LEED® Homes and **LEED®** for Neighborhood Developments: Status of the U.S. Green Building Council's Residential Programs

Ann V. Edminster, Design AVEnues

ABSTRACT

The U. S. Green Building Council has been enormously successful with its LEED® (Leadership in Energy and Environmental Design) commercial building rating program. Now, several years into development, the residential and neighborhood development counterparts of this program are poised for market launch within the near future. LEED® for Homes anticipates initiating a pilot program in late 2004 and LEED® for Neighborhood Developments will be close on its heels.

The LEED® Homes development team is working with local, regional, and national stakeholder organizations, including several federal agencies, to winnow the best of existing and proposed draft standards, and then package and market the resulting product in areas not yet served by residential rating programs. LEED® for Neighborhood Development is being developed in collaboration with the Smart Growth and New Urbanist communities to establish a definition of "green" neighborhood development that will be implemented nationally to foster the design of exemplary green developments.

These programs in tandem provide an integrated set of tools to assist designers, builders, and developers in creating efficient homes and mixed-use developments in efficient communities. LEED® and the USGBC have demonstrated the potency of a community unified in promoting green building. These initiatives will further leverage that power through the involvement of a wide array of knowledgeable, influential, and credible stakeholders in this new arena. This paper addresses the status and scope of the two programs and how they interact, the participants in the programs' development, and an overview of some of the key features of each program.

Purpose and Scope

The resource consumption and land use associated with homebuilding, the creation of residential subdivisions, and other broad-scale development activities are of paramount concern to the green building and green development communities. Pervasive sprawl; urban blight; the loss of valuable habitat, agricultural land, and open space; and air and water pollution are among the environmentally, socially, and economically devastating byproducts of conventional development processes. With more than 1.4 million homes built each year, homes represent 55 to 60 percent of all environmental impacts of buildings. Thus LEED® for Homes (LEED®-H) and LEED® for Neighborhood Development (LEED®-ND) are crucial components of USGBC's overall strategy to transform the building market toward more efficient utilization of land and other critical global resources.

These two products will allow builders and developers to competitively promote their products with a third-party "green" designation to discriminating consumers and jurisdictions. These LEED programs will ultimately also incorporate education of real estate professionals – agents, brokers, lenders, appraisers, insurance providers, and others – as well as the builders,

homeowners, and communities in which they work and reside. The U. S. Green Building Council (USGBC) will also have an active role in promoting the rated projects as part of a broader, fullcircle public education program.

Both LEED®-H and LEED®-ND are being formulated under the same premise that has driven development of the other products in the LEED® suite – that is, by offering an opportunity for builders and developers to distinguish their products from competitors' through the achievement of a credible, tiered, third-party label, USGBC is creating a market driver for higher levels of "green" performance. This will spur builders and developers to incorporate greater efficiencies in their projects.

The purview of LEED®-H will include individual residential (or primarily residential) structures on individual sites. These may range from single-family detached homes to duplexes, row houses, townhomes, and multifamily structures up to three stories. For the initial phases of program development, the rating system will only address new construction and perhaps only single-family homes; multi-family structures and remodels will be addressed in later versions of LEED®-H. LEED®-H will target a builder audience ranging from leading-edge quality production homebuilders to innovative green custom builders. The purview of LEED®-ND is likely to include multiple-structure, multiple-use developments.

There will be a certain amount of overlap between the two programs, as there are a variety of project attributes that are significant for both individual, single-use sites/individual structures and multiple uses/multiple structures. These attributes fall under the broad LEED® umbrella of "Sustainable Sites" but, particularly for large development projects, will acquire greater significance and are therefore anticipated to carry greater weight within LEED®-ND. Thus the LEED®-ND Committee anticipates subdividing that area into three topic areas, tentatively titled Location and Linkage, Neighborhood Pattern and Design, and On-site Environmental Management. Supplementing the LEED®-ND Committee's effort to develop the LEED®-ND program, they also expect to offer input on the refinement of the Sustainable Sites criteria in other LEED products.

Project attributes likely to appear in both LEED®-H and LEED®-ND include selecting an environmentally appropriate site; designing the building(s) to protect on-site land features; protecting the site during construction; stormwater and wastewater management systems; proximity to transportation and other services; and other issues that are relevant for projects at both scales.

LEED®-H is envisioned as a marketing tool, a mechanism that will enable builders to distinguish their products in the marketplace by appealing to consumers who are interested in high performance, environmentally responsible homes. The focus of LEED®-ND, in contrast, is on the creation of a tool that will assist developers by enhancing their credibility with muncipalities that may otherwise prove resistant to land use innovation. The LEED®-ND label will represent the support of a coalition of credible institutions knowledgeable in land use issues.

The LEED®-H and LEED®-ND committees anticipate crafting a mechanism to address cases where applicants wish to obtain ratings under both systems, to ensure that the programs synchronize well and require no duplication of effort.

LEED® for Homes

Background

An inaugural "LEED Residential" committee was appointed by the USGBC in early 2000, and four technical advisory groups (TAGs) were formed to develop draft criteria. This phase of work concluded with a first draft of criteria that was completed in late 2001. In 2002, the committee's work shifted to a focus on understanding the residential market, which differs in substantial ways from the commercial market; understanding the infrastructure needs for the LEED®-H program; building relationships with the myriad organizations and agencies already active in residential green building across the country; and working with USGBC leadership on strategies to increase the Council's residential constituency.

Major tasks undertaken in 2003 included USGBC's sponsorship of a Green Building Program Summit in conjunction with Affordable Comfort's annual conference in Kansas City; the formation later that year of the Coalition of Green Building Programs (CGBP) – a direct outgrowth of the Kansas City summit and groundwork leading up to that summit; and, in August, the seating of a new LEED® Homes Committee. That committee represents a broad array of experience and insight in the residential sector:

Mack Caldwell, Ideal Homes Craig Collins, NAVFAC Dennis Creech, Southface Energy Institute Ann Edminster, Design AVEnues (co-chair) Richard Faesy, Vermont Built Green Butch Gaudette, Whirlpool Randy Hansell, EarthAdvantage Joy Altwies, ASHRAE Ron Jones, Sierra Custom Builders Eric Martin, Florida Solar Energy Center Richard Morgan, Austin Energy Kathleen O'Brien, O'Brien & Company Sam Rashkin, US EPA Energy Star Kristin Shewfelt, E-Star Colorado Dave Ware, Owens-Corning Steve Winter, Steven Winter Associates (co-chair)

In addition to the organizations and institutions represented on the LEED® Homes Committee, the LEED®-H effort is bolstered by other relationships developed by the Committee over the last two years. These include the following:

Local and regional green building programs	Energy & Environmental Building
(via the CGBP)	Association
DOE – Building America	Sustainable Buildings Industry Council
EPA – Energy Star	Affordable Comfort
National Association of Home Builders	RESNET
U.S. Navy and other military branches	

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LEED®-H, like the other LEED products developed to date, will encompass project attributes in six categories: Sustainable Sites, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation in Design. And, while the criteria used in the pilot rating system have yet to be drafted and will ultimately be subject to a vote by the USGBC

membership, the work on LEED®-H to date has already revealed a variety of issues likely to be addressed within the rating system. Selected key attributes that we anticipate LEED®-H to include in each of the six categories are listed below in Table 1. (Recurring issues are shown in italic and boldface type.)

Sustainable Sites:	Materials & Resources:
Infill & compact development	Optimized framing
Proximity to transit	Design for deconstruction & adaptability
Proximity to services	• Building reuse, deconstruction, & recycling
Outdoor living spaces	Environmentally preferable materials
Minimizing auto dominance	Home size
Energy & Atmosphere:	Envelope durability
Quality control	Systems integration
Envelope & mechanical systems	
performance	Water:
Energy-efficient lighting & appliances	Water-efficient fixtures & landscaping
• Passive, renewable, & alternative energy	Innovative wastewater technologies
Home size	Reduced energy demand associated with hot
	water
Systems integration	Drain water heat recovery
Indoor Environmental Quality:	Water catchment
Building envelope moisture control	Innovation in Design/Overarching Issues:
Combustion safety	Universal design elements
Ventilation/air conveyance system	Homeowner/occupant education
effectiveness	
Vehicle exhaust protection (garage	• Systems integration: integrated solutions to
design)	durability, moisture control, IAQ, & energy
Low-emitting materials	Home size
Home-landscape interface design	
Quality control	
Systems integration	

 Table 1. LEED®-H Key Attributes

Challenges

Between now and the launch of a LEED®-H pilot program, the development effort faces a number of challenges related both to infrastructure and technical content. Among the infrastructure challenges are program economics – how can we deliver a rigorous, credible program that is economical for builders and homeowners? How do we ensure compatibility with existing regional and local green building programs around the country? USGBC is committed to supporting those programs and collaborating with them to the extent feasible. How can we develop a delivery mechanism and network that will enable us to serve the constituency that the USGBC Board has mandated for us? Our scope is national, save the areas already served by local and regional programs. This means that we need to team with existing organizations whose missions and capacities dovetail well with USGBC's.

Other questions that face the LEED®-H Committee include whether the rating system should have multiple tiers or just one; to what extent we should reward or penalize homes based on size; and how to effectively evaluate and verify that rigorous durability protocols and sound,

building science-based systems integration practices have been employed in the homes' design and construction.

Another key challenge before the LEED®-H Committee will be how to frame a system that is both national in scope and regionally responsive and appropriate. This will demand that we identify and incorporate the most effective mechanisms for addressing climatic and geographic factors that drive different approaches to place-based, high-performance homebuilding. This may suggest, for example, establishing a set of specified criteria – perhaps prescriptive – along with a set of placeholders for regional variables – perhaps performance-based. Forthcoming research is anticipated to identify a variety of approaches for the Committee's consideration, derived from analysis of green homebuilding programs around the country. However, because LEED®-H differs from those programs in that it will be national in scope, this may prove an area in which there is need for true innovation on the part of the LEED®-H development team.

Status and Timetable

Early in 2004, the LEED®-H Committee finalized a proposed business model for the delivery of LEED®-H following months of detailed development and discussion. The principal elements of that delivery model and responsibilities of the parties are shown in Figure 1.

The black arrows represent oversight, quality control and quality assurance, and education/training. The green arrows represent revenues. This model borrows much from the home energy rating industry¹, and the roles of program providers and raters are anticipated to be analogous to those roles in the energy rating world. Further, the LEED®-H Committee intends to actively pursue collaboration with this industry in the delivery of LEED®-H.

The role of "program development consultant" is shown linking the USGBC and program providers with a dashed line. This represents the functions of recruiting, nurturing, and training new program providers. We anticipate that there will be a wide range of types of program providers, from US military agencies to private developers and homebuilders, universities, affordable housing organizations, HUD, utilities, and others. Some of these will be "LEED®-H-ready", others will need some assistance from program development consultants to develop the capacity to deliver LEED®-H for their target constituency. It is anticipated that there may be multiple program providers and multiple raters in any given market, creating competitive opportunities for all parties.

The LEED®-H Committee and USGBC staff have been working with a consultant team led by Building Knowledge, Inc., to validate and finalize this business model, conduct a survey of local/regional program criteria, analyze these and compare them to the November 2001 LEED Homes draft criteria, and compile a "best of the best" set of draft criteria.

This draft, after iterative refinement by the LEED®-H Committee, will be the basis for the LEED®-H pilot, anticipated to launch in late 2004 or early 2005. The LEED®-H Committee will hold a charrette with the consultant team in the fall of 2004 to review and provide input on the consultants' work to date; the outcomes of the charrette will be incorporated into the draft prior to the launch of the pilot. Work of the committee throughout 2004 has been focused on grounding both the criteria and the delivery system in the realities of the homebuilding industry. That will remain our focus throughout the process of finalizing and launching the pilot rating system.

¹ HERS (Home Energy Rating System) and RESNET (Residential Energy Services Network).



The tasks remaining in the LEED®-H development process are *estimated* to take place on the schedule outlined in Table 2, with the pilot concluding and the official launch of the rating system occurring in mid-2006.

Table 2. LEED®-H Timetable		
Hold LHC technical charrette	Fall 2004	
Finalize draft rating system	January 2005	
Pre-pilot ("alpha test") rating system with builders	1st quarter 2005	
Draft pilot reference materials	March 2005	
Revise rating system as needed based on pre-pilot	March 2005	
outcomes		
Finalize pilot reference materials	April 2005	
Launch pilot	April 2005	
Conclude pilot, launch rating system	April 2006	

LEED® for Neighborhood Developments

Background

The USGBC, the Congress for the New Urbanism, and Natural Resources Defense Council — three organizations which represent the nation's leaders among progressive design professionals, builders, developers, and the environmental community — have come together to develop a national standard for neighborhood design that integrates the principles of green building and smart growth. The goal of this partnership is to engage stakeholders across the country in establishing consensus-based standards for assessing the impacts of development projects using the rating framework of LEED® that has already become the national standard for high performance buildings.

LEED®-ND is intended to provide an objective basis on which to certify developments as "smart growth". In short, LEED®-ND would create a label, as well as a set of guidelines for decision-making, to serve as a concrete signal of, and incentive for, better location, design, and construction of neighborhoods and buildings. Equally important, it will be a product that can be readily folded into USGBC's existing and successful efforts to market LEED® to developers, consumers, and policymakers.

The LEED®-ND Committee comprises representatives from three constituencies, the smart growth movement, new urbanists, and the green building community:

Kaid Benfield, Natural Resources Defense Council (vice chair) Jessica Cogan, Smart Growth Leadership Institute Michael Pawlukiewicz, Urban Land Institute Dana Beach, South Carolina Coastal Conservation League Laura Watchman, Defenders of Wildlife Doug Farr, Farr Associates, Architecture and Urban Design (chair) Shelley Poticha, Center for Transit-Oriented Development Susan Mudd, Congress for the New Urbanism and the Brico Fund Victor Dover, Dover, Kohl & Partners Town Planning Eliot Allen, Criterion Planners Engineers Bill Browning, Rocky Mountain Institute Rebecca Flora, Green Building Alliance Sharon Feigon, Center for Neighborhood Technology Sandy Wiggins, W.S. Cumby & Sons, Inc. Melissa Knott, Forest City Stapleton

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Whereas other LEED® products focus primarily on green building practices, with only a few criteria addressing site-oriented issues, LEED®-ND is intended to emphasize smart growth aspects of development while still incorporating a selection of the most important green building practices. LEED®-ND's smart growth design criteria are expected to be guided by the Smart Growth Network's ten principles of smart growth, including density, proximity to transit, mixed use, mixed housing types, and pedestrian- and bicycle- friendly design.

The existing LEED® rating system for new commercial construction (LEED®-NC) has a proven track record of encouraging builders to utilize green building practices such as increasing energy and water efficiency and improving indoor air quality in buildings. LEED®-ND aims to have a similarly positive effect on development trends by rewarding developers for efficient, responsible land-use decisions. LEED®-ND will award points for design choices that will revitalize existing urban areas, decrease land consumption, decrease vehicle miles traveled, improve air quality, decrease polluted stormwater runoff, and build communities where people of a variety of income levels can coexist and where jobs and services are accessible by foot or transit. LEED®-NC has demonstrated that offering more points for higher levels of achievement is an effective driver for decisionmaking; rewarding these choices will encourage developers to scrutinize their land-use decisions more closely and thus to select sites that are inherently more resource-efficient.

The continued use of certain green building standards in LEED®-ND also will ensure that indoor air quality is healthier, that energy and water consumption decrease, and that the corresponding utility bills of residents are lower as well. In addition to direct economic and quality-of-life benefits for consumers, the implementation of water- and energy-efficient technologies will ensure a more efficient use of infrastructure in urban areas, where water, sewer, and electric grid systems are typically overtaxed.

Challenges

Defining the scope of LEED®-ND is a primary challenge facing the development team. This task encompasses a number of sub-issues, including overlap and potential competition with other LEED products as well as whether or not to include criteria addressing affordable housing, community involvement, and other issues very much related to good land-use planning but falling outside the usual "green" domain.

Marketing LEED®-ND to the right audience is another prospective challenge, as is ensuring good engagement with all the important stakeholders – because of the potentially wide scope of the program.

Developing LEED®-ND as a joint venture sponsored by multiple organizations also represents a unique challenge. The USGBC has weathered numerous challenges related to balancing stakeholder viewpoints; but in the past those efforts have all been under the umbrella

of a single parent organization. This joint venture represents new territory and will inevitably present the Council and its ND partners with new precedents in decisionmaking.

Status and Timetable

Beginning in December 2003, LEED®-ND has been staffed by a program manager funded under the Blue Moon Fund's Urban Fellowship program. USGBC will serve as the host institution for the fellowship, which lasts for three years. Additional funding has been received in the form of two EPA grants, one from the smart growth program in conjunction with the Center for Disease Control (recognizing the linkage between pedestrian-oriented communities and reduced risk of heart disease), and the other from the EPA brownfields office.

Thus far, the initial focus for the program manager and partner organizations has been constituting a core product committee, a larger corresponding committee, and establishing support infrastructure and protocols for that committee. The core committee held its first inperson retreat in May 2004, in Washington, DC. A subsequent committee meeting was scheduled for June 2004 in Chicago, to coincide with the annual meeting of the Congress for a New Urbanism and a larger LEED®-ND public stakeholder meeting to be held there. The core committee anticipates focusing for the remainder of 2004 on product development activities, including holding another stakeholder meeting at the USGBC's annual Greenbuild conference in November 2004 (in Portland, OR). Plans for 2005 tentatively include releasing a draft rating system, conducting a pilot, and subsequent revision of the draft, with marketing and implementation to follow in 2006.

Summary and Conclusions

LEED®-H and LEED®-ND represent significant and potentially monumental extensions of the USGBC's successful efforts to date to transform the building marketplace in North America and beyond. With the construction of homes and the neighborhoods in which they reside representing fully half of all building activity in North America and accounting for corresponding fractions of environmental impacts, the Council could ill afford to neglect these markets and does in fact have a Board mandate to tackle them, notwithstanding the Council's still-predominantly commercially-oriented membership base. While recognizing the need to continue to build constituency within the residential sector, the USGBC has nevertheless forged ahead with development of these programs concurrent with efforts to build the associated constituency.

Both the LEED®-H and LEED®-ND programs face appreciable challenges, for many of which precedents with the forerunner LEED® products provide little aid or insight due to the vastly different natures of their markets and affilated industries. Nevertheless, both programs are solidly backed, both by USGBC and allied organizations, and both benefit from the momentum USGBC has created with LEED®-NC and its sister products – Commercial Interiors, Existing Buildings, and those still under development.

LEED®-H and LEED®-ND have at their disposal dedicated, knowledgeable, and talented cadres of individuals and deeply-resourced organizations. These stakeholders will ensure the development of viable, rigorous, and effective labeling programs directed at motivating positive, measurable change in homebuilding and development practices. The aim of these programs is to concentrate the effect of decades of pioneering work into a set of highly

effective transformative tools. Within a few short years, both programs will bear fruit – certified buildings and developments – that will serve as example, inspiration, and spur – the apex of the wedge that will drive lasting change into the heart of the residential building industry.