

# Trends and Challenges in GREEN BUILDING

by Anthony Floyd

The act of building has significant effects on our regional and global environments. Resources are consumed, natural habitats are altered and the ecological systems are affected. This has been the case throughout human history, but as the world's population and patterns of consumption have increased, the impacts have become more critical. For example, according to the U.S. Energy Information Administration, buildings are responsible for 48 percent of annual greenhouse gas emissions and 76 percent of all electricity generated by U.S. power plants supplies the building sector.

Building and fire safety codes and standards establish the benchmarks for what government, industry and society deem acceptable for the public welfare. The building regulatory community has become increasingly responsive not just to the hard lessons learned from disasters but the benefits of accommodating—as appropriate—emerging building systems, new materials and innovative practices.

## Mapping the Trend

Perhaps the most dramatic changes in this area over the past several decades have occurred within the context of

growing energy demand and shrinking supplies. Energy efficiency codes and standards were first developed in response to the oil crisis of the 1970s and have since continued to evolve in scope and usability. Today, voluntary consumer-oriented programs such as ENERGY STAR (created by the U.S. Environmental Protection Agency in 1992) are often complemented by mandated energy efficiency codes at the municipal, county or state levels.

As with life safety code requirements, energy efficiency requirements set out minimum acceptable levels of performance. The important difference is that the adoption and enforcement of a code like the *International Energy Conservation Code* (IECC) has a cumulative benefit of not only reducing energy consumption within the given jurisdiction but also minimizing global impacts. This general characteristic holds true for all “green” or sustainable building practices, which may be defined as strategies that, in aggregate, reduce their environmental impact by accounting for the larger ramifications of material resources, energy, water and indoor environmental quality. Thus, whereas the benefits of code provisions addressing life safety issues can be immediate and tangible (particularly in the event of a potentially devastating disaster), green building provisions address public welfare issues that are usually broader in scope, such as global warming, total embodied energy, toxicity of materials and externalized costs to society (see Figure 1).

Recent changes to the I-Codes facilitating the use of insulated concrete form (ICF) wall systems, unvented conditioned attics, waterless urinals and graywater recycling systems illustrate how an increasing number of sustainable strategies are earning public and industry recognition. From consensus-based

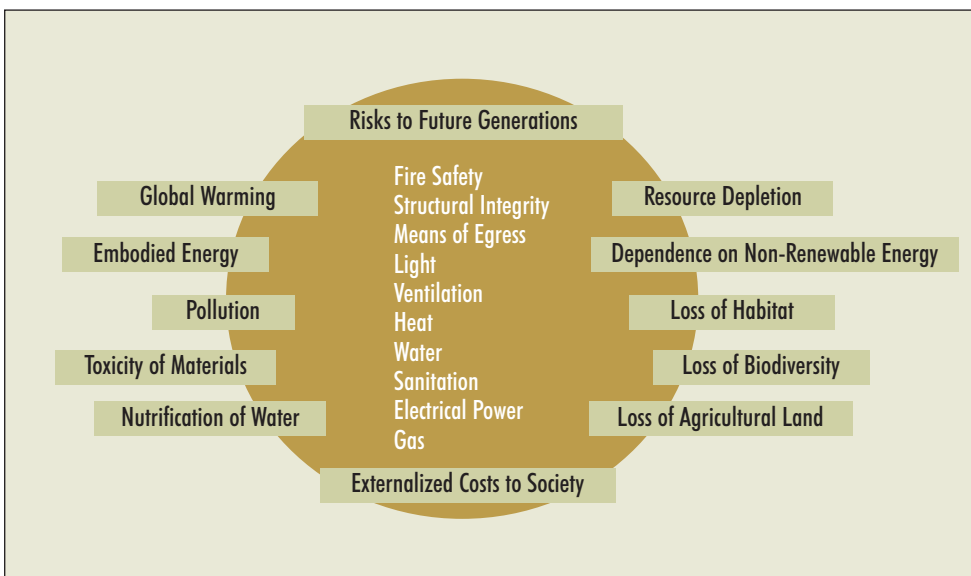


Figure 1. Building codes and the scope of sustainability. (Development Center for Appropriate Technology, 2005.)

standards such as American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)/U.S. Green Building Council (USGBC)/Illuminating Engineering Society of North America (IESNA) Proposed Standard 189, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, to national green building rating systems like USGBC's Leadership in Energy and Environmental Design (LEED) program to local green building programs around the country, a confluence of market and regulatory trends are bringing more and more green building measures into mainstream practice (see Table 1).

### Meeting the Challenges

With the exception of energy efficiency, the correlation of green building measures with model building codes and standards has been a significant challenge (see Figure 2). There have always been architects and builders seeking to use nonconforming "alternative" building materials, whether natural or manufactured. Compliance issues have typically been resolved through evaluation reports, local jurisdictional variances or engineering substantiation. The next critical step is a comprehensive correlation of green measures within the context of building codes.

Work towards that end is already well underway. The goal of the previously mentioned ASHRAE/USGBC/IESNA Proposed Standard 189 is to establish minimum performance measures for new commercial projects and major renovations, based on corresponding LEED criteria, through a consensus-based standard that can be adopted by reference in building codes. In another effort, the National Association of Home Builders (NAHB), ICC and the NAHB Research Center have initiated a process for the development of an American National Standards Institute (ANSI) standard for green home building construction practices. The goal is to have a green home building standard that can be adopted by local green home building programs or local building departments as a conformance guide.

Other national initiatives include the establishment of USGBC's Greening the Codes Committee, the primary goals of which are to identify obstacles to the integration of green building measures into the codes and help develop tools and resources to help the design and construction communities steer appropriate green building features through the building regulatory process. One valuable resource already available is a comparative matrix of the Green Globes and LEED 2.1 green building assessment systems prepared by the ICC Industry Advisory Committee Task Group on Green Buildings, which is available online

at [www.iccsafe.org/cs/cc/iac/iac2.html](http://www.iccsafe.org/cs/cc/iac/iac2.html) (March 2007 "IAC Task Group Report on Green Buildings").

In related news, the Code Council recently moved its headquarters to a LEED-certified building in Washington, D.C., and its Board of Directors has issued a policy on green building and sustainable communities that outlines

**Table 1. Green building market and regulatory trends.**

CATEGORIES	EXAMPLES
National and International Codes and Standards	<p><i>International Energy Conservation Code</i></p> <p>International Organization for Standardization, National Institute of Standards and Technology, and ASTM International sustainability standards</p> <p>ASHRAE/USGBC/IESNA Proposed Standard 189, <i>Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings</i></p> <p>NAHB/ICC/NAHB Research Center Development of <i>ANSI Standard for Green Home Building</i></p>
National and International Green Building Programs	<p>USGBC LEED rating systems</p> <p>Green Building Initiative Green Globes environmental assessment and rating tool for commercial construction</p> <p>NAHB <i>Model Green Home Building Guidelines</i></p>
Federal Laws, Policies and Programs	<p>Lead restrictions and asbestos abatement</p> <p>Ban on use of chromated copper arsenic treated wood in building construction</p> <p>Energy Policy and Conservation Act of 2005</p> <p>Energy Policy Act of 2005</p> <p>EPA Energy Star program, WaterSense program</p>
State Programs	<p>Renewable energy portfolio standards</p> <p>Energy efficiency and renewable energy incentives</p>
Utilities	<p>Energy efficiency and renewable energy incentives</p>
Local Governments	<p>Adoption of energy codes</p> <p>Recognition or adoption of above-code energy efficiency programs such as Energy Star</p> <p>Green building programs</p>
Green Labeling Programs	<p>FloorScore, Forest Stewardship Council, Green Label Plus, Green Seal, GreenGuard, Sustainable Forest Initiative, etc.</p>
Building Practices	<p>Energy efficiency (insulation, windows, radiant barriers, shading devices)</p> <p>Indoor environmental quality (daylighting, selection of materials with reduced off-gassing)</p> <p>Water efficiency (plumbing, irrigation)</p> <p>Material resource efficiency (recycled content, waste reduction)</p>
Regional Issues	<p>Heat island effect, scarce material resources, water, renewable energy, preservation, conservation, biodiversity</p>
General Public	<p>Better informed on energy, health and environmental issues</p>

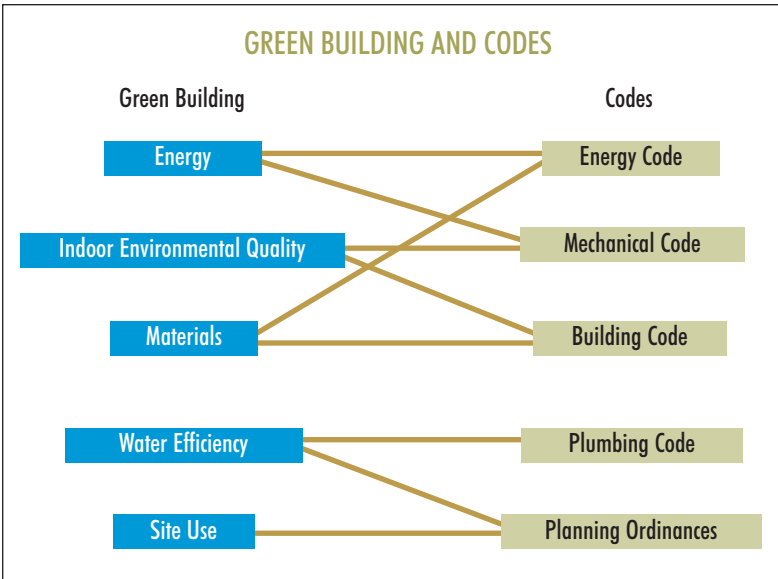


Figure 2. The scope of building codes is evolving to address service and performance issues with the least adverse impact on natural resources and environmental health.

For more green building news, go to <http://www.iccsafe.org/news/green/index.html>.

initiatives including educating its members on programs available for achieving environmentally responsible buildings and advocating for green building in the legislative, regulatory and code development arenas.

Efforts like these make it clear that the building regulatory community recognizes sustainability as a critical aspect of public welfare and is committed to playing a leadership role in building a safe and healthy future for the generations to follow. ♦

*Anthony Floyd is a registered architect and LEED accredited professional. In his current position as City of Scottsdale, Arizona, Green Building Program Manager, Floyd oversees the jurisdiction's green building certification process; outreach programs; energy code compliance; and the review of alternative materials, systems and methods of construction. He also serves as Administrator for the Sonoran LEED for Homes pilot program and as Co-Chair of USGBC's Greening the Codes Committee.*

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