

UPDATING VERMONT'S RESIDENTIAL ENERGY CODE

Stakeholder Input Meetings

JUNE 19 AND 25, 2014

http://publicservice.vermont.gov/topics/energy_efficiency/code_update

Welcome and Purpose

- ▶ To get stakeholder input on specific residential energy standards requirements
- ▶ NOT for wordsmithing– please submit suggestions online

Agenda

- ▶ 9:00 Introductions
Purpose and Background
- ▶ 9:20 Code Elements–Not Changed
- ▶ 9:30 Proposed Code Changes
- ▶ 10:30 Break
- ▶ 10:45 Discussion of Specific Issues
- ▶ 11:45 Wrap-up
- ▶ 12:00 Adjourn

Introductions–Update Team

- ▶ Kelly Launder and Barry Murphy, *Vermont Public Service Department*
- ▶ Richard Faesy and Jim Grevatt, *Energy Futures Group*
- ▶ Stu Slote and Tim Guiterman, *Navigant*
- ▶ Eric Makela, *Britt Makela Group*
- ▶ Jim Edelson, *New Buildings Institute*
- ▶ Mike DeWein, *Consultant*

Introductions–Attendees

- ▶ Who are you?
- ▶ What organization do you represent?
- ▶ What is your stake in the codes update?

Background

- ▶ Energy code update required by Vermont Law
- ▶ Residential Building Energy Standards (RBES)
- ▶ Commercial Building Energy Standards (CBES)
- ▶ Every 3 years
- ▶ Process managed by Public Service Department

Background

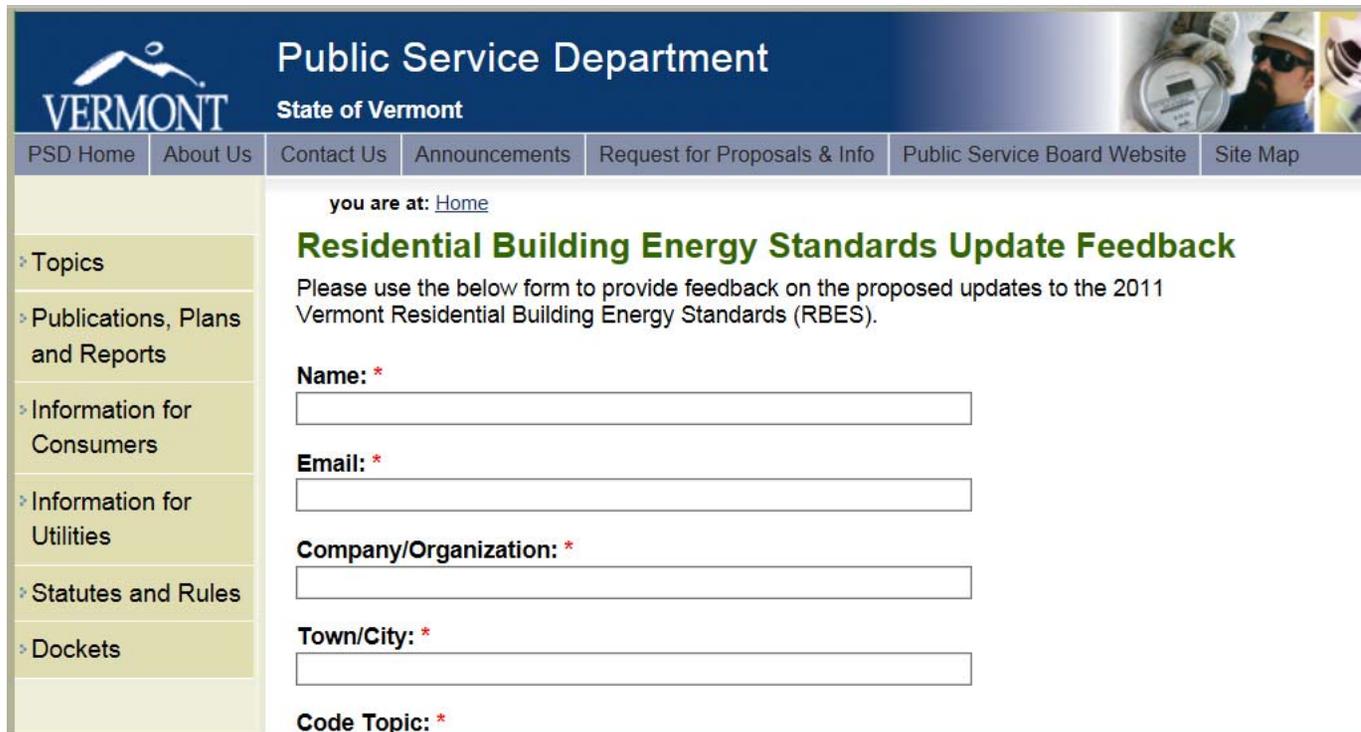
- ▶ Act 89–
 - Town administrator requirements
 - Provide information
 - Certificate of Occupancy tied to code certificate
 - Stretch code for residential
 - Adoption by local jurisdictions; optional
 - Act 250

Schedule for Update Process

- ▶ Stakeholder meetings mid-June
- ▶ Comment period ends July 9
- ▶ Draft filed with LCAR by end of July
- ▶ Public Hearing – September
- ▶ End of Public Comment period – 1 week following Public Hearing
- ▶ File rule with LCAR and LCAR hearing– October 2014
- ▶ RBES Handbook (or Field Guide) developed fall 2014
- ▶ Target Code Adoption Date – December 2014
- ▶ Target Code Effective Date – March 2015

Public Comments

- ▶ **Due by July 9**
- ▶ http://publicservice.vermont.gov/topics/energy_efficiency/code_update



 **Public Service Department**
State of Vermont

PSD Home | About Us | Contact Us | Announcements | Request for Proposals & Info | Public Service Board Website | Site Map

you are at: [Home](#)

Residential Building Energy Standards Update Feedback

Please use the below form to provide feedback on the proposed updates to the 2011 Vermont Residential Building Energy Standards (RBES).

Name: *

Email: *

Company/Organization: *

Town/City: *

Code Topic: *

- › Topics
- › Publications, Plans and Reports
- › Information for Consumers
- › Information for Utilities
- › Statutes and Rules
- › Dockets

Foundational Document

▶ 2015 IECC

- Effectively similar to 2012 IECC, but still changed compared with 2011 RBES
- Better clarifications and definitions
- Chapter on Existing Buildings

What has not changed:

- ▶ R304 Ventilation
- ▶ R305 Combustion safety
- ▶ Administrative requirements for documentation
- ▶ Compliance: HERS, Fast-Track, RES*check*
- ▶ Exemptions including owner-builders and hunting camps
- ▶ “Where applicable” caveats regarding enforcement officials
- ▶ Some VT-specific technical details
 - Air sealing in Party walls

Proposed changes:

- ▶ Definitions updates
- ▶ R402.1.2 & R402.1.4– R values/U factors
- ▶ Base code proposed HERS score = 60
- ▶ Stretch code proposed HERS score = 54
- ▶ FastTrack tables updated
- ▶ Log homes requirements
- ▶ Blower door testing
- ▶ Lighting Efficacy
- ▶ Existing Buildings

Tables R402.1.2 & R402.1.4

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE	FLOOR R-VALUE	BASEMENT WALL R-VALUE	SLAB EDGE R-VALUE AND DEPTH	CRAWL-SPACE WALL R-VALUE
6	0.32	0.55	NR	49	20+5 or 13+10	15/20	30	15/19	10, 4ft	15/19

TABLE R402.1.4
EQUIVALENT U-FACTORS

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL-SPACE WALL U-FACTOR
6	0.32	0.55	0.026	0.045	0.06	0.033	0.050	0.055

HERS targets–Base Code

TABLE R406.4 MAXIMUM BASE CODE ENERGY RATING INDEX

Base Code Target	60	Maximum HERS Index to demonstrate code compliance
Sub-Target	65	Maximum HERS Index without any renewables incorporated
Renewables Adder	5	Maximum HERS Index points that can be counted towards Code Target

All residential structures, including log homes

Example Home Features – HERS 60

	HERS 75	HERS 60
Envelope	RBES 2011 - Fast Track Package 1	
Windows	U-.032	U-.032
Insulation Installation	N/A	Grade I
Ceiling Insulation (flat & slope)	R-49	R-49
Wall Insulation	R-20	R-20
Foundation Wall Insulation	R-15 cont. or R-20 cavity	R-15 cont. or R-20 cavity
Floor Insulation (exposed)	R-30	R-30
Slab Edge Insulation	R-15	R-15
Air Leakage	5 ACH50	3 ACH50
Mechanicals		
Heating & Cooling	Boiler @ 80% AFUE Furnace @ 78% AFUE	ENERGY STAR or equivalent *Boiler @ 85 AFUE *Furnace @ 95 AFUE
Ventilation	RBES Ventilation & Combustion Safety Requirements	ASHRAE 62.2
Lighting & Appliances		
Efficient Lighting	50%	80%
Renewables		
PV	n/a	n/a

Note: Final packages to include one NAECA minimum efficiency compliant equipment package

Base Code FastTrack Tables

		Base Code>>>			
Component		Package 1*	Package 2	Package 3	Package 4
Envelope	Ceiling R-Value	R-49	R-38	R-38	R-49
	Wood Frame Wall R-Value	R-20 + 5	R-20 + 7.5	R-20 + 5	R-20 (cav)
	Log Wall U-Factor	n/a	n/a	n/a	n/a
	Floor R-Value	R-30	R-30	R-30	R-30
	Basement/Crawl Space Wall R-Value	R-15 (cont)	R-15 (cont)	R-20 (cont)	R-15 (cont)
	Slab Edge R-Value	R-15, 4ft	R-15, 4ft	R-15, 4ft	R-15, 4ft
	Heated Slab Edge R-Value (Edge and Under)	R-15	R-15	R-15	R-15
	Window and Door U-Value	0.32	0.32	0.32	0.32
	Skylight U-Value	0.55	0.55	0.55	0.55
	ACH50	3	3	3	3
Mechanicals	Heating	NAECA (82% Blr/78% Fur)	NAECA (82% Blr/78% Fur)	NAECA (82% Blr/78% Fur)	ENERGY STAR (85% Blr/95% Fur)
	Cooling	NAECA (13 SEER)	NAECA (13 SEER)	NAECA (13 SEER)	ENERGY STAR (14.5 SEER)
	Hot Water	NAECA (75 EF indirect)	NAECA (75 EF indirect)	NAECA (75 EF indirect)	(78 EF indirect)

HERS targets–Stretch Code

TABLE R407.1 MAXIMUM STRETCH CODE ENERGY RATING INDEX

Stretch Code Target	54	Maximum HERS Index to demonstrate code compliance
Sub-Target	65	Maximum HERS Index without any renewables incorporated
Renewables Adder	11	Maximum HERS Index points that can be counted towards Code Target

Example Home Features – HERS 54

	HERS 75	HERS 54	
	RBES 2011 - Fast Track Package 1	Energy Efficiency Path	Renewable Energy Path
Envelope			
Windows	U-.032	U-.030	U-.032
Insulation Installation	N/A	Grade I	Grade I
Ceiling Insulation (flat & slope)	R-49	R-60	R-49
Wall Insulation	R-20	R-20	R-20
Foundation Wall Insulation	R-15 cont. or R-20 cavity	R-15 cont. or R-20 cavity	R-15 cont. or R-20 cavity
Floor Insulation (exposed)	R-30	R-30	R-30
Slab Edge Insulation	R-15	R-15	R-15
Air Leakage	5 ACH50	2 ACH50	3 ACH50
Mechanicals			
Heating & Cooling	Boiler @ 80% AFUE Furnace @ 78% AFUE	ENERGY STAR *Boiler @ 85 AFUE *Furnace @ 95 AFUE	ENERGY STAR *Boiler @ 85 AFUE *Furnace @ 95 AFUE
Ventilation	RBES Ventilation & Combustion Safety Requirements	Balanced ventilation with ≥80% efficiency	ASHRAE 62.2
Lighting & Appliances			
Efficient Lighting	50%	90%	80%
Renewables			
PV	n/a	n/a	~5 HERS pts/kW

Note: Final packages to include one NAECA minimum efficiency compliant equipment package

Stretch Code FastTrack Tables

		Stretch Code>>>	
<i>Component</i>		<i>ESTAR-P1</i>	<i>ESTAR-P2</i>
Envelope	Ceiling R-Value	R-60 (all)	R-60 (all)
	Wood Frame Wall R-Value	R20+5	R20+5
	Log Wall U-Factor	n/a	n/a
	Floor R-Value	R-30	R-30
	Basement/Crawl Space Wall R-Value	R-30 (I/E)	R-15 (cont)
	Slab Edge R-Value	R-15, 4ft	R-15, 4ft
	Heated Slab Edge R-Value (Edge and Under)	R-15	R-15
	Window and Door U-Value	0.30	0.28
	Skylight U-Value	0.55	0.55
	ACH50	3	2
Mechanicals	Heating	ENERGY STAR (85% Blr/95% Fur)	ENERGY STAR (85% Blr/95% Fur)
	Cooling	ENERGY STAR (14.5 SEER)	ENERGY STAR (14.5 SEER)
	Hot Water	(78 EF indirect)	(78 EF indirect)

Log Homes

	Component	Log Home Package
Envelope	Ceiling R-Value	R-49
	Wood Frame Wall R-Value	R-20+5
	Log Wall U-Factor	Log - 5" min.
	Floor R-Value	R-38
	Basement/Crawl Space Wall R-Value	R-15 (cont)
	Slab Edge R-Value	R-15, 4 ft.
	Heated Slab Edge R-Value (Edge and Under)	R-15
	Window and Door U-Value	0.30
	Skylight U-Value	0.55
	ACH50	3
Mechanicals	Heating	90% gas/LP, 85% oil
	Cooling	NAECA (13 SEER)
	Hot Water	NAECA (75 EF indirect)

ICC-400-2012 Standards for log homes required

R402.4.1.2 Blower Door Testing

- ▶ Required for Stretch Code
 - 3 ACH50 maximum leakage rate
 - Written “report” by approved tester must be submitted with compliance docs
 - 2012 & 2015 IECC requires testing
 - Only in Stretch Code for 2015 RBES in Vermont
 - HERS Raters, BPI Contractors and others approved by PSD can test
 - Anticipate consideration for Base Code in 2018

R404.1 Lighting equipment

- ▶ Not less than 75 percent of the lamps in permanently installed lighting fixtures shall be high–efficacy lamps
- ▶ Or not less than 75 percent of the permanently installed lighting fixtures shall contain only high–efficacy lamps.
- ▶ ~~Exception: Low–voltage lighting.~~

Chapter 5 Existing Buildings

▶ R502 Additions

Additions to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code.

Chapter 5 Existing Buildings

- ▶ **R503 Alterations**

Alterations to any building or structure shall comply with the requirements of the code for new construction. *Alterations* shall be such that the existing building or structure is no less conforming to the provisions of this code than the existing building or structure was prior to the *alteration*

- ▶ Includes provisions describing when existing conditions are sufficient

Additional Changes

- ▶ **402.4.1.1 Air Barrier and Insulation**
 - Air barrier definition updated
 - “Rigid” no longer required but must be “durable”
- ▶ **R403.1.2**
 - Can not install heat pumps that have electric resistance backup
- ▶ **R403.9**
 - Snow melt and ice system controls: Energy must be provided by on-site renewable energy

Additional Changes–Stretch

- ▶ **R407.2 Electric Vehicles**
- ▶ In a multifamily development with ≥ 10 units, 4% of parking spots (rounded up to the nearest whole number) should have at least a level 1 (120 V outlet) charging socket within 5 feet of the centerline of the parking space.

# of Units	# of Outlets
1–25	1
26–50	2
51–75	3 etc.

Reminder: Stakeholder Input

- ▶ Questions and comments to:
 - Barry Murphy, Public Service Department
802-828-3183
barry.murphy@state.vt.us

http://publicservice.vermont.gov/topics/energy_efficiency/code_update

Thank you!

- ▶ Kelly Launder and Barry Murphy, *Vermont Public Service Department*
- ▶ Richard Faesy and Jim Grevatt, *Energy Futures Group*
- ▶ Stu Slote and Tim Guiterman, *Navigant*
- ▶ Eric Makela, *Britt Makela Group*
- ▶ Jim Edelson, *New Buildings Institute*
- ▶ Mike DeWein, *Consultant*