An Affordable Cachet: Using ENERGY STAR® to Turn Around Old Neighborhoods, Legitimize Urban Modular Developments and Create "Buzz"

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ABSTRACT

Advocates of energy efficiency in affordable housing tend to use a "good for the home buyer " theme on the benefits of housing with low energy usage and costs. But builders, whether they are affordable housing providers or not, for-profit or not-for-profit entities, are focused on first costs. Builders know incremental costs come out of profit or operating budgets. So, the message gets lost in details, and the hard work to create a new paradigm of housing fails to resonate. Two local weatherization agencies have found successful approaches to provide affordable, energy efficient housing. One affordable housing provider, Neighborhood Housing Services of Toledo, Inc. (NHS Toledo), used ENERGY STAR® to build market demand for a revitalization of an East Toledo neighborhood. The other, Oakland-Livingston Human Services Agency, Inc, (OLHSA) based in Pontiac, Michigan, uses modular housing for dispersed in-fill projects throughout Oakland County. Both agencies built ENERGY STAR® modular affordable housing without significant additional subsidies. They relied on assistance from U.S. Department of Energy offices and programs for technology-based assistance, the ENERGY STAR® brand for marketing, and modular housing to achieve ENERGY STAR® standards at a cost often less than site built.

The results are:

- All new construction housing, whether modular or site built, will be ENERGY STAR®;
- Buyers were drawn to ENERGY STAR® houses over non-ENERGY STAR® whether they qualified or not for affordable housing; and
- The actions by these two local agencies and the U.S. Department Of Energy Chicago Regional Office may lead to a broader market transformation initiative.

Introduction

"Affordable housing" for the purpose of this paper is defined as homes for households earning less than 80% of the median income in a given metropolitan area. The housing should not only be affordable to buy, but also to operate and maintain. Affordable housing also provides economic development opportunity, as well as providing accessible labor for both the immediately impacted distressed areas and the surrounding metropolitan area.

The need for affordable housing is great, and the challenge to provide it is substantial. Housing costs, especially for new construction, have risen dramatically. The median price of a new

home jumped 7% in 1998 alone, to $163,000 [HUD]. The recent economic boom has forced many households out of the new construction market as materials and labor shortages have increased new home prices. Indeed, the dominant bias of the market has been to serve more upscale clientele. Affordable housing providers have struggled to fill the neglected affordable housing niche, often building low cost houses with the hidden burden of high maintenance and energy costs.

Fortunately, some trends portend well for the affordable housing market. Technical and financial resources from government programs such as HOME and private sector financing are filling some of the gap, as well as partnerships with the U.S. Department of Energy, U.S. Environmental Protection Agency and state agencies. There is an increased acceptance of more cost effective means of providing housing, through increased sophistication of manufacturing housing. Weatherization expertise which has long served communities to reduce energy costs in low income existing housing is migrating to serve new construction for low and moderate income households.

Manufactured housing, which includes a range of applications, has extricated itself from the"trailer home" image. No longer a choice reserved for the aesthetically tolerant, "HUD Code" and modular homes are now often difficult to discern from site-built, and they have gained greater acceptance in urbanized markets. Modular home production is estimated at 150,000 homes per year, or 10-15% of all single family production [EDU]. The manufacturing process has permitted the industry access to advantages in better quality, cost control and generic resource efficiency.

Advantages to Modular Housing

Modular housing is defined here as the construction of the shell of a house in an enclosed factory setting. The shell is the mostly completed envelope, both exterior and interior, that is delivered typically in two lengthwise modules by trailer to the construction site. The shell is then installed by crane onto the foundation, whether it is a slab, crawl space or basement. Although many manufactors offer turnkey options, typically a contractor at the site is responsible for building the foundation, providing utilities, installing the modules on the foundation, joining the modules, and sometimes, installing air conditioning, water heating and other appliances.

Modular housing promises considerable savings in first costs and just as importantly, time. Because modular construction sites do not remain open or unoccupied for long periods of time, losses due to the weather, theft or vandalism are minimized. The weatherization agency can focus its expertise on specifying energy efficient features in the factory constructed component, performing finish work on site, and performing quality control inspections to ensure the house is energy efficient.

While the technologies and regulations are in the process of change, modular housing is not legally defined as "HUD housing". A "HUD house" is a completely self-contained unit that is delivered on a chassis that remains with the house when it is installed. All appliances and other equipment are included, and it only needs to be installed and hooked up to utilities to be occupied. A "HUD house" is subject only to a national code. A modular house, while it may be delivered nearly as complete as a HUD code home, is subject to the same codes as a site-built house. Modular homes typically require more site finishing than a HUD code home. While they are subject to local building code, they are also subject to any statewide standards for housing components that are shipped.

The Role of Local Weatherization Agencies

The entry of agencies which provide weatherization services is proving to be a boon for the affordable housing market. Many of these agencies have up to 25 years' experience in insulation, air sealing, mechanical improvements and other practices that have given them considerable expertise and understanding of how energy usage affects housing. Lack of growth in public energy efficiency funds for weatherization has compelled many of them to seek other opportunities within their mission and capabilities. They have been able to move into the new construction affordable housing market because many contractors and developers have moved up into more lucrative markets. In addition, these agencies, as public or not-for-profit sector organizations, benefit from the recognition that these initiatives bring.

Many weatherization providers, either on their own, or in joint ventures, initially found it difficult to make the leap from being responsible for retrofit projects costing a few thousand to new site-built construction costing $100,000 or more. However, this lack of experience in new construction also made them more receptive to manufacturing options such as modular housing.

Based on the projects described below, modular construction may be the solution for providers of affordable new housing.

Initial Experiences

Affordable housing providers have sought to serve the market as best as they could. The issue of energy efficiency has traditionally been defined by the assumption that it costs more, and the limits of affordable housing budgets precludes improved performance without additional subsidy. However, that assumption has been challenged by two Midwestern affordable housing providers.

The two pioneering agencies, NHS Toledo and OLHSA, became Community Housing Development Organizations (CHODO's) and were awarded funding under the US Department of Housing and Urban Development HOME Program. In addition to HOME funds, NHS Toledo also used Community Development Finance Initiative (CDFI) funding to create a tandem mortgage (18% of the house total) at an interest rate of 5%. To qualify for the 5% interest rate, a Home Energy Rating (HERS) must show the home is at least 30% more efficient than a home built to the 1995 Model Energy Code. Homes meeting this standard of efficiency are given the designation "Five Stars." Failure to achieve Five Stars resulted in the tandem mortgage going up to market rates, which were in the 7 to 7-1/2% range. This "5% Five Star" Mortgage is believed to be one of the first energy efficiency mortgages outside of the Alaska Housing Finance Corporation offering a significant discount [AHFC]. More typically, energy efficient mortgages provide debt-to income "stretches" and fee reductions or waivers, rather than interest discounts. Five Star homes may also qualify as ENERGY STAR® homes, an EPA/DOE program with marketing benefits to builders of performance tested energy efficient homes.

NHS Toledo's first ENERGY STAR® modular house was dedicated in June, 1999, and OLHSA's first Five Star-rated modular homes were achieved in January, 2000. Both agencies navigated numerous bumps on the road to achieving ENERGY STAR® status for the modular houses.

Collateral problems - The NHS Toledo project suffered from unexpected problems that

had nothing to do with the house itself, but to more generic issues of in-fill development. The excavation revealed that the foundation of an older house was not removed, but merely pushed in. There was a question on property lines, which necessitated another survey. These costs almost caused plans for the energy efficient features to be jettisoned, but NHS Toledo's resolve that all their new construction was going to be ENERGY STAR® saved the day.

Contractor disputes - OLHSA had difficulty conveying the importance of energy efficiency standards to contractors. The first houses failed to make Five Star due to lack of band joist and basement insulation and less-than-optimal furnaces. Much of the problem was attributed to a lack of effective communication. In these initial projects, OLHSA hired a developer, who hired the general contractor, who hired the subcontractors. In later projects, OLHSA assumed the developer role and was more actively involved. This closer connection to the construction process eventually eliminated previous failures to install efficient appliances and insulation.

Code Inspection issues - Both agencies had to address building inspector concerns with mechanical and envelope installations. These issues kept surfacing in spite of the partnerships' efforts to get local governments on board. Efforts included specific meetings and briefings with city managers and their staffs, including inspectors. A number of issues were forestalled. One example was the code officials' insistence to install a basement window for fire escape purposes, even though there was no allowance to legally permit sleeping arrangements and the windows themselves were not effective means of egress. The installation of the "hole" in the basement was alleviated by installing an insulated cover over the window well opening. NHS Toledo had delays getting their combination domestic hot water heater-forced air heating system approved, even though the approved plans indicated such an installation. OLHSA had problems getting approval on basement insulation without expensive firewall protection.

Some houses were delivered with insulation deficiencies. Some deficiencies occurred as a result of shifting or settling while in transport. Others occurred as spots that were missed in the manufacturing process, primarily in knee wall areas. Fortunately, inspections assured proper insulation in closed cavities. Lighting fixtures also were a problem. Manufacturers who did not supply hard wired compact fluorescent fixtures were advised to leave them off so they could be field installed. But a couple of the houses still arrived with the incandescent fixtures installed, requiring corrections.

Developing the Partnership

Due to the unique cross cutting nature of an affordable ENERGY STAR® modular housing project, it was decided early on by the partners to make it a separate activity, called the Modular Housing Initiative, and use resources from existing programs. This helped focus on the market, similar to the Energy Smart Schools Initiative, which utilizes a variety community and government resources, but focuses on schools. For the Modular Housing Initiative, many DOE resources, primarily from the Office of Buildings Technologies and Community and State Programs, were employed. Both early adopters discussed here are Weatherization Assistance Program agencies, and NHS Toledo is also a Rebuild America partner. Both agencies worked with their State Energy Offices (SEO).

OLHSA had access to $1,000 incentive funding to achieve Five Star-rated homes and technical assistance from the Michigan SEO, the Department of Consumer and Industry Services, to develop their Home Energy Rating provider capabilities. The Midwest HERS Consortium, a

group that maintains the integrity of the HERS process, also provided assistance. NHS Toledo worked closely with SEO staff from the Ohio Department of Development's Office of Energy Efficiency, which supplemented the technical assistance provided by the DOE Chicago Regional Office (CRO).

The modular house manufacturer used by NHS Toledo was provided design assistance through the U.S. Department of Energy's Building America Program. OLHSA used a manufacturer that was not involved in Building America, and their model required further improvements so that it could be "buttoned up" as an ENERGY STAR® house. In general, OLHSA used NHS Toledo's experiences as spinoff opportunities as they proceeded up the learning curve. The Ohio SEO sponsored the first outreach workshop on the Initiative in Columbus. The modular housing manual was funded by DOE. Finally, and certainly not least, was the use of ENERGY STAR® as the brand to the public, while HERS provided a diagnostic and quality control tool.

Throughout this process, the CRO played an active role in the Initiative. The CRO encouraged the early adopters with a high level of hands-on technical assistance, making use of its in-house expertise in buildings applications, as well as coordinating resources from other programs and providers. They expanded beyond the traditional grantor role in the development of a manual with Steven Winter Associates, using ongoing drafts with the affordable housing providers in a "test drive" format, before it was finalized and sent to print.

Next Steps

The next steps for the Initiative are as follows:

- Develop a resource toolkit around the manual.
- Market the Initiative to other affordable housing providers within and outside of the weatherization community
- Structure the Initiative into a regional consortium.

An outreach mailing was sent by the CRO in February, 2000 to all eight state and 252 local weatherization agencies in its region. The mailing advised of the availability of the modular housing manual, which was requested by over 100 local agencies. The agencies were invited to participate in a survey, which 21 did, including at least one from every state in the region.

Eight of the agencies built new construction housing in 1999 for a total of 19 units, while 12 agencies plan to build a total of 72 units, plus a multi-family project in the year 2000. Ten agencies presently have a total of 41 lots. Three agencies have tried modular housing. All have had HERS rating training, and two have successfully achieved Five Star/ENERGY STAR® standards. Ten agencies report having personnel qualified to do HERS.

During interviews with modular manufacturers, aggregating market demand was continually cited as being critical to encourage them to build a Five Star house. CRO is utilizing data collected via the outreach mailing to target agencies ready to make the leap into new residential construction, and hopefully, manufacturers will be compelled to change practices and meet the demand for energy efficient, affordable modular homes.

References

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