

Role of a Rater: Unhappy Homeowners of a new ENERGY STAR home



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I'm going to tell you a joke or two

What was the first animal in Space?

The cow that jumped
over the moon



Here's the second one!

*What runs faster,
Cold or Hot?*

Krw"

DGE CW UG"

[QW "ECP "

ECVEJ "C "

EQNF #



OUTLINE

- 1. Why This Topic?**
- 2. What We've Found**
- 3. Current Resolution Process**
- 4. How to Evolve Industry**
- 5. Added Value for Raters**

Who's in the room?

- **Raters / Builders / HVAC / Government / Utility**
- **Who conducts Ratings or Energy Audits on existing homes?**
- **Who has encountered new homeowners who wondered if their home was “built right”?**



Why This Topic?

- **What I've found**
- **Getting issues fixed**
 - **Want homeowners to get the full value of their investment**

Desired Outcomes for Session

- **Move the Industry to DO The Right Things Right**
- **Increase the value of HERS Raters**
- **Accelerate RESNET's enhanced QA Results**

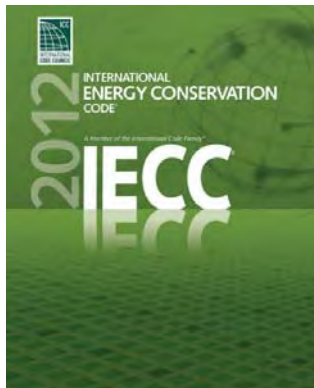
Who are the ENERGY STAR Checklists designed to benefit?



Rater Field Checklist
ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

Home Address: _____	City: _____	State: _____	Permit Date: _____			
Thermal Enclosure System			Must Correct	Builder Verified ¹	Rater Verified ²	N/A ³
1. High-Performance Fenestration & Insulation						
1.1 Fenestration meets or exceeds levels specified in Item 2.1 of the Rater Design Review Checklist			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
1.2 Insulation meets or exceeds levels specified in Item 3.1 of the Rater Design Review Checklist			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-

Who are energy codes designed to benefit?



Builders
 or **Building Departments**
 or **Politicians** or **Society**
 or **Homebuyers / Occupants**

ENERGY STAR Homes

Who's responsible for compliance?

1. Rater
2. Rater Company
3. Rater Provider
4. RESNET
5. EPA (ENERGY STAR)

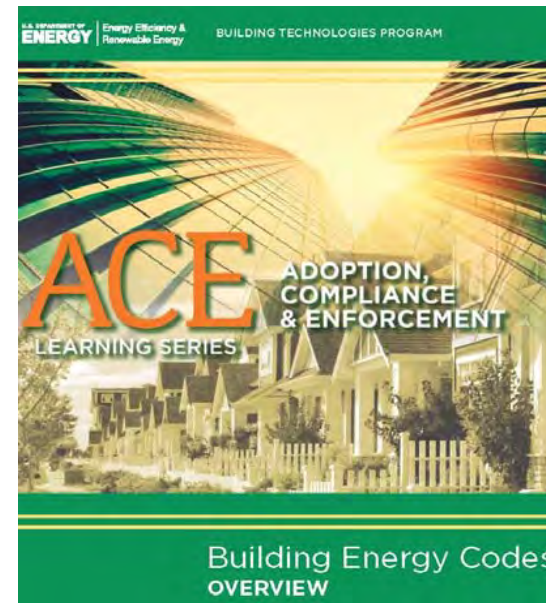


2012, 2015 IECC Energy Codes

Who's ultimately responsible for compliance?

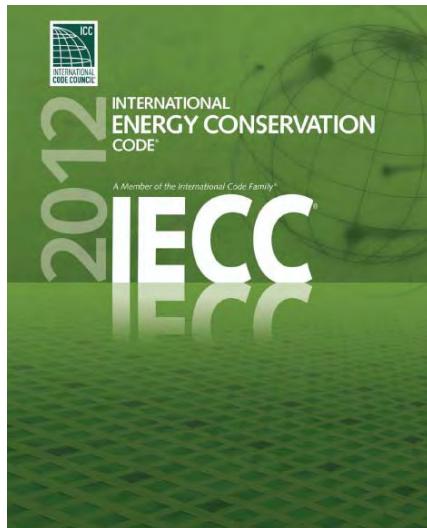
The Building Inspector signed off on the insulation.

regardless of the level of enforcement, as a law **the building owner/developer is ultimately responsible to comply with the energy code.**



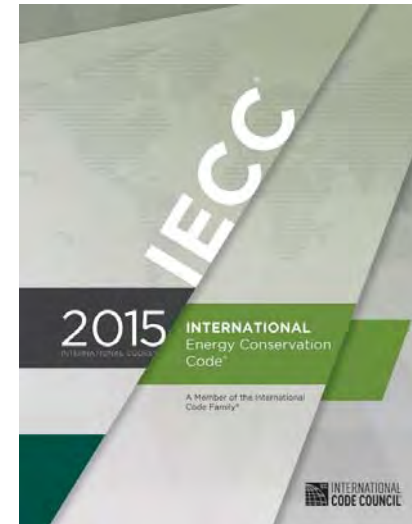
DOE Building Energy Codes, Sept 2012

2012, 2015 IECC Energy Codes



Quantifiable measures

- Duct Tightness
- Envelope Tightness



Visually Verified

- Continuous Air barrier
- Insulation Effectiveness
 - *Free of voids, gaps and compression*

Z kdw̃#k h#J dwhũ#J r d n B

ROLE OF A RATER- MAKING HOMEOWNERS HAPPY



2012 IECC - Table R402.4.1.1 Air Barrier and Insulation Installation

Air Barrier and Thermal Barrier	External Thermal Envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material. Air-permeable insulation is inside of an air barrier.
Ceiling/Attic	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation aligned with insulation and any gaps are sealed. Attic access (except unvented attic), knee wall door or drop down stair is sealed.
Walls	Corners and headers insulated. Junction of foundation and sill plate is sealed.
Windows & Doors	Space between windows/door jambs and framing is sealed.
Rim Joists	Rim joists are insulated and include an air barrier.
Floors	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.
Crawl space walls	Insulation is permanently attached to walls. Exposed earth in unvented crawl space is covered with Class I vapor retarder with overlapping joints taped.
Shafts & Penetrations	Duct shafts, utility penetrations, knee walls and flue shaft opening to exterior or unconditioned space are sealed.
Narrow cavities	Batts in narrow cavities are cut to fit or narrow cavities are filled with spray/blown insulation.
Garage separation	Air sealing is provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures are tight, IC rated and sealed to drywall. Exception - fixtures in conditioned space.
Plumbing & Wiring	Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing or spray/blown insulation extends behind piping and wiring.
Shower/tub on exterior wall	Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.
Electrical/phone box	Air barrier extends behind boxes or air sealed-type boxes installed.
Common wall	Air barrier is installed in common wall between dwelling units.
HVAC boots	HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.
Fireplace	Fireplace walls include an air barrier.

What's troubling new homeowners?

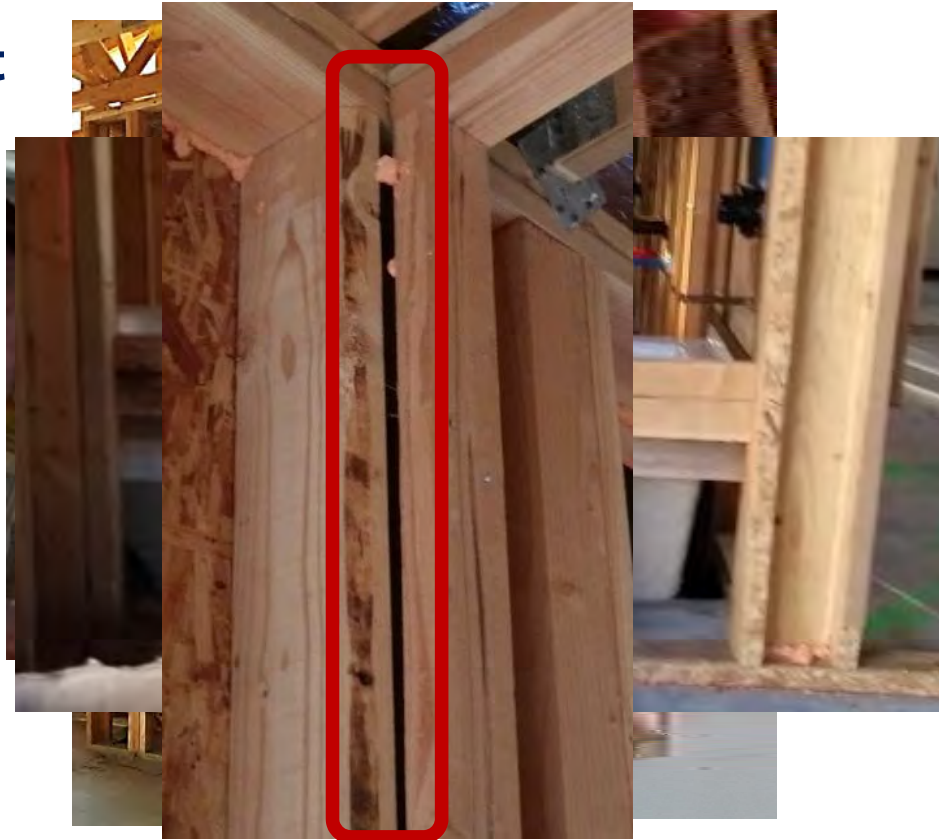
- Comfort (hot/cold), Drafts
- Indoor Air Quality (IAQ) – Dust, Sneezing, sore throat
- Noisy supply vents
- Leary of Home Builders (*i.e. lawyers*)
- Higher than expected Energy Bills (?)
- Did they get their money's worth?



Z kdwtz rxog# rx#gr#i# rx#z huh#
wh#ghz #krp hrz qhuB

Incomplete Air Barriers

- Water heater vent
- Kitchen Exhaust
- Fireplace
- Soffits
- Tubs/showers
- Walls



Photos are from a combination of ENERGY STAR and 2012 IECC Code Homes (Southern Nevada)

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Incomplete Air Barriers

- **Ceiling Penetrations**

- Exhaust Fans
- Recessed lights
- Sprinklers
- Attic hatch



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Insulation Effectiveness

- **Ceiling**
 - Alignment (Batts)
 - Depth



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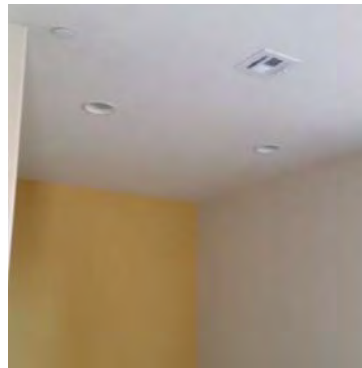
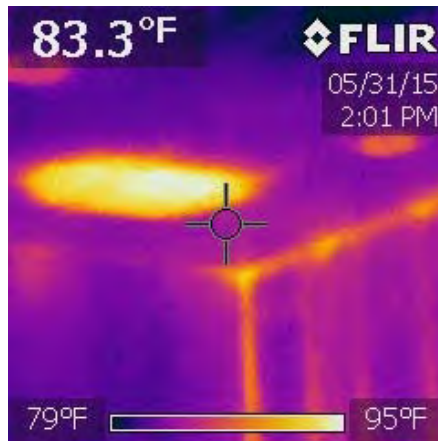
Insulation Effectiveness

- **Baffle Installation**
 - *O'Hagan vents*



Insulation Effectiveness

- **Baffle Installation**
 - *O'Hagan vents*



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Insulation Effectiveness

- Under Service Platform



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Duct Leakage



Mechanical Ventilation

- Underperforming bathroom or kitchen exhaust fans
- **Exhaust Only**
 - Exhaust: Uneducated homeowner, No labeling, switch controller
- **Supply Only**
 - (Outside air ducted to return) with controller

Is controller programmed?



Indoor Air Quality (IAQ)

- Impact of Tighter Envelopes & More Exhaust Devices

2,530 sf 2.8 ACH

(Pa)	House Pressures with Respect to Outside Results (11/1/2016)
Time	Weather Conditions: 68°F, Calm
Ave 30	<i>Exterior doors/windows/attic access closed/air filters removed during pressure</i>
sec	<i>measurements</i>
0.50	All interior doors open; exterior doors and windows closed; AC, dryer & exhaust fans "OFF", Air Filters removed
-23.5	All Exhaust Fans "ON"
-30.1	All Exhaust Fans and Clothes Dryer "ON"
-40.0	All Exhaust Fans and Clothes Dryer "ON"; AC (Master) "ON"
-42.6	All Exhaust Fans and Clothes Dryer "ON"; AC (Master) and Bed 2 & 3 "ON"
-35.5	All Exhaust Fans and Clothes Dryer "ON"; AC (Master), Bed 2 & 3 and Central Zone "ON"

2012 IECC Code Home (Southern Nevada)

How to resolve compliance issues?

1. Unoccupied ENERGY STAR Home

- Hired by Builder

2. Occupied ENERGY STAR Home

- Hired by Homeowner

3. Unoccupied 2012/2015 IECC Home

- Hired by Builder

4. Occupied 2012/2015 IECC Home

- Hired by Homeowner

RESNET Complaint Resolution Process

Non-ENERGY STAR Home Issue

- **Ethics and Compliance Complaints (Section 908)**
For failures to comply with the RESNET Standards

ENERGY STAR Home – Certification Issue

- **RESNET & EPA**

RESNET Complaint Resolution Process

ENERGY STAR Home – Certification Issue

Resolving ENERGY STAR Certification

- If EPA determines that a home has been improperly certified,
 1. Builder partners are expected to take the necessary actions to resolve the deficiencies in a timely manner
 2. If the builder fails to make the needed improvements to the home, EPA will issue a letter to the homeowner and the builder stating the home has been improperly certified as ENERGY STAR and that the label should be removed

RESNET Complaint Resolution Process

ENERGY STAR Home – Certification Issue

Resolving ENERGY STAR Certification

- EPA has **NO authority** to pursue (partial list):
 1. Sending EPA personnel or representatives to inspect a home in question
 2. Taking legal action to compel a builder to make modifications to a home that was improperly-certified as ENERGY STAR

RESNET Complaint Resolution Process

ENERGY STAR Home – Certification Issue

Resolving ENERGY STAR Certification

- EPA has **NO authority** to pursue (partial list):
 3. Pursuing financial compensation on behalf of the homebuyer;
 4. Pursuing criminal enforcement or other penalties against the builder beyond revocation of partnership; and
 5. Providing legal guidance to homeowners regarding litigation they are taking or may pursue against the builder

RESNET Complaint Resolution Process

1. Who has pursued this process?
2. What were your results?

***What about IECC Code
compliance issues?***

Resolving IECC Code compliance issues?

Who should homeowner contact?

- **Builder**
- **Building Department**
- **Lawyer**
- **Bureau of Consumer Protection**

Resolving IECC Code compliance issues?

Who should Rater communicate with?

1. Homeowner Only – who hired them
2. Provide Report for homeowner to give builder
3. Speak on Homeowner's behalf to Builder?

Evolving the Industry

Builder's Goal: Build the Best Home for the \$

Challenges to Attaining Builder's Goal

- 1. Supervisors think they are doing everything correctly**
- 2. Architectural Complexity**
- 3. Weather Delays creating "Wait, Wait, RUSH, RUSH"**
- 4. Buyers want to move in before holiday, Year end**
- 5. Rater – Over worked**
- 6. Corporate bureaucracy to make productive changes**

Evolving the Industry

Builder's Goal: Build the Best Home for the \$

Challenges to Attaining Builder's Goal

- 7. Work Scope does not specify creating continuous air barrier or installing insulation to Grade I**
- 8. Supervisors need education to make sure they're getting what they are paying (Subs)**
- 9. Raters not educating Supervisors/Subs**
 - Effective air barriers**
 - Effective Insulation Installation**
- 10. Raters not wanting to upset Supervisor**

Evolving the Industry

How to Improve Compliance/Performance

Involve all Stakeholders (Create Buy-In)

1. **Builder – Subcontractors – Building Inspectors**
2. **Present “where we are” and “here’s our goal” without Blame**
3. **Review details of Work Scope**
 - ❑ **E.g. Continuous air barrier / Insulation installed per manufacture’s instructions or code (Grade I)**
4. **Provide training and mentoring to Builders, Subcontractors and Building Officials**

Create a positive experience

Evolving the Industry

How to Improve Compliance/Performance

Involve all Stakeholders (Create Buy-In)

- Create a COOPERATIVE Team Culture
- Create a culture that is always improving
 - ❑ **Feedback Loop**
- Drive Quality through fostering Personal Pride
- Everyone is a stakeholder
- Imagine the power of **Z IQ OZ IQ** QA!
- Improved RESNET QA is coming
 - Rough / Final (Virtual)

Provide Added Value to Builders

Hyhg#Z khq#K rp h#Sdvvhv

**Water line
insulation**



Provide Added Value to Builders

Hyhg#Z khq#K rp h#S dvvhv

Custom Homes

1. Were Manual J, S and D created or reviewed?
2. Was Mechanical Ventilation Installed?
 - **Functioning??**
3. Are exhaust fans performing?

Provide Added Value to Builders

Hyhg#Z khq#K rp h#S dvvhv

Insulation Certificates

**Bag count?
Manufacturer's Specs?**

Exterior: Batts Manufacture <u>GUARDIAN</u>	Thickness/Type: 3.5"	R-Value: <u>R-13</u>
Ceilings (Batts): Manufacture <u>J. MANVILLE</u>	Thickness/Type: 10.25"	R-Value: <u>R-30</u>
Blown In: Manufacture <u>CLIMATE PRO</u> <u>CELLULOSE</u>	Thickness/Type: 11.4" Thickness/Type: 8.3"	R-Value: <u>R-30</u> R-Value: <u>R-30</u>
Garage Walls Manufacture <u>GUARDIAN</u>	Thickness/Type: <u>N/A</u>	R-Value: <u>N/A</u>
Floors: Manufacture <u>GUARDIAN</u>	Thickness/Type: <u>N/A</u>	R-Value: <u>N/A</u>
Interior Walls: Manufacture <u>J. MANVILLE</u>	Thickness/Type: <u>N/A</u>	R-Value: <u>N/A</u>
Date _____		

Provide Added Value to Builders

Hyhg#Z khq#K rp h#S dvvhv

- **Non-Energy Features (Durability, Health & Safety)**
 - B-Vent clearance
 - Vent location & height above roof
 - Condensate slope
 - Water heater T&P, earthquake straps
 - Recessed Window flashing
 - Sealing Garage to Attic (single story)
- **Best Practices (BASC)**
 - Training Subs (free)
 - Air seal door frames
 - Better framing practices
- **New Products/Solutions**

**Go Forth and Make A
Positive Impact on The
Home Performance
Industry**