

# Vermont Building Energy Code Collaborative

## Residential Committee Meeting Notes

5/13/2021 3:00 -5:00 pm

### Participants:

#### **Team**

Liz Bourguet- Energy Futures Group  
Richard Faesy- Energy Futures Group  
Kelly Launder – VT Department of Public Service  
Keith Levenson– VT Department of Public Service  
Barry Murphy– VT Department of Public Service  
Gabrielle Stebbins- Energy Futures Group

#### **Stakeholders**

Jim Bradley - VBRA & Authenticated Diagnostics  
Enrique Bueno- VT Passive House  
Chris Charuk- VGS  
Jeff Forward- Richmond, Forward Thinking Consultants, LLC  
Collin Frisbie- Sterling Homes- South Burlington  
Jeff Gephart - Retired face of Residential New Construction 1994 to 2017 / Rochester Energy Coordinator (his words)  
Craig Peltier- VHCB  
Rob Pickett- Rob Pickett & Associates, LLC, Hartland, Log & Timber Homes Council and Home Builders & Remodelers of SW NH  
Bill Powell- Washington Electric Co-op, East Montpelier  
Chris Snyder - Snyder Homes - Shelburne  
Steve Spatz- VEIC/EVT Shrewsbury  
Sandra Vitzthum - Sandra Vitzthum Architect LLC  
Jason Webster- Huntington Homes. East Montpelier  
Chris West - Eco Houses of Vermont

### Discussion:

#### Topics:

- Challenging aspects of 2020 RBES
- Efficiency improvements in the next RBES
  - Balanced Ventilation
  - Triple Glazed Windows
  - Tighter air sealing
  - Continuous insulation
  
- Jeff Forward- towns that are interested in linking RBES to (Certificate of Occupancy) COO through zoning ordinance- how to go about doing that? It's already in statute that you have to file a certificate to

get a COO, but what if a town wanted to specify a specific compliance path or requirement above base code?

-town planner questions whether town has the authority to require anything different than base code

-Keith Levenson- it is up to the town government to pass whatever ordinance it wishes- including the enforcement mechanism

-Steve Spatz- the local jurisdiction is the bottom line as long as it's not less than what base code requires

-Kelly Launder- municipal town attorneys should be addressing this- not the Department

— the reason for the stretch code was to not have different piecemeal requirements for different towns. So, it could be problematic if every town adopts a different requirement

-Richard Faesy- are there towns that have adopted stretch code?

-South Burlington

## 2020 RBES and Compliance Paths

-Discussion question: How is 2020 RBES going? Any experience with Package Plus Points approach?

-Steve Spatz- hasn't been fielding any calls related to how the PPP works – so no feedback here

-Sandra Vitzthum – working on a house with prescriptive method – hard to find time to do ResCheck

-thinks points method is reasonable but continues to have concerns that there aren't points for passive things

–passive measures are important for older buildings (which use passive methods for reducing heat/cooling) –thinks it's a real hole in the points package to not include these techniques (examples- solar shading and thermal mass)

-Richard- in theory, the HERS approach should take those techniques into account – but that's a good suggestion for the PPP for next time around

-Sandra- historic preservation has a list of measures; important for renovating buildings

-Chris West- likes the idea of including these measure but would be careful about adding this. Those measures are very location-in-envelope/ site -specific – so he is concerned about setting points with measures that are too variable

-Collin Frisbie- he is using the HERS method – they can be a lot more specific about what they are trying to do (a lot less crude than other methods)

-also says a lack of enforcement is apparent in all compliance methods

-Jason Webster- he has adopted the point system. They are trying to standardize the product/ make points part of standard package

-says point system is not efficient (reinventing the wheel each time)

-in the Code book, in the points section, there is a typo about water – basic water heating – fossil fuel- fired water heating – Handbook says 3 points but certificate says 1 point; correct this to 1 point in the Handbook

-Steve– this is an error in the Handbook – there will be an updated version in the Handbook that changes this

-people should look to ICC code website to view full VT RBES

-Jim Bradley- getting some pushback from some builders (people who are building their own houses)

–people are calling him asking how to achieve code compliance prior to construction – views this as a good sign

-a lot of people concerned about affordability component

–people are finding him through EVT website and word of mouth (for blower door testing)  
-Steve- EVT has a link for blower door testers – searchable in the find a contractor portal  
<https://www.encyvermont.com/find-contractor-retailer?provider=contractors&search=residential-new-construction-envelope-testing>

-Jeff Gephart- there is a lack of blower door testers for Commercial buildings

-Steve- more market for commissioning agents

-Jim Bradley- experience with blower door test in larger buildings: had to put door stops on hundreds of doors. There is a tricky dynamic to get access to overall building and to get people out of building in order to do the blower door test

-Collin- EVT is not currently operating HERS services if you're trying to achieve code

-Steve- EVT's goal in providing HERS services has always been linked to meeting their program goal, which has always been above code (currently at stretch code)

-Collin- so for the average builder, who does the state recommend to seek assistance in getting to code?

-Curious to know what percent of homes are built beyond code, what percent to code, and who is helping them get to code?

-Jim Bradley- anecdotally, builders are asking, how am I going to get to net zero? How to help people?

-Suggests building better relationships with builders to help achieve code and providing the knowledge of how to meet code. For example, better relationships between builders and blower door testers.

-Knows a builder who is building 50+ buildings a year- the builder says there's no enforcement and doesn't really care to meet code when they are building that many buildings a year

-Recommendation- providing resources and education component

-Collin- there are a lot resources for those trying to exceed but it doesn't seem like there are a whole lot of resources for those people who are just building to code (which includes a lot of people)

-Steve – uses ERI/HERS for compliance. It is less stringent than prescriptive – no points, no balanced ventilation. The limiting factor is there aren't third party HERS providers in Vermont besides Efficiency Vermont, so HERS rater availability is limited outside of EVT staff

-Collin- education efforts are not enough for most people

-Chris West- did not get certified to become a HERS rater- expensive, no guarantee on getting HERS work – there needs to be effort to create a non-EVT HERS market

-Jeff Forward- if I wanted to build to base code and use HERS Compliance Path, but just want to go to base code, I cannot get that rating unless I do stretch code through EVT?

-would have to find an independent contractor to support you getting HERS done on the home

-Steve- anyone who is going to comply with RBES, they can do HERS path – no they do not need to do stretch code – just need to use HERS rater – HERS pathway is more flexible than other compliance paths and takes away some stringent options

-Jeff Forward- HERS raters not up on EVT website

-Steve- HERS raters are available through EVT; some outside of EVT – he lists two people who do HERS outside of EVT; clarifies that they are still offering HERS ratings

-Chris – EVT has offered trainings to fill niches (ex- auditor training) – is there any chance that can happen again? Can EVT provide training on site?

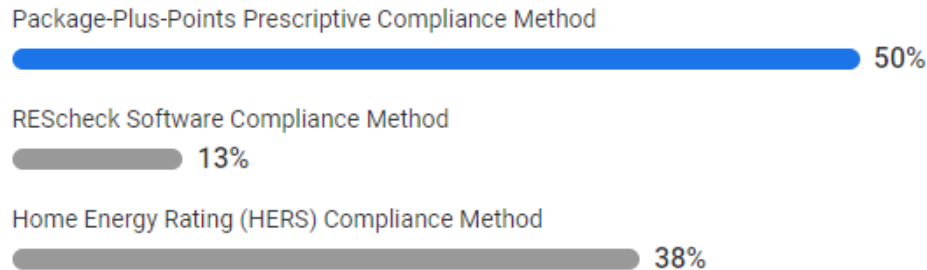
-Jeff Gephart- EVT used to provide a HERS rating for a fee

-Steve- that does not exist anymore

James Bradley (in the chat)- Current HERS training available for \$2,595

### Which compliance method are you currently using?

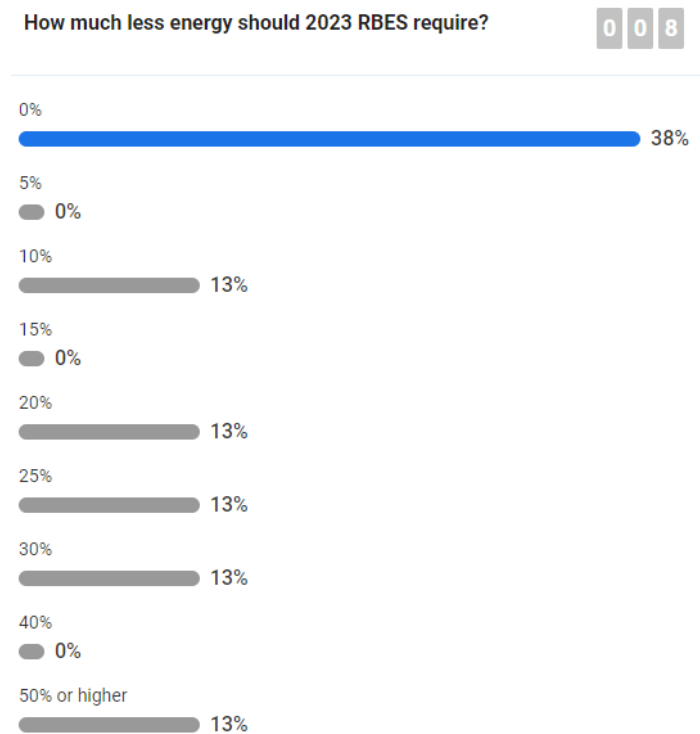
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### Efficiency Improvements in the Next RBES?

- Enrique Bueno- foundation insulation is very weak in the code
  - balanced ventilation should be mandatory for all buildings
- Chris West- last iteration of code was not a quarter of the difference between now and 2030 – are we trying to get 33% more efficiency out of this particular iteration?
- Chris West- we have to have discussion on what definition of Net Zero is before we have this discussion
- Chris Snyder- we do have to consider cost and think about housing. You're only getting a certain percent of homes that are meeting current code and then you're going to up the requirements on that limited percent? Should we instead focus more on how do we get to get current construction to meet existing requirements?
  - Our housing is unaffordable now, so how can we continue to increase costs for general public? How do we require these things on everyone's house?
- playing field isn't level for those who are building to code
- Chris West- the experts in the field say we're at 70% at compliance
- Collin- how do we measure this 70% compliance?
- Richard- thinks it may actually be 67%
  - Believes it was a random sample of homes for only technical compliance (not all filed a certificate or admin) including an inspection by a HERS rater and a blower door test for technical compliance of code
- Jeff Forward (in the chat)- 67% Compliance for which code the 2015 or 2020?
- Jason Webster (in the chat)- That's what I was going to ask. . . . 2015 Code was good building practice and 67% seems about right. I think actual compliance with 2020 is way lower
- Barry Murphy (in the chat)- 67% compliance with the 2011 code. we are currently measuring compliance with the 2015 code.
- Collin- "stretches credulity" to say we're at 67% - with no enforcement and lack of compliance – hard to say we will increase even further
- Jason Webster (in the chat) I bet a ginger ale that actual compliance with 2020 RBES is lower than 10% on single family homes

- Collin Frisbie- I would not take the over on that Jason. Even trying to hit it from the front side with good planning I can't imagine 70% are hitting it many by accident.
- Steve- concerned about affordability and durability (making sure assemblies are put together appropriately). If we raise the ante, we're going to have buildings that aren't durable. We're at a point that we need to dig deeper into the heating/ cooling/ distribution side of equation
- Chris - required balanced ventilation is a good way to go
- James Bradley (in the chat)- I agree with Chris on balanced ventilation must be incorporated
- Enrique- we need to consider affordability including the total cost of ownership. He is seeing a lot of single family homes which are installed with complex/ expensive mechanical systems, which he says could be reduced if we go to passive approaches and will reduce the total cost of ownership. It's our responsibility to teach the consumer to what this is going to cost them in the long run
- Chris - having a discussion about Net Zero is critical
- Richard- we should have the Net Zero conversation specifically for Residential
- Kelly - clarifies- she thinks of it as "net zero by design by 2030" / "net zero ready" - how far can we push efficiency cost effectively and make up the rest with renewable energy system



- Collin- we need to define "net zero ready"
- Jason Webster- instead of defining net zero, let's define the goal. Is it carbon neutrality? You don't have to have a high-performance home to get to carbon neutral from an operational standpoint. If it's cost effective to be carbon neutral without high performance, then why not let people do this?
- Enrique- unless we reduce the waste that we're generating through the buildings through energy efficiency in the envelope, then we're not going to make renewables effective. A lot of renewables will affect the grid. A well-designed envelope should last 100 years, but equipment will last less (solar, heat pumps). The cost of replacement should be taken into account as well
- Jason Webster (in the chat)- It's nuts to me that we're talking about raising the bar when most of us think that the majority of players don't hit / don't need to hit the old bar.

-James Bradley (in the chat)- The lack of simple verification let alone proper enforcement is amazing to me as well. Vermont is great at passing laws and or standards that they have no ability to enforce unless litigation is a part of the equation. However, that does not help either and is painful as well as expensive!

-Richard- assuming that we need to advance the code in the next round, where should we be focusing our efforts?

-Chris West- if we go any tighter with new house, we will need to require balanced ventilation. It would be dangerous for air quality if we didn't

-Enrique- even with a 3 ACH50, it should be mandatory to have balanced ventilation

-Steve- agrees with balanced ventilation. There's more to be considered around systems and functionality of a system as a priority

-Need consensus on the impact around the appropriate functioning of systems. We need to fine tune what we have now

-Richard – so we should be bringing mechanical systems into the picture?

-Steve – yes and building controls

-Sandra- should follow New York – continue to allow passive balancing option. Agrees that balanced ventilation is critical, but it is one sided to assume that it has to be mechanical

-Sandra- it is time to focus on the bigger picture, including building and community. There are too many existing buildings to think of this as just new construction. The next version needs to be more holistic and needs to focus on community (could this be included as bonus points?). People are reliant on their communities. For example, some people can't have standalone solar on roof in some homes

-We need to take into account existing building stock

-Enrique- the problem is renovating existing buildings – we need to be weatherizing 12,000 units per year but we're only at 1,000 units right now (really 2,000)

-but if we keep building new buildings that will require weatherization from day one, how to improve RBES to make sure every single building doesn't require weatherization in the future?

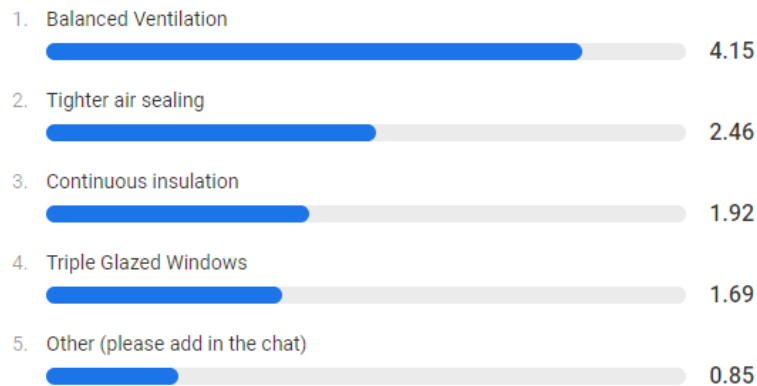
-Craig Peltier- there are different pathways to net zero capable buildings for different kinds of buildings. There are differences in requirements for MF, existing buildings, and thermal issues. How can we work backwards with measures to where we want to get to?

-He likes the point system

Rank the measures you think should be included in 2023

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RBES:



-Chris West- thinks we do have a holistic approach, so why is HERS modeling is not a holistic approach? He is open to learn about passive balancing with regards to indoor air quality

-Sandra- can send more information to Richard to answer Chris's question and we can include it in the notes

-Collin- seconding what Sandra said about existing buildings. If we are looking to improve efficiency, existing homes are generally less efficient. Dollars invested in existing homes would go a lot farther in efficiency than new construction

-Steve- it's hard to interpret the existing homes chapter of the code. Filling out information for existing homes is difficult. It is hard to mesh what's called out in Chapter 5 vs what's called out in Chapter 4

-Richard- what other topics to discuss in the next Residential Meeting?

-net zero, existing homes, systems in the homes, other topics?

-Sandra- path that historic buildings need to take

-Jim – concerned about setting up litigation issues. We need to consider compliance/ enforcement

-Jeff – we have to invest in builder training and licensing as well as better attempts at compliance. Also, the total cost of ownership/ cost effectiveness issue. And providing a support system

-Jeff Forward (in the chat)- We should not be building any new buildings that are not EV Charging ready and Solar Ready. 200 amp service, roofs structurally capable to handle solar panels, that kind of thing.

-Jeff Gephart (in the chat)- Make non-compliance a defect in marketable title as it is on commercial structures.

**Emails (4) from Sandra Vitzthum:**

1. In general, it's easy to discount these if you want to stick to the 21<sup>st</sup> century, tech-based net zero that is so popular right now. But I think you are missing a huge opportunity... and ultimate savings.

- 1) Contribution to community solar or other alternative power generation or shared heat. People should be able to pay into a system rather than build a solar collector on a small plot which should be used as a vegetable garden. Please do not legislate out village life.
- 2) Orientation to south, with low north profile (classic saltbox)
- 3) Thermal mass in center of building if any kind of flue used.
- 4) Deciduous shade trees to south and west; evergreens and other protection from north.
- 5) Envelope and slab thermal mass. Whether it's on the exterior (which helps with cooling) or interior (which helps with heating).
- 6) Credit for re-use of old structure (embodied energy)
- 7) Credit for use of local materials, for instance cedar shingles from nearby

PLUS I would definitely add:

- self-activated (smart) operable skylights.
- "Hippie" strategies such as cordwood and straw bale walls, Trombe walls, etc.

Note I have not added shutters and other intensive user strategies.

When you question the longevity of trees, I challenge you to take into account malfunctioning ERV/HRV systems, failed foam insulation, failed windows, etc... it is not fair to hold traditional strategies to a higher standard.

One last point: there needs to be a provision for buildings to use wood pellet stoves and boilers. I can't find the recent publication on the subject, but it is excellent. It is a reasonable strategy for older homes and it benefits Vermont.

2. Here is the fuel guide I really like:

<https://publicservice.vermont.gov/content/vermonters-guide-residential-clean-heating-and-cooling-2021>

You should think of a way to capture this in the next version.

3. Here it is from the Division for Historic Preservation. I encourage you to speak with Elizabeth or her director, Laura Trieschmann.

Here is the overview page

<https://accd.vermont.gov/historic-preservation/planning/building-efficiency>

And a direct link to the document



<https://accd.vermont.gov/sites/accdnew/files/Energy%20Conserving%20Features%20Inherent%20to%20Older%20Buildings%205.13.2021.pdf>

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<http://accd.vermont.gov/historic-preservation>

4. The ZEN program is much more holistic than RBES... I hope you will consider it as a model or at least as an alternative. (See attached)

Passive air balancing is very simple: One simply inserts the one-way sleeve into a utility space connect to the house, and then undercuts the door so an equivalent sq. inch of opening ventilates the house. Here is one example: <https://na.panasonic.com/us/home-and-building-solutions/ventilation-indoor-air-quality/ventilation-accessories/passive-inlet-vent>

The most I've ever had to install is two in a house that had a commercial fan without an intake. These complement bathroom and kitchen hood exhausts.

And I am a big fan of mandating dedicated air intakes for any machine that exhausts or combusts (like dryers, wood stoves).