or when to change the filters of forced air furnaces. In turn, affiliates may also need to be trained on these procedures.

7. Resource Efficient

The current *Planbook* lists items that should be considered during the design and construction of a house to improve energy efficiency. Design elements include insulation, window and door specifications, infiltration control and natural cooling. (See *Habitat for Humanity Planbook* pages 24-26 for more information.)

A note about air conditioning: Due to installation and operating costs, affiliates have long been encouraged to avoid using air conditioning in Habitat for Humanity houses. HFHI strongly urges affiliates to consider alternatives such as passive cooling, natural ventilation, whole house fans and room ceiling fans.

The existing *Habitat for Humanity Planbook* does not include guidelines on other sustainable design features. That's where all of you talented experts come in! The following "Principles of Resource Efficiency" will help you get the process started.

Principles of Resource Efficiency

The following is an excerpt from Rocky Mountain Institute's *Primer on Sustainable Building*, © 1995. All Habitat for Humanity symposium participants will receive a copy of the Primer at the design workshop.

What is Green Development?

Although today's buildings are more resource efficient than those of thirty years ago, the average house, office, apartment building, school or hotel still places undue demands upon the earth, wasting tremendous amounts of energy and water. Sited and designed with little regard for local climate, new buildings are far more expensive to heat or cool than necessary. Meanwhile, leapfrogging, sprawling development erodes existing communities, converts prime farm lands to housing, requires expensive new highways for commuters, and exacts a heavy toll on the environment.

Today's buildings not only are designed without the planet in mind, they also neglect their occupants. The news is sprinkled with stories about "sick" office buildings whose indoor air quality makes workers ill. Office workers often toil in bleak spaces with windows that won't open and lighting that is poor. Homeowners pick up the tab for energy-inefficient construction and drafty houses.

As growing numbers of homeowners, architects, builders and developers realize the need for change, an exciting new field is emerging called "sustainable design" or "green development." Although this new architecture is difficult to describe in a sentence or two, its overall goal is to produce buildings that take less from the earth and give more to people.

Note that sustainable design is not a new building style. Instead it represents a revolution in how we think about, design, construct and operate buildings. The primary goal of sustainable design is to lessen the harm that poorly designed buildings cause by using the best of ancient building approaches in logical combination with the best of new technological advances. Its ultimate goal is to make possible offices, homes, even entire subdivisions that are net producers of energy, food, clean water and air, beauty, and healthy human and biological communities. Ideally, a green building would:

- make appropriate use of land
- use water, energy, lumber and other resources efficiently
- enhance human health
- strengthen local economies and communities
- conserve plants, animals, endangered species and natural habitats
- protect agricultural, cultural and archeological resources
- be nice to live in
- be economical to build and operate

Advantages of green buildings:

Save energy: Over 30% of total energy and 60% of the electricity used in the U.S. is consumed in buildings. Modern energy efficiency can enhance any building's comfort, beauty, quietness, performance, bottom line, and worker productivity.

Save water: Water-efficient plumbing fixtures reduce water, energy, and sewage-treatment bills. They may also decrease tap fees while eliminating the need to dam rivers or expand water and waste water treatment facilities.

Promote economic development: Resource-efficient buildings strengthen local, state, and national economies, since owners and tenants spend less money on imported energy and utilities. Those saved dollars stay in the community, supporting local jobs and businesses.

Improve health and productivity: Americans spend 80% of their time indoors. Owners of green homes enjoy better air quality and health.

Reduce pollution: Saving a unit of electricity saves three or four units of fuel, generally coal, at the power plant. Burning less fuel reduces CO₂ emissions, the primary green house gas, and SO_x and NO_x, which contribute to acid rain.

Protect the environment: Poorly designed or sited buildings scar the landscape, take valuable agricultural lands out of production, and blight wildlife habitat. Green buildings can be designed to restore and enhance natural habitats. The use of recycled or sustainably sourced building materials can also help protect forests and species.

Enhance security: Green buildings reduce dependence on precarious resource imports, improve trade balance and competitiveness, and create a fairer, more resource-abundant world.

Benefit our descendants: Green buildings make you feel better, not only because they are inherently more comfortable, but also because you are using up fewer of your grandchildren's resources and opportunities.

Some things to think about in building green:

Site selection - It is important to understand the site before beginning the building process. Understanding the sun's path and existing shadow patterns, for example, will determine the amount of solar heating and daylighting that can be obtained.

Site development - Sustainable design aims to minimize environmental harm. Ecological disruption caused by erecting a building can be dramatically reduced through restraint and careful planning. Always protect the site's natural resources. Driveway placement in single family homes is a critical decision: road orientation and lot platting will effect tremendously what is built there.

Transportation - For green development, making vehicular access the primary consideration is no longer desirable. Even small developments can be designed with pedestrians in mind. Developments should be sited to take advantage of existing roads, highways, and public transit, linking new projects into the existing community.

Building placement - Green buildings should always be sited to maximize their beneficial use of the sun and other renewable resources, and to minimize their impact on the natural

environment. Taking advantage of existing land forms and vegetation can improve your building's energy performance and comfort.

Land design/Landscaping - Preserving as much vegetation as possible will eliminate future landscaping costs and needs. New plantings in conjunction with existing vegetation can create a desirable micro-climate around a building. Shading a building and nearby paved surfaces from the summer sun can lower air temperature by as much as 15 degrees. Design to promote composting as well as gardens and edible landscaping if possible.

Building configuration - A building's shape, interior layout, size, and solar orientation all affect its energy use and its sustainability. All four variables should be considered in an integrated manner to maximize energy savings. Regardless of climate, green buildings should use as much daylight as possible. Natural daylighting reduces operating costs, provides superior light quality and increases occupants' health, well-being and productivity.

Building shell - The building shell or envelope includes walls, windows, doors and roof. It should be designed to optimize thermal performance. The individual components must be designed to work together as a system. In general, the design should minimize conduction losses and infiltration of hot air in the summer, and radiation of heated air in the winter.

Alternative construction materials - Many alternatives to conventional wood-framed or concrete-block construction are either cheaper or use less resources. Examples include: adobe, native stone, rammed earth, straw bales, concrete foam forms, etc.

Interior energy use - The best results come from considering energy efficiency as a design imperative from the beginning. An efficient building will typically cost about the same as a conventional one to build. A comprehensive approach to energy efficiency can lower capital costs 3-5% while reducing energy use by 50-80%.

Space cooling - The need for mechanical cooling can be minimized through whole-systems engineering that focuses on reducing unwanted heat gain, using natural ventilation and cooling techniques (like people have been using for centuries), expanding the occupants' "comfort envelope" and properly sizing and controlling any cooling equipment.

Space heating - The basic strategy for space heating is first to minimize heating losses through the building shell, then, to capture as much of the sun's heat as possible. Finally, meet the remaining heat load with an efficient furnace, boiler, heat pump, wood stove or other heater. This strategy will enable the heating system to be downsized or even eliminated. The following elements should be considered in addressing space heating.

Electric lighting - Design lighting according to a given space's specific needs. Glare-free, well-distributed daylighting will minimize the need for electric light. In residential buildings, compact fluorescents should be used instead of incandescent lamps for most ambient lighting: they produce pleasant "warm-colored" light and use one quarter as much energy as incandescents. While they are more expensive, they will last about ten times as long.

Water heaters - After space heating and cooling, the water heater is the next largest energy user in the typical home. Water heaters will be much cheaper to operate if they support a reduced load; water-efficient shower heads and faucet aerators should be standard practice.

Appliances - Ideally, all appliances in a green home should be as efficient as possible. At a minimum, a home should have an efficient refrigerator, washer and dryer. Differences in the costs of efficient appliances will be rapidly repaid in energy savings.

Saving water - Efficient devices such as low-flush toilets provide the same or better service at comparable prices and can cut the average household's water and energy bills by \$59-\$119 each year.

Building ecology - As buildings become tighter and are filled with manufactured building materials, poor indoor air quality can appear. This problem can be addressed in many ways, such as by making sure incoming air is clean, providing adequate ventilation, using non-toxic materials for paints, finishes, carpets, etc.

Operations - Most of the extra thought that a sustainable building requires is expended during its design and construction. But for the building to achieve its full promise, it must be operated and maintained in accordance with its design. Issues to address include: replacement materials and fixtures, operation of systems (irrigation, heating, etc.), maintenance and inspection of equipment, and recycling.

Specification and construction - The same commitment to sustainability must be maintained during the specification and construction phases. During the specification period, it is common for substitutions to be proposed. Those in charge of buying products and/or authorizing purchases must understand the importance of an integrated system. Remember that green design takes into account higher prices for some components in order to achieve much larger savings for the whole system. The innocent substitution of lower cost, lower quality items may end up costing its occupants a lot.

Building color - One aspect that is often overlooked is building color. Roof color, especially, may substantially affect a building's energy use. In a hot climate, a white or light-colored roof in combination with well placed shade trees can lower the building's cooling load by 30%. Another important consideration is the absorption of the infrared half of solar energy: some pastel finishes reflect infrared well, while some visually "white"-looking asphalt shingles absorb it.

Affiliate Case Studies

The following summaries represent a sampling of the many Habitat for Humanity house projects that have incorporated sustainable design elements into their construction and operations.

The Earth Wise Affordable Homes Project in Atlanta, Ga

On July 22, Southface Energy Institute, in partnership with The Home Depot, began construction of an Earth Wise Home for Habitat for Humanity. Earth Wise is an adaptation of the standard Habitat home designed to demonstrate practical ways of improving energy and water efficiency in affordable homes; along with the use of environmentally-friendly building materials. Insulation made from recycled materials, interior paints that emit few toxic fumes, duct work with a special seal that prevents energy loss and minimizes entry of outdoor pollutants, and solar designs are a few of the resource-efficient features of the Earth Wise project. The construction of the home was done by 200 volunteers every Saturday for nine weeks and now serves as a model for Habitat for Humanity and other affordable housing groups.

La Frontera Initiative's Colonia Habitat Program

La Frontera Initiative is a special HFHI project addressing the needs of the U.S./Mexico border colonias. Colonias, located within 150 miles of the U.S./Mexico border, are unincorporated, rural subdivisions that lack infrastructure and decent housing. Almost all colonias residents confront persistent poverty, unclear land and title agreements, limited fresh water and waste water facilities, and limited access to health care, education, and employment training. The vision of the Colonia Habitat Program is to build leadership and economic capacity by developing and implementing a community led self-help housing program. In January of 1996, La Frontera Initiative will begin a 100 home demonstration project in the colonias of Hidalgo County, Texas. The Colonia Habitat Program is partnering with a local appropriate technology innovator, David Omick, to develop buildings and infrastructure appropriate to the region and demonstrate the use of sustainable practices. Designs will consist of complete housing systems, including innovative and traditional technologies to obtain fresh water, process gray water and sewage, and cool homes.

Jordan Commons in Homestead, Florida

In August 1992, Hurricane Andrew destroyed much of South Florida's Dade County, leaving many people homeless and low-income families helpless. Habitat for Humanity began a mission of building new houses with displaced families. The result of the affiliate's efforts is Jordan Commons, a 200-home model community committed to community building and ecological responsibility. Some of the features that make Jordan Commons an atypical development project are visual access to streets that facilitate supervision of children and monitoring of public spaces, pedestrian-friendly streets and common facilities such as parks and day care centers. The design of the individual houses includes ecological elements such as low-cost water heaters, photovoltaic pumps,

reflective steel roofs, and the planting of nearly 15 trees per house, which reduces the heat-island effect by 3 to 5 degrees Fahrenheit. The National Association of Home Builders and the U.S. Environmental Protection Agency also are using Jordan Commons as a demonstration site for appropriate methods of recovering and recycling construction waste.

The Green Habitat Learning Project in Austin, Texas

Habitat for Humanity, the City of Austin, and the American Institute for Learning (AIL) completed and dedicated a house under the Green Builder Program in March 1994. The Green Builder Program was designed to serve as a model for home building around the world and, specific to the Austin Habitat project, focused on energy, water, building materials, and solid waste. The East Austin home was designed by the Green Builder Program and built by eight students of AIL and volunteers from Habitat. Not only is the house energy efficient, built from non toxic and natural materials, and the same cost as a home that does not use recycled materials, but also the Green Habitat Learning Project served as a way to teach math and writing to the AIL students. Martin and Adela Torres and their two children moved into the three bedroom house in March.

The Greenprint House in Americus, Ga

In June of 1994, The Home Depot created its Affordable Environmental Greenprint House in conjunction with HFHI's 30/3000 Blitz Build in Americus, GA. The project is a three-dimensional demonstration of environmental empowerment, focusing on energy and water efficiency, indoor air quality, recycling, and waste reduction. The house incorporates innovative products in development or sold by The Home Depot, many of which are certified by Scientific Certification Systems, Inc. These products demonstrate the company's pro-active effort to increase the mix of alternative products available to its customers. In a partnership with Habitat, The Home Depot will foster the use of more environmentally sensitive products and building techniques, thus increasing quality of life for the Habitat homeowner.

The Earthwise House in Lynchburg, Virginia

The Lynchburg affiliate's project manager, Kevin Campbell, and volunteer coordinator Mary Adams joined their efforts and ideas to build a Habitat home that has minimal impact on the earth. They contacted businesses that could assist in this process and discovered Louisiana-Pacific, which donated \$15,000 worth of lumber, windows, siding, and insulation for the construction for a four-bedroom, single-story house. The house was built for a family of seven using wood made of scraps and insulation and wallboard made of recycled materials. The land was donated by the Lynchburg Redevelopment and Housing Authority and the house cost roughly \$30,000, including permits, materials, utilities fees and overhead.

Greenhome in Washington, Dc

In partnership with DC Habitat for Humanity, a coalition of local design professionals and environmental organizations are researching, designing and building an affordable, energy and resource efficient house through the GreenHOME project. The house will

serve as a model of sustainable building for Habitat for Humanity and the community. Education is an integral part of the project. GreenHOME will provide a list of available and affordable green technologies, products and practices to anyone who is interested. Waste reduction, reuse, recycling, use of recycled materials, composting, use of non toxic materials and products, energy efficiency and landscaping are among the technologies and design features that will be used for the project.

Breaking Ground in West Philadelphia

Project "Breaking Ground" is a collaboration of Habitat for Humanity West Philadelphia and Urban Designers, a Drexel University senior design group made up of architectural engineering students. Plans call for rebuilding row houses in the 4900 block of West Stiles Street using the best of old and new in building materials, design features, and building techniques. Urban Designers are researching and updating the design of the standard Philadelphia row house with special attention to energy efficiency, indoor air quality, and impact on the environment. "Breaking Ground" takes a comprehensive view of ecological design that includes the impact on the larger environment. The notion of "ecology" is extended to include the quality of the environment enclosed by the structure itself.

Silver City in New Mexico

The Silver City project completed the first plastered straw bale house in all of Habitat for Humanity; the Amador House in the Gila Region of Silver City, NM. The project is on the cutting edge of resource efficiency and on the frontier of earth wise construction. The rectangular ranch style house is 1,000 square feet and uses post and beam construction. Its features include a natural gas furnace and water heater, Formica counters, pressed wood cabinets, and all vinyl tile floors.

Texas Low-Cost Model Home Program

Texas Habitat for Humanity is working with the National Center for Appropriate Technology's Dallas field office to address the barriers that inhibit low-cost housing programs from adding adequate resource efficiency to their homes. A statewide, model low-cost housing program that will provide technical assistance, documentation, and tools for change is proposed. Dramatic energy and resource savings for the lowest cost construction in Texas are foreseen. The program includes developing a technical assistance network; model construction specifications; training materials, and a statewide demonstration of climate-appropriate construction.

Insu-Form House in Southern California

The Coachella Valley Habitat for Humanity affiliate used a new and exciting building material for a house built as part of the 1995 Jimmy Carter Work Project for the Southern California area. The material is called OTW 2001 Building System with Insu-Form. The Insu-Form block, the size of three concrete blocks, is composed of fly ash, fibers, and portland cement and weighs about as much as one concrete block. It has a high R-factor, as well as providing considerable mass, which makes the structure highly energy-efficient. The block manufacturer donated all the blocks required for the house and the time of the engineer to supervise and assist in the project.

Organization Profiles

Habitat for Humanity International

Habitat for Humanity International, founded in 1976, is a nonprofit, ecumenical Christian housing ministry that seeks to eliminate poverty housing from the world and to make decent shelter a matter of conscience and action. Through volunteer labor, management expertise, and tax-deductible donations of money and materials, Habitat builds and rehabilitates homes with the "sweat equity" help of homeowners. Homes are sold at no profit to Habitat's partner families and financed with affordable, no-interest mortgages issued over a fixed period. Homeowners make low monthly mortgage payments that are repaid over an average of 20 years and deposited into a revolving "Fund for Humanity" that supports the construction of more houses. HFHI headquarters in Americus, GA, coordinates the efforts of Habitat's affiliates in the United States, Canada and more than 40 other nations around the world.

*Habitat for Humanity International, Inc., 121 Habitat Street, Americus, GA 31709
(912) 924-6935, Fax (912) 928-3655*

Symposium Participants:

David Snell, Director of Education Ministries
Frank Purvis, Director, Department of Environment
David Ewing, Senior Advisor, Department of Environment
Peter Dalva, Associate Director of Construction Technology
Emily Keyes, Department of Environment
Jane Emerson, Director of Corporate Programs
Michael Willard, Associate Director of US Affiliates
Jim Purks, Senior Writer, Education Ministries
Marjorie Farley

Global Green USA

Having effected historic and fundamental change as president of the Soviet Union, Nobel Prize winner Mikhail Gorbachev issued a new challenge to governments, businesses and individuals to help ensure humankind's future on earth. Gorbachev's response to this challenge was the creation of Green Cross International (GCI) in Kyoto, Japan, in 1993. Global Green USA, the American affiliate of GCI, was inaugurated during the October, 1994 visit of Mikhail and Raisa Gorbachev to Los Angeles. The objectives and programs of Global Green USA mirror the goals of GCI: (1) Building the capacity to prevent and respond to human-made environmental disasters through its "Legacy Project," which is working to accelerate military toxics cleanup; (2) Fostering a global value shift with regard to the environment through such efforts as the Habitat for Humanity Environmental Initiative; and (3) Creating international ecological law through the Earth Charter process.

*Global Green USA, 4223 Glencoe Avenue, Suite B103, Marina del Rey, CA 90292
(310) 577-1885, Fax (310) 827-7416*

Symposium participants:

Matt Petersen, Executive Director
Kristin Coates, Program Associate

Rocky Mountain Institute's Green Development Services

Rocky Mountain Institute (RMI) is a nonprofit resource policy center dedicated to finding market-based solutions to complex problems in energy, water, economic development, transportation, security and environmentally responsive development. RMI works with corporations, governments and citizen groups worldwide. RMI's work on environmentally responsive development is coordinated by its Green Development Services (GDS) program. This program has two components. The first is research into the cost, approvals, construction and market implications of incorporating environmentally and economically sound measures into real estate projects. The second component is direct consulting services to architects, planners, developers and corporations on ways to integrate energy efficient and environmentally responsive design into specific projects.

Rocky Mountain Institute, Green Development Services, 1739 Snowmass Creek Road, Snowmass, CO 81654-9199, (970) 927-3807, Fax (970) 927-4510

Symposium participants:

Bill Browning, Director, Green Development Services
Lisa McManigal, Senior Research Associate
Gunnar Hubbard, Research Scholar
Jenifer Uncapher, Research Associate

Project Managers for Global Green USA

ReThink, Inc.

ReThink, Inc., founded in 1994 by April Smith and Sidney Wales, is a Los Angeles-based consulting firm specializing in environmental planning. ReThink's services include ecological auditing, resource efficient facilities planning and management, solid waste reduction, environmental purchasing, ecoliteracy programs, public relations, project management, event planning and nonprofit fundraising. The principals of ReThink, Inc., have worked with a variety of clients including Sony Pictures Entertainment, The Gap, Inc., Green Seal, AmeriCorps, The Walt Disney Company, the County of Los Angeles, the Southern California Gas Company, the J. Paul Getty Trust and the Los Angeles Department of Water and Power. In addition to the HFHI/GG USA Environmental Initiative, ReThink is currently project managing an urban forestry initiative throughout the Los Angeles region on behalf of TreePeople and helping Waste Management, Inc., to integrate resource efficient design elements into its Chicago office renovation.

*ReThink, Inc., 4223 Glencoe Avenue, Suite B 103, Marina del Rey, CA 90292.
(310) 827-1217, Fax (310) 827-7416*

Symposium participants:

April Smith, President
Sid Wales, Executive Vice President

Directory and Participant Biographies

Peter Bahouth

Mr. Bahouth, a longtime forest activist, is currently the director of the Turner Foundation and the former executive director of Greenpeace USA. For years, he has helped lead national efforts to protect vast expanses of roadless wilderness and ancient forests. Mr. Bahouth speaks on numerous social and environmental issues, and recently contributed his knowledge, writing, and monetary support through the Turner Foundation to the Rainforest Action Network publication, *Cut Waste, Not Trees*.
The Turner Foundation, One CNN Center, Suite 1090, South Tower, Atlanta, GA 30303, (404) 681-9900, FAX: (404) 681-0172

Robert Berkebile, FAIA

BNIM Architects work in creating buildings, developments, and communities as pedagogy. As founding chairman of the American Institute of Architect's Committee on the Environment, Mr. Berkebile forged a joint venture with the U.S. EPA, manufacturers, and environmental groups to create the criteria, methodology, and database that has become the *Environmental Resource Guide*. He is working with the National Park Service, Department of Energy, Department of Defense, Canadian Provincial Governments, and the National Science Foundation to develop sustainable guidelines for their projects.
BNIM Architects, 1200 Main St., Suite 515, Kansas City, MO 64105, (816) 474-6910, FAX: (816) 221-3047

Perry Bigelow

Mr. Bigelow is the President of the Bigelow Group and founder of Isaiah Community Development Group, a not-for-profit inner-city housing and community development organization. He has been a home builder in Chicago area for over 25 years. His deep beliefs and intense desire to use respectfully God's gift of the Earth are the basis of his business philosophy. He is perhaps best known for guaranteeing heating bills on his homes throughout Chicago at \$200 per year. Mr. Bigelow has been published in many publications and was recognized as "Energy Builder of the Year" from 1982 to 1990.
The Bigelow Group, Inc., 999 South Plum Grove Rd., Palatine, IL 60067, (708) 705-6400, FAX: (708) 705-6733

Larry Blackburn

Currently Mr. Blackburn is Senior Program Manager for CTSI Corporation, an environmental and conservation consulting firm with offices throughout the U.S. During his tenure, he has had oversight

responsibilities for some of the largest, most far reaching water conservation programs in the western U.S. Throughout his career Mr. Blackburn has been very active in resource conservation and pollution prevention. Previously, as the executive director of EarthBond, an environmentally active non-profit consultancy based in Atlanta, GA, he helped to develop and coordinate a pilot pollution prevention program, which establishes partnerships between the EPA and local businesses.

CTSI/Earthbond, 1881 Kaiser Ave., Irvine, CA 92714, (404) 565-3187, FAX: (404) 565-9396

George B. Brewster

Since 1973, Mr. Brewster has built 450 single family and condo units, built and renovated over 3,500 apartment units, developed 580,000 square feet of corporate office buildings, and acquired two billion dollars of existing properties for institutional investors. He is active as a consultant specializing in applying leading-edge technology to real estate development, asset management and facilities projects. He also is a director of TERRA Group, LLC, which is developing and distributing alternative building technologies. Mr. Brewster also has published books and articles on the topic of environmentally responsible development.

Asset & Development Management, 28 Bayview Ave., Belvedere, CA 94920, (415) 435-9922, FAX: (415) 435-4327

Bill Browning

Mr. Browning is director of Green Development Services at Rocky Mountain Institute. He received a BS in environmental design from the University of Colorado, specializing in energy-conscious architecture and resource management, and an MS in real estate development from MIT, where he was the 1991 Public-Sector Fellow at the Center for Real Estate. Bill serves as a science advisor on the environment for the AIA and was vice-chair of ASTM's Green Building Rating Committee. His papers have been published in numerous trade journals and his design portfolio includes greenhouses, homes, an art gallery, a recording studio, and an award-winning youth exchange camp in the Republic of Georgia.

RMI, Green Development Services, 1739 Snowmass Creek Road, Snowmass, CO 81654-9199, (970) 927-3807, FAX: (970) 927-4510

Charles Buki

Mr. Buki directs community design for the Neighborhood Reinvestment Corporation, which provides training to nonprofit community groups in areas of design, community planning and real estate development in the inner city. He is also the director of the Design for Housing program of the National Endowment for the Arts and has presented speeches extensively on community design. Mr. Buki is currently working on a book about community planning and the relevance of good architecture in low income communities.

Neighborhood Reinvestment Corporation, 1325 G St., NW, Suite 800, Washington, DC 20005, (202) 376-2473, FAX: (202) 376-2600

Dan Cautley

Dan Cautley, P.E., is a staff engineer at NAHB Research Center, a subsidiary of the National Association of Home Builders. For several years, Mr. Cautley worked on the U.S. Department of Energy sponsored Residential Efficiency Program, where he developed and offered educational programs on subjects such as lumber framing, geothermal heat pumps and marketing of energy efficient homes. Mr. Cautley has also managed the development of the national Energy Value Housing Awards program and has initiated a pilot project in Richmond, VA, to test the effect of home energy ratings in marketing analysis of energy efficient new homes. Mr. Cautley has performed a marketing analysis of the Jordan Commons Habitat for Humanity housing project in Homestead, FL.

NAHB Research Center, 400 Prince George Blvd., Upper Marlboro, MD 20774, (301) 249-4000, FAX: (301) 249 3265

Chet Chaffee, Ph.D.

Dr. Chaffee is vice president of marketing for Scientific Certification Systems. He also has headed its effort in developing environmental analysis and certification procedures for building products, including directing an environmental claims evaluation program for The Home Depot. Dr. Chaffee has developed and provided training programs for retailers, manufacturers, architects, and building contractors on the environmental aspects of building products and building design. He also is a participant in ASTM's standards committees on life cycle analysis for building materials and environmentally preferable cleaning products.

Scientific Certification Systems, 1 Kaiser Plaza, Suite 901, Oakland, CA 94612, (510) 832-1415, FAX: (510) 832-0359

Subrato Chandra, Ph.D., PE

Dr. Chandra has over 15 years experience in managing research, primarily in the area of energy conservation in buildings. He serves as Florida Solar Energy Center's project director of Energy Efficient Industrialized Housing. This is a multi-year project sponsored by the U.S. Department of Energy that seeks to develop, evaluate and transfer technologies for high quality, affordable and energy efficient housing. His primary professional interest is to increase the market share of high quality housing that minimizes the sum of the energy and allergy-related medical costs.

Florida Solar Energy Center, 1679 Clearlake Rd., Cocoa, FL 32922-5703, (407) 638-1000, FAX: (407) 638-1010

John Connell

Mr. Connell founded the Yestermorrow Design/Build School in 1980, where he continues to serve on the board of directors. In 1983 he started the Yestermorrow Building Group, Inc., serving as a principle and owner. The Building Group practices what the school preaches. John is the author of *Homing Instinct* and has spoken and taught at a number of colleges and universities.

Yestermorrow Design/Build School, RR1 Box 97-5, Warren, VT 05674, (802) 496-5546, FAX: (802) 496-6280.

Bernadette Cozart

Ms. Cozart is executive director of the Greening of Harlem Coalition and is a gardener for the Department of Parks and Recreation of NYC. Transforming public spaces, such as abandoned buildings, vacant lots and tree pits, is the focus of the coalition with the goal of making them ecologically sound spaces for community interaction. Her background is in horticulture with an emphasis on botany.

300 Riverside Dr., Apt. 10-H, New York, NY 10025, (212) 254-2870

Dennis Creech

Mr. Creech is a founder and the Executive Director of Southface Energy Institute, a nonprofit corporation dedicated to research and education in environmental and energy technologies. He has conducted hundreds of seminars and workshops on topics ranging from passive solar design to pressure diagnostics of houses. In addition to teaching and speaking, Mr. Creech writes extensively on environmental topics and serves as the editor of the *Southface Journal of Energy and Building Science*.

Southface Energy, 158 Moreland Ave., P.O. Box 5066, Atlanta, GA 30307, (404) 525-7657, FAX: (404) 525-6420

W. Laurence Doxsey

Mr. Doxsey has served as coordinator for the award winning Austin Green Builder Program since its beginning in 1990 and coordinated the building of a model "green" Habitat for Humanity home in Austin. As a former business owner, he focused on passive solar construction, alternative energy systems, and energy efficient products and services. Mr. Doxsey also has worked with the Center for Maximum Potential Building Systems.

City of Austin, ECSD, 206 E. 9th St., Suite 17.102, Austin, TX 78701, (512) 499-3504

Mark Eisen

Mr. Eisen joined The Home Depot in 1990 to launch the company's environmental marketing program. He has over 20 years of marketing management experience, primarily in retail consulting. As director of environmental marketing, Mark describes his role as providing the creative tension and sensitivity to environmental issues that has enabled the company to change its culture and stay ahead of the curve. He works closely with all of the company's functional areas and suppliers, focusing on a wide variety of merchandising and recycling issues. Mark serves on the Marketing and Certification Committee of the National Retail Hardware Association and Home Center Institute's Industry Council on the Environment. He is also a Georgia Conservancy Board of Trustee member.

The Home Depot, 2727 Paces Ferry Rd., Atlanta, GA 30339, (770) 801-5871, FAX: (770) 319-2345

Lynne Elizabeth

Ms. Elizabeth is the founder and former President of the Eos Institute, an educational nonprofit organization for the study of sustainable living. She publishes *Earthword Journal*, which addresses topics such as integrated land-use planning, wise water management and urban landscapes. Ms. Elizabeth also is a contributing editor for several building magazines and has consulted on recently published articles in *Architecture*, *Home* and *Sunset*. Her most recent project is a national education campaign to increase the utilization of sustainable, resource-efficient building systems for one and two story structures.

639 Pearl St., Laguna Beach, CA 92651, (714) 494-8591, FAX: (714) 494-2824

Dagmar Epsten, AIA, CCS

Ms. Epsten is an environmental architect and principal of The Epsten Group. Sustainable design ideas have guided the firm's architectural projects, which include custom homes, adaptive reuse of historic structures, and midsize commercial and institutional buildings. Ms. Epsten chairs the AIA

GA Environment Committee and is a steering group member of the AIA's National Committee On the Environment. She also served as a consultant to Habitat for Humanity International and The Home Depot for the Greenprint House in Americus, GA.

The Epsten Group, 303 Ferguson St., Atlanta, GA 30307, (404) 577-0370, FAX: (404) 577-1739

Rick Fedrizzi

As an in-house environmental marketing consultant for Carrier Corporation's commercial and residential business units, Rick works through engineering, marketing and sales to ensure responsible environmental product development and implementation. Externally, Rick works with government agencies, utility companies and environmental organizations to advance issues that include energy efficiency, safe refrigerants, sound, indoor air quality and material reduction. Carrier Corporation received EPA's 1994 Stratospheric Ozone Protection Award for new product development. Rick is currently chairman of the U.S. Green Building Council and was a member of the "Greening of the White House" feasibility study team.

Carrier Corporation, Carrier Parkway, P.O. Box 4804, Syracuse, NY 13221, (315) 432-6177, FAX: (315) 432-3213

R. Warren Flint, Ph.D.

Dr. Flint is executive director of The Eastern Shore Institute, which assists communities to build diverse, prosperous, and self-reliant economies that provide good jobs for all and encourage preservation of globally-significant natural resources, history and tradition. His most recent work has been centered on promoting concepts of sustainable development and working with groups to seek common-ground solutions for balancing economic, environmental and social equity concerns.

The Eastern Shore Institute, P.O. Box 1035, Nassawadox, VA 23413, (804) 442-5588, FAX: (804) 442-5488

Carol Franklin

Ms. Franklin, a founding member of Andropogon Associates, Ltd., is an ecological landscape planner and designer. She is a registered landscape architect and Adjunct Professor at the University of Pennsylvania's Graduate School of Landscape Architecture and Regional Planning. Ms. Franklin is an expert in the design and management of native plant communities in a wide range of habitats and has implemented restoration and management projects. She has over 30 years of experience with master planning and phased implementation projects.

Andropogon Associates, Ltd., 374 Shurs Lane, Philadelphia, PA 19128, (215) 487-0700, FAX: (215) 483-7520

Colin Franklin

Mr. Franklin has had a career-long involvement in the design of new towns and is active in the movement to develop sustainable communities nationally and internationally. Currently, he is working on a major new city in the Middle East and is a participant in the "Green Building" program, a sustainable design initiative in Bozeman, Montana. He has lectured and published articles on the historic values and planning guidelines that preserve community and park landscapes.

Andropogon Associates, Ltd., 374 Shurs Lane, Philadelphia, PA 19128, (215) 487-0700, FAX: (215) 483-7520

Gregory Franta, FAIA

Mr. Franta is the principal architect of ENSAR Group, Inc., an international design consulting firm specializing in environmental quality, energy efficiency and daylighting. For over twenty years, he has pioneered environmentally sustainable architecture throughout the world. Mr. Franta has lead ENSAR Group in producing over 400 energy efficient and environmentally sound buildings. He has authored several environmental publications and won many design awards for his work. He has served on the National Board of Directors for the AIA and is a founding member and past chair AIA's Committee on the Environment.

ENSAR Group, Inc., P.O. Box 267, Boulder, CO 80306, (303) 449-5226, FAX: (303) 449-5276

Randall Godwin

Mr. Godwin is currently instructor of air conditioning technology at Carroll Tech in Carrollton, GA. Previously, Randall worked as a heating and air conditioning contractor. He has worked with Southface Energy in Atlanta on energy conservation and building technology, and currently serves on the Board of Directors of the West Georgia Habitat affiliate.

Carroll Tech, 997 South Highway 16, Carrollton, GA 30116. (770) 836-6800. Fax: 6807

Barbara Harwood

Mrs. Harwood founded BBH Enterprises, Inc. in 1984, which was the recipient of the first E-Seal for the Esperanza del Sol project, an inner-city development of energy and resource efficient, single family housing that guarantees heating and cooling costs will not exceed \$1/day year-round. In addition to BBH Enterprises, she owns Aragon Management Group, Inc., which manages over 400 units of low-income housing in the Dallas area. Mrs. Harwood is a nationally known speaker on affordable housing and energy efficiency.

BBH Enterprises, Inc., 2718 Wagonwheel Dr., Suite 100, Carrollton, TX 75006, (214) 418-7772, FAX: (214) 418-7773

Laura Heery

Ms. Heery is co-founder and president of the Satulah Group, which does project management, facilities planning, corporate real estate, investment and development services, and serves as the mother company to the Brookwood Design Group. She is currently project designer for several southeastern projects such as the Yarmouth Group's renovations of the 100 Galleria building in Atlanta. She also was the project designer for the Internet Corporation's Computer Center, a build-to-suit lease project which utilized the *Bridging* construction procurement method introduced by Satulah Group.

1819 Peachtree Rd. NE, Suite 201, Atlanta, GA 30309, (404) 350-9988, FAX: (404) 351-6153

Ernest J. Hooks, Jr., AIA, CSI, BB

For the past ten years Mr. Hooks has served as project manager and director of B&E Jackson & Associates and the Fleming Corporation, the latter from 1984 to 1988. He has recently been awarded certification as a *Bau-Biological* (Building Biologist), which involves study of the relationship between the built environment and life forms and the application of that knowledge to the design and construction of healthy buildings. Mr. Hooks is a speaker on environmental issues and is presently a candidate for the Society of American Value Engineers.

156 Sisson Ave. NE, Atlanta, GA 30317, (404) 577-4914, FAX: (404) 377-8115

Michael Horst

Mr. Horst is an internationally renown real estate consultant and educator and co-founder of Shenoa Retreat & Learning Center, a Findhorn inspired community in Northern California demonstrating ecological, economic and spiritual sustainability and innovative building technologies such as straw bale and non-toxic cottages. His firm, InSpire (Integrated Strategic Planning in Real Estate) consults to developers of master planned communities and resorts. He has created and taught multi-disciplinary graduate classes and currently serves on the faculty of the University of Southern California.

InSpire Enterprises, P.O. Box 157, 177 Seadrift Rd., Stinson Beach, CA 94970, (415) 868-2580, FAX: (415) 868-2585

Margaret Howard

Ms. Howard is the founder and director of GEO (Global Environmental Options), a nonprofit dedicated to providing leading edge sustainable solutions for buildings and communities. GEO projects include a 'Design for Life' Workshop series and a Sustainable National Parks initiative involving partnership development in the Grand Canyon and Yellowstone. Ms. Howard co-developed *The Sustainable Grand Canyon Workshop* and is currently directing projects including an ecologically sustainable recovery plan for the earthquake affected areas of Hanshin, Japan. A specialist in building ecology and energy efficient, low-toxic materials, she is a consultant to organizations worldwide.

Global Environmental Options, 900 Park Ave., Suite 18 E, NYC, NY 10021, (212) 439-6042, FAX: (212) 794-4378

Jerry Ingersoll

Mr. Ingersoll is an architect and housing program consultant promoting climatically-sensitive designs, energy conservation, appropriate utilization of local materials and other green building practices. He also is a specialist in investment and production of rural and urban shelter by self-help as a means for alleviating poverty. His skills also include housing policy formulation, programming and budgeting; architectural design, programming and budgeting; site planning and design; and post-occupancy evaluation of facilities.

Tudor Garland Ingersoll Architect, 120 Lakeview Ave., Cambridge, MA 02138, (617) 661-3025, FAX: (617) 661-4626

Arnie Katz

Mr. Katz is a building design consultant at North Carolina Alternative Energy Corporation, primarily responsible for developing training programs for builders on techniques, products and practices that are effective in building energy efficient houses that are safe, healthy, durable and affordable. He consults with builders and has worked with several Habitat affiliates in North Carolina. Mr. Katz edited *The Exemplary Home Builder's Field Guide* and writes a monthly newspaper column.

Alternative Energy Corporation, P.O. Box 12699 Research Triangle Park, NC 27709, (919) 361-8029, FAX (919) 544-6149

John L. Knott, Jr.

Mr. Knott is CEO/managing director of Dewees Island, SC, an oceanfront island retreat dedicated to environmental preservation that is recognized as one of the leading environmental developments in the nation. He has leadership experience both nationally and internationally, ranging from the White House Exchange with the Soviet Union for City Re-

Development/Historic preservation to his role as National Life Director for the National Association of Home Builders (NAHB). In Charleston, South Carolina, Mr. Knott is the founding member and chairman of the board for the Clean Water Council, and founder and chairman of the Executive Committee for The Harmony Project, a nonprofit foundation promoting the development of sustainable communities.

Island Preservation Partnership, P.O. Box 361, Dewees Island, SC 29451-2662, (803) 886-8783, FAX: (803) 886-5836

Tony Lent

Mr. Lent has played a leading management role in new product development and marketing for companies such as EcoTimber International and Global Warming Alternatives. Both companies have brought together business, government, and environmental groups in strategic partnerships to solve environmental problems. With Abt Associates, he directed a study of 42 Fortune 500 manufacturers that demonstrated how the environment is a pivotal source of competitive advantage.

Environmental Advantage, 80 Wall St., Suite 715, New York, NY 10005, (212) 482-0671, FAX: (212) 482-0679

Gail A. Lindsey, AIA

Ms. Lindsey is a principal in the Raleigh, NC, firm Design Harmony, which specializes in environmentally-conscious architecture. Since 1990, she has been involved with the AIA Committee on the Environment, taught architectural courses at NC State University and Duke University and designed and built ecologically-responsible structures. She has been involved with the Greening of the White House, the Grand Canyon and the Pentagon. Her goal is to educate her profession and the public about ecologically viable architecture and to promote the design and construction of a built environment that is healthy not only for the inhabitants, but for the earth as well.

Design Harmony, 16 North Boylan Ave., Raleigh, NC 27603, (919) 755-0300, FAX: (919) 755-0028

Steve Loken

Steve Loken is president of the nonprofit Center for Resourceful Building Technology, founded in 1990, and the author of *ReCRAFT 90: The Construction of a Resource Efficient House*. Mr. Loken has been designing and building homes for over fifteen years, emphasizing resource efficient and energy efficient design, material selection and construction. He has spoken at conferences, conducted workshops and training sessions, and taught classes around the United States, Canada and Australia. In addition to consulting on natural resource and energy efficient demonstration projects, Mr. Loken has consulted to major corporations, including Amoco and Weyerhaeuser.

Center for Resourceful Building Technology, P.O. Box 100, Missoula, MT 59806, (406) 549-7678, FAX: (406) 549-4100

Joseph Lstiburek

Mr. Lstiburek is a principal of Building Science Corporation and is internationally recognized as an authority on moisture related building envelope problems and indoor air quality. He is the developer of ADA (the Air Drywall Approach to air barriers) and the author of several publications, such as the *U.S. DOE Handbook on Moisture Control*. Mr. Lstiburek is an acclaimed public speaker and lecturer in building science.

Building Science Corporation, 273 Russett Rd., Chestnut Hill, MA 02167, (617) 323-6552, FAX: (617) 469-2413

Nadav Malin

Mr. Malin is the managing editor of *Environmental Building News* and leads design consulting work at the company. He lectures widely and has written dozens of technical articles on green building issues. Prior to beginning work with the newsletter, Malin was a builder in southern New Hampshire and Vermont. He also is coordinating the design and construction of the Northeast Sustainability Center, a state-of-the-art demonstration office building in Greenfield, MA, that is the home for the Northeast Sustainable Energy Association.

Environmental Building News, RR 1, Box 161, Brattleboro, VT 05301, (802) 257-7300, FAX: (802) 257-7304

Janet McIlvaine

In 1990, Ms. McIlvaine began her energy-efficiency research at the Florida Solar Energy Center. She specializes in building energy use simulation (DOE2.1E) and technology transfer. Her current areas of work include national design support for Habitat for Humanity, EPA *Energy Rating System* evaluations, a semi-annual newsletter on FSEC's Building Design Assistance Center, and VAX/VMS

programming for simulation automation. Ms. McIlvaine speaks on making energy choices and integrating them into existing design processes and also promotes discussion of indoor air quality and its relationship to energy design.

Florida Solar Energy Center, 1679 Clearlake Rd., Cocoa, FL 32922-5703, (407) 638-1000, FAX: (407) 638-1439

Michael Myers

At the U.S. Department of Energy's Office of Building Technologies, Mr. Myers manages research initiatives and practices for affordable housing projects and for existing buildings. He also is manager for the DOE-HUD Partnership. Previously, Mr. Myers directed the Energy Services Division for the City of Austin, Texas, where he co-developed the city's Green Building Program. He has taught green building strategies, sustainable development practices, and energy efficiency techniques for local communities.

Department of Energy, 1000 Independence Ave. SW, MC EE-421, Washington, DC 20585, (202) 586-9167, FAX: (202) 586-1628

Gary Petersen

Mr. Petersen serves as director of environmental affairs for Waste Management, Inc.'s Recycle America service of Western Group Waste Management, Inc., which is a unit of WMX Technologies, Inc., the world's largest environmental service company. Petersen directs strategic business policy and government relations activities in Los Angeles County and serves as an expert recycling consultant to Waste Management operations in several states across the U.S. In July of 1995, Petersen designed Waste Management's new Los Angeles office entirely out of recycled materials. Prior to joining Waste Management, Petersen directed his own recycling firm, Ecolo-Haul, Inc., which was one of the nation's first modern recycling companies.

WMX Technologies, 500 S. Grand, Suite 1710, Los Angeles, CA 90071, (213) 239-6681, FAX: (213) 239-6689

Mathew Petersen

Executive Director Matt Petersen brings to Global Green USA his passion for the environment and his experience with a range of local, state and presidential political campaigns. In 1992, Petersen served as campaign manager for environmental stalwart, Congressman Anthony C. Beilenson. Petersen has been a Habitat for Humanity volunteer locally and at Jimmy Carter Work Projects in Canada and South Dakota for the past 4 years. Petersen led the "Green Team" for the 1995 HFHI Jimmy Carter Work Project in Los Angeles to incorporate green building elements. Prior to heading GG USA, Petersen ran a Los Angeles-based nonprofit working to shape state and national policy on radioactive waste.

Global Green USA, 4223 Glencoe Avenue, Suite B 103, Marina del Rey, CA 90292, (310) 577-1885; FAX: (310) 827-7416.

Frank Purvis, A.I.C.

Mr. Purvis is Habitat for Humanity's Director of Environment. He has over 25 years of experience in construction and development in the U.S. and abroad. Mr. Purvis is a member of the American Institute of Constructors, the Residential Advisory Board for the American Iron and Steel Institute, the Evangelical Environmental Network, the Environmental Advantage, and the Association for the Advancement of Policy, Research and Development in the Third World.

Habitat for Humanity International, Department of the Environment, 121 Habitat Street, Americus, GA 31709-3655, (912) 924-6935, FAX: (912) 928-3655

Marc Rosenbaum

Mr. Rosenbaum is a designer, engineer and builder of environmentally sound homes. The goal of Marc's work is helping people create buildings that support personal and planetary healing. Since 1979, he has focused on integrating solar heating and hot water systems, mechanical systems, superinsulation, health-sustaining, food production and storage, efficient electrical and water systems, and benign materials selection into the homes he designs. Mr. Rosenbaum is a teacher, a trainer for energy efficiency workshops, and has been published in several building magazines.

Energysmiths, P.O. Box 194, Meriden, NH 03770, (603) 469-3355, FAX: (603) 469-3855

J. Edward Seiber

Mr. Seiber is president of Seiber Design, Inc., an Atlanta-based architecture and interior design firm. He received a BA in architecture from the University of Tennessee, Knoxville, specializing in human-environment systems research and design. In 1994 Mr. Seiber began focusing on issues of sustainability

through participation in Harvard GSD seminars on sustainable design, the AIA Symposium on Sustainable Environments and independent research. *Seiber Design, Inc., 675 Drewry St. NE, Studio 10, Atlanta, GA 30306, (404) 875-6765, FAX: (404) 875-0324*

Lynn Simon

Ms. Simon is president of Simon & Associates, an environmental building consulting firm for design firms, nonprofit organizations, and corporations that address a broad range of issues, including resource efficiency, sustainable materials selection and healthy building practices. She is founder and past chair of the AIA San Francisco Task Force on the Environment, on the National AIA Committee on the Environment Steering Group, a board member for Interior Concerns Environmental Resources and a member of the U.S. Green Building Council.

Simon & Associates, 99 Jersey St., No. 4, San Francisco, CA 94114, (415) 282-2992, FAX: (415) 282-8490

April Smith

Ms. Smith is co-founder and president of ReThink, Inc., a consulting firm specializing in environmental planning for businesses, government agencies, nonprofits, utilities and schools. As an Urban Planning Master's student at UCLA in 1989, April's thesis team conducted the nationally-recognized eco-audit of the university, which was the first comprehensive environmental review of any college in the country. The thesis received the American Planning Association's award for Best Student Project and became the foundation for Earth Day 1990's Campus Environmental Audit program. April's subsequent book, *Campus Ecology*, has inspired thousands of students to improve the environmental practices of their campuses worldwide. April is also a member of the City of Santa Monica's Task Force on the Environment, where she has played a critical role in developing the sustainable schools program and the green development program.

ReThink, Inc., 4223 Glencoe Ave., Suite B103, Marina del Rey, CA 90292, (310) 827-1217, FAX: (310) 827-7416

David Snell

Mr. Snell is Habitat for Humanity International's Director of Habitat Education Ministries. This department is responsible for both internal and public education about Habitat, its mission, principles and goal of making decent housing a matter of conscience on the hearts and minds of people everywhere. Mr. Snell has helped coordinate Jimmy Carter Work Projects in Washington, DC; Baltimore, MD; and Tijuana, Mexico.

Habitat for Humanity International, Education Ministries, 121 Habitat Street, Americus, GA 31709-3655, (912) 924-6935, FAX: (912) 928-3655.

LeRoy Troyer, FAIA

Mr. Troyer is the founder and President of The Troyer Group, Inc., a firm providing services in architecture, engineering, landscape, architecture and interior design. A Habitat for Humanity board member from 1987 to 1993, Mr. Troyer has provided services ranging from house crew leader for 10 Jimmy Carter Work Projects to rewriting the corporate by-laws of the organization. He also has played many roles within the Mennonite Economic Development Association, which is committed to the nurture and expression of the Christian faith in business and work settings.

The Troyer Group, Inc., 415 Lincolnway East Mishawaka, IN 46544 (219) 259-9976, FAX: (219) 259-9982

Donald Watson, Architect FAIA

Mr. Watson is an architect, author and educator dedicated to environmentally responsible design and construction. For over thirty years, the mission of the Office of Donald Watson has been to integrate research, technology and design to advance the practice of environmental architecture. He has authored over one hundred professional and research publications and books, including *Climatic Building Design*, which received the Best Book Award for Architecture and Planning from the American Association of Publishers. Mr. Watson has served as a professor at the Rensselaer Polytechnic Institute and as a visiting professor at the Yale School of Architecture. He has also worked as a consultant for international humanitarian organizations on housing and community development projects in over thirty countries.

54 Larkspur Dr., Trumbull, CT 06611, (203) 459-0332, FAX: (203) 268-9248

Alex Wilson

Mr. Wilson is editor and publisher of *Environmental Building News* and co-author of the *Consumer Guide to Home Energy Savings*. He has written several hundred articles since the late 1970s on energy conservation, building technology, and the environment in magazines such as *Architecture*, *Progressive Architecture*, *Fine Homebuilding* and *Popular Science*.

Environmental Building News, RR 1, Box 161, Brattleboro, VT 05301, (802) 257-7300, FAX: (802) 257-7304

Peter A. Yost

Mr. Yost is a project manager in the Structures and Environmental Systems Division of the NAHB Research Center of Upper Marlboro, MD. His work at the Research Center includes management of an EPA-funded construction waste management study and evaluation of innovative building products within the DOE-funded, Advanced Housing Technology Program. Mr. Yost has made presentations to organizations ranging from the National Association of Home Builders Educational Series to the 1st Annual CIB Sustainable Construction Conference.

NAHB Research Center, 400 Prince George's Blvd., Upper Marlboro, MD 20774-8731, (301) 249-4000, FAX: (301) 249-0305

Elizabeth Plater-Zyberk

Ms. Plater-Zyberk studied architecture as an undergraduate at Princeton and received her graduate degree from Yale School of Architecture. In 1980, Plater-Zyberk and her husband, Andres Duany, opened an architecture and planning firm which to date has completed over eighty plans, ranging from the development of new towns for private developers to master plans for urban municipalities. The firm's efforts have also been dedicated to the writing of model legislation including the Traditional Neighborhood Development Ordinance. She has been teaching at the University of Miami School of Architecture since 1975 and currently serves as the director of the Center for Urban and Community Design. Duany and Plater-Zyberk are part of a national movement for the reform of urbanism, which is integrated with environmental, social and economic initiatives. Together with Solomon, Calthorpe, Polyzoides and Moule, they are the founders of the Congress for the New Urbanism.

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Symposium Agenda

Omni Hotel at CNN Center, Atlanta

Thursday, December 7

- 6:00 PM **HFHI AND GG USA DINNER MEETING**
in the Omni Penthouse for GG USA, RMI, Team Facilitators and Habitat participants only. (Technical Expert participation officially begins Friday morning.)
- 8-10 PM **ENVIRONMENTAL BUILDING NEWS OPEN MEETING**
Branton Room
- 9:00 PM **FACILITATORS' BRIEFING**
for Gail Lindsey, Bob Berkebile, Lynn Simon and John Connell

Friday, December 8

- 8:00 AM **CHECK-IN & CONTINENTAL BREAKFAST**
Swanton Room
- 8:30 AM **WELCOME REMARKS**
Peter Bahouth, Director, Turner Foundation
- 8:35 AM **PROGRAM OVERVIEW**
David Snell, Director, Education Ministries, HFHI
Matt Petersen, Executive Director, Global Green USA
- 9:45 AM **AFFILIATE CASE STUDIES**
"Resource Efficient Affordable Housing: Overcoming Barriers"
Facilitator: Elizabeth Plater-Zyberk
Panelists: Dennis Creech, the Earthwise Project, Atlanta, GA
Robin Adair, Jordan Commons, Homestead, FL
Laurence Doxsey, Green Habitat Learning Project, Austin, TX
Daniel Lopez, La Frontera Initiative, TX
- 11:45 AM **BREAK**
- 12:00 PM **LUNCH**
Swanton Room
Keynote Address: Paul Hawken, Author, Ecology of Commerce
Introduction given by Ray Anderson, CEO, Interface, Inc.
- 1:30 PM **DESIGN REVIEW BRIEFING: GOALS AND PROCESS**
Bill Browning, Director, Green Development Services, RMI
- 2:00 PM **DESIGN TEAM BREAKOUTS**

Team 1 (Hot/Humid Zone) - Facilitator: Gail Lindsey
Knollwood A Room

Team 2 (Hot/Dry Zone) - Facilitator: Bob Berkebile
Jarret Room

Team 3 (Temperate Zone) - Facilitator: Lynn Simon
Knollwood B Room

Team 4 (Cold/Dry Zone) - Facilitator: John Connell
Thornton Room

Team 5 (Rehabs) - Facilitator: John Knott
Swanton Room

- 2:30 PM** **CONCURRENT SESSION: SITE VISIT TO SOUTHFACE PROJECT**
for invited guests, GG USA and HFHI staff
- 7:00 PM** **DINNER**
West Foyer
Working dinner for Design Review Teams
- 7:30 PM** **DESIGN REVIEW CONTINUES...**
Design teams should expect to work late into the night.
Snacks and coffee will be provided!

Saturday, December 9

- 8:00 AM** **CONTINENTAL BREAKFAST**
Swanton Room
- 8:30 AM** **AGENDA OVERVIEW AND ANNOUNCEMENTS**
- 8:45 AM** **TEAM REPORTS**
(5 min. each)
- 9:30 AM** **DESIGN REVIEW TEAMS CONTINUE**
- 12:00 PM** **LUNCH**
Working lunch for team participants
- 12:30 PM** **DESIGN REVIEW TEAMS CONTINUE**
- 4:00 PM** **TEAM PRESENTATIONS**
(20 min. each with Q & A)
- 5:45 PM** **WRAP UP**
- 6:00 PM** **BREAK**
- 7 - 9 PM** **DINNER CELEBRATION**
hosted by Hard Rock Cafe, downtown Atlanta

Sunday, December 10

- 9 - 11 AM** **PROGRAM DEBRIEFING AND NEXT STEPS**
for HFHI staff, GG USA, RMI and facilitators