

# Vermont Building Energy Code Collaborative Commercial & Industrial Committee Meeting Notes

5/11/2021 11:00 – 1:00

## Participants:

### Team

Liz Bourguet- Energy Futures Group  
Keith Downes- Guidehouse  
Richard Faesy- Energy Futures Group  
Eveline Killian- Cx Associates  
Kelly Launder- VT Department of Public Service  
Barry Murphy- VT Department of Public Service

### Stakeholders

Walter Adams - Building Design and Construction  
Bob Bolin - Burlington Electric Department (BED)  
Enrique Bueno – Vermont Passive House  
Charlie Carpenter- Efficiency Vermont. Williston. Code interpretation & Sustainability  
Brian Hayes - Bellwether Craftsmen  
Donna Leban- Light/Space/Design  
Brian Leet - Freeman French Freeman, Burlington - PM, Building Science, Sustainability  
Dave Mentzer- Dore + Whittier Architects, Burlington, Building Codes & Sustainability  
Steve O'Malley- Energy Consultant, Efficiency Vermont, Richmond. Building Science, code support  
Craig Peltier - Vermont Housing and Conservation Board  
Tim Perrin- VGS Manager, Energy Efficiency & Innovation  
Mary Jane Poynter- Efficiency Vermont  
Jeff Schoellkopf- Architect, The Design Group, Warren, generalist  
John Thompson- Dore + Whittier Architects, Burlington  
Jake Yanulavich- Burlington Electric, Energy Services

## Comments before the discussion:

-Is Comcheck considered prescriptive, modelled, or program? It is prescriptive  
**-Errors in code:** Brian Leet says that the rewriting of performance cost index target- the change where the parentheses are to include unregulated codes- has had unintended consequences  
–in industrial spaces where there's heavy non-regulated loads, it takes performance off the table as code compliance

## Lighting Power Density (LPD)

-Mary Jane Poynter- calculations on LPD for commercial buildings are clear, on Multifamily buildings over three stories are clear, but for Multifamily buildings that are big but not over 3 stories, there is no requirement for LPD

-so from a program standpoint, two buildings that are different in just a story are being treated differently. And if buildings are being over-lit, there is really no check and balance. Same for exterior lighting, if buildings aren't covered in CBES but have a big parking lot, for exterior lighting there isn't anything in Residential code, there is no LPD

- Need to be clear like LPDs are for C&I and >3 story

- Resolution: align RBES and CBES for MF building

## Poll

**Lighting Power Density: Assuming the next code will strive for higher-efficiency, what should we do with LPD?** 14 people voted

Lighting Power Density: Assuming the next code will strive for higher-efficiency, what should we do with LPD?

Stricter LPD allowances, LPD has more potential for savings than other sections of the code

 21%

Moderately stricter LPD allowances, make LPD proportionally more difficult as other sections of the code

 79%

Leave LPD alone, LPD is already too difficult to achieve

 0%

Loosen LPD allowances, the 2020 code went too far and we need to make it easier

 0%

## Discussion

-Mary Jane Poynter- there is a lot of design build for Commercial buildings because the cost of construction has gone up, people are cutting corners. So, we don't want to go too far with the LPD

-People using decorative fixtures with screw in LEDs and don't understand that it's based on the wattage of the fixture they purchased

-She is hesitant to push LPD too much further – people may have to fudge on their reporting.

For example, they are probably writing in what the screw-based lamp is, not the actual fixture

-Walt Adams- exterior lighting – has a question of whether you should be requiring people to do solar exterior lighting to take load completely out of design load requirements of a building or to include solar system and battery to run their lights at night?

-Keith to Walt– so if we put in renewables to power exterior lights, then you can get exemption on the controls?

-Walt -yes or you are granted some number of points for lighting section – if you want to create fully solar lighting on exterior PV system/ battery or if you can find decent exterior solar lighting

-Consider exterior solar lighting as a requirement

## Mechanical Controls

### Poll

#### **Mechanical controls: what specific suggestions are there for changes and on what equipment type?**

##### Results:

- I suggest that Code control sequences do not get overly complex, as they are difficult to support by facilities owners. Complexity equals difficulty in supporting without sufficient staff.
- economizer requirements need to be clarified. If VRF or WSHP or GSHP or fan coils or BBHW it is not clear if an outdoor air economizer needs to be installed give that there is no major AHU. Also not clear if the design would need to have a water side economizer. Can this be clarified?
- Confusion around ERV Requirement
- remotely accessible web-based required for all commercial spaces
- Require 90%+ for fossil fuel burning equipment
- Nothing specific. As an architect, I want to retain flexibility to have operable windows without adding controls cost/complexity.

### Discussion

- Discussed economizers, mechanical ventilation and heat pump control issues
- Charlie Carpenter (in the chat)- shouldn't there be Mechanical ventilation based on ASHRAE 62.1 Requirements? Natural ventilation would not meet ASHRAE 62.1
- Enrique Bueno (in the chat)- ERV/HRV should be a must. Any other type of ventilation is NO ventilation. 100% balanced ventilation without recirculation
- Eveline addressed question on AHU question- if AHU is more than 3000 CFM, then it needs to have an economizer
- Eveline- ASHRAE standard 62.1 is guideline for ventilation. This is getting more attention with Covid, it is more important to have ventilation air. We frown upon not having (baseboard or heat pumps) any ventilation air
- Mary Jane Poynter- so only air being distributed is fresh, when you go into economizer mode, that is fraction of what you would need – are you asking for more air to go into economizer mode?
- Eveline- just have an economizer that can do the 30000 CFM, if ERV- driven by ventilation requirements (might only need 1000 CFM)
- Mary Jane- but is code saying you need two different fan sizes? – one for ventilation and one if you go into economizer mode?
- Eveline- if you're recirculating air, you would need economizer, you would size AHU for that economizer, but if you're using ERV instead of economizer, then you wouldn't need that economizer
- Mary Jane – this is not easy to figure out, and this needs to be clarified for systems that don't have air handling
  - suggestion from Mary Jane- make this more clear and clarify intent
- people have not been doing water-side economizers – is this allowed as an option instead of air?
- Walt- my impression is that the code only allows ERVs. So given that, if you installed a fresh air system that is independent of the economizer that is in rooftop AHU, that economizer is there to provide cool air. It behooves us to find a way to keep economizers in place – it's difficult if you want to build a system with an ERV built in. The ERV handles entire amount of air, so Walt has stopped using those because it is

way more fresh air than he needed – uses an economizer and ERV

-Enrique Bueno- ventilation air should be kept separate from heating and cooling – with air source heat pumps or other. But if you choose a high efficiency ventilation system, then you don't need to have recirculating air or economizer in the system

-Charlie Carpenter- on ERV confusion of definition of what an air system is- has that changed from the 2015 code? What does that mean? Looking just at energy recovery ventilator? Individual air source heat pumps? How do you take those air flows? Separately or together?

-Eveline- you look at them all together as one system

-Charlie- so if you had a hotel with one ERV per floor you would add all systems, then look at each ERV in that table?

-Eveline- conditioning is separate from the air, so we're trying to use the outside air to our advantage when conditions are right – intent of economizer to use outside air as much as possible

-Charlie- design air flow rate table – is this the whole system? Of heating, cooling and ventilation?

-Eveline- yes

-Walt- if I had a building with 20 heat pumps and the total air flow is more than 3000 CFM, then I need to install an economizer to provide free cooling to each of those heat pumps?

-Eveline- no, if there is air handling unit that is serving 20 heat pumps, that AHU needs to have economizer if that AHU is more than 3000 CFM

-Walt- but then it's how much air can this system move?

-Eveline- economizer is only there to take most efficient way to heat/ cool air– only works in right conditions. If the unit is more than 3000 CFM, we want to use outside air as much as possible.

-Walt- then if I install several separate standalone heat pumps, you don't have to do anything?

-Eveline- correct (but don't do that...)

## Section C406

-included beforehand for reference, a PNN white paper to explain how these points were derived

### Discussion

-Enrique Bueno (comment in chat)- Codes should be performance based not prescriptive because each building is a different universe. Electrification without efficiency is not sustainable

-Walt Adams- would love to see this section occur at the beginning of code or be reminded of in every section of the code that has to do with lighting, equipment, envelope (just because you picked the right solutions out of the chart, reminder that you'd better look at this other section that would be beneficial for you to get extra points)

–thinks it is not useful at the end – puts people off

-Keith – we did make an attempt to put right at top “you may need to get additional points” and then references 406 – but this seems not sufficient

-Brian Leet- against 406 –there is a disconnect between code and being told that you are trying to get points – some points are much more achievable than others

-he is a huge advocate for VT code to differ as little as possible from national codes– there is an added cost and complexity when builders/ suppliers come in to VT and have to relearn things

–also if the goal is to move to net zero, our code will have to be a general energy model – buildings like in an industrial space/ mixed use in an urban setting – make code hard to meet because they don't fit into presumed generic model that has happened (makes case to follow national example)

- Steve O'Malley- while customers are finding it challenging initially, I'm not getting feedback that we'd like to see this removed from code
- Charlie Carpenter (in chat) - I find some people are still missing this section of the code. Possibly intentionally...
- Donna Leban- could we incorporate additional incentives for lighting controls and HVAC controls to be integrated? Could be a part of C406?
  - Helps make lighting controls more cost-effective- building wide lighting controls are not used because HVAC people don't understand them – and no one seems to know how to integrate them
  - Donna- this could be another category where you could get points
  - Donna- continuing to lower lighting power densities is a waste of time – you need to focus on lighting controls rather than LPDs
- Brian Leet (in the chat)- This section in particular is why I'm skeptical of claimed "compliance" rates for CBES projects – Charlie Carpenter liked this comment

## Poll

### Additional Efficiency Package C406: What should the next revision of C406 look like?

Continue down the path we are currently on with points and multiple options

27%

Defer to 2021 IECC C406

45%

Simplify to things such as LPD, envelope, mechanical and renewable energy, but still on a point system by building type

18%

Simplify to things such as LPD, envelope, mechanical and renewable energy, but no distinction between building types

0%

Eliminate C406, which means other sections would be even more stringent

18%

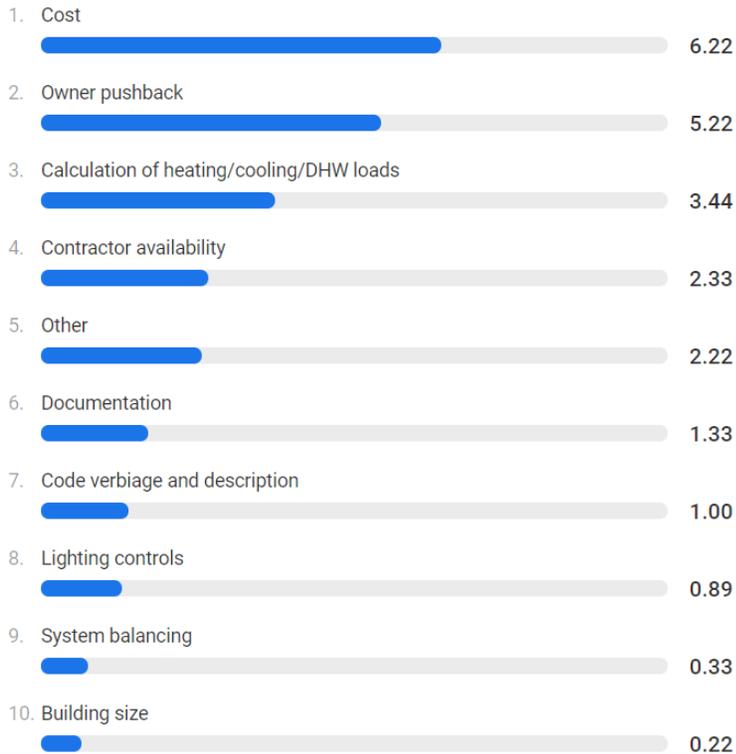
- how to get people to comply with 406? Move location, continue to highlight even more, other?
- Brian Leet- could have a footnote or additional column directly in the tables that are modified by 406 saying, "here is the prescriptive value and here is value if you're using 406 compliance path"
  - reference mechanical sections and duplicate tables
- Charlie Carpenter (in the chat) – I like that idea Brian
- Keith- could do the same with mechanical section as well
- Walt- recommend adjust CBES certificate to have it identify where the points come from on the certificate and whether those objectives were met at the end when you submit the certificate-
- do you have to say where you got the 6 points? Barry Murphy says yes you identify it right on the front of the certificate itself

-we could think about how to better align where points come from for the CBES certificate  
Maintenance Information/ Systems Commissioning C407

## Poll

### Commissioning – where are the issues (ranked)

Commissioning – where are the issues?



## Discussion

-Brian Leet – as architect, this is challenging to explain to owners early in the process – I don't have a good sense early on that we will hit the threshold and what it will cost the owner

-On more and more jobs, we have a design build mechanical/ electrical, am I supposed to be worrying about compliance or can I assume the engineer has to ensure compliance? Who's going to notice if they do or don't? Don't consistently see engineers stepping in and telling owners that they need to incur expenses

-Eveline- so it's a question of who's responsible for telling the owner that the threshold has been met and who will ensure it is implemented and completed?

-Brian- yes, there's an educational component required- not an issue on larger projects or under a certain threshold, but there's an in-between where this is not captured

-Walt – commissioning occurs on every building no matter what size- is it a function of whether mechanical equipment gets commissioned specifically?

-For certain products you wouldn't need to do commissioning

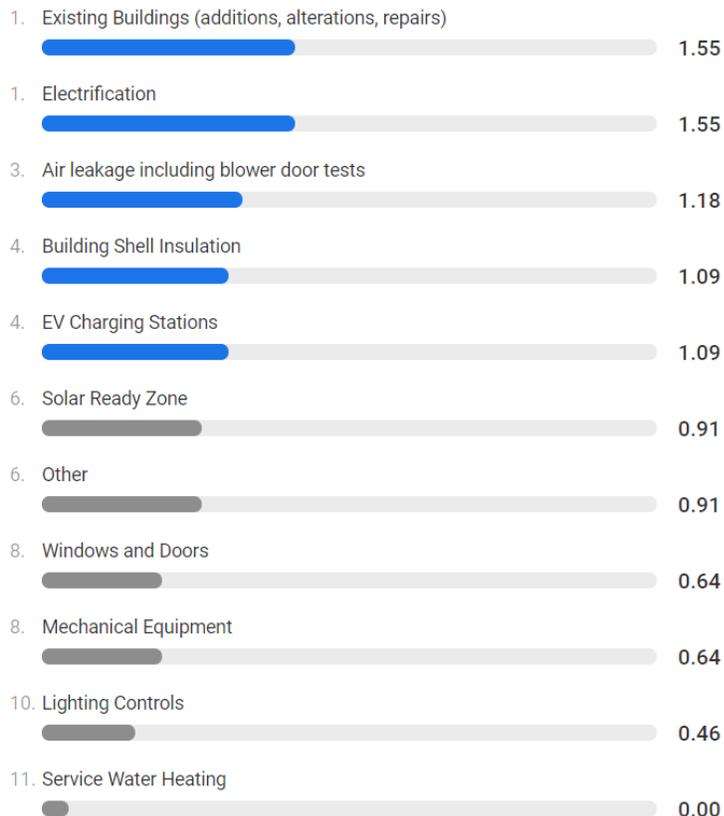
-Commissioning is only based on equipment size over 40 tons of cooling

- Blower door test is required on every building
- Charlie Carpenter (in the chat)- Instead of having the HVAC size requirements in an exception, it could spell out the BTU/h size requirement a bit more clearly
- Jeff Schoellkopf (in the chat)- who reviews documentation?
- Eveline – you’re supposed to get a certified professional – Code does not spell out who requires documentation- so that is a good question
- Walt – a client asked who I would recommend to do a blower door test and I had no names available to me – couldn’t find a person on EVT’s list that lists blower door – the search was difficult for something that will become the norm. This could be more intuitive
- Charlie Carpenter (in the chat) - BPI Certified contractors perform blower door tests. I agree though, our EVT contractor search is not the most intuitive
- Steve O’Malley- EEN website has a list of BPI trained professionals and people identified who work on C&I – think “blower door specialist” should be listed on the website – this is a growing need
- Donna Leban (in the chat)- I would say that this is one of the many deficiencies of the EEN Contractors list. It’s not specific enough about services offered and to what sectors.
- Enrique Bueno- agrees with Steve – though when it comes to big buildings, North American Passive House Network are doing blower door tests of high rises- if you need this, you could contact Enrique- they specialize in big buildings

## Next Steps

### Poll

#### Focus of following 2 C&I meetings:



-Steve O'Malley (in the chat)- I have specific comments to make regarding insulation and ventilation. I'm just looking for the right moment to bring them up

-Brian Leet (in the chat)-Topics Other: How CBES can encourage zero or near zero lot line urban infill mixed used development