

building safety journal

SUSTAINABILITY & GREEN BUILDING

Gaining New and Wider Views

Promoting Building Energy Efficiency

Preview of ICC 700-2008

National Green Building Standard

Greening Fire Suppression Systems



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POSITION FOR FSC LOGO

A Green Future by Steve Shapiro

Considering the theme of this issue of *Building Safety Journal*, I can't help but recall Kermit the Frog singing, "It's not easy being green." But today when it comes to the planet we all share, "green" is no longer the wave of the future but the wave of today, and everyone is getting involved. This is because it's not only more environmentally friendly but more environmentally responsible.

The Code Council has proven to have fully embraced the pursuit of progress in this area by demonstrating our clear commitment to sustainable building. Besides locating our new headquarters in the LEED-certified National Association of Realtors' building in Washington, D.C., we are fostering relationships with organizations like the U.S. Green Building Council and the Green Building Initiative, and developing an Inspector of Green Building Technologies certification exam. In addition, we have partnered with the National Association of Home Builders and are nearing completion of the ICC 700-2008 *National Green Building Standard*.

Considering these efforts led me to think about our individual responsibilities as building and fire safety code professionals. In my current capacity as Director of Codes Compliance for the City of Hampton, Virginia, I wondered what I could do to affect further progress in my jurisdiction. Hampton has only recently begun to deal with sustainable building, so my practical working knowledge on the subject is limited. However, from speaking with my colleagues around the country I've come to realize that the resistance to approving green systems or projects is often due to a lack of knowledge.

I realize that change is rarely easy or comfortable, but it is often beneficial—if not absolutely necessary—and it seems clear to me that the time

has come to bring appropriate, effective sustainable building practices into the mainstream. The first step is for all of us to become more informed about alternative materials and methods of construction and disseminate that information to our staff in order to better equip them when dealing with customers who approach them with green issues.



I encourage all of my fellow Code Council members to bone-up on everything green as it applies to our profession, and this issue of BSJ is a good start. Inside, you will find an informative article by Allan Bilka about the *National Green Building Standard*. In addition, Doug Seiter explains the relationship between building energy efficiency and greenhouse gas emissions. And once again, our old friend David Eisenberg shares his perspective on where we are on environmental issues and—more importantly—where we could be heading.

But don't stop there. Visit the ICC Green Building web page at www.iccsafe.org/news/green for the most up-to-date information on ICC's green endeavors. Believe me: the more you learn, the more you'll know that green building is here to stay. While some may still insist that it's not easy being green, within our industry it is definitely becoming easier.

Steve Shapiro

Going Green: Our Future Depends on It

by Richard P. Weiland, CEO

It is ironic that the greatest challenges in our nation's history are often first met by disagreement and indecision rather than by boldness and decisive action. Perhaps it is the gravity of the question—and the fundamental change required by the answer—that makes us hesitate, when in retrospect we can see with clarity what was necessary and right. Yet an equally enduring national characteristic is that, once unleashed, the American spirit can meet any challenge with firm, unshakable resolve. And so it is today with an issue that will define us all for generations to come: protecting and preserving the environment.

After years of debate, there is now virtual unanimity within the scientific community that global climate change is real. At the same time, “green” has slowly but indisputably entered the public's consciousness, so much so that most Americans no longer say we *should* act, but rather we *must* act. What role, then, should the Code Council play in a greening world? It is a question that will almost certainly determine the fate of our organization.

What do our members and the public expect of us? As the leading code development organization in the U.S., the Code Council occupies a unique position of trust and responsibility in our society. Communities across the country have come to rely on us because of the integrity of our code development process and the consensus products that have emerged. Our mission has now taken on a special urgency in this era of energy and environmental challenges, and our members and the public are looking to us to translate the need for safe and sustainable structures into sensible and enforceable codes.

What will make our citizens the safest? One of the most compelling arguments for the consolidation that resulted in creation of the International Code Council was that building and fire safety professionals—and the public they protect—would be best served by a single set of coordinated codes developed by the experts who use them. Yet across the country, jurisdictions are increasingly making up for the lack of comprehensive, enforceable green code provisions by creating their own. Given ICC's proven

record of success, no one is better qualified than our members to determine how building codes should be used to promote green and safe construction practices.

How will “green” affect the Code Council? The growing interest in green products and services offers both risk and reward. With the building industry responsible for 40 percent of annual energy use and 25 percent of landfill deposits in the United States, there will continue to be enormous public and regulatory pressure to lessen the impacts of the built environment. If we don't lead the way, someone else surely will. Not only will that limit our growth within the expanding green building marketplace, it will seriously undermine our standing and relevance within the entire industry.

One of the strategic goals set forth in the Code Council's “Blueprint to the Future” is to be recognized as an association of members who improve the quality of life in the community through their expertise and professionalism. It is clear that by doing what is right for our organization we can do what is good for our communities.

Make no mistake, the Code Council has taken strong, purposeful strides to implement a green building agenda. Ten years ago, ICC produced the International Energy Conservation Code—in a sense the first “green” code. In recent months, we have partnered with the National Association of Home Builders on the development of the new *National Green Building Standard* for residential construction. More ambitious initiatives lie ahead.

We know that this is not a time to be hesitant. To be a true leader in this movement we must do still more. Our future depends on it.



Richard P. Weiland

PROMOTING BUILDING *ENERGY* EFFICIENCY

by Doug Seiter, LEED AP

There is little room remaining for debate on the issue of global climate change: it is happening and we must deal with it. By most credible accounts, we have less than ten years to stabilize and begin a downward trend in carbon emissions in order to mitigate catastrophic consequences. Daunting, yes—but not impossible. Part of the solution lies in the construction of high-performance buildings. The increasingly popular concept of “green building,” a major component of global sustainability, evokes a broad range of features from the use of on-site or recycled-content materials to water-efficient landscaping, but there is no escaping the fact that a truly green building is at its core an energy-efficient building.

A 2007 report by the American Solar Energy Society, “Tackling Climate Change in the U.S.: Potential Carbon Emissions Reductions from Energy Efficiency and Renewable Energy by 2030,” includes a chart projecting reasonable reductions in carbon emissions through a combination of efficiency strategies—which include buildings and transportation—and renewable energy (Figure 1). This graphic dramatically illustrates how energy efficiency measures alone have the potential to keep our nation’s carbon emissions roughly constant over the next twenty-four years, with a combination of renewable energy strategies further driving emissions downward.

Vehicles are often thought to be at the top of the greenhouse gas emission list, but buildings actually have a far greater impact. While the majority of autos and light trucks could be turned over in about twelve years to more efficient models, buildings are typically in use—and consuming energy—



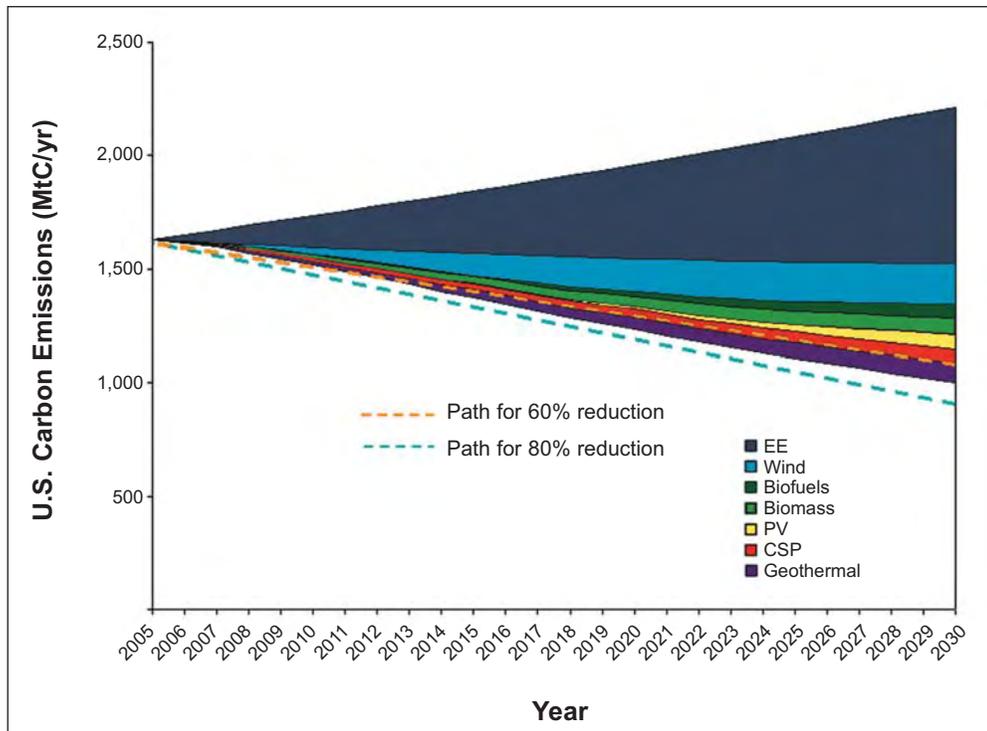


Figure 1. U.S. carbon displacement potentials by 2030 for energy efficiency, wind power, biofuels, biomass, photovoltaics, concentrating solar power and geothermal power.

for at least twice that and sometimes substantially longer. Current building energy sources are coal, oil and natural gas. While coal is available in relative abundance and the primary fuel for electricity generation in the U.S., “clean coal” technologies are still in development and decades from common use. In the meantime, because it is market-ready and relatively low-cost, energy efficiency is the most effective way of reducing emissions from the generation of electricity.

An energy-efficient building package involves good design, efficient materials and equipment, and technology—in that order. Good design includes paying attention to how the sun can help warm and illuminate the building through thoughtful placement of windows. Even with less than optimal building orientation, high performance windows, well-insulated walls, a tighter envelope and properly sealed ductwork interact to keep heat isolated. After consideration has been made to make an occupied space “inherently comfortable” (livable even if the utilities are down for a few days), the heating, cooling and ventilation systems can be sized to lower load requirements in order to run more efficiently. Finally, when the energy requirements of the building have been

reduced, adding technologies such as sophisticated controls and renewable energy systems begin to make more sense.

We know how to do this. The most adaptable solutions are neither new nor prohibitively costly: they involve sensible design, good material choices and approaching a building as a system. Also required is a commitment from builders to educate their staff and customers, and from building departments to affect the necessary cultural shift

acknowledging that building energy efficiency is a critical health and safety issue, particularly when considered in a global context.

Codifying Green

Lately, numerous jurisdictions have begun to consider adopting “green” building code provisions in response to the urgent global condition and the acceleration of energy challenges. This can be approached in several ways.

The least sensible approach is for jurisdictions to create their own provisions, which can lead to regional confusion at the very least. Another approach is to adapt a successful voluntary program like Built Green Colorado or Atlanta, Georgia’s, Southface Earthcraft House, or to codify aspects of the Leadership in Energy and Environmental Design (LEED) rating system, Green Globes rating system, or other market-based programs. Each of these approaches can stifle motivation for innovation and competition, and seldom yield the level of performance desired.

A third approach is to incorporate green building best practices through the model code development process. This brings all interested parties together on a regular

basis to evaluate the available options, including the consideration of larger-scale market and business realities. One final approach is to offer voluntary programs as compliance options. This allows market-driven programs to continue to operate independently, which can serve the goal of continuous improvement more effectively than regular development and adoption cycles. Several jurisdictions across the country have used this approach to ease the burden on code officials and, coincidentally, stimulate the growth of small businesses that offer quality control services to builders. The end result can be a healthier relationship between the building industry and government.

A New Normal

Anyone who thinks that the emphasis on building energy efficiency will diminish any time in the foreseeable future is certain to be disappointed. If anything, energy-efficient system design will take its rightful place as a fundamental element of quality construction, and the growing interest in building science and subsequent

blooming of an industry education infrastructure is already helping building departments large and small redefine their roles in the protection of public health, safety and welfare.

There is every reason to look forward to a rapidly approaching “new normal” when high-performance buildings are not the exception but the rule. Instituting energy efficiency as a core element will require a concerted and coordinated effort, but—as we have seen—is an absolutely crucial early step to achieving a long-term solution to global climate change. ♦

DOUG SEITER, LEED AP, co-developed the groundbreaking Austin, Texas, Green Builder Program and is the former State Coordinator for Built Green Colorado. He currently works with the U.S. Department of Energy Building Technologies Program in developing a variety of sustainable energy strategies for a nine-state region. Seiter can be reached via e-mail at dlseiter@comcast.net.



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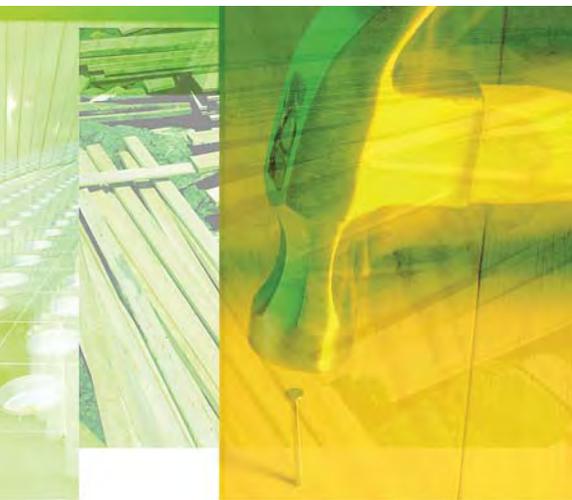
Gaining New and Wider Views

by David Eisenberg



Creating a new theory is not like destroying an old barn and erecting a skyscraper in its place. It is rather like climbing a mountain, gaining new and wider views, discovering unexpected connections between our starting point and its rich environment. But the point from which we started out still exists and can be seen, although it appears smaller and forms a tiny part of our broad view gained by the mastery of the obstacles on our adventurous way up.

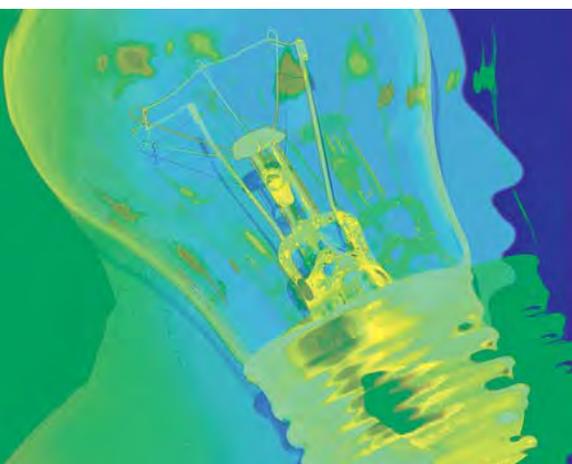
— Albert Einstein



This quotation accurately describes the essential process of learning: how the experience of working something through enhances and expands our view of reality. We have been required to do much learning lately. Those who have heard about net-zero energy buildings and programs like the Living Building Challenge—which is also working toward net-zero water balance and very high environmental performance—and think these goals are decades away from implementation might want to get out their hiking boots and compasses, because there is a high probability that these kinds of projects will begin sprouting up across the country in the next few years.

The rapid changes we are seeing are driven by emerging realities that are forcing increasing numbers of people in responsible public policy and business leadership positions to rethink what is required of them to fulfill their duties with regard to the health and welfare of their communities and businesses. As a result, the dialogue is shifting from whether issues associated with global climate change are real or serious and if and when we should respond to them, to finding the most effective and beneficial path forward.

Designers, builders and developers ahead of the mainstream have been pushing hard in this direction and have discovered that high



performance green projects with much smaller ecological footprints can be built at close to conventional costs, and in many cases with enhanced profitability. For example, the August 2007 “Energy Efficiency in Buildings: Business Realities and Opportunities” report from the World Business Council for Sustainable Development (WBCSD) reveals that many of those in real estate and construction significantly underestimate the benefits and overestimate the costs of green building.

The North American Cooperation for Green Building

We are now witnessing international cooperation in support of the shift to green building through agreements between various international organizations. “Green Building in North America: Opportunities and Challenges,” released in March 2008 by the Commission for Environmental Cooperation (CEC), recommends that North American leaders make green building a foundational driver for environmental, social and economic improvement in Canada, Mexico and the U.S. The report and background research papers can be downloaded from the CEC website at www.cec.org/greenbuilding.

The CEC was created under the North American Agreement on Environmental Cooperation to address regional environmental and trade concerns and promote the effective enforcement of environmental law as a complement to the environmental provisions of the North American Free Trade Agreement. The following is from the report’s Preamble, which was excerpted from the “Advisory Group Statement and Advice on Recommendations.”

We are standing on the threshold of the largest opportunity in human history to increase significantly the quality of life for all citizens of North America and the vitality of our social, economic and environmental systems.

North America is facing unprecedented challenges in areas such as climate change, concerns regarding the security of energy supplies and the depletion of water and natural resources.

These challenges are not insurmountable. Canada, Mexico and the United States have the resources, wealth and ingenuity to overcome these

challenges and create a sustainable, healthier and more productive North America.

Success, however, will require a fundamental shift in the way we think about our environment. At the heart of this thinking should be a plan to make green building a foundational driver for change in North America.

The WBCSD—whose corporate members include national and international industry leaders—is among the many groups supporting this report and is working to develop a plan to accomplish net-zero energy buildings by 2050.

Aggressive efforts have also been rolled out by Architecture 2030 in the form of its 2030 Challenge, which now has commitments from the American Institute of Architects, the International Council for Local Environmental Initiatives, the Royal Architectural Institute of Canada and the U.S. Council of Mayors. In addition, the American Society of Heating, Refrigerating and Air-Conditioning Engineers; the Illuminating Engineering Society of North America; and the U.S. Green Building Council, with support from the U.S. Department of Energy, have signed a memorandum of understanding to support the development of net-zero energy buildings with the goal of carbon-neutral buildings by the year 2030.

It is now time to begin the process of aligning our energy and building codes with these goals. Although there has been great concern and speculation raised about the economic impacts of addressing climate change, the “Fourth Assessment Report” (2007) of the Intergovernmental Panel on Climate Change (IPCC) states that buildings represent the greatest opportunity for substantial carbon dioxide emissions reductions. The IPCC report adds that 30 percent of projected global





reductions of greenhouse gas emissions by 2030 can result from the building sector with a net economic benefit while also improving indoor and outdoor air quality and enhancing energy security and social welfare.

On the Way Up

Many have been navigating through a great many obstacles on the way to gaining new and wider views. There is still a ways to go, but the initial points of concern now occupy a much smaller aspect of what we can see and the path forward needs to be based on the view from where we are now. That includes both what we have learned about how to design and build safely and well, and what we've learned and are continuing to learn about new risks that need to be addressed.

A part of the new focus on risk must be learning how to balance the specific, local and relatively short-term risks that have garnered so much attention in the codes with these larger, generalized, distributed, aggregated mid- to long-term risks we now recognize. These new risks are generated at virtually every step of the entire life cycle of our built projects, beginning with the acquisition of resources and extending all along their journey through transportation and processing, installation and use, repair and maintenance, and eventual disposition, as well as the flows of energy, water and air, and even wealth. Although we can look back with deserved pride on the tremendous accomplishments in building safety to date, we cannot become complacent with our accomplishments.

Among the biggest challenges will be the need to respond quickly to climate change and energy-, water- and resource-scarcity issues through major changes in building design and construction. Acceleration of the rates of change will increase certain kinds of risk. The

conversation that needs to begin in earnest is how to create an appropriately balanced, flexible and responsive regulatory system that doesn't impede crucial changes or compromise public health and safety. In order to accomplish this, we will need a much broader and more robust process for assessing risks relative to each other that doesn't shortchange future generations.

New regulatory structures must be created that facilitate projects seeking to address the full spectrum of risks we now recognize. Mechanisms that more easily allow demonstration and experimental projects through multiple iterations, with appropriate review and monitoring to provide real-time research results, are necessary. This will require a new regulatory role: one of real partnership so that when, inevitably, some things don't work exactly as expected the opportunity is there to take corrective action and try again.

There is no question that a fundamental shift in the way we currently approach things—both in theory and in practice—is needed. This will require that regulatory systems be sufficiently integrated and operate against a large enough background that we can comprehend the full range of risks taken and created in order to preclude others. To accomplish this, we need to keep working together to arrive at a point where we can see clearly and far enough ahead to safeguard each other and the natural systems we all depend on for our health, safety and welfare. ♦

DAVID EISENBERG is Director of the Development Center for Appropriate Technology (DCAT), which has been working on issues of sustainability and building codes for more than a decade. The Center was honored as 2007 ICC Affiliate of the Year and received the 2007 U.S. Green Building Council Leadership Award in the category of Organizational Excellence.

To learn more about DCAT, visit its website at www.dcat.net.

GREENING

FIRE SUPPRESSION SYSTEMS

by Brian Carnazza, P.E., LEED AP, and Edward Orazine, P.E.

To date, most environmental efforts within the fire suppression industry have involved specialized systems including foaming agents, carbon dioxide and clean agents, and national and local green building initiatives have largely overlooked available opportunities related to traditional fire suppression systems. Moving forward, we should begin to seek ways to reduce the environmental impacts of all fire suppression systems during design and testing.

Foaming Agents

Foam concentrates and expanded foams are generally safe with regard to exposure to humans but, unless specifically indicated, can impact the environment if allowed to flow freely into watershed areas.

The base properties of typical foaming agents include nitrates, phosphorous and organic carbon, which can act as fertilizer and promote unwanted plant growth in ponds and streams, and may also be toxic to animal life. Because dissipated foaming agents take time to biodegrade, sewage treatment facilities should be contacted prior to conducting discharge tests. Alternatively, renting a tanker truck to properly dispose of the discharge will ensure that the foam does not get into the water supply system. In any case, the manufacturer should be contacted for information on proper handling and discharge containment.

Newer systems that use less water and biodegradable foams are being developed and should be considered as well.

Clean Agents

The use of halons in fire suppression systems was phased out in the early 1990s to comply with the Montreal Protocol because they were determined to cause significant damage to the ozone layer. In addition, they have a long life in the atmosphere and a high global warming potential (GWP). Hydrofluorocarbons (HFCs)—which have zero ozone depletion potential—were provided as an alternative but their GWP, while a significant improvement over halons, is substantial enough to have raised some major concerns of late. According to the 2007 Intergovernmental Panel on Climate Change assessment



report, commonly manufactured HFCs have an atmospheric lifetime of approximately thirty years and a GWP of 3,200. This raises the possibility that HFCs may follow halons in being restricted or even banned in the future.

Inert agents such as argon may generally be considered to have a minimal environmental impact. Carbon dioxide (CO₂) is also available, but it is widely recognized as a global warming agent and there have been recent efforts by the U.S. Environmental Protection Agency to limit its use. Proponents argue that CO₂ is a natural by-product of other processes and reusing it as a fire suppressant is practical and efficient. Typical disadvantages to the use of inert agents are that their discharge reduces oxygen concentration—a potentially serious threat to occupant health and safety—and that systems employing them may take up significant floor area and require special construction such as pressure relief vents in enclosed spaces.

There are therefore two primary factors to consider with regard to clean agents: achieving a safe and effective fire suppression system without increasing a facility's carbon footprint, and minimizing lifetime costs by avoiding systems that may need extensive modifications or replacement to meet future regulatory requirements.

Automatic Sprinkler Systems

The most effective means of addressing environmental impact and sustainability is through design and construction, and automatic sprinkler systems are well-established in terms of both design and effectiveness.

An optimized sprinkler system design effectively uses the available water source, requires the minimal necessary number of components, and employs techniques and technologies that make it adaptable to future building modifications. Minimizing variations in piping can reduce construction waste and promote more efficient installation, and may eliminate the need for a fire pump and reduce water waste. Even though fire pumps only run intermittently, providing a more efficient engine will reduce their environmental impact in terms of both exhaust and noise. In addition, the proper design of the valve or pump room—including proper insulation and efficient heating systems to prevent freezing—can maximize the life of the system and ease future modifications.

Other items to review in the design of automatic sprinkler systems include proper connections for flow and flow testing. For example, fire pumps may be provided with recirculation loops and circulation relief valves to avoid over-pressurization or discharge relief back to a supply tank or greywater tank. Provided that the local authorities permit the use of water meters instead of discharging hose streams, this should save water during system tests and may allow the waste water to be reclaimed (the greywater tank designer and fire protection engineer should determine if the tank is large enough for this purpose and can accept the installation of a simple hose connection). Additionally, flexible connections and arm-overs can be used to provide a means for easily relocating sprinklers with minimal need for additional materials if the system designer incorporates appropriate flow restrictions due to friction losses.

Summary

Fire protection systems serve the purpose of life safety and should never be comprised. However, just like any other building system, they can be designed, sourced, installed and maintained in a manner that reduces their impacts on the environment. ♦

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Preview of ICC 700-2008 National Green Building Standard

by Allan Bilka, RA, ICC Senior Staff Architect
and Staff Liaison to the NGBS



Since the International Code Council (ICC) released its Green Building Policy Position Statement in late 2006, many steps have been taken by the organization on the green front. The Code Council's most ambitious green effort to date, however, may be its decision to join in the development of the ICC 700-2008 *National Green Building Standard* (NGBS), as requested by the National Association of Homebuilders (NAHB). ICC was one of sixty-four stakeholders in the NAHB process that led to the creation of the 2005 NAHB *Model Green Home Building Guidelines*, upon which the Working Draft of the NGBS was based.

The ANSI Standard Process

Pending approval, the NGBS will be a true American National Standards Institute (ANSI) standard—and the very first ANSI green building standard in the U.S. Its development follows strict due process in accordance with ANSI requirements, with the NAHB Resource Center acting as Secretariat. The ANSI Consensus Committee for the NGBS includes builders, building officials, members of the U.S. Green Building Council, members of the Green Building Initiative, a U.S. Department of Energy employee and an Environmental Protection Agency employee, as well as many other interested parties. The diverse mixture of interests and wide knowledge base of the Consensus Committee helps to ensure that the provisions of the standard address environmental concerns in ways that are affordable, enforceable and readily implemented into the real world.

ICC on the Green Front

Since the release of the Green Building Policy Position Statement in 2006, the Code Council has taken the following steps in establishing itself as a leader in the green building movement.

- ✓ Created the ICC Green Building web page.
- ✓ Released two green papers.
- ✓ Signed a memorandum of understanding with the U.S. Green Building Council to develop green building books and educational training targeted at building officials.
- ✓ Exhibited at various green building shows.
- ✓ Conducted a “Green Building Survey” of governmental members.
- ✓ Published numerous green articles in various Code Council publications.
- ✓ Added many state-of-the-art green-related titles to the ICC Bookstore.

For more information on these efforts, visit the ICC Green Building web page at www.iccsafe.org/news/green

Affordability, Enforceability and Ease of Implementation

Affordability, enforceability and ease of implementation are vital considerations if green building requirements are to truly accomplish their goal of limiting the negative effects of buildings on the environment. Affordability impacts green and sustainable buildings in that affordable green features are more likely to be maintained, which inherently makes buildings more sustainable. The involvement of manufacturers and builders in the process helps to keep a perspective on potential costs and ease of implementation in the real world.

Both initial and long term costs were considered in the development of the standard. In addition, the NGBS is written in enforceable language intended to coordinate with the requirements of the *International Codes*, which will allow local building departments to double as environmental stewards. This will potentially save on green building-related administration fees where the authority having jurisdiction chooses to administer the standard itself.

Why do We Need a Green Building Standard if We Already Have Codes?

One function of the I-Codes is to regulate the ways in which the environment affects buildings. The primary function of the NGBS, on the other hand, is to address how buildings affect the environment. The NGBS does this primarily by encouraging design choices based on potential

environmental impact. The detailed requirements for the implementation of these design choices are typically found in the codes. However, the codes generally tend to be silent regarding the consideration of environmental impact. Green Building requirements add another layer of criteria, environmental criteria, which must be considered in the building design and construction process. In that sense, Green Building requirements are similar to those of the *International Energy Conservation Code* (IECC) and ICC/ANSI A117.1, *Accessible and Usable Buildings and Facilities*. In fact, the IECC, as its title suggests, is a conservation code, and energy conservation is an important component of green, sustainable and high-performance building principles.

Also note that the first page of most of the I-Codes indicates that the code's purpose is to address not only public safety but public health and general welfare as well. The NGBS, again like the IECC, primarily addresses public welfare concerns. Others postulate that green building programs and standards address public safety because traditionally constructed buildings produce an environment which is less safe.

Scope, Intent and Applicability

The NGBS is intended to rate the environmental impact of low-rise, high-rise, mixed use, single-family and multifamily residential buildings. In addition to rating new green buildings, the standard will also rate renovations, additions and subdivisions, as well as potential “green” sites on

which these structures may be located.

The application to existing residential buildings is arguably the major distinguishing feature of the NGBS. Because existing structures make up 90 percent of housing, they represent a huge market segment with great opportunities to address the environmental impact of buildings. While existing buildings are not addressed by most current residential green building programs, renovations and additions are specifically addressed and rated by the NGBS.

The NGBS as a Rating Tool

The standard rates the environmental impact of buildings in accordance with principles related to land, water, material resource and energy conservation, as well as indoor and outdoor air quality. It also contains provisions which encourage the education of owners regarding the continued operation and maintenance of their green buildings.

In addition to setting minimum requirements for green buildings, the NGBS rates structures by awarding them Bronze, Silver, Gold or Emerald threshold level status. The rating system is intended to encourage the construction of higher performance buildings, as each threshold level is progressively more environmentally friendly. Setting minimum requirements alone typically does not encourage compliance which exceeds those minimum requirements. Due to the frequent promotion of buildings that perform to higher green thresh-

old levels by builders, owners, designers and communities—and the media coverage this often receives—a friendly and healthy race has ensued to attain bragging rights for the most environmentally responsible buildings.

The NGBS sets separate and specific threshold levels for land conservation, water conservation, material resource conservation, energy efficiency, and indoor and outdoor air quality. As a result, the NGBS is uncommon in that, to advance to a higher threshold level, the building must perform at a higher level in every one of these environmental categories.

This also allows adopting entities to pick and choose the minimum level of compliance they deem appropriate within their jurisdictions. For example, a jurisdiction wishing to promote higher minimum thresholds can amend adoption of the standard to require an overall minimum Silver rating rather than Bronze, and rest assured that environmental responsibility has been ramped up in each and every category. Similarly, a jurisdiction which adopts the standard with an overall minimum threshold level of Bronze might make an amendment to require a minimum Silver rating for energy or water if those are critical concerns within the jurisdiction.

Points in the standard are listed for each provision. These point values were assigned by the consensus committee based on many factors, including magnitude of environmental impact, affordability, environmental cost/benefit ratio, ease of implementation, ease of mainte-

nance, durability and the desire to encourage emerging innovative green technologies.

NGBS Points in the Energy Efficiency Category

To put the energy requirements in perspective, note that using software (in accordance with IECC Sections 404, 606.2 or 506.5) to show that energy performance was improved by 15, 30, 50 or 60 percent over baseline or minimum IECC requirements would result in awards of 30, 60, 100 or 120 points, respectively, in the energy categories. These are the exact minimum points required in the energy category for the Bronze, Silver, Gold and Emerald threshold levels. As mentioned earlier, to attain a Silver, Gold or Emerald classification, performance would have to be ramped up in all other environmental categories as well.

Who Will Administer the NGBS?

The standard allows administration by any Adopting Entity, which is defined as “The governmental jurisdiction, green building program, or any other third party compliance assurance body that adopts this Standard, and is responsible for implementation and administration of the practices herein.” Where jurisdictions have not adopted the standard, builders, designers and building owners may use an independent Adopting Entity to administer, rate and certify their green building projects in accordance with the requirements of the standard on a voluntary basis.

Choice vs. Mandatory Requirements

Many “mandatory” requirements are often functions of design choices. Realizing this, the Consensus Committee has chosen to simply require specific minimum points in each environmental category rather than mandating specific design choices. As point values for each provision are primarily based on environmental impact, environmental principles are not compromised and more choices become available to owners, designers and builders.

The decision whether the NGBS as a whole should be adopted and administered by a jurisdiction on a mandatory or voluntary basis is made at its own discretion. In some cases, jurisdictions may only mandate that certain structures, such as government buildings, be compliant. In other cases, compliance with the standard could be completely voluntary or become mandatory only when residential buildings exceed a specified area threshold.

The Real Environmental Benefits of the NGBS

The concept of sustainability requires that we live in ways which the environment can support now and in the future. It sets the goal that the current generation utilize natural resources in ways that ensure all future generations will have access to the same resources and quality of life. It is important that we conserve and recycle nonrenewable resources and refrain from using renewable resources at rates faster than they can be replenished. At this point, no current standard or program in existence or

development can claim that buildings constructed in accordance with its requirements are truly sustainable in this ideal sense.

Green building is simply building with a conscious effort to reduce the negative impacts of structures on the environment. Although the NGBS is poised to offer such a result, green building is a new concept that we have only recently begun to consider. The NGBS is a significant step in the right direction, but even if every future structure is built in accordance with this, or any of the current green building programs or standards available, it would not guarantee that buildings will have zero negative environmental impact. It would only mean that we are doing a better job than we have in the past. Obviously, an Emerald-certified building will have less environmental impact than one that is Bronze-certified. But we must constantly ask ourselves what is good enough and we must recognize that the green building movement is still in its infancy and requires much more scientific research in many areas of concern. And just as the environment itself and our environmental priorities will continue to evolve and require reassessment, the NGBS is intended to evolve and incorporate advances in green building science in each future edition. ♦

This article was based on Draft #2 of the NGBS. At press time, the NGBS was pending approval by ANSI and was expected to be available in May of 2008. For the most up-to-date information on the NGBS and all ongoing ICC green initiatives, visit the ICC Green Building web page at www.iccsafe.org/news/green.

ANSI Requirements

The development of the **National Green Building Standard** follows strict due process in accordance with the following ANSI requirements.

- The NGBS Consensus Committee consists of forty-two members, of which:
 - one-third were appointed by NAHB,
 - one-third were appointed by ICC and
 - one-third were appointed jointly.
- A two-thirds majority vote by the Consensus Committee is required for every provision in the standard.
- The NAHB Resource Center serves as the Secretariat for the standard.
- The ANSI process requires balanced input from:
 - producers/manufacturers,
 - users (builders, designers, owners); and
 - general interests (public comment periods allow input by any interested parties, including the general public).
- The standard is a living document which will continue to develop and evolve in response to new technologies, all in accordance with ANSI guidelines.

New DOE Builders Challenge

The U.S. Department of Energy (DOE) launched its Builders Challenge on February 14 of this year, calling for the construction of 220,000 high-performance, energy efficient homes by 2012. Thirty-eight homebuilders have already pledged to build 6,000 units under the voluntary program, and the DOE is now aiming for the construction of 1.3 million high-performance homes by 2030, which will save up to \$1.7 billion in energy costs while eliminating greenhouse gas emissions equal to those of 606,000 automobiles.

The DOE ranks homes participating in the Builders Challenge on the EnergySmart Home scale. New homes typically score 100 while zero-energy homes, which produce as much energy as they consume, score 0. Homes must score 70 or better to qualify for the Builders Challenge, making them 30 percent more efficient than the average new home. To learn more about the DOE Builders Challenge, go to <http://www1.eere.energy.gov/buildings/challenge>. ♦

Building Codes Assistance Project

The Building Codes Assistance Project (BCAP) has launched a new website—www.bcap-energy.org—to provide online access to information, resources and assistance on building energy code adoption and implementation.

A joint initiative of the Alliance to Save Energy, the American Council for an Energy-Efficient Economy and the Natural Resources Defense Council, BCAP was formed in 1994

to deliver code advocacy on behalf of the U.S. DOE Building Energy Code Program, serve as a clearinghouse on energy code information, develop resources to support code compliance, and provide energy code training and workshops. ♦

First Fuel Cell-Powered Supermarket Opens

The new 46,000-square-foot Whole Foods Market in Glastonbury, Connecticut, is the first supermarket to have a substantial amount of its power supplied on-site by a hydro-

gen fuel cell. The fuel cell technology employed generates 50 percent of the electricity and heat and nearly 100 percent of the hot water needed to operate the market, and is capable of providing 200 kilowatts of standby power in the event of grid failure.

Use of the fuel cell system has estimated carbon dioxide-mitigating benefits equal to planting more than twenty-one acres of forest and reductions in nitrogen oxide emissions equal to removing one hundred automobiles from the roadways per year.

Whole Foods Market, the world's

Green Campus Energy Efficiency Summit

Earlier this year, the 4th Annual Alliance to Save Energy's 2008 Green Campus Energy Efficiency Summit convened a diverse group of university students, faculty, staff and administrators for a valuable networking opportunity, presentations of best practices, structured campus planning sessions, and high-caliber speakers including climate action plan expert Peter Garforth and co-founder of WorldChanging and Fellow at the Institute for Ethics and Emerging Technologies Jamais Cascio.

The Alliance to Save Energy is a coalition of business, government, environmental and consumer leaders who promote the efficient and clean use of energy worldwide to benefit consumers, the environment, economy and national security. The event is part of its student-driven Green Campus Program, which features teams of interns that work on projects addressing energy

waste on campus. These projects include piloting energy efficiency technologies, dorm energy competitions and sponsorship of academic courses addressing energy and technical skill development. Primary goals are to demonstrate measurable energy savings; create lasting partnerships between students, faculty and staff; raise awareness about the relationship between energy and the environment; develop replicable energy education curriculum; and provide opportunities to train, mentor and encourage future energy efficiency professionals.

To learn more about the Green Campus Program, direct your web browser to www.ase.org/section/program/greencampus. ♦



largest retailer of natural and organic foods, has also eliminated plastic grocery bags in its stores; employs sustainable building methods; and uses compostable, all-natural fiber containers in its salad and food bars. ♦

Hydrogen Vehicle Demonstration Projects

A demonstration project in Aiken County, South Carolina is operating the first Hydrogen Internal Combustion Engine (H2ICE) truck registered

in the state as a development, demonstration and educational tool.

H2ICE technology employs a traditional internal combustion engine that is modified to run on hydrogen rather than gasoline. Compared with gasoline engines, H2ICE deliver up to a 99.7 percent reduction in greenhouse gases and include many of the benefits of hydrogen fuel cells at a fraction of their current cost. The technology is seen as an important interim step in the development of a national hydrogen fuel infrastructure.

“Aiken County is committed to supporting the development, demonstration and early deployment of technologies and products which use clean hydrogen as a replacement for increasingly expensive, foreign-based and polluting petroleum-based fuels,” says Aiken County Economic Development Partnership Director Fred E. Humes. “The project team will provide tangible and visible proof that the use of hydrogen as a replacement for gasoline is feasible, safe and reliable. It is important we start laying the groundwork today.”

Meanwhile in Michigan, two H2ICE buses are now being operated by the Wayne County Airport Authority for terminal-to-terminal shuttle use at Detroit Metropolitan Airport.

“This cooperative partnership will provide the Airport Authority with new technology to support our ongoing commitment to reducing airport emissions and to transport customers in a more sustainable manner,” says Wayne County Airport Authority CEO Lester Robinson.

Serving nearly 36 million passengers each year, the Detroit Metropolitan Airport is the largest in

Chances High for Big California Quakes

According to a multidisciplinary group of scientists and engineers, there is a more than a 99-percent chance that a magnitude 6.7 or greater earthquake will occur in California within the next thirty years and a 46-percent chance that a major quake of magnitude 7.5 or greater will strike—most likely in the southern half of the state.

The model used to produce “The Uniform California Earthquake Rupture Forecast” (UCERF) was developed by the Working Group on California Earthquake Probabilities and combines information from seismology, earthquake geology and geodesy (measuring precise locations on the Earth’s surface). Building on previous studies, the group updated and developed the first-ever statewide, comprehensive model of California. Sponsoring organizations includes the U.S. Geological Survey (USGS), the California Geological Survey and the Southern California Earthquake Center. The California Earthquake Prediction Evaluation Council, National Earthquake Prediction Evaluation Council and an independent scientific review panel have evaluated the study.

“This new, comprehensive forecast advances our understanding of earthquakes and pulls together existing research with new techniques and data,” says USGS geophysicist and lead scientist Ned Field. “Planners, decision-makers and California residents can use this information to improve public safety and mitigate damage before the next destructive earthquake occurs.”

The forecast—produced as part of ongoing National Earthquake Hazard Reduction Program efforts—is expected to be of particular value to those in the state involved with building and fire safety codes, emergency planning, and property insurance, and the USGS is incorporating the UCERF into its official estimate of California’s seismic hazard. Subsequent studies will add information about the vulnerability of man-made structures to estimate expected losses.

The full UCERF report is available online at <http://pubs.usgs.gov/of/2007/1437>. A four-page, print-ready summary can be downloaded from <http://pubs.usgs.gov/fs/2008/3027>. ♦



Michigan and among the twenty busiest air transportation hubs in the world. ♦

NECA Joins USGBC

The National Electrical Contractors Association (NECA) is among the latest industry organizations to become a member of the U.S. Green Building Council.

“Our vision is that NECA will be a resource to help our member contractors and their customers ‘go green’ at whatever level they want,” says NECA Executive Director for Marketing Rob Colgan. “Sustainable construction can be a part of any building project, and our goal is to help owners, developers and general contractors find the right balance in their electrical and communication systems.”

Colgan points out that consumers

are becoming more educated about alternatives to convention power generation like solar, wind and biomass. “Effectively using these alternative methods of power generation, however, takes specific skills and experience with a wide array of new products, and NECA contractors have a distinct advantage in this area,” he says. “Our training programs are the acknowledged leader in photovoltaic installation, and our annual trade show features the most significant gathering of alternative energy technologies specifically for electrical contractors.”

NECA’s national office and 120 local chapters seek to advance the industry through advocacy, education, research and standards development. For more information, visit www.necanet.org. ♦

California Leads Nation in ENERGY STAR Buildings

In 1992, the U.S. Environmental Protection Agency (EPA) introduced ENERGY STAR: a voluntary, market-based labeling program designed to reduce greenhouse gas emissions through energy efficiency. Through 1995 the label was expanded from computers and monitors to other office equipment products and residential heating and cooling equipment. Then in 1996 the EPA partnered with the U.S. DOE to offer ENERGY STAR evaluation for particular product categories including, most recently, new homes and commercial and industrial buildings.

According to the EPA, energy use in commercial buildings and manufacturing plants accounts for nearly half of the total U.S. greenhouse gas

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emissions and nearly 50 percent of energy consumption nationwide. To qualify for the ENERGY STAR label, a commercial building or manufacturing plant must score in the top 25 percent using the EPA's National Energy Performance Rating System. The EPA reports that commercial buildings that have earned the ENERGY STAR label use nearly 40 percent less energy than average buildings and emit 35 percent less carbon dioxide into the atmosphere. Over 4,000 office buildings, schools, hospitals and public buildings have earned the ENERGY STAR label for superior energy and environmental performance, including 1,400 in 2007 alone.

California is home to 917 ENERGY STAR-qualified buildings, representing approximately 177 million square feet of space and saving an estimated \$199 billion annually in lower energy

bills while meeting industry standards for comfort and indoor air quality. These buildings also eliminate a potential 1.6 billion pounds of greenhouse gas emissions, equivalent to the emissions of more than 135,000 vehicles.

To learn more about ENERGY STAR, visit www.energystar.gov. ♦

Electronic Spa Controls Recalled

The CPSC has announced the recall of approximately 1,670 electronic spa controls manufactured by Gecko Alliance of Quebec, Canada, installed in Serenity Spa Hot Tubs. The controls can overheat, posing a fire hazard.

The recall involves Hydropool Serenity Series Spa hot tubs with serial numbers 01350XXXX through

03210XXXX. The serial numbers are printed on the right side of the spa control. The Gecko spa control (SSPA-1) has model number 0202-205097 printed on it. Serenity brand hot tubs containing the recalled controls were sold exclusively by Hydropool dealers throughout the Northeastern U.S. from January 2002 through December 2004 for \$3,900 to \$8,200.

The CPSC is recommending that consumers immediately stop using the hot tubs, reduce the water temperature control to the minimum setting, and contact Gecko Alliance's Back-Pak support center at 1-800-784-3256 or go to www.back-pak.com to request a free retrofit enclosure kit.

For photos of the recalled product, go to www.cpsc.gov/cpscpub/prerel/prhtml08/08235.html. ♦



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