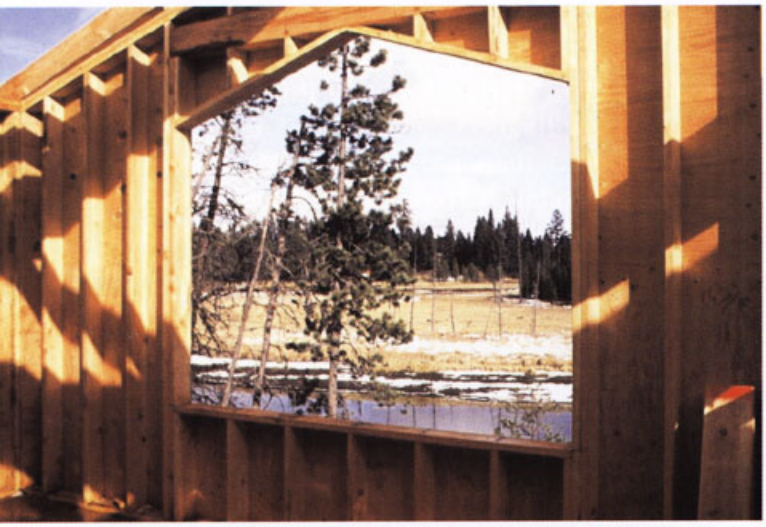

Green Building Programs—An Overview

by Peter Yost, Senior Research Associate, Building Science Corporation

In 1991, the City of Austin, Texas, rolled out the first green building program in the country, which went on to win a prestigious international environmental award at the Earth Summit in Rio de Janeiro in 1992. Since then, home-builder associations, municipalities, utilities and environmental organizations across the country have independently or in collaboration developed more than two dozen local green building programs (see Table 1). In addition, having developed a successful national program for the certification of commercial green buildings, the U.S. Green Building Council is now developing a similar program for residential buildings.

Something as fundamental as a standard definition of green building is still hard to come by, even ten years after the first green building program appeared (see the sidebar for the author's definition). Complicating the concept of green building is the fact that it is, by nature, a matter of both context and degree. The context of an urban area like Miami can lead to resource-efficient home design, construction and operation very different from the context of rural Idaho. Further, because the construction and operation of all residential structures necessarily have a significant environmental impact, there is a spectrum of resource efficiency to homes, rather than a discrete or absolute character of green building. These two points are important to keep in mind when investigating or comparing the various programs.

What have green building programs meant to local building officials? In most cases, unfortunately, not a whole lot. Most local green building programs have been developed and implemented with little or no role for the local building department. There are, however, a number of notable exceptions.

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Table 1: Green Building Programs in the United States

Program Name	Program Administrator	Date of Inception	Contact Information	Notes
Austin Green Building	City of Austin, TX	1991	*www.ci.austin.tx.us/greenbuilder*	The granddaddy—now with an excellent land development component.
Built Green	Home Builders Association (HBA) of Metro Denver, CO	1995	*www.builtgreen.org*	Well-established program for homes; working on a green communities program.
Innovative Building Review Program	County of Santa Barbara, CA	1995	(805) 568-2507	Gives expedited plan review to green residential and commercial projects.
Green Points	City of Boulder, CO	1996	*www.ci.boulder.co.us/environmental affairs/green_points/gp_overview.html*	Among the only mandatory programs for both new homes and remodeling.
Build a Better Kitsap	Kitsap County, WA HBA	1997	*www.kitsaphba.com*	Has a green remodeling component as well as a new home program.
Green Building	HBA of Central New Mexico	1997	*www.hbacnm.com/green_builder/ index.html*	Recently revamped to reflect leading work with Building America program.
Green Building	Maryland National Capital Building Industry Association	1998	(301) 445-5400	Not very active and not coordinated with strong state efforts.
Build a Better Clark	Clark County, WA HBA	1998	*www.cchba.com/green.asp*	One of the first residential programs with a component for land development.
Scottsdale's Green Building	City of Scottsdale, AZ	1998	*www.ci.scottsdale.az.us/green building*	New home program with significant participation from realtors.
Earth Craft House	Greater Atlanta, GA HBA	1999	*www.atlantahomebuilders.com*	Developed with Southface Institute and backed by local and state government agencies.
Green Built Home	Wisconsin Environmental Initiative	1999	*wwwwi-ei.org/GBH/index.htm*	Good example of HBAs teaming up with an environmental group.
Green Building	City of San José, CA	2000	*www.ci.san-jose.ca.us/esd/ gb-home.htm*	Program under development for homes and commercial buildings.
Built Green, Colorado	HBA of Colorado	2000	(303) 421-4889	The successful Denver program taken statewide.
Built Green	Master Builders Assoc. of King and Snohomish Counties, WA	2000	*www.builtgreen.net*	Developed with a special focus on issues related to salmon protection.
Earth Advantage Homes	Portland, OR General Electric	2001	*www.earthadvantage.com*	Long-standing utility program; interesting new partnership with state building industry association.
Vermont Built Green	Building for Social Responsibility	2001	(802) 658-6060, ext.1016	Newly developed; first in the Northeast.
The Heart of America Green Builder	Kansas City, MO Metropolitan Energy Center	2001	(816) 531-7283 *www.kcgreen.org*	Broad-ranging program under development; closely tied to LEED.
Program under development	Western North Carolina Green Building Council	n/a	(828) 251-5888 *www.main.nc.us/wncgbc*	Nonprofit effort with good initial support from local government.
Program under development	Southern Arizona Green Building Alliance	n/a	(520) 624-6628	Coalition of a nonprofit organization, HBA and the City of Tucson.
Program under development	Florida Green Building Coalition	n/a	*http://floridagreenbuilding.org*	Nonprofit with state-wide organization.
Program under development	Alameda County, CA	n/a	*www.stopwaste.org/fsbuild.html*	Program for both new homes and remodeling.
Program under development	City of Chula Vista, CA	n/a	(619) 409-5870	Has U.S. Environmental Protection Agency grant to develop program.
Program under development	HBAs of Hudson Valley and Schenectady, NY	n/a	(914) 562-002 (Hudson Valley) (518) 355-0055 (Schenectady)	Working with the National Association of Home Builders Research Center as a New York State Energy Research and Development Authority project.

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Defining Green Building

The heart of green building is resource efficiency in the design, construction and operation of homes. The soul of green building is systems integration in design and construction. Green building addresses four major areas: energy, materials, indoor environmental quality and site development.

Energy, of course, concerns performance, but its real environmental impacts are dependent upon the form of energy being used. Hence, a structure's source of energy is as much an element of green building as the efficient use of that energy. The energy embodied in building materials is generally included in the consideration of materials.

A life-cycle analysis of a building material or system reveals a unique environmental performance profile deriving from the resources used and pollution resulting from its production, use and end-of-life fate. Because such analyses are very complex, single environmental attributes such as recycled content, recyclability or durability often serve as proxies for environmental performance and, therefore, preference. It should also be noted that the consideration of materials usually includes water efficiency, even though this is the only "material" with which environmental impact and efficiency are limited to consumption during operation of the building.

Despite the fact that indoor environmental quality is not a resource efficiency issue but rather one of occupant well-being, it is almost always inculcated in the concept of green building due to the immutable connection that the health, safety and comfort of occupants have to energy efficiency and materials selection.

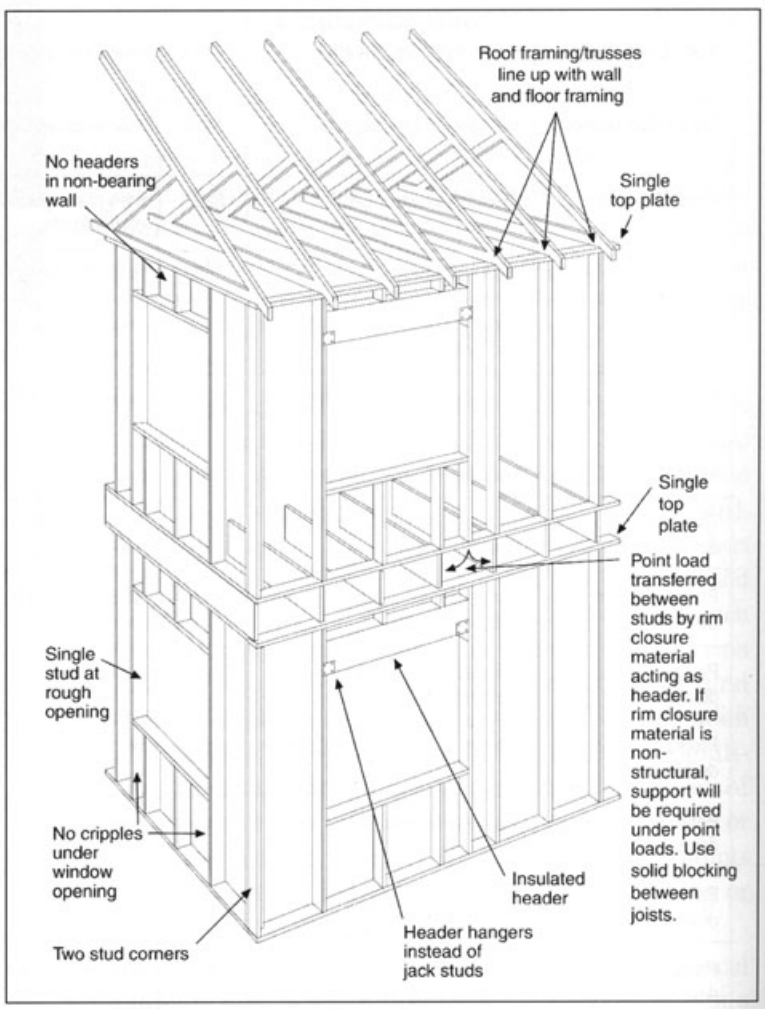
Finally, green building can—and, arguably, should—enfold the broader contexts of neighborhood, community and even regional development. These are often regarded separately, however, because the players and resultant issues surrounding land development are completely different from those involved at an individual building site. ◆

The City of Boulder, Colorado, Green Points Building Program

Boulder was the first municipality in the country to mandate green building features in part of all residential new construction and remodeling projects greater than 500 square feet. According to the Green Points website (*www.ci.boulder.co.us/environmentalaffairs/green_ points/overview.html*), the program "requires building permit applicants to earn 'points' by selecting optional measures in order to receive a building permit." For new home construction, the point totals required follow the voluntary Built Green™ Colorado program.

The Santa Barbara County, California, Innovative Building Design Review Committee

The first of its kind, this incentive program gives "fast track" permit approvals to projects judged to have superior environmental performance. A voluntary panel of local specialists in several environmental fields related to construction provide



Single top plate in advanced framing. Note the 24-inch on center two- stud outside corners and single top plate framing. Although less framing is more resource- and energy-efficient, building code provisions often discourage—if not preclude—this type of design.

Metal band shear bracing. Using bracing for shear resistance in walls instead of structural sheathing permits the installation of a continuous rigid foam insulation, which acts as a complete thermal break and drainage plane. Again, only builders employing Lake County's optional code can use this technique.

Airtight electrical box. Because Lake County's residential code requires electrical conduit, this energy efficiency measure cannot be used unless builders comply with the alternative code.

timely design review and award appropriate projects expedited approval. For more information, go to *www.silcom.com/~sbcplan/ibdrc.html*.

The City of Scottsdale, Arizona, Green Building Program

The Scottsdale program, which provides a package of incentives to participating builders, was spearheaded by the local building department and is led by its former head. Incentives include priority plan review (qualified projects receive building permits in one-half the usual time), promotional package and media coverage, certified independent green inspections, training and workshops, and homeowner manuals. Interested parties can visit the program's website at *www.ci.scottsdale.az.us/greenbuilding*.

USGBC and LEED

The U.S. Green Building Council (USGBC) was formed in 1993 as a building industry membership organization "to promote buildings that are environmentally responsible, profitable and healthy places to live and work." It is a committee-based organization with over 1,000 industry leaders, including product manufacturers, environmental organizations, architects, builders, building owners and financial institutions. Its membership is overwhelmingly from the commercial side of the building industry.

One of the primary ways in which the USGBC promotes green building is through its Leadership in Energy and Environmental Design (LEED™) programs. The initial program began operation in 2000 after a multi-year development and balloting period, and three other LEED programs are currently under development: LEED for Residential Buildings (LEED-R), LEED for Existing Buildings and LEED for Commercial Interiors. Each LEED program is developed by a volunteer group of industry experts, piloted with select projects and then balloted to the USGBC membership. As a consensus organization, each program and its criteria are the result of a consultation and discussion process.

At present, LEED-R is fairly early in its development, with draft criteria established and piloting envisioned for 2002, and poses two unique challenges for USGBC. First, being primarily a commercial building industry organization, the council will need to establish LEED-R's credibility within and relevance to the residential side of the industry. In addition, USGBC will need to establish the relationship, if any, between LEED-R and each of the many local residential green building programs across the country.

For more information about USGBC and its LEED programs, visit the council's website at *www.usgbc.org*. ◆

The City of Frisco, Texas, Green Building Program

In 2001, the City of Frisco became the first municipality to institute by city ordinance a mandatory green building program using the Environmental Protection Agency's Energy Star® program. The ordinance regulates energy efficiency, conservation of water, indoor air quality and recycling of waste for all residential buildings.

Frisco's program was developed as a quality measure to protect the housing stock of a rapidly developing community. The City Council felt that a program mandating high-performance housing was a good way of keeping real estate and community values high as the more or less uniform housing stock matures. For more information, direct your web browser to *http://mail.ci.frisco.tx.us/scripts/LFWebLink.exe/weblink/browser.html?doc=90.*

The Alameda County, California, Green Building Guidelines

The Alameda County Waste Management Authority has developed a set of green building guidelines for residential new construction and remodeling. Currently, the City of Pleasanton uses these guidelines as the basis for one of several conditions of approval which strongly encourage green building elements, and the city's Planning Department is in the process of moving to a more definitive residential green building city ordinance. To learn more about Alameda's efforts, go to *www.stopwaste.org/fsbuild.html.*

The Lake County, Illinois, Advanced Energy Efficient and Resource Efficient Single Family Residence Code

Section 326 of the Lake County, Illinois, building code is an "all-or-nothing" optional code that permits builders to use non-compliant building elements and systems if the builder complies with all elements of the jurisdiction's optional energy- and resource-efficient code.

The code was developed by Building Science Corporation in 1996 for use on a U.S. Department of Energy "Building America" project in Prairie Crossing, Illinois (go to the project web page at *www.buildingscience.com/buildingamerica/casestudies/prairie_crossing.htm* for more information). While some builders may find the all-or-nothing aspect of the code onerous, others—such as the Lake County Building Department—recognize the beauty of the total systems approach.

Conclusion

Lake County illustrates an almost universal issue with green building programs: the difficulty of overcoming the "buffet syndrome" associated with program checklists. Most programs provide a list of green features with associated points from which participants can choose. The problem is that when builders or home buyers approach resource efficiency as a pick-and-choose menu of discrete and isolated options, the heart of green building—systems engineering and integrated design—gets lost in the process.

An important example of this phenomenon is indoor air quality in energy-efficient homes. If fresh air ventilation, moisture, combustion safety, automobile exhaust in attached garages and materials selection are not all given due consideration when a home is "tightened" to increase energy performance, both the structure and the occupants can suffer. Fortunately, building science guidance programs like Building America (*www.eren.doe.gov/buildings/building_america/index.html*) are available to help building officials keep green building smart and sound.

Even if a building department does not seek as active a role as in the examples cited above, there are plenty of opportunities for local building officials in terms of builder education and support. The integrated design and systems-thinking approach required for the construction of high-performance homes can be fostered by building officials in their interactions with builders, and open-mindedness toward alternative technologies and building systems like properly designed and implemented unvented attics and crawlspace basements, greywater waste recycling systems, and rain catchment systems can increase the likelihood that residential construction projects will have a significantly lower environmental impact. ◆

Peter Yost *is a senior building research associate with Building Science Corporation (BSC). His building and building science experience includes seven years as a builder/remodeler in seacoast New Hampshire, seven years as a senior researcher at the National Association of Home Builders Research Center (including two as Director of Resource and Environmental Analysis), and a year and-a-half as Senior Editor of* Environmental Building News.

Yost carries this latest experience to BSC, working extensively on editing and writing technical resources for builders and building researchers. One of his primary responsibilities at BSC is defining and refining the relationship between building science and green building.

The views expressed here are those of the author and do not necessarily reflect the opinion or agreement of the International Conference of Building Officials