Habitat for Humanity

Energy Efficient Building Advisor

Presented by Gina Cooper

December 1, 2001
Background and Overview
Construction and Environmental Resources (CAER), is a department of Habitat for Humanity International (HFHI) that exists to assist with house design, construction, and environmental sustainability.

The department is working to educate and encourage affiliates to build energy efficient homes. Two energy efficiency levels are promoted: Energy Star and High Performance (HP2). CAER provides a variety of resources designed to assist affiliates, including the HFH Green Team, HFHI House Plans, ReStore Network Development, the Construction Video Lending Library, Accessibility/Visitability Information, Energy Bulletins and Fact Sheets, Training Opportunities, as well as construction materials and methods information.

Laboratory for Sustainable Solutions (LSS)
Led by Dr. Wally Peters, LSS is currently performing integrated, systems engineering research in the areas of sustainable economic development and eco-industrial parks including a system for measuring and predicting sustainable development indicators, systems modeling for sustainable industrial ecosystems, and the development of “green”/sustainable building tools and information sharing. Strong connections are maintained with the University’s interdisciplinary School of the Environment.

Opportunity
A research opportunity exists to benefit Habitat for Humanity International and the University of South Carolina Laboratory for Sustainable Solutions. The research findings will be shared with HFHI by the LSS to use in consideration of changes in programs, materials and services aimed at increasing the number of Energy Star and HP2 homes built by Habitat affiliates. For example, should the survey results indicate that affiliates received increased media attention for building an Energy Star home compared to a typical home, then perhaps this fact will be promoted to other affiliates as an incentive that Energy Star Homes will give their affiliate more exposure to the community.

Problem/Issue
While the Energy Star and HP2 programs are both very effective in creating energy efficient homes, the number of affiliates currently building them remains small. The benefits of energy-efficient homes affect the community, the affiliate and most importantly the homeowner. While participation is slowly increasing, there is a need to determine what challenges the affiliates that build these types of homes are facing. The information gathered could be used by CAER to make the process easier and more efficient for other affiliates who take on Energy Star and HP2 projects in the future. This may result in an increase in the number of affiliates building Energy Star and HP2 Homes.
**Purpose**
The purpose of this survey was to determine the challenges and opportunities faced by Habitat affiliates that have built at least one Energy Star or HP2 home.

**Target Population**
The survey targeted a sample of U.S. affiliates that have built at least one Energy Star or HP2 Home. These affiliates include:

- Rochester Area HFH of Minnesota
- HFH of North Central Iowa*
- Cobb County HFH of Georgia
- Lakeland HFH of Florida
- Broward County HFH of Florida*
- New Horizons HFH of Georgia
- HFH of Dane County Wisconsin
- Greater Fox Cities Area HFH of Wisconsin*
- HFH of Metro Denver of Colorado*
- Copper Country HFH of Michigan
- Chattanooga Area HFH of Tennessee*
- Alachua HFH of Florida
- Space Coast HFH of Florida
- HFH of New Castle County of Delaware*
- Tucson HFH of Arizona
- HFH Valley of the Sun of Arizona*
- San Antonio HFH of Texas*
- HFH of Southwest Montana*

**Definitions**
Energy Star is defined as “a home predicted to save 30% of heating, cooling, and water heating energy use compared to a home meeting the 1993 Model Energy Code and having minimum efficiency heating, cooling, and water heating equipment.”

HP2 is defined as “40-50% more energy-efficient than MEC 1993, resulting in homes that heat & cool for $250 or less per year.”

**Survey Implementation**
Upon approval, the survey was emailed or faxed to each of the eighteen affiliates identified previously. The email the survey implementation began on Wednesday, November 7, 2001. The affiliates were asked to complete and return the completed surveys by Monday, November 26, 2001. Affiliates not responding by the deadline date received a follow-up phone call in an attempt to conduct the survey over the phone.

**Responses and Findings**
Through researching Energy Star and HP2 Habitat builders, three additional affiliates were identified: Rock County, HFH (WI), Lower Wisconsin River HFH (WI), and Greater Bellevue HFH (NE). They were provided with a copy of the survey and their responses are included in this report. Of 21 affiliates, 12 responded. The affiliates (hereafter ‘affiliates’ represents all those that responded to this survey) built a total of 137 homes in calendar year 2000 and 85 so far this calendar year (as of November 15, 2001).
Making the Decision
All (12) affiliates indicated “Affordable Bills for Homeowners” as the predominant factor in deciding to build Energy Star and HP2 homes. One respondent cited “good stewardship” as an important factor in deciding to build energy efficient homes, while another stated, “ethical responsibility” as a key factor in making their decision. When changing from traditional building practices to Energy Star and HP2, the affiliates consider it important to get everyone involved in the process. One respondent advises others to make a complete presentation to the board, committees, and especially workers and subcontractors, implying that when everyone involved is better educated on the process, they will be more likely to support and cooperate with the changes associated with building Energy Star and HP2.

Energy Star
The number of Energy Star homes built by the affiliates in 2000 totaled 85, while the number to date in 2001 is 62. One affiliate expressed their preference for surpassing Energy Star standards for HP2 standards in order to be most efficient, “Do not expect good results using “energy star” guidelines. Energy Star is good for appliances, furnaces, water heaters etc., but it is woefully poor for construction standards. Example: Energy Star calls for R-18 walls. This is not even code for cold climates. Our area calls for a minimum of R-19. I am trained in E. S. rating. There are five ratings, one through five. Only 4 & 5 are good for qualifying for energy efficient mortgage. Any house with roof, doors and windows can get an Energy Star 1 rating.”

HP2
In 2000, affiliates built 42 HP2 homes and so far in 2001, affiliates built 48. In following the NAHN requirements for HP2 homes, one affiliate gave this advice, “Use cases of caulk and follow NAHN specs EXACTLY. There is no ‘little thing’ that ‘doesn’t make any difference’.”
Challenges
“Material Costs” and “Change in Building Practices” were described as the key challenges affiliates face as a result of building Energy Star and HP2 homes. Educating volunteers about the importance of building energy efficient homes is important in overcoming challenges. “My volunteers are not very accepting of new ideas and tried to stop the changes from occurring.”

Overcoming the challenges for many affiliates came in the form of support from local and national experts, “We have direct support from staff and volunteers from the HP2 program, NAHN, including third-party testing to meet the HP2 standard.”

Most affiliates agree, the up front costs associated with Energy Star and HP2 building is a bit higher than a typical home, although there is a quick payback through lower utility costs. One affiliate was unsure of where to draw the line in terms of increasing upfront costs in energy efficiency and expressed interest in having a standard guideline to follow. “The affiliate absorbs the additional costs for building Energy Star, although they don’t receive the direct benefit. A cost/benefit analysis would help to determine when it is no longer beneficial to increase costs associated with building energy efficiently.”

Media Attention
Affiliates generally do not receive additional media attention for building Energy Star and HP2 homes compared to building traditional Habitat homes, although they also indicated that affiliates didn’t do anything extra to promote their accomplishments. Those that did (3) receive additional media attention were promoted in various ways, “We promoted them as Energy Star by placing the Energy Star logo on our house job site signs and our construction department literature and training material.” While another affiliate expressed the ongoing relationship with the media, “We get outstanding publicity from the local media just for building affordable housing so the fact that the house was energy efficient was just one more feature of the build, not the main story.” Another affiliate had this experience, “The affiliate won awards for the most energy efficient house in the city. The affiliate has received solar products as donations,
which generated interest curiosity.” Other award winning affiliates received additional media exposure as well, “We received two awards from HFHI that resulted in favorable local press”.

**Volunteers**

While most affiliates did not gain volunteers or additional donations as a result of building their homes, one particular affiliate responded this way, “It’s just the right thing to do. The volunteers find it extremely noble of us and enjoy holding their heads up high when they talk about us to others. People have asked us how we do what we do, we should be the one setting the example and God’s construction Company, He or our Board it’s God all might, not our ED or our Board it’s God all might. We build as energy efficient home as we can because it’s the right thing to do!!!!!!!!”

Some of the variations in building practices make it more challenging for volunteers, as one affiliate explains, “The volunteers do not enjoy putting in the double ceiling. It is difficult and then makes trimming doors difficult due to the tight head height. We have not lost volunteers as a result, but we certainly have not gained them either.”

**Resources**

After deciding to build Energy Star and HP2 homes, most affiliates sought out the help of local and national resources and experts. Local school districts, construction and utility companies, architects, energy consultants and the HFHI Green Team were all listed as resources by respondents (see table 1.1). Many affiliates benefited from working with the National Affordable Housing Network (NAHN), “Our affiliate built an NAHN, HP2 home in 1998. In 1999, we received an Energy Leadership Award from the Iowa Department of Natural Resources and the Iowa Renewable Energy Association. This design was brought to the attention of (Habitat Founder) Millard Fuller and was designated as the “best practice” for cold climate Habitat homes this spring. Our affiliate was awarded an energy leadership award at the 25th Habitat Celebration in Indianapolis this September. The 1998 home was dedicated the week after we hosted a regional conference at which Millard Fuller attended and had Americus construction people check it out. NAHN was involved heavily, to such an extent that NAHN has an office in Texas to work with Habitat affiliates that build HP2 homes.”

***Table 1.1***

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<th>Organization</th>
<th>Phone</th>
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<tr>
<td>American Council for an Energy-Efficient Economy</td>
<td>(202) 429-8873</td>
<td><a href="mailto:info@aceee.org">info@aceee.org</a></td>
<td><a href="http://www.aceee.org">www.aceee.org</a></td>
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<tr>
<td>Campbell</td>
<td>Mary Kathryn</td>
<td>Center for Renewable Energy and Sustainable</td>
<td>202-293-2898</td>
<td><a href="mailto:mkcampbell@repp.org">mkcampbell@repp.org</a></td>
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<td>McIlvane</td>
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<td>321-638-1434</td>
<td><a href="mailto:Janet@FSEC.UCF.EDU">Janet@FSEC.UCF.EDU</a></td>
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<td>Davis</td>
<td>HFHI Green Team</td>
<td>229-924-6935 ext. 2426</td>
<td>Const&amp;<a href="mailto:Env@hfhi.org">Env@hfhi.org</a></td>
<td><a href="http://www.habitat.org/env/greenteam.html">www.habitat.org/env/greenteam.html</a></td>
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<td>Miller</td>
<td>National Affordable Housing Network (NAHN)</td>
<td>406-782-8145</td>
<td><a href="mailto:nahn@nahn.com">nahn@nahn.com</a></td>
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<td></td>
<td>National Association of State Utility Consumer Advocates</td>
<td>301-589-6313</td>
<td><a href="mailto:nasuca@nasuca.org">nasuca@nasuca.org</a></td>
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<td>404-872-3549</td>
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**Information and Resources**

Affiliates predominately need funding resources to assist them in building energy efficient homes (8). As mentioned earlier, the upfront costs for building energy efficient homes are generally higher than typical homes. Affiliates need to overcome these costs, as well as the costs of training and providing technical support in order to ease the process. Funding Energy Star and HP2 homes can be a source of contention within affiliates, ""We have construction people who believe cheaper is always better."

**Advice**

Most affiliates had advice to share regarding building Energy Star and HP2 homes, some are clearly passionate about their recommendations, “Don’t worry about being tested on your performance just build the best house you can with the knowledge you have and never stop learning form others how to do it better. If you are receiving resistance from your ED or from your Board do what Graham told me to do-Tell them they hired you to build the houses, you’re the professional so if they don’t like the way you build houses then maybe they need to hire someone else to do the job. Hold your ground; resolve in your own heart that what you are doing is the best thing for the families and that you refuse to put your name on substandard building techniques……………..Amen!”
Many affiliates recommend getting support from HFHI and other organizations, “Get with the Habitat International Green Team rep and the energy conservation departments of your local utilities.” Most stated a sense of responsibility. “It is our responsibility to provide homes with the lowest maintenance costs possible for our families to be successful homeowners. Energy efficiency is one of the easiest things we can do.”

Training volunteers and workers with outside experts was suggested to prepare them for the changes in building techniques. While construction specifications are provided for Energy Star and HP2 homes, Habitat affiliates give their own recommendations, “Use the ‘whole house’ concept in which all workers and subs are required to follow specs, instead of doing whatever pleases them, (i.e. heat – use only hard duct, not panning of return air, use mastic on all joints). NAHN specifications follow this in designing their houses.” Still, others state the importance of being prepared, “Have good, accurate house plans.”

Respecting the living costs of Habitat homeowners is very important to affiliates, “Our purpose as a Habitat affiliate is to serve the families that have very limited income. These families have just enough to cover their life’s base essentials so by providing them with the Energy Star (appliances and techniques) equipment will allow them to spend more money on essentials rather than utilities. I highly recommend it.”

Summary
Affiliate representatives who build Energy Star and HP2 homes are generally eager to tell about the opportunities and challenges they face. Many are committed to building energy efficient as a part of their mission to provide homeowners with the lowest operating costs possible as explained by one affiliate, “Don’t do a ‘partial’ job when it comes to energy savings. Invest in items proven performance. Check the performance of the homes, and help families learn how to achieve the lowest possible energy bills.” In addition, it is recommended that affiliates truly interested in keeping living costs low for homeowners should surpass basic Energy Star ratings and aim for HP2, as it is the most energy efficient and provides the lowest cost for homeowners.

The number of Energy Star and HP2 homes built so far in 2001 (as of 11/5/01) is higher than those built in all of last year. This is an indication of the growing commitment by affiliates to build a higher percentage of energy efficient homes than in the past. In order to increase these numbers, affiliates indicated they need funding to cover the additional costs associated with building these homes. In addition, they will benefit by joining the HFH Green Team and from partnering with local and national experts, including architects, utility companies and others who are committed to energy efficiency.

In conclusion, the number of Habitat affiliates that build Energy Star and HP2 homes is increasing. According to those who build them it is critical to educate the local volunteers, board members and staff on the benefits of building these types of homes. As a result, Habitat affiliates will go further to fulfill Habitat’s mission ‘to eliminate poverty housing’.

Table 1.2 Survey respondents: Habitat Affiliates

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<tr>
<td>Balck</td>
<td>Scott</td>
<td>Valley of the Sun HFH (AZ)</td>
<td>602-725-8938</td>
<td><a href="mailto:sbalck@habitataz.org">sbalck@habitataz.org</a></td>
<td><a href="http://www.Habitataz.org">www.Habitataz.org</a></td>
</tr>
<tr>
<td>Bowman</td>
<td>Mary</td>
<td>HFH of Broward (FL)</td>
<td>720-231-8813</td>
<td><a href="mailto:Mlbarch@aol.com">Mlbarch@aol.com</a></td>
<td><a href="http://www.habitat.broward.fl.us">www.habitat.broward.fl.us</a></td>
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<td>Carpenter</td>
<td>Bruce</td>
<td>Denver Metro HFH (CO)</td>
<td>720-231-8813</td>
<td><a href="mailto:bruce@denverhabitat.org">bruce@denverhabitat.org</a></td>
<td><a href="http://www.denverhabitat.org">www.denverhabitat.org</a></td>
</tr>
<tr>
<td>Dillon</td>
<td>Brett</td>
<td>Chattanooga, HFH (TN)</td>
<td>423-622-1132</td>
<td><a href="mailto:bddillon@wwdb.org">bddillon@wwdb.org</a></td>
<td>N/A</td>
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<tr>
<td>Grant</td>
<td>Jim</td>
<td>HFH of San Antonio</td>
<td>210-223-5203</td>
<td><a href="mailto:JimGrant@habitasa.org">JimGrant@habitasa.org</a></td>
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<tr>
<td>Griffin</td>
<td>Tom</td>
<td>Rock County HFH (WI)</td>
<td>608-774-1410</td>
<td><a href="mailto:griftom@ticon.net">griftom@ticon.net</a></td>
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<td>Mason</td>
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<td><a href="mailto:emason@netconx.net">emason@netconx.net</a></td>
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<td>Miller</td>
<td>Barbara</td>
<td>HFH of SW MT (MT)</td>
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<td>Read</td>
<td>Pete</td>
<td>Lower Wisconsin River (WI)</td>
<td>608-437-5220</td>
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<td>Smith</td>
<td>Kevin</td>
<td>HFH of New Castle Co., Inc. (DE)</td>
<td>302-652-0365</td>
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<tr>
<td>Weyenberg</td>
<td>John</td>
<td>Greater Fox Cities HFH (WI)</td>
<td>920-954-8702</td>
<td><a href="mailto:Jweyenberg_hfh@gwicc.org">Jweyenberg_hfh@gwicc.org</a></td>
<td>N/A</td>
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<tr>
<td>Zens</td>
<td>Mike</td>
<td>Greater Bellevue HFH (NE)</td>
<td>402-731-3155</td>
<td><a href="mailto:Dzens@aol.com">Dzens@aol.com</a></td>
<td><a href="http://www.cckweb.com/habitat">www.cckweb.com/habitat</a></td>
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