Trends in Beyond Code Programs - Among Jurisdictions, Builders and National Programs

By Michelle Britt, Britt/Makela Group, Inc, February, 2009
Based in part on research conducted for the Southwest Energy Efficiency Project, 2008[1].

Above code, beyond code, or green building – whatever we may call it, there are more options available than ever before. Builders are realizing the financial benefits of developing sustainable communities and energy efficient buildings. Local jurisdictions are raising the standards on development and construction with an eye towards energy efficiency, water conservation, and more walkable, bikeable and transit friendly communities. Groundbreaking new standards are being developed on a local and national levels.

In the 1970s and into the 1980's building energy efficiency was commonly viewed as a function of the building, its siting, orientation, shading, and the general neighborhood layout. Communities adopted solar access requirements, specifically allowed for solar water heating panels and clothes drying lines, and discussed the heat island effect of wide roads and hardscape. Communities designed walking and bike paths that connected the community. General plans were revised to accommodate new conservation goals, and zoning ordinances reflected the changes. With the advent of Title 24 in California and the national Model Energy Code (precursor to the current IECC) that many states adopted in the late 1980's, energy efficiency was codified in a new way, relegated to the building departments and the focus energy conservation was building energy efficiency. Today, that trend is reversing itself, and the growth in beyond code programs is substantial.

Jurisdictions

Municipalities are taking a range of approaches in developing beyond code programs. They include voluntary or incentive-based programs, mandatory programs, or a combination of the two. Britt/Makela Group recently conducted research for the Southwest Energy Efficiency Project in nine western states, evaluating the status of beyond code programs. Of the programs evaluated, roughly two-thirds of them had been adopted in 2008, or were in draft form and expected adoption in 2009. The programs are broad based, focusing on the entire development, or community. Of the programs evaluated, only one focuses solely on building energy efficiency – The City of Albuquerque Energy Conservation Code, and it was developed in tandem with their Green Path Program.

The programs vary, such as the Eagle County's mandatory Sustainable Community Index and ECOBuild program, to the voluntary, point-based programs implemented by Pima County. The programs are being adopted in a variety of climate zones, and demographics.

Program elements commonly include:

- Building size,
- Site selection,
- Landscaping,
- Water conservation,
- Energy conservation,
- Materials and resources,
- Indoor environmental quality,
- Operation, maintenance and owner education,
- Guidelines used (LEED, HERS, NAHB), and

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[1] Refer to http://swenergy.org/buildingefficiency/codes/beyondcode/index.html for a copy of *Going Beyond Code: A Guide to Creating Energy Efficient and Sustainable Buildings in the Southwest*, which includes much of the research.

- Type of Construction (residential, commercial, or both).

To address building energy efficiency, several of the programs include specific energy efficiency standards tied to a measurable level above the 2006 IECC such as Scottsdale, AZ – 15% above, Las Vegas Region – 15% above, the City of Boulder, CO – 30-65% above, Boulder County, CO – 15-90% above, Reno Region, NV – 15% above and Santa Fe, NM – 30-100% above. The other points based programs have energy efficiency measures that were developed independent of the IECC and do not benchmark a specific code or standard.

Example – Voluntary, Locally Developed, Pima County, AZ

Pima County's comprehensive, point based Regional Residential Green Building Rating System program is voluntary. Home size determines the number of points needed to achieve each level of certification. The program is designed to coordinate with ENERGY STAR, utility incentive programs, and EPAct Home program. A parallel commercial program is under development. Unique features of the Pima County program include the broad based, detailed, locally appropriate design elements, and the in-house integration and planning that has taken place.

Pima County provides HERS training for their department staff to ensure a better understanding of the standards of workmanship and inspections associated with HERS ratings. All aspects of plan review and inspection are addressed at the same time, whether they are code minimum or part of the Green Rating System. The county developed a Standard Operating Procedure for how staff handles a question or unusual technology which identifies for both staff and applicants what to expect when permitting and inspection process. Although their residential program is voluntary, they have fully integrated the permitting and inspections process. Additionally, they assign each project applicant an ombudsman, who serves as the key contact throughout the permitting and inspection process and assists the applicant as questions arise between departments and agencies.

Example – Voluntary, Support of LEED, City of Caldwell, ID,

Although beyond code building is not typical in Caldwell and the surrounding Canyon County, in 2007 the City of Caldwell adopted a resolution in 2007 that all future public buildings in the Downtown City Center Zone be LEED certified. This resolution further authorized a Request for Proposal (RFP) for a LEED certified Redevelopment Catalyst project. Not only are the municipal buildings going to be built to LEED, but the city is refunding fifty percent of the building permit fees to private developers that build to LEED in the revitalization zone and fast tracks their plan review.

The trend in this community is evidenced by Caldwell School District construction of two new schools built to LEED Silver. The first district in the state to build under the LEED for schools program, Superintendent Quarles was the recipient of this years Better Bricks award as the Owner/Decision Maker of 2008.

Another excellent example is Chandler, AZ. Chandler has evaluated all the municipal building programs and maintenance, revisited their general plan, and to the private sector offers reimbursement of LEED certification fees.

Example – Mandatory, Locally Developed, Eagle County Colorado's Sustainable Community Index and ECOBuild Checklist

Eagle County's comprehensive approach to sustainable development includes using their Sustainable Community Index (SCI) as a review tool for new development applications, followed up by the point based ECOBuild Checklist. The SCI promotes mixed use, transit-oriented, new urbanist, form-based, pedestrian- and environmentally-friendly, clustered, infill development, and is a required finding for new development proposals reviewed by the Board of County Commissioners. The ECOBuild Checklist is mandatory. Home size determines the number of points needed to achieve each level of certification. Plan review and inspection of program elements is fully integrated into the standard permitting and inspection process. Buildings exceeding minimum standards are eligible for rebates.

Example – Mandatory, Regional and National Standards, City of Rohnert Park's Mandatory Green Building Ordinance

Rohnert Park's new mandatory green program is unique in its mandatory third party verification for residential and commercial compliance. New single-family dwellings must comply with the regional third party verified, beyond code program GreenPoint Rated. Commercial projects must adhere to a certain level of LEED certification, depending upon size, and whether it is new construction or a tenant improvement.

Builders

Independent adoption of higher standards by builders is on the rise. Not mandated by code or ordinance, more builders are realizing the market demand for higher performing residential and commercial construction. In Idaho, state late to adopt building energy codes, and generally considered a little less progressive in terms of sustainability issues, there has been a dramatic increase in the number of ENERGY STAR builders. There are currently 158 registered ENERGY STAR Builders in Idaho, of which 60 were new in 2007-2008. We can see from the growth in registered builders the momentum within the building community to embrace beyond code programs. While residential builders are voluntarily building to ENERGY STAR standards, commercial builders are using nationwide beyond code energy efficiency programs such as New Building Institute's (NBI) Advanced Buildings Core Performance, or comprehensive programs such as LEED.

Data from the USGBC tracks LEED projects. Although it does not include beyond code buildings built to individual or customized specifications, it shows the magnitude of growth in beyond code commercial construction. Some states, such as Idaho are showing particular growth in LEED projects. Although to date there have only been five LEED for New Construction projects certified in Idaho, there are currently 38 projects registered. Table 1 shows a sampling of LEED registered and certified projects in western states.

Table 1. LEED Registered and Certified Projects[2]

State	*New Construction*		*Core and Shell*		*Commercial Interior*		*Existing Building*	
	Registered	***Certified***	***Registered***	***Certified***	***Registered***	***Certified***	***Registered***	***Certified***
Arizona	164	35	40	1	36	5	8	3
California	963	144	190	6	247	58	174	24
Colorado	203	33	11	7	53	13	32	13
Idaho	38	5	9	1	9	2	1	1
New Mexico	111	8	13	2	3	2	3	--
Nevada	71	10	18	--	8	--	21	1
Oregon	81	71	36	10	29	9	17	6
Utah	67	13	15	--	16	2	4	--
Washington	294	70	67	8	62	17	18	6
Wyoming	19	3	--	--	2	--	--	--
Region	**2011**	**392**	**399**	**35**	**465**	**108**	**278**	**54**

National Program Development

Programs are being developed nationwide that can be used by developers and builders, or adopted by jurisdictions. There are both new comprehensive programs, and building energy efficiency programs and standards, including: LEED, Core Performance Guide, ICC National Green Standard, ASHRAE Standard 189, and the ASHRAE Advanced Energy Design Guides (AEDG).

LEED

LEED[3] is a third-party certification program and the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED programs have been developed for:

- New Commercial Construction,

[2] LEED project directory. Retrieved September 10, 2008, from USGBC Web site: http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx

[3] (2008). LEED. Retrieved October 9, 2008, from USGBC Web site: http://www.usgbc.org/DisplayPage.aspx?CMSPageID=22

- Existing Buildings: Operations & Maintenance,
- Commercial Interiors,
- Core & Shell,
- Schools,
- Retail,
- Healthcare,
- Homes, and
- Neighborhood Development.

The level of residential building energy efficiency, when tied to LEED is typically a percent above the IECC, in commercial construction it is evaluated as a percent above ASHRAE 90.1-2004. This percentage above code is one way to earn Energy and Atmosphere (EA) credits on a LEED project. Several beyond code programs specify the number of EA points that must be acquired in LEED to assure it goes beyond minimum LEED certification.

Advanced Building Core Performance Guide

The New Buildings Institute's Advanced Building Core Performance Guide[4] now provides a guided path to achieving energy performance that is 20-30% above the performance called for in ASHRAE 90.1-2004. This only applies to commercial development. Developed by the New Buildings Institute, this fee-based program is available nationally. It is designed for commercial buildings 10,000 to 70,000 square feet.

National Green Building Standard (ICC 700-2008)

This cooperative effort between the International Codes Council (ICC) and the National Association of Homebuilders (NAHB), replaces NAHB's current green building guidelines. The Standard will be available this spring, and is currently being presold. It is described as:

> A first in this industry, this standard provides the "green" practices that can be incorporated into new homes, including high-rise multifamily buildings, home remodeling and additions, hotels and motels, and the site upon which the green homes are located.
>
> The green practices include lot design, preparation and development; resource, energy, and water efficiency; indoor environmental quality; and operation, maintenance, and building owner education. The four threshold levels, Bronze, Silver, Gold, and Emerald provide builders with a means to achieve basic, entry-level green building, or achieve the highest level of sustainable "green" building that incorporates energy savings of 65 percent or higher. The Standard can be used by any builder for their individual projects, or be the basis for a local community or state green building program. [5]

ASHRAE/USGBC/IESNA Standard 189.1

ASHRAE 189.1 is scheduled for release during the first quarter of 2009. The new standard will include requirements for:

- Site sustainability,
- Water use efficiency,
- Energy efficiency,
- Indoor environmental quality,
- Atmosphere, materials and resources, and
- Construction and operation plans.

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[4] New Buildings Institute. (2007). *Core Performance Guide*, White Salmon:

[5] (2008). National green building standard (ICC 700-2008). Retrieved October 27, 2008, from International Codes Conference Web site: http://www.iccsafe.org/e/prodshow.html?prodid=9551S08

It is designed as a standard for high performance with an energy target savings of 30% over ASHRAE 90.1-2007. ASHRAE 90.1-2007 includes all of the addenda from 90.1-2004 and is slightly more efficient than the 2004 Standard. The energy provisions of the Standard are prescriptive with several provisions superseding the requirements in 90.1-2007 to increase the level of stringency.

There is no limit on building area for this standard. ASHRAE 189.1 does contain many NAECA preempted requirements and other unenforceable requirements such as plug loads, so care must be taken if it is being contemplated as a mandatory requirement.

ASHRAE Advanced Energy Design Guides

The AEDG provide a prescriptive approach for the design of a building approximately 30% more efficient than a similar building designed and constructed to ASHRAE Standard 90.1-2004. The AEDGs have been developed for the following building types:

- Offices (≤ 20,000 ft^2),
- Retail (≤ 20,000 ft^2),
- Schools (limited floor area), and
- Warehouses (≤ 50,000 ft^2).

The AEDGs provide requirements for building envelope, mechanical and lighting systems that are more stringent than either ASHRAE 90.1-1999 (for which they are based on) or 90.1-2004. For the building envelope increased insulation levels are required in addition to taking advantage of daylighting by installing high performance vertical fenestration. Lighting systems are limited to a maximum watts/ft^2 with automatic controls and daylighting controls required when applicable. The mechanical requirements focus on high efficiency heating and cooling equipment and restrictions on fan motor size. The format of the AEDGs are similar to 90.1-2004 reducing the learning curve for using the documents. ASHRAE is currently working on AEDGs for the following occupancy types:

- Highway lodging,
- Healthcare facilities, and
- Existing buildings.

These are scheduled to be released in late 2008 and early 2009. Note that the AEDGs are not written in code-enforceable language, so care must be taken if the jurisdiction adopts this as a requirement.

Architecture 2030

Architecture 2030 is not a program or a standard; it does however reflect the trend in beyond code programs today and should be referenced. Architecture 2030[6] is a non-profit, non-partisan and independent organization established in response to the global-warming crisis by architect Edward Mazria in 2002. 2030's mission is to rapidly transform the US and global Building Sector from the major contributor of greenhouse gas emissions to a central part of the solution to the global-warming crisis.

To accomplish this, Architecture 2030 has issued **The 2030 Challenge** asking the global architecture and building community to adopt the following targets:

- All new buildings, developments and major renovations shall be designed to meet a fossil fuel green house gas (GHG)-emitting, energy consumption performance standard of 50% of the regional (or country) average for that building type.
- At a minimum, an equal amount of existing building area shall be renovated annually to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 50% of the regional (or country) average for that building type.

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[6] (2008). Global Warming, Climate Change, and the Built Environment. Retrieved October 25, 2008, from Architecture 2030 Web site: http://www.architecture2030.org/

The fossil fuel reduction standard for all new buildings in 2030 shall be Carbon-neutral (using no fossil fuel GHG emitting energy to operate). This target may be accomplished by implementing innovative sustainable design strategies, generating on-site renewable power and/or purchasing (20% maximum) renewable energy and/or certified renewable energy credits.

Supporters of Architecture 2030 include the following:

- US Conference of Mayors
- The American Institute of Architects (AIA)
- US Green Building Council (USGBC)
- State of New Mexico (Governor Bill Richardson)
- City of Santa Fe, NM
- County of Santa Fe, NM
- City of Albuquerque, NM
- Rocky Mountain Institute (RMI)
- International Council for Local Environmental Initiatives (ICLEI)
- Environmental Protection Agency (EPA/Target Finder)
- American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)
- AIA Committee on the Environment (AIA/COTE)
- American Solar Energy Society (ASES)
- American Society of Interior Designers (ASID)