

Buildings Use Too Much
Energy: The Solutions
Symposium

BEC Charleston

October 25, 2012

South Carolina & The International Energy Conservation Code

Presented by:

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Founder + CEO

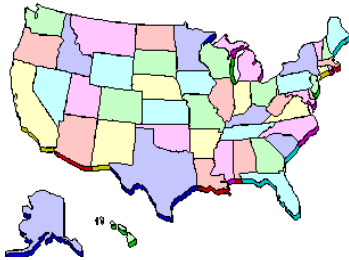
Whole Building Systems, LLC



***“Our lives succeed or fail gradually,
then suddenly, one conversation at a
time. While no single conversation is
guaranteed to change the trajectory of
a career, a business, a marriage, or a
life, any single conversation can. The
conversation is the relationship”***

***Susan Scott
Fierce Conversations***

Energy Codes are typically -



Developed at the national level



Adopted at the state level



Enforced at the municipal level

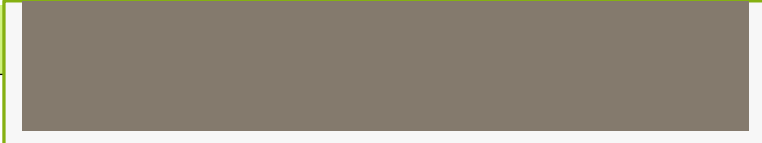
South Carolina

- Legislature
- Building Codes Council



The SCBCC has 16 members

- Architect
- Engineer
- Residential Home Builder
- General Contractor
- Modular Building Industry
- Code Enforcement Official
- Fire Marshal
- Municipal Administrator
- State Engineer
- County Administrator
- Disabled Person
- General Public
- Insurance Industry
- Electric Industry
- Mechanical or Gas Industry
- Plumbing Industry



Legislature Adopts Codes as Modified or Makes Additional Changes and Passes Legislation to Adopt Updated Codes as of an Effective Date

Model Codes Updated by Publishing Organization via ANSI Consensus Process

**Usually
a 3
Year
Cycle**

SCBCC Amends or Modifies Codes based on Public Comments and Hearings and Recommends to Legislature Adoption

SCBCC Issues Notice of Intent to Adopt to Start Public Review Period

SCBCC Holds Public Comment Hearings

Statute

- A formal written enactment of a legislative authority:
 - State
 - County
 - City/Municipality

Regulation

- Administrative legislation issued by a government agency
- Constitutes or Constrains Rights
- Allocates Responsibilities

Building Code

- The purpose of the code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

Building Code

- Mandatory
 - Every municipality and county in SC must enforce the mandatory codes listed in Section 6-9-50 of the SC Code of Laws, 1976 as Amended.
 - Must be used in conjunction with approved modifications.
- Permissive Codes
 - International Property Maintenance Code
 - International Existing Building Code
 - International Performance Code for Buildings and Facilities

Standard or Reference Standard

- The codes and standards referenced in the code shall be considered part of the requirements of the code to the prescribed extent of each such reference. Where differences occur between provisions of the code and referenced codes and standards, the provisions of the code shall apply.

Municipalities



Ordinance

- A local **Law**
- Enforced along with State and Federal Laws
- City of Charleston has two sets of ordinances:
 - City of Charleston Code of Ordinances, and
 - City of Charleston Zoning Ordinances
- May be accessed at the Municode website:
<http://www.municode.com/library/clientCodePage.aspx?clientID=11257>.

Authority Having Jurisdiction

- The Building Official
- Fire Marshal
- State Engineer's Office
- Office of School Facilities
- SC Department of Health and Environmental Control

Building Official

- The building official is authorized and directed to enforce the provisions of the code. The building official has the authority to render interpretations of the code and to adopt policies and procedures in order to clarify the application of its provisions.
- Such interpretations, policies and procedures shall be in compliance with the intent and purpose of the code.
- Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

Permits

- Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit.

Inspections

- The chief building official and his assistants and employees shall function as the inspections division of the department of public service.
- The chief building official shall personally inspect or cause to be inspected all buildings erected throughout the city, and also all buildings now standing in the city which to him appear to be in a dangerous, dilapidated, unhealthy or unsanitary condition

Appeals

- Board of Architectural Review Appeal
- Zoning Board of Appeals – Zoning
- Zoning Board of Appeals – Site Design
- Building Board of Adjustments and Appeals

Recent History of Building Codes In SC

- 1972 Building Codes Council Created – Approved all local modifications, helped municipalities adopt codes and performed all code research and verification for appeals
- 1979 BBC given authority to hear and decide variance requests and appeals to SC Energy Standards.
- 1984 BCC made responsible for regulating modular housing manufacturing.

Recent History of Building Codes In SC

- June 13, 1997 Statewide Building Code Act made local adoption of BCC approved codes mandatory unless local jurisdiction opted out. 2000 BCC Made Responsible for Barrier Free Design
- 2003 the BCC made responsible for adoption and implementation of the mandatory building codes for all local jurisdictions in the state.
- 2006 local jurisdictions cannot adopt Appendices of model codes. BCC must adopt them.

Recent History of Building Codes In SC

- The 2009 International Code Series was formally adopted by the Building Codes Council May 10, 2010. Implementation did not occur, however, due to a request to remove the regulations from the administrative procedures process by the South Carolina House Labor, Commerce and Industry Committee.

Energy Standards in SC

- House Bill 2863 (Act 156) 1979
- Effective July 6, 1979: Appendix J of The Standard Building Code - Referenced “Code for Energy Conservation in New Buildings” and ASHRAE Standard 90
- 1982 SBC Automatically updated – Same Reference Standards.
- 1985 SBC Automatically updated – Appendix J now Referenced CABO Model Energy Code and ASHRAE Standards 90A and 90B.

Energy Standards in SC

- 1991 SBC Moved Energy Standards from Appendix J to Appendix E. CABO MEC remained – ASHRAE 90A & B became ASHRAE 90.1
- 2001 SC Implemented 2000 Edition of IBC – but State Energy Standard continued to Reference Appendix J of SBC
- 2002 SC Implemented 2000 Edition of IRC – but State Energy Standard continued to Reference Appendix J of SBC
- 2005 SC Implemented 2003 Edition of IBC – but State Energy Standard continued to Reference Appendix J of SBC
- 2008 SC Implemented 2006 Edition of IBC – but State Energy Standard continued to Reference Appendix J of SBC

Energy Standards in SC

- 2009 SC Implemented 2006 Edition of IRC – but State Energy Standard continued to Reference Appendix J of SBC
- On July 1, 2009 SC House Bill 3550 (Act 46) updated the State Energy Standards to the 2006 IECC for both residential and commercial construction. The 2006 IECC references ASHRAE 90.1-2004.
- On April 2, 2012, by Act 143 (H4639) The SC Energy Standard was updated to the 2009 International Energy Conservation Code for all commercial and residential buildings. The 2009 IECC references ASHRAE 90.1-2007.

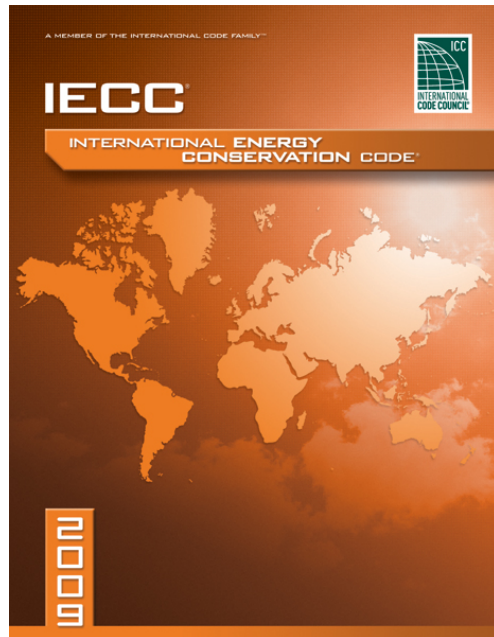
Mandatory Building Codes Currently Adopted in SC (As of July 2011)

- 2006 International Building Code with SC modifications;
- 2006 International Residential Code with SC modifications;
- 2006 International Fire Code with SC modifications;
- 2006 International Plumbing Code;
- 2006 International Mechanical Code;
- 2006 International Energy Conservation Code;
- 2006 International Fuel Gas Code with SC modifications; and,
- 2008 National Electrical Code.

Mandatory Building Codes Currently Adopted in SC (Beginning July 1, 2013)

- 2012 International Building Code with SC modifications;
- 2012 International Residential Code with SC modifications;
- 2012 International Fire Code with SC modifications;
- 2012 International Plumbing Code;
- 2012 International Mechanical Code;
- 2009 International Energy Conservation Code (**Effective January 1, 2013);
- 2012 International Fuel Gas Code with SC modifications; and,
- 2011 National Electrical Code.

Let's Talk About The Codes



The Energy Codes

- The IECC – Model Energy Code
- ASHRAE 90.1 - Standard

The Energy Codes Regulate

- The design of the following energy using systems:
 - HVAC
 - Service Water Heating
 - Electric Power Distribution
 - Electric Power Metering (IECC)
 - Lighting
 - Other electric motors, belts and drives

Compliance Paths



2006 IECC versus 2009 IECC

- Envelope U-Value Table Added in 2009
- References ASHRAE 90.1 – 2007 ILO 2004 as an alternative compliance path
- Group R specific envelope requirements added in Chapter 5
- Above grade roof, walls and floors are more stringent
- Below grade walls and fenestration are the same

Source PNNL Study for Kansas City, MO, March 2011

2006 IECC versus 2009 IECC

- Metal building requirements more strict – continuous insulated sheathing in metal building walls
- Skylight requirements more strict
- All recessed lighting must be IC rated
- Minimum efficiency of unitary HVAC is SEER 13 ILO SEER 10
- Minimum pipe insulation thickness increased

2006 IECC versus 2009 IECC

- Fan power section with limitations added
- Economizers required in systems greater than 54kBtu/hr except CZ 1, 2A, 7 & 8
- Heat rejection equipment requirements have been revised based on climate zone, and a new exception is provided if a heat pump is used to reject heat throughout the year.

2006 IECC versus 2009 IECC

- A new requirement has been added for supply-air temperature reset controls to reset the supply air temperature based on building loads or outdoor air temperature.
- Lighting exemption for dwelling units is provided if high-efficacy lamps are used in at least 50% of all the permanent fixtures.

2006 IECC versus 2009 IECC

- A new section has been added requiring manual daylight zone controls in zones adjacent to vertical fenestration and zones with skylights.
- The interior lighting power requirements exemption list has been revised and expanded to specify more detailed functions such as photographic process, lighting in refrigerator/ freezer cases, and furniture-mounted task lighting that is controlled by automatic shut off.

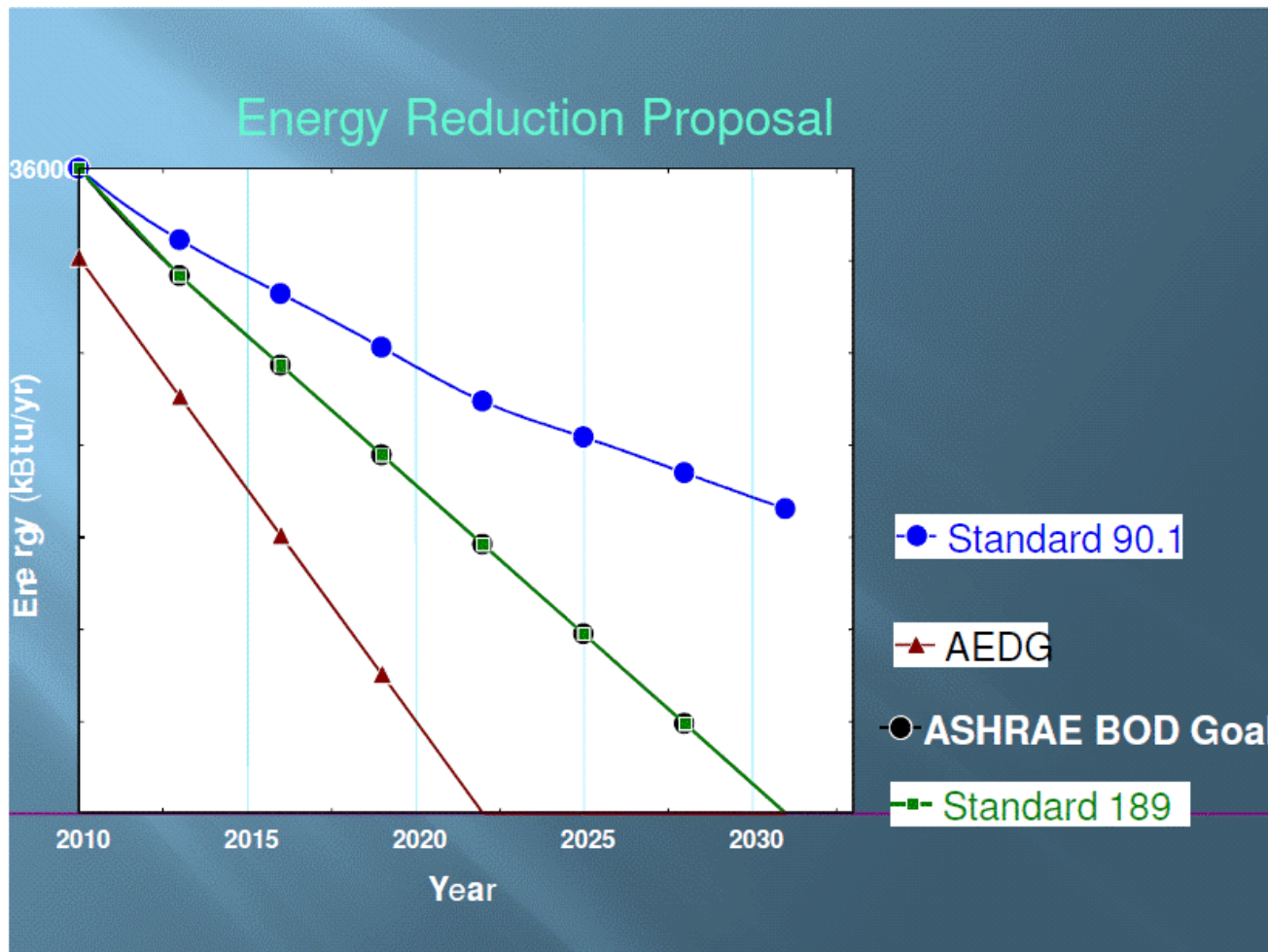
2006 IECC versus 2009 IECC

- Interior lighting power allowance adjustments have been revised for retail display based on the type of products on display.
- Lighting-zone-based power allowance requirements are specified for exterior lighting.

SC Mods to 2012 Codes

- 25 to IRC
- 5 to IBC
- 25 to IFC
- 7 to IFGC
- 2 to NEC 2012
- Ironically – no public process to modify the energy code – except through legislation

Where Codes Are Headed



Quick Overview of 2012 IECC

- 30% Better than IECC 2006
- Mandatory whole house pressure testing
- Duct leakage rates lowered
- Insulation increased to R38
- 2x6 framing required in some climate zones
- Continuous air barrier required in commercial construction (correct barrier, assembly or test to demonstrate compliance)

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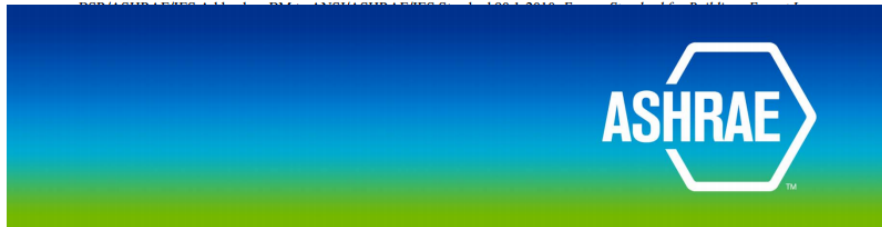
Quick Overview of 2012 IECC

- Vertical glazing limited to 30% to trigger whole building simulation
- Lighting controls required all buildings
- Functional testing all lighting controls required
- Cx required for bldgs with 480,000 Btu/Hr clg or 600,000 Btu/Hr htg load
- LPD's reduced 10% Office, 7% Retail

Some Short Term DOE Goals

- IECC 50% better than 2006 by 2015. Not clear if this can be met with prescriptive measures.
- 70% adoption of current code by 2015
- 90% compliance by 2017

Breaking News



BSR/ASHRAE/IES Addendum BM
to ANSI/ASHRAE/IES Standard 90.1-2010

Public Review Draft
Proposed Addendum BM to Standard
90.1-2010, *Energy Standard for*
Buildings Except Low-Rise
Residential Buildings

First Public Review (August 2012)
(Draft shows Proposed Changes to Current Standard)

Open for Public
Comment
October 12
through
November 26,
2012

[www.ashrae.org
/publicreviews](http://www.ashrae.org/publicreviews)

[https://osr.ashrae.org/sitepages/
showdoc2.aspx/ListName/Public%20Review
%20Draft%20Standards/ItemID/806/
IsAttachment/N/90.1BMFirstPPR.pdf](https://osr.ashrae.org/sitepages/showdoc2.aspx/ListName/Public%20Review%20Draft%20Standards/ItemID/806/IsAttachment/N/90.1BMFirstPPR.pdf)

ASHRAE 90.1 Addendum BM

- Allows PRM as a code compliance path in lieu of ECB if 45% better than baseline design. Eliminates need for two models.
- Sets ASHRAE 90.1-2004 as baseline for future improvements.
- Will be baseline for federal incentive programs, tax incentive programs and many utility rebate programs
- Provides more credit for integrated design for code compliance

ASHRAE 90.1 Addendum BM

- Better than code programs now can just establish their own percent better target
- The performance path will no longer lag behind the prescriptive path
- Allows for consistent and deliberate trend in energy reduction with each version of the standard rather than encouraging use of prescriptive path

Resources

www.iccsafe.org

www.ashrae.org

www.energycodes.gov

The screenshot shows the homepage of the U.S. Department of Energy's Building Energy Codes Program. The header includes the U.S. Department of Energy logo and the text "Energy Efficiency & Renewable Energy". Below the header, the main navigation bar contains "ABOUT BECP", "WHY BUILDING ENERGY CODES", and "RELATED LINKS". A search bar is located on the right side of the navigation bar. The main content area features a large banner with the slogan "Less Energy. Less Cost. Less Carbon." and a central graphic of a computer monitor displaying a graduation cap and a pencil, with the text "BECP WEBCASTS with Live Q&A" and "Registration is Open!". Below the banner, there are several sections: "BROWSE..." with links to Publications, Events Calendar, and Job/Internship Opportunities; "QUICKLINKS FOR..." with links for Architects/Engineers/Designers, Builders/Contractors, Code Enforcement Officials, State & Local Code Adopters, Codes Advocates, and Students; "FOLLOW US:" with social media icons for RSS, Facebook, YouTube, and Twitter; "STATES OF ENERGY CODES" and "SOLUTIONS & HELP CENTER"; "SOFTWARE & TOOLS" and "EDUCATION & TRAINING"; "RECENT UPDATES" with news items about the Building Energy Codes Program Website, Energy Codes 2010 location and promotional opportunities, and the launch of the New IFC Green Building Codes; "CODES IN THE NEWS" with news items about the State Building Code Council, New York State Department of State, and North Carolina Home Guide to Energy Code Compliance; and "AROUND THE WEB" with a link to the ICC Compliance Guide for New Homes in Maine. At the bottom, there are two large buttons for "RESIDENTIAL Energy Codes" and "COMMERCIAL Energy Codes".

Conversation

