

UPDATING VERMONT'S RESIDENTIAL ENERGY CODE

Informational Webinar for Stakeholders

FEBRUARY 21, 2014

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



Welcome and Agenda

- ▶ Introductions
- ▶ Background and schedule
- ▶ How to provide input
- ▶ Approach: guiding principles
- ▶ Compliance update
- ▶ 2015 IECC – foundational document
- ▶ Technical requirements
- ▶ Q & A

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*

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

- ▶ Effective early 2015
- ▶ Stakeholder meetings Spring 2014
- ▶ Legislative Committee on Rulemaking (LCAR) early fall, 2014 in order to meet January 1 target

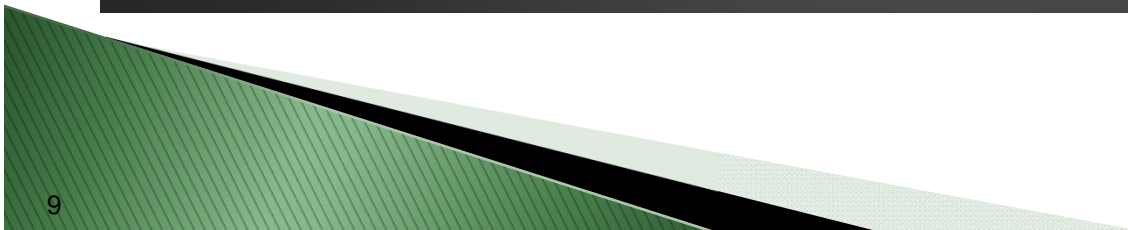
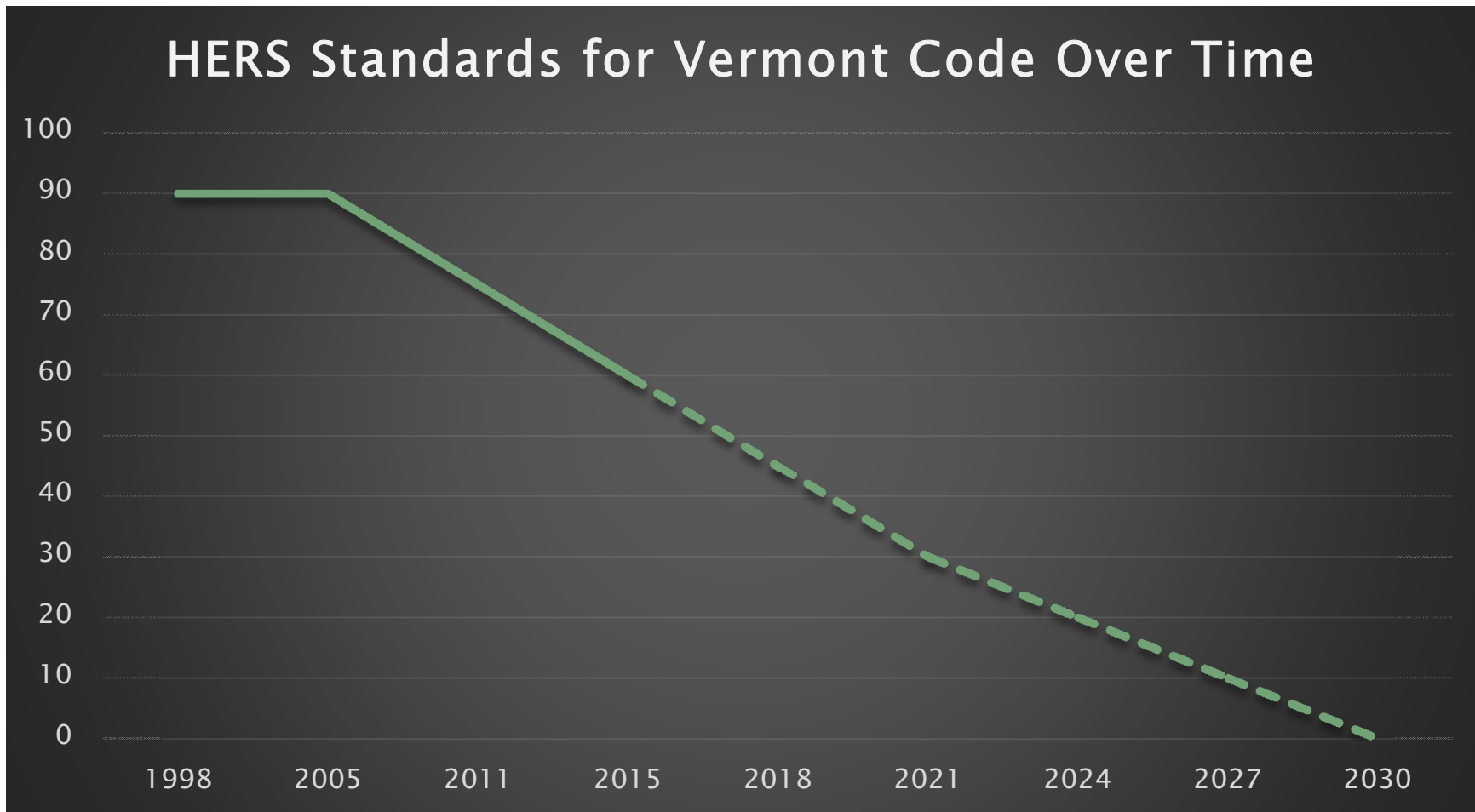
Stakeholder Input

- ▶ Four public stakeholder meetings:
 - 9:00am–12:00pm for Residential Code
 - March 12 – Vermont College, Montpelier
 - March 14 – Vermont Fire Academy, Pittsford
 - May 7 – Burlington Electric Department
 - May 9 – Windsor Welcome Center
- ▶ Questions and comments to:
 - Barry Murphy, Public Service Department
802-828-3183
barry.murphy@state.vt.us

Objectives and Approach

- ▶ Comprehensive Energy Plan says VT should establish a “...clear path to achieve a goal of having all new buildings built to net zero design by 2030.”
- ▶ “Path” means it’s not one step to net zero—rather incremental improvements to achieve net-zero goal (up to 5 more code updates before 2030)
- ▶ Balance any construction cost increases and construction/technology changes with reducing energy use

Vermont Energy Codes Over Time



Code Compliance

- ▶ Scarcity of enforcement funding/resources, BUT
- ▶ Several initiatives to increase compliance:
 - Energy Efficiency Utility (EEU) programs: Efficiency Vermont, Vermont Gas and Burlington Electric Department
 - Act 89– new requirements
 - Energy Code Assistance Center through Efficiency Vermont
 - Outreach to municipalities by Public Service Department and Efficiency Vermont
 - Exploring creation of a “Building Energy Code Collaborative”

Compliance Options

- ▶ **Technical Approaches:**
 - Prescriptive (Fast Track) Packages
 - Some with renewables
 - RES*check* software approach
 - Possible additional prescriptive renewables option
 - HERS approach
 - Blower door test required for all options
- ▶ **Mandatory Requirements**
- ▶ **Administrative Requirements**
 - Certificate signed and posted in house
 - Copy filed with the Town Clerk
 - Copy to the PSD

Technical Issues

► Current “Fast Track” Requirements

Performance Requirements				
Single-Family and Multi-Family Homes ~ <i>Fast-Track Method</i>				
Component	Package 1	Package 2	Package 3	Package 4
1. Ceiling R-Value	R-49	R-38	R-38 or R-30+10	R-28 cont.
2. Above-Grade Wall R-value	R-20 or R-13+5	R-20+5 or R-13+7.5	R-20 or R-13+5	R-21 cont.
3. Floor R-value	R-30	R-30	R-30	R-30
4. Basement/Crawl Space Wall R-value	R-15/20	R-15/20	R-20 cont.	R-15/20
5. Slab Edge R-value	R-15, 4ft.	R-15, 4ft.	R-15, 4ft	R-15, 4 ft
6. Heated Slab R-value (Edge and Under)	R-15	R-15	R-15	R-15
7. Window and Door U-value	0.32	0.32	0.30	0.32
8. Skylight U-value	0.55	0.55	0.55	0.55

RBES 2011 vs 2012/2015 IECC

Efficiency Level/Tier	HERS Index	Notes
2012-2013 Program Homes - Batch-Modeled with Various Envelope Configurations		
Program Homes As Built	52	Actual HERS score from homes and multifamily buildings as-built and rated
Baseline	70	Modeled with 2011 NMR Market Assessment Study average features
RBES 2011 (2009 IECC)	71	Modeled with minimal RBES features
Energy Code Plus	65	Modeled with minimal Code Plus features
ENERGY STAR 3.0	62	Modeled with ENERGY STAR v. 3.0 features
2012 IECC	63	Modeled with minimal 2012 IECC features

2015 IECC as the Foundational Document for 2014 RBES

- ▶ Desire to be consistent between Res and C&I
- ▶ Residential is not significantly different technically from 2012 to 2015 IECC
- ▶ 2015 clarifies definitions
- ▶ 2015 has a chapter on renovation/remodel
- ▶ 2015 brings us in step with national update cycle
- ▶ Whether 2012 or 2015 IECC, Vermont can increase OR decrease stringency
- ▶ Home Energy Rating System (HERS) path aligns with 2015 IECC

Proposed Base & Stretch Levels

Base Code		
Code Efficiency Sub-Target (A)	65	Max. threshold with EE only.
Renewables/Efficiency Adder (B)	5	Builder can choose to achieve 5 HERS points between 65 and 60 with EE, RE or combination to reach ultimate code target of 60.
Ultimate Base Code Target (C) = (A) – (B)	60	Max. target HERS including EE and RE for single-family homes and multifamily buildings.
Stretch Code		
Code Efficiency Sub-Target (D)	65	Max. threshold with EE only.
Renewables/Efficiency (E)	11	Builder can choose to achieve 11 HERS points between 65 and 54 with EE, RE or combination to reach ultimate code target of 54.
Ultimate Stretch Code Target (F) = (D) – (E)	54	Max. target HERS including EE and RE. Aligns with HERS index in 2015 IECC for zone 6.

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		
Efficiency Lighting	50%	80%
Renewables		
PV	n/a	n/a

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

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			
Efficiency 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

Technical Issues in 2015 IECC

- ▶ Examples of clarifications:
 - New Chapter 5: Additions, alterations, renovations and repairs. New chapter specifically focused on existing building projects
 - Allows floor insulation to be installed in contact with sheathing or continuous insulation installed at the bottom side of floor framing
 - Requires that air leakage testing be conducted in accordance with ASTM E779 or ASTM E 1827

Questions?

- Richard Faesy, Energy Futures Group
- Jim Grevatt, Energy Futures Group
- Stu Slote, Navigant
- Eric Makela, Britt/Makela Group
- Mike DeWein, Consultant

Follow up with:

Barry Murphy, Public Service Department

802-828-3183

barry.murphy@state.vt.us

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