



# 2015 CODES

**DOCKET #BORC-15-0001**

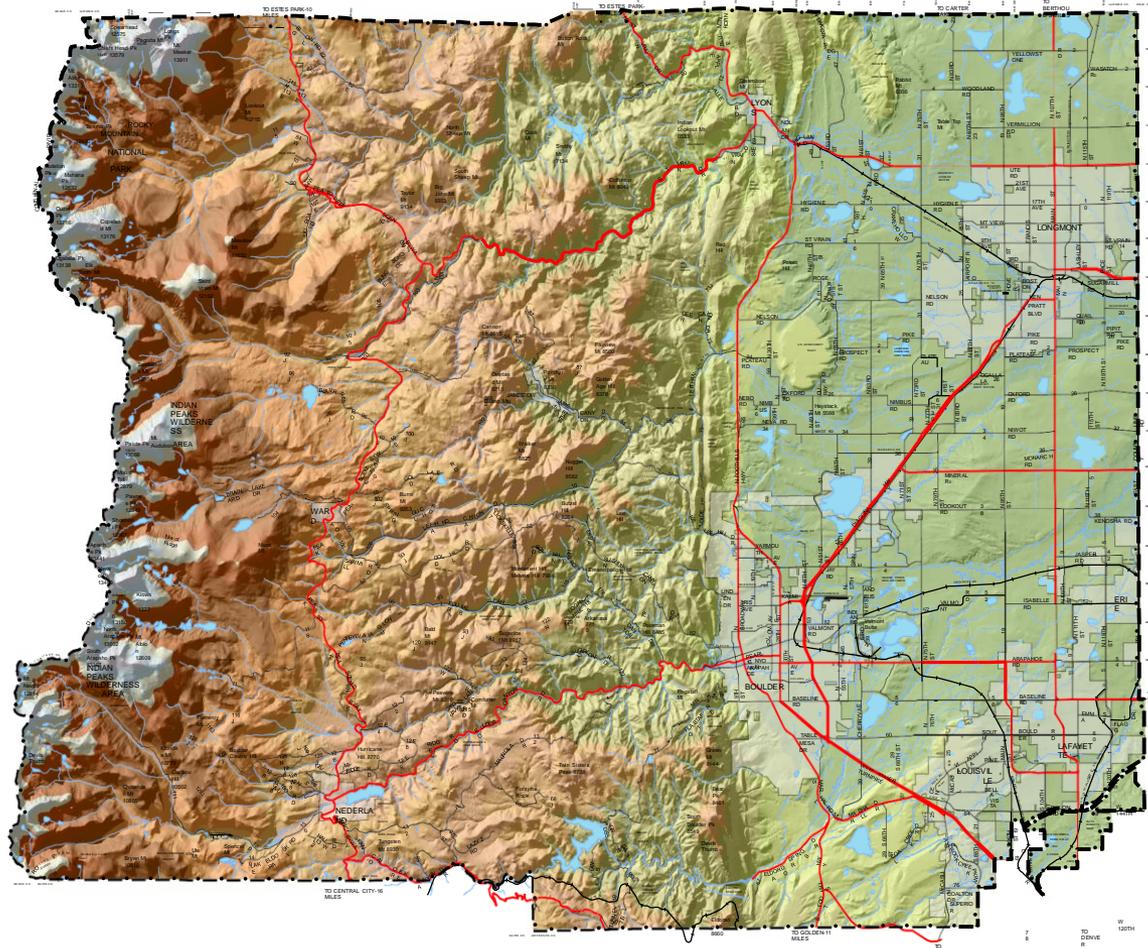
**Proposed BOCC Resolution #2015-104**

**UPDATES TO THE BOULDER  
COUNTY BUILDING CODE TO THE  
LATEST 2015 EDITIONS OF THE  
INTERNATIONAL CODES & OTHER  
AMENDMENTS**

Board of County Commissioners Public Hearing, Tuesday, November 3, 2015-2:00 P.M.



# BOULDER COUNTY



Coordinate System: Colorado State  
Plane North NAD83 / HARN  
Projection: Lambert Conformal Conic  
Central Meridian: -  
105.500 Latitude of  
Origin: 40.333

Source:  
USGS 7.5 Min. DEM  
Boulder County Transm.  
Data  
Date: June 2003

# UNINCORPORATED BOULDER COUNTY

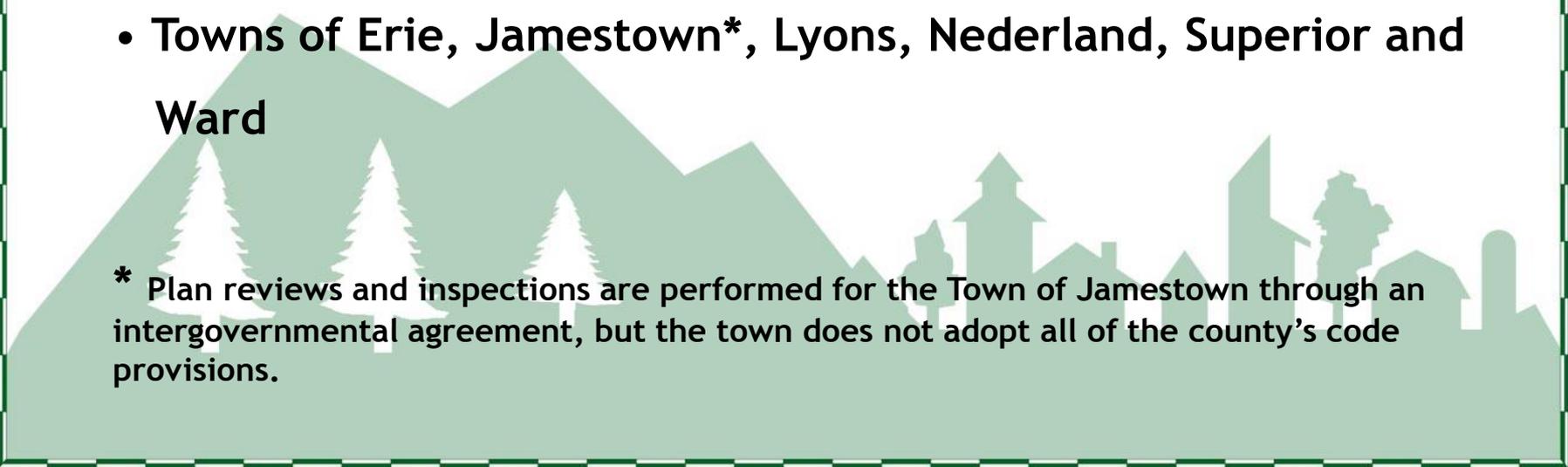
- DOES INCLUDE:

- Boulder County areas outside of cities and towns
- Unincorporated areas like Allenspark, Eldora, Eldorado Springs, portions of Gunbarrel and all of Niwot

- DOES NOT INCLUDE:

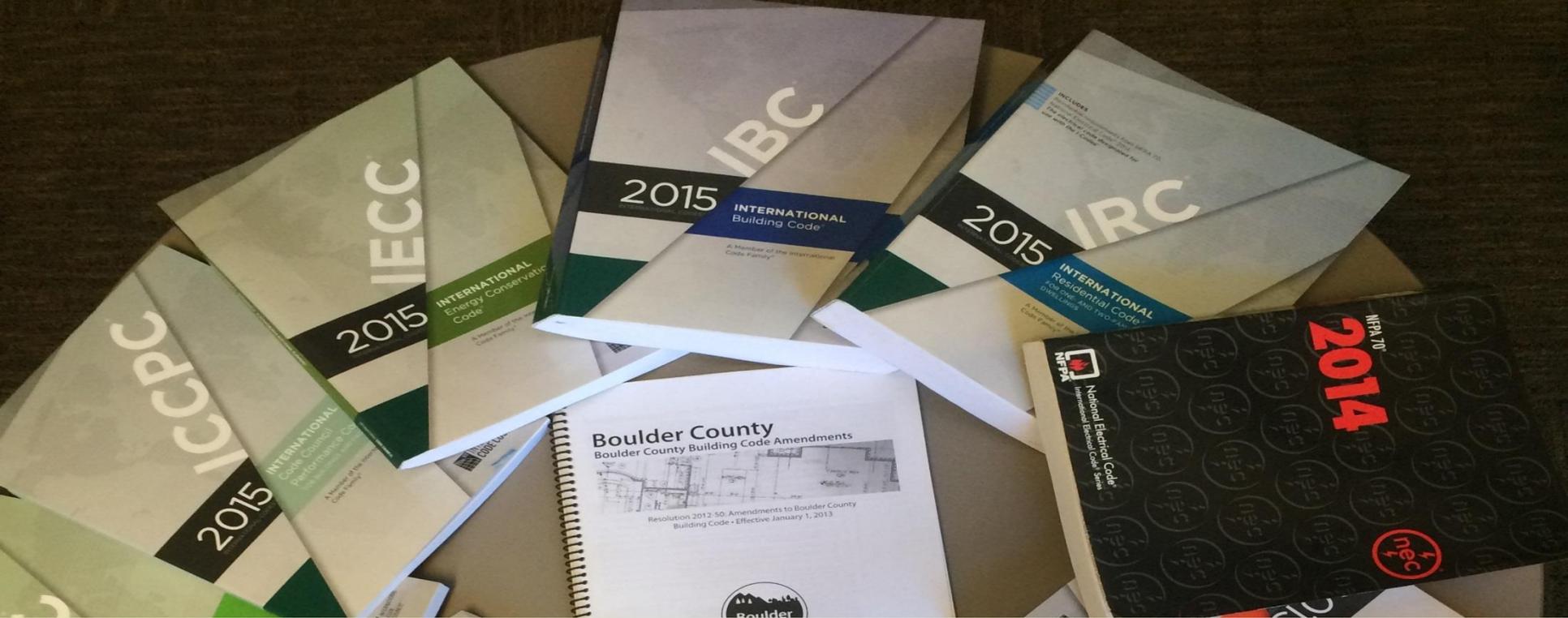
- Cities of Boulder, Lafayette, Longmont and Louisville
- Towns of Erie, Jamestown\*, Lyons, Nederland, Superior and Ward

\* Plan reviews and inspections are performed for the Town of Jamestown through an intergovernmental agreement, but the town does not adopt all of the county's code provisions.



# 2015 BUILDING CODES ADOPTION PROCESS

- Land Use Department Web Site Postings, Updates
- E-Mail Notifications to E-Mail List Servers, Licensed Contractors and other interested parties.
- Tuesday, July 14, 4:00 P.M.: Board of Review Public Meeting for input and feedback on proposed code adoptions/amendments
- Thursday, August 6, 3:00 P.M.: Board of Review Public Meeting and work session.
- Tuesday, August 11, 12:00 - 1:30 P.M.: Colorado Green Building Guild (CGBG) Brown Bag Lunch Presentation.
- Tuesday, September 1, 3:00 p.m.: 1st Board of Review Public Hearing.
- Tuesday, September 22, 3:00 p.m.: 2nd Board of Review Public Hearing.
- Tuesday, October 13, 4:15 pm: Board of Review Public Meeting to consider 3 TABLED issues from the September 22 Public Hearing.
- Tuesday, November 3, 2:00 pm - Board of County Commissioners Public Hearing
- Friday, January 1, 2016: Updated Codes Effective for all Building Permit Applications received on or after this date (effectively January 4, 2016).



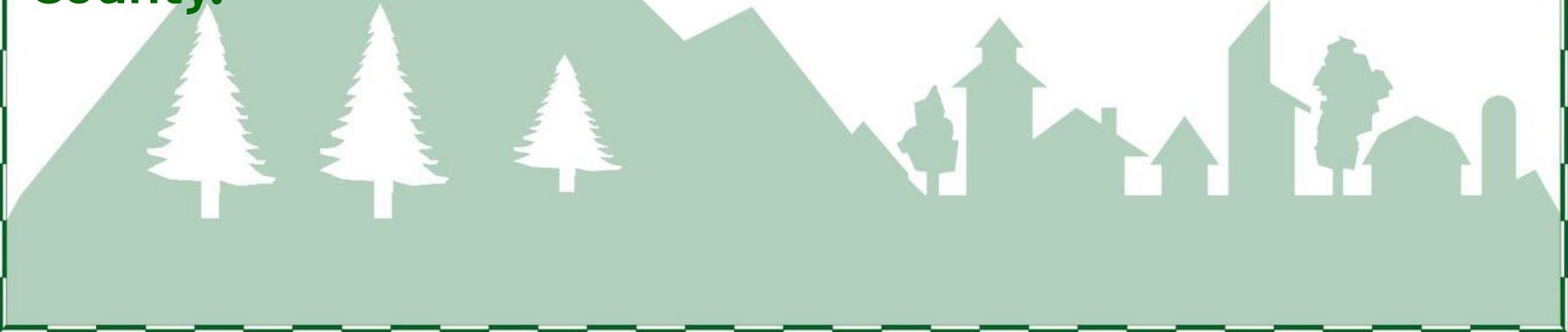
- We are proposing to adopt Eleven (11) nationally recognized model codes with 2,887 pages of highly technical material.
- Our current amendments occupy about 90 pages, most of which is combining all of the Chapter 1 administrative provisions into one Chapter 1.
- Otherwise, our most significant amendments are probably our wildfire hazard mitigation provisions and our “BuildSmart” program amendments to Chapter 11 of the International Residential Code (“IRC”).
- We are proposing to substantially reduce our existing “local amendments” in favor of the published model codes.

## THE INTERNATIONAL CODE COUNCIL (“ICC”) AND THE INTERNATIONAL CODES

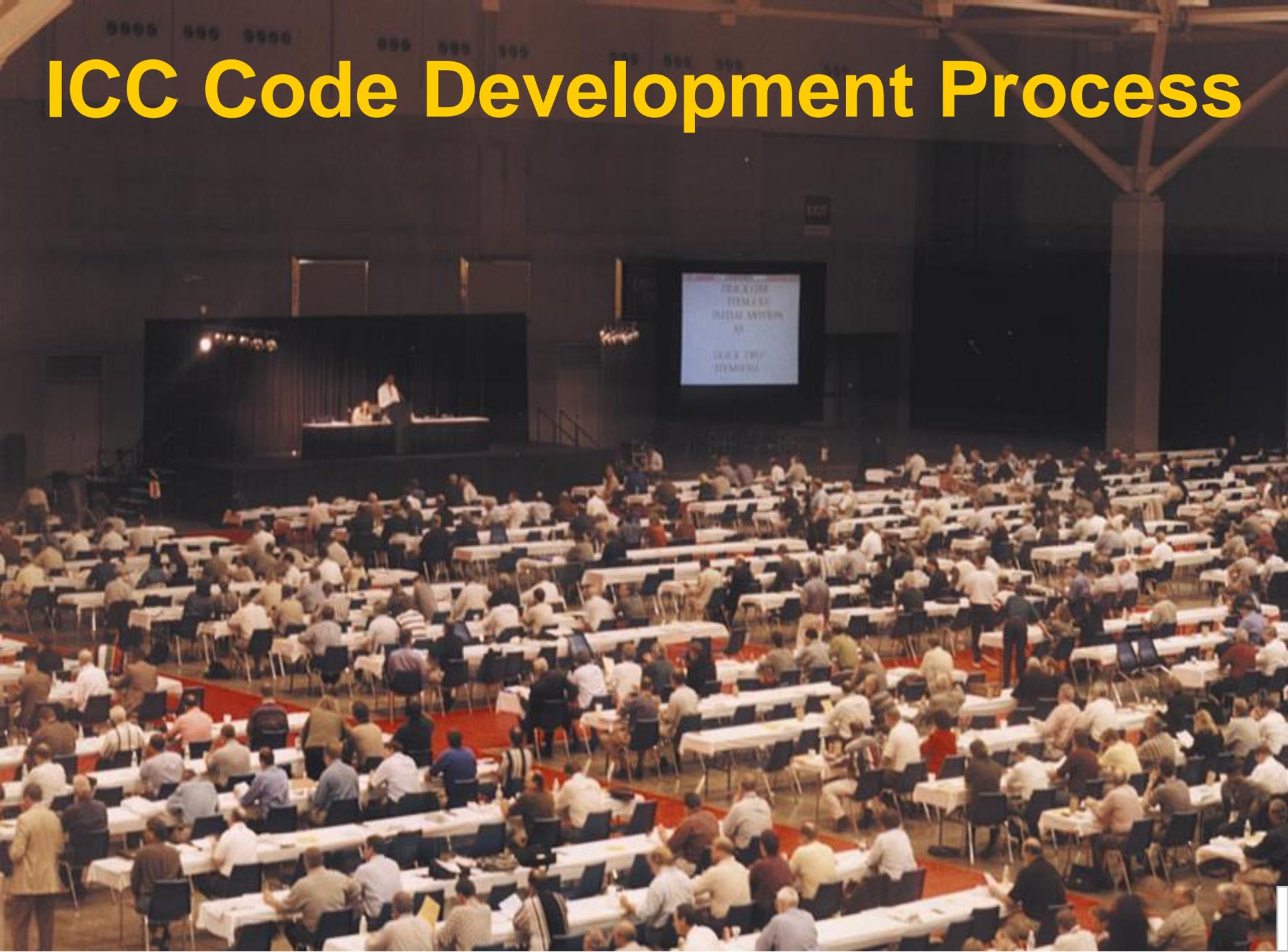
- The International Building Codes, including the International Building Code (“IBC”), International Residential Code (“IRC”) and other nationally recognized model codes dealing with building fuel gas, mechanical and plumbing systems, energy conservation and green building, are promulgated by the International Code Council (“ICC”). The ICC is composed of building officials, fire officials, design professionals, industry representatives, contractors, homebuilders and others involved in the design and construction of buildings.
- The International Codes are nationally recognized minimum safety standards governing the design and construction of buildings and structures.

## THE INTERNATIONAL CODE COUNCIL (“ICC”) AND THE INTERNATIONAL CODES, CONTINUED

- The ICC conducts an ongoing code development process. Changes to the codes may be proposed by anyone. Hearings are held on the proposed changes, and the changes are voted upon by national committee members and the ICC membership.
- Major editions of the International Codes are published every three (3) years. The most current are the 2015 editions, which are being proposed for adoption and application in the unincorporated areas of Boulder County.



# ICC Code Development Process

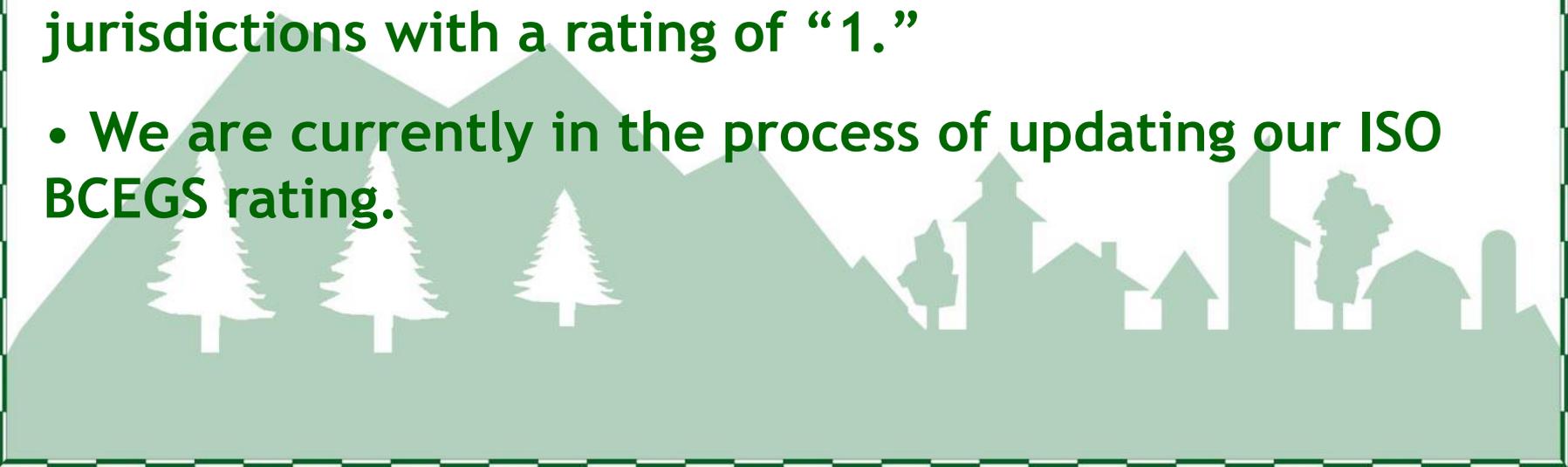


# THE ISO BCEGS PROGRAM

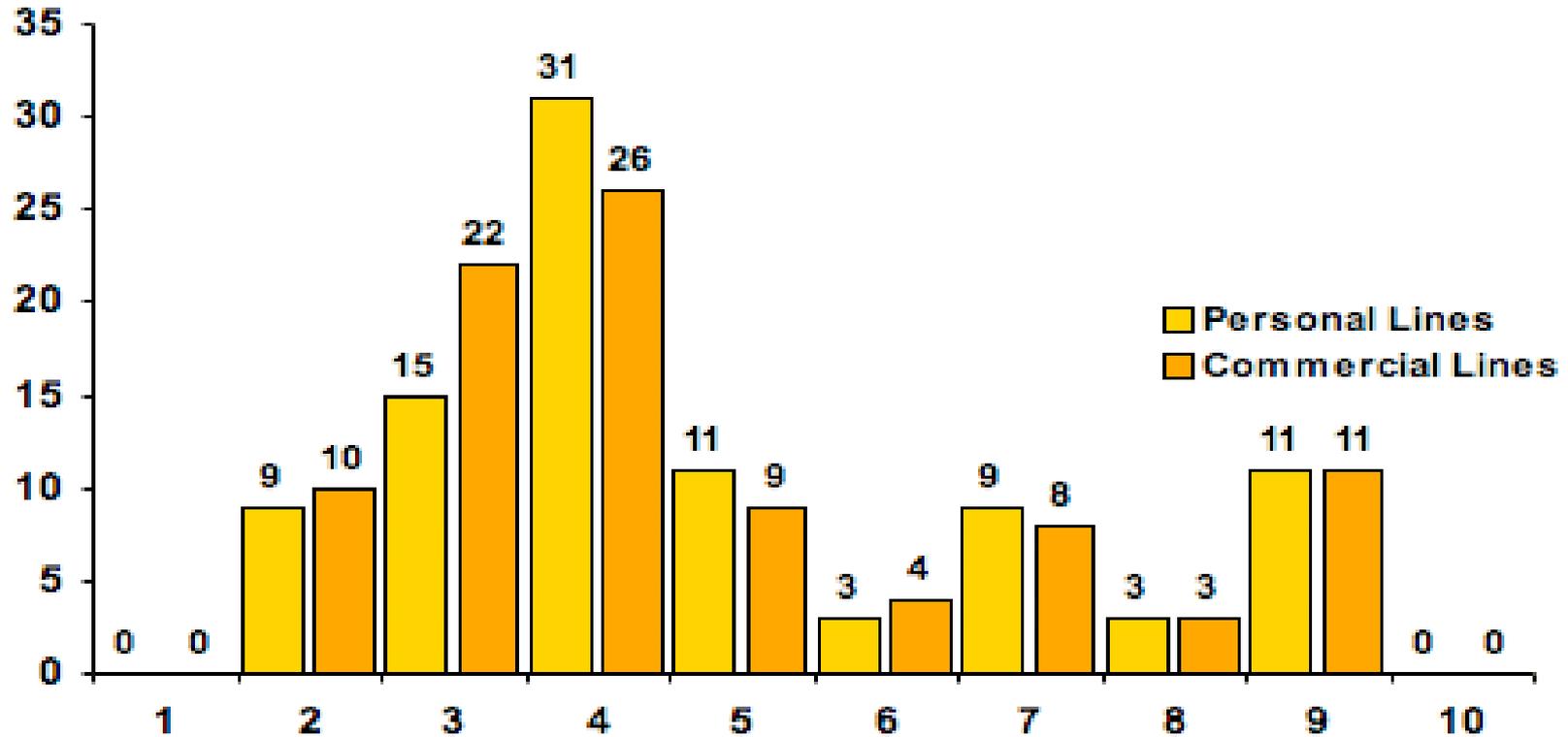
- “ISO BCEGS” stands for the Insurance Services Organization Building Code Effectiveness Grading Schedule.
- Much as it rates fire departments with an “ISO rating,” the ISO surveys and rates building departments all over the country with ratings from 1 - 10, with lower ratings being better.
- Insurance companies use the ISO ratings to assign insurance premium rates. Jurisdictions whose building departments earn lower ISO BCEGS ratings have lower insurance premium ratings for commercial and residential buildings. Discounts begin if a building department achieves a rating of 9 or lower.

# THE ISO BCEGS PROGRAM, cont'd

- Adopting the latest editions of the nationally recognized model codes is a key component of a good ISO rating.
- Boulder County achieved an ISO BCEGS rating of “3” as a result of its last ISO survey. According to ISO records, there are only 9-10 jurisdictions out of 93 surveyed in Colorado that have earned a higher rating of “2” and no jurisdictions with a rating of “1.”
- We are currently in the process of updating our ISO BCEGS rating.

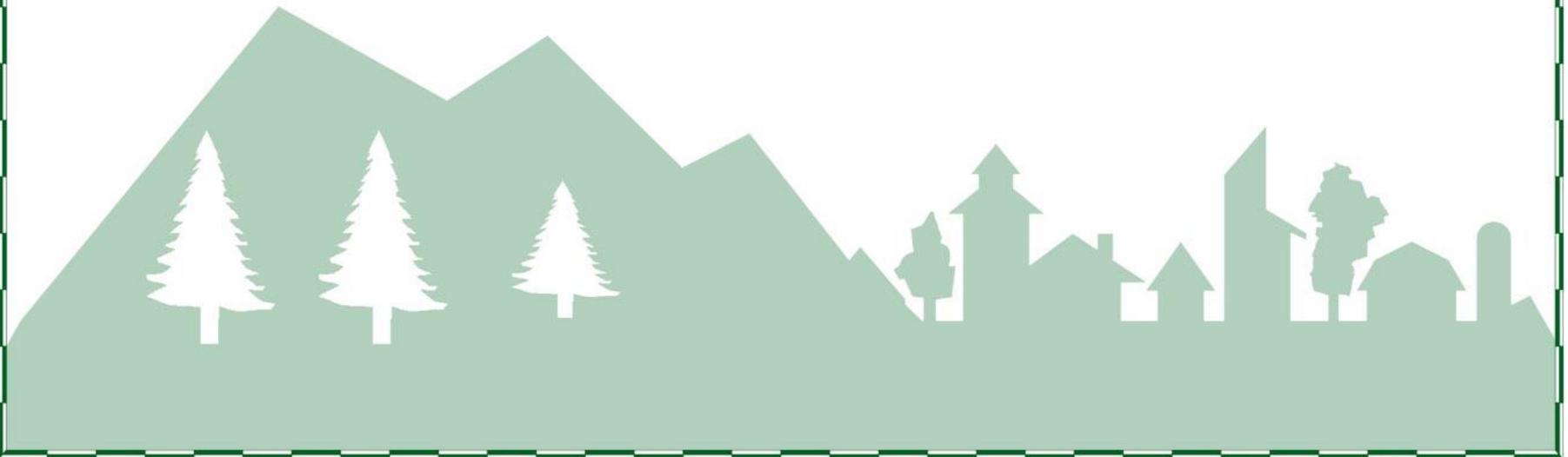


# Colorado: Distribution of Communities by BCEGS Class



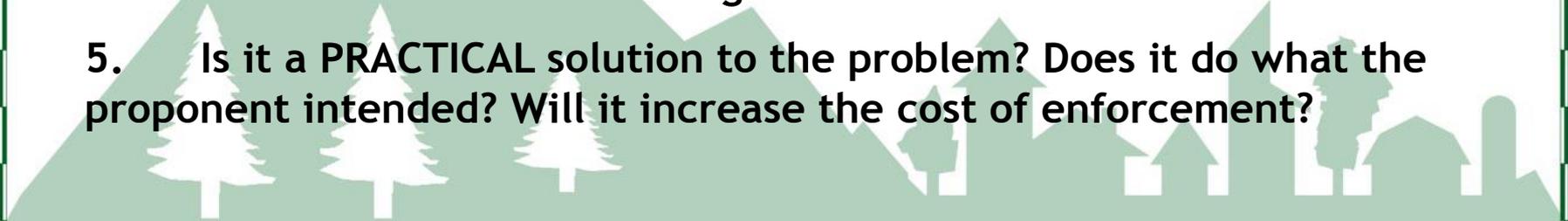
# THE ISO BCEGS PROGRAM, cont'd

- Communities with BCEGS ratings of 1 - 3 receive the highest rating credits.



# CODE CHANGE DEVELOPMENT AND REVIEW CRITERIA

1. Is the code change **NECESSARY**? Is there really a problem with the existing code? Does the proposed change already exist in another section of the code or as part of a recently approved code change?
2. Is there **SUPPORTING DATA** or convincing evidence to illustrate or support the specific code change?
3. Is it **UNIFORM**? Can it be applied to any geographic area or is it needed only in a limited region? Is it generic in terms of any products to be used and thus not a proprietary code change?
4. Is it **FEASIBLE**? Can the requirement be constructed with existing or readily available methods and technology? If a product is involved, is that product readily available? Is any additional cost to the consumer commensurate with the benefit gained?
5. Is it a **PRACTICAL** solution to the problem? Does it do what the proponent intended? Will it increase the cost of enforcement?



## **CODE CHANGE DEVELOPMENT AND REVIEW CRITERIA, cont'd**

- 6. Is it located in the right code chapter or section? Could it be more effective in a different LOCATION?**
- 7. Is the proposed change CONSISTENT with other code provisions and other model codes? Does it require corresponding changes in other code sections or other codes?**
- 8. Is the wording as CLEAR as it can be? Is it concise while still saying everything it needs to say? Does it avoid confusion and the potential for varying interpretations?**
- 9. Is the FORMAT of the code change consistent with proper code organization and writing style?**
- 10. Does the 'REASON' portion of the submittal clearly and concisely explain the need for the change and the effect it will have on the code?**

**FINALLY, WILL THE PROPOSED CODE CHANGE CLEARLY IMPROVE THE EXISTING CODE?**

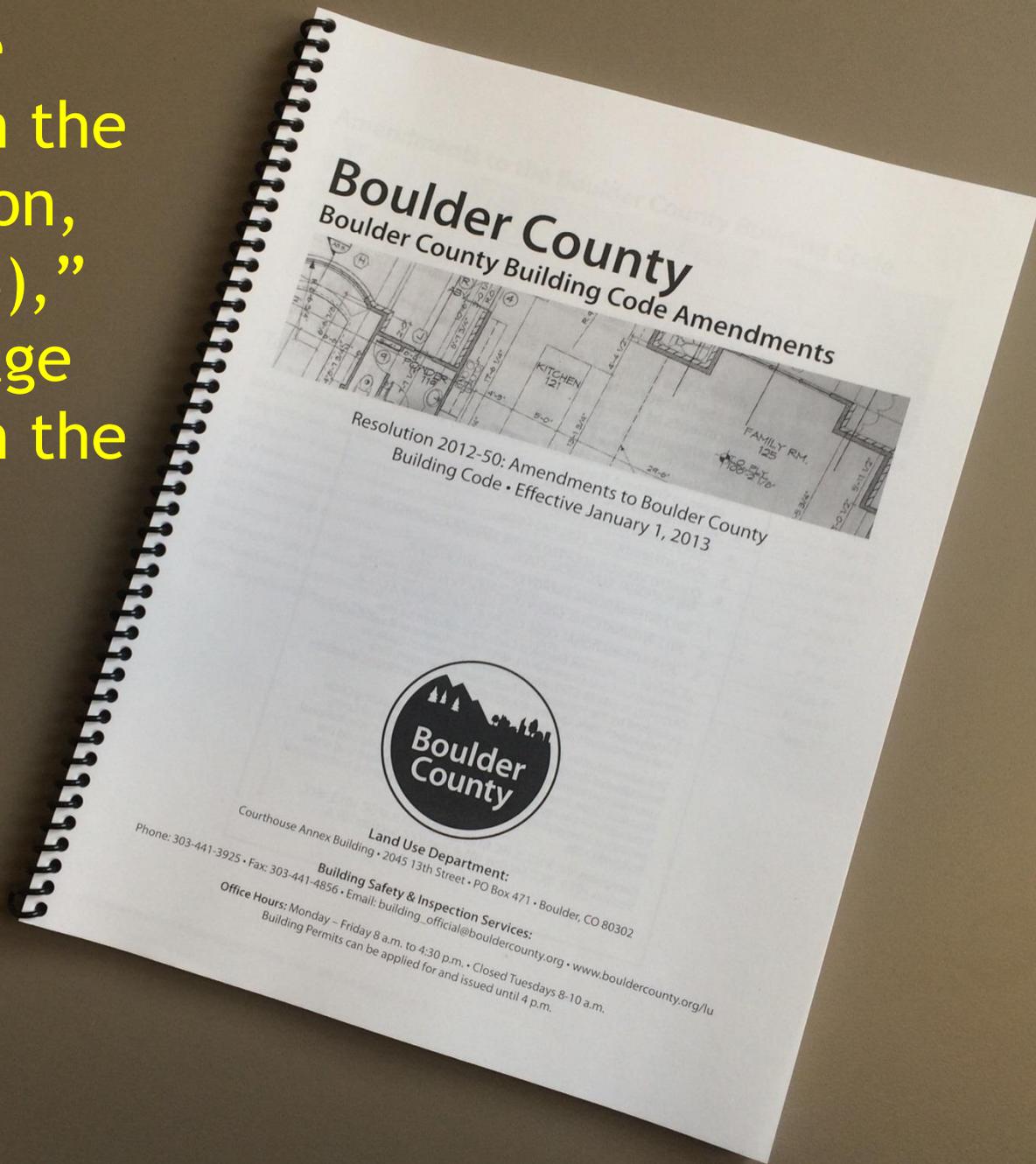
(Gordon Murdoch, City of Dana Point, CA; Gary Goodell, County of Boulder, CO)

## THE CODES UPDATES, FROM THE ~~2012~~ TO THE 2015 EDITIONS:

- International Building Code (“IBC”)
- International Residential Code (“IRC”)
- International Energy Conservation Code (“IECC”)
- International Fuel Gas Code (“IFGC”) (ANSI Z223.1, the National Fuel Gas Code)
- International Mechanical Code (“IMC”)
- International Plumbing Code (“IPC”)
- International Green Construction Code (IgCC)
- ICC Performance Code
- National Electrical Code (“NEC”)(as adopted by the State Electrical Board)
- NEW ADOPTIONS:
  - International Existing Building Code (“IEBC”)
  - International Swimming Pool and Spa Code (“ISPSC”)



Note: Page numbers in the presentation, i.e., “(p. 3),” refer to page numbers in the proposed adopting resolution.



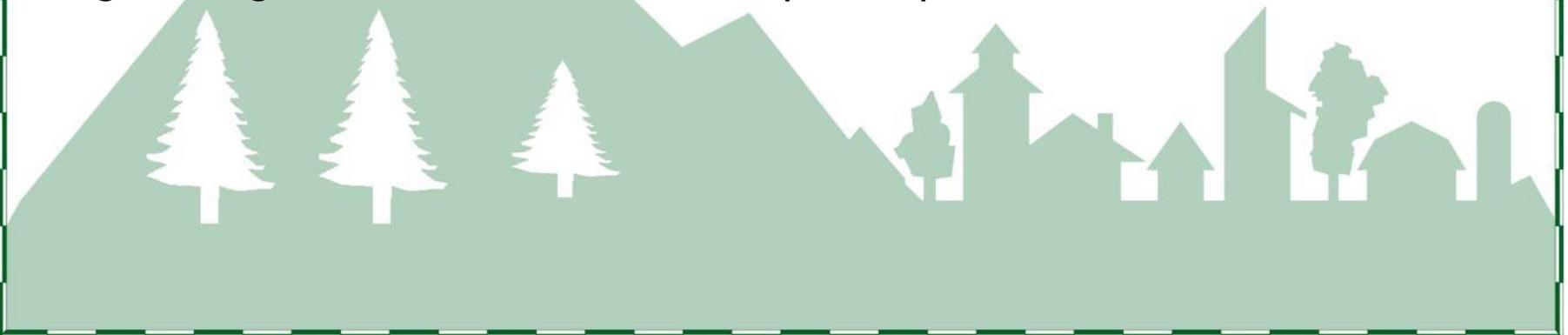
# SUMMARY OF PROPOSED CHANGES ADMINISTRATIVE PROVISIONS, CHAPTER 1:

- **Format.** (p. 3) Boulder County Chapter 1 combining the administrative provisions for all 11 model codes adoptions OR show amendments only to all 11 administrative chapters? This is considered EDITORIAL, but we've decided to continue with the existing combined Chapter 1, as it better serves our customers (architects, engineers, contractors, homeowners, etc.)
- **101.4 Referenced codes.** (p. 3) Deleted *Property Maintenance Code* and added *Electrical, Green Construction, Performance and Swimming Pool & Spa Codes*.
- **102.2.1 Flood hazard areas.** (p. 4) Provision that, where conflicts occur between the codes and the county's floodplain regulations, the floodplain regulations apply.
- **104.6 Right of entry.** (p. 5) Retain the county's existing amendment.
- **104.8 Liability.** (p. 5) Retain the county's existing amendment.



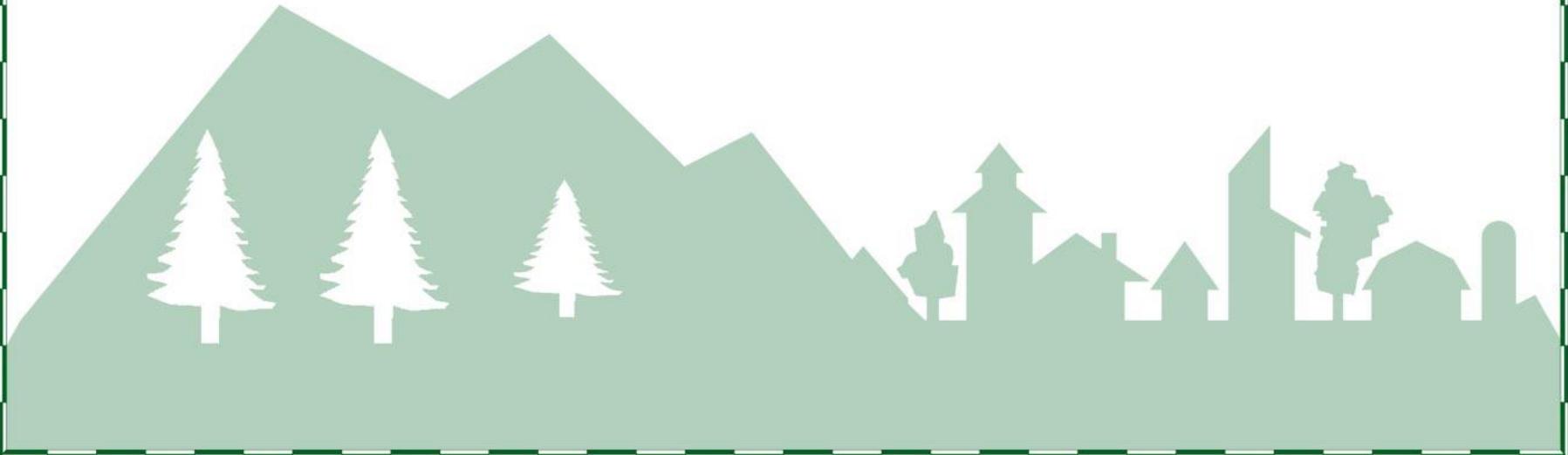
## SUMMARY OF PROPOSED CHANGES ADMINISTRATIVE PROVISIONS, CHAPTER 1, Continued:

- **104.10 Modifications.** (p. 5) New subsection providing that *ICC Performance Code* may be used as a tool for evaluation.
- **104.11 Alternate materials, design and methods of construction and equipment.** (p. 5-6). Same as above.
- **101.5.2 Work exempt from permit.** (pp. 6 - 8) Modified only slightly to match either the published code or the corresponding provisions in the Boulder County Land Use Code. Clarified that playhouses exempt from building permits are for private use only.
- **106.1 Live loads posted.** (p. 8) Delete existing amendment - not needed.
- **109.2 Schedule of permit fees.** (p. 9) Note that fees are acted upon separately and are contained in a separate publication.
- **110.3 Required inspections.** (p. 9) Retain section as published as a general guide, but note there is a separate publication.



## **SUMMARY OF PROPOSED CHANGES ADMINISTRATIVE PROVISIONS, CHAPTER 1:**

- **SECTION 113 BOARD OF REVIEW. (p. 10)** Incorporate existing provisions that are based on Colorado statutes, but also include published IBC provisions.
- **SECTION 117 CONTRACTOR LICENSING (P. 10)** Note that this requirement is acted upon separately and is contained in a separate publication.



IBC<sup>®</sup>

2015  
INTERNATIONAL CODES<sup>®</sup>

INTERNATIONAL  
Building Code<sup>®</sup>

A Member of the International  
Code Family<sup>®</sup>

 INTERNATIONAL  
CODE COUNCIL

# INTERNATIONAL BUILDING CODE CHAPTER 2 DEFINITIONS

- 202 DEFINITIONS (p. 10 - 11) Delete unnecessary definitions.

## CHAPTER 7

# FIRE AND SMOKE PROTECTION FEATURES

- 723.1 General. (p. 12) Add text to reference to IRC ignition-resistant construction requirements to note that other planning processes may have more restrictive wildfire mitigation requirements.



## IBC CHAPTER 16 STRUCTURAL DESIGN

- **1608.2 Ground snow loads. (p. 12)** Discussion with the Board of Review on whether or not to attempt to incorporate the 2015 Colorado Design Snow Loads by the Structural Engineers Association of Colorado (SEAC) into the 2015 adoption. Design snow loads would increase in the Plains portion of the county. If we can assess the impacts and return to the Board of Review on this, we'd like to have it in place with the rest of the code updates on January 4, 2016.
- **1609.3 Ultimate design wind speeds. (p. 12 - 13)** Add language to make the change from nominal design wind speeds to ultimate design wind speeds. A conversion formula and/or table will be added to convert the existing 2006 wind map speeds to the ultimate design wind speeds of ASCE 7-10.

## ~~IBC CHAPTER 34~~ ~~EXISTING BUILDINGS~~

- (p. 14) This chapter has been deleted from the IBC and is replaced by the adoption of the *International Existing Building Code (IEBC)*.
- **3410.1 and 3410.2 Manufactured housing.** (p. 14) Delete these existing amendments and replace them with the adoption of an amended version of Appendix E of the IRC.

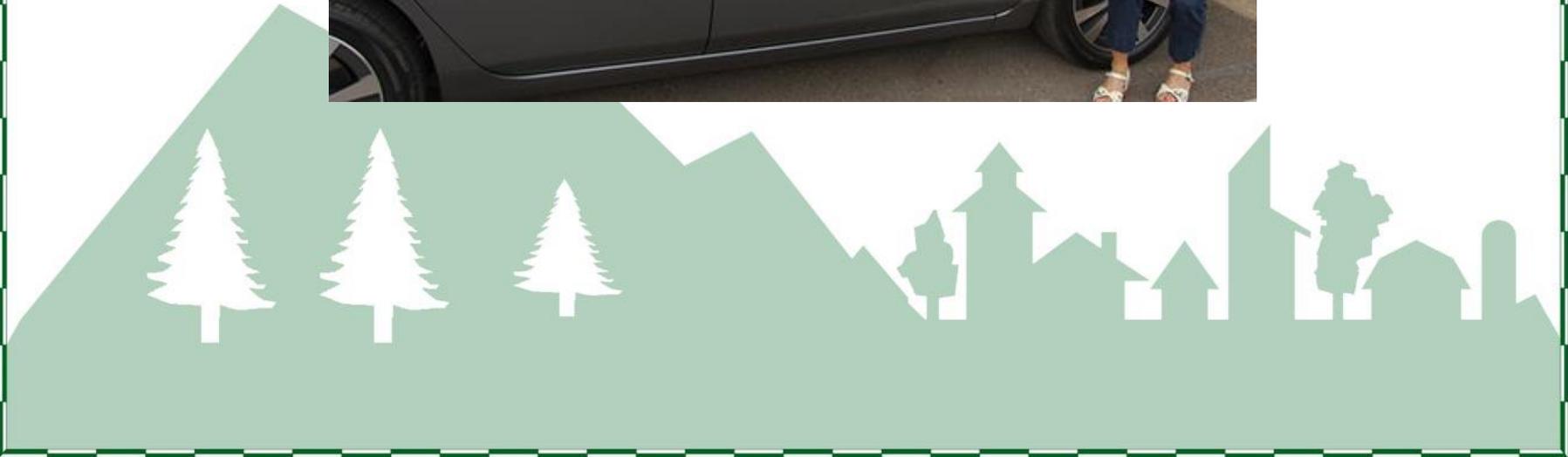


# IBC APPENDIX K ADMINISTRATIVE PROVISIONS (to the National Electrical Code)

- **K111.4 Nonmetallic sheathed cable.** (p. 15) Delete this section, which conflicts with the “Romex” limitations in the NEC, and replace it with a new electric vehicle (EV) charging receptacle outlets requirement. This item is discussed in more detail under the *BuildSmart* and *Energy Code* requirements.



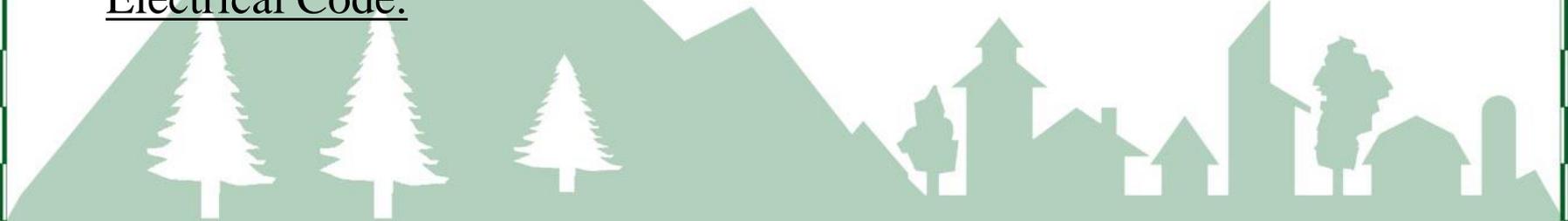
# IBC APPENDIX K ELECTRIC VEHICLE (EV) CHARGING RECEPTACLE OUTLETS (p. 15)



# IBC APPENDIX K

## ELECTRIC VEHICLE (EV) CHARGING RECEPTACLE OUTLETS

- **K111.4 ~~Nonmetallic-sheathed cable~~ Electric vehicle (EV) charging receptacle outlets. (p. 15)** Level 2 (240-volt) electric vehicle (EV) charging **receptacle outlets** are to be installed for all new commercial, industrial or multiple-family residential buildings or additions or alterations to existing such buildings that increase the existing total floor area of the building by either fifty percent or by 5,000 square feet in accordance with Table K111.4. Charging receptacle outlets shall be installed in accordance with the requirements of Article 625 of the Electrical Code.



# IBC APPENDIX K ELECTRIC VEHICLE (EV) CHARGING RECEPTACLE OUTLETS, CONTINUED (p. 15)

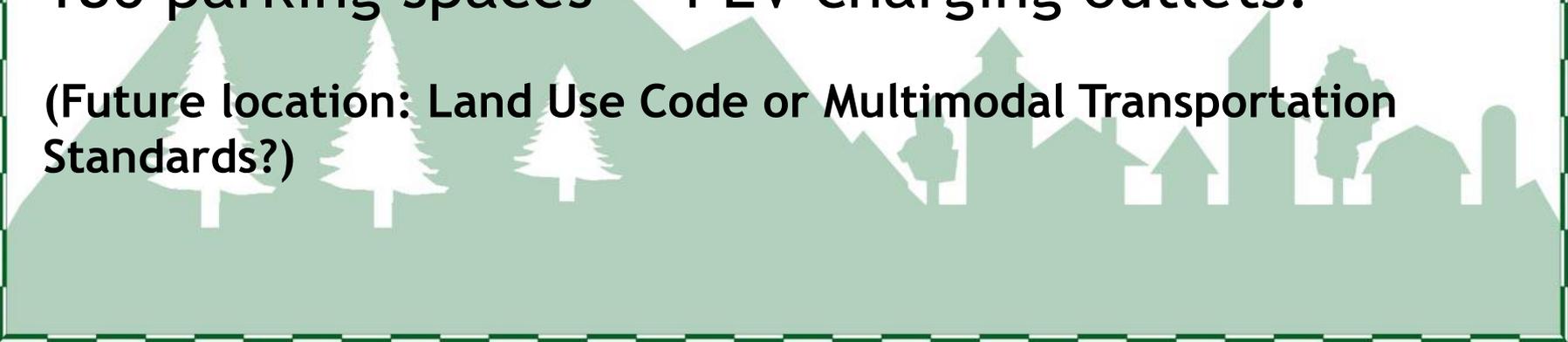
TABLE K111.4

ELECTRIC VEHICLE (EV) CHARGING RECEPTACLE OUTLETS

TOTAL PARKING SPACES PROVIDED	1 - 19	20 - 50	21 - 100	101 - 150	151 - 200	201 - 250	251 - 300	301 - 350	351 - 400	401 - 450	451 - 500	501 AND OVER
REQUIRED EV CHARGING OUTLETS	0	1	2	3	4	5	6	7	8	9	10	2% OF TOTAL

**EXAMPLE:** SparkFun Building, 80,000 square feet, 186 parking spaces = 4 EV charging outlets.

(Future location: Land Use Code or Multimodal Transportation Standards?)



**INCLUDES**  
Residential requirements from NFPA 70,  
National Electrical Code® 2014  
The electrical code designated for  
use with the I-Codes®

**IRC**

**2015**  
INTERNATIONAL CODES®

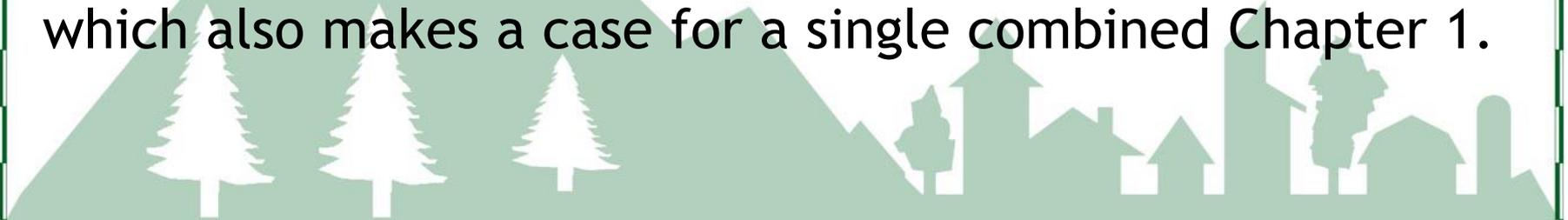
**INTERNATIONAL**  
Residential Code®  
FOR ONE- AND TWO-FAMILY  
DWELLINGS

A Member of the International  
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CODE COUNCIL®**

# **INTERNATIONAL RESIDENTIAL CODE CHAPTER 1 SCOPE AND ADMINISTRATION**

**R102.2.1, Flood hazard areas, R104 Right of entry, R104.8 Liability, R104.10 Modifications, R104.11 Alternate materials, design and methods of construction and equipment, R105.2 Work exempt from permit, R108 Fees, and R115 Contractor licensing (p. 16 - 20) are all amended exactly as the IBC is amended, which also makes a case for a single combined Chapter 1.**

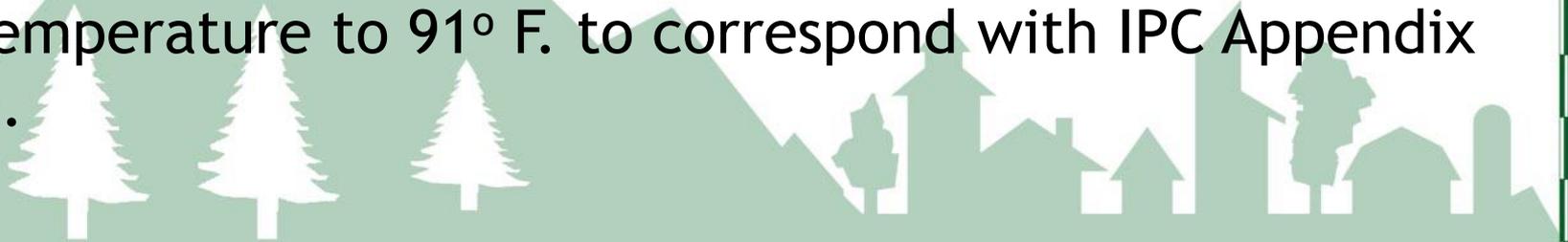


# INTERNATIONAL RESIDENTIAL CODE

## CHAPTER 3

### BUILDING PLANNING

- **R301.2.1 Wind design criteria (p. 21)** Revise for ultimate design wind speed as per IBC.
- **R301.2.3 Snow loads (p. 21)** See previous discussion on attempting to incorporate 2015 snow load study from SEAC.
- **IRC TABLE R301.2(1), CLIMATE AND GEOGRAPHIC DESIGN CRITERIA (p. 21 - 22)** Revise summer design temperature to 91° F. to correspond with IPC Appendix D.



# RESIDENTIAL FIRE SPRINKLERS



## IRC SECTION R313 AUTOMATIC FIRE SPRINKLER SYSTEMS

- **R313.1.1 Additions to existing townhouses (p. 24)** Revise the existing requirement to have open carports that are exempt from the Boulder County Land Use Code definition of “Residential Floor Area” not be counted as part of the 4,800 sq. ft. or greater floor area that initiates the fire sprinkler requirement.
- **R313.2.1 Additions to existing one- and two-family dwellings (p. 25)** Same as above.
- Carports are required to be open on at least two sides. This allows smoke and heat from a fire to dissipate, and the open nature makes it unlikely that large amounts of combustible material will be stored. The openness, combined with driveway access, also provides for good fire department access.

## **IRC SECTION R321 ELEVATORS AND PLATFORM LIFTS**

- **R321.4 Permits and inspections (p. 25)** Move this existing elevator amendment from its current location at IRC Chapter 12 to this more appropriate location in Chapter 3.

## **~~IRC SECTION R324 MOVED BUILDINGS~~**

- (p. 25 - 26) As with the IBC, delete these existing amendments and replace them with the adoption of IRC Appendix E, “Manufactured Housing Used As Dwellings,” with amendments to align with Colorado Division of Housing requirements.

## IRC SECTION R324 SOLAR ENERGY SYSTEMS

- **R324.7 Access and pathways (p. 26 and 27)** Insert the City of Boulder Fire Department amendments into the requirements for PV panel spacing to allow fire department access to the roof. This more reasonable solution for PV panel spacing on roofs was developed as the city adopted the 2012 International Fire Code (“IFC”).
- It permits more panels on the roof while still allowing for good and safe fire department access.



# WILDFIRE MITIGATION



# IGNITION-RESISTANT CONSTRUCTION



IRC Section ~~R325~~ R327 (p. 28 – 38)

## IRC SECTION R327 GENERAL SUMMARY OF CHANGES

- Changed from ~~R325~~ to R327 due to 2 new sections in the published IRC.
- Most requirements are identical to or based upon the 2015 *International Wildland-Urban Interface Code* (“IWUIC”).
- Eliminate existing 3 hazard ratings: MODERATE, HIGH and EXTREME
- Use the latest Colorado State Forest Service (CSFS) guide as the “DEFENSIBLE SPACE STANDARD” for all sites.
- Use the existing HIGH requirements as the basis for a single set of ignition-resistant requirements for all sites (for the 2012 Codes, exterior wall requirements were already revised so that all 3 hazard ratings have the same requirements).
- Formally recognize that an approved wildfire mitigation plan required through a planning process meets the requirements.
- Allow obtaining a Wildfire Partners certificate as an alternate means of compliance with the defensible space provisions.

## IRC SECTION R327 IGNITION-RESISTANT MATERIALS AND CONSTRUCTION

**R327.1. General.** (p. 28) Revise the exceptions to the ignition-resistant requirements to eliminate some existing exceptions and allow exceptions only for:

- 200-sq.-ft. additions, which is line with other exceptions to fire sprinklers, TDCs, etc.
- Allow new decks and additions or repairs to existing decks to provide limited *defensible space*, including a weed barrier and gravel and modifying only Zone 1 around the deck in accordance with the *defensible space standard*.



## IRC SECTION R327.3 DEFINITIONS (p. 28 - 32)

- DELETE existing definitions related to the 3 existing hazard ratings, including CRITICAL FIRE WEATHER, HEAVY FUEL, MEDIUM FUEL, LIGHT FUEL, EXTREME HAZARD WILDFIRE SITES, etc.
- ADD definitions for DEFENSIBLE SPACE, DEFENSIBLE SPACE STANDARD, FIRE-RETARDANT-TREATED WOOD, HEAVY TIMBER CONSTRUCTION, LOG WALL CONSTRUCTION, WILDFIRE MITIGATION PLAN and WILDFIRE PARTNERS.
- MODIFY the definition for IGNITION-RESISTANT BUILDING MATERIAL to provide a link to the current search site for materials approved by the California State Fire Marshal.



## IRC SECTION R327.4

### RESTRICTIONS IN WILDFIRE ZONE 1 (p. 33 - 38)

- **R327.4 Restrictions in Wildfire Zone No. 1.** Eliminate the existing 3 separate sections for Moderate, High and Extreme requirements and combine them into one “Restrictions in Wildfire Zone 1” set of requirements.
- **R327.4.2 Gutters and downspouts.** Require noncombustible gutter coverings and point out existing exceptions to requiring gutters and downspouts.
- **R327.4.4 Fences, retaining walls and similar appurtenances.** Require these items to be noncombustible materials for the first 3 feet beyond the exterior walls.
- **R327.4.5 Protection of eaves.** Add a requirement for a metal drip edge at the roof edge.



**IRC SECTION R327.4**  
**RESTRICTIONS IN WILDFIRE ZONE 1 (Continued) (p. 35 - 36)**

- **R327.4.5 Protection of eaves (continued).** List the most desirable materials for the protection of eaves, but include “any materials permitted by this code” as per the existing “High” requirements, except that the use of vinyl or plastic materials for soffits, fascia or trim is prohibited.
- **R327.4.8.2 Deck framing.** List the most desirable materials for the protection of eaves, but include common wood framing materials as per the existing “High” requirements.
- **R327.4.9 Exterior windows and glazing.** Permit all types of window frames except unreinforced vinyl.
- **R327.4.11 Vents.** Add a requirement that vents be “designed and approved to prevent flame or ember penetration” and increase the distance of gable end or dormer vents from property lines from the 10 feet specified in the *IWUIC* to 15 feet, which is the minimum zoning setback in the Forestry zone.

## IRC SECTION R327.4

### RESTRICTIONS IN WILDFIRE ZONE 1 (Continued) (p. 37)

- **R327.4.13 Defensible space.** Eliminate the reference to a set distance (30', 50' or 100') and require compliance with the CSFS guide ("the defensible space standard").
- **R327.4.13 Defensible space (continued).** Recognize the implementation of an approved wildfire mitigation plan or obtaining a Wildfire Partners Certificate as meeting the defensible space requirements.
- **R327.4.13.1 Weed barrier and gravel or crushed rock.** Clarify that the gravel is to extend at least 3 feet and that it is also to extend 2 feet beyond the driplines of decks, bay windows and other eaves and overhangs.



## IRC SECTION R329 (p. 39) ELECTRIC VEHICLE CHARGING PRE-WIRE OPTION

Patterned after the state law and existing amendment on solar pre-wiring (Section R326), this requires either a receptacle, wiring or conduit in new garages and carports to facilitate the charging of electric vehicles. This existing amendment is changed only by noting that the NEC now requires a single 125-volt receptacle outlet for each garage bay.



## IRC CHAPTER 4 FOUNDATIONS

**R401.2.1 Design water table (p. 39)** Delete the existing amendment, as it is felt that the published IRC now has sufficient safeguards against high groundwater levels.





**Boulder County BuildSmart**



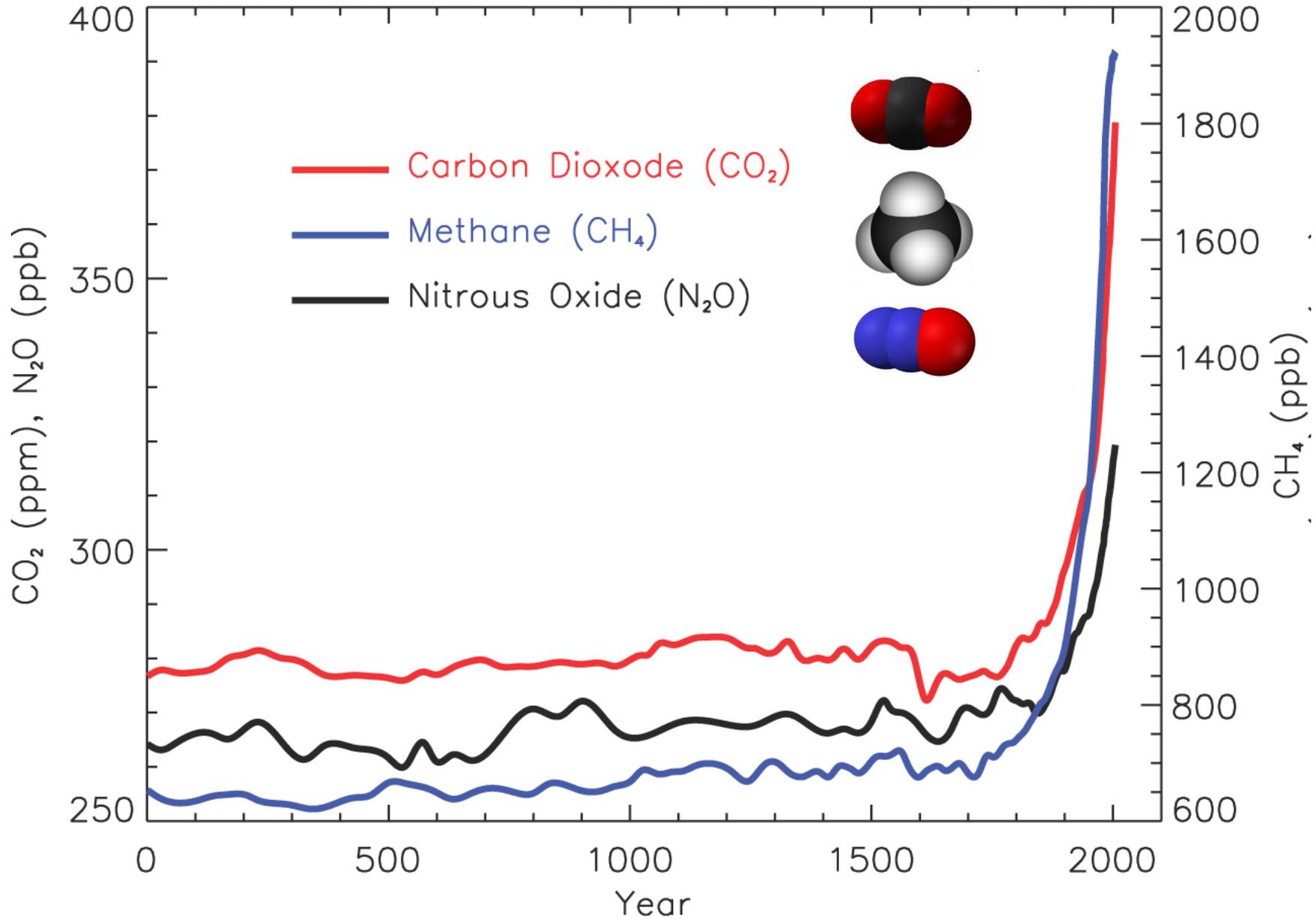
# Boulder County BuildSmart Updates

Board of County Commissioners  
Public Hearing, November 3, 2015 – 2:00 p.m.  
(p. 41 – 74)

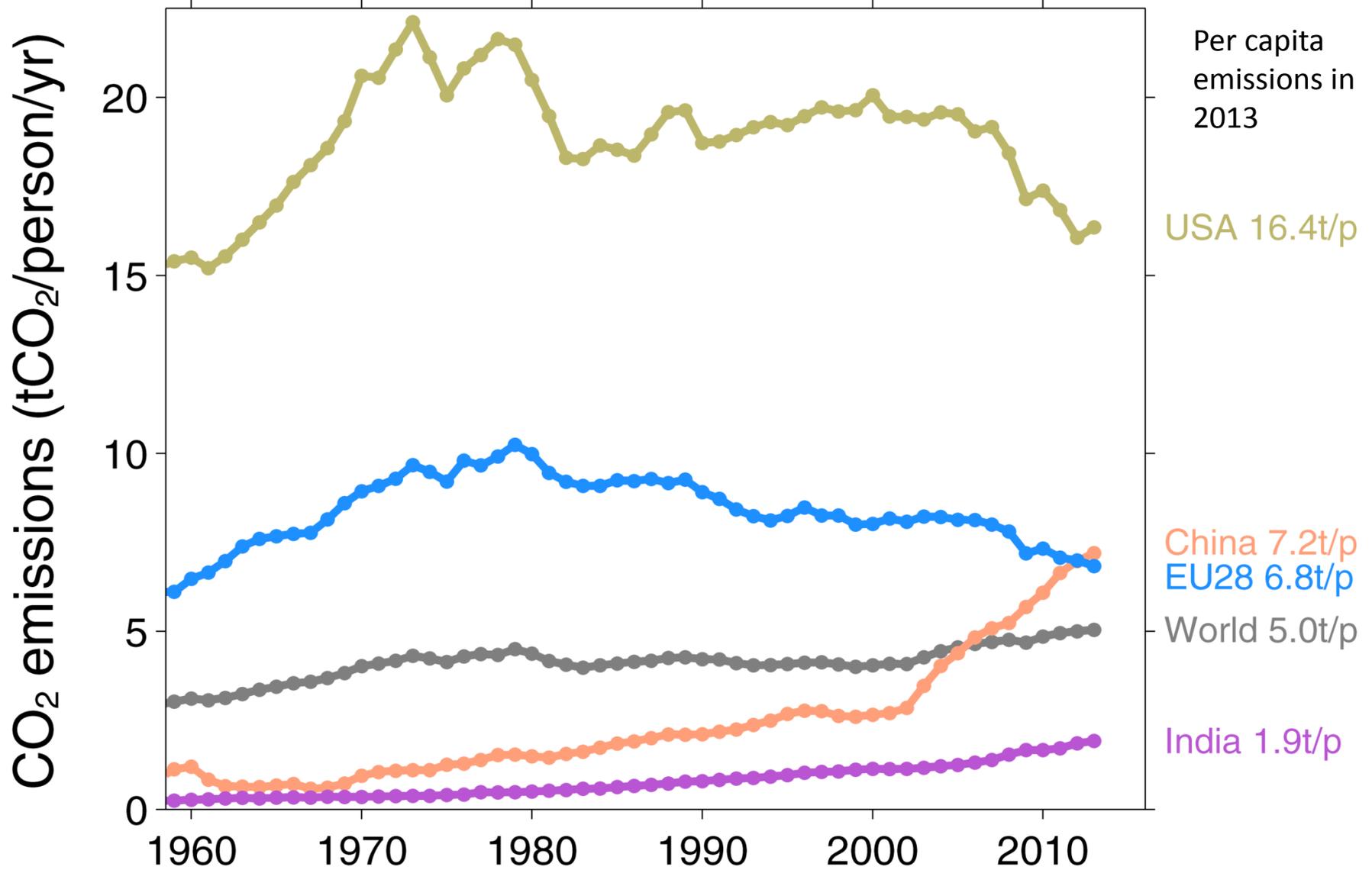


# Greenhouse Gases

Concentrations of Greenhouse Gases from 0 to 2005



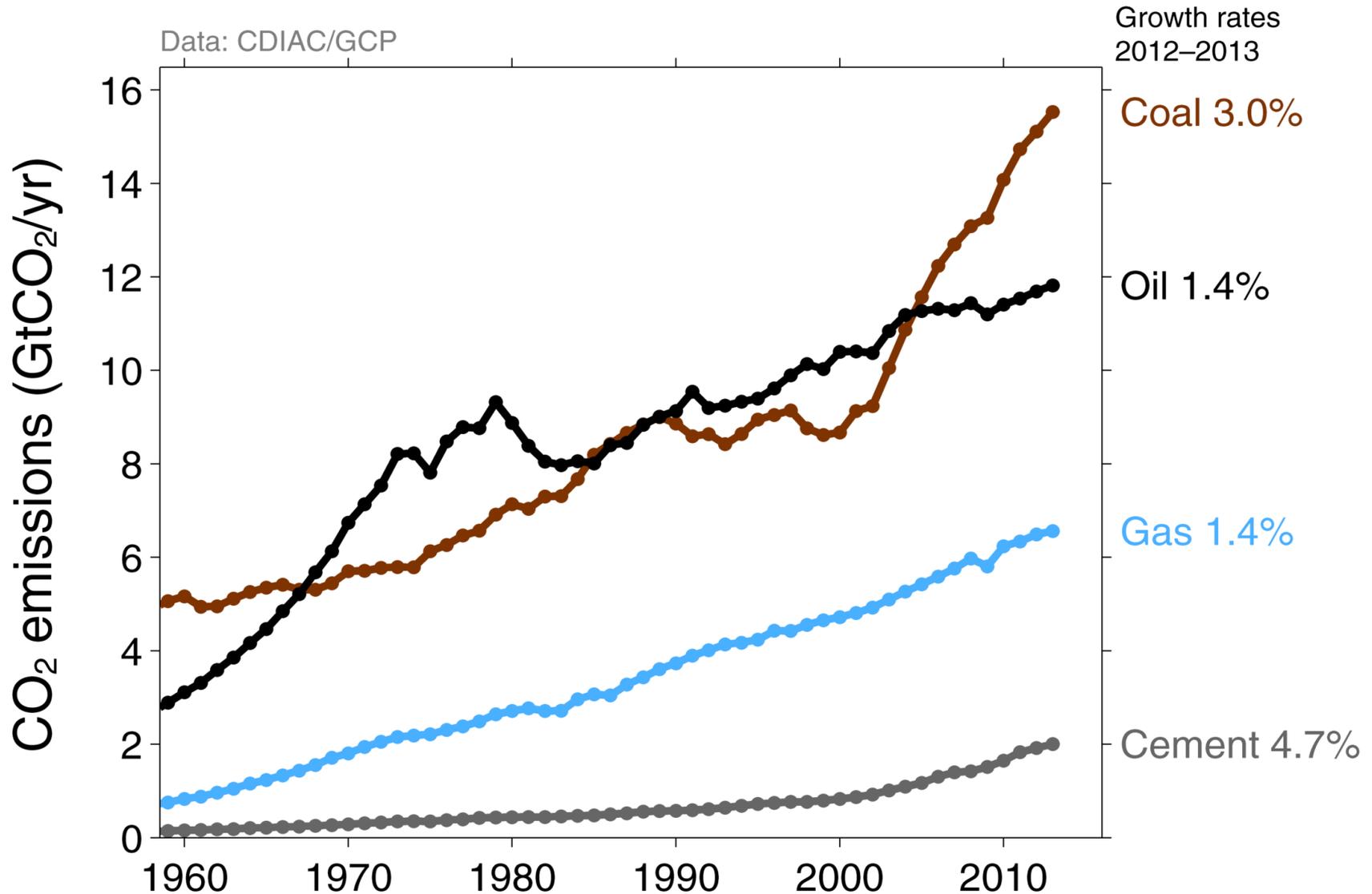
## Top Fossil Fuel Emitters (Per Capita)



Source: [CDIAC](#); [Le Quéré et al 2014](#); [Global Carbon Budget 2014](#)

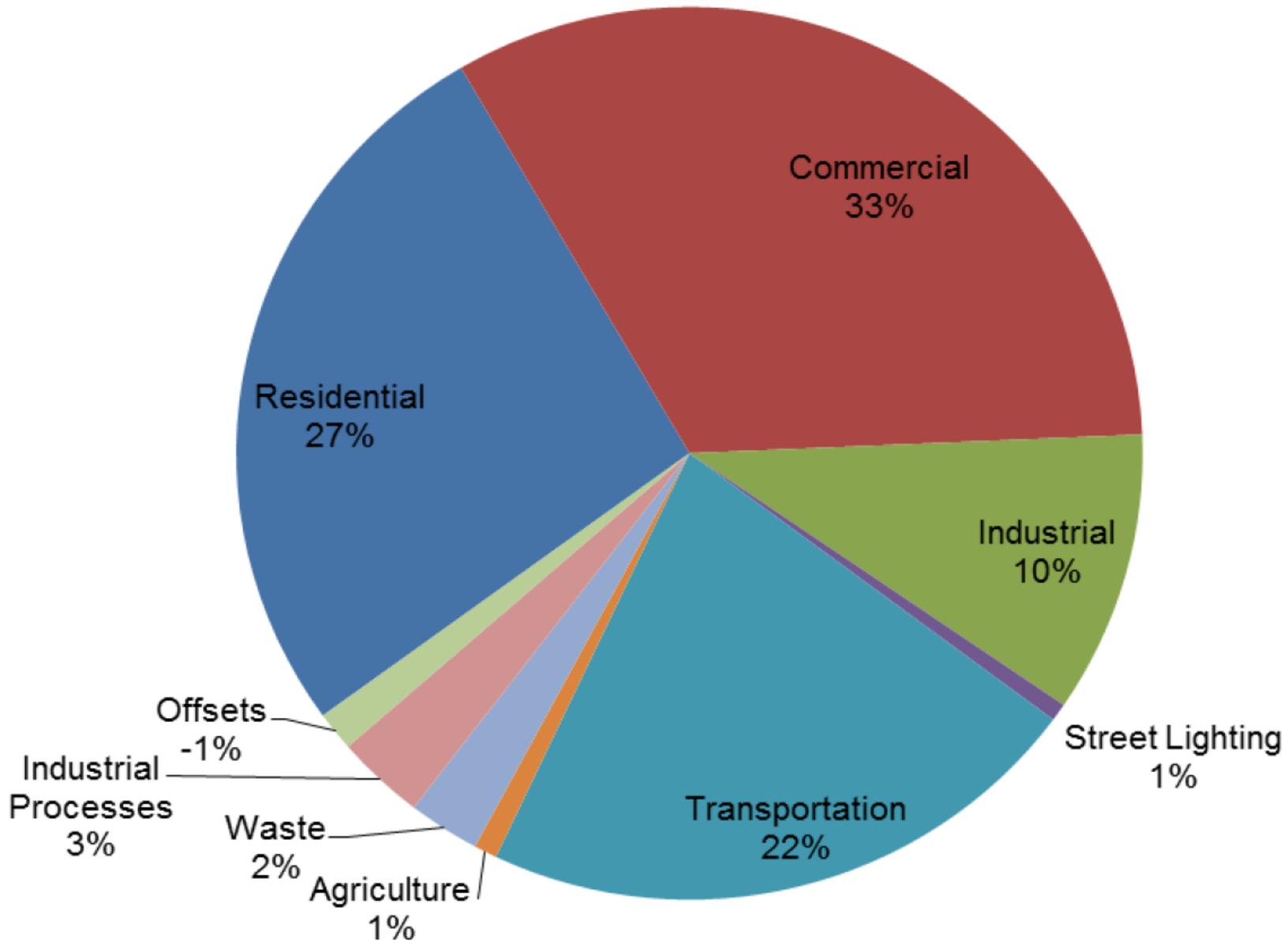
## Share of global emissions in 2013

coal (43%), oil (33%), gas (18%), cement (6%), flaring (1%, not shown)

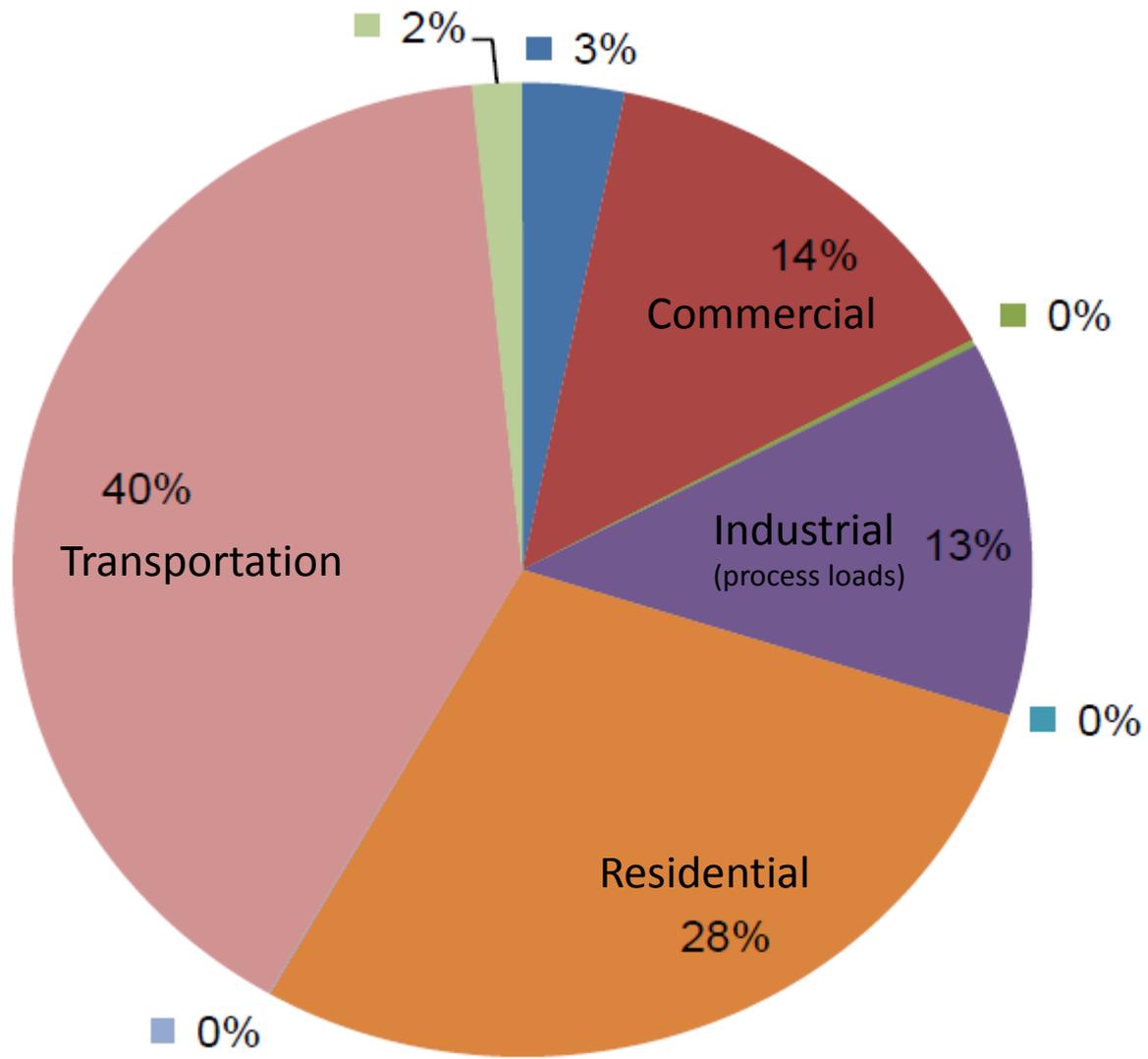


Source: [CDIAC](#); [Le Quéré et al 2014](#); [Global Carbon Budget 2014](#)

*All of Boulder County - Emissions by Economic Sector (2011 data)*



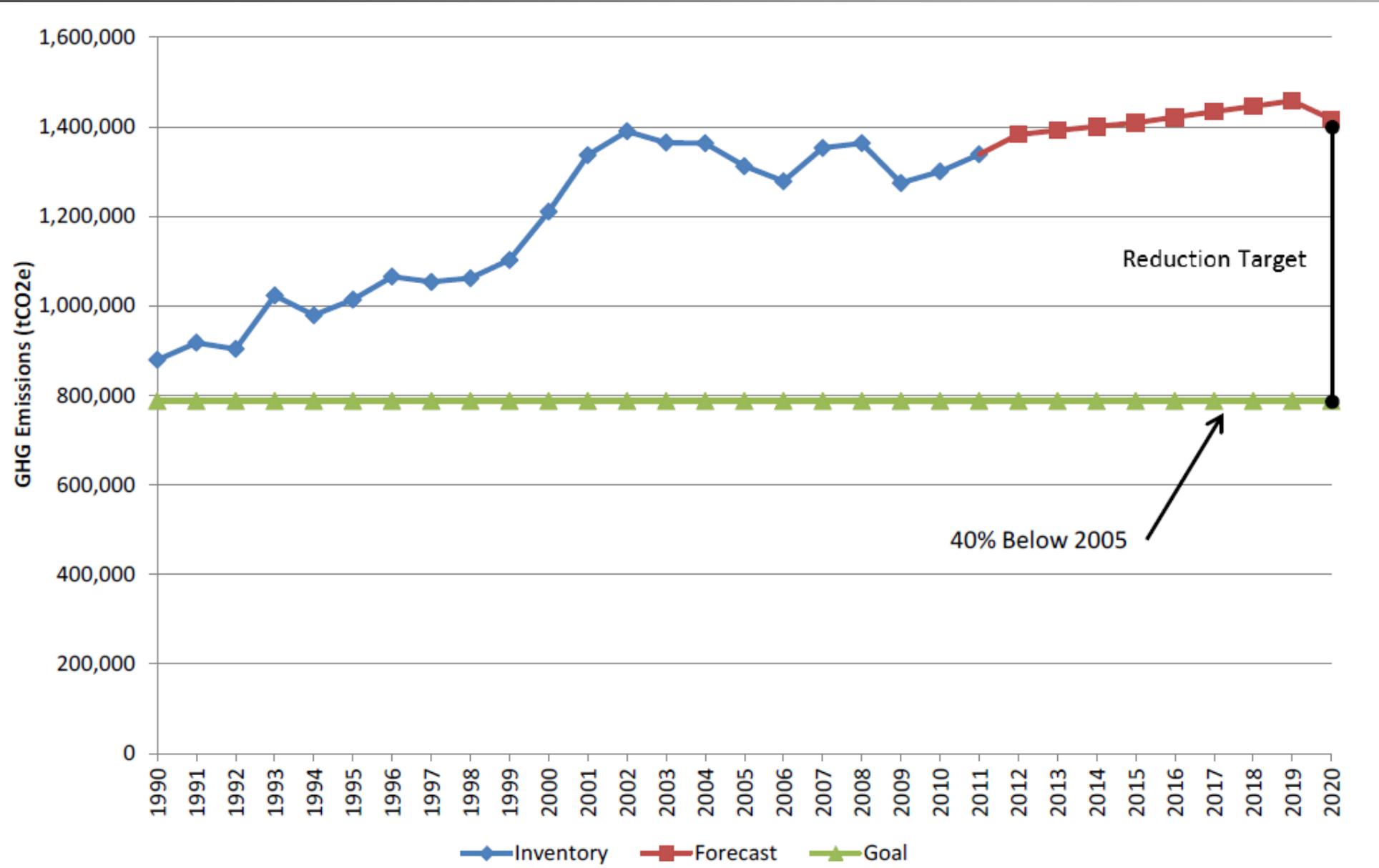
# Unincorporated Boulder County - Emissions by Economic Sector (2011 data)



- Agriculture
- Commercial \*
- Industrial
- Industrial Process
- Offsets
- Residential
- Street Lighting
- Transportation
- Waste

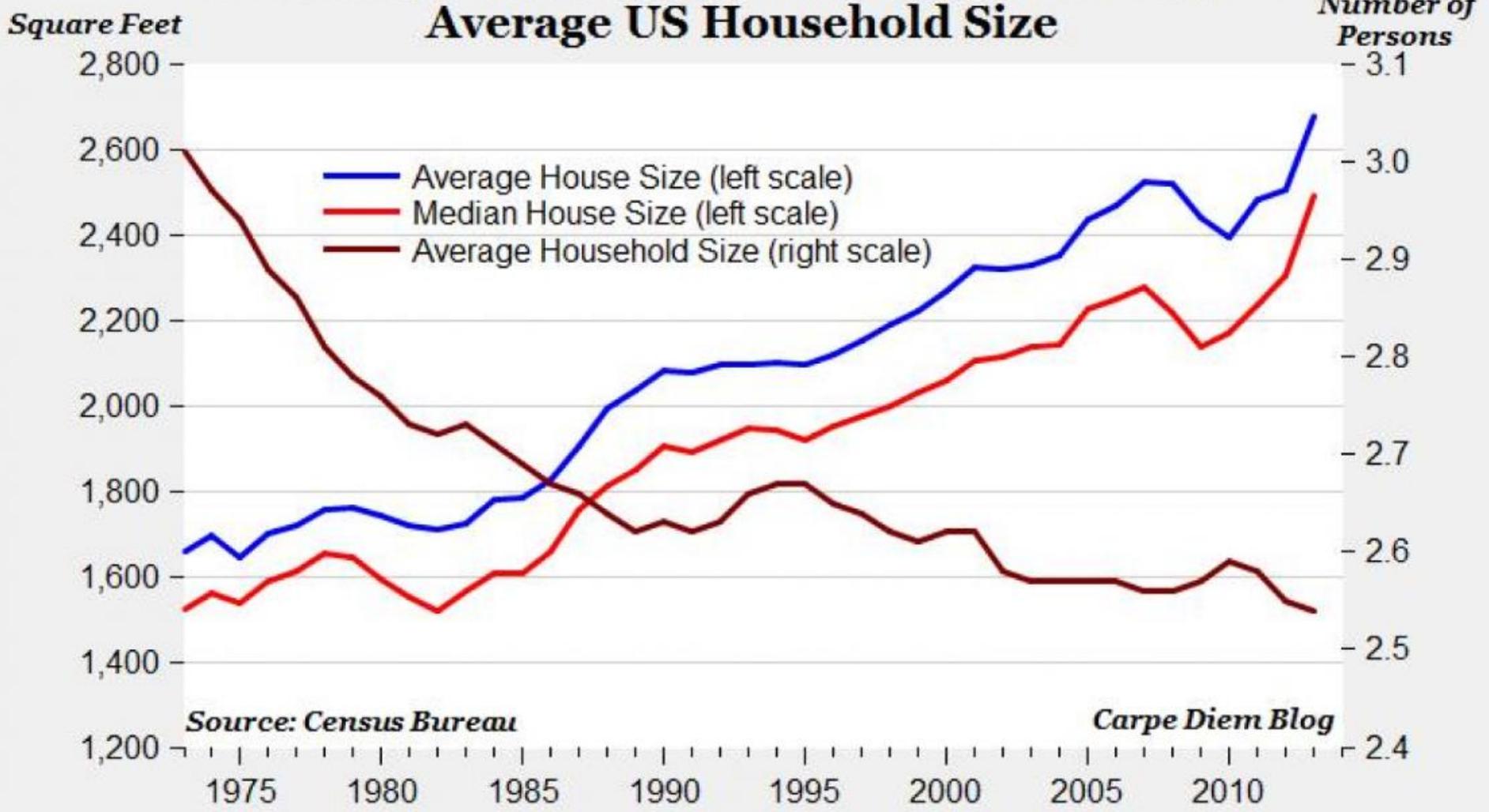
\* A significant portion these emissions come from electricity consumed in commercial buildings located in incorporated municipalities not explicitly broken out in the GHG inventory (Erie, Niwot, Gunbarrel, Ward, and others).

# All of Boulder County: Residential Sector – Target and Outlook



*National Numbers: Houses are bigger than they used to be, with fewer occupants.*

# Average and Median Square Feet of Floor Area in New Single-Family US Houses, 1973 to 2013 vs. Average US Household Size



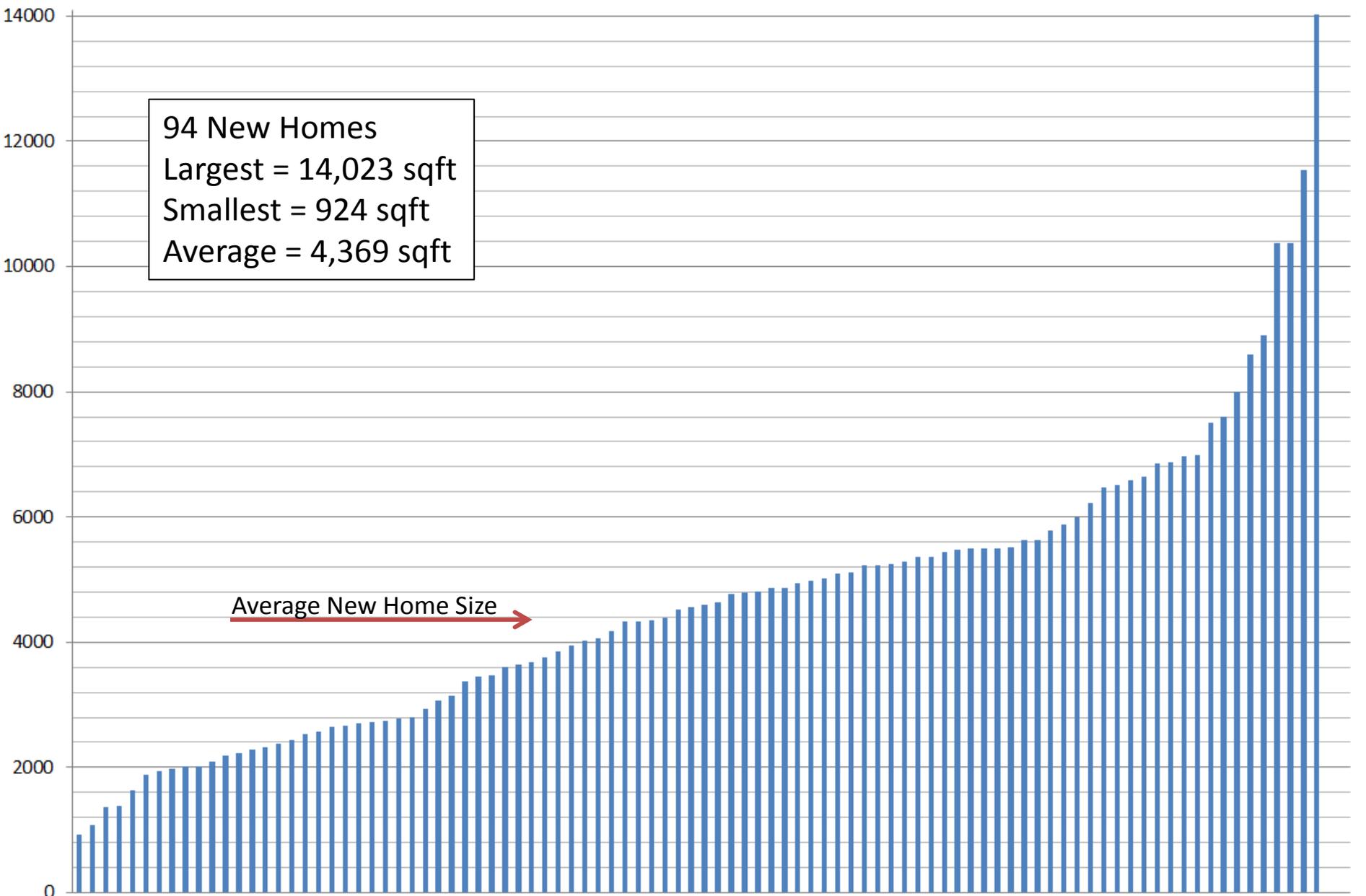
Source: Census Bureau

Carpe Diem Blog

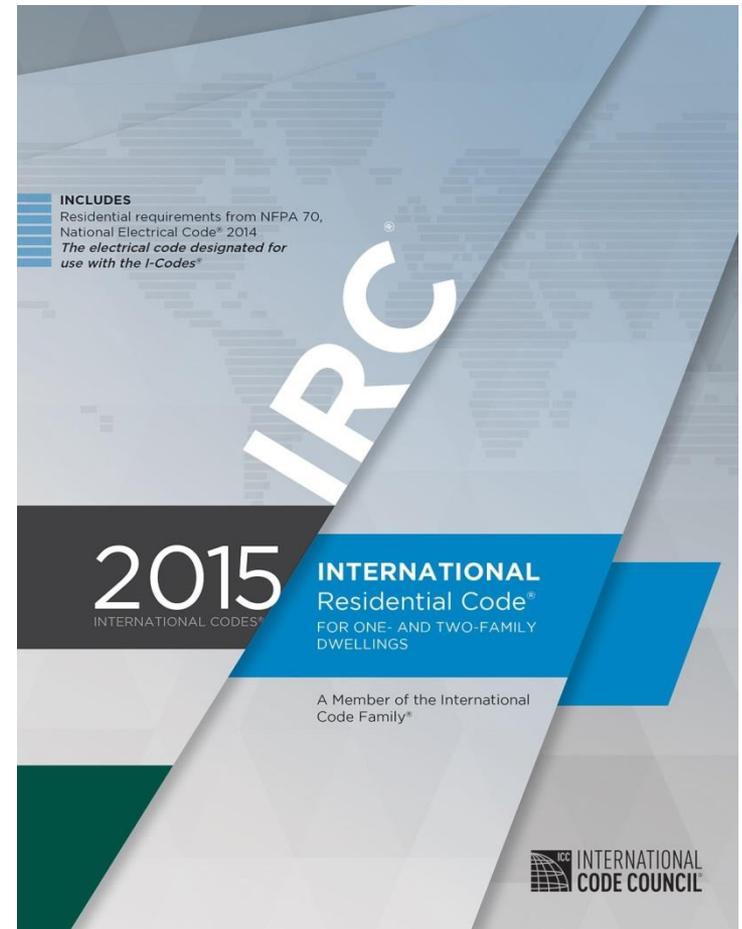
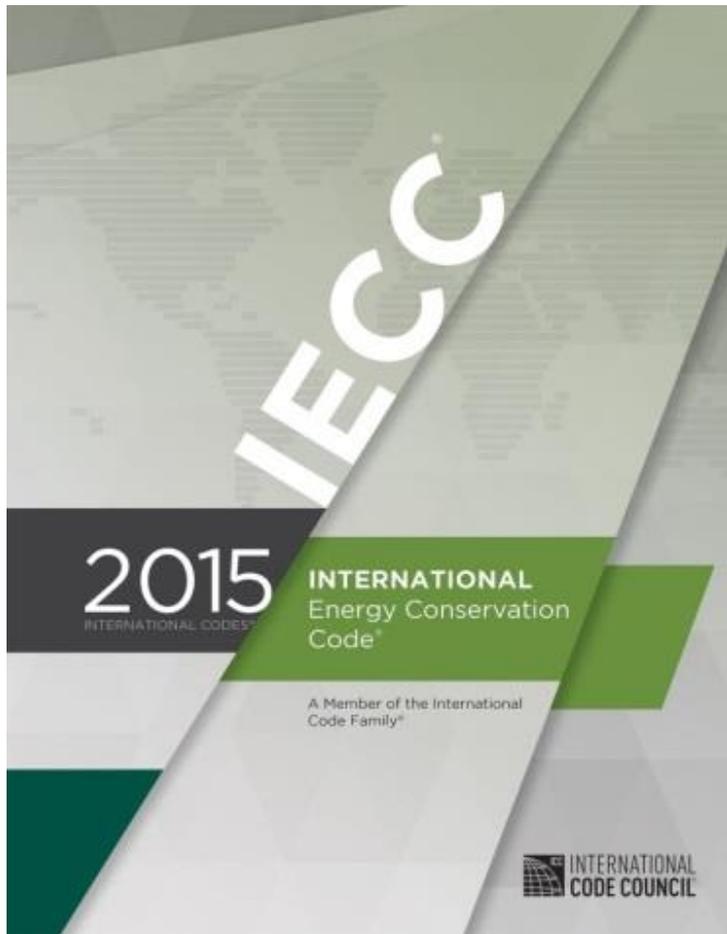
# Size of New Homes 2013, 2014, and first six months of 2015

94 New Homes  
Largest = 14,023 sqft  
Smallest = 924 sqft  
Average = 4,369 sqft

Average New Home Size →



The Residential Provisions of the IECC become the energy provisions (Chapter 11) of the IRC.



- **CONDITIONED FLOOR AREA**
- **DECONSTRUCTION**
- **DECONSTRUCTION, NON-STRUCTURAL**
- **DECONSTRUCTION, STRUCTURAL**
- **DECONSTRUCTION PROFESSIONAL**
- **DEMOLITION**
- **ENERGYSMART**
- **ENERGYSMART ASSESSMENT**
- **ENERGYSMART ADVISING**
- **ENERGY STAR (for homes)**
- **LEED**
- **LIVING BUILDING CHALLENGE**
- **PASSIVE HOUSE**
- **RENEWABLE ENERGY SYSTEMS**
- **ZERO ENERGY READY HOMES (ZERH)**

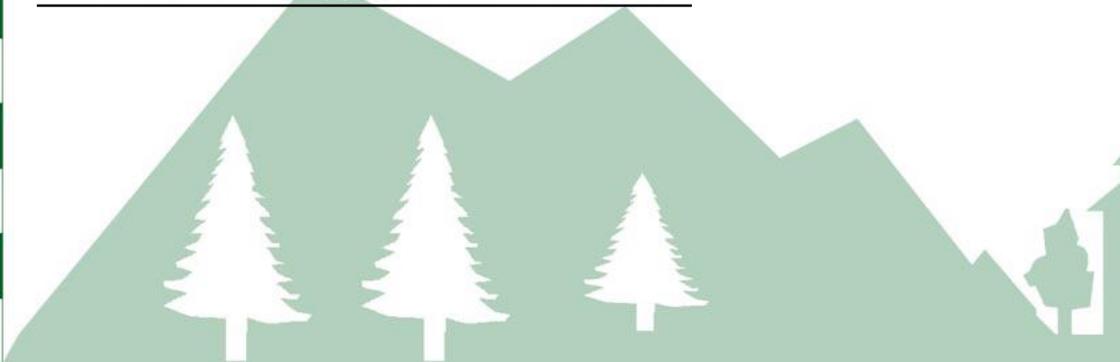
# IRC CHAPTER 11

## ENERGY EFFICIENCY (“BuildSmart”)

### R1101.6 Defined terms.

*Revise the definition for CONDITIONED FLOOR AREA to read as follows:*

**CONDITIONED FLOOR AREA.** The horizontal projection of the floors associated with the *conditioned space*. For the purposes of this chapter, the *conditioned floor area* shall be measured as the floor area within the inside face of the interior *air barrier*.

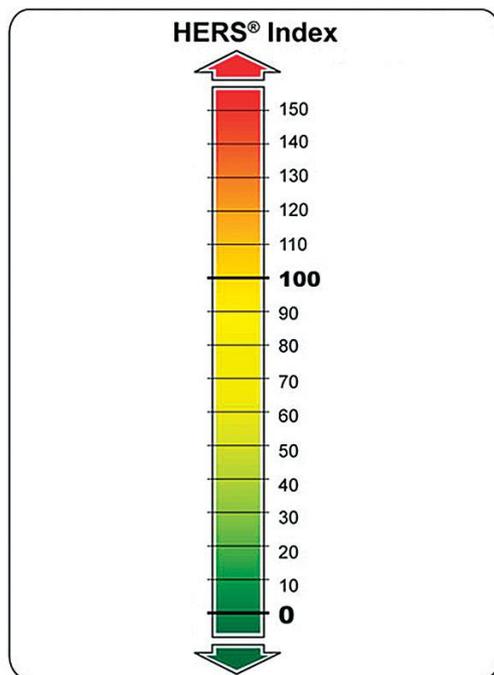


## The Energy Rating Index (ERI) Pathway N1106

- **Mandatory Building Envelope Requirements of the Prescriptive Path**
- **HERS rating for the home**

**N1106.3 (R406.3) Energy rating index.** The Energy Rating Index (ERI) shall be a numerical integer value that is based on a linear scale constructed such that the *ERI reference design* has an Index value of 100 and a *residential building* that uses no net purchased energy has an Index value of 0. Each integer value on the scale shall represent a 1 percent change in the total energy use of the rated design relative to the total energy use of the *ERI reference design*. The ERI shall consider all energy used in the *residential building*.

**N1106.3.1 (R406.3.1) ERI reference design.** The *ERI reference design* shall be configured such that it meets the minimum requirements of the 2006 *International Energy Conservation Code* prescriptive requirements. The proposed *residential building* shall be shown to have an annual total normalized modified load less than or equal to the annual total loads of the *ERI reference design*.

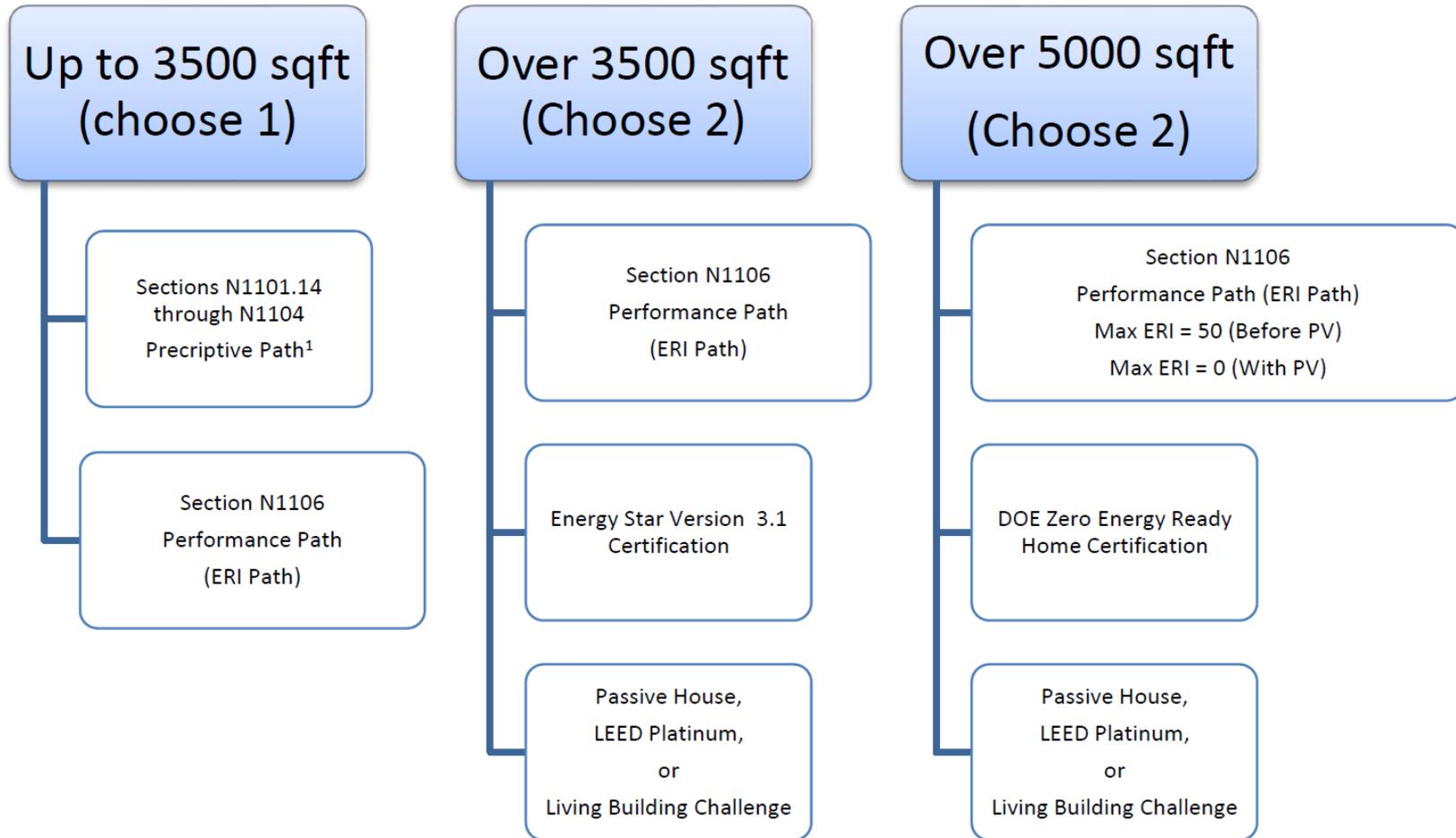


**HERS of 100 = Meets 2006 Energy Code**

**HERS of 35 to 40 = Approximate lower limit of score without renewable energy production**

**HERS of 0 = Zero Net Energy**

# Figure N1101.13.1 (R R401.2.1) Options for New Homes<sup>a,b,c</sup>:



## Footnotes:

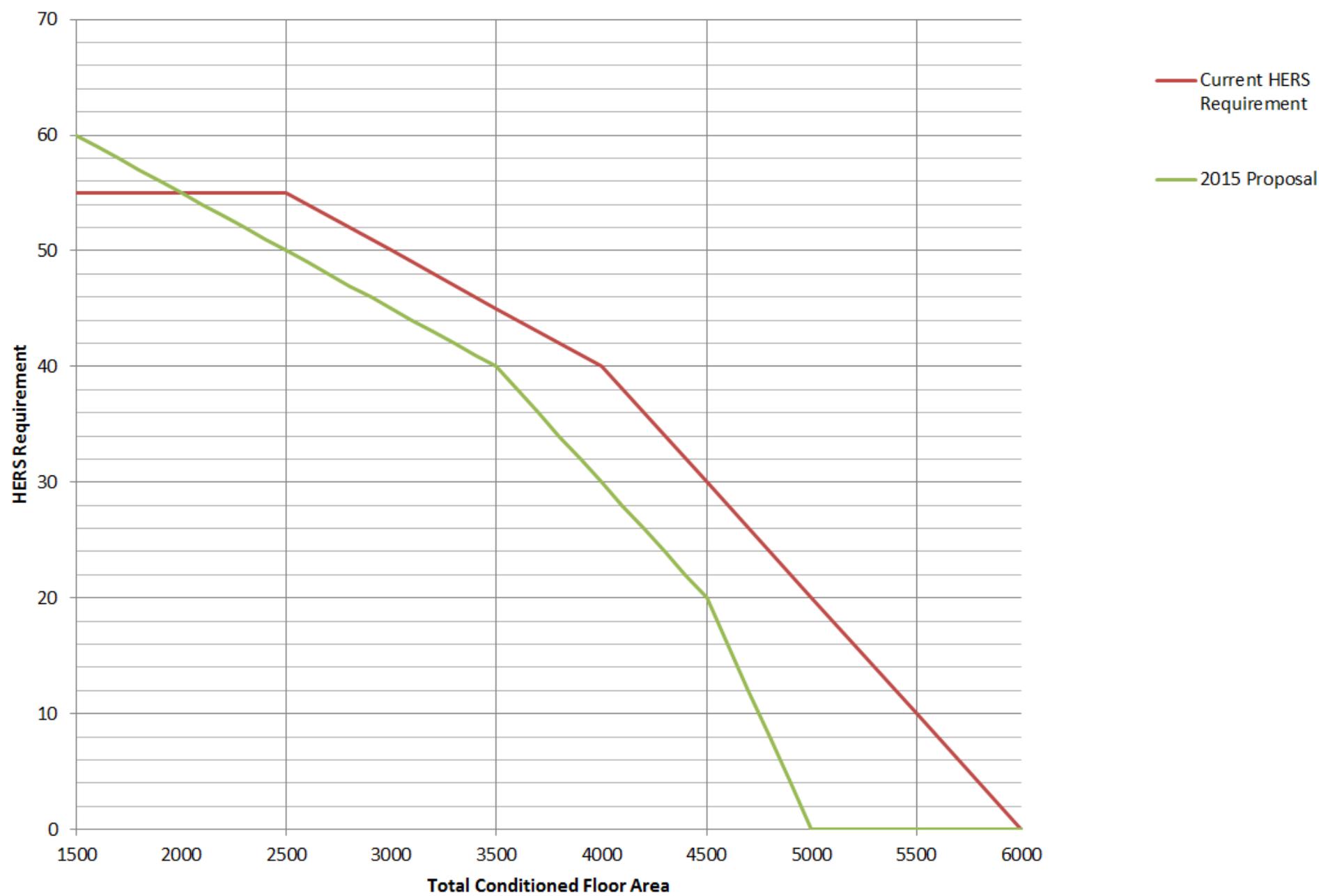
a) Glazing to floor area ratios that exceed 18% may not use prescriptive path.

Exception: Passive Solar Designs in which 50% or more of the total glazing faces South.

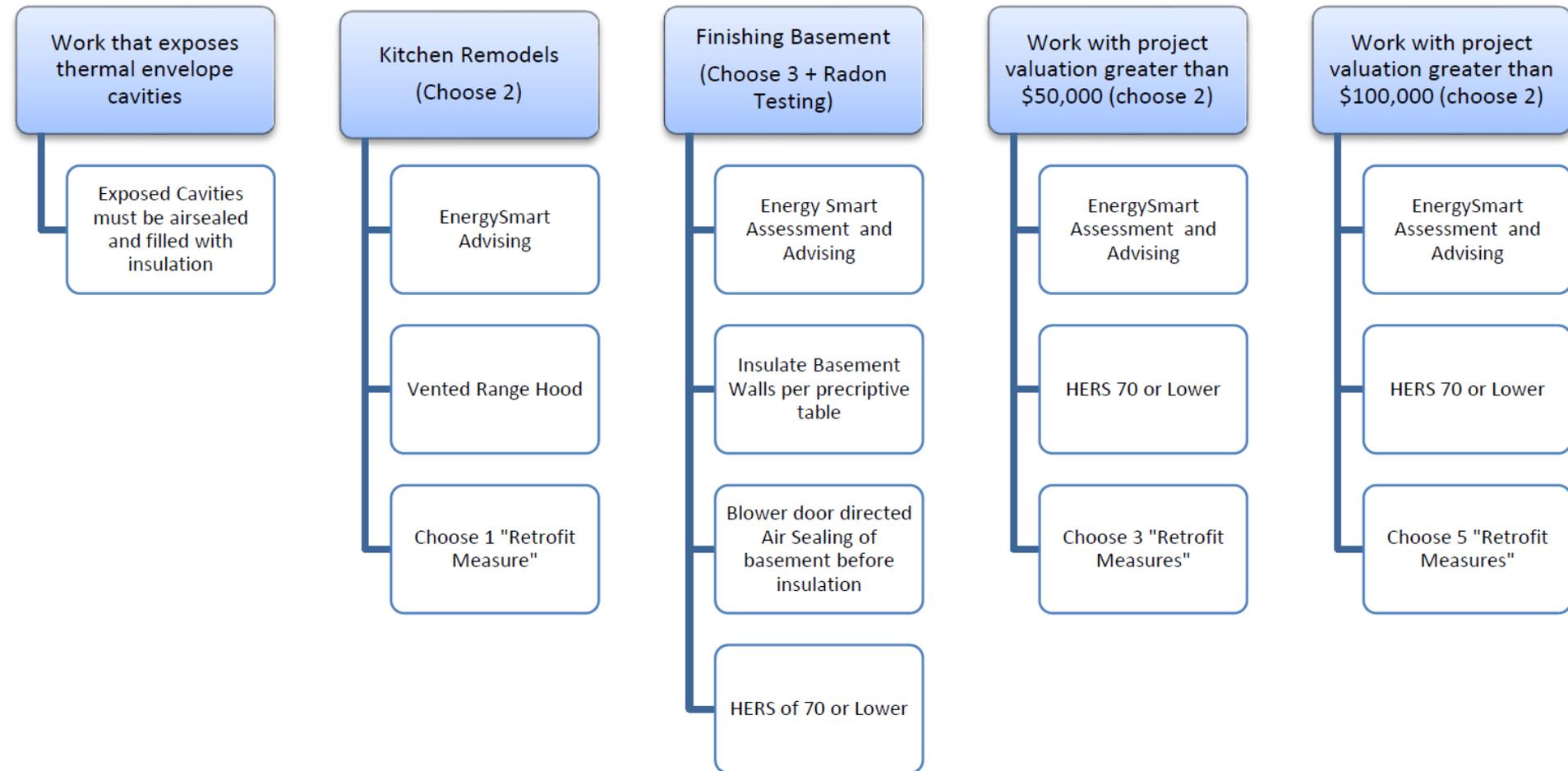
b) Energy requirements of BuildSmart are exempted for buildings with an annual space conditioning requirement of less than 5kBtu/sqft/year.

c) When converting Unconditioned Floor Area to Conditioned Floor Area, treat as an addition (except basements).

**Table N1106.4 : Maximum Energy Rating Index (HERS Score)**

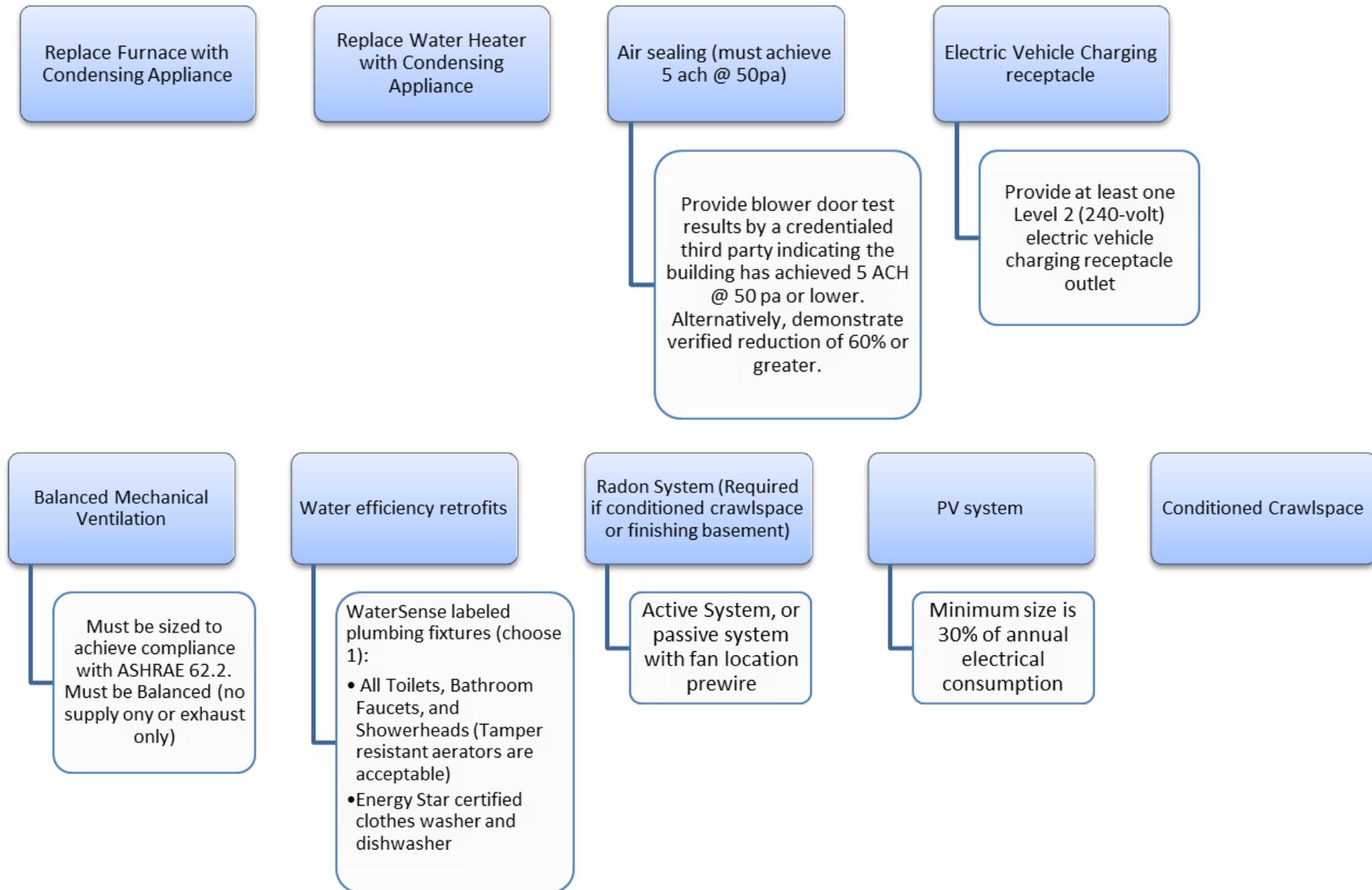


**Figure N1101.13.3 – Options for Alterations, Remodels and Repairs**

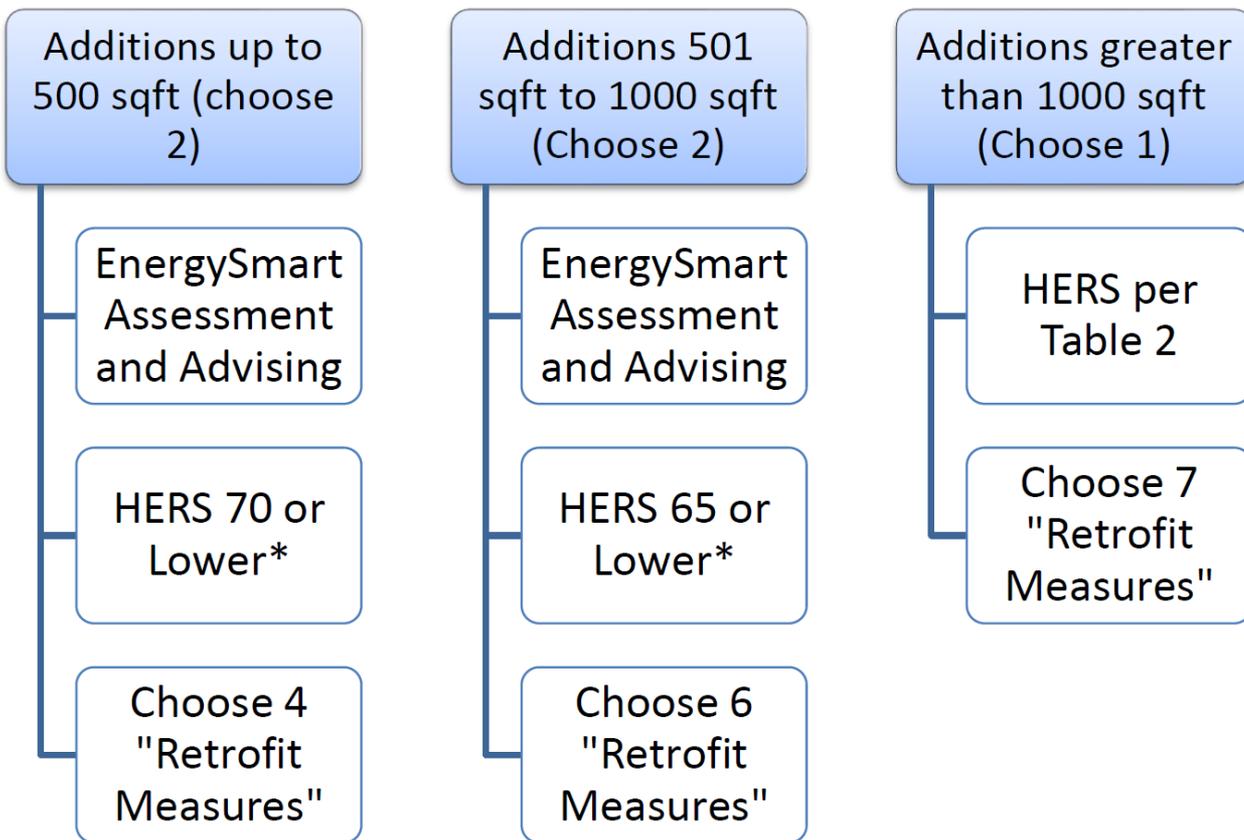


Note: All Energy Audits that meet prescribed standards will be accepted for use by Energy Smart advisors

**Figure N1101.13.3 –Alterations, Remodels and Repairs: Retrofit Measures**



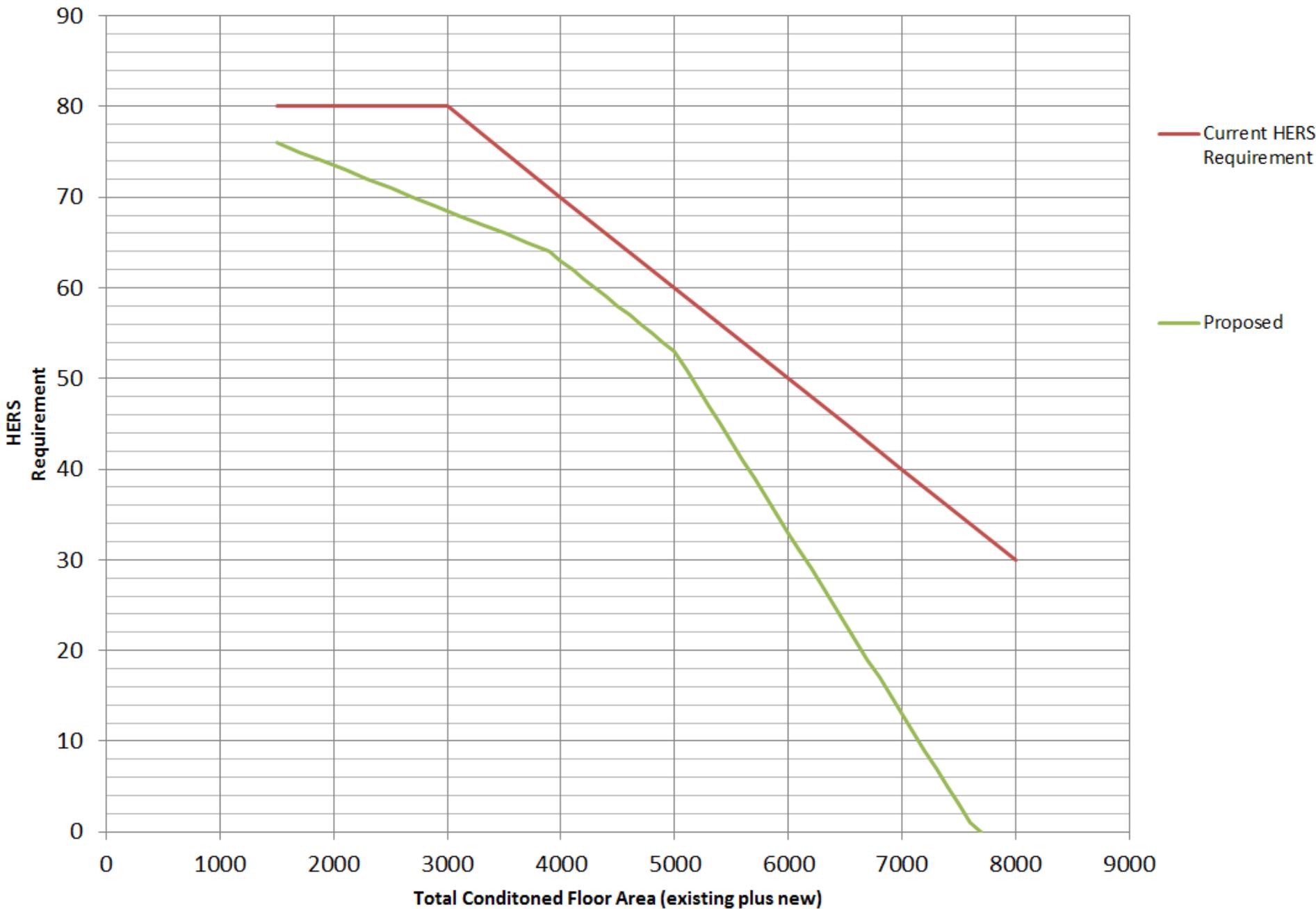
**Figure N1101.13.2: Options for Additions** *a,b*



a. All new building components must meet the requirements of Section N1102 (R402). Exception: Homes using the ERI (HERS) pathway.

b. For additions greater than 200 sqft: Homes larger than 3500 conditioned floor area (existing plus proposed) must use Table 2: HERS requirements for Additions.

**Figure N1101.13.2 - Maximum ERI (HERS) for Additions**



**IRC CHAPTER 13  
GENERAL MECHANICAL SYSTEM REQUIREMENTS  
SECTION M1302  
APPROVAL**

- **M1302.2 Solid fuel burning equipment (p. 75).** Updated the language and added a link to refer to state and federal lists of approved wood-burning appliances.



**IRC CHAPTER 24  
FUEL GAS  
SECTION G2417  
INSPECTION, TESTING AND PURGING**

- ~~G2417.1 Test pressure, G2417.4.2 Test duration (p. 75).~~  
Relocate current gas pipe test requirements for 10 psi for 15 minutes to appropriate location in code. Delete this local amendment in favor of the published code requirements for 1 ½ times the working pressure or 3 psi for a duration of 10 minutes.

**SECTION G2434  
VENTED GAS FIREPLACES (DECORATIVE APPLIANCES)**

- **G2434.3 Vented gas fireplaces (p. 75 - 76).** Delete these amendments, as it is felt that IRC Sections G2434, G2432, G2406, etc., along with the listings and manufacturer's installation instructions for appliances, cover these areas.

# **GRAY WATER / RAINWATER**

## **IRC CHAPTER 29**

### **WATER SUPPLY AND DISTRIBUTION**

- **SECTION 2911, ON-SITE NONPOTABLE WATER REUSE SYSTEMS (GRAY WATER) and SECTION P2912, NONPOTABLE RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS (p. 76 - 77)** These provisions have been moved from 2012 IRC Section 3009. The Colorado Department of Public Health and Environment has also adopted a “Regulation #86” regarding gray water. There are still constraints on anything but indoor use under the regulations of the Colorado Division of Water Resources. Language to this effect has once again been added the amendments.

## **IRC CHAPTER 30**

### **SANITARY DRAINAGE**

- **SECTION P3009, SUBSURFACE LANDSCAPE IRRIGATION SYSTEMS (P. 77).** A similar amendment regarding Colorado laws and regulations has been added.

## IRC APPENDIX E (p. 77 - 78)

# MANUFACTURED HOUSING USED AS DWELLINGS

*Add the adoption of Appendix E, Manufactured Housing Used as Dwellings, with amendments to correlate with the requirements of the Colorado Department of Local Affairs, Division of Housing.*

## SECTION AE101

### SCOPE

*Amend Section AE101.1 to include manufactured housing on rental lots.*

**AE101.1 General.** These provisions shall be applicable only to a *manufactured home* used as a single *dwelling unit* ~~installed on privately owned (nonrental) lots~~ and shall apply to the following: *(remainder of section to remain as published)*

*Add a Section AE101.2 to require that all installations meet the requirements of the Colorado Department of Local Affairs, Division of Housing.*

**AE101.2 Colorado installation requirements.** All *manufactured home* installations are to be in accordance with the requirements of the Colorado Department of Local Affairs, Division of Housing, including the most current edition of the “Manufactured Homes and Factory Built Housing Installation Handbook,” which is available at the following link:

<https://www.colorado.gov/pacific/dola/manufactured-housing-installation-program>

## APPENDIX R LIGHT STRAW-CLAY CONSTRUCTION

*Adopt the new Appendix R for light straw-clay construction.*



APPENDIX S (p. 78 – 79)

# STRAWBALE CONSTRUCTION

*Adopt the new Appendix S for strawbale construction.*

## SECTION AS108 THERMAL INSULATION

*Add a new Section AS108.2 to specify a straw bale wall assembly that is deemed to meet the prescriptive requirements of BuildSmart Table N1102.1.2.*



IMC

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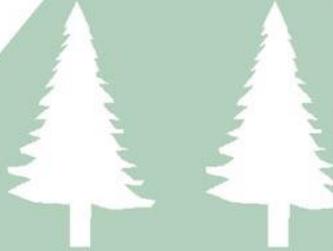
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**2015 INTERNATIONAL MECHANICAL CODE  
IMC CHAPTER 9  
SPECIFIC APPLIANCES, FIREPLACES AND SOLID FUEL-BURNING  
EQUIPMENT (p. 80)**

- **901.4 Solid fuel burning equipment.** *Update the existing amendment to include the current link to state and federal lists of approved wood-burning appliances.*



**INCLUDES**  
International Private Sewage  
Disposal Code

# IPC

**2015**  
INTERNATIONAL CODES

**INTERNATIONAL  
Plumbing Code**

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CODE COUNCIL**

**2015 INTERNATIONAL PLUMBING CODE**  
**CHAPTER 13**  
**NONPOTABLE WATER SYSTEMS (p. 81 – 82)**  
**SECTION 1301**  
**GENERAL**

*The provisions for the use of gray water and rainwater have been moved from the former Appendix C of the IPC to new chapters 13 and 14. As with these provisions in the IRC, wording has been added to make it clear that any reuse of nonpotable water must be in compliance with the requirements of the Colorado Division of Water Resources and the Colorado Department of Public Health and Environment (Sections 1301.1, 1302.1, 1303.1, 1304.1 & 1401.1).*

**1301.1 Scope.** The provisions of Chapter 13 shall govern the materials, design, construction and installation of systems for the collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction. Any use of *nonpotable water* shall be in strict compliance with applicable Colorado statutes and all applicable regulations of the Colorado Department of Natural Resources, Division of Water Resources and the Colorado Department of Public Health and Environment, Water Quality Control Commission, including “Regulation #86,” 5 CCR 1002-86.

IFGC

2015  
INTERNATIONAL CODES

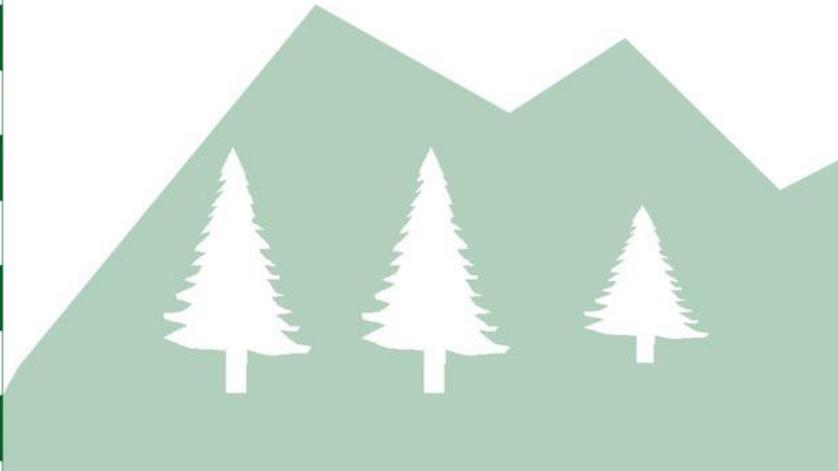
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**2015 INTERNATIONAL FUEL GAS CODE  
IFGC CHAPTER 4  
GAS PIPING INSTALLATIONS  
SECTION 406  
INSPECTION, TESTING AND PURGING**

- **DELETE** this existing amendment in favor of the published code provisions for gas piping pressure tests.



# IFGC CHAPTER 6

# SPECIFIC APPLIANCES

## IFGC SECTION 602

### DECORATIVE APPLIANCES FOR INSTALLATION IN FIREPLACES

**DELETE** *this existing amendment. The current provisions of IFGC 602 and 303.3, etc., cover these areas. These amendments were written at a time when there were many more prescriptive requirements in the codes. Today, the published code language, the listing of the appliance and the manufacturer's installation and use instructions, which are an integral part of the listing, cover all of these areas.*



IECC

2015  
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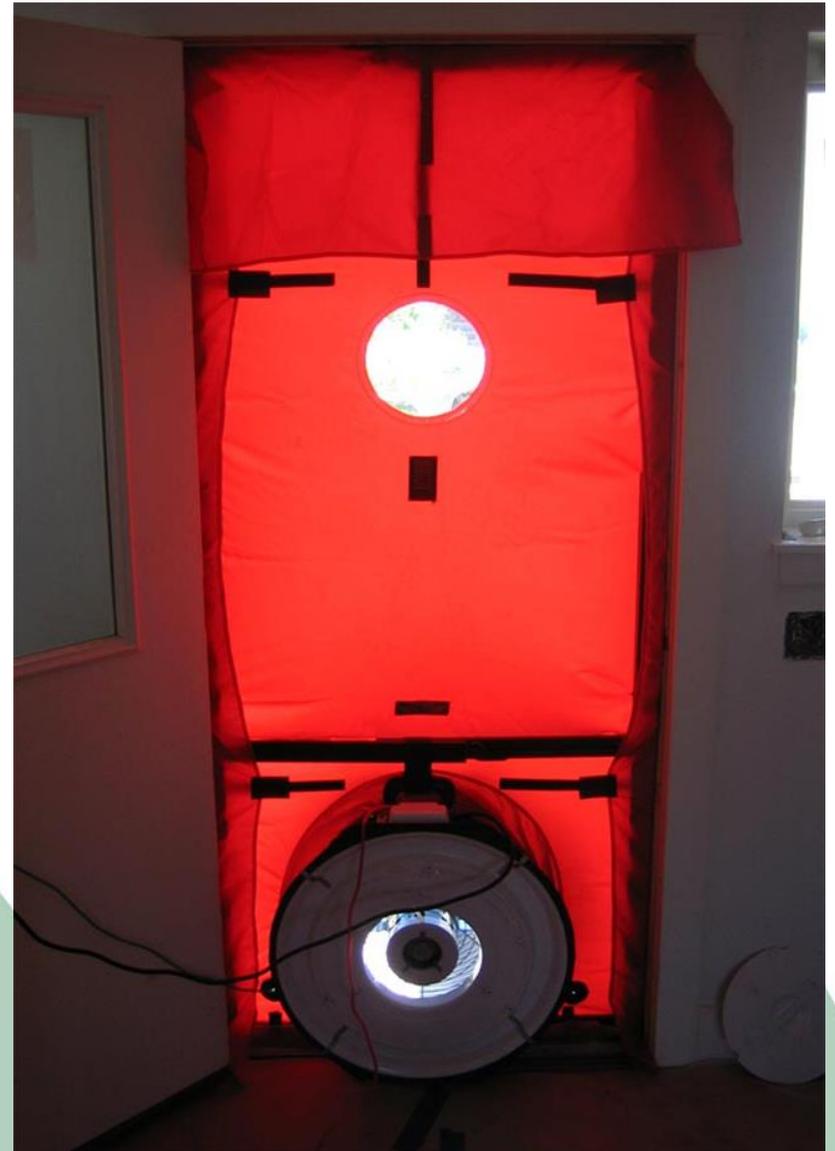
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Energy Conservation  
Code

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CODE COUNCIL

## 2015 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)

- Vast Majority of 2015 IECC for Commercial Construction is proposed to be adopted without local amendments.
- Maintaining Existing Local Amendments for:
  - Deconstruction
  - Construction Jobsite Waste and Recycling
  - Trash Storage and Recycling Areas



# igcc

**INCLUDES**  
ANSI/ASHRAE/USGBC/IES  
189.1-2014 Standard for the Design of  
High-Performance Green Buildings  
Except Low-Rise Residential Buildings

**REFERENCES**  
ICC 700-2012 National Green  
Building Standard for residential  
construction

## 2015

INTERNATIONAL CODES

### INTERNATIONAL Green Construction Code

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**IGCC CHAPTER 1**  
**SCOPE AND ADMINISTRATION**  
**IGCC SECTION 101**  
**GENERAL**

*DELETE the application of the IgCC to additions and alterations to existing buildings, as we haven't see any of these over the past 3 years and the IgCC doesn't apply very well to existing buildings in the unincorporated county. Additions and alterations to buildings constructed under the IgCC are still required to comply.*

**101.3 Scope.** The provisions of this code shall apply to the design, construction, addition, alteration, change of occupancy, relocation, replacement, repair, equipment, building site, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures and to the site on which the building is located for new buildings, ~~existing building additions, and alterations to existing buildings~~ or complexes of buildings on the same property over 25,000 square feet in total building floor area and additions and alterations to existing buildings that were constructed under the *International Green Construction Code*. Occupancy classifications shall be determined in accordance with the *International Building Code*® (IBC®).

ICCPC

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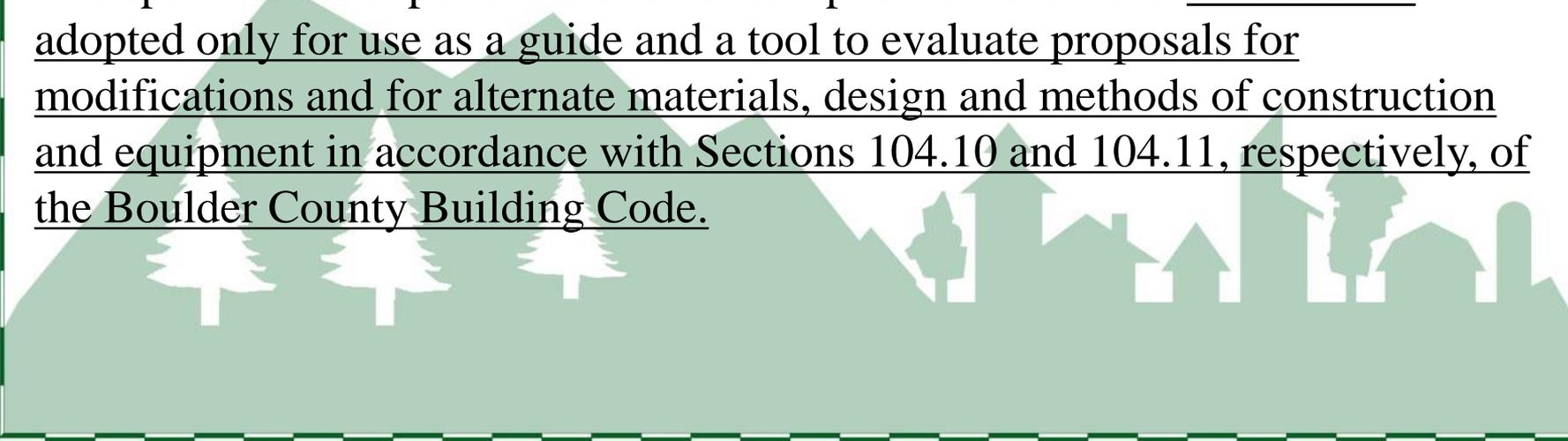
# ICC PERFORMANCE CODE

## *Part I—Administrative*

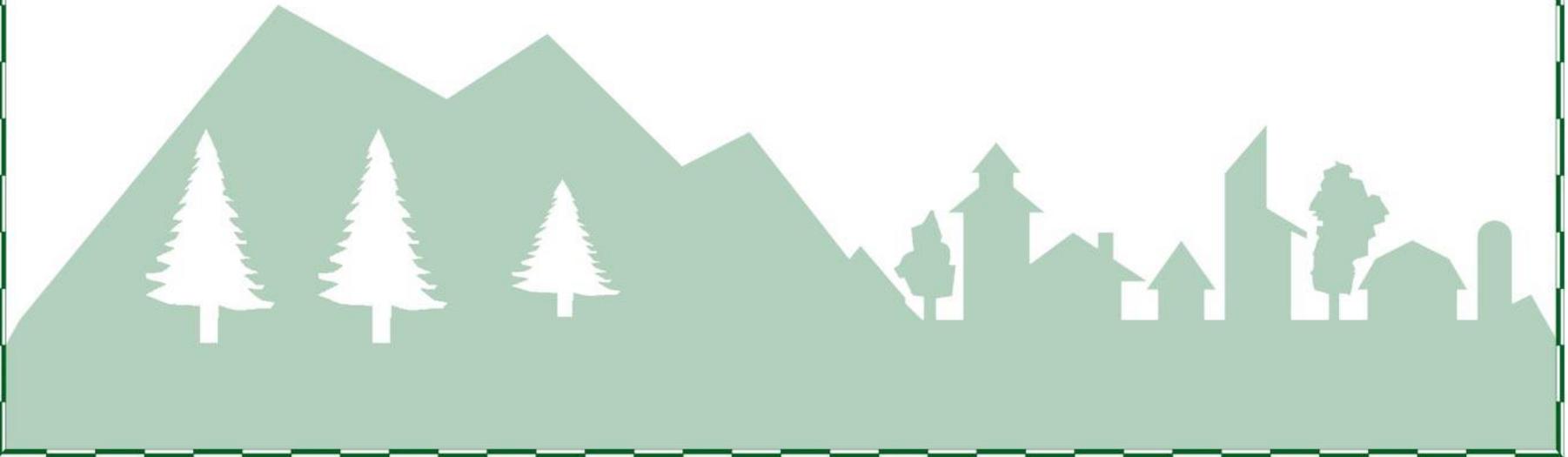
### CHAPTER 1 GENERAL ADMINISTRATIVE PROVISIONS SECTION 101 INTENT AND PURPOSE

*Add a sentence to state that the adoption is for limited use.*

**101.1 Purpose.** To provide appropriate health, safety, welfare, and social and economic value, while promoting innovative, flexible and responsive solutions that optimize the expenditure and consumption of resources. This code is adopted only for use as a guide and a tool to evaluate proposals for modifications and for alternate materials, design and methods of construction and equipment in accordance with Sections 104.10 and 104.11, respectively, of the Boulder County Building Code.



**BOULDER COUNTY  
BOARD OF REVIEW ACTION,  
TUESDAY, OCTOBER 13, 2015**



## **BOARD OF REVIEW TABLING ACTION ON 3 ITEMS:**

After the close of the public hearing on September 22, the Board of Review took action to TABLE action on the recommendation to the Board of County Commissioners based upon the following stated concerns:

- Consideration of a report, 2015 Colorado Design Snow Loads, prepared by the Structural Engineers Association of Colorado (SEAC), and possible amendment of the Boulder County Snow Load Map in accordance with the recommendations in the report.
- Modification of the proposed new footnote to Table N1106.4, IRC, regarding “thick walls,” such as double stud and strawbale walls, and measuring the conditioned floor area for such walls for HERS rating purposes from the interior air barrier, to expand the types of walls to be considered as “thick walls.”
- Consideration of a way to recognize the economic and energy efficiency of below grade basements, such as crediting basements as having less floor area than the actual floor area for the purposes of meeting BuildSmart requirements.

## IRC CHAPTER 11, BuildSmart

# REVISED CONDITIONED FLOOR AREA DEFINITION

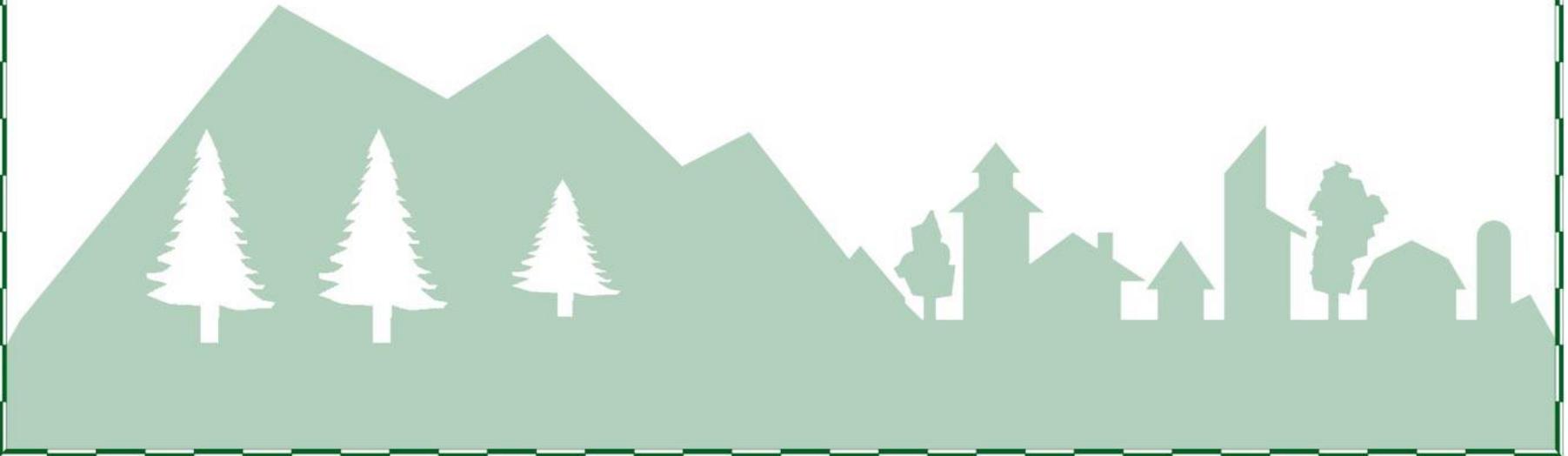
The proposed revised definition would accomplish the following:

- It defines “*conditioned floor area*” as exactly what it is. The area inside of the interior drywall is exactly the amount of floor area or building volume that is conditioned.
- **All.** It somewhat lessens HERS rating requirements for all projects by removing the area of what is most typically an 8-inch-thick exterior wall. The “average” new home with 4,000 sq. ft. of conditioned floor area would typically have at least 200 sq. ft. subtracted from the area that determines the HERS rating that must be achieved.
- **Thick Walls.** It provides more incentive for “thick walls” that are more carbon friendly (but have less *R*-value per inch), such as strawbale walls or walls insulated with cellulose insulation, by not penalizing them for their additional wall thickness. Under the proposed definition, a strawbale wall 16½ inches thick, for instance, would result in at least a 412-sq.-ft. reduction in the amount of conditioned floor area for an “average” 4,000 sq. ft. dwelling.
- **Basements.** In order to meet either prescriptive or HERS rating requirements, a typical 8-inch-thick concrete foundation wall is typically furred out with 2 X 4s with insulation in the stud cavities, resulting in a 12-inch-thick wall. An average 4,000-sq.-ft. house would see at least a 300-sq.-ft. reduction in the area that is counted as *conditioned floor area*.

Based upon the revised definition of **CONDITIONED FLOOR AREA** and the fact that the revised snow load is not included in the proposal and could be brought back to them at a later date, the Board of Review passed a unanimous motion to recommend **APPROVAL** of Docket #BORC-15-0001 and **ADOPTION** of proposed BOCC Resolution 2015-104.

# PROPOSED CODES EFFECTIVE DATE

- **January 1, 2016:** The updated codes are proposed to be effective for all building permit applications received on or after this date (effectively January 4, 2016) for construction in the unincorporated portions of Boulder County.



## RECOMMENDATION:

Staff and the Boulder County Board of Review recommend that the Board of County Commissioners APPROVE Docket #BORC-15-0001, 2015 International Codes Adoption and Amendments to the Boulder County Building Code, and ADOPT the proposed BOCC Resolution 2015-104 dated October 27, 2015.

