Dallas Area Habitat for Humanity Study tests impact of home energy efficiency upgrades in South Dallas

In the Mill City community of South Dallas on Spring Avenue, a new residential subdivision is nearing completion. Located on 6.3 acres donated by Dallas Housing Authority, this $5.3 million development is a joint venture between two nonprofit housing organizations. When complete, the development will consist of 51 single-family homes that will offer homeownership opportunities for low and moderate income families. But these homes are not typical of what most people think when they hear the term "affordable housing"—these homes are an *exercise in "affordable green building."*
City Councilwoman Carolyn Davis, whose district includes the new subdivision, explains the situation facing many of her constituents:

> "Even in a difficult economic environment, the typical American family pays upwards of $1,500 a year in energy costs, according to the U.S. Department of Energy. Smart homeowners are investing in residences that will nurture their families' health while cutting their utility bills, offering durability and providing comfort for years to come.
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> In fact, a study has confirmed that the homes in Mill City's Frazier Courtyards, and others built to the same standards in South Dallas, are outperforming efficiency expectations significantly reducing homeowner's utility costs and becoming model examples for other areas of the city and country."

Testing the waters…

Dallas Area Habitat for Humanity, one of six original Dallas Sustainable Skylines Initiative (DSSI) partners, has a history of building EnergyStar™-certified new homes. As a non-profit organization, Dallas Area Habitat operates with a keen awareness of the "bottom line"—providing quality housing, utilizing standardized construction templates, while working under cost constraints. When approached with the idea to "test-implement" new "energy efficiency" measures in several of its proposed subdivision homes, the organization was careful to ensure that concerns over costs and replicability were at the forefront of the discussion.

Enter DSSI: This City-led partnership invested $215,000 (approximately $70,000 in grant money from the U.S. Environmental Protection Agency, EPA, combined with a $145,000 grant from the Sue Pope Fund—a nonprofit organization dedicated to reducing air pollution in North Texas) to raise the level of "green" building from EnergyStar™ to LEED™ Silver for 40 homes in the new Frazier Courtyard subdivision in South Dallas.

The Frazier Courtyard development project is part of the Fair Park Partnership—a collaboration between Dallas Area Habitat and the nonprofit Inner-city Community Development Corporation (ICDC) which is building 11 additional homes on its own.

ICDC's Managing Director, Diane Ragsdale explains:

> "This partnership is a collaborative effort to provide not only homeownership opportunities to deserving low-income families, but also to establish sustainable neighborhoods in Fair Park. Simply put, ICDC's purpose is to build lives and revitalize neighborhoods and this partnership with Dallas Housing Authority, the City of Dallas, and Dallas Area Habitat has moved us one step closer to fulfilling our purpose."

The DSSI grant also included provisions to conduct a study that would analyze the impacts of 13 energy-efficient upgrades incorporated into the new Frazier Courtyard homes. This study examined the physical energy and pollutant aspects of the homes and also attempted to evaluate the effect of individual resident behaviors—i.e., how did residents respond to these new features and how did this behavior impact the overall energy profile and pollution potential of the homes?

In summer 2010, DSSI partners *Texas A&M University - Energy Systems Laboratory (ESL)* and *TexEnergy Solutions* agreed to donate staff time and resources to model and measure the energy efficiency of the homes and analyze

behavioral factors. Due to the construction schedule (10 homes completed in 2008, 18 in 2009 and 12 in 2010), the DSSI/Dallas Area Habitat Energy Study was limited to the first 28 homes completed by the end of 2009.

As part of the study, Dallas Area Habitat also distributed a questionnaire to the homeowners in an effort to try and gauge the "human x-factor" part of the energy equation (e.g., "Do you have an extra refrigerator or freezer in the garage?" "At what temperature do you typically set your thermostat?"). These kinds of behavioral factors could overwhelm the energy savings inherent in the more efficient construction. They also worked with the local electricity delivery provider, Oncor, to obtain records of energy consumption at each of the surveyed homes.

At the conclusion of ESL's testing and modeling of the 28 energy study homes, it determined that the Dallas Area Habitat Frazier Courtyard homes provide an average energy savings range of 10%-12% in the three-bedroom (1285 sq. ft.) houses; and a savings range of 21%-22% in the two-bedroom (843 sq. ft.) houses when compared to the standard building code in effect at the time of construction (IECC 2004). This translates into a savings of approximately 1 ton of carbon dioxide (CO_2) air pollution per year, per home. Thus far, 28 of these homes have been certified as LEED™ Silver homes—the first LEED™ Silver - Habitat homes in Texas.

Taking the plunge…

Dallas Area Habitat was so encouraged by its experience at Frazier Courtyard that it plans to build all subsequent homes to the equivalent of LEED™ Silver or Gold. Dallas Area Habitat will use $29 million in stimulus funding and other contributions to invest approximately $100 million to serve 1000 families. Over the next five years, Dallas Area Habitat plans to construct over 750 highly energy-efficient new homes and embark on a new exterior rehabilitation program called "A Brush with Kindness" for 250 existing homes.

> "We are very excited to incorporate green building technologies into our homes, and to be able to have the data to support future cost savings for our families and the community at large," said Dallas Area Habitat for Humanity's Government Funding Coordinator, Kristen Schulz.

Not an isolated case…

One of the goals DSSI had in supporting Dallas Area Habitat green building in Frazier Courtyard was to stimulate the private sector to build affordable, green homes throughout the Dallas-Fort Worth Area.

Don Ferrier, DSSI partner and CEO of Ferrier Custom Homes in Fort Worth, who builds moderately priced green homes himself, commented:

> "Everyone wins with Green Building: great energy efficiency, reduced water consumption, protecting natural habitats, recycled materials, recycled waste, etc., all result in a greatly reduced impact on our environment and substantially lower energy & water bills. Careful selection of non-toxic materials results in an exceptionally healthy indoor living environment. With Green Building we preserve our environment for future generations and leave more money in our pocketbook during our lifetime. The upfront cost will be a little more but the long range benefit is tremendous."

The lessons of affordable green housing are being implemented throughout the DFW Metroplex. Another South Dallas project, a short distance from Frazier Courtyard, is also demonstrating how innovative sustainable practices go hand-in-hand with community preservation. The bcWorkshop has partnered with residents to rebuild homes that line Congo Street using green materials and methods, each for $50,000, thereby demonstrating that environmentally friendly design can also be affordable. bcWorkshop founder, Brent Brown explains:

> "Green building works to create healthier environments for families and that directly improves the quality of life in any neighborhood. In particular, sustainable practices in modest communities coupled with community involvement and a creative design approach can re-frame the perception of a place bringing other needed resources and benefits. What starts with "green practices" can transform the way a neighborhood sees itself and its expectations for change."

The green building principles and lessons learned from these real-world examples are also finding their way into the classroom.

One of the leading local proponents for education in sustainability is Betsy del Monte, a Principle in Architecture, and Director of Sustainability for the Beck Group. She has worked with the Lyle School of Engineering at Southern Methodist University to create a program of graduate classes in sustainability. Bringing sustainability into the classroom with participation by industry and government leaders is broadening students' knowledge of the built environment and quality of life for all inhabitants of the planet. As del Monte explains:

"As we continue to expand the built environment for the benefit of our society, it is essential that we do so in a way that addresses economic, environmental and social issues. Education is a key component to understanding how our use of resources to create our environment will impact the ability to live in it productively for generations to come. We applaud Dallas Area Habitat for Humanity for meeting the challenge of protecting our natural resources by building efficiently and effectively to improve the quality of life for its residents."

A greener, more sustainable Dallas…

As part of its ongoing efforts to become one of if not *the* greenest among cities in the country, Dallas continues to promote sustainable practices throughout the city including "green" building.

Dallas Mayor Tom Leppert is proud of the city's ongoing efforts:

"The City of Dallas has been 'going green' for many years, even before the green movement was in fashion. In fact, the organization had racked up so many green initiatives and accomplishments over the past two decades that the U.S. Environmental Protection Agency has called Dallas '…a leader among cities…standing ready to be a model for the rest of the nation.'"

City Manager Mary K. Suhm echoes this sentiment:

"The City has built an impressive list of accomplishments when it comes to supporting the environment and setting standards for the future. Dallas boasts one of the largest alternative-fueled fleets in Texas and the nation, the City buys a significant amount of clean, renewable power; and Dallas was chosen as the first and only pilot city for the EPA's Dallas Sustainable Skylines Initiative aimed at improving air quality."

Dallas is working hard to become the model the rest of the world turns to when considering how to live sustainably. Through the combination of private and public resources, the community is better served. Working together with Dallas Area Habitat and other Sustainable Skylines partners, the City continues to reach out to help those who are willing to contribute to projects to make our community a safe, livable, clean home!