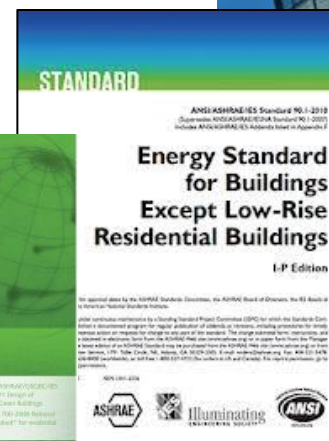
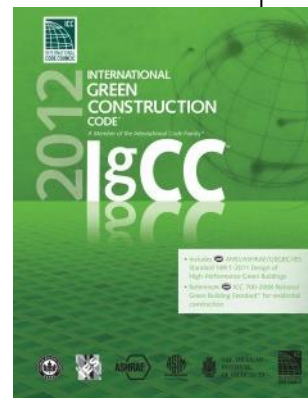


# Update on Energy Codes and Standards for Commercial Buildings

CSI Webinar  
December 16, 2014



# Learning Objectives

1. Review what is occurring at the national level on development of standards and model codes covering energy efficiency
2. Identify the current status of adoption of those standards and model codes by and within each of the states
3. Recognize how to better implement what has been adopted
4. Discover and develop resources to help with documenting compliance with what has been adopted



# Purpose and Expected Outcome

Purpose – to provide an overview of energy codes and standards applicable to commercial buildings and the resources available designers and specifiers to implement those documents



Expected outcome – an enhanced ability for designers and specifiers to bring value to their client's commercial building projects by being more conversant on and better equipped to document compliance with energy codes and standards



# Background: Building Energy Codes

- ▶ Developed at the national level through ASHRAE and ICC processes with opportunities for all to participate
- ▶ Adopted by state and local government, generally as a component of building construction regulations
- ▶ The building industry is required to comply with what is adopted and document compliance
- ▶ State and local government are generally responsible for validating compliance
- ▶ Increasing adoption of green and above code programs is increasing the focus on minimum building energy codes



# What's Adopted Now?

**STANDARD**

ANSI/ASHRAE/IES Standard 90.1-2019  
 (Supersedes ANSI/ASHRAE/IES Standard 90.1-2009)  
 Includes ANSI/ASHRAE/IES Addenda listed in Appendix F




## Energy Standard for Buildings Except Low-Rise Residential Buildings

I-P Edition

See Appendix F for approval dates by the ASHRAE Standards Committee, the ASHRAE Board of Directors, the ASHRAE Board of Directors, and the American National Standards Institute.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site ([www.ashrae.org](http://www.ashrae.org)) or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from the ASHRAE Web site ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2255. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org) or toll-free 1-800-527-4773 (for orders in the United States and Canada). For reprint permission, go to [www.ashrae.org/permissions](http://www.ashrae.org/permissions).

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INTERNATIONAL ENERGY CONSERVATION CODE

# 2012 IECC

ANSI/ASHRAE/USGBC/IES Standard 189.1-2011  
 (Supersedes ANSI/ASHRAE/USGBC/IES Standard 189.1-2009)

## Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings






A Compliance Option of the International Green Construction Code™

See Appendix I for approval dates by the ASHRAE Standards Committee, the ASHRAE Board of Directors, the U.S. Green Building Council, the Illuminating Engineering Society of North America, and the American National Standards Institute.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site ([www.ashrae.org](http://www.ashrae.org)), or in paper form from the ASHRAE Manager of Standards.

The latest edition of an ASHRAE Standard may be purchased on the ASHRAE Web site ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2255; telephone: 404-426-9400 (worldwide), or toll free 1-800-527-4773 (for orders in the United States and Canada), or e-mail: [orders@ashrae.org](mailto:orders@ashrae.org). For reprint permission, go to [www.ashrae.org/permissions](http://www.ashrae.org/permissions).

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







INTERNATIONAL GREEN CONSTRUCTION CODE

# 2012 IGCC

A Member of the International Code Family™

- Includes ANSI/ASHRAE/USGBC/IES Standard 189.1-2011 Design of High-Performance Green Buildings
- Reference ICC 700 2009 National Green Building Standard for residential construction

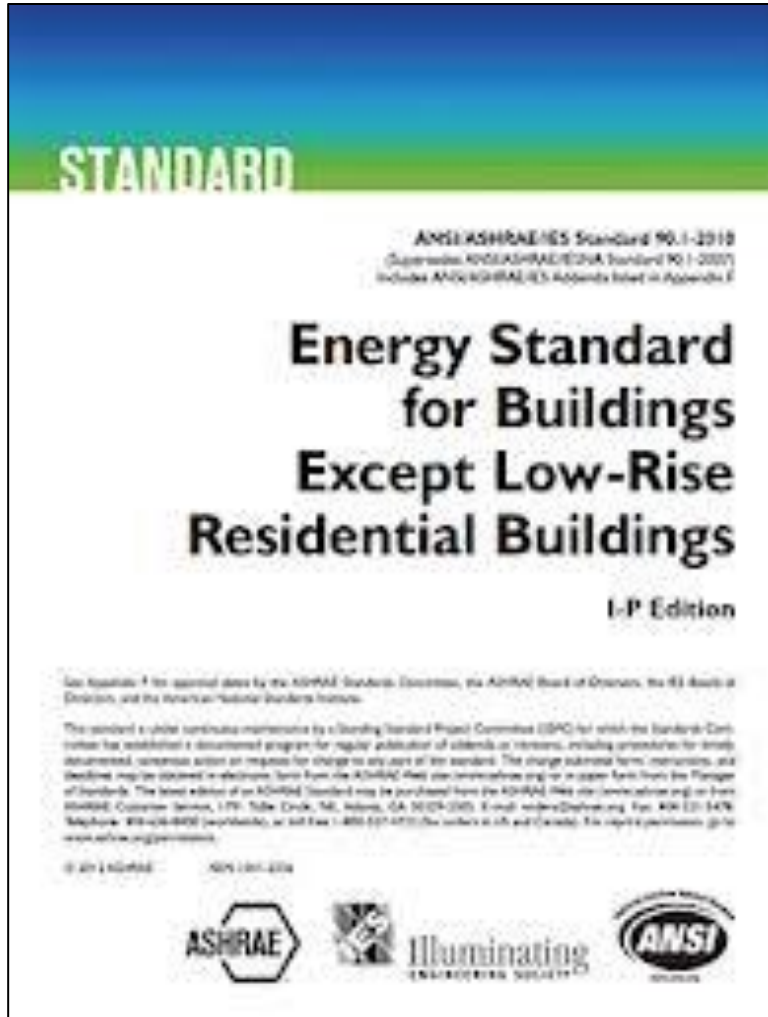


# What's in What's on the Radar

- ▶ What is and is not part of the building thermal envelope
- ▶ R, U, C and F, solar reflectance, emittance and SRI
- ▶ SHGC, VT, PF and daylighting areas in a building
- ▶ Air barrier material, design and placement
- ▶ Air leakage testing ACH and/or cfm/sq. ft.
- ▶ EER, SEER, IPLV, IEER, COP, AFUE
- ▶ Damper leakage rate, HVAC system type and controls
- ▶ EF, E<sub>t</sub>, SL, COP
- ▶ LPD w/sq.ft. or w/lin.ft.
- ▶ Maximum rating of on site solar
- ▶ Requirements for application and use of on-site renewables
- ▶ Commissioning of MEP systems and equipment



# Overview ANSI/ASHRAE/IES 90.1-2010

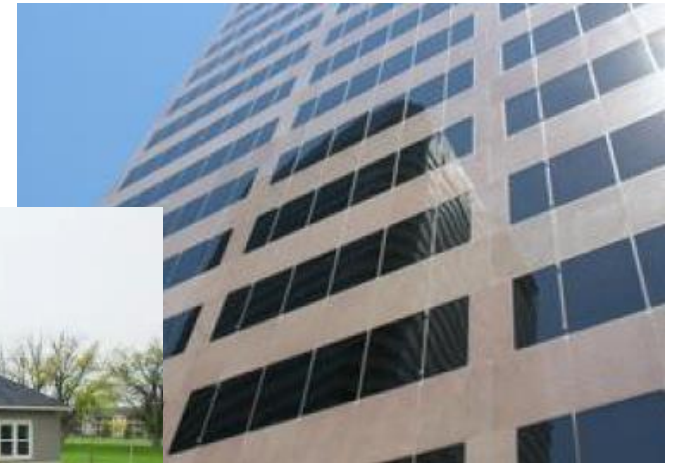


- ▶ Minimum energy efficiency in commercial buildings
- ▶ Design and construction
- ▶ Commissioning of HVAC systems
- ▶ Use of on-site, renewable energy resources



# Overview ANSI/ASHRAE/IES 90.1-2010

- ▶ Applies to:
  - New commercial buildings and their systems
  - New portions of commercial buildings and their systems
  - New systems and equipment in existing commercial buildings
  - New equipment or building systems specifically identified in the standard that are part of industrial or manufacturing processes





# ANSI/ASHRAE/IES 90.1-2010 Compliance Paths



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Includes mandatory and prescriptive requirements from 5, 6, 7, 8, 9, and 10

5. Building Envelope

6. Heating, Ventilating, and Air Conditioning

7. Service Water Heating

8. Power

9. Lighting

10. Other Equipment

OR

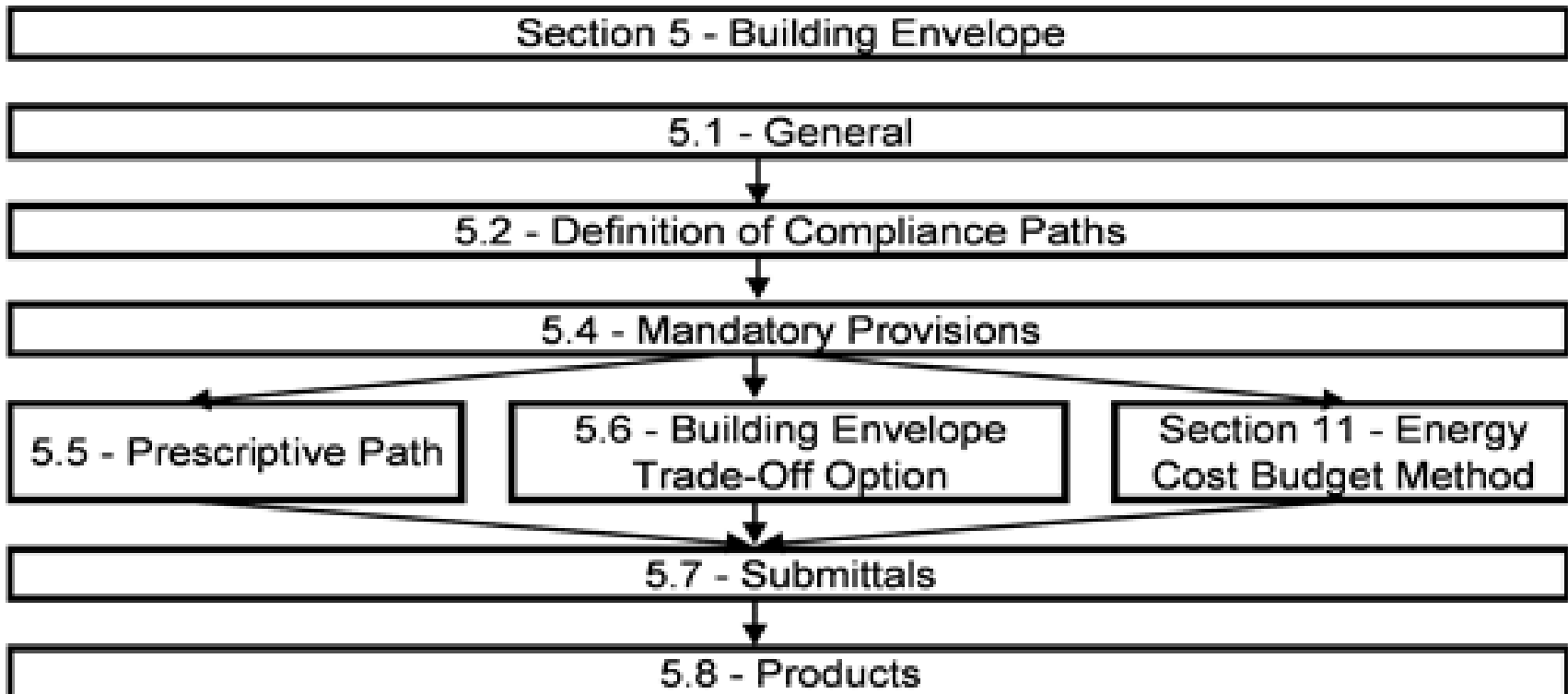
11. Energy Cost Budget Method

Includes mandatory requirements from 5, 6, 7, 8, 9, and 10



# Overview ANSI/ASHRAE/IES 90.1-2010

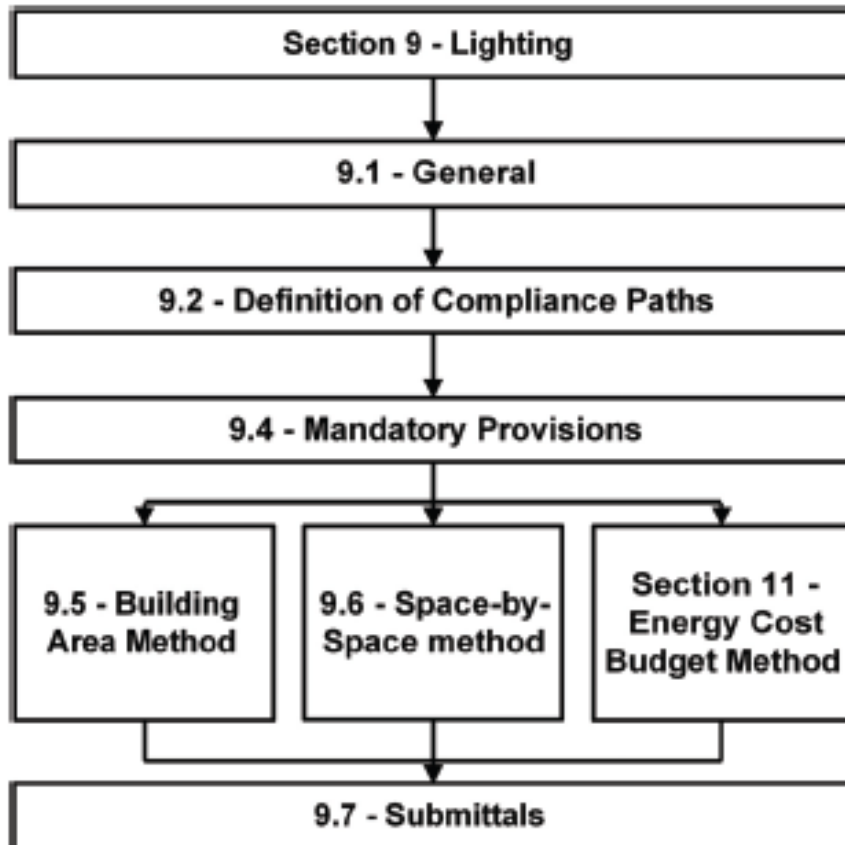
## Building thermal envelope structure





# Overview ANSI/ASHRAE/IES 90.1-2010

## ▶ Lighting structure



## ▶ Increased interactions between envelope and lighting

- Daylighting areas
- Daylighting controls
- Building design and space use and layout
- Fenestration area, location, shading and thermal properties





# Energy Efficiency – ASHRAE 90.1

- ▶ More than 30% energy savings are realized using the 2010 edition of Standard 90.1 compared to the 2004 edition
- ▶ Site energy savings are 32.7% and energy cost savings 29.5% without plug loads
- ▶ Site energy savings are estimated at 25.6% and energy cost savings 23.2% with plug loads

Source: “Achieving the 30% Goal: Energy and Cost Savings Analysis of ASHRAE Standard 90.1-10”, PNNL-20405. May 2011.  
<http://www.energycodes.gov/achieving-30-goal-energy-and-cost-savings-analysis-ashrae-standard-901-2010>

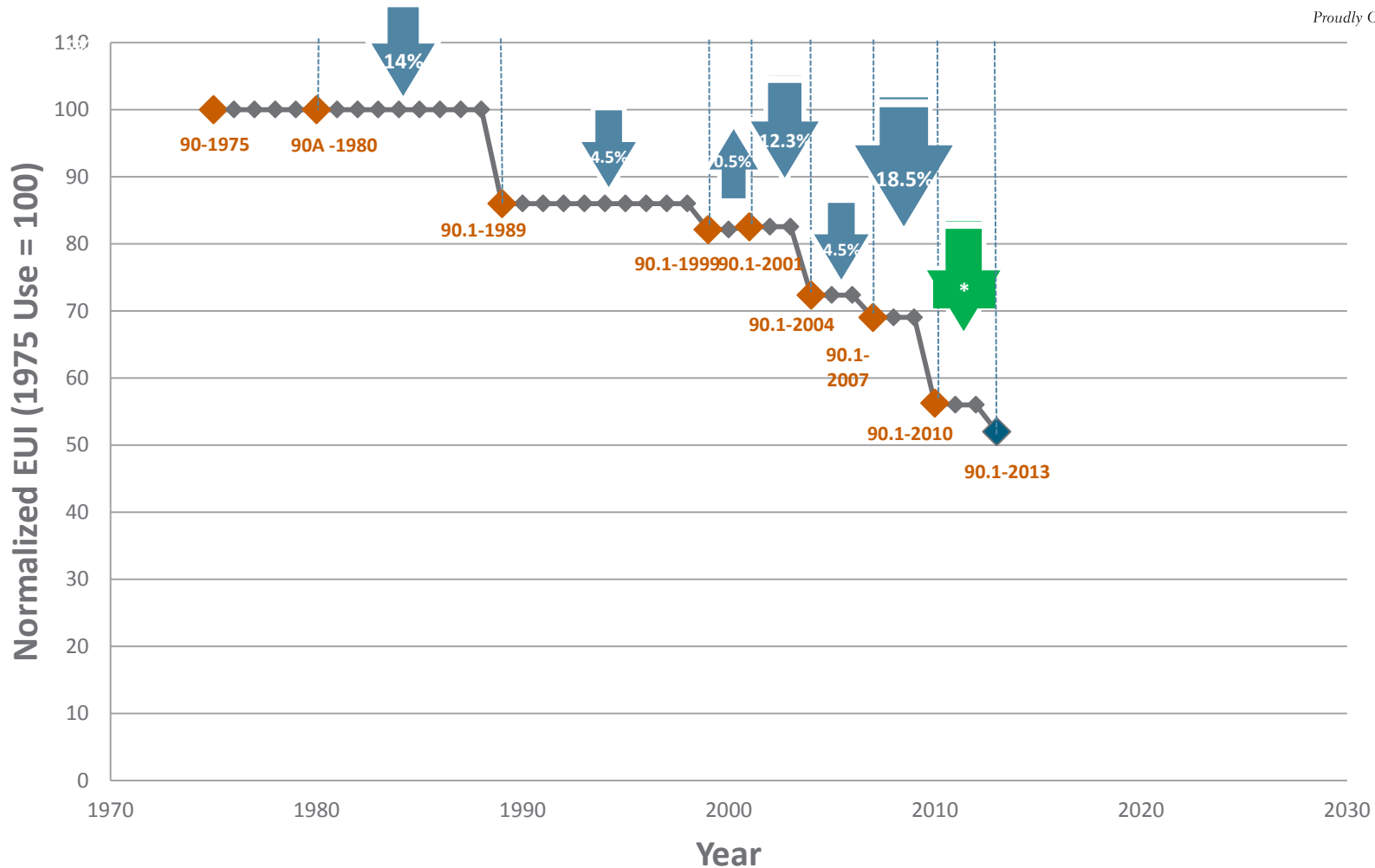
# Improvement Over Time



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## Improvement in ASHRAE Standard 90.1 (Year 1975-2013)



**\* Improvement from 2010 to 2013 is 8.7% cost, 8.5% source energy and 7.6% site energy**

ANSI/ASHRAE/IES Standard 90.1-2013 Determination of Energy Savings: Quantitative Analysis.  
PNNL-23479, Pacific Northwest National Laboratory, Richland, WA.

[http://www.pnnl.gov/main/publications/external/technical\\_reports/PNNL-23479.pdf](http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23479.pdf)

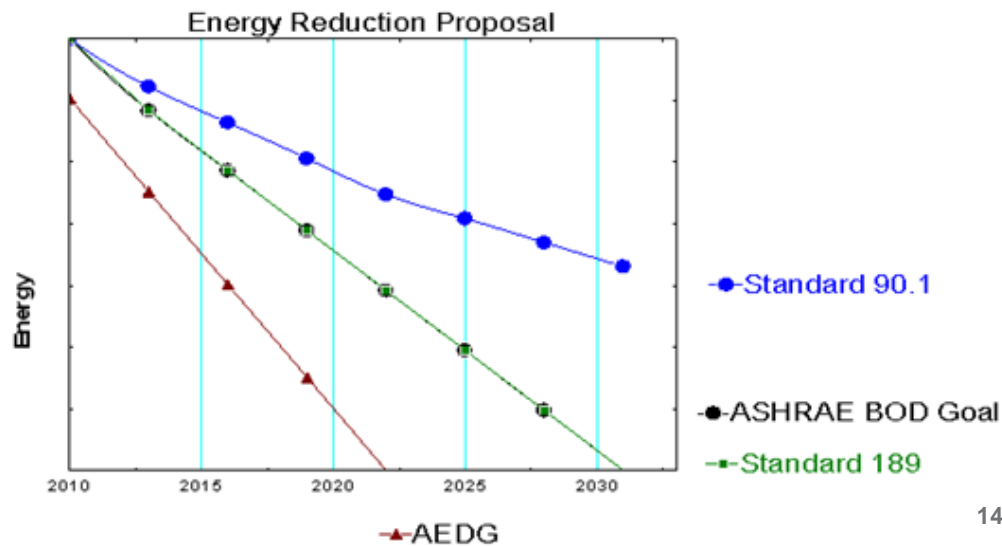
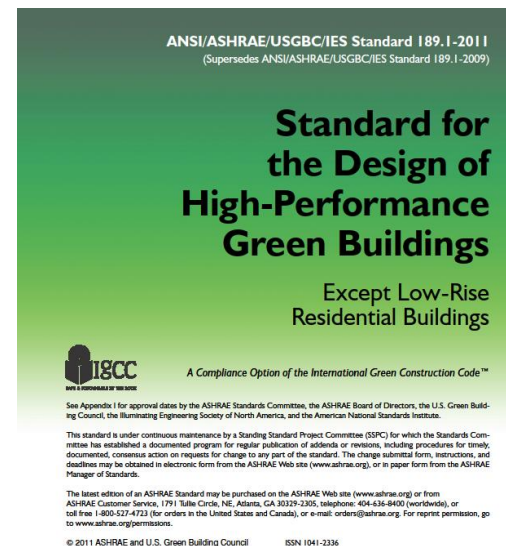
# Overview ANSI/ASHRAE/IES/USGBC 189.1-2011



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- ▶ Applies to
  - new commercial buildings and their systems
  - new portions of commercial buildings and their systems
  - new systems and equipment in existing commercial buildings



# Standard 189.1-2011

## Topics Covered

- Site Sustainability
- Water Use Efficiency
- Energy Efficiency
  - Standard 90.1-2010 plus onsite renewables + improved envelope + lower LPDs + refrigeration system requirements
- Indoor Environmental Quality
- The Buildings Impact on the Atmosphere, Materials, and Resources
- Construction and Plans for Resources



# Overview ICC 2012 IECC Commercial

- ▶ Minimum energy efficiency in commercial buildings
- ▶ Design, construction, mechanical system commissioning and lighting system functional testing
- ▶ Meet all mandatory requirements AND prescriptive requirements AND one of the following:
  - on-site renewable energy resources
  - higher efficiency HVAC equipment
  - lower LPDs
  - OR document compliance via total building energy performance







# Overview ICC 2012 IECC Commercial

- ▶ Applies to:
  - New commercial buildings and their systems
  - New portions of commercial buildings and their systems
  - New systems and equipment in existing commercial buildings



# 2012 IECC Commercial

- ▶ Relationship to Standard 90.1
  - Parallels the provisions in 90.1-2010
  - IECC adopts Standard 90.1 as an alternative compliance path
  - Cannot 'pick and choose' criteria from Standard 90.1 and IECC
- ▶ Differences between 2012 IECC and Standard 90.1
  - Commissioning required in the IECC
  - Some differences in stringency and what is covered
- ▶ Overview of 2012 IECC and comparison of 2012 IECC and Standard 90.1-2010 at <http://www.energycodes.gov/sites/default/files/documents/PNNL-22760.pdf>



# 2012 IECC Compliance Paths I

## ▶ 2012 IECC Mandatory + Prescriptive

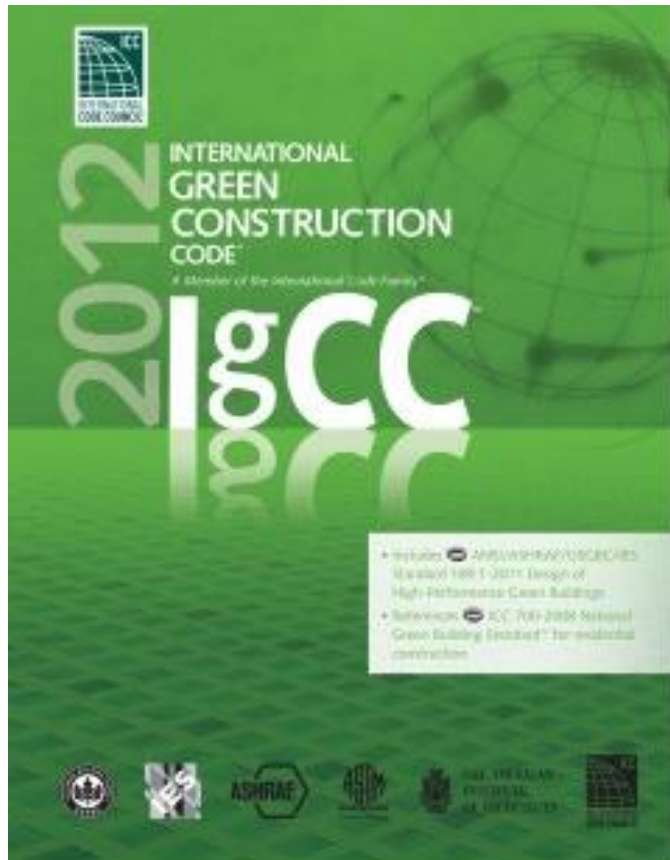
- C402 (Building Envelope)
- C403 (Building Mechanical)
- C404 (Service Water Heating)
- C405 (Electrical Power and Lighting)
- plus ONE of the following
  - C406.2 (Efficient HVAC)
  - C406.3 (Efficient Lighting)
  - C406.4 (On-Site Renewable Energy)



## 2012 IECC Compliance Paths II

- ▶ C407 (Total Building Performance) plus mandatory requirements of
  - C402.4 (air leakage)
  - C403.2 (HVAC efficiency, controls and distribution systems)
  - C404 (service water heating)
  - C405.2, C405.3, C405.4, C405.6, and C405.7 (lighting controls, wiring, exit signs, exterior lighting power limits, metering)
- ▶ Standard 90.1-2010 (including any of its multiple compliance paths)

# Overview ICC 2012 IgCC



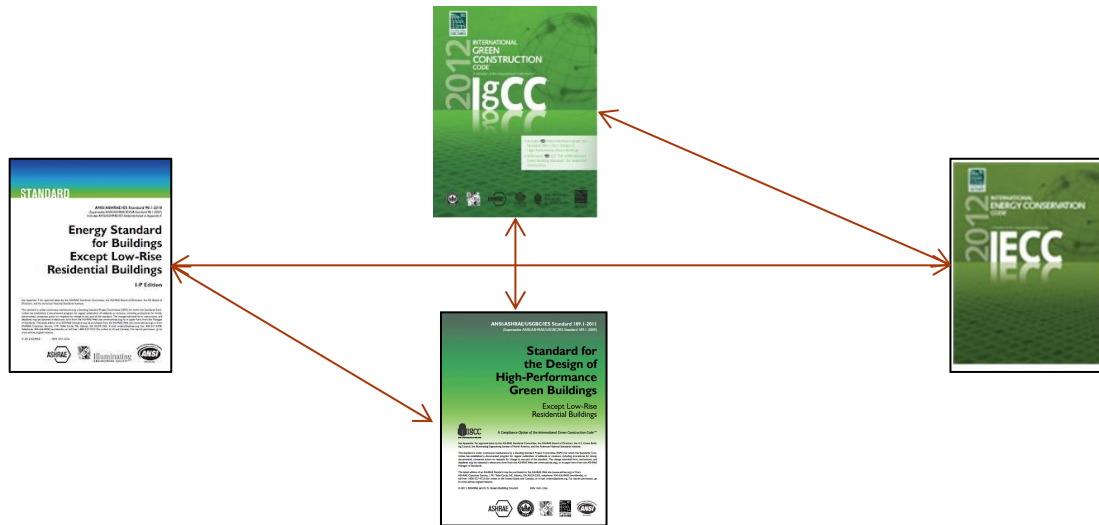
- ▶ Overlay to the ICC codes, including the IECC
  - Increases minimum requirements in the ICC codes
  - Provides additional criteria for items and issues not in the ICC codes
- ▶ 189.1 adopted by reference as an alternative path to compliance but cannot ‘pick and choose’ between IgCC and 189.1
- ▶ First published in 2012



# 2012 IgCC Topics Covered

- Site Development and Land Use
- Material Resource Conservation and Efficiency
- Energy Conservation, Efficiency, and CO<sub>2</sub>e Emission Reduction
  - 2012 IECC + Performance-based on source energy and consideration of CO<sub>2</sub> emissions + energy metering + automated demand response (in some cases) + shading devices + air curtain instead of vestibules + more robust duct sealing + more economizers in more locations + heat reclaim for lab and kitchen exhaust systems + HVAC system commissioning and completion
- Water Conservation and Efficiency
- Indoor Environmental Quality and Comfort
- Commissioning, Operations and Maintenance
- Existing Buildings

# Interrelationships



- ▶ IECC adopts 90.1 by reference – designer choice which to use but cannot ‘pick and choose’, must use one or the other only and completely
- ▶ IgCC adopts the IECC by reference but adds criteria to address additional items not covered in the IECC or increases stringency of the IECC
- ▶ The IgCC adopts 189.1 by reference – designer choice which to use but cannot ‘pick and choose’, must use one or the other only and completely
- ▶ ASHRAE 189.1 adopts 90.1 by reference but adds criteria to address additional items not covered by 90.1 or increases stringency of 90.1

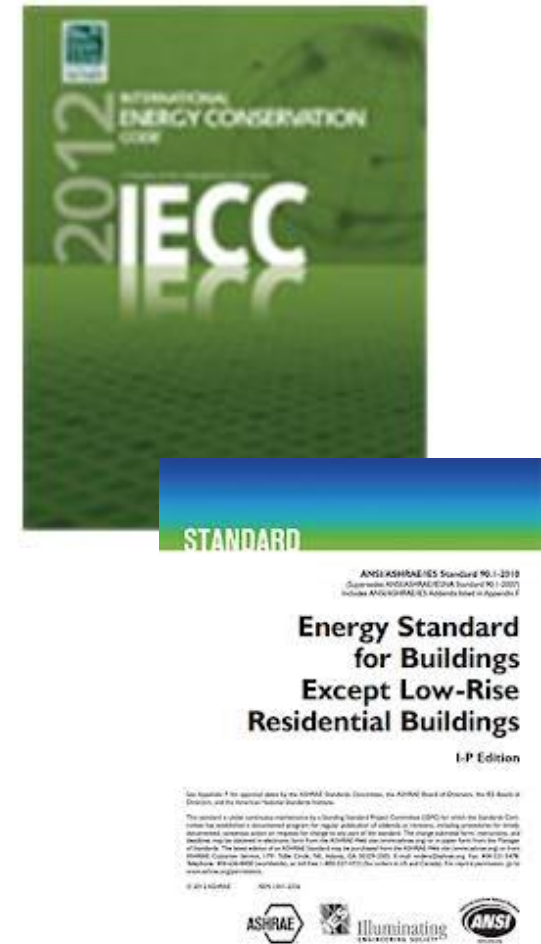
# 90.1/IECC Compliance - Performance



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- ▶ Performance is based on the expected annual energy cost of the building as designed compared to that expected as if it just met the IECC or 90.1 (i.e., standard design)
  - 90.1 energy cost budget method in Chapter 11 of the standard with as designed annual energy cost being  $\leq$  that of the standard design
  - IECC total building performance method in Section 407 with as designed annual energy cost being  $\leq 85\%$  of the standard design
- ▶ 90.1 building performance option strictly for buildings designed to substantially exceed the requirements of Standard 90.1, and this option is the basis of the performance options in 189.1

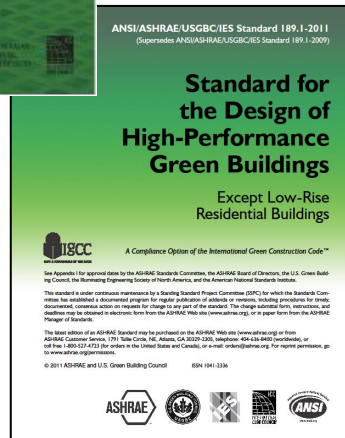
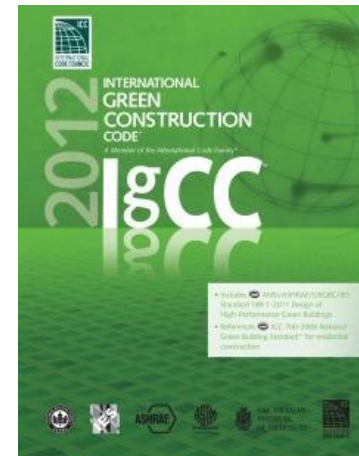






# 189.1/IgCC Compliance - Performance

- ▶ Performance is based on the expected annual energy cost of the building as designed not exceeding that expected as if it just met the IgCC or 189.1
- ▶ 189.1 considers annual energy cost, CO<sub>2</sub> equivalent and load factor/peak electrical demand
- ▶ IgCC references the predictive modeling in 90.1 but uses source energy and CO<sub>2</sub> emissions as metrics – with the EUI for the proposed design being not over 90% of the building as if it just satisfied the IECC
- ▶ Certain mandatory provisions in the IgCC and 189.1 must still be satisfied



# What's On the Radar?

**2013**

**2016**

**ASHRAE/IES Standard 90.1-2019**  
**Energy Standard for Buildings Except Low-Rise Residential Buildings**

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**2015**

**2018**

**INTERNATIONAL GREEN CONSTRUCTION CODE**

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**2015**

**2018**

**INTERNATIONAL GREEN CONSTRUCTION CODE**

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**2018**

**2014**

**ANSI/ASHRAE/USGBC/IES Standard 189.1-2011**  
**Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings**

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# Current status of Standard 90.1 and the IECC

- ▶ 90.1-2013 published and contains a number of revisions and enhancements over 90.1-2010
- ▶ 90.1-2013 on continuous maintenance, addenda expected and next edition published in 2016
- ▶ 2015 IECC completed in October 2013 and published in June 2014
- ▶ Proposed changes to the IECC are due in January 2016 and those approved through the ICC process will make up the 2018 IECC

# Current status of Standard 189.1 and the IgCC

- ▶ 189.1-2014 recently published and contains a number of revisions to 189.1-2011
- ▶ 189.1-2014 is on continuous maintenance, addenda expected and next edition published in 2017
- ▶ 2015 IgCC development process completed in October 2014 and being prepared for publication in early 2015

# Consolidation of Standard 189.1 and the IgCC



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- ▶ ASHRAE and ICC discussing the details associated with a recent MOU to ‘combine’ the IgCC and 189.1
  - ASHRAE through 189.1 would cover the technical requirements of a ‘combined document’
  - ICC would cover the administrative and compliance related requirements of a ‘combined document’
  - Need to align current scopes of 189.1 and IgCC
  - A committee will be established to address issues associated with ‘combining the documents’ and moving forward to implement the MOU

## Leading Building Industry Groups Agree to Streamline Green Building Tool Coordination and Development

*Move will coordinate Standard 189.1, the International Green Construction Code and LEED to offer comprehensive system of regulatory and voluntary leadership tools for jurisdictions*

**Washington, D.C.** — (Aug. 21, 2014) — The International Code Council (ICC), ASHRAE, the American Institute of Architects (AIA), the Illuminating Engineering Society of North America (IES) and the U.S. Green Building Council (USGBC) announce the signing of a memorandum to collaborate on the development of Standard 189.1, the *International Green Construction Code* (IgCC) and the LEED green building program.

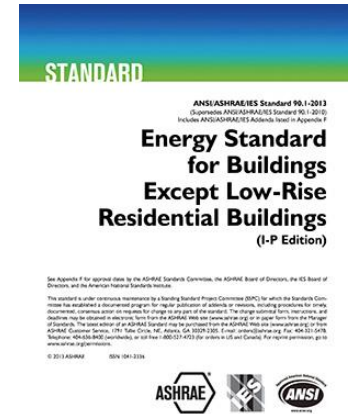
The unprecedented cooperation aims to create a comprehensive framework for jurisdictions looking to implement and adopt green building regulations and codes and/or provide incentives for voluntary leadership programs such as LEED.

The agreement outlines the development, maintenance and implementation of new versions of ANSI/ASHRAE/IES/USGBC Standard 189.1, *Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings* and the IgCC, which will be combined into one regulatory tool. This agreement also endeavors to align the LEED program with the new code to ensure a streamlined, effective set of regulatory and above-code options for jurisdictions across the country.

“Architects have become the leaders in employing green building techniques, and the IgCC, a valuable regulatory tool, provides support leading to the creation of a sustainable, resilient built environment,” said AIA CEO Robert Ivy, FAIA. “This agreement, which underscores the AIA’s dedication to sustainable design and construction, should lead to more rapid adoption of responsible approaches by designers, builders, developers and a host of other building industry groups.”

# Key Changes from Standard 90.1-2010 to Standard 90.1-2013

- ▶ Revamps Appendix C (envelope tradeoff)
- ▶ Adds specific vestibule requirements for large spaces
- ▶ Lowers fenestration U-factors about 18%
- ▶ Modifies daylighting and several other definitions
- ▶ Limits skylight area to 3% except to 6% if daylighting criteria are met
- ▶ Increases equipment efficiencies
- ▶ Changes for direct digital control systems
- ▶ Reduces occupancy threshold for demand-controlled ventilation
- ▶ Reduces system size and outdoor air thresholds for energy recovery
- ▶ Adds requirements for walk-in coolers and freezers and refrigerated display cases, and also for individual fans
- ▶ Increases the spaces where plug receptacle shutoff control is required
- ▶ Requires the use of certain lighting controls in more space types
- ▶ Updates and reduces LPDs





## Key Changes from 2012 to 2015 IECC

- ▶ The clarity and usability of the IECC was improved
- ▶ Historical buildings now partially covered
- ▶ Replacement fenestration covered
- ▶ Requires full upgrade of roofing insulation when re-roofing
- ▶ Roof replacement exempt from air barrier requirements
- ▶ New exterior and warehouse lighting control requirements
- ▶ Revised lighting controls
- ▶ Revised daylighting zone controls
- ▶ New hotel/motel sleeping and guest suite lighting controls
- ▶ Air barriers now required in Climate Zones 1-3
- ▶ High clerestory glass must now meet SHGC criteria
- ▶ Reduce skylight mandate in certain buildings from 10K sf to 2.5K sf
- ▶ Adds new UA envelope tradeoff option
- ▶ Commissioning requirements moved to appendix
- ▶ Clearer distinction of criteria for simple and complex HVAC systems



# Key Energy Related Changes from 2012 to 2015 IgCC

- ▶ Removed some provisions that were in the 2012 IgCC because they are now covered in the 2015 IECC
- ▶ Floor area allocation percentage for multiple buildings on one site is now net instead of gross floor area
- ▶ Building simulation can now be done by an RDP (was RDP in charge of building simulation)
- ▶ Added new provision for permanent shading using automatically controlled shading devices
- ▶ Added performance criteria for air curtains used in lieu of vestibules
- ▶ Interior light reduction controls no longer required on storage and stack areas not open to the public
- ▶ Designer still retains control of option to use 189.1 in lieu of IgCC



# Key Energy Related Changes from 2012 to 2015 IgCC

- ▶ Moisture control for the envelope will not be in the 2015 IgCC (an issue that should be addressed in the minimum codes)
- ▶ The improvement in the building thermal envelope over the IECC provision was reduced from 10% to 5%
- ▶ An air leakage test of the building is now required but if the building fails remedial action must be taken to seal leaks but no re-testing is required
- ▶ A new outcome based compliance path that sets limits for annual energy use as a function of climate zone and building type was added to the IgCC and uses the actual performance of the building for a continuous 12 month period within the first 3 years of occupancy was approved

# Key Takeaways for Designers

- ▶ Prescriptive minimums have increased
- ▶ Green and related documents are leading beyond minimums
- ▶ Green and related documents provide a look into what could become minimums in the future
- ▶ Additional focus on commissioning
- ▶ Increased emphasis on building modeling in larger commercial buildings
- ▶ Consideration and use of renewable energy sources



# Key Takeaways for Designers

- ▶ More rigorous thermal envelope criteria that are increasingly recognizing the value of daylighting
- ▶ Decreased lighting power limits, more automatic lighting controls and increased consideration of how fenestration impacts daylighting and building energy use
- ▶ More opportunities for architects to look at the total building and lead as the project registered design professional
- ▶ The advent of a new compliance path for energy based on the actual performance of a building over time



# Who Can Adopt What for Energy

- ▶ Federal Government
  - Federally owned
  - Federally leased (required by legislation but implementing regulations not published)
  - Buildings wanting to participate in Federal programs
  - Federal agencies directed to develop preemptive criteria





# Who Can Adopt What

- ▶ State and Local Government
  - Public sector buildings generally the same as Federal but for state and local buildings but varies by state
  - Private sector buildings
  
- ▶ Indian Tribes
  - Adopt for buildings on tribal territory
  
- ▶ Private Sector
  - Adopt for their own buildings beyond public mandates

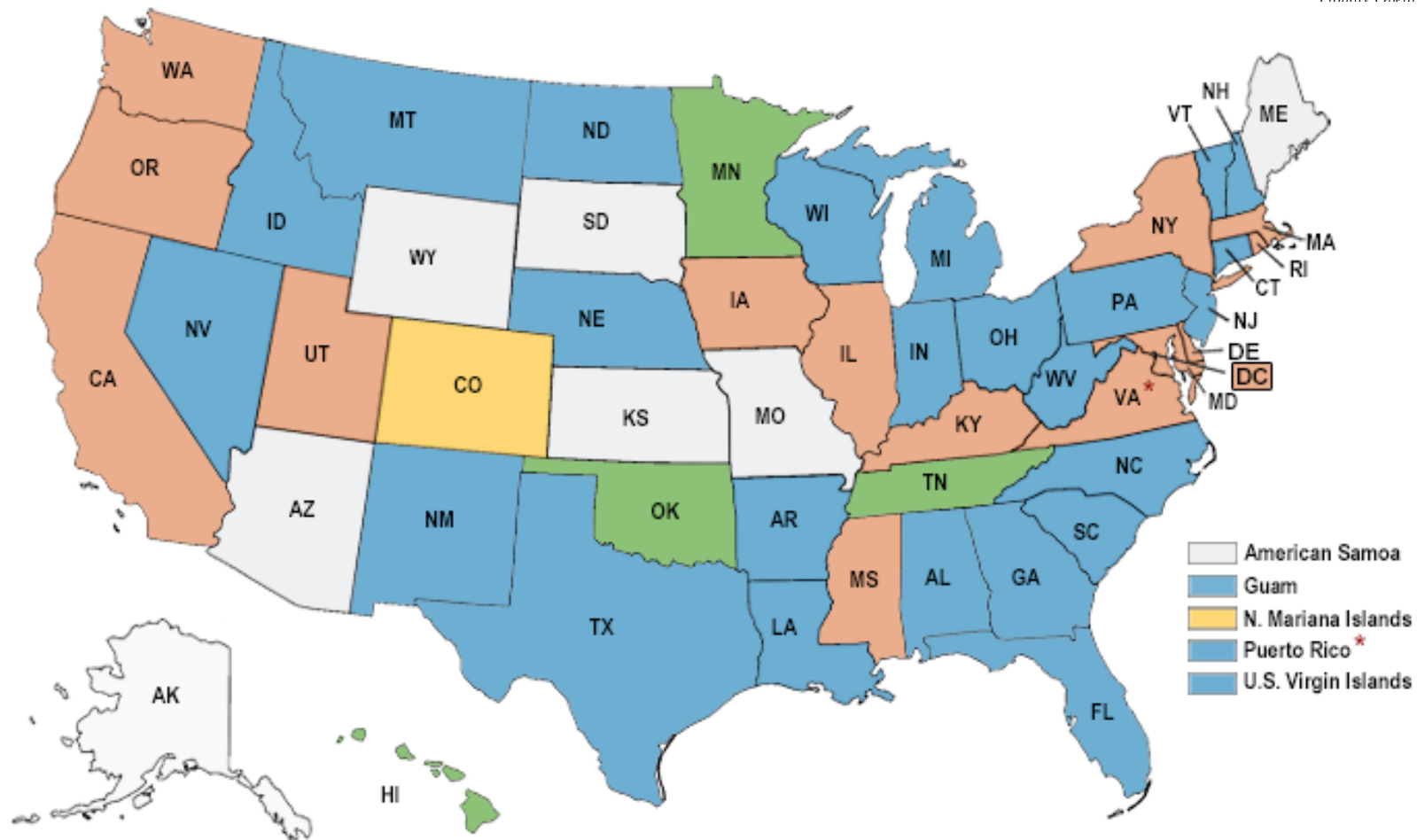


# Adoption Status – Commercial Buildings



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\* Adopted new Code to be effective at a later date

As of December 2014

# Federal Building Energy Efficiency Standards

- ▶ DOE has developed regulations for energy efficiency in Federal buildings
  - New Federal buildings must meet ANSI/ASHRAE/IES 90.1-2010 and if life cycle cost effective also design to have an annual energy cost at least 30% less than if meeting 90.1-2010
- ▶ Each Federal agency is responsible for following Federal law and DOE regulations as to the adoption and application of the regulations within their building programs



*New GSA headquarters building, Washington, DC*



# Tips for Addressing Compliance

- ▶ The documents are lengthy and can be complicated and also reference other documents - so save yourself time and money
  - Develop a 'cheat sheet' for the climate zones in which you work delineating thermal envelope and other climate zone related criteria
  - Develop a 'cheat sheet' or standardized specification covering the types of systems you commonly specify
  - Develop standardized language for specifications that can be re-used and adjusted based on the value of metric(s) covered in the document
  - Develop standardized language for specifications that can be re-used and adjusted to address criteria that are impacted by installation quality (e.g. air leakage, duct leakage)





## More Tips

- ▶ Failure to comply with adopted requirements can cause project delay and cost overruns
  - Provide preliminaries of the compliance documentation to applicable AHJs early on in the design process
  - Be specific in language associated with construction, application of materials, testing and quality assurance
  - If someone else is responsible for compliance be specific as to what it is, who is to do it, and the desired results

# Common Needs of those Deploying Codes



- ▶ Copies of adopted codes
- ▶ Education and training – knowledge of what’s in the codes and how to apply the provisions
- ▶ Standardized tools and resources to facilitate documenting code compliance
- ▶ Testing equipment and qualified personnel
- ▶ Documentation of costs, benefits and best-practices

*Challenge:* These needs are not always centrally located and available from a single organization and needs can be regional, state or locally unique

*Response:* Services and programs to address these needs are available

# DOE's Building Energy Codes Program



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- ▶ Technical support
- ▶ Code notes
- ▶ Publications
- ▶ Training programs

90.1-2010 Section #	Framing / Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
5.4.3.1.2 [FR15]	Continuous air barrier is wrapped, sealed, caulked, gasketed, and/or taped in an approved manner.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.4.3.2 [FR1]	Factory-built fenestration and doors are labeled as meeting air leakage requirements.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.4.3.4 [FR4]	Vestibules are installed where building entrances separate conditioned space from the exterior, and meet exterior envelope requirements. Doors have self-closing devices, and are >=7 ft apart.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.5.4.3a [FR8]	Vertical fenestration U-Factor.	U-_____	U-_____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.5.4.3b [FR9]	Skylight fenestration U-Factor.	U-_____	U-_____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.5.4.4.1 [FR10]	Vertical fenestration SHGC value.	SHGC:_____	SHGC:_____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.5.4.4.2 [FR11]	Skylight SHGC value.	SHGC:_____	SHGC:_____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.8.2.1 [FR12]	Fenestration products rated in accordance with NFRC.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.8.2.2 [FR13]	Fenestration products are certified as to performance labels or certificates provided.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
5.8.2.3, 5.5.3.6 [FR14]	U-factor of opaque doors associated with the building thermal envelope meets requirements.	U-_____	U-_____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<input type="checkbox"/> Swinging <input type="checkbox"/> Nonswinging <input type="checkbox"/> Swinging <input type="checkbox"/> Nonswinging

## ▶ Contact Information

■ <http://www.energycodes.gov>

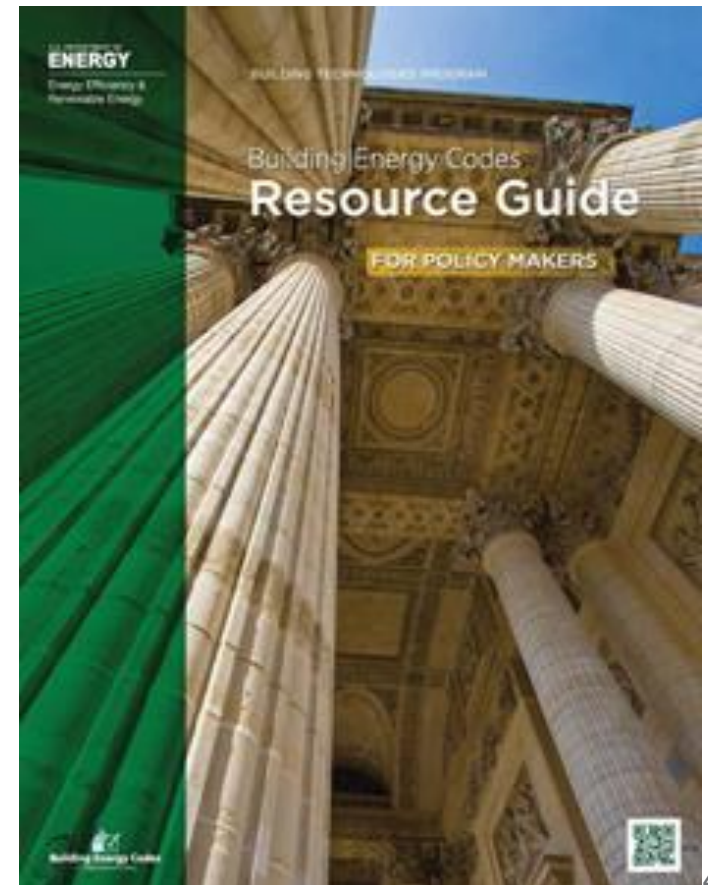
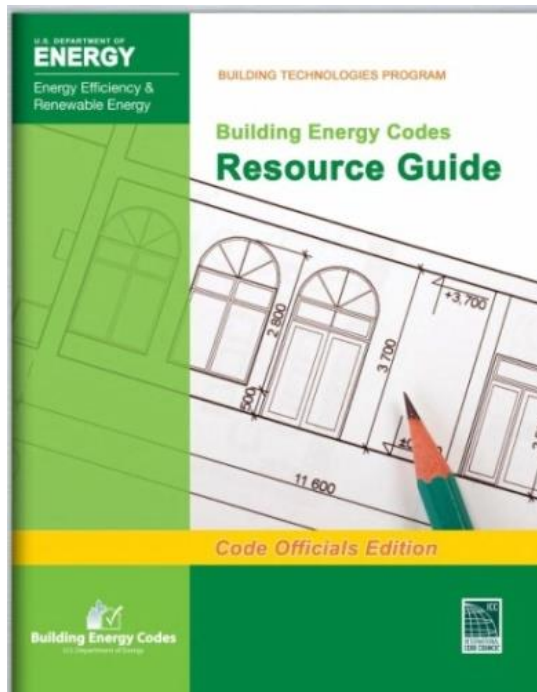
■ <http://www.energycodes.gov/resource-center/help-desk>



# DOE's Building Energy Codes Program



## Resource Guides





# DOE's Building Energy Codes Program

- ▶ The COMcheck software offers a quick and easy way to demonstrate compliance with commercial building energy codes, including Standard 90.1 and the IECC.
- ▶ For free download (Windows and Mac versions), Web version, and more information, see <http://www.energycodes.gov/comcheck>

The screenshot shows the COMcheck-Web software interface in a Windows Internet Explorer browser. The interface includes a navigation menu with tabs for PROJECT, ENVELOPE, INT. LIGHTING, and MECHANICAL. Below the menu is a table of building components with columns for Component, Assembly, Construction Details, Gross Area, Cavity Insulation R-Value, Continuous Insulation R-Value, and U-Factor. A 'CHECK COMPLIANCE' button is visible at the bottom of the interface.

Row	Component	Assembly	Construction Details	Gross Area	Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor
1	Roof 1	Non-Wood Joist/Rafter/Truss		6112 ft <sup>2</sup>	0.0	26.1	0.037
2	Skylight 1	Metal Frame, Double Pane	Glazing: Tinted	112 ft <sup>2</sup>			0.500
3	Exterior Wall 1	Solid Concrete or Masonry <= 8in.	Furring: Metal	6000 ft <sup>2</sup>	22.0	0.0	0.114
4	Door 1	Glass	Glazing: Clear	42 ft <sup>2</sup>			0.700
5	Window 1	Metal Frame, Double Pane with Low-E	Glazing: Tinted	1500 ft <sup>2</sup>			0.600
6	Window 2	Metal Frame, Double Pane	Glazing: Clear	56 ft <sup>2</sup>			0.700



# NASEO Background and Resources



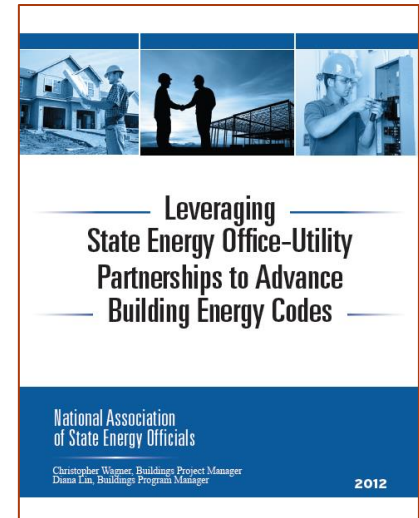
- ▶ The National Association of State Energy Officials is the membership association for the 56 State and Territory Energy Offices (SEOs)
- ▶ The SEOs are governor-designated agencies that promote energy efficiency and economic development through state policies and programs
- ▶ SEO engagement on commercial and public building energy codes varies from state to state:
  - Overseeing/participating in state development/adoption process
  - Funding/leading energy code training courses or plan review
  - Collaborating with local jurisdictions on code training, enforcement, and compliance assessment
  - Collaborating with utilities on ratepayer funded energy efficiency or energy code programs
  - Managing code compliance evaluation studies
  - Convening stakeholder groups to identify strategies for code adoption and compliance
  - Creating state “stretch” codes for public or commercial buildings

# NASEO Resources

- ▶ In order to support the State Energy Offices and their codes activities, NASEO serves a variety of roles:
  - Develop reports on State Energy Office codes programs and best practices
  - Convene codes stakeholders to discuss coordinated support for states
  - Collaborate with other codes organizations (DOE, BCAP, REEOs) to deliver effective codes programs to states

## Contact Information

- <http://www.naseo.org>



# Building Code Assistance Project

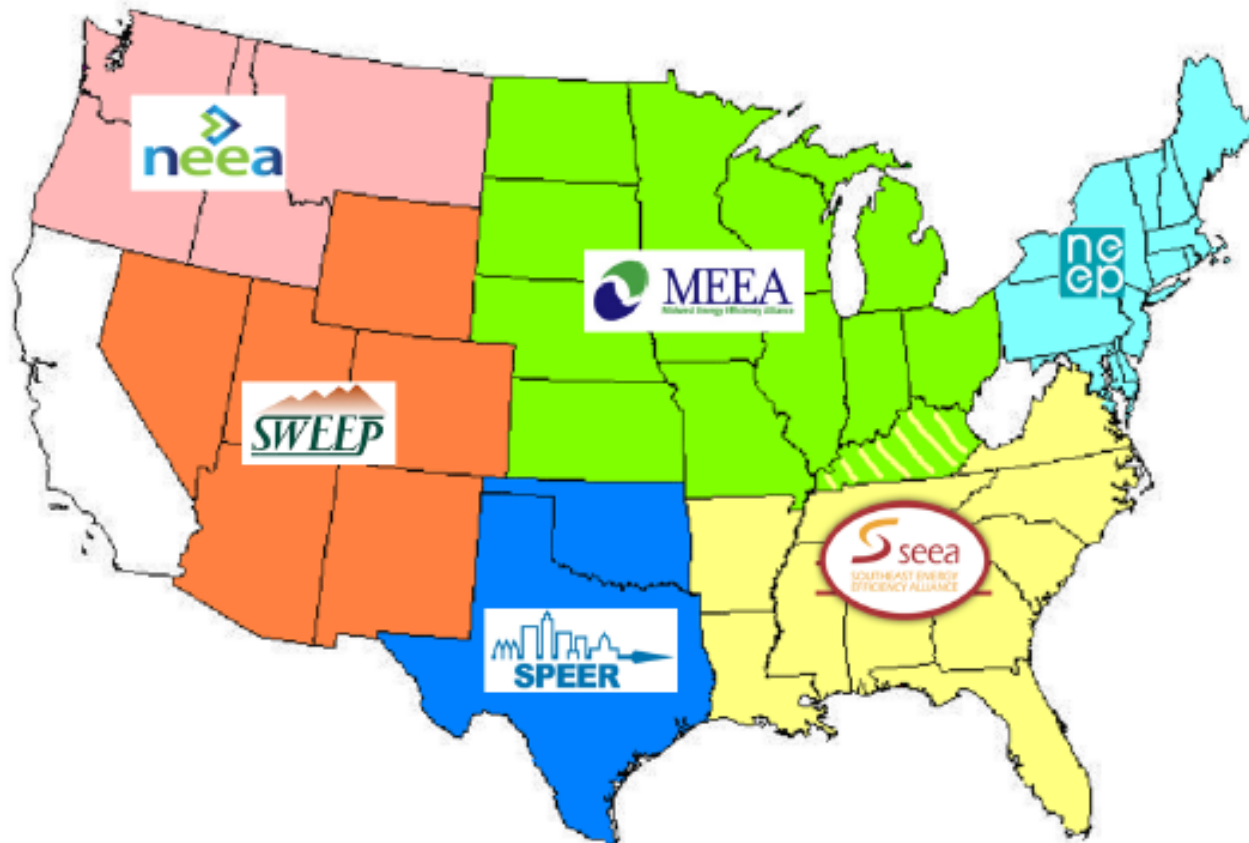
- ▶ Training and education for architects
- ▶ Direct code adoption support
- ▶ Compliance planning assistance
- ▶ Incremental cost savings analyses
- ▶ Consumer outreach
- ▶ Compliance collaboratives
- ▶ Contact Information
  - Maureen Guttman  
([mguttman@bcapcodes.org](mailto:mguttman@bcapcodes.org))
  - <http://bcap-energy.org>
  - <http://energycodesocean.org>



An online portal of building energy code resources, best practices, tools, news, and more



# U.S. Regional Energy Efficiency Organizations



# Northwest Energy Efficiency Alliance



## ▶ NEEA's energy codes team supports:

- Development and adoption of new, increasingly efficient building energy codes by participating in state and national processes.
- Implementation of newly adopted energy codes in each state by:
  - Developing curricula
  - Providing education and training
  - Offering technical assistance
  - Creating compliance tools (forms, explanations, field guides, etc.)

## ▶ Contact Information

- Ken Baker (kbaker@neea.org)
- <http://neea.org>



# Northeast Energy Efficiency Partnership



- ▶ Building Energy Codes
  - Adopt updated energy codes
  - Improve energy code compliance
  - Grow energy code workforce
- ▶ Building Energy Rating
  - State/local building rating policies
  - National rating systems/tools- informed by pilot results, etc.
- ▶ High Performance Buildings
  - NE CHPS 3.0 for schools
  - O&M Guidelines for public buildings
  - Zero net energy public building roadmap
- ▶ Contact Information
  - Carolyn Sarno ([csarno@neep.org](mailto:csarno@neep.org))
  - <http://www.neep.org>

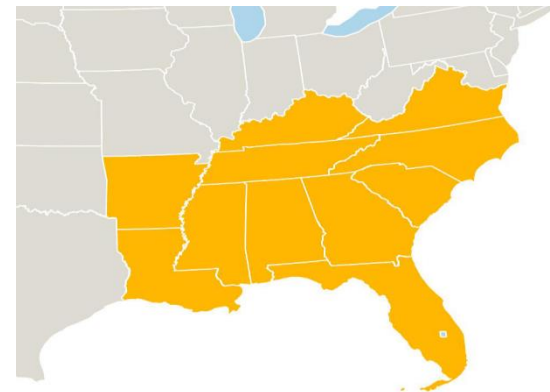


# Southeast Energy Efficiency Alliance



- ▶ Stakeholder engagement
- ▶ Energy Code Training
- ▶ State-Specific, Comprehensive, Illustrated Success Manuals
- ▶ Mandatory Testing Best Practices
- ▶ Technical Assistance
- ▶ Contact Information
  - Lauren Westmoreland  
([lwestmoreland@seealliance.org](mailto:lwestmoreland@seealliance.org))
  - <http://www.seealliance.org>

## Driving Energy Efficiency Market Transformation in the Southeast



# South-Central Partnership for Energy Efficiency as a Resource



- ▶ Leading the Energy Code Compliance Collaboratives
- ▶ Promoting Code Adoption and Compliance
- ▶ Coordinating Energy Code Ambassadors
- ▶ Connecting local resources and initiatives
- ▶ Working with Local Leadership
- ▶ Offering Education and Certification for Building Operators
- ▶ Providing CHP Technical Assistance
- ▶ Contact Information
  - Doug Lewin ([dlewin@eepartnership.org](mailto:dlewin@eepartnership.org))
  - <http://www.eepartnership.org>



# Southwest Energy Efficiency Project

- ▶ Relationships with public and private stakeholders at the local level
- ▶ Experience with the energy code adoption process, including education and implementation
- ▶ Technical expertise with codes and standards
- ▶ Connections with the local trainers who specialize in commercial buildings and energy codes
- ▶ Technical assistance with commercial building design and construction
- ▶ State-level energy code collaboratives
- ▶ National resources for energy efficiency
- ▶ Contact Information
  - Jim Meyers ([jmeyers@swenergy.org](mailto:jmeyers@swenergy.org))
  - <http://www.swenergy.org>





# Summary

- ▶ Documents such as 90.1, 189.1, IECC and the IgCC impact building design and associated specifications
- ▶ These documents are updated on a regular (3-year) basis and it is important to participate in the update process and know the new criteria
- ▶ Changes will occur to these documents that will impact you and your clients
- ▶ Federal, state and local government regularly adopt these documents predominately as part of their building construction regulations
- ▶ These documents provide paths through building performance for designers to establish a lead in project delivery
- ▶ Develop standardized specifications and ‘cheat sheets’ that can be used to guide project design and delivery and document compliance
- ▶ There are a myriad of resources available to assist in understanding and implementing energy codes and standards

# Questions?

David Conover

[david.conover@pnnl.gov](mailto:david.conover@pnnl.gov)

[www.energycodes.gov](http://www.energycodes.gov)