BUILDING ENERGY CODES PROGRAM

Setting the Standard

U.S. Department of Energy • Office of Energy Efficiency and Renewable Energy

July 2008

Attention code officials, architects, engineers, builders, and state energy representatives

Don't miss Energy Codes 2008!

Register at www.energycodes.gov for this annual, national event, offering an opportunity for hands-on training and face-to-face networking with other members of the energy codes community. Registration is $300; pre- and post-training events are no cost.

Benefit

Meet state energy office representatives and members of the building industry and receive consistent technical training on building energy codes and standards.

No Cost Pre- and Post-Training

Sessions before and after **Energy Codes 2008**, offered at no cost, will provide training on how to use the U.S. Department of Energy's (DOE) free software, COM*check*™ and RES*check*™, which are designed to make commercial and residential energy code compliance quick and easy.

No-cost sessions at **Energy Codes 2008** also cater to the local energy codes community, including training specific to Minnesota's residential and commercial energy codes.

Building Tours

Energy Codes 2008 attendees are invited to join building tours to see, first-hand, buildings with sustainable and forward-looking energy efficient features. **Energy Codes 2008** building tours will include the Minneapolis Central Library, The Winnipeg, District Energy St. Paul, Wellstone Apartments, and Ripley Gardens.

Jeffrey A. Johnson Award for Excellence

At **Energy Codes 2008**, DOE will announce the winner of the Jeffrey A. Johnson Award for Excellence in the Advancement of Building Energy Codes and Performance.

Energy Codes 2008

Register Now!

July 22-25, 2008

St. Paul, Minnesota at the Crowne Plaza St. Paul-Riverfront

Key Speakers

Energy Codes 2008 will feature presentations by representatives from a number of energy codes-related institutions who will address a variety of topics, including DOE's efforts to make codes and standards 30% more stringent, designing and building with energy efficiency in mind, the challenges of code enforcement, and state-specific issues. Don't miss this opportunity to learn from commercial and residential energy code experts.

Energy Codes 2008 Key Speakers

- **Lynn Bellenger,** American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- **Rick Carter,** LHB Architects
- **Dave Conover,** International Code Council®
- **Dru Crawley,** DOE
- **Craig Drumheller,** National Association of Home Builders Research Center
- **Bill Fay,** Alliance to Save Energy
- **Kevin Gobble,** Habitat for Humanity
- **John Hogan,** City of Seattle
- **Marti Kooistra,** Habitat for Humanity
- **Karen Linner,** Builders Association of Minnesota
- **Ron Majette,** DOE
- **Brad Oberg,** Integrated Building and Construction Solutions
- **Eric Richman,** ASHRAE SSPC 90.1 Lighting Subcommittee Chair, Pacific Northwest National Laboratory (PNNL)
- **Mick Schwedler,** ASHRAE SSPC 90.1 Full Committee Chair, Trane
- **Todd Taylor,** PNNL
- **Rachel Wagner,** Wagner Zaun Architecture
- **Thom Zaremba,** Roetzel & Andress

Raising the Standard of Energy Efficiency

The following article is an update to the lighting progress reported in the March issue of *Setting the Standard* in BECP's series about the U.S. Department of Energy's partnership with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the Illuminating Engineering Society of North America (IESNA) to increase the efficiency of ANSI/ASHRAE/IESNA[1] Standard 90.1-2010 by 30% relative to Standard 90.1-2004. The previous article of the series focused on work being done to support the development of proposed changes to the lighting chapter of the next version of the Standard. In this continuation, detail is provided about recent progress supported by the Building Energy Codes Program's work with the ANSI/ASHRAE/IESNA 90.1 Lighting Subcommittee.

The nature of the lighting requirements in the Standard allow for specific component proposals that can often be implemented quicker than proposed changes in the envelope and mechanical sections. Since the March newsletter, several proposed lighting changes have been approved for inclusion in the 2010 version of the Standard. Others are in the public review process, and still others have been added to the list of concepts under development.

Approved Addenda

Addendum "i" – Exterior lighting power limits by exterior zone. This change adds exterior lighting zones to the exterior lighting requirements table based on the Model Lighting Ordinance work being done by IESNA. This modification will change the requirements depending on the type of exterior area or zone the building is in, such as high-activity commercial districts and rural areas.

Addendum "al" requires that skylights be designed into the roofs of larger spaces where daylighting capability exists and the use of electric lighting controls would be an effective energy efficiency measure.

Addendum "aa" – Manual-on requirement for automatic lighting controls. This change requires that automatic controls, such as occupancy sensors, be manual-on instead of automatic-on to eliminate unnecessary energy use caused by false-on and short-term room entrance.

Addendum "ac" – Advanced lighting control incentives. This addition to the Standard provides limited control application incentives when advanced lighting control strategies are applied. The incentives are provided as additional power density allowances equal to a low percentage of the expected energy savings from application of the control.

Addendum "aw" – Hotel bathroom lighting exemption. This allows bathroom lighting to be excluded from the hotel room main entry control requirement provided that the bathroom lighting has an occupancy control (with allowed nightlight capability).

Public review of ASHRAE proposals is encouraged. Visit www.ashrae.org/technology/page/331 to comment on proposals and to sign up for notifications of public review comment opportunities.

Addenda in Public Review

Addendum "x" – Additional occupancy sensor controls. This change expands the current requirement for the use of occupancy sensor lighting controls to additional space types including: storage and supply rooms up to 1000 square feet, rooms used for document copying and printing, office spaces up to 250 square feet, restrooms, dressing rooms, locker rooms, fitting rooms, training rooms, and lecture halls.

Addendum "ab" – Required electric lighting controls for daylighting. This proposal places the requirement for electric lighting controls in larger spaces where sufficient skylights (including rooftop monitors) and sidelighting (windows) are in place to provide effective daylighting.

Addendum "al" – Requirement for the design of skylights in building spaces with daylighting capability. This proposal requires that skylights be designed into the roofs of larger spaces where daylighting capability exists and the use of electric lighting controls would be an effective energy efficiency measure.

[1] The American National Standards Institute/ASHRAE/IESNA.

Challenging the Status Code

Everyone's been doing it. Except the International Energy Conservation Code® (IECC), that is. Research and demonstration programs such as the U.S. Department of Energy's (DOE) Building America and the Environmental Protection Agency's ENERGY STAR have settled the question of whether highly efficient residences can be cost effective and practical. But the IECC's home efficiency requirements have advanced only modestly since its predecessor, the 1992 Model Energy Code, hit the streets a decade and a half ago.

DOE is trying to change this. Building on the experiences of research and demonstration programs, and joining forces with similar efforts by private-sector groups such as the Energy Efficient Codes Coalition, DOE is pursuing an aggressive goal, to be accomplished by 2012, of reducing the energy consumption of IECC-compliant homes by 30% compared to the 2006 IECC. This article is the first in a new series of *Setting the Standard* articles to discuss DOE's work to this end.

Can it be done?

DOE is confident that it can. Achieving 30% more energy efficiency in the IECC will require incremental improvements in regulated building components, such as ceilings, walls, floors, and windows, and some loopholes must be closed. For example, although the 2006 IECC requires ducts to be "substantially airtight," it gives no measureable metric by which that requirement can be enforced. Adding this metric and a testing requirement to generate it for each home can save enormous amounts of energy often pumped directly into attics, garages, and crawlspaces.

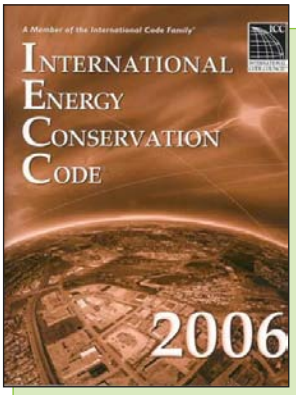
Scope expansions are also in order. For example, the IECC has never regulated lighting in residential living spaces, but mandating high-efficiency bulbs and/or fixtures has great potential for saving energy. In addition, HVAC efficiency can be addressed in part by the IECC in terms that don't interfere with legislative mandates that regulate HVAC efficiency at the manufacturing level.

DOE and others have a number of active code change proposals before the International Code Council® that attempt to address many of these issues.

Mandating high-efficiency bulbs and/or fixtures for certain applications has great potential for saving energy.

Is it affordable?

One lesson learned from research and demonstration programs is that cost effectiveness can only be evaluated on a whole-building, systems-analysis basis. Improvements in individual house components that may appear to be bad investments on their own can result in a home with lower overall life-cycle costs when combined with enough other improvements. For example, with enough added efficiency, HVAC equipment can be smaller, ducts can be smaller and shorter, and some materials can be eliminated, resulting in cost reductions that more than make up for component improvements. Because the IECC allows flexibility of design via several compliance methods, DOE is confident that a 30% improved code will make for very attractive investments to homebuyers facing some of the most daunting energy cost increases in recent history.



ICC Hearings Results

Many impactful proposals were approved at the International Code Council® (ICC) hearings in Palm Springs, California, February 2008. The changes to the code for residential buildings were particularly significant. These changes, if upheld at the second and final hearing in September 2008, will represent approximately a 15 to 20% improvement over the 2006 International Energy Conservation Code® (IECC). Included is a U.S. Department of Energy proposal to mandate pressure testing of ducts that may represent the largest single efficiency improvement in the history of the residential IECC.

There was also a number of approved proposals to the commercial building category of the IECC, including proposals to require code users to use either ANSI/ASHRAE/IESNA Standard 90.1 or the IECC in its entirety, require cool roofs in climate zones 1-3, and provide high-efficiency lighting in high-rise residential spaces.

For more information about the hearing results, see the ICC's full report: www.iccsafe.org/cs/codes/2007-08cycle/Proposed Changes/Committee-Action0308.pdf. Public comments on the hearing results were due June 9, 2008. Final action hearings will be held September 17-23, 2008, in Minneapolis, Minnesota.

Jeffrey A. Johnson

Call for Nominations

Nominations are open through July 7, 2008 for the Jeffrey A. Johnson Award for Excellence in the Advancement of Building Energy Codes and Performance. This Department of Energy award, given in memory of energy codes leader Jeffrey A. Johnson, recognizes an individual or team in the United States (U.S. Territories included) for sustained service of the highest caliber in the pursuit of energy efficiency goals. Go to www.energycodes.gov to nominate a member of the energy codes community who exemplifies Jeff's enthusiasm; his motivation and drive for innovation; and his can-do, no-fear attitude for making a difference.

The winner of this award will be honored at the Energy Codes 2008 event in St. Paul, Minnesota the week of July 22, 2008.

How to Apply for State Technical Assistance

The U.S. Department of Energy (DOE) provides specialized technical assistance to states upon request, including economic analysis, code comparisons, webcast training, and compliance material development. This assistance is to help states adopt, upgrade, implement, and enforce building energy codes that will achieve energy efficiency in buildings 30% beyond ANSI/ASHRAE/IESNA Standard 90.1-2004 or the 2006 International Energy Conservation Code®, or achieve a meaningful increment toward that goal.

To request assistance, states must submit requests through their DOE Project Management Center (PMC). Requests must be in writing (email or formal letter) and include:

- Detailed explanation of what is being requested
- Date by which the request must be completed
- Contact information for the person who can answer technical questions regarding the request.

State requests will be coordinated with the submitter of the request, DOE Headquarters, PMC staff, and Building Energy Codes Program staff. Requests, activity, and progress will be monitored continuously.

Visit www.energycodes.gov/implement/state_tech_assist.stm to see sample summaries of states that have received technical assistance and to read past state technical assistance reports.

DOE Project Management Center contacts per state.

Area	PMC Contact	Phone	E-mail
Cold 1	Paul J. King	(412) 386-4724	Paul.J.King@netl.doe.gov
Cold 2	Gary Sames	(412) 386-5067	Gary.Sames@netl.doe.gov
Cold 3	Doug Seiter	(303) 275-4810	Doug.Seiter@go.doe.gov
Mixed-Humid	Amy Tomer	(304) 285-4670	Amy.Tomer@netl.doe.gov
Hot-Humid	Brett Aristegui	(412) 386-4641	Brett.Aristegui@netl.doe.gov
Hot-Dry/ Marine	Tim Eastling	(412) 386-4770	Timothy.Eastling@netl.doe.gov

Ask an Expert

Every month, the Building Energy Codes Program's (BECP) Technical Support team responds to hundreds of code-compliance inquiries from builders, architects, engineers, and code officials from around the country. Every issue of *Setting the Standard* offers frequently asked questions from the codes community and answers from BECP's codes experts.

Multi-tenant commercial space.

Q: The following question from Columbia, South Carolina relates to the 2006 International Energy Conservation Code® (IECC), article 505.2.2.2 in regard to automatic shutoff requirements in multi-tenant retail buildings, such as commercial retail strip malls. Many of our recent projects have included upfits of commercial retail space in multi-tenant retail buildings, usually existing, and usually built before the introduction of the 2003 IECC and other energy codes. While the buildings are usually overall over the 5000-square-foot rule requiring automatic shutoff, we continuously run into an issue where a tenant will lease a space in these buildings that is much smaller, usually around 1000 or 2000 square feet.

We have run into the issue of designing costly lighting control systems for areas that really do not make much sense to have them, from small walk-in delis to small retail stores. The way we interpret this is even though the tenant is leasing minimal square footage, their leased area must be designed with the idea that the entire building is over 5000 square feet and therefore must meet 505.2.2.2. We have had several contractors and clients question this and the cost efficiency of such a system in such a small leased area and would like any type of clarification. The question is do we consider the space that we are designing, which the tenant has leased, or do we consider the overall square footage of the entire property?

Email questions about residential and commercial energy codes to BECP Technical Support at techsupport@becp.pnl.gov, or submit an inquiry at www.energycodes.gov/support/helpdesk.php.

A: Though asked specifically from Columbia, South Carolina, BECP's answer applies generally to IECC article 505.2.2.2. In general, if the electrical system is designed as a single-building system with control generally maintained by the building owner/manager, then the automatic shutoff requirements must be met if the building is over 5000 square feet. If the building is designed/constructed to provide generally independent electrical services and control of their own lighting for the individual semi-permanent tenants in under 5000 square feet of space, then it is considered impractical to apply automatic shutoff. In these specific cases, the requirement is not applicable; however, the final application of the requirements rests with the local building official.

Insulating concrete forms.

Q: We are going to build a walkout rambler house and are trying to compare the total efficiency of insulating concrete forms (ICF) to a traditional stick-built home with BIBS® system or other insulating means. We are planning on going to the rafters with ICF, but want to make sure this is the best alternative as opposed to any other financially feasible method. Do you have studies that show the R-value of different methods and studies that show the total combined R-value after calculating air infiltration, etc?

A: ICFs have a good reputation for energy efficiency. There is no such thing as a combined R-value that includes air infiltration. These are always considered separately, and both are important. To our knowledge there have not been many good studies of ICF against the standard wood-frame wall, but we direct your attention to this one: www.pathnet.org/sp.asp?id=1005.

ICF walls can have reduced infiltration, or air leakage, compared to stick-frame walls. For general information on the energy efficiency of ICF walls, see: www.homeenergy.org/archive/hem.dis.anl.gov/eehem/98/980712.html.

The thermal mass of the ICF provides a limited benefit, storing heat in the daytime to release at night, though the foam insulation on the inside of the concrete somewhat blocks this from the inside of the house. For more information, see: www.ornl.gov/sci/roofs+walls/research/detailed_papers/thermal/index.html.

All ***Ask an Expert*** answers reflect the *opinions* of BECP staff. BECP **does not provide** formal code interpretations. For formal code interpretations, contact your code official or submit an inquiry to the American Society for Heating, Refrigerating and Air-Conditioning Engineers or to the International Code Council.

Training Events

Energy Codes 2008

Register for **Energy Codes 2008** at www.energycodes.gov. Don't miss this opportunity for hands-on training and face-to-face networking with members of the energy codes community July 22-25, 2008, in St. Paul, Minnesota at the Crowne Plaza St. Paul-Riverfront.

Stay Tuned

The Building Energy Codes Program (BECP) will host a three-part webcast series about the American Society for Heating, Refrigerating and Air-Conditioning Engineers' (ASHRAE) Advanced Energy Design Guides in late summer and early fall. These guides, developed in collaboration with partner organizations, including the U.S. Department of Energy, are companion above-code documents for ANSI/ASHRAE/IESNA Standard 90.1-1999. They demonstrate how buildings may be built to be 30% more energy efficient than the Standard.

- **July 31** – ***Overview of the Lighting Recommendations***
- **August 14** – ***Overview of the Mechanical Recommendations***
- **September 11** – ***Overview of the Envelope Recommendations***

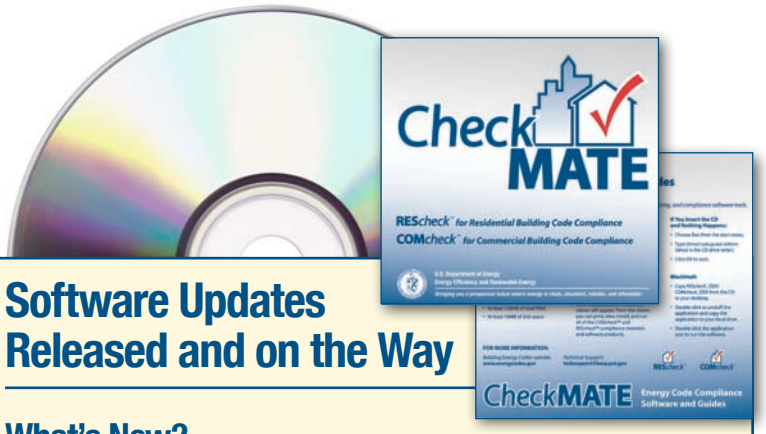
Registration for the series will open soon at www.energycodes.gov.

Watch these live webcasts and many of BECP's recorded webcasts to receive American Institute of Architects Continuing Education System Learning Units.

Visit www.energycodes.gov/events/index.php to view a calendar of upcoming events or to submit an event or training of your own.

Did You Know?

BECP hosts a calendar you can use to promote your events to the energy-codes community or to learn about upcoming events in your area. We invite website visitors to add a training or event on our Calendar of Events—a community source for buildings-related conferences and workshops as well as national and state energy-code training.



Software Updates Released and on the Way

What's New?

RES*check*™ version 4.1.4 for Windows® was released in April 2008 and for Apple® Macintosh in July 2008; features of the new version of the software follow.

- Software version checking to inform users of software updates
- Inclusion of the Georgia state code based on the 2006 International Energy Conservation Code® (IECC) with 2008 Georgia state amendments
- Removal of the New Jersey state code

COM*check*™ version 3.5.3 was released in March 2008 and provides the features below.

- Software version checking to inform users of software updates
- Inclusion of the Georgia state code based on the 2006 IECC with 2008 Georgia state amendments
- Macintosh compatibility

COM*check-Web* was updated to support the 2006 IECC.

Coming Soon!

- Additions and alterations in RES*check*
- ANSI/ASHRAE/IESNA Standard 90.1-2007 in COM*check*
- Updates for RES*check* and COM*check* package generators
- Performance-based compliance for single-zone buildings in COM*check-Web*, based on EnergyPlus.

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Building Energy Codes Website:
www.energycodes.gov
Tech Support:
www.energycodes.gov/support

Setting the Standard is published by the Building Energy Codes Program of the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy at the Pacific Northwest National Laboratory. Its purpose is to encourage information exchange among building industry professionals and organizations, state and local code officials, and researchers to facilitate timely development and early adoption of the building energy conservation standards. The Building Energy Codes Program would like to continue sending you information about energy codes and compliance tools, but if you would like your name removed from our contacts list, go to www.energycodes.gov/unsubscribe.stm. Send comments and contributions to Loel Kathmann at Pacific Northwest National Laboratory (techsupport@becp.pnl.gov).

Editor: Loel Kathmann
www.energycodes.gov
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