



TABLE R402.1.2 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT³

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^{1a} U-FACTOR	GLAZED FENESTRATION SHGC ^{b, e}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ^c	FLOOR R-VALUE	BASEMENT ^{1c} WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^e WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5 ^b	8/13	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5 ^b	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5 ^b	13/17	30 ^g	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10 ^b	15/20	30 ^g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10 ^b	19/21	38 ^g	15/19	10, 4 ft	15/19

HAS THE PRESCRIPTIVE PATH SEEN ITS LAST DAYS?

With the incorporation of the ERI (HERS path) in the 2015 IECC
which compliance path is the best?

JIM MEYERS - SWEEP

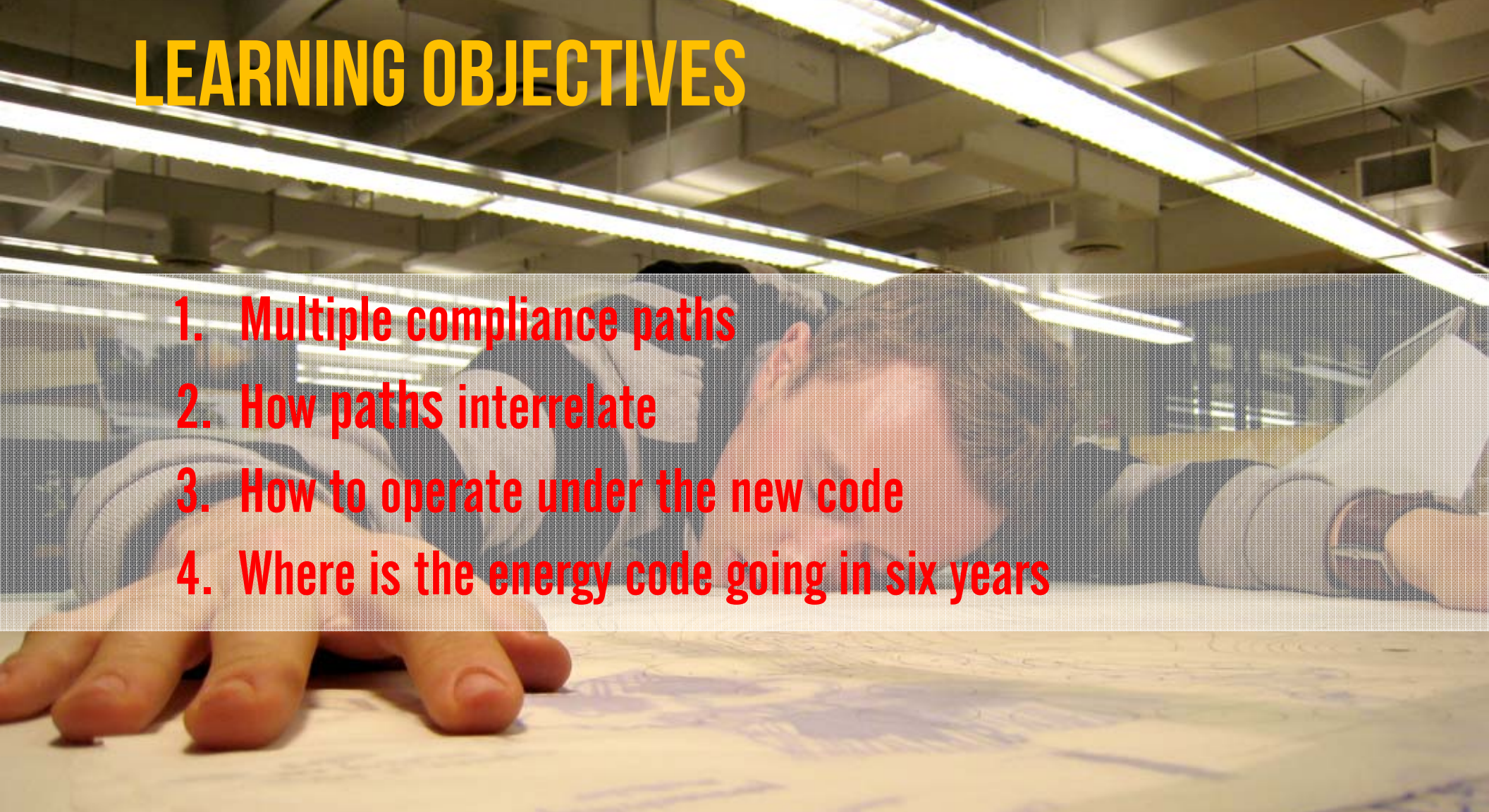


HAS THE PRESCRIPTIVE PATH SEEN ITS LAST DAYS?

- Approximately 1.5 years ago the 2015 IECC was released and the new energy code incorporates a different compliance path that takes into consideration appliance loads, renewable generation and mechanical trade-offs. With this new compliance path will the homebuilder gravitate to this new path or stay with the prescriptive path, which includes REScheck?
- Working in the southwestern U.S. the presenter will show the benefits and obstacles to an energy code of the future with no prescriptive path. With jargon such as better than code, and low HERS scores infiltrating the building industry can a performance path be the chosen compliance path within the IECC? By looking at energy code adoption trends, state policies supporting the newer energy codes, witnessing the changes in the commercial energy code, and watching the clean tech industry the picture of the future code is all around.



LEARNING OBJECTIVES

A person is lying face down on a table in a classroom, with their hand resting on a diagram. The background shows a classroom with fluorescent lights and a grid ceiling. The person is wearing a blue and white striped shirt. The diagram on the table is a technical drawing with purple lines.

1. Multiple compliance paths
2. How paths interrelate
3. How to operate under the new code
4. Where is the energy code going in six years

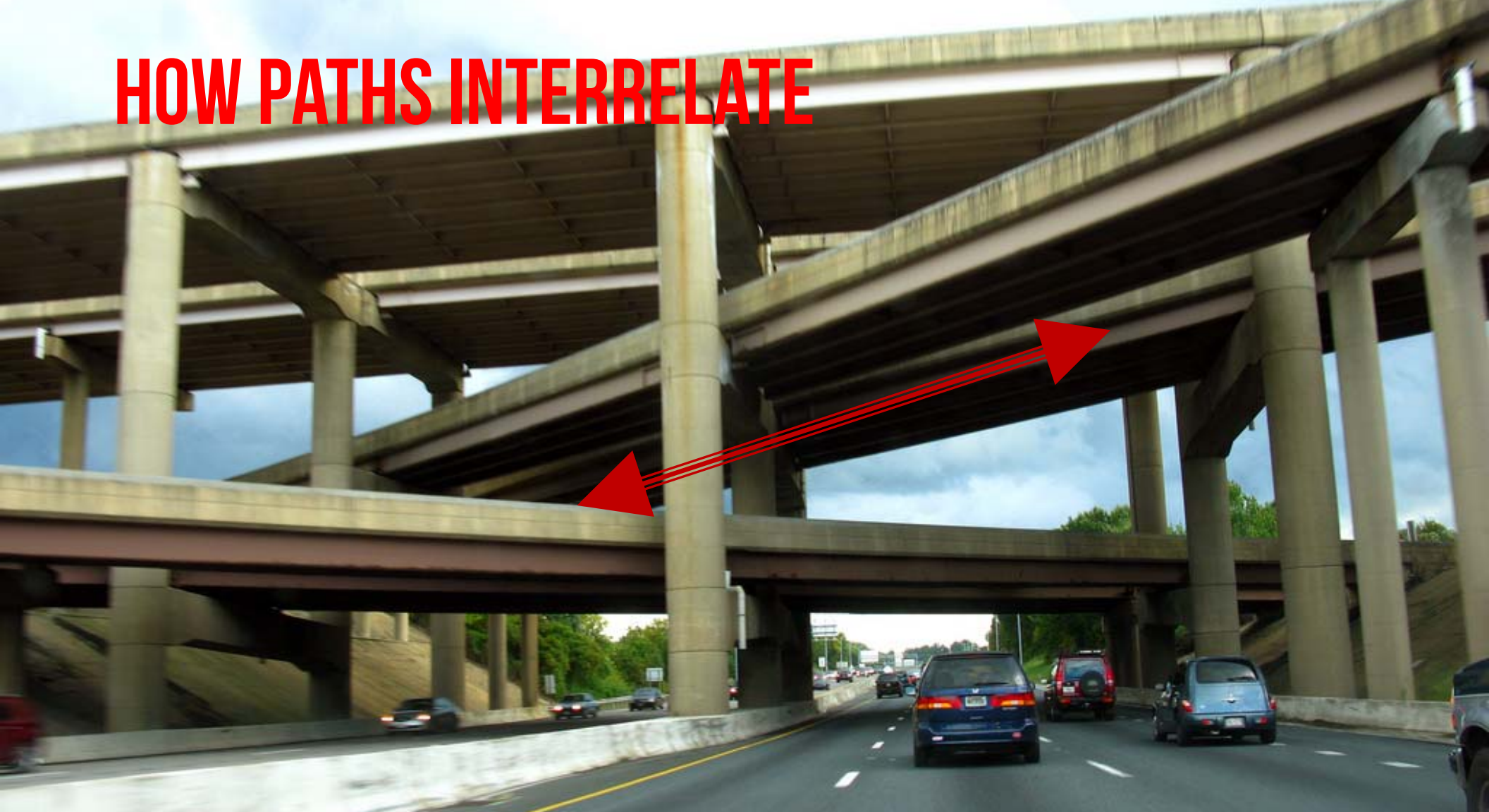


COMPLIANCE PATHS

- Multiple Compliance Paths



HOW PATHS INTERRELATE



IS THE NEW CODE MORE COMPLEX...

NOTICE

**Do Not Remove/Interrupt
Aircraft Power**

Software Installation In-Process

WHERE IS THE ENERGY CODE IN SIX YEARS?

THE BOARD

Like all Lexus design, the board's design features a balance of crafted details, modern materials and technical innovation. Inspired by classic skateboarding and Lexus design principles, the result is the perfect balance of the natural and high tech.



IECC

2015

INTERNATIONAL CODES®

INTERNATIONAL
Energy Conservation
Code®

A Member of the International
Code Family®

COMPLIANCE PATHS

- Table R402.1.2
- Table R402.1.4
- Section R405 / Table R405.5.2(1)
- Section R406 / Table R406.4

TABLE R402.1.2 (R-VALUE TABLE)

TABLE R402.1.2 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, e}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5 ^h	8/13	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5 ^h	8/13	19	10 /13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5 ^h	13/17	30 ^g	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10 ^h	15/20	30 ^g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10 ^h	19/21	38 ^g	15/19	10, 4 ft	15/19

TABLE R402.1.4



TABLE R402.1.4 EQUIVALENT *U*-FACTORS^a

CLIMATE ZONE	FENESTRATION <i>U</i> -FACTOR	SKYLIGHT <i>U</i> -FACTOR	CEILING <i>U</i> -FACTOR	FRAME WALL <i>U</i> -FACTOR	MASS WALL <i>U</i> -FACTOR ^b	FLOOR <i>U</i> -FACTOR	BASEMENT WALL <i>U</i> -FACTOR	CRAWL SPACE WALL <i>U</i> -FACTOR
1	0.50	0.75	0.035	0.084	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.084	0.165	0.064	0.360	0.477
3	0.35	0.55	0.030	0.060	0.098	0.047	0.091 ^c	0.136
4 except Marine	0.35	0.55	0.026	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

SECTION R405 / TABLE R405.5.2(1)

(PERFORMANCE
PATH)



SECTION R405 / TABLE R405.5.2(1)

(PERFORMANCE PATH)

TABLE R405.5.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass wall if proposed wall is mass; otherwise wood frame.	As proposed
	Gross area: same as proposed	As proposed
	U-factor: as specified in Table R402.1.4	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed
Basement and crawl space walls	Type: same as proposed	As proposed
	Gross area: same as proposed	As proposed
	U-factor: from Table R402.1.4, with insulation layer on interior side of walls	As proposed
Above-grade floors	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-factor: as specified in Table R402.1.4	As proposed
Ceilings	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-factor: as specified in Table R402.1.4	As proposed
Roofs	Type: composition shingle on wood sheathing	As proposed
	Gross area: same as proposed	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed
Attics	Type: vented with aperture = 1 ft ² per 300 ft ² ceiling area	As proposed
Foundations	Type: same as proposed	As proposed
	Foundation wall area above and below grade and soil characteristics: same as proposed	As proposed
Windows	U-factor: as specified in Table R402.1.4	As proposed
Opaque doors	Orientation: North	As proposed



C

SECTION R406 / TABLE R406.4

(ENERGY RATING
INDEX)

55

CLIMATE ZONE	ENERGY RATING INDEX
1	52
2	52
3	51
4	54
5	55
6	54
7	53
8	53

POLICY IMPLICATIONS — NO PRESCRIPTIVE

- Design
- Adoption
- Compliance
- Education
- Government
- Interests

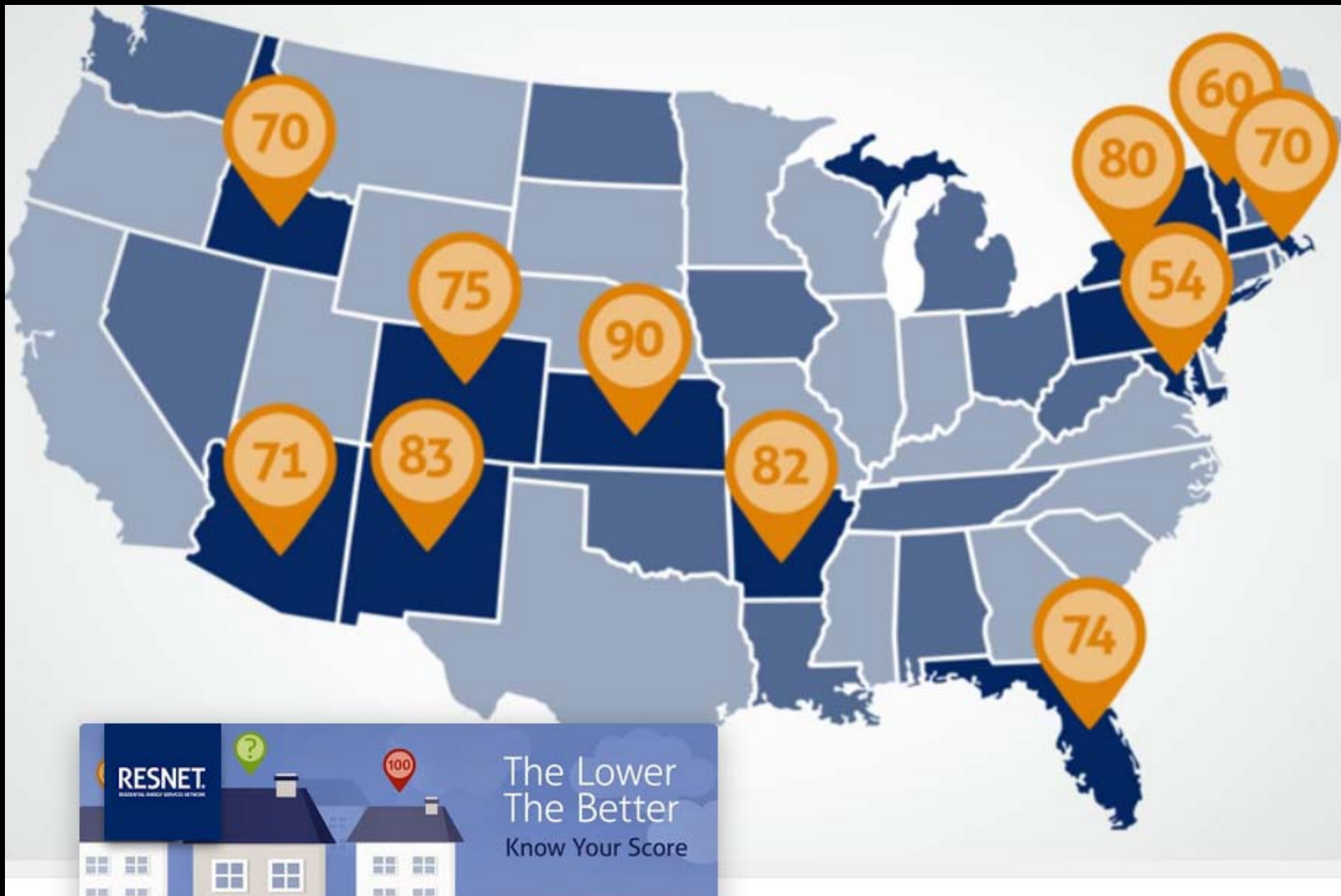


POLICY IMPLICATIONS — NO PRESCRIPTIVE



ERI OR PERFORMANCE PATH





RESNET.
RESIDENTIAL ENERGY SERVICE NETWORK

**The Lower
The Better**
Know Your Score

ADOPTION TRENDS



ERI ADOPTIONS

- VT
- TX
- MA



A close-up photograph of a glass pitcher pouring a thick, white stream of milk into a clear glass. The background is a soft, out-of-focus light blue. The text 'WHERE IS THE CODE GOING NEXT?' is overlaid in bold yellow capital letters at the top.

WHERE IS THE CODE GOING NEXT?

National Milk Day

www.NationalDayCalendar.com

January 11

History — Look back to look forward

MONTH	DAY	YEAR	AM PM	HOUR	MIN
OCT	28	2015	PM	04	29
DESTINATION TIME					
MONTH	DAY	YEAR	AM PM	HOUR	MIN
JUL	10	2012	PM	09	37
PRESENT TIME					
MONTH	DAY	YEAR	AM PM	HOUR	MIN
OCT	26	1985	PM	01	20
LAST TIME DEPARTED					

TABLE 402.1
PRESCRIPTIVE REQUIREMENTS BY COMPONENT^a

<u>Climate Zone</u>	<u>Path Number</u>	<u>Fenestration U-Factor^{b,c}</u>	<u>Skylight U-Factor^b</u>	<u>Glazed Fenestration SHGC^{b,d,e}</u>	<u>Ceiling R-Value</u>	<u>Wood-frame wall R-Value^f</u>	<u>Mass Wall R-Value^g</u>	<u>Floor R-Value^h</u>	<u>Basement/Crawl space Wall R-Valueⁱ</u>	<u>Slab R-Value & Depth^j</u>	<u>Building Air Tightness (ACH50)^k</u>	<u>Duct Tightness^l</u>	<u>Furnace (AFUE) /Heat Pump (HSPF)^m</u>	<u>Air Conditioning (SEER)ⁿ</u>	<u>Hot Water Heater^o</u>
1	1	0.60	0.75	0.25	38	13+3	5/10	13	0	0	7	Cond or Tested	Standard	Standard	Standard
1	2	NR	0.75	0.3	30	13	3/4	13	0	0	7	Cond or Tested	Standard	SEER 15	62G/94E
1	3	0.60	0.75	0.3	30	13	3/4	13	0	0	7	Reduced Leakage	Standard	Standard	Standard
1	4	NR	0.75	0.3	30	13	3/4	13	0	0	7	Cond or Tested	Standard	SEER 17	Standard

<u>Climate Zone</u>	<u>Path Number</u>	<u>Fenestration U-Factor^{b,c}</u>	<u>Skylight U-Factor^b</u>	<u>Glazed Fenestration SHGC^{b,d,e}</u>	<u>Ceiling R-Value</u>	<u>Wood-frame wall R-Value^f</u>	<u>Mass Wall R-Value^g</u>	<u>Floor R-Value^h</u>	<u>Basement/Crawl space Wall R-Valueⁱ</u>	<u>Slab R-Value & Depth^j</u>	<u>Building Air Tightness (ACH50)^k</u>	<u>Duct Tightness^l</u>	<u>Furnace (AFUE) /Heat Pump (HSPF)^m</u>	<u>Air Conditioning (SEER)ⁿ</u>	<u>Hot Water Heater^o</u>
2	1	0.35	0.65	0.25	38	13+3	6/13	13	0	0	7	Cond or Tested	Standard	Standard	Standard
2	2	0.60	0.65	0.3	30	13	4/6	13	0	0	7	Cond or Tested	Standard	SEER 15	62G/94E
2	3	0.35	0.65	0.3	30	13	4/6	13	0	0	7	Reduced Leakage	Standard	Standard	Standard
2	4	0.60	0.65	0.3	30	13	4/6	13	0	0	7	Cond or Tested	Standard	SEER 17	Standard

<u>Climate Zone</u>	<u>Path Number</u>	<u>Fenestration U-Factor^{b,c}</u>	<u>Skylight U-Factor^b</u>	<u>Glazed Fenestration SHGC^{b,d,e}</u>	<u>Ceiling R-Value</u>	<u>Wood-frame wall R-Value^f</u>	<u>Mass Wall R-Value^g</u>	<u>Floor R-Value^h</u>	<u>Basement/Crawl space Wall R-Valueⁱ</u>	<u>Slab R-Value & Depth^j</u>	<u>Building Air Tightness (ACH50)^k</u>	<u>Duct Tightness^l</u>	<u>Furnace (AFUE) /Heat Pump (HSPF)^m</u>	<u>Air Conditioning (SEER)ⁿ</u>	<u>Hot Water Heater^o</u>
3	1	0.33	0.63	0.3	38	20 or	8/13	16	2/13 ^p	0	7	Cond or	Standard	Standard	Standard

R401.2 (N1101.15) Compliance. Projects shall comply with Sections identified as “mandatory” and with either sections identified as “prescriptive” or performance approach in Section R401.2. Buildings shall comply with one of the following:

1. The requirements of Section R402.1, Section 406, and all sections identified as “mandatory”.
2. The requirements of Section R405 and all sections identified as “mandatory” or performance approach in Section R401.2. The design shall be equal to or less than 95 percent of the standard reference.

SECTION R406
ADDITIONAL PRESCRIPTIVE EFFICIENCY MEASURES

R406.1 (N1106.1) Additional efficiency measures. Each dwelling unit shall include the measures described in Table R406.1.

Exceptions:

1. Residential buildings which include a ground or water source heat pump meeting the requirements of Table C403.2.3(2).

TABLE R406.1 (N1106.1)
ADDITIONAL EFFICIENCY MEASURES
CLIMATE ZONES 1, 2 and 3

MEASURE

CLIMATE ZONES 4, MARINE 4, and 5

MEASURE

<u>1</u>	<u>HIGH EFFICIENCY HVAC SYSTEM:</u> <u>Air-source heat pump with minimum HSPF of 10.5</u>
<u>2</u>	<u>ENVELOPE UA:</u> <u>The proposed building envelope shall have a total UA at least 10 percent less than the code target UA as calculated using Table 402.1.4 and Section 402.1.4 alternative.</u>
<u>3</u>	<u>REDUCED AIR LEAKAGE ENVELOPE:</u> <u>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION:</u> <u>Reduce the tested air leakage to 2.0 air changes per hour maximum.</u> <u>and</u> <u>All whole house ventilation requirements as determined by Section M1507.3 of the International Residential Code shall be met with a heat recovery ventilation system with a minimum sensible heat recovery efficiency of 0.75.</u>
<u>4</u>	<u>HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM:</u> <u>All heating and cooling system components installed inside the conditioned space shall be direct vent or sealed combustion.</u> <u>Not qualifying: Systems utilizing electric resistant heat, including baseboard heaters, as the primary heat source.</u>
<u>5</u>	<u>HIGH EFFICIENCY WATER HEATING.</u> <u>Water heating system includes one of the following:</u> <u>Gas, propane, or oil water heater with a minimum EF of 0.80 or</u> <u>Electric water heater with a minimum EF of 1.15</u>
<u>6</u>	<u>SOLAR HOT WATER</u> <u>Solar Domestic Hot Water with a minimum 0.4 Solar Fraction</u>

2018 PROPOSALS

- Potential proposals for multiple prescriptive paths
- Clarification to ERI
- 3 - 5% efficiency improvement

ALTERNATIVE COMPONENT REQUIREMENTS

<u>Criteria from Sections R401—R404</u>	<u>Shall be permitted to be substituted with</u>	<u>Provided these efficiency improvements are present in the building</u>
<u>Building thermal envelope air leakage rate (Section R402.4.1.2)</u>	<u>A maximum of 4.0 air changes per hour at 50Pa in Climate Zones 3 through 8.</u>	<u>High-efficiency HVAC criteria from Table R407.3.2</u> <u>-OR-</u> <u>High-efficiency envelope criteria from Table R407.3.3</u>
<u>Wood frame wall R-value in Climate Zones 4-6 (Table R402.1.2)</u>	<u>Wood frame wall R-value in Climate Zones 4-6 from Table R407.3.4</u>	<u>High-efficiency HVAC criteria from Table R407.3.2</u> <u>-OR-</u> <u>Heat recovery ventilator meeting the requirements in Section R407.4</u>
<u>Insulation and fenestration requirements (Tables R402.1.2 and R402.1.4)</u>	<u>Alternative insulation and fenestration requirements from Table R407.3.4</u>	<u>Maximum building thermal envelope air leakage rate of 2.0 air changes per hour at 50Pa</u> <u>-OR-</u> <u>High-efficiency HVAC criteria from Table R407.3.2</u> <u>-OR-</u> <u>Heat recovery ventilator meeting the requirements in Section R407.4 and no supply or return ducts located outside the conditioned space</u>

TABLE R407.3.2¶**HIGH-EFFICIENCY HVAC OPTION PACKAGES¶**

<u>Climate Zone¶</u>	<u>Minimum HVAC Efficiency Metrics¶</u>			
	<u>Gas Furnace AFUE¶</u>	<u>Oil Furnace AFUE¶</u>	<u>Air Conditioning SEER¶</u>	<u>Heat Pump HSPF/SEER¶</u>
<u>1¶</u>	<u>NR¶</u>	<u>NR¶</u>	<u>18¶</u>	<u>10/18¶</u>
<u>2¶</u>	<u>NR¶</u>	<u>NR¶</u>	<u>18¶</u>	<u>10/18¶</u>
<u>3¶</u>	<u>92¶</u>	<u>92¶</u>	<u>17¶</u>	<u>9/17¶</u>
<u>4 except Marine¶</u>	<u>92¶</u>	<u>92¶</u>	<u>17¶</u>	<u>9/17¶</u>
<u>5 and Marine 4¶</u>	<u>95¶</u>	<u>95¶</u>	<u>NR¶</u>	<u>10/18¶</u>
<u>6¶</u>	<u>95¶</u>	<u>95¶</u>	<u>NR¶</u>	<u>10/18¶</u>
<u>7¶</u>	<u>95¶</u>	<u>95¶</u>	<u>NR¶</u>	<u>10/18¶</u>
<u>8¶</u>	<u>95¶</u>	<u>95¶</u>	<u>NR¶</u>	<u>10/18¶</u>

TABLE R407.3.3¶**HIGH-EFFICIENCY ENVELOPE OPTION PACKAGES¶**

<u>CLIMATE ZONE¶</u>	<u>FENESTRATION U-FACTOR¶</u>	<u>CEILING R-VALUE¶</u>	<u>WOOD-FRAME WALL R-VALUE¶</u>	<u>FLOOR R-VALUE¶</u>
<u>1¶</u>	<u>0.25¶</u>	<u>38¶</u>	<u>13+5¶</u>	<u>19¶</u>
<u>2¶</u>	<u>0.25¶</u>	<u>49¶</u>	<u>13+5¶</u>	<u>19¶</u>
<u>3¶</u>	<u>0.25¶</u>	<u>49¶</u>	<u>20+5¶</u>	<u>30¶</u>
<u>4 except Marine¶</u>	<u>0.25¶</u>	<u>60¶</u>	<u>20+5¶</u>	<u>30¶</u>
<u>5 and Marine 4¶</u>	<u>0.20¶</u>	<u>60¶</u>	<u>20+5¶</u>	<u>38¶</u>

Leaks and Lives: How Better Building Envelopes Make Blackouts Less Dangerous

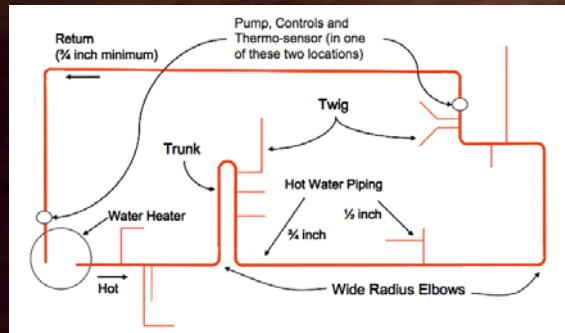
*Richard Leigh, Jamie Kleinberg, Cecil Scheib, and Russell Unger, Urban Green Council
Nico Kienzl, Michael Esposito, Emilie Hagen, and Michael Tillou, Atelier Ten*

ABSTRACT

IS NOW THE TIME TO CAPTURE NEW TECHNOLOGY?

- Smart thermostat
- Structured plumbing
- Tankless water heaters
- Renewables

How will this impact
policy decisions?



**“EVERYONE HERE HAS THE SENSE THAT RIGHT NOW IS
ONE OF THOSE MOMENTS WHEN WE ARE INFLUENCING
THE FUTURE”
STEVE JOBS**

- Thanks — Jim Meyers, Southwest Energy Efficiency Project
- Jmeyers@SWEnergy.org / [@EnergyMeyers](https://twitter.com/EnergyMeyers)