The HERS Associate and Taking the Performance Path

Module 2 – Cracking the Building Energy Code

Presented by:
Mike Barcik

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Squirrel !!!

Boy, the sacrifices I make for EEBA...
Introductions

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About Southface

• Building a Regenerative Economy, Responsible Resource Use & Social Equity Through a Healthy Built Environment for All
  www.southface.org
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Module Learning Objectives

- Understand how building science influences the energy code
- Know the prescriptive R-values for components
- Learn mandatory code requirements
- Comprehend the trade-off compliance options to the prescriptive code
The house as a system

A house is a system made up of interrelated parts:
- The weather barrier
- Lighting & appliances & plumbing
- The site and neighboring homes
- The building thermal envelope
- Space conditioning
- Ventilation

- All efficiency measures should take occupants into account (e.g., air sealing & ventilation)

Building Science:

- Employ scientific principles from a variety of fields that govern building performance
- Optimize building performance and understand, predict, prevent and correct building failures
- Systems approach to houses
- Physics of:
  - Heat: Flows from hot to cold
  - Air: Flows from high pressure to low
  - Moisture: Flows from wet to dry (liquid and vapor)

A. Hot-Humid
B. Mixed-Humid
C. Cold
D. Hot-Dry
E. Mixed-Dry
F. Marine
G. Very Cold
H. Ridiculously Cold
Question 1

In your opinion, what percentage of a home’s total energy is used for space heating and cooling?

- A. < 20%
- B. Between 20 & 50%
- C. More than 50%

Home Energy Usage Over Time

-Shrink the pie!
-Usage shifts

Energy consumption in homes by end uses: quadrillion Btu and percent

Sources: U.S. Energy Information Administration, Residential Energy Consumption Survey.
Note: Amounts represent the energy consumption in occupied primary housing units.
Home Energy Usage Breakdown

AC Usage Varies Greatly
Mechanical systems

- Water heating & distribution
- Heating & Cooling
- Ventilation
- Lighting & Appliances

Codes: Applied building science

- Energy codes today are based on building science
- Some examples include 2015/18 IECC envelope & mechanical system requirements
- Some requirements are prescriptive while others are mandatory
IECC envelope examples

- Blower door testing was an option in 2009 IECC (< 7 ACH<sub>50</sub>)
- For 2012/15/18 IECC, homes must pass mandatory air leakage testing (blower door)
  - Climate zones 1 & 2 must test at < 5 ACH<sub>50</sub>
  - Climate zones 3 - 8 must test at < 3 ACH<sub>50</sub>
- Homes must meet increased thermal boundary requirements (insulation, windows, etc.)
- Different pathways available to demonstrate compliance (e.g., prescriptive tables & REScheck)

IECC mechanical examples

- Heating and cooling system ducts must be sealed and pass more stringent duct leakage testing (~4 cfm<sub>25</sub> / 100 s.f.)
- Mechanical ventilation systems are mandatory for < 5 ACH<sub>50</sub> (IRC 2012/15/18 & ASHRAE 62.2)
- Heating and cooling equipment must be properly sized and selected (Manual J & S)
- Equipment must meet minimum efficiency ratings (which are set by a separate DOE standard)
- Combustion safety issues are starting to be addressed

Load calcs are required, but there are no details about who is qualified to perform them.

Winter Outdoor Design Temp

Summer Outdoor Design Temp

Energy codes

- A brief history of energy codes
- Overview of the 2015/18 IECC
- Compliance options – focus on the ERI
History of energy codes

• **MEC 1992, ’93, 95** – Early energy codes (complicated)
• **IECC 98, 2000, ’03** – Strengthening of codes
• **IECC 2004, ’06** – Codes become simpler
• **IECC 2009** – Big jump in stringency, duct & envelope testing introduced, ARRA “mandated”
• **IECC 2012** – Stricter testing & envelope requirements
• **IECC 2015/18** - More stringent, new compliance path introduced (Energy Rating Index)

  - Historically, the code increased in stringency about 1-3% each cycle - until more recently!
    - ’09 Code is ~15% more stringent than ’06 version
    - ’12 Code is ~30% more stringent than ’06 version
    - ’15, ’18 Code is ~30+% more stringent than ’06 version

Energy Code Trajectory

- Residential Energy Codes became much more stringent between IECC 2006 and 2012
- Since then, residential energy codes have been mostly stagnant
The 2015/18 IECC: Overview

- What are the mandatory requirements of the 2015/18 IECC?
- Like previous versions, the 15/18 IECC provides prescriptive and trade-off performance options
- The 2015 IECC introduces a new compliance option: the Energy Rating Index (ERI)
Review: Thermal and Air Barriers

- The building envelope is comprised of thermal & pressure boundaries
- The thermal & pressure boundaries must be complete and aligned

- Insulation products such as fiberglass batts need to be completely enclosed on all sides
- Insulation is most effective when it is continuous and located on the exterior

Continuous Insulation & Air Barrier

- Building Thermal Envelope (air barrier and insulation must be in contact)
Thermal Boundary

- Limits heat transfer between inside and outside.
- Identified by the presence of insulation.
- The location of insulation in relation to other building components is critical to its effectiveness.
- Even small areas of missing insulation are very important.
- Voids of 7% can reduce effective R-value by half.

Building Thermal Envelope

- Although these three homes look identical from the outside, each has defined the building thermal envelope differently.
Conduction Heat Flow Calculations

- Heat transfer through a solid object: the formula for calculating transmission heat loss is:

\[ q = U \times A \times \Delta T \]

- \( q \) = heat flow (Btu/hr)
- \( U \) = inverse of R-Value \([U=1/R, \ R=1/U]\) (Btu/hr ft\(^2\)°F)
  
  \( U \) is referred to as the **Conductance** or **Thermal Transmittance**
- \( A \) = area (square feet)
- \( \Delta T \) = temperature difference across component (°F)

Insulation Coverage is key!

- If 990 s.f. of R-38 is installed with 10 s.f. of uninsulated attic access (R-1), it effectively yields the same heat transfer as R-28!

\[
U_{\text{avg}} = \frac{U_1 \times A_1 + U_2 \times A_2 + U_3 \times A_3}{A_{\text{total}}}
\]

\[
U_{\text{avg}} = \frac{0.026 \times 990 + 1 \times 10}{1000}
\]

\[
U_{\text{avg}} = 0.036 \quad R = 27.7
\]
Insulation Coverage is Key!

Prescriptive Code
The 2015/18 IECC: Prescriptive

Fill in the prescriptive code R-values

Determine Climate Zone
Prescriptive code R-values

Example: Climate Zone 4A

2015/18 IECC: R402.2
Specific Insulation Requirements (Prescriptive)

- R402.2.1 Ceilings with Attic Spaces
- R402.2.2 Ceilings without Attic Spaces
- R402.2.3 Eave Baffle
- R402.2.4 Access hatches and doors
- R402.2.5 Mass Walls
- R402.2.6 Steel Framing
- R402.2.7 Walls with Structural Sheathing
- R402.2.8 Floors
- R402.2.9 Basement Walls
- R402.2.10 Slab-on-grade floors
- R402.2.11 Crawlspace walls
- R402.2.12 Masonry Veneer
- R402.2.13 Sunrooms
R402.2: SPECIFIC INSULATION REQUIREMENTS

Prescriptive details for insulating portions of the building envelope
- Ceilings with Attic – 402.2.1
- Ceilings w/out Attic – 402.2.2
- Eave baffles – 402.2.3
- Access hatches and doors – 402.2.4
- Mass Walls – 402.2.5
- Steel Framing – 402.2.6
- Partial structural sheathed walls – 402.2.7
- Floors – 402.2.8
- Basement Walls – 402.2.9
- Slab-on-grade – 402.2.10
- Crawlspace Walls – 402.2.11
- Masonry Veneer – 402.2.12
- Sunrooms – 402.2.13

402.2.1 - CEILINGS WITH ATTICS

- R-38 or 49 is typical prescriptive requirement
- Complete coverage of continuous R-30 or 38 is deemed to comply
- Rulers required every 300 s.f. for blown attic insulation (R301.1.1)
402.2.1 - CEILINGS WITH ATTICS

- R-30 for 20% (up to 500 s.f.) acceptable
- Vaulted ceilings and foam sprayed rooflines will need to perform an R-value trade-off
- GA specific: Can trade down to unvented R-20 if spray foam insulation is used (air impermeable insulation)

402.2.2 - CEILINGS WITHOUT ATTICS

R402.2 Specific insulation requirements (Prescriptive). In addition to the requirements of Section R402.1, insulation shall meet the specific requirements of Sections R402.2.1 through R402.2.13.

R402.2.1 Ceilings with attic spaces. Where Section R402.1.2 would require R-38 insulation in the ceiling, installing R-30 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Similarly, where Section R402.1.2 would require R-49 insulation in the ceiling, installing R-38 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R-49 insulation whenever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the U-factor alternative approach in Section R402.1.4 and the total UA alternative in Section R402.1.5.
402.2.2 - CEILINGS WITHOUT ATTICS

- Can trade down to R-20 fiberglass or cellulose (air-permeable insulation) with added:
  - R-5 (CZ 2 & 3) or R-15 (CZ 4) rigid foam board (air impermeable insulation) for unvented attics

IRC 806.5 Unvented Roof Assemblies

- To reduce risk of condensation, install a certain amount of “air-impermeable” insulation before using an “air-permeable” product in an unvented roof assembly

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>MINIMUM RIGID BOARD ON AIR-IMPERMEABLE INSULATION R-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2B and 3B</td>
<td>0 (none required)</td>
</tr>
<tr>
<td>1, 2A, 2B, 3A, 3B, 3C</td>
<td>R-5</td>
</tr>
<tr>
<td>4C</td>
<td>R-10</td>
</tr>
<tr>
<td>4A, 4B</td>
<td>R-15</td>
</tr>
<tr>
<td>5</td>
<td>R-20</td>
</tr>
<tr>
<td>6</td>
<td>R-25</td>
</tr>
<tr>
<td>7</td>
<td>R-30</td>
</tr>
<tr>
<td>8</td>
<td>R-35</td>
</tr>
</tbody>
</table>

a. A contributes to but does not supersede the requirements in Section 4.102.
b. Alternatively, sufficient continuous insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

5. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.
402.2.2 - CEILINGS WITHOUT ATTICS

- May trade down to R-20 fiberglass or cellulose (air-permeable insulation) with complete vented channel that extends to ridge
R402.2.8 FLOORS

R402.2.8 Floors. Floor framing-cavity insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

Exception: The floor framing-cavity insulation shall be permitted to be in contact with the topside of sheathing or continuous insulation installed on the bottom side of floor framing where combined with insulation that meets or exceeds the minimum wood frame wall R-value in Table 402.1.2 and that extends from the bottom to the top of all perimeter floor framing members.

R402.2.9 BASEMENT WALLS

R402.2.9 Basement walls. Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections R402.1.2 and R402.2.8.

Basement Wall – Average gross wall must be > 50% below grade and enclose conditioned space

CZ4C-8: R-15 continuous or R-19 cavity
CZ4AB: R-10 continuous or R-13 cavity
CZ3: R-5 continuous or R-13 cavity
CZ1-2: No insulation required
R402.2.9 BASEMENT WALLS

Insulation strategies:

- Fiberglass batt w/ vinyl backing
- Cellulose batt
- Rigid foam board
- Rigid foam board in AGW, foam board on concrete
- Spray Polyurethane Foam
R402.2.9 BASEMENT WALLS

Blanket basement insulation options

R402.2.9 BASEMENT WALLS

Blanket basement insulation options
R402.2.11 CRAWLSPACE WALLS

- Seal ground with 6-mil plastic (6” up walls, 6” overlaps)
- Insulate interior of walls to satisfy code (aligns with basement R-values)
- Eliminate all vents and leaks (access doors)
- Satisfy IRC exception to vent requirement (IRC section R408.3)

**Critical Details:**
- No drainage problems
- Use a sealed combustion / direct vent furnace or install a Heat Pump
- Pest Control and Code Official awareness

**Venting Exceptions:**
- Continuous exhaust (radon)
- Direct condition crawlspace (supply)
- Direct condition (dehumidifier)

*Note: all crawspaces must meet vapor retarder requirements, as per IRC (exception for open crawspaces)*
Crawl Insulation – Band area

- Pest Control industry struggles with band area that is fully filled with SPF
- SPF that fills band blocks inspection for pest control
- Air seal and then insulate with movable insulation product (batts, pillows, rigid board, etc.)

PROBLEMS WITH UNDERFLOOR INSULATION

- Learn the benefits of conditioned crawlspaces
  www.crawlspaces.org
R402.3 FENESTRATION

**U-factor**
Lower U-factor means better insulated \((U = 1/R)\)
U-factor applies to
- windows,
- skylights,
- doors

**Solar Heat Gain Coefficient**
The SHGC is the fraction of the solar heat from the sun that enters through a window
- SP clear glass
  SHGC: ~ 0.8
- DP clear glass
  SHGC: ~ 0.6-0.7
- DP low-e
  (low solar gain)
  SHGC: ~ 0.3

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R402.3 FENESTRATION EXEMPTIONS

R402.3.3 Glazed fenestration exemption. Up to 15 square feet (1.4 m²) of glazed fenestration per dwelling unit shall be permitted to be exempt from U-factor and SHGC requirements in Section R402.1.2. This exemption shall not apply to the U-factor alternative approach in Section R402.1.4 and the Total UA alternative in Section R402.1.5.

R402.3.4 Opaque door exemption. One side-hinged opaque door assembly up to 24 square feet (2.22 m²) in area is exempted from the U-factor requirement in Section R402.1.4. This exemption shall not apply to Attic Access Doors or the U-factor alternative approach in Section R402.1.4 and the total UA alternative in Section R402.1.5.
(Effective January 1, 2020)
2015/18 IECC Prescriptive Requirement – Hot water pipe insulation

- Insulation on all hot water pipes – smaller diameter best
- Centrally locate hot water source near fixtures (or point of use)
- Small diameter tubes to each fixture ("home run")
  (make sure manifold is very close to WH!)
- Recirculating systems – controls are critical
  - Timer
  - Demand (best!)

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2015/18 IECC Mandatory Requirements

- R401.3 Certificate
- R402.4 Air leakage (air sealing, testing, fireplace, fenestration, combustion zones and recessed lighting specifics)
- R402.5 Maximum fenestration U-factor and SHGC
- R403.1 Controls
- R403.3.2-3 Duct sealing & testing
- R403.5.1 Hot water circulation & temperature maintenance systems
- R403.6 Mechanical ventilation
- R403.7 Equipment sizing and efficiency rating
- R403.8 Systems serving multiple dwelling units
- R403.9 Snow melt and ice system controls
- R403.11 Portable spas
- R404.1 Lighting equipment
Air Barrier Installation

Building Science: Air Movement

- Air moves from high pressure to low
- \( \text{CFM}_{\text{out}} = \text{CFM}_{\text{in}} \)
- Air leakage requires
  - A hole or pathway
  - A pressure difference
- 3 forces cause pressure differences:
  - Wind
  - Stack
  - Fans
Air Barrier

- Limits airflow between inside and outside.
- The IECC defines the air barrier as materials assembled and joined together to limit air leakage.
- Should be collocated with the thermal boundary
- New homes – wall sheathing
  Old homes – wall interior finish

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>AIR BARRIER AND INSULATION INSTALLATION*</th>
</tr>
</thead>
<tbody>
<tr>
<td>General requirements</td>
<td>A continuous air barrier shall be installed in the building envelope. The exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.</td>
</tr>
<tr>
<td>Ceilingattic</td>
<td>The air barrier in any dropped ceiling or soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be sealed.</td>
</tr>
<tr>
<td>Walls</td>
<td>The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of exterior walls shall be sealed. Knee walls shall be sealed.</td>
</tr>
<tr>
<td>Windows, skylights and doors</td>
<td>The space between framing and skylights, and the jams of windows and doors, shall be sealed.</td>
</tr>
<tr>
<td>Rim joists</td>
<td>Rim joists shall include the air barrier.</td>
</tr>
<tr>
<td>Floors, including cast-in-place slabs and floors above garages</td>
<td>The air barrier shall be installed at any exposed edge of insulation.</td>
</tr>
</tbody>
</table>
### Blower Door Recap

- For any given home, there is one unique amount of CFM that will create exactly 50 Pa difference across the envelope.

\[
\text{CFM}_{50} = \frac{\text{ACH}_{50}}{60} \times \text{Volume}
\]

- Say a blower door is used to depressurize a house to -50 Pa, while the fan is running, the water in a sink’s P-trap will...

**Answer:** Water in trap will rise up 0.2” towards the house
Residential Blower door testing

• Optional in 2009 IECC (<7 ACH\textsubscript{50}), Required by 2012 and later versions

• CZ 1-2 < 5 ACH\textsubscript{50} \[ \text{ACH}_{50} = \frac{\text{CFM}_{50} \times 60}{\text{Volume}} \]

• CZ 3-8 < 3 ACH\textsubscript{50}

• Quantifies the amount of leakage across the home's thermal boundary

• Several states - Test performed by a certified professional (DET Verifier, HERS Rater, BPI, etc.)

• Reported to builder and code official via certificate

2012-18 IRC Ventilation requirements

• Ventilation is REQUIRED

• For any home tighter than 5 ACH\textsubscript{50}

R303.4 Mechanical ventilation. Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c. (50 Pa) in accordance with Section R1102.4.1.2, the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

R303.5 Opening location. Outdoor intake and exhaust openings shall be located in accordance with Sections R303.5.1 and R303.5.2.

R303.5.1 Intake openings. Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Where a source of contaminant is located within 10 feet (3048 mm) of an intake opening, such opening shall be located a minimum of 3 feet (914 mm) below the contaminant source.

For the purpose of this section, the exhaust from dwelling unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.

R303.5.2 Exhaust openings. Exhaust air shall not be directed onto walkways.
R403.6 – 2012-18 IECC Ventilation requirements

- Ventilation is REQUIRED:
  - For most of country (CZ 3-8), < 3 \( ACH_{50} \)
  - For CZ 1-2, < 5 \( ACH_{50} \)

Between ’12 IECC and ’12 IRC, whole house mechanical ventilation is now mandated everywhere!

R404.1 Efficient Lighting

9 bulbs x 60 watts each = 540 w
540 w x 4 hours a day = 2160 wh
2160 wh x 365 days = 788,400 wh a year
788,400 / 1000 = 788 kwh
788 kwh x $.12 = $94.61 per year

9 bulbs x 9 watts each = 81 w
81 w x 4 hours a day = 324 wh
324 wh x 365 days = 118,260 wh a year
118,260 / 1000 = 118 kwh
118 kwh x $.12 = $14.19 per year

High Efficacy Lamps Thresholds
- 2009 IECC > 50%
- 2015 IECC > 75%
- 2018 IECC > 90%
Economics of Lighting for Builders

It takes 24 days to payback LED's if half the lights are left on during construction!

(12 days if all on!!!)

Compliance Options
2015/18 IECC compliance options

- Prescriptive (table)
- Total UA Alternative (REScheck)
- Simulated Performance Alternative (computer simulation using the standard reference and proposed design)
- Energy Rating Index (“HERS Rating”)

COMPLIANCE PATHS FOR INSULATION & WINDOWS

- The new ERI path gives the most design flexibility – such as credit for mechanical equipment efficiency
- It also credits items not covered by the code (e.g., appliance efficiencies)
RESCHECK FOR UA TRADEOFF

- [www.energycodes.gov](http://www.energycodes.gov)
- Software evaluates specific designs quickly
- Demonstrates SHGC compliance
- Allows trade-offs
  - Building envelope components
  - No trade-offs for better heating & cooling equipment efficiencies

2015 IECC – Section 405
Simulated Performance Alternative

- Annual energy usage simulation demonstrates that the proposed building’s energy costs are ≤ “standard code” building
- No credit for mechanical efficiencies
- Likely to involve a HERS rater
- Ekotrope, REMrate & Energy Gauge are acceptable
- REScheck has a “crude” version

[www.resnet.us](http://www.resnet.us)
2015 IECC – Section 405
Simulated Performance Alternative – Sample Report

- Compares total annual energy costs
  - Window U-factor and SHGC
  - Envelope and duct testing
  - Lighting, duct insulation
- Compares energy costs of actual home being built against 2015 IECC reference home’s energy cost

The Energy Rating Index (ERI) path
The ERI may allow more options in materials choice, technologies and innovative strategies than the simulated performance path

- The new Energy Rating Index (ERI) path gives the most design flexibility (e.g., credit for mechanical equipment efficiency)
- It also credits items not covered by the code (e.g., appliance efficiencies)
Determining the Energy Rating Index

1. Simulate two homes
   - Rated Home – what will be built
   - Reference Home – same home but exactly meets ‘06 code

2. Compare Annual Energy
   - Space Heating & Cooling, Hot Water, Lighting and some Appliances
   - Multiply by 100 (lower w/ renewables)

\[
\text{Index} = 100 \times \text{PE}_{\text{fraction}} \times \left[ \frac{\text{Rated Home’s Htg + Clg + WtrH + L.A.}}{\text{Refer. Home’s Htg + Clg + WtrH + L.A.}} \right] = 75
\]

ERI Target Values

- The 2015/18 IECC sets a maximum ERI for each climate zone
- The ERI is not a “magic bullet” or “easy cakewalk”
- However, it opens more options and allows builders more credit for innovative strategies (“the ERI shall consider all energy used in the residential building”)

The rated design must have an ERI less than or equal to the above table to comply with 2015/18 IECC

**NOTE:** The 2018 calculations were adjusted so the thresholds were amended!
Question 3: Likely Energy Code Compliance Scenarios

1. Builder A has a few small windows that don’t quite meet code but their walls are sheathed with higher R-value than minimum.
2. Builder B just wants a construction package that will guarantee they comply every time.
3. Builder C is incorporating high efficiency mini-split HP’s, electric HP water heaters and is considering renewables; they want to foam the roofline to less than prescriptive and market the performance.
4. Builder D is using standard equipment and appliances, tight construction and better windows, and wants to foam the roofline to less than prescriptive.

Answer choices:
1. **Prescriptive** ("Recipe")
2. **UA Trade-off** (REScheck)
3. **Simulated Perf** (Hourly sim.)
4. **Energy Rating Index** (ERI)

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Energy Code Questions 4

According to the 2015/18 IECC, new homes are required to be tight and have mechanical whole-house ventilation systems.

- True
- False
Energy Code Questions 5

“A builder may choose to insulate the floor over a crawlspace or the walls of a conditioned crawlspace. For a basement, the only option is to insulate the floor over the basement.”

- True
- False

Energy Code Questions 6

What is the minimum percentage of high-efficacy lighting required by the 2015 IECC?

- 50%
- 75%
- 90%
- 100%

What is the minimum percentage of high-efficacy lighting required by the 2018 IECC?

- 50%
- 75%
- 90%
- 100%
Thoughts / Questions?

Thank you!
mikeb@southface.org

Southface Applied BS Webinars
Third Thursdays! 11 a.m. ET
• June 18th - Combustion Safety
• July 16th - HVAC Load Calcs
• Aug 20th - High Performance Design

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• June 4: It All Begins with Building Science
• June 11: Cracking the Building Energy Code
• June 18: Demystifying Energy Modeling
• June 25: Healthy Homes Matter - Understanding IAQ & Ventilation
• July 2: An Industry That Puts It All Together: The World of HERS Raters