
Affordable Housing

Greening Affordable Housing

Gail D.A. Vittori

Despite record numbers of new home starts and record homeownership rates, the quest for affordable housing remains elusive for many Americans, particularly those in the lowest income quartiles. Indeed, in the first years of this new millennium, the shortfall in supply of public and assisted housing for the nation's very poorest people stands at 3.3 million housing units.¹ Moreover, according to the National Association of Home Builders, one in four households, or about 28 million American families, spend more than 30 percent of their household income, a federal benchmark for affordability, on housing.² But beyond evaluating this issue through the lens of supply and demand, what are the essential qualitative concerns that should define the agenda for filling the affordability gap? Even with heightened awareness about the links between buildings and health and evolving spatial needs over time, an agenda lacking a vision and commitment to green and adaptable affordable housing is out of step with current knowledge and trends. The burdens associated with substandard housing, and with exposure to environmental health risks, are disproportionately carried by this nation's poor. Current data shows an alarming 20.3 million asthma sufferers in the United States, and more than 5,000 people dying from asthma per year.³ The nation's low-income population endures the highest rates of asthma, with many of the known and suspected triggers correlated with its housing.⁴ In New York City, an estimated 38 percent of homeless children suffer from asthma.⁵ More generally, the U.S. Environmental Protection Agency finds indoor air pollution to be one of the top five environmental risks to public health.⁶

Part of the responsibility for impaired indoor air quality is associated with building materials.⁷ For example, approximately 70 percent of formaldehyde—a known carcinogen and asthma trigger—is used in building materials, serving as a binder for engineered wood products, carpet, and insulation, among other materials.⁸ This statistic is rarely known by architects and designers who specify materials or by contractors who build, and rarer still is it known by the residents whose indoor environment is largely defined by the materials with which it is built. Yet, with no current labeling requirements and the appeal of inexpensive cost, problematic chemicals

Gail D.A. Vittori (gvittori@cmpbs.org) is co-director of the Center for Maximum Potential Building Systems, a nonprofit sustainable planning and design firm established in 1975, based in Austin, Texas.

such as formaldehyde are likely to continue to have widespread use, especially for projects for which reducing costs per square foot is a priority. Are these trade-offs necessary?

It is both instructive and encouraging to consider a few of the contemporary success stories in greening affordable housing in the public and private sectors relative to both policy and implementation. While still considered by some to be unachievable, affordable green housing is doing well in the emerging proof-of-concept phase. This phase is evidenced by a spectrum of projects and policies around the country that provide a compass for realizing the common ground between affordability and sustainability, from green material specification templates adopted by the District of Columbia Housing Authority, to a green prototype Habitat for Humanity residence constructed in New Orleans in spring 2004, to the GroHome⁹ modular build-as-you-grow design approach developed in coordination with Austin, Texas's Center for Maximum Potential Building Systems.

In 2002, the District of Columbia Housing Authority (DCHA)—one of the nation's largest housing authorities with over 9,000 units and more than 50,000 residents—launched an effort to green its material specifications. This effort showed an interest in enhancing the health of DCHA's residents by improving the indoor environmental quality of its units, as well as an ability to be attentive to opportunities to minimize the upstream environmental and health burdens associated with many conventional manufacturing practices. According to DCHA Commissioner Marcie Cohen, "DCHA now advocates the use of environmentally friendly construction products and methodologies whenever possible."¹⁰ DCHA's assessment of the recommended green products found that in many cases, a significantly enhanced material was available with no price premium and with better durability and performance, resulting in DCHA's quick adoption of and enthusiasm for the green specifications.¹¹

A similar success story lies with the spring 2004 construction of the Green PVC-Free Habitat for Humanity house in New Orleans. Coming in on budget (\$50/square foot) and on schedule, the project evolved as a partnership between Habitat for Humanity, Greenpeace, and the Healthy Building Network to create a model, affordable healthy home using a standard Habitat for Humanity design. The green substitution strategy introduced an impressive array of durable, nontoxic, high-performance materials, including wood from sustainable forests, nontoxic pressure-treated wood, low-chemical-emitting paints and carpet, fiber-cement siding, and PVC-free plumbing pipe. While sometimes having a more expensive first cost, substitutes for PVC piping, such as cross-linked polyethylene, eliminate the potential for dioxin releases as a consequence of manufacturing or accidental or intentional combustion, and require no cement, which also eliminates a potential source of toxic exposure. In addition, the home's energy-efficient windows enabled the HVAC system to be reduced from three tons to two tons, cutting first costs and shaving the energy bills over the life of the house, a decided bonus to the family moving in.¹² The dem-

onstrator was particularly notable, since many doubted whether the green construction would be achievable within budget.

On a more anticipatory plane, the GroHome project is founded on the premise that the home environment should be designed to adapt to inevitable changes that occur over time, including family size, family members (from infants to elders), physical disabilities, and the potential introduction of a home business, and introduces financial and design concepts that reinforce this premise. These elements include the following:

- The family should be able to incrementally pay for improvements (internal and external) either through internal savings (pay as you grow) or through special financial arrangements that parallel micro-enterprise lending practices in which incremental payoff builds value and equity and is not penalized;
- Building footprints should be spatially adaptable so that small urban infill can be accommodated using incremental dimensional building procedures that are less cumbersome than the procedures needed for large modular components that often necessitate small cranes and can increase neighborhood and environmental disruption; and
- Building system configuration including detailing, joining and other basic configuration should be simplified to facilitate self-help and local small contractor participation.

The leading edge of green affordable housing demonstrates that the desired price points can be achieved without cutting corners on a building's environmental/health performance. Common elements that highlight the underlying guiding principles include:

- **Integrated Design Process:** The actualization of green building hinges on an early assessment of project goals and the integrated strategies required to deliver them. Experience shows that making smart decisions on right sizing of mechanical systems and efficient space planning yields substantial reduction of first costs, with these savings invested in environmentally preferred, durable, low-maintenance materials that may represent a higher first cost. Additionally, a systems perspective reveals how investment in one technology (e.g., rain-water harvesting) can be folded into other fixed costs (e.g., roofing, gutters) that lessen the added costs otherwise associated with a "green" technology.
- **Design with Climate/Local Resources:** An assessment of local climatic, natural, and manufactured materials and products presents an opportunity to inform design and specifications decisions. By using a climatic-responsive design approach, a home can be designed to take advantage of natural ventilation, daylighting, passive heating, and cooling strategies that can reduce first-cost investments in mechanical systems and reduce annual operating costs associated with heating, cooling, and ventilating. Additionally, tapping into a local resource base for major building materials eliminates the added costs resulting

from transportation while also supporting local economic development and job security.

- **Design for Flexibility:** Recognizing the inevitability of change in the spatial needs of residents over time, building in adaptable post and beam structural systems facilitates change by allowing for easy modifications over the life of the house, and helps curb the construction-related wastes (due to remodeling and the lack of planned reusability of materials) that currently represent about 25 percent of the municipal waste stream.
- **Healthy Materials:** Specific nontoxic, durable, low-maintenance materials and products should be used to curb the release of chemicals that conflict with healthful indoor and outdoor environments and to reduce waste and maintenance requirements through the life of the house, yielding lower operating costs.

These strategies, for the most part, represent off-the-shelf, practical opportunities for immediate implementation, while others represent a more fundamental shift in form. Regardless, it is clear that there is proven demonstration that healthy, sustainable, affordable housing is achievable. The opportunities for broader adoption include loosening the trends of intransigent building, financing, and code officials, and building familiarity within the construction industry.

Successful market transformation tools are in place, such as the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED).¹³ Over the past five years, the USGBC has grown its diverse membership to more than 4,000 companies, and has more than 1,100 LEED-registered projects. LEED has also served as a catalyst for public policy shifts toward green building, complementing a myriad of local and regional efforts that have sprung up over the last decade.

The overlay of successful projects with a growing body of supportive public policy is beginning to tip the scale toward the broader promotion and adoption of green building practices. Among the steepest challenges is to ensure that this market transformation benefit all construction types, regardless of where they fit on the affordability scale.

1. See Joint Center for Housing Studies of Harvard University, *The State of the Nation's Housing 2001*, at 24 (2001), at www.law.cornell.edu/citation/index.htm.

2. Nat'l Ass'n of Home Builders, *America Is Facing a Silent Housing Affordability Crisis*, at www.nahb.org/assets/docs/publication/silent_814200293611AM.pdf (July 2002).

3. American Academy of Allergy, Asthma & Immunology, *Asthma Statistics*, at www.aaaai.org/media/resources/media_kit/asthma_statistics.stm.

4. See Alliance for Healthy Homes, *Boosting Healthy Homes Funding: An Investment in Health*, at www.aeclp.org/aa/aa_hh_policy_federal_funding_hhi_campaign_investinhealth.htm.

5. IRWIN REDLENER & DENNIS JOHNSON, *STILL IN CRISIS: HEALTH STATUS OF NEW YORK'S HOMELESS CHILDREN* (Children's Health Fund 1999).

6. INDOOR AIR QUALITY, U.S. ENVIRONMENTAL PROTECTION AGENCY, EPA DOC. NO. 400-R-92-012, TARGETING INDOOR AIR POLLUTION: EPA'S APPROACH AND PROGRESS (Mar. 1993), available at www.epa.gov/iaq/pubs/targetng.html.

7. See *id.*

8. See Massachusetts Toxics Use Reduction Institute, 2000 *Formaldehyde Fact Sheet*, available at www.turi.org.

9. GroHome is a registered trademark of EcoRetro Systems.

10. *Green Materials Become a Priority*, 1 DCHA CONNECTIONS NEWSLETTER. 2 (Dec. 2003/Jan. 2004) available at www.dchousing.org/newsletter/jan_conn.pdf.

11. Interview with Marcie Cohen, DCHA Commissioner, July 9, 2004.

12. Interview with Bruce Hampton, Elton and Hampton Architects, Boston, July 9, 2004.

13. LEED is a registered trademark of the U.S. Green Building Council.