U.S. Department of Energy
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Building Energy Codes

# On the Road to the 2009 IECC

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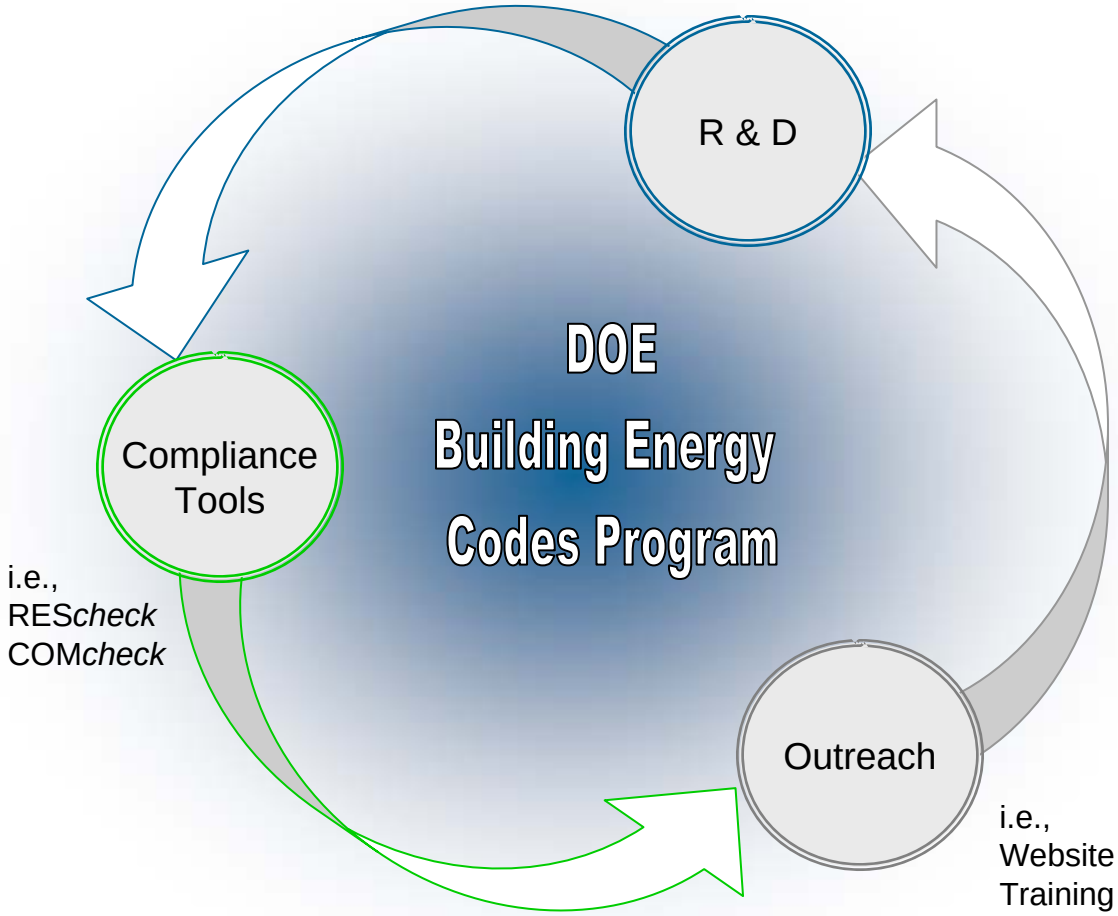
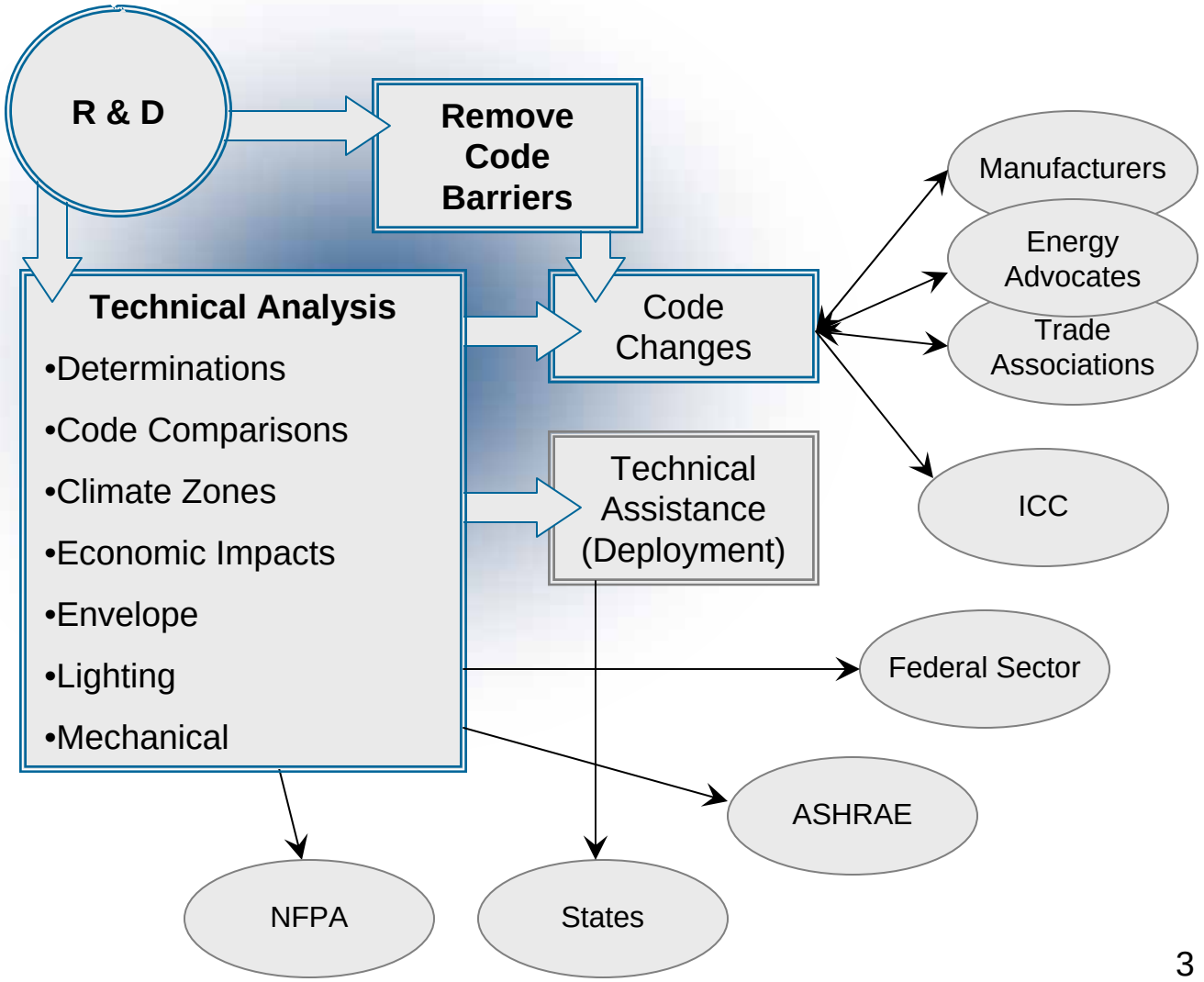
# BECP Structure



# R&D


R & D
Remove Code Barriers
Technical Analysis
•Determinations
•Code Comparisons
•Climate Zones
•Economic Impacts
•Envelope
•Lighting
•Mechanical
Code Changes
Technical Assistance (Deployment)
Manufacturers
Energy Advocates
Trade Associations
ICC
Federal Sector
ASHRAE
NFPA
States

# Goals of This Webcast

1. To provide an overview of what happened in the recent International Energy Conservation Code (IECC) Code Development hearings

2. To encourage you to participate in the remaining parts of the “Road to the 2009 IECC”

3. To explain how to participate in the remaining parts

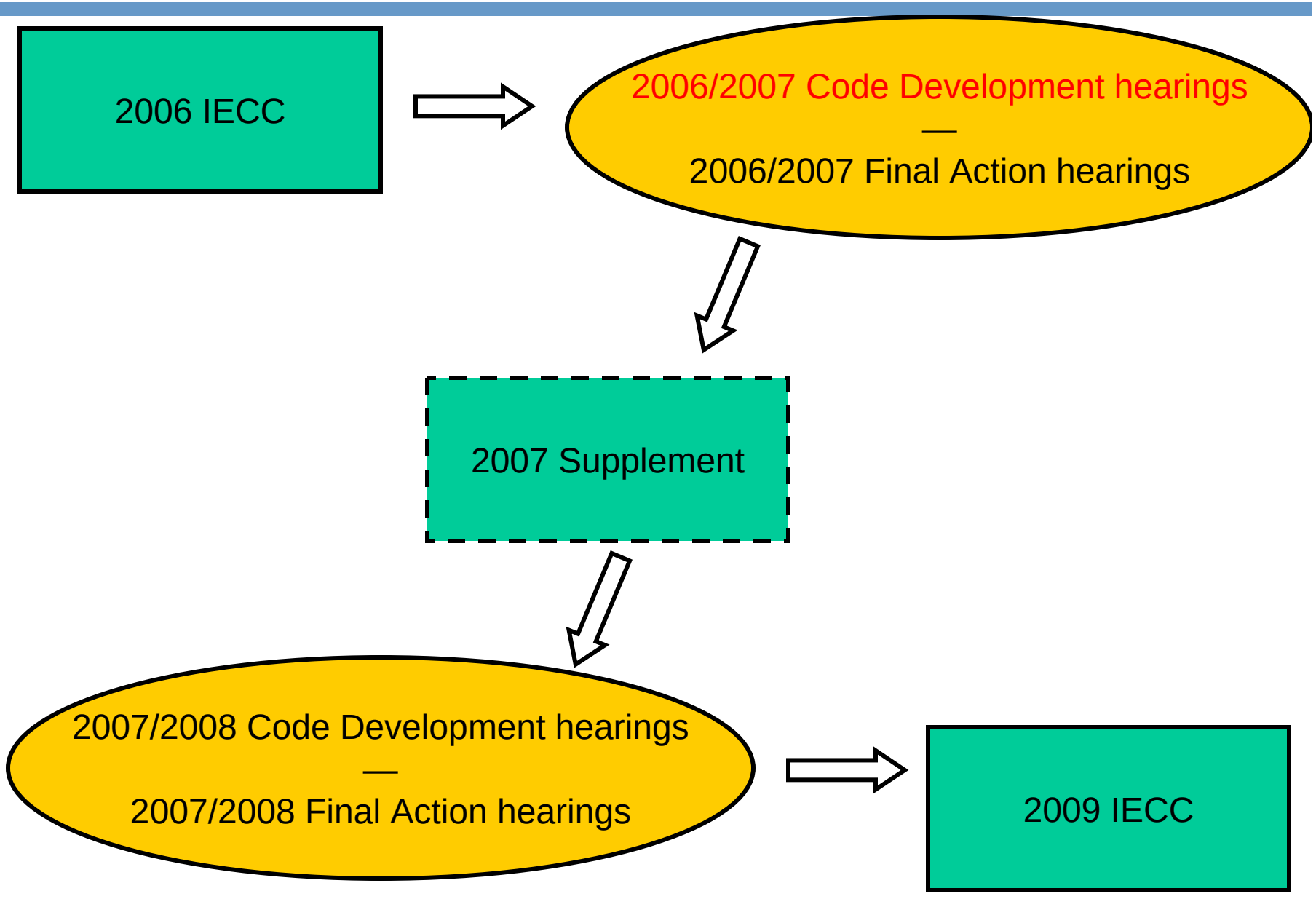
# Outline

- Overview of ICC Process and Terminology
- Proposed Changes Impacting All Buildings
- Proposed Changes to the Commercial Requirements
- Proposed Changes to the Residential Requirements
- How You Can Get Involved

# ICC Process Overview

- "Perpetual" code cycles, ~18 months each
- New publication every other cycle (supplement published in intervening cycles)
- Each 18-month cycle broken into two parts
  1. Code Development hearings (aka "1st hearing")
     - Proposals sent to ICC prior to hearings
     - Proponents argue before an ICC-selected committee
  2. Final Action hearings (aka "2nd hearing")
     - Public comments on committee's decisions sent to ICC prior to hearings
     - Proponents argue before all ICC members present

# The Road to the 2009 IECC



# Terminology

- ***IECC*** – International Energy Conservation Code
- ***IRC*** – International Residential Code
  - One- and Two-Family Dwellings
  - Chapter 11 – Energy Efficiency
  - Other chapters as applicable

# International Codes (I-Codes)

- ***International Building Code®***
- ***International Energy Conservation Code®***
- ***International Code Council Electrical Code Administrative Provisions ®***
- ***International Existing Building Code®***
- ***International Fire Code®***
- ***International Fuel Gas Code®***
- ***International Mechanical Code®***
- ***ICC Performance Code™***
- ***International Plumbing Code®***
- ***International Private Sewage Disposal Code®***
- ***International Property Maintenance Code®***
- ***International Residential Code®***
- ***International Urban-Wildland Interface Code™***
- ***International Zoning Code®***

# Terminology

- ***Code-change proposal*** – anyone may submit to the ICC prior to the Code Development hearings (sometimes called simply a “code change”)
- ***Modification*** – a change to a code-change proposal, raised “from the floor” in the Code Development hearings or via public comment prior to the Final Action hearings (aka “floor mod”)

# Terminology

- ***Committee*** – ICC-selected group that hears arguments at Code Development hearings
- ***Committee Actions*** – Recommendations sent on to Final Action hearings
  - AS (approve as submitted)
  - AM (approve as modified)
  - D (disapprove)
- ***Assembly Actions*** – Motions “from the floor” to overturn Committee Actions
  - ASF, AMF, DF (as per above)

# What Was Proposed in the Current Cycle?

- A total of 2300 code change proposals were submitted to the ICC
- 132 code change proposals were submitted to the IECC
  - 31 proposals impacted both residential and commercial buildings
  - 49 impacted commercial buildings only
  - 52 impacted residential buildings only

# What Happened at the Code Development Hearings?

- Mixed residential and commercial proposals - 31
  - 10 Approved As Submitted, 5 As Modified (48%)
  - 15 Denied, 1 Withdrawn by Proponent
- Commercial only proposals - 49
  - 19 Approved As Submitted, 4 As Modified (47%)
  - 25 Denied, 1 Withdrawn by Proponent
- Residential only proposals - 52
  - 16 Approved As Submitted, 2 As Modified (35%)
  - 30 Denied, 4 Withdrawn by Proponent

# Proposals Affecting All Building Types

- Vapor Retarders – EC28 relaxes requirements for certain wall constructions (IECC AM, IRC D)
- Insulation R-values – EC11 requires R-value to be based on 16-CFR-460 at 75°F, in units of h-sf-F/Btu (IECC AS, IRC D)
- Climate Zones – EC29 shifts eight WA counties from zone 5 Dry to zone 6 Dry (IECC D, IRC D)

# Proposals Affecting All Building Types

- Beyond-Code Appendix – EC131 adds an informative appendix for states/jurisdictions interested in better-than-minimum code options (IECC D)
- Site-built Windows and Storefronts – EC9 allows AAMA 507 as an alternative to NFRC (IECC D)

# Proposals Affecting All Building Types

- High-rise Residential and Commercial Requirements – Redefine building types or allow alternative compliance (EC1, EC8 Disapproved)
- Above-Code Programs – EC15 removes allowance for local official to approve beyond-code programs as meeting the IECC (IECC D, IRC D)
- Definitions – Various proposals would modify (EC24, EC26, and EC27 Disapproved)

# Proposals Affecting All Building Types

- Clarifications of Existing Requirements – (EC2, EC4, EC5, EC6, EC7, and EC25 Approved)
- Administrative Language – Various changes to correlate with other I-codes (EC16, EC18, EC19, EC20, EC22, and EC23 Approved; EC3, EC10, EC12, EC13, EC14, and EC21 Disapproved)
- Documentation Requirements – EC17 requires additional detail on building plans, as applicable (IECC AM)

# Proposals Affecting Commercial Buildings

- Envelope Requirements – EC82 eliminates use of ASHRAE Standard 90.1 envelope requirements as an option to the IECC
- Additional Envelope Table – EC82 and EC84 add U-, F-, and C-factors to R-value requirements
- New Tradeoff Mechanism – EC82 also adds UA and SHGC-A tradeoffs

# Proposals Affecting Commercial Buildings

- Skylights – EC95 eliminates separate requirements for plastic skylights and lowers skylight U-factors in Climate Zones 1-3
- Controlled Ventilation – EC104 adds a demand controlled ventilation requirement for high occupancy areas
- Economizers – EC112, EC113, EC114 – modify economizer requirements
  - Add exception for spaces that are humidified or dehumidified (EC112)
  - Limit “non-economizer” capacity to eliminate use of many small units (EC113)
  - Lowers cooling capacity threshold in Climate Zones 5A and 6A and requires economizers in Climate Zones 3A and 4A (EC114)

# Proposals Affecting Commercial Buildings

- Daylighting – Individual controls for daylight zones under skylights or near windows required (EC122: Approved); requirements for daylighting controls in big box retail and warehouse (EC90: Disapproved)
- Mechanical Systems and Equipment Requirements – EC98, EC102, EC104, EC105, EC106, EC107, EC108, EC109, EC112, EC113, EC114, EC117, EC119, and EC132: Approved; EC101, EC103, EC115, EC116, and EC118: Disapproved
- Lighting Controls – EC122, EC123, and EC125 clarify requirements for sleeping unit controls and exterior lighting controls

# Proposals Affecting Commercial Buildings

- Interior Lighting Power – EC124 and EC126 modify interior lighting power exceptions
- Reference Standards – EC130 updates reference standards
- Air/Moisture Management – Requirements for vapor retarders (EC28: Approved); EC96 and EC97 deal with air barriers; EC99 with vestibules; and EC100 with moisture condensation (EC96, EC97, and EC99: Disapproved)

# Proposals Affecting Commercial Buildings

- Commissioning – Add commissioning requirements (EC110 and EC111: Disapproved)
- Building Envelope – Modify opaque and glazing envelope requirements (EC83, EC86, EC87, EC89, EC90, EC91, EC92, and EC93: Disapproved)
- Lighting Systems – Modify lighting system requirements (EC120, EC121, EC127, EC128, and EC129: Disapproved)

# Proposals Affecting Residential Only

- There were 52 residential IECC proposals
  - 34 disapproved or withdrawn by the proponent
  - 18 approved (35%)
- 34 corresponding proposals in the IRC energy chapter
- Additionally, a few energy-related proposals were heard by the structural, mechanical, or general committees

# Proposals Affecting Residential Only

- Lower SHGC
  - EC39 reduces the maximum allowable SHGC from 0.4 to 0.37 in climate zones 1 and 2 (IECC AS)
  - EC35 would reduce maximum allowable SHGC to 0.25 in climate zones 1 and 2 (IECC D, IRC D)
- Leakage Testing of Recessed Lighting – EC56 requires that all recessed luminaires be IC-rated and leakage tested against ASTM E 283 (IECC AS, IRC D)

# Proposals Affecting Residential Only

- Sealed Air Handlers – EC64 and EC65 define what "sealed" means in the existing code requirement (EC64:  IECC AS, IRC D; EC65: IECC D, IRC D)
- Basement Wall Insulation – EC42 adds a requirement for insulation in basement walls in climate zone 3 (IECC AS, IRC D)
- Duct Insulation – EC62 lowers duct R-value requirements from R-8 to R-6 for all ducts except supply ducts in attics (IECC AM, IRC AS)

# Proposals Affecting Residential Only

- Wall Insulation – EC38 and EC43 increase wall insulation from R-19 to either R-21 or R-22 in very cold zones (both: IECC WP, IRC D)
- Prescriptive Trade-offs – EC37 would add a table of prescriptive alternatives that allow lower insulation levels in trade for more efficient equipment (IECC D, IRC D)
- Trade-off Limits on Insulation – EC57 would add trade-off limits for ceiling, wall, and foundation insulation (IECC D, IRC D)

# Proposals Affecting Residential Only

- Windows and Glazing – A number of proposals related to trade-off procedures or other changes for windows and glazing (EC35, EC40, EC41, EC44, EC45, EC52, EC53, and EC54: Disapproved)
- Performance Path – Eight proposals would make various tweaks to the details of the Simulated Performance Alternative (EC69, EC73, EC74, EC77, EC78, EC79, EC80, and EC81: Disapproved)

# Proposals Affecting Residential Only

- Clarifications and Simplifications – A host of simple code fixes:
  - EC31, EC32, EC34, EC49, EC55, EC60, EC66, EC70, EC71, EC27, and EC75: Approved
  - EC33, EC36, EC47, EC48, EC50, EC51, EC63, EC65, and EC67: Disapproved

# IECC/IRC Differences—Overview

- As of 2006, the two codes have nearly identical requirements
- Many proposals apply to both codes
- Votes on identical proposals diverged about 25% of the time
  - IECC efficiency improvements *all* disapproved in the IRC
  - If the differences prevail, measurable differences will exist in the 2007 Supplement

# IECC/IRC Differences

| Proposal | IECC | IRC |
|---|---|---|
| R-values per FTC rule (EC11) | AS | D |
| Clarified mass wall requirements (EC 34) | AS | D |
| Basement wall insulation requirement in zone 3 (EC42) | AM | D |
| Insulation and weatherstripping on attic access hatch (EC49) | AS | D |
| U-factor/SHGC trade-off table for cold climates (EC54) | D | AS |

# IECC/IRC Differences

| Proposal | IECC | IRC |
|---|---|---|
| Ratings for recessed luminaires (EC56) | AS | D |
| Elimination of glazing trade-off limits (EC58, EC59) | D | AS |
| New vapor retarder allowances (EC28) | AM | D |
| Duct R-value lowered from R-8 to R-6 (EC62) | AM | AS[1] |
| Manufacturer's designation for sealed AHUs (EC64) | AS | D |

1. Approved, but w/o modification to remove 'mandatory' designation.

# What Can You Do Now?

- Review the existing proposals and the results of the recent hearings
  - See http://www.iccsafe.org/cs/codes/2006-07cycle/index.html for details
- Consider submitting a “public comment” if you disagree with any of the hearing results
  - See http://www.iccsafe.org/cs/codes/publicforms.html for forms

# Review of Process Leading to the 2007 Supplement

1. Submission of Proposals
2. Code Development Hearing on Proposals
3. “Public Comments” on Results of Hearing
4. Final Action Hearing

# Public Comment on Code Change Proposals

- The “Public Comment” period offers a “second chance” before the code cycle ends
- Public comments must be related to the original proposals, so no completely new proposals are allowed
- Public comments generally attempt to overturn results of first hearing, either by:
  - Asking disapproval of proposals approved at first hearing
  - Asking approval of proposals rejected at first hearing
    - Usually with modifications

# Final Action Hearing

- The Final Action hearing is the second and final public debate on proposed changes
  - Only proposals that have a “public comment” are considered
- The final contents of the codes determined at the Final Action hearings
- Voting is by all code officials in attendance (there is no committee)
- Code officials do not always vote the same way as code development committee members, but the vote of the committee weighs heavily in the final vote

# How to Prepare a Successful Public Comment

- Be smart
  - Make sure the wording is precise, clear, and does not conflict with other parts of the code or with other I-codes
- Be convincing
  - Provide a convincing reason as to why the code change should be rejected or accepted, with supporting technical material
  - Recommend specific modifications to the proposal if appropriate
- Be prompt
  - Send your public comment to the ICC by the deadline

# How to Support a Public Comment

- Be active
  - Attend the final action hearing and testify in support of your public comment
- Be prepared
  - Provide concise and relevant testimony
- Be strategic
  - If the proposal you are supporting (or opposing) may be controversial, you may want to recruit others to also testify in support (or opposition)

# What Can You Do Next Year?

- Attend final action hearings next May in Rochester, NY
  - The final action hearings should also be webcast

- Begin to think about any new code changes you would like. Consider preparing a proposal for the next cycle. New proposals for the 2009 IECC will be due in the fall of 2007.

# Key Dates on the Road to the 2009 IECC

- March 2006 — Code Change Proposals Due
- July 2006 — Code Change Proposals Published
- Sept 2006 — Code Development Hearings
- Dec 2006 — Report of Hearing Published
- Jan 2007 — Deadline for Public Comments
- April 2007 — Publication of Final Action Agenda
- May 2007 — Final Action Hearings
- Summer 2007 — Publication of 2007 Supplement
- Fall 2007 — Start of Next Code Cycle

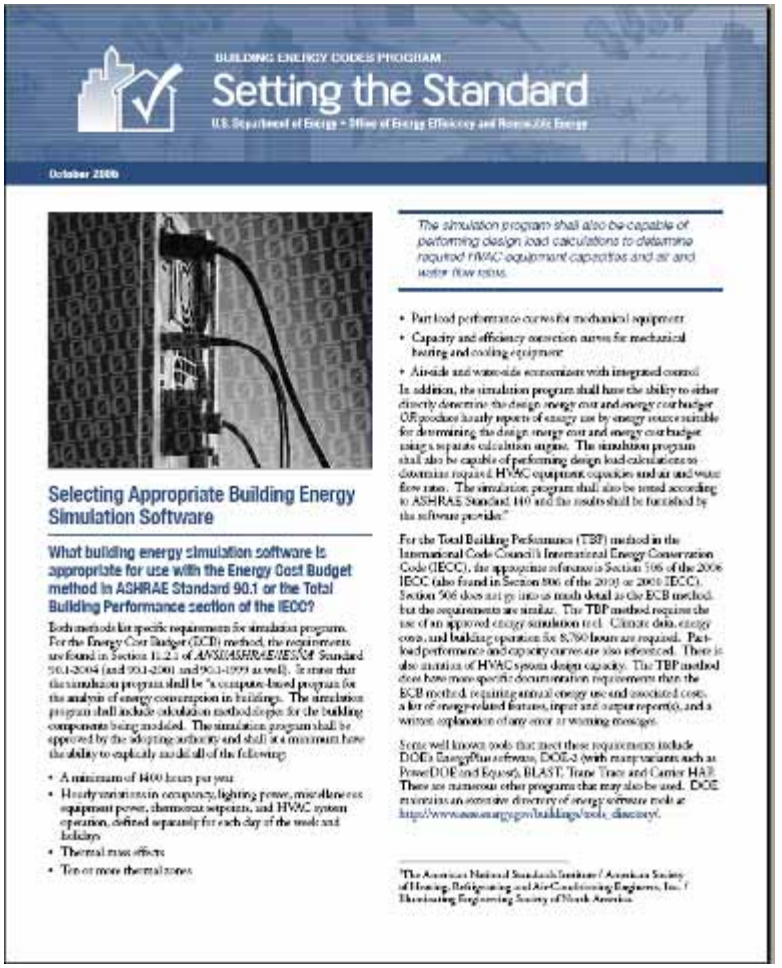
# The Official ICC Web Sites

- Official information on the ICC process and I-codes may be found at www.iccsafe.org
- Official ICC information on the current code development cycle may be found at http://www.iccsafe.org/cs/codes/2006-07cycle/index.html
- The official ICC schedule for the current code development cycle may be found at http://www.iccsafe.org/cs/codes/2006-07cycle/2006-07CDSch.pdf

# www.energycodes.gov
# techsupport@becp.pnl.gov

# Setting the Standard Newsletter

- Register on-line to receive the latest up-to-date information on energy code related issues



BUILDING ENERGY CODES PROGRAM

Setting the Standard

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October 2006

*The simulation program shall also be capable of performing design load calculations to determine required HVAC equipment capacities and air and water flow rates.*

- Part load performance curves for mechanical equipment
- Capacity and efficiency correction curves for mechanical heating and cooling equipment
- Air-side and water-side economizers with integrated control

In addition, the simulation program shall have the ability to either directly determine the design energy cost and energy cost budget OR produce hourly reports of energy use by energy source suitable for determining the design energy cost and energy cost budget using a separate calculation engine. The simulation program shall also be capable of performing design load calculations to determine required HVAC equipment capacities and air and water flow rates. The simulation program shall also be tested according to ASHRAE Standard 140 and the results shall be furnished by the software provider."

For the Total Building Performance (TBP) method in the International Code Council's International Energy Conservation Code (IECC), the appropriate reference is Section 506 of the 2006 IECC (also found in Section 506 of the 2009 or 2012 IECC). Section 506 does not go into as much detail as the ECB method, but the requirements are similar. The TBP method requires the use of an approved energy simulation tool. Climatic data, energy costs, and building operation for 8,760 hours are required. Part-load performance and capacity curves are also referenced. There is also mention of HVAC system design capacity. The TBP method does have more specific documentation requirements than the ECB method, requiring annual energy use and associated costs, a list of energy-related features, input and output report(s), and a written explanation of any error or warning messages.

Some well known tools that meet these requirements include DOE's EnergyPlus software, DOE-2 (with many variants such as PowerDOE and Equest), BLAST, Trane Trace and Carrier HAP. There are numerous other programs that may also be used. DOE maintains an extensive directory of energy software tools at http://www.eere.energy.gov/buildings/tools_directory/.

[1]The American National Standards Institute / American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. / Illuminating Engineering Society of North America

**Selecting Appropriate Building Energy Simulation Software**

**What building energy simulation software is appropriate for use with the Energy Cost Budget method in ASHRAE Standard 90.1 or the Total Building Performance section of the IECC?**

Both methods list specific requirements for simulation programs. For the Energy Cost Budget (ECB) method, the requirements are found in Section 11.2.1 of *ANSI/ASHRAE/IES*[1] Standard 90.1-2004 (and 90.1-2001 and 90.1-1999 as well). It states that the simulation program shall be "a computer-based program for the analysis of energy consumption in buildings. The simulation program shall include calculation methodologies for the building components being modeled. The simulation program shall be approved by the adopting authority and shall at a minimum have the ability to explicitly model all of the following:

- A minimum of 8400 hours per year
- Hourly variations in occupancy, lighting power, miscellaneous equipment power, thermostat setpoints, and HVAC system operation, defined separately for each day of the week and holidays
- Thermal mass effects
- Ten or more thermal zones

Newsletter: http://www.energycodes.gov/news/

# Questions/Comments

- Help Desk – on-line electronic form
  http://www.energycodes.gov/support/helpdesk.php

- Email
  Techsupport@becp.pnl.gov

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# Thank You

- Please complete a short evaluation of today's webcast at

**www.energycodes.gov/training/onlinetraining/OTR-thankyou.stm**



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