

Date	Name	Organization	Section	Comments	PSD Response	Decision and Resulting Changes Made																
11/1/2022	Walt Adams			<p>At the last committee meeting the idea that there would not be insulation under the floor anymore in the new code was introduced by Mr. Faesy.</p> <p>I asked about the justification for that and was told he would forward it to me. I have asked twice more and haven't even received a response.</p> <p>I used my building modeler on a soon to be constructed 55,000 sf warehouse building with the following results:</p> <table border="0"> <tr> <td>1. Based on 2020 CBES without section 406</td> <td>EUI</td> <td>25.796</td> <td></td> </tr> <tr> <td>2. Based on Proposed 2023 without 406</td> <td>EUI</td> <td>27.369</td> <td></td> </tr> <tr> <td>3. Based on Proposed 2023 and R10 slab</td> <td>EUI</td> <td>23.015</td> <td></td> </tr> <tr> <td>4. Actual building design</td> <td>EUI</td> <td>19.206</td> <td>Envelope is 40% better than 2020 code(at least 10 points in 406)</td> </tr> </table> <p>Electrical use is 10% less than 2023, and Ngas use 30% less than 2023 code</p>	1. Based on 2020 CBES without section 406	EUI	25.796		2. Based on Proposed 2023 without 406	EUI	27.369		3. Based on Proposed 2023 and R10 slab	EUI	23.015		4. Actual building design	EUI	19.206	Envelope is 40% better than 2020 code(at least 10 points in 406)	In the previous iteration of the code (2020 CBES) the Department of Public Service (PSD) opted for under slab insulation on all slabs, heated or unheated. However in this iteration of the code valid concerns were raised as to the unintended consequences of insulating large slabs from the earth. Namely this approach could drive heating and cooling loads depending on the size and purpose of the building. Taking this into consideration (along with the expense related to under slab insulation) PSD decided to revert back to requiring under slab insulation only for heated slabs as described in the proposed language. This is still the viewpoint of the Department, and is consistent with the current International Energy Conservation Code (IECC).	The 2023 CBES only requires under slab insulation for heated slabs. No changes made since the initial proposal.
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12/1/2022	Kevin Dennis			On the CBES side, DFS reviews drawings for life safety compliance. Their expertise is in life safety, not energy. Again, while design professionals are voluntarily demonstrating compliance, there is no review or enforcement of energy code.	This is an enforcement issue. DFS are looking for acknowledgement that the CBES was taken into consideration when designing the building, they are not checking for compliance.	This is outside the PSD remit with respect to updating the code.																
11/8/2022	Paul Conner	City of South Burlington		That the Residential and Commercial codes require that buildings and roofs be oriented to maximize solar potential and to require that solar ready zones on new commercial buildings be required to have solar PV systems that reasonable maximize those solar ready zones.	Building orientation is somewhat outside of scope for CBES. That would more fall within the jurisdiction of the local planning office or zoning administrator.	No change was made to require specific building orientation.																
11/7/2022	Rob Pickett	Rob Pickett & Associates, LLC		...these two attachments reflect the work done in the ICC Energy Standards Committees. These two public comment drafts present a different minimum specification for the building thermal envelope that had been published in the 2021 IECC/IRC Ch. 11. Based on my participation on the VT Stakeholders calls, I believe that what has happened in the ICC residential energy standard reflects the comments of builders in VT. For example, the minimum requirement for Climate Zone 6 roof insulation has been reduced from R60 to R49. I propose to the Energy Code Update Team that the RBES that has been developed works great as a Stretch Code, but the base energy code needs to be a realistic minimum level similar to that in the attached draft.	This comment is referencing RBES and not CBES, however the R-49 reference is set as a minimum with potential points available for going further. However going from R-49 to R-60 is not cost-effective as per PSD modeling.	No change made to CBES.																
12/1/2022	Walt Adams			Include a definition of "net zero ready" in RBES and CBES.	The PSD is still developing a definition of 'NetZero ready' for commercial buildings. The issue is that different building types and uses would have a different application of the term.	No change made to CBES.																
12/1/2022	Walt Adams			<p>Unheated Under Slab insulation: Imaging that you built a building in an environment where the temperature was always 50F. Would you not insulate that building? For most of the building shell the heat loss varies based on the exterior temperature. However the soil under the floor is always about 50F so the heat loss into the space is the same on May 5th as it is on January 10th. And it doesn't make any difference where that square foot of floor is, near the outside wall or in the center of the building for slab loss. For most single story buildings the floor heat loss uninsulated will be about 18-20% of the heat loss of the rest of the envelope. You can reduce it to under 8% with R10 insulation.</p> <p>However if you air condition you will lose the cooling effect of the floor so you will have to add .1 tons of capacity for every 1000 square feet of floor.</p> <p>The average Burlington VT temperature is 45F. However we don't insulate our buildings for that, we insulate for the extremes of -9F and 95F.</p>	In the previous iteration of the code (2020 CBES) the PSD opted for under slab insulation on all slabs, heated or unheated. However in this iteration of the code valid concerns were raised as to the unintended consequences of insulating large slabs from the earth. Namely this approach could drive heating and cooling loads depending on the size and purpose of the building. Taking this into consideration (along with the expense related to under slab insulation) PSD decided to revert back to requiring under slab insulation only for heated slabs as described in the proposed language. This is still the viewpoint of the Department.	No changes made.																
12/1/2022	Walt Adams			<p>Duplex outlet control: The cost benefit ratio for two items proposed in the new code are clearly not worth it. The first is controlled duplex outlets. My clients cringe when I bring this up and I worry about the cost to install compared to the savings. Computers today use significantly less energy than they used to and when shut off thru software, or go into sleep mode, preserve you current work. If you leave it on and shut the power off most computers get very unhappy and they don't preserve any open work. Desk lamps are, if installed are mostly Led and are very low wattage. It would seem that the only thing left is small electric heaters and it would be easier and much cheaper to require then, if they exist, to have an occupancy sensor so they would not run unless there was someone to heat. When modeling a space the closed hours have 10% of the duplex outlet load of the open. So what we're talking about controlling is that 10% not the 100%.</p>	This is in reference to section C406.1.2 renewable and load management. The requirement is for some controlled and some uncontrolled sockets. Equipment meant to be left on at all times would be plugged into the uncontrolled receptacles (computers for example) and peripheral equipment would be plugged into the controlled sockets (monitors). Uncontrolled plug loads represent the largest segment of a building's energy use that was not covered by the energy code; this modification allows control of those previously uncontrolled loads.	PSD reviewed this section and offered a method to bypass these requirements if sufficient points were accrued in C406.1.1 to offset any uncontrolled plug loads.																

11/13/2022	Walt Adams		<p>Long term open door controls: Door controls that notice when a door is open more than 15 minutes and effect the set points of the local HVAC equipment. I have asked for the cost of this equipment, so I can compare it to any potential savings. In Vermont the penalty for leaving a door open, especially in the winter, is significant, from a work environment stand point, that's why you don't see it. So what's the point of this complex arrangement, and how do you decide what the savings will be. And over time these systems will fail and there will be no incentive to fix them because the added fuel cost is so low and the cost to fix is so high. If a client had a door he wanted to leave open they would have to comply with this, (think Costco), even if they installed air curtains? And did Costco get an exemption from the vestibule standards, oh right the door opens into a space bigger than 3000 sf, so none required. Perhaps it was argued that these warehouse store building are such energy hogs that those open doors don 't really matter.</p>	<p>This refers to a requirement for mechanical interlocks on the heating system to prevent heat loss due to a open loading door or other large door. It would have required the heating system to stop heating that space for the duration the door was open.</p>	<p>Given the difficulty in implementing this the PSD removed this requirement. However it should be noted that is requirement is likely to be included in the IECC 2024 and will come back up for discussion in the next update.</p>
11/17/2022	Erin DeSantis	American Chemistry Council	<p>Our members produce products for the whole of the U.S. market and in some cases have a global presence as well.</p> <p>This includes but is not limited to plastic building materials like foam plastic board insulation, spray foam insulation and air sealants, house and building wraps, liquid applied water resistive barriers, plastic pipe, plastic glazing, and roof membranes. These products provide a wide range of benefits including thermal, air, and moisture management.</p> <p>ACC has concerns with the proposed amendments to Vermont CBES and RBES that give preference to low embodied carbon insulation materials. If adopted, this would be a significant expansion of the energy code; no other state has adopted any mandated or optional points for low embodied carbon insulation materials.</p> <p>We encourage the consideration of the following information:</p> <p>All materials require an investment of carbon to produce them including those with high embodied carbon like concrete, steel, and glass. However, only some materials provide carbon savings benefits during the operational life of the building like insulation and air barriers.</p> <p>The building and construction sector accounts for 37 percent of global carbon emissions. Embodied carbon accounts for 10 percent while building operations account for 27 percent of emissions of those emissions.1 Building materials like concrete, steel, and glass account for the largest portion of the embodied carbon. Cement, steel and glass are the next highest contributors, which means insulation makes up an extremely small portion of a building's embodied carbon.</p>	See below	
11/17/2022	Erin DeSantis (cont.)	American Chemistry Council	<p>Despite its relatively small percentage in overall building embodied carbon impact, insulation does however have a significant contribution to operational energy and greenhouse gas emissions savings. Energy Star estimates that you can save an average of 15% on heating and cooling costs by air sealing and adding insulation to the typical existing U.S. home.</p>	See below	
12/8/2022	Erin DeSantis (cont.)	American Chemistry Council	<p>Insulation products offer significant savings with a minor impact on the building's embodied carbon profile. The preference for low embodied carbon insulation could lead to improper product selection and negatively impact the operation carbon use of the building. Insulation materials provide important benefits beyond thermal protection like air sealing and vapor management which are beneficial to a building's overall performance. Insulation manufacturers have been optimizing their products to lower their carbon footprints for many decades. They have also been very transparent, and Environmental Product Declarations (EPDs) are available for most products.</p> <ul style="list-style-type: none"> • We support a whole building approach that includes operation carbon benefits and product transparency. • We believe that manufacturers that have been optimizing the carbon intensity of their products should be rewarded rather than disincentivized from doing the right thing. • We believe Vermont should recognize product contributions to operational carbon savings. • We believe insulation choice should not be limited by this policy as insulation products save more carbon and energy than it takes to produce them. 	See below	

12/8/2022	Erin DeSantis (cont.)	American Chemistry Council		<p>ACC members have been making great progress in lowering their embodied carbon emissions. Their innovative and durable building materials enable greater carbon savings over their service life than it takes to produce them. Their progress has also minimized the difference in CO2 emissions between different insulation products.</p> <p>A recent report by McKinsey & Company also demonstrates the carbon benefits of plastic building materials in comparison to alternative products. In fact, this report shows that in most cases plastic materials provide lower total GHG emissions over their life. This climate-related benefit commonly associated with the use plastics, including plastic construction materials, is further detailed in McKinsey's report.</p> <p>Insulation manufacturers have been providing transparency information for the industry in the form of Environmental Product Declarations (EPDs) that provide CO2 embodied carbon emissions data for over a decade. This data was not intended for comparison purposes. If it is used in this manner, it is important for users to be educated regarding the limitations of comparisons as well as the tools and data sources they are using. Unfortunately, many tools do not accurately account for industry improvements in a timely manner or follow standard guidance for comparing products. They often allow products with different baseline assumptions and utilize different Product Category Rules. They also often include comparisons between industry and product specific EPDs, etc.</p>	See below	
12/8/2022	Erin DeSantis (cont.)	American Chemistry Council		<p>Due to the above concerns, we recommend that total carbon accounting be used to understand the full impact different products have over the life of the building. We do not recommend providing incentives for embodied carbon as a single attribute that could lead to regrettable substitutions. Embodied carbon decisions should not be made prior to considering the other primary and necessary functions of building materials like their ability to eliminate other products, mitigate air leakage, manage moisture, etc. Operational offsets must be considered.</p> <p>Decoupling the embodied carbon of products like insulation can have negative effects on building performance and the performance characteristics of the insulation regarding thermal protection, moisture management and air leakage should not be sacrificed for relatively small differences in embodied carbon.</p> <p>ACC along with several other insulation industry associations published a Building Decarbonization Statement of Policy Principles that supports this total carbon or whole building view of the carbon impacts. This is important so that decisions are not made that would affect the building performance (thermal, air, moisture management, etc.). Please see more regarding the Insulation Industry Decarbonization Policy Principles here: Building Decarbonization Statement of Policy Principles (americanchemistry.com)</p>	<p>The proposed CBES does not contain any prohibitions of particular insulation or building materials. The embodied carbon provisions in the proposed code are limited to providing optional points toward compliance in the Prescriptive compliance pathway. Should a builder choose to complete a carbon inventory of insulation products used, that inventory can and should contain the default GWP value or values from Type III Product specific Environmental Product Declaration (EPD), which should accurately reflect the degree to which a particular product has been optimized for carbon intensity. EPDs are the best available source of information regarding the embodied carbon GWP of particular products.</p> <p>RBES and CBES pertain only to the energy use in buildings, so we have limited the scope of embodied carbon to just those materials that are measurable (through EPDs) and impact the energy performance of buildings; insulation. Embodied carbon in building materials can rival or even be significantly larger than operational energy. In order to educate designer and builders about the potentially large carbon impacts of insulation choices, we felt it was important to include an optional means of gaining points through measuring and reducing the amount of embodied carbon in insulation materials.</p>	No changes made.
12/9/2022	Chris Miksic	Vermont Passive House		VTPH recommends strongly including the CBES 2030 targets now in the code as an option , as a gold 2030 standard for those Developers that would like to achieve the 2030 target now, only 7 years away.	CBES energy targets will be required to be recalculated with every iteration of the code. As technology progresses, building practices and materials change; these all need to be factored into what it means to be net zero ready. For example, the cost of solar PV has decreased over the past 10 years while its energy output has increased, and this has the net result of making it cost-effective to put more solar PV on a roof than even 5 years ago.	No action taken
12/9/2022	Chris Miksic	Vermont Passive House		We strongly advocate that CBES also include and indicate an option for Certified Passive House projects.	The energy code is a minimum standard. Builders can always exceed RBES and CBES and build to the Passive House standard. The PSD is concerned about picking a particular standard like Passive House over other available standards such as Energy Star, LEED, etc without additional analysis on each standard and their differences. Adding additional standards would also require more resources to continually review and understand the standards to ensure they are above or equivalent to the CBES and that they incorporate all the minimum requirements in CBES.	No action taken.
12/9/2022	Chris Miksic	Vermont Passive House		VTPH strongly suggests that the State incentives for Passive House Certified Multi-Family housing projects be increased	This is outside the scope of the CBES update.	No action taken.
12/9/2022	Chris Miksic	Vermont Passive House		VTPH can offer a subsidy up to 50%, to Builders and designers for Passive House training. The VTPH program is for interested professionals who would like to complete PHIUS and PHI consulting and builder certifications .VTPH would like also to integrate/partner with any educational/workforce training/vocational sector opportunities.	This is outside the scope of the CBES update.	No action taken.

12/9/2022	Sandra Vitzthum	Sandra Vitzthum Architect LLC	C101	Sections 109 and 110 are missing. Both are connected, related parts of an integrated administration for all building codes. There is no reason I know of to eliminate them, particularly because they reinforce other building codes and also other sections of this code.	These are administrative sections of the IECC relating to enforcement, including aspects such as stop work orders and a board of appeals. Without a relevant enforcement mechanism these sections are inapplicable and have always been removed from CBES since its inception.	No action taken.
12/9/2022	Aaron Gunzner	AMCA International	C403	AMCA does have one recommendation for the current version of CBES, as was mentioned during verbal testimony at the December 2 hearing. In our limited reading of the CBES 2023 Full-Text Redline 9/23/2022 (Current Version), it seems that the inclusion of Fan Efficiency Grade (FEG) reporting requirements in mechanical equipment schedules, such as mentioned on PDF page 28 of 354, should instead be updated to Fan Energy Index (FEI), per other changes drafted in the CBES update.	Agreed.	FEG updated to FEI within the code.
12/9/2022	Isaac Elinecave	Passive House US		Add a Passive House alternative compliance path to commercial and high-rise multifamily projects certified by Phius.	The energy code is a minimum standard. Builders can always exceed RBES and CBES and build to the Passive House standard. The PSD is concerned about picking a particular standard like Passive House over other available standards such as Energy Star, LEED, etc without additional analysis on each standard and their differences. Adding additional standards would also require more resources to continually review and understand the standards to ensure they are above or equivalent to the CBES and that they incorporate all the minimum requirements in CBES.	No action taken
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.		Any proposed VT CBES customizations from the IECC, unless taken from another similar source such as Standard 90.1, should be fully vetted before including.	VT specific changes are vetted by subject matter experts and typically are derived from language that is planned to be introduced into the forthcoming International Energy Conservation Code (IECC).	No action taken.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.		The VT CBES is generally considered to be unenforced, and public feedback throughout the last few updates has continued to be that this needs to change for the Code to be effective. Recognizing that this implementing enforcement is complicated and beyond the scope of the update process, the fact that enforcement doesn't exist should be taken into account when considering modifications to the Code.	The proposed updates have been developed with the understanding that they will be implemented through the existing compliance and enforcement mechanisms.	No action taken.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.		The cost effectiveness of requirements which exceed those in the IECC or Standard 90.1 should be clearly proven before implementing.	The PSD has completed a cost-effectiveness analysis for the proposed 2023 CBES, which includes impacts on energy savings, return on investment, and cash flow.	No action taken.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.		Experience by many local practitioners demonstrates that above-deck roof insulation beyond that required in the IECC/90.1 is not cost-effective.	Above deck insulation requirements have not changed, and are almost exactly the same as those in the draft 2024 IECC.	No action taken.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.		For slab-on-grade insulation in particular, little energy impact can be demonstrated in the difference between the IECC/90.1 requirements and anything beyond them due to ground heat and the thermal resistance capacity of soil.	We took this into consideration when we removed the under slab insulation requirements for unheated slabs which had been part of the previous iteration of CBES.	No action taken.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.	Electric Resistance Space Heating (C403.2.3)	The historical exception for "replacement of electric resistance unit" appears to have been removed, however the justification is not clear.	Language will be checked but existing "approved" resistance heaters are still allowed to be replaced.	Language allowing replacement of existing electrical heaters still in place.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.	Heating and Cooling Equipment Sizing (C403.3.1)	Text regarding heat pump sizing has been added to the proposed VT CBES. This requirement states that "equipment shall not be sized greater than the calculated peak heating and cooling loads". Given that equipment is not available in an infinite amount of capacities, text similar to that within the main requirement ("to the next nearest available size") should be used.	Agreed. This should be added to the redline.	Language added.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.	Economizers (C403.5)	The basis for the requirement exempting "VRF system installed with a dedicated outdoor air system" is not clear. It is understood that this exception is not VT custom, is included in the IECC, but is not in Standard 90.1.	This exemption pertains to the VRF system portion of a system with DOAS. The economizer is addressed in the DOAS section of the code.	No action required.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.	Nontransient Dwelling Units (C403.7.4.1)	The proposed VT CBES has been customized from the IECC to include recovery requirements at cooling design condition, and increases both cooling and heating recovery effectiveness minimum thresholds from 50 to 60% and 60 to 70% respectively. Have these thresholds been determined to be achievable with commercially available equipment, particularly the cooling threshold? Or at a minimum, is equipment meeting these thresholds been proved to be cost effective?	We have verified equipment is available and have conducted cost-effectiveness modeling which has proven it is cost-effective.	No action required.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.	Automatic Control of HVAC Systems Serving Guestrooms (C403.7.6)	Temperature reset is required for guestrooms, however zones served exclusively by cold-climate heat pumps are generally exempt from off-hour controls by the proposed VT CBES customized requirement in C403.4.2. Are these controls required for cold-climate heat pumps serving guestrooms? If not, maybe this should be added to C403.7.6.	The reason we didn't add this exemption to guestrooms is that these rooms could be unrented for long periods of time, but it makes sense to be consistent and add this language to C403.7.6.	Language added.

12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.	Fan Airflow Control (C403.8.6)	The proposed VT CBES have been customized from the IECC regarding duct located in a conditioned space - this is understood to be intended to apply to untreated air. It appears that rather than replacing the existing requirement for duct located within a building envelope assembly (a different location than a conditioned space), the modification should be in addition to the existing requirements.	Reviewed section C403.8.6 and no edits took place to the existing language	No action taken.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.	Duct and Plenum Insulation and Sealing (C403.12)	This new CBES requirement is understood to be included in both the IECC and Standard 90.1 and not custom to the CBES. However, has the actual effectiveness of this requirement been demonstrated? From a technical standpoint, it is understood that uncontrolled plug loads consume a considerable amount of energy and should be a target for energy reduction. From a practical standpoint, it seems like if a user values minimizing energy use, they either manually control their device or set up automated control on the device, resulting in a controlled receptacle providing no value.	Measures contained within the IECC and 90.1 undergo a rigorous process including cost-effectiveness before becoming part of the standard.	No action taken.
12/9/2022	Nicholas Thiltgen	DuBois & King, Inc.	C405.14	Is the intent of this requirement to add a burden to install fossil fuel heating equipment so it is not chosen, or to add necessary infrastructure for future electric heating equipment? If the former, it seems like it would mostly apply to buildings with R-2 occupancy classifications which are exempt but where reasonable alternatives are available and many are already using non-fossil fuel equipment. Other occupancies have less desirable electric options for some end-uses at the moment and projected near future.	The intent of the requirement is to future proof the trend towards heat pump and other electrification technology so that buildings would have an option to choose fossil or electric tech in the future. The wording comes from an NBI proposal for the 2024 IECC and was passed unanimously by an IECC subcommittee. This would apply to all space heating and water heating buildings.	No action taken.
12/9/2022	Jonathan Dowds	Renewable Energy Vermont		Support of the EV readiness standards in the proposed updates to the CBES and RBES.		No action required.
12/9/2022	Emily Kelly	ChargePoint		ChargePoint applauds the Vermont Department of Public Service for the strong inclusion of EV Ready parking requirements and standards in both versions of the building energy standards. To support the adoption of EVs, it is critical that drivers have access to convenient places to charge. Most charging occurs at home, and access to home charging is a key factor in determining whether households will adopt an EV as their next vehicle. EV Ready codes promote new residential, multi-family, and commercial buildings to expand breaker panels, lay conduit, and wire through a raceway to parking spots based on a percentage of parking. This preparation for electric vehicles enables a site to reduce costs, complexity, and disruptive construction by incorporating EV-ready infrastructure at time of construction rather than during retrofits.		No action required.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.	C401.2.1.2	C401.2.1.2 replaces the equation for PCI with an equation that appears to include process (plug, etc.) loads in the overall equation, even though these are not directly regulated by the code elsewhere and this is not standard modeling practice with fewer guidelines for baseline or reasonable targets. Recommend deleting this equation change.	The largest uncontrolled load in a building is currently plug (process) loads. The intent of this equation is to begin addressing these loads.	No action taken.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.	C406	C406 the improvements are good, but a bit of rearranging the deck chairs on the Titanic. Primary challenge with this section is trying to define around the myriad of building types and overall good planning goals for broadly multi-use buildings which flexibly change use in the future. In combination with lack of understanding and enforcement I believe this section should not be relied upon to justify energy performance improvements over the remainder of the code.	C406 allows for the use of "other" as a building category if the designer is unable to adequately define what the building's purpose is intended to be, however building use can change over the lifetime of the building. C406 is designed to offer flexibility in the choices made by owners/architects.	No action taken.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.	C406	C406 needs better guidance on how to handle multi-use buildings. For example, from a building code standpoint a new school is typically occupancies B, A-2, A-4, and E at least. Is this intended to fall into the All Other category? By space allocation it may not typically have more than 50% of the space in any one of these categories.	CBES uses the standard building classification identifiers that all architects and builders should be familiar with: for example, they are the same as those used by the Division of Fire Safety. However, we understand that sometimes it can be difficult to classify a building under a single category. Typically, classification will be based on the majority use of the building, but the 'other' category is included for cases where that is difficult to determine. Importantly, building classifications as determined by the Division of Fire Safety should always be followed.	No action taken.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.	C402.1(1)	C402.1(1) on recent large commercial/institutional projects where we have modeled insulation beyond the current R-20ci level for a metal framed wall the payback has not consistently been worthwhile. Strongly recommend not raising insulation levels as proposed in this table and instead informing legislature that economical path to Net Zero would involved addressing energy production side rather than overly tightening these numbers to force expensive solutions that don't perform significantly better than current construction.	Overall, the Department's modeling shows that the proposed updates are cost effective.	No action taken.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.	C402.1(1)	C402.1(1) change to remove requirement for full underslab insulation is very good. On a recent project initial energy modeling revealed that this approach would save the project over \$200,000 in construction costs while simultaneously lowering predicted energy use.		No action taken.

12/9/2022	Brian Leet	Freeman French Freeman, Inc.	C402.3	C402.3 why should storefront as a product get an exception? This exception is an acknowledgement that the standard is exceeding affordable and feasible solutions across the range of acceptable construction products. Recommend instead informing legislature that economical path to Net Zero would involve addressing energy production side rather than overly tightening these numbers to force expensive solutions that don't perform significantly better than current construction.	Based upon comments received and research carried out by Department contractors, it was determined that currently there was no cost-effective way to implement changes to storefront glazing requirements.	No action taken.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.		What is the basis of support for exemplary lighting solutions being achievable with 15% less LPD? Based on input from trusted lighting designers, this may overly constrain projects and there is no viable alternative approach for this issue short of full project energy modeling. Recommend not making these changes out of line with national standards.	Most National standards for Lighting Power Density (LPD) still include fluorescent and other types of relatively inefficient lights. The updated being proposed by the PSD focus on utilizing LEDs almost exclusively except for places where they are unsuitable. Appropriately located and utilized LED technology will be able to meet these requirements.	No action taken.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.		EV Charging Parking Spaces – it would help to have multi-use/occupancy guidance for this as well. Likely tied to zoning definitions of requirements for parking. EV capable spaces seems very high for non-residential parking lots. Even just putting conduit in place becomes very pricey at scale. Is this based on any data or state or national plan for approach to charging stations?	EV capable spaces simply require a conduit to the space running from the power room of a building. The number of spaces required to be EV capable was determined by the PSD to be a modest increase from that already required within the 2020 CBES, and is included as a cost-only consideration in the PSD's cost-effectiveness model. As to national standards, the number of spaces to be required in the 2024 IECC greatly exceeds the number required within the 2023 CBES.	No changes made.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.		Operable Openings Interlocking – recommend adding an exception similar to the third bullet point for double doors which are primarily used for egress. This standard impacts any typical 6'x7' double door condition and could be very challenging to implement with many mechanical systems causing significant additional costs out of proportion with energy savings.	Agreed this is problematic to implement currently.	Language removed.
12/9/2022	Brian Leet	Freeman French Freeman, Inc.		It would be helpful to publish the data on Automatic Receptacle Controls identifying the benefits, documented savings relative to costs and successful use by occupants of space throughout all building types.	Plug loads are the largest single remaining uncontrolled load in most buildings. This is taken from an approved amendment to the 2024 IECC which has been vetted by Industry professionals.	No change made
12/9/2022	Jeff Stetter	Pella Architectural Consultant	Table C402.3	Table C402.3 Building Envelope Fenestration Maximum U-Factor and SHGC Requirements •How is storefront defined? Pella often utilizes our fiberglass line Impervia for storefronts. We can factory glaze or site glaze, so having a definition associated with glazing location doesn't really make much sense (if that is the approach).	Definition in the proposal: "STOREFRONT. A system of doors and windows muller as a composite fenestration structure that has been designed to resist heavy use. Storefront systems include, but are not limited to, exterior fenestration systems that span from the floor level or above to the ceiling of the same story on commercial buildings, with or without muller windows and doors." This definition was already in the 2020 CBES and came from IECC.	No action required.
12/9/2022	Jeff Stetter	Pella Architectural Consultant	Table C402.3	•Ramifications of a .27 U-Value Requirement for Operable Fenestration for R2. oWith the proposed .27 requirement most, if not all, Aluminum Clad Wood Windows will require switching to a glazing package which includes an additional interior coat of Low-E. Depending on the line of windows, this can increase the overall window cost between 9-16%. These are real numbers. To change to triple pane windows would increase the base cost between 38-46%. oThe glazing package that requires an additional interior coat of Low-E lowers the interior surface temperature of the glass, and thus decreases the window's resistance to condensation. oVinyl windows can typically meet the standard without any increase in cost. oFiberglass windows have fewer options to meet the new standard without triple pane and typically will have increased cost.	To align with RBES, this has been changed back to U 0.30.	Operable fenestration requirements reverted back to U-0.30 for multifamily R2, to align with RBES.
12/9/2022	Charlie Willner	Evernorth		Add " - FOR ALL USES EXCEPT MULTIFAMILY" after ELECTRIC VEHICLE CAPABLE SPACE (EV CAPABLE SPACE).	Specific exemption included in text for multifamily buildings.	No action taken.
12/9/2022	Charlie Willner	Evernorth		Add new definition: "ELECTRIC VEHICLE CHARGING - LEVEL 2 CAPABLE (MULTI-FAMILY): provide appropriate sized pathway to the building electrical room to accommodate a future electrical upgrade for Level 2 EVSE electric vehicle charging; provide adequate wall and floor space in the building electrical room for future EV charging related electrical equipment; provide the appropriate sized pathways to exterior on-grade surface parking spaces for future Level 2 EVSE electric vehicle charging; if the building includes garage or covered parking, provide a line diagram on the electrical drawings demonstrating a pathway for future Level 2 EVSE electric vehicle charging. Quantity of future Level 2 EVSE electric vehicle charging stations shall be as required by Table R404.3."	CBES has aligned with RBES on the issue of multifamily building EV charging requirements.	R-2 occupancies have had language similar to that proposed in the comment implemented.
12/9/2022	Charlie Willner	Evernorth	C402.5.1	The solar ready provisions do not apply to multifamily buildings in RBES, but does apply to multifamily buildings in CBES. It should either apply to multifamily buildings in both or neither.	While overall alignment between RBES and CBES for multifamily construction is desired, certain requirements will differ.	No changes made.

12/9/2022	Charlie Willner	Evernorth	C405.6	This language should be clarified and aligned with the corresponding RBES (R404.5) language. We suggest both codes read "Exception: Buildings where a majority of the living units serve tenants at or below %80 percent of area median income."	Agreed	Language added.
12/9/2022	Charlie Willner	Evernorth	C405.12	Add Exceptions: R-2 occupancies and individual tenant spaces are not required to comply with this section provided that the space has its own utility services and meters and has less than 5,000 square feet of conditioned floor area.	Agreed	Language added
12/9/2022	Charlie Willner	Evernorth	C405.13	405.13 Electric Vehicle Power Transfer Infrastructure Table C405.13.1: delete Equation 4-11 and replace with the requirement to "provide EV Capable spaces at 25% of the parking spaces provided for the multifamily development. Note that EV Capable requirements vary according to whether spaces are in a garage/covered versus exterior on-grade spaces (see DEFINITIONS)." C405.13.2: modify this Section so as to be consistent with the new definitions of EV Capable spaces as suggested above.	The number of spaces remains consistent - it is up to the building where these spaces are deployed.	Definitions between RBES and CBES have been synchronized. Specific exemptions for multi-family EV requirements have been included.
12/9/2022	Charlie Willner	Evernorth	C405.14.1.1	Item 2 appears to require that a complete circuit (breaker, wiring, termination) be installed. If this section was changed to require space in the panel and conduit from the panel to the future equipment location the intention (facilitate future transition to Heat Pump technology) will be preserved while reducing current cost burden to the building owner.	Language will be checked but existing "approved" resistance heaters are still allowed to be replaced.	Language for high capacity heating clarified to show that the high capacity heating requirement only requires conduit, no wire or breaker.
12/9/2022	Charlie Willner	Evernorth	C405.14.2.1	Item 1 appears to require that a complete circuit (breaker, wiring, termination) be installed. If this section was changed to require space in the panel and conduit from the panel to the future equipment location the intention (facilitate future transition to Heat Pump technology) will be preserved while reducing current cost burden to the building owner	Agreed.	Language updated to reflect conduit only approach.
12/9/2022	Charlie Willner	Evernorth	C405.14.4.2	C405.14.4.2 Residential drying Rather than require a complete circuit be installed we request only installation of conduit and space in the electrical panel for future circuit installation.	Agreed.	Language updated to reflect a conduit only approach
12/9/2022	Charlie Willner	Evernorth	C406.1.1	C406.1.1 + C406.1.2 These code section mandate additional energy efficiency requirements. This is a similar section in RBES (402.1.2.2), but the RBES requirements mandate different point values based on the average living unit size in multifamily buildings. We request that a similar provision (points required are scaled to average living unit size) be applied in multifamily buildings that are built under CBES. The current point values should apply to the largest unit size category created. This is consistent with the Departments stated goal to align the RBES/CBES requirements for multifamily buildings.	This approach is not easily implementable within CBES without creating a separate multifamily chapter.	No changes made.
12/9/2022	Charlie Willner	Evernorth	C406.2.1.3	C406.2.1.3 E03 Reduced air leakage "Energy credits shall be achieved where tested building air leakage is not less than .15 cmf/ft2...." The bolded "not" should be deleted from this code section if the intent is to incentivize tight building construction. These points do not appear to apply to R-2 type occupancies less than six stories, as the baseline air leakage rate in this type of building is .15 cfm/ft2 @ 50pa. Please provide an equivalent incentive for low air leakage R-2 occupancy buildings when testing at 50pa. Suggested language for this incentive: "Multifamily buildings testing @ 50pa shall receive these credits where the tested air leakage is less than .1 cfm/ft2 @ 50pa."	Agreed	The suggested changes were made.
12/9/2022	Charlie Willner	Evernorth	C407.1.1	407.1.1 Qualifications, subsection 2. "Be an independent third-party entity. The commissioning authority shall not be an employee of the design team, construction team, owner or developer." We recommend striking 'owner or developer'. We understand the importance of the commissioning provider being independent of the construction team, however we believe that as long as the provider is qualified, they could be an employee of the owner or developer. The owner/developer's incentives are aligned with the intent of this requirement. As owners/developers, we want our systems to function properly, meet the design requirements. Furthermore, the 2020 CBES requirement varies from other standards; for example LEED NC allows the CxA to be a qualified employee of the owner (but not a member of the construction/design team).	PSD feels its language on who qualifies as a commissioning agent is broad and would include the example mentioned in the comment.	No change made.

12/9/2022	Charlie Willner	Evernorth	C403.2	Suggested Addition to C403.2. We suggest adding a subsection to C403.2 with language similar to the following: "Hydronic heating systems and associated equipment shall be sized for and operated at a maximum heating hot water temperature of 140F." One goal of this requirement is that it ensures that condensing boilers will actually condense and operate at higher efficiencies. Many boiler systems have constant primary pumps, which means that at part-load conditions the delta-T across in the primary loop is very low and the boiler will not condense if the supply water temperature is above 140F. The second goal of this requirement is to future-proof buildings for electrification. Air-to-water heat pumps struggle to provide hot water over 140F. If a building's hot water coils, radiators, etc. are designed to operate at 180F, they would all need to be replaced in order to electrify a building in the future (assuming the building would heat the hydronic loop with heat pumps).	We concur with this statement and will add this to the redline.	language added to C403.2
12/9/2022	Charlie Willner	Evernorth	C403	Suggested Additional to C403; Sequence of Operations (SOO). Evernorth has had challenges getting a SOO for projects, receiving generic SOOs, and/or receiving SOOs after the project is constructed. This challenge makes it difficult to have our buildings set up as efficiently as we would like them. To that end, we suggest requiring that Construction Drawings include a Sequence of Operations for all mechanical equipment. CBES 2020 C406.4.5 requires a SOO for lighting controls, but we do not believe there is a comparable requirement for mechanical systems. Proposed additional to C403: "Construction documents shall include submittal of a Sequence of Operations for all mechanical equipment, including a specification outlining each of the functions required by this section."	We concur with this statement and will add this to the redline.	Language updated.
12/9/2022	Charlie Willner	Evernorth	C403.7	Suggested Additional Requirement to C403.7 relating to dehumidification in Energy Recovery Ventilation Systems. We have had several projects with central Energy Recovery Ventilation (ERV) systems that include a dehumidification sequence. The factory control method of dehumidification was to assume that the unit needed to dehumidify whenever the outside air temperature was above 65F (i.e. it used dry bulb temperature to control humidity). This results in the unit subcooling air with a compressor for a significant number of hours when it is not necessary. We suggest that CBES not allow this type of control. Proposed requirement: "For Energy recovery ventilation systems that utilize dehumidification, not fewer than one humidity control device shall be provided for each humidity control system. A humidity control device is a device that measures relative humidity or enthalpy (dry bulb temperature sensors do not qualify as humidity control devices)." Our experience relates to ERVs w/ dehumidification, but it may also make sense to expand this requirement to other heating/cooling equipment, in which case it would likely be an update to C403.4.1.	We concur with this statement and will add this to the redline in both section C403.7 and section C403.4.1. In section C403.1 we will replace "Energy recovery ventilation systems with dehumidification" with "HVAC systems with dehumidification".	Language added
12/8/2022	Henry Amistadi	Operations Monitoring and Analytics LLC	TABLE C403.1.2(1)	TABLE C403.1.2(1) Maximum DESIGN Mechanical Load Component (Design MLC) is based on the 2016 version of the standard. In the 2019 and proposed 2023 standard, DESIGN MLC pathway has been eliminated. DESIGN MLC was eliminated because it didn't consider part load energy performance of partially filled data centers. Since Design MLC has been eliminated, data centers requirements shouldn't be located in C403.1.1 Calculation of heating and cooling loads. The 2019 and 2023 standard only have Maximum ANNUALIZED MLC. <ul style="list-style-type: none"> In the 2019 standard, TABLE C403.1.2(2) Maximum ANNUALIZED Mechanical Load Component (Annualized MLC) table values were updated. In the 2023 standard, Maximum ANNUALIZED MLC cooling table values were updated and columns were added to include ancillary data center heating and ventilation 	Table should be updated to the 2023 standard, Maximum ANNUALIZED MLC cooling table values.	Table amended
12/10/2022	Henry Amistadi	Operations Monitoring and Analytics LLC	C403.5.3	C403.5.3.3 High-limit shutoff. "Air economizers shall be configured to automatically reduce outdoor air intake to the design minimum outdoor air quantity when outdoor air intake will not reduce cooling energy usage. High-limit shutoff control types for SPECIFIC CLIMATES shall be chosen from Table C403.5.3.3". Which device types are recommended for VT?	We will remove "for specific climates" verbiage from VT CBES for clarity.	Language Updated

12/10/2022	Rupal Choksi	Madison Indoor Air Quality (IAQ)	C403.7.4.1	<p>For better alignment with the proposed RBES language it is suggested the following changes be made to C403.7.4.1. See attachment for full details.</p> <p>C403.7.4.1 Nontransient dwelling units. Nontransient dwelling units shall be provided with outdoor air energy recovery ventilation systems with an enthalpy recovery ratio of not less than 60 percent at cooling design condition and not less than 70 percent at heating design condition.</p> <p>Exception: 1. Systems with a minimum sensible recovery efficiency (SRE) of 75 percent at 32°F (0°C), determined in accordance with HVI Publication 920 at an airflow greater than or equal to the design airflow.</p>	Agreed. This limited change can be implemented.	Language updated
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