

Implementation patterns for Green Housing in Non-Profit Organizations in Indiana

Sandeep Langar, Ph.D., LEED AP BD+C
The University of Texas at San Antonio
San Antonio, TX

Sanjeev Adhikari, Ph.D.
Indiana University Purdue University Indianapolis (IUPUI)
Indianapolis, IN

Poor housing quality can influence the physical, psychological, and emotional health of the occupants. Non-Profit Organizations (NPOs) contribute voluntary support aiming towards providing adequate habitable housing for underprivileged people. However, these efforts are hindered by multiple factors, such as a lack of affordability, increase in poverty, increased NPO operation costs, and more. The budgetary constraints for NPOs infer that green housing may not be perceived as critically important. However, miscalculating the benefits of green housing for such causes is a critical issue from an environmental perspective as well as the life cycle cost to the occupant. Since many of the people owning and operating houses are poor, it is imperative that such families spend less on maintenance and operations. Therefore, the research investigates the adoption patterns of green housing in NPO within the state of Indiana. The state and NPO, Habitat for Humanity (HfH), were purposely selected for analysis. HfH was selected because it is a national organization with various affiliates across the US and US territories. As part of the study, an online survey was created and distributed to all HfH affiliates. The survey was active for eight weeks after initial contact, and two reminders were emailed during the active period. Upon deactivation of the survey, all data was compiled and statistically analyzed. Green housing adoption patterns were identified and analyzed, and the study also provides a comprehensive list of accelerators and barriers to green housing. The study further identified the importance of champions within the affiliate to be a successful provider of green housing. The study results will help NPOs to create a strategy for providing green housing families in need, even in competitive markets.

Keywords: Non-profit housing, Habitat for Humanity, Green housing, Adoption & Implementation of Green Technologies & Strategies

Introduction and Background

The average poverty rate for the State of Indiana for the period of 2013-2015 was approximately 15% (USCB 2016), which is slightly higher than the US national average of 14.4% (USCB 2016). The impact of poverty affects not only the growth of the economy but also the quality of life among low-income families. These families tend to live in substandard conditions, affecting their health and well-being. Children who grow up in poverty are susceptible to adverse health outcomes, lower cognitive and behavioral abilities, and significant economic inactivity (Brooks-Gunn and Duncan 2005). People living in areas of poverty also experience problems such as lacking a safe environment, lower job opportunities, poor housing quality, and more (ISS 2014). Poor housing quality affects the physical, psychological, and emotional health of occupants (Krieger and Higgins, 2002), it and may have more detrimental impacts on younger generations. Also, low-income families spend a substantial portion of their household income on housing costs if they are unable to buy a home (IRP, 2015). These conditions contradict the fundamental understanding that housing expenses should not exceed 30% of the household income. Increased housing expenses can be attributed to the rising costs of rent and utilities, failure of federal assistance to bridge the economic gap, and no significant increase in income for the poor (IRP, 2015). According to Shlay (2006), there are many challenges to achieving homeownership for low-income families. Evidence suggests that there is limited sustainable growth in low-income homeownership. Research does not provide uniform support to obtain asset accumulation, neighborhood economic development, or other social and political goals (Shlay, 2006). Given the challenges faced by members of the society who are economically disadvantaged, Non-Profit Organizations (NPOs) can aid in providing an alternative that improves housing situations, quality of low-income housing, and housing that lowers operating costs over the structure's lifecycle.

NPOs aim toward improving conditions for communities that experience economic hardships by providing adequate and habitable housing (Rase and Weech, 2013). NPOs play a critical role in the US housing policy because their housing investments produce significant neighborhood spillover benefits. Neighborhood spillovers are community developments that include maintenance of the grounds and exterior as well as any community facilities. Ellen and Voicu (2006) claim that minimal work has been done to measure these impacts on neighborhoods by analyzing the neighborhood spillover effects of city-supported rehabilitation of rental housing undertaken by NPOs (Ellen and Voicu, 2006). At the same time, the economic conditions of which NPOs operate under are becoming severe (Walker, 1993). This can be attributed to the increased cost of housing, rising number of economically disadvantaged families, and reduced access to credit (Walker, 1993). Thus, the reduced economic support creates a unique problem for NPOs that are serving the economically disadvantaged. The issue stems from the need to offer housing at the lowest price to serve the maximum amount of members of society. However, providing houses which prioritize the lowest price at construction may not be an optimal solution when factoring in the lifecycle cost. This issue is critical for poor occupants who encounter economic struggles on a continuous basis. The National Resources Defense Council (NRDC, 2006) cites that the lifecycle cost of green homes is potentially less than traditional homes. The increased cost typically associated with traditional homes can be attributed to poorly designed ventilation systems, use of toxic materials associated with adverse health impacts, an inefficient envelope resulting in increased spending on utilities, and more (NRDC, 2006). Apart from the lifecycle cost, the impact of initial costs continues to be debated. Multiple studies have indicated that the initial cost of green technologies has been found to be more than those of traditional technologies (Federal Bank of St. Louis 2008; Tellus Institute 2003; Walker 1993). At the same time, contradictory literature also exists indicating that the costs of building green housing should not exceed those of traditional houses. Apart from the cost perspective, other project factors such as *perceived risk, increased regulatory requirements, reduced ownership period for developers,* and *limited experience in building green projects* have been identified as barriers for the establishment of green housing technologies and strategies (Federal Bank of St. Louis, 2008; Tellus Institute, 2003). Although numerous NPOs provide voluntary support to economically disadvantaged people, Habitat for Humanity (HfH) has a notable national presence and an ability to offer housing support to economically disadvantaged communities across the nation. It is estimated that the organization builds approximately 10,000 low-income housing units annually and serves approximately 1,400 communities across the country. To date, the non-profit has served about 6.8 million people (HfH, 2016). Given the scale at which the organization operates, the researchers selected the organization for analysis.

HfH aims to provide habitable housing for the people it serves. According to HfH (2016), Clarence Jordan and HfH's founders, Millard and Linda Fuller, developed the concept of "*partnership housing.*" The concept derives from a vision to construct affordable houses with little regard for profit, and it's aided by the help of volunteers. The proposed homeowner's house payments would be made *with no-interest loans* and *supported by donations*. The HfH affiliates are community-level offices of the HfH that act in partnership with the parent organization. Each affiliate operates independently and coordinates all aspects of home-building in their local area. HfH affiliates independently involve fundraising, building site selection, partner family selection and support, house construction, and mortgage servicing. The vision of the parent organization, which percolates to all affiliates, is to provide a decent home for every person to live. HfH's vision is "*building strength, stability, and self-reliance in partnership with people and families in need of a decent and affordable home*" (HfH, 2016). HfH has emerged as a highly active NPO run by volunteers building homes for low-income families (Hays, 2002). Homeowners are selected by need, ability to pay, and willingness to partner with HfH. Also, eligibility relies on the selected families' lack of ability to afford purchasing a home by any other means. Eligible persons must also reside in the substandard or temporary housing (Stoddart and Rogerson 2004). Once a potential homeowner is selected, they provide a modest down payment and invest 300 to 500 hours of *sweat equity*. The term *sweat equity* indicates that the homeowners will dedicate themselves to constructing the home (HfH-IN, 2017). In Indiana, eligible family incomes should be within 30% to 65% of the country's median income (HfH-H, 2017). Lower and higher range of the county's median income is varied.

Huovila and Koskela (1998) indicate that HfH's suitable housing was provided to low-income families using community services, energy-efficiency, and affordability along with a comprehensive approach to sustainable development. Some green practices exist on HfH's build-a-home program. For example, HfH's homes are oriented by the southern window (depending on the geographic location) for maximum exposure to the sun for the use of passive solar heating during cold months. HfH's homes are designed to maintain healthy indoor air quality by placing windows on opposite and adjacent walls to allow for direct cross-ventilation. These examples are evidence that HfH is making attempts to provide green housing for its occupants. However, the extent to which green housing

is offered has not been assessed. Though HfH affiliates are associated with the central organization, they have individual budgets to maintain. In addition, there is scant information found in literature related to implementation patterns for green housing with regard to HfH, especially in the state of Indiana (IN).

Thus, given the challenges with funding and other barriers associated with green housing as well as a lack of literature about the implementation of green housing offered by NPOs in IN, the study aimed to identify the implementation patterns of green housing among NPOs in the state of IN. Because multiple NPOs exist within IN, HfH was considered as the unit of analysis among NPOs for consistency purposes.

Methodology

The study used an electronic survey method to identify the implementation patterns for green housing among the NPOs in IN. To conduct the survey, an online tool was created using Doleac (2014) with NPO study as the point of departure for this study. The decision to conduct the survey online was selected for the following reasons:

- Most of the general population in the United States have access to the Internet (Sheehan, 2001).
- Email invitation generates a rapid response (Flaherty et al., 1998).
- Previous experiences of the researchers using similar study structures.

The online survey tool had four sections: *Demographics*, *Green Housing Implementation*, *Green Technologies and Strategies*, and *Barriers and Accelerators for Green Housing*. The electronic survey utilized the following types of questions: multiple choice, matrix table, text-based, and rank order. The questions were designed in such a manner that the respondents would typically complete the survey within 15 minutes. After completion of the survey tool, it was subject to pilot testing by HfH members. The feedback resulted in improvement of the survey questions and tool aesthetics. Additionally, content validity and reliability were evaluated during the pilot study. After completion of the pilot test, a comprehensive list of HfH affiliates operating across IN was obtained from the HfH website. The publically accessible website provided information about 55 HfH affiliates operating within IN. After obtaining appropriate contact information from the website, the survey instrument was emailed to all 55 affiliates via email. After the initial email, a reminder was provided to non-respondents in one-week intervals for two total weeks. After eight weeks, the survey was closed, and all available data were downloaded from the online database.

Results

The study received responses from 11 of the 55 affiliates identified, thereby indicating a response rate of 20%. A higher response rate would have been beneficial to the study, but as Sheehan (2001) indicates, it is difficult to obtain higher response rates for internet-based surveys due to reasons such as information overload of the respondents, compensation of time, the frequent use of Internet-based survey, and others. Table 1 indicates the demographics of the survey respondents.

Respondent Demographics

Regarding the business volume of respondents, many were equally representing the categories of up to 100,000 USD and 251,000 USD to 500,000 USD. Regarding affiliates' experience, a majority had 21-30 years of experience, and a majority were constructing 1-5 new homes annually. Figure 1 indicates the number of employees associated with each affiliate. Also, many respondents (84.62%) indicated that they executed the residential project, while the remainder executed repairs, restoration, neighborhood revitalization, and education for first time home. Further, approximately 91% indicated that most of their projects were new constructions. Finally, many respondents (23.5%) indicated that their primary source of income was either from business or religious donations, followed by 11.7% of respondents indicating that their primary source of income was from state grants or restore donations.

Table 1: Affiliate Demographics of the Respondents

Item	Group	Percentage	Number
Annual Business Volume	Up to 100,000 USD	27.3%	3
	100,001-250,000 USD	9.1%	1
	251,00-500,000 USD	27.3%	3

	500,001- 1.0 M USD	18.2%	2
	1.01-2.5 M USD	0.0%	0
	More than 2.5 M USD	18.2%	2
Affiliate Experience (Years)	Less than a year	0.0%	0
	1-10 years	0.0%	0
	11-20 years	9.1%	1
	21-30 years	63.6%	6
	More than 30 years	27.3%	3
Houses built on yearly basis	0 NC houses	9.1%	1
	1-5 NC houses	72.7%	8
	6-10 NC houses	0.0%	0
	11-20 NC houses	9.1%	1
	More than 20 NC houses	9.1%	1
	0 R houses	72.7%	8
	1-5 R houses	27.3%	3
	6-10 R houses	0.0%	0
	11-20 R houses	0.0%	0
	More than 20 R houses	0.0%	0

NC- New Construction
R- Renovation

Source(s) of income	Federal grants	5.88%	1
	State grants	11.76%	2
	Individual donations	17.65%	3
	Business donations	23.53%	4
	Religious donations	23.53%	4
	Restore donations	11.76%	2
	Other	5.88%	1

The total was higher in this section because the respondent could select more than one source as their primary source of income

Implementation patterns for green housing in Habitat for Humanity

A majority of respondents (54.5%) indicated that implementation of green housing was compatible with the affiliate's goals. Only 9.1% indicated that implementation of green housing was not compatible with the affiliate's goals, and the remaining respondents (36.4%) were unsure if green housing was compatible with the affiliate's goals. Figure 2 indicates the percentage of new residential construction projects that were identified as green per the respondents. Many respondents (45.5%) indicated that they had not executed any green residential projects until recently, followed by approximately 18.2% indicating that they had identified more than 75% of their projects as green, and the same percentage identified up to 10% of their projects as green. Figure 3 depicts the stakeholders that are responsible for the design of green housing projects, as per the responding affiliates. As per the respondents, about 50% associated HfH employees with Construction Experience as the individual responsible for such, followed by 25% respondents selecting HfH employees with no design/construction experience. Only 12.5% respondents identified HfH employees with Design Experience as stakeholders responsible for the design of such projects.

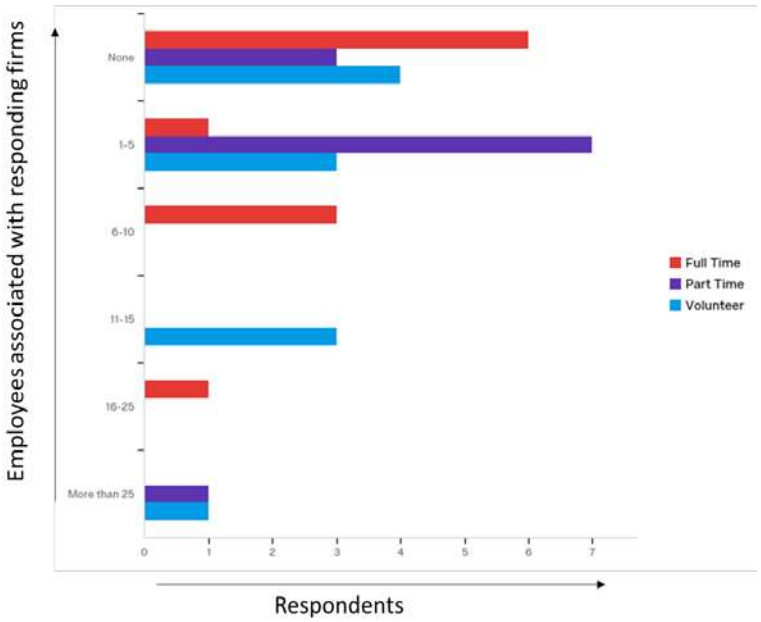

Figure 1: Number of employees associated with responding affiliate

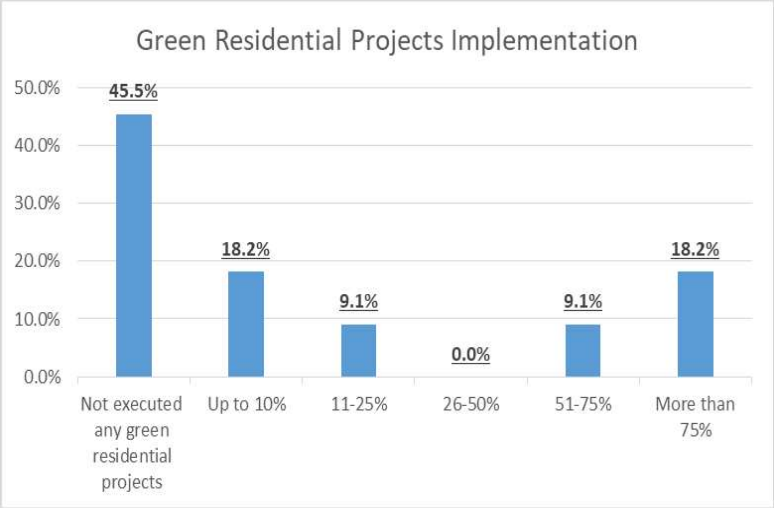

Figure 2: Implementation Pattern for Green Residential Projects among the respondents

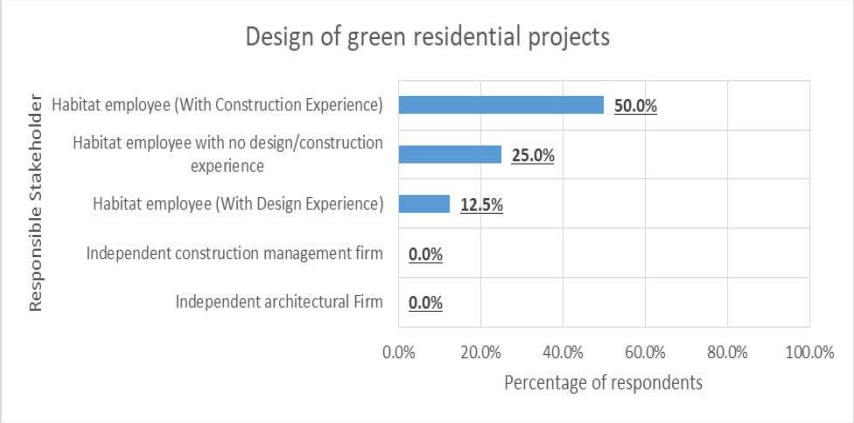

Figure 3: Design of Green Residential Projects

Approximately, 80% of the respondents executing green housing projects followed third-party benchmarking tools to evaluate the extent of the greenness of new residential construction projects. Of those benchmarking tools, 40% of respondents used the tool provided by the NAHB (National Association of Home Builders), which was succeeded by LEED certification. Further, when asked when the respondents had selected their benchmarking tool, nearly all respondents identified 5-9 years as the period of adoption. Nearly 80% of the respondents also indicated that the use of a third-party benchmarking tool, such as LEED certification, makes the implementation of green technologies and strategies easier. For the affiliates that were executing green housing projects, only 40% had an individual considered to be a champion of green innovation. For the firms that had a champion, all appointed champions were in a position of senior management.

When asked about accelerators for the projects to be green, the top three selected reasons were (in order of importance):

1. Availability of funding
2. Reducing the Lifecycle Cost for the occupant
3. Partner family

When asked about the barriers to implementing green projects, the top three selected barriers were (in order of importance):

1. Financial costs associated with a green project
2. Increased initial costs
3. Lack of availability of specialized contractors to build the project

When asked about the areas of a building that use the most number of green technologies and strategies (for new projects executed by the affiliate) the top three selected barriers were (in order of importance):

1. Exterior walls
2. Heating Generating Systems
3. Foundations

Additionally, information relating to lifecycle benefits of green housing and explaining lifecycle benefits appeared to be one of the strategies used by HfH to persuade a potential occupant into implementing green technologies and strategies.

Conclusion

The NPO selected for this study was HfH, and it identified existing green practices. This research investigated the implementation patterns of green housing among NPOs within the state of Indiana. From the annual business volume of affiliates, it was found that about 50% affiliates are involved in construction and maintenance of 1-2 houses annually. The study also indicated that HfH programs are not supported through dedicated employees as 1) approximately 50% affiliates do not have full-time employees and 2) approximately 50% of affiliates do not have even a part-time employee. Most of the affiliates are operated by volunteers. Volunteers may not necessarily possess professional knowledge of green component implementation within the context of the residential industry. This problem is further exacerbated by only 12.5% affiliates having employees with design experience responsible for designing a green residential project. Approximately, 40% of respondents were unsure if green housing was compatible with the affiliate's goals. Certainly, HfH affiliates need training on green housing practices and implementation.

The existence of champion is necessary for the adoption and implementation of innovation, and their absence can create problems with the implementation of green housing. For the affiliates that were executing green housing projects, only 40% had an individual considered to be a champion of green innovation. The researchers believe that some affiliates are facing more significant challenges with implementing green housing without a green housing champion than those affiliates that have champions. Thus, for affiliates to implement green housing they must identify and cultivate green housing champions.

When asked about the barriers to implementing green projects, the top three selected barriers were (in order of importance): Financial costs associated with a green project, increased initial cost, and a lack of availability of specialized contractors to build the project. Thus indicating that green housing does still cost more than traditional housing, and the increased cost does impact its implementation among HfH affiliates. One of the reasons that may be attributed to an escalation of this magnitude involves the lack of a skilled workforce able to handle green housing (as identified by the respondents) or specialized materials. However, future studies should investigate if this lack of

specialized contractors is a phenomenon impacts other states aside from IN. When asked about the areas of a building that use the most number of green technologies and strategies, for new projects executed by the affiliate, the top three selected barriers were (in order of importance): Exterior walls, Heating Generating Systems, and Foundations. These results may be attributed the geographical location of the state and the importance of tightening the envelope so that the houses provide a comfortable climate for occupants.

Future studies

The study explored the implementation patterns for green housing in the state of Indiana, and it was built from Doleac (2014). Future studies should be conducted that aim to identify the implementation of green housing across the US. In this process, future research would also identify if green housing within the non-profit can be tied to its geographical location. Further, future studies may also investigate other NPOs to compare implementation patterns between HfH and other NPOs. Lastly, funding was identified as a critical component to the success of green implementation, as per the respondents. The respondents of the study identified that the cost of green housing is more than traditional housing. However, literature also exists indicating that the cost of green projects should not exceed the cost of other housing projects. Future studies should investigate potential reasons for which the responding chapters identified escalating costs.

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