

**IECC/DGC Energy Committee Supplemental Hearing #6  
 June 7, 2022**

**1. Attendees:**

<b>Name of CCD Committee Member</b>	<b>Organization</b>	<b>In Attendance?</b>
Carol Pafford	City and County of Denver (CCD)	
Christy Collins	City and County of Denver (CCD)	X
Chuck Bartel	CCD	X
Allen Yanong	CCD	X
Courtney Anderson	CCD	X
Eric Browning	CCD	X
Antonio Navarra	CCD	X
Tom Gleason	CCD	X
Robert Pruett	CCD	X
Mike Fulton	Western Mechanical Solutions	
Robby Schwarz	BUILDTank Inc.	X
Bill Rectanus	Thrive Home Builders	
John Burns	StanTec	
Jeff Slaugh	Energy Logic	
Nathan Kahre	Energy Logic	
Kevin Eronymous	SAR Architects	
Linda Morrison	Mead Hunt	
John Arent	Noresco	
Elizabeth Gillmor	Energetics	X
Aaron Esselink	Xcel Energy	X
Mark Rodriguez	Sun Run	X
Mark Jelinske	RMH Group	X
Alex Martin	SAR Architects	
Nathan Skrdla	Brookfield Properties Development	

2. Meeting purpose: Not going to be able to discuss all proposals in hearing agendas – having supplemental discussions to vet proposals for advancement. Want to be transparent, recording meetings and posting minutes so members of the public can know what we’re talking about.

3. Discussion and voting on IECC/DGC Energy
  - a. **Residential**
    - [#P45](#) - R402.4.1.2 Testing air leakage
    - [#P24.4](#) - R402.2.9 - Basement walls
    - [#17](#) - R402.2.10 - Crawl Walls
  - b. **Commercial**
    - [#5](#) – Allowable Fan Power
    - [#39](#) - C405.3.2 - LPDs IECC and DGC
    - [#74.2](#) – Congregate Roof Penetrations
    - [#62](#) - Air Barrier Testing
    - [#4b](#) - DGC Battery Storage

#### [#45](#) - R402.4.1.2 Testing Air Leakage: Robby Schwarz (BuildTank/Noresco)

- a. Proposal overview: This proposal is with regards to air leakage testing. The building and dwelling unit shall be tested not to exceed 3 air changes and .16 CFM per square foot. Reference standard is ANSI ResNet 380 standard. That standard it talks about exactly what you need to do during the test, so further explanation of testing really isn't needed. There are exceptions for heated and detached garages. Even if it is heated and attached, it's outside of the building envelope, so outside of what is being governed by the Energy Code and the three air changes requirements, so that that has been amended as well, and then the other exception is for the attached dwelling units for townhouses, duplexes and apartments that are three stories or less.

#### Discussion:

- a. Courtney checked for consensus – any opposition to moving this proposal forward?
  - i. No opposition from the group

#### Action Items:

- a. Robby/Noresco move proposal forward

#### [#P24.4](#) - R402.2.9 - Basement Walls: Robby Schwarz (BuildTank/Noresco)

- a. Proposal overview: insulation requirement for basement walls. Table for the requirement for the R value of that table should be pointing to a broader range of insulation that can be chosen and demonstrated to demonstrate compliance, so this language was added. It shall be insulated in accordance with that table or the installed R value in accordance with the compliance path. If you're using the uh trade off path or the building performance path, or the Energy Rating index pathway, you might be using a different R value, but you still need to be ensured that the R value that has been demonstrated to comply has been installed properly. The next section discusses how you insulate an unconditioned basement, and that's the exception for unconditioned basements, which should be insulated according to that table, and then there's a new R402.2.7 section, which is with regards to how you insulate floor assemblies that are separating conditioned space from unconditioned space. Also ensures, that insulation is covering the foundation from an essence, the sill plate down to the foundation floor or footing, or 10 feet or, whichever is less.

## Discussion

- a. Antonio: Add table R402.1.2 to proposal to address rim joist insulation and for clarification
  - i. Robby: It would be fine to say R402.1.3 or R402.1.2. R402.1.2 table should be added should be added (Courtney made addition to proposal)
- b. Courtney checked to see if everyone was supportive of moving proposal forward
  - i. No opposition to moving proposal forward

## Action Items:

- a. Robby/Noresco move proposal forward

## #17 - R402.2.10 - Crawl Walls – Robby Schwarz (BuildTank/Noresco)

- a. Proposal overview: similar to basement walls but talking about vented or conditioned crawl space. R402.2.10.1 was made consistent with the basement walls proposal with the idea of being able to insulate on the inside or the exterior of the foundation wall and making it clear that the earth in either vented or unvented crawlspaces needs to have a class one vapor retarder on it, which in the past was only a requirement for unvented crawl spaces. There's a substantial amount of moisture moving through that dirt and should be covered regardless of if it's vented or unvented.

## Discussion:

- a. Antonio: If it's not conditioned, we'll be addressing all the registers and the access to the crawl space and we're going to find that language in the air barrier and insulation requirements table
  - i. Robby: rim joists are addressed in that table (going back to your last question). Crawl spaces are addressed in HVAC boots, but I don't think you need to reference it here because the Air sealing and insulation installation table is a mandatory requirement in and of itself. U value table is an option – they can insulate to that U value table or use a different compliance option.
- b. Allen: minor edit to language (completed by Courtney). What is the reasoning for removing horizontal insulation?
  - i. Robby: horizontal insulation installation most commonly used on the exterior of the foundation for shallow frost foundation design and protection. It's not disallowed by this – you can optionally go out to the exterior. However, it's not really cost-effective and has a small effect on performance
  - ii. Eric: it makes things more challenging from the install perspective, and if we're not seeing value, then I'm fine with leaving it out
- b. Courtney: check for consensus on moving forward – any opposition?
  - i. No opposition from the group on moving the proposal forward

## Action Items:

- a. Robby/Noresco move proposal forward

## #5 – Allowable Fan Power: John Arent (Noresco)

- a. Proposal overview: intent to tighten up fan power requirements for a/c systems and expand scope to cover greater range of systems. Some clean-up done to the exceptions with regards to larger buildings and systems, so John relaxed proposed requirements to fan system brake horsepower for systems with greater than 10,000 CFM, so I've relaxed it back to 0.0013 times the CFM plus the allowance, the added allowance for special features, so that that restores it back to the current 2021 IECC value– approx. 15% reduction in fan power allowance. Restored

name plate horse plate allowance for the VAV systems – either meet name plate motor horsepower requirements or the brake horsepower requirements

## Discussion

- a. Chuck: concerned about the all or nothing language around duct work replacement in exception #3. How to accommodate small/partial changes to duct work without creating a loophole
  - i. John: Maybe there can be language allowing certain branch duct work to be changed as long as it only serves some percentage of the system?
- b. Elizabeth: I don't think this proposal is too onerous, but this would be a mandatory requirement, so we have to update C406 and C407, update ComCheck and could impact Xcel rebate applicability by making this mandatory rather than an option
  - i. John: the intent of this is to move toward good design practices and not necessarily require new systems or technologies
- c. Mark J: I think this pushes designers to meet this. I'm curious about the enforceability of this. This proposal is not onerous, but it's challenging. This is indeed where it gets tough on a large building with larger air handler requirement. Concept is great, let's make sure it's enforceable. Also, the table (C403.8.1(1) is a little clunky and could be more readable
- d. John: I've relaxed the requirements the allowance for fan power for the smaller below 10,000 CFM, so less than 2000 and between 2000 and 10,000. And you know, given where the industry is moving towards, you know this at least historically. Looking back 100 years, the variable speed drives are much more common on small systems down to 5 tons and you know want to make sure that those systems are addressed as well. As far as enforceability, for existing buildings we want to make sure requirements aren't too onerous and impose requirements for partial duct work replacement
- e. Mark J: a path to address existing buildings is within the IEBC and the IRC, chapter 5 of the international energy code is a good place to address many of the topics we've been talking about. I would point out that in the IEBC as an example, they use that in order to determine what has to be sprinklered in a certain level of alteration, so we can do the same thing for energy.
  - i. Chuck: agree with Mark – that table C403.8.1(1) is a little clunky need to better distinguish 3 different levels that correspond to the variable volume column. We need to find a different wording than “not supported” and then in the next row that less than 2000, greater than 2000, less than 10,000. Somehow, we need to better distinguish that as three different levels that correspond to the variable volume column. Lastly, in the fan power the table I think we can make that option one or option two for the existing building alterations.
  - ii. John: I think we can adjust that for replacement of existing equipment can satisfy fan power using option one or two in table C403.8.1(2)
- f. Mark J: I like the idea of pushing the base code to require a higher level of fan power efficiency and then updating C406 to add a credit for beating this minimum. Chuck: want to hear this in the full committee and have additional mechanical engineers weigh in and review
- g. Elizabeth: if you put this in C406 instead of making this mandatory, Xcel can rebate improvements
- h. Eric: if it's a matter of getting the credit or not, I'd be in favor of shifting it over to C406
- i. Courtney: it seems like the group is mostly supportive of moving this into C406 for credit rather than adding this as a requirement to the base code. Is that correct? John can you update this proposal to share with our C406 working group next Tuesday?

- j. Chuck: is ComCheck going to be updated to count credits per Denver's requirements? If this is a credit would ComCheck be updated to verify compliance with this section?
  - i. Elizabeth: right now, when we use 2019 Denver Building Code in ComCheck we choose the efficiency packages like 30% better lighting or enhanced envelope or whatever it does change the baseline and it does automatically confirms compliance with those items, so ComCheck would need to be updated to include each of these C406 credits. It should make review for CPD straightforward and automatic
- k. Courtney: check to confirm group is supportive of shifting this proposal to be a C406 credit rather than a requirement in the base code.
  - i. No opposition for shifting this proposal to C406.

**Action Items:**

- a. John/Noresco move this proposal into C406 as a credit option rather than a requirement and make revisions to bring this proposal to C406 working group next week

**#39 - C405.3.2 - LPDs IECC and DGC: John Arent (Noresco)**

- a. Proposal overview: previously we recommended lowering the lighting power allowances as part of the base code by and it varied by space type, but it was about 10% to align with ASHRAE 189.1 and there was a slight adjustment to the Green Code to make sure that the requirements based on that adjusted lighting power were not too stringent. The feedback we got from the last meeting was that there was a preference to keep this in in the energy credits rather than as a requirement. So where whereas before we had a couple long tables with lighting power density or allowance requirements by space type, those are no longer applicable. Basically, this would become part of the C406 lighting credits. Currently, there's a minimum 10% threshold or reduction below the lighting power allowances to receive any credits at all for the energy credits for reduced lighting power. I lowered that threshold, to increase the stringency or minimum floor at which you can receive energy credit points for lighting to from 10% below code to 15% below code.
- b. John: recommended change: HVAC systems have equipment life of 15-20 years, envelope components are much longer than that – at least 30 years, so you can put additional constraints to limit the amount of credits that could be earned through lighting. Focus should be more on building envelope than lighting.
- c. Courtney: we don't want buildings to get 90% of their credits from lighting versus efficiency or electrification measures
  - i. John: there could be a cap on credit points on this particular measure or cap on total credits received on lighting
- d. Elizabeth: I think this is the only C406 option that scales linearly – is there a reason we're doing that for lighting but not everything else? If we're going to have things linearly scale in one category, we should do that in other categories. I would lean more towards having 2-3 thresholds.
  - i. John: I'm not sure – I would have to look at the credits to be sure
- b. Courtney: I agree with Elizabeth. Changing this to a tiered structure makes things simpler.
- e. Chuck: for high efficiency cooling and heating, I thought we had proposals with a linear point structure?
  - i. John: we do have that proposal as a scaling option
- f. Elizabeth: as soon as you start to get more into the scaling-type things, you're probably going to go into the performance path. I lean towards keeping C406 simple and visual. Easier to bid and plan with straightforward point values

- g. Courtney: does everyone agree with moving this into C406 and having as a tiered structure?
- i. Group was supportive
- h. Mark J: one of the points of C406 is trying to disincentivize non-all-electric buildings, so maybe it's a good thing that a simple check box gets you 80-90% of your credits if you're all-electric. Let's make it easy

Action Items:

- a. John/Noresco move this proposal into C406 with a tiered structure and make revisions to bring this proposal to C406 working group next week

## #74.2 – Congregate Roof Penetrations: John Arent (Noresco)

- a. Proposal overview: clarified what is being changed in appendix CB. Exception for buildings with a system with existing capacity, that is it greater 1 Watt per square foot or roof area of roof area or five kilowatts DC. That would exempt having a new solar zone and there was an increase in the solar ready zone area from 40% to 60% to accommodate a lot of the PV requirements for buildings that could host these PV systems. Also, exception for buildings 6 or more stories above grade.

Discussion

- a. Mark R: What happens if the builder includes a solar system when they build the house? Does the builder still need to include a solar ready zone? There's an exception listed for an existing on-site renewable system, but I think that exception should be listed under 405.13. I just want to make sure it's in the right position – no questions with the language or intent.
  - i. John: if they're installing a system that meets the requirements of the code, that should exempt the solar access area
- b. Elizabeth: it's confusing that we have exceptions that seemingly apply to both but are in different sections. Maybe we put them all here in section CB rather than having some in 405.13. Also confused about language for exception #1 – is that intended to read as all buildings 6 or more stories above grade, or non-residential buildings?
  - i. John: basically buildings 6 or more stories above grade would be exempted (Courtney made edit to the proposal)
- c. Courtney: can we move exceptions to the top of the proposal, like Mark was mentioning?
  - i. Elizabeth: there's two requirements 1) access 2) the solar ready zone. Do you want the same exceptions for both? Do you still want solar access for buildings that can hit 60% solar access and do you buildings to just do the best they can – is it all or nothing?
- d. Mark R: if you can't fit the whole system, what do you do? And is there an off-site option or consideration?
  - i. Elizabeth: this is based on just physical roof area, so off-site shouldn't be applicable. I think you still want a solar-ready zone, even if that building can't hit 60%.
- e. Mark J: do we want to exclude certain architectural features or considerations (e.g., rooftop units, pitched or sloped roofs, etc.) We ought to not exclude so much if we're really trying to encourage solar ready zones
- f. Elizabeth: want language to clarify that it's not an all or nothing exception – want folks to do the best they can even if they can't do 60%
- g. Mark R: Moving the exceptions from CB103 to 405.13 doesn't really change anything from access. What you're talking about is the #4 exception has to stay. And if it's here, you don't get the solar ready zone because you've made that exception already. So, I think #4 needs to be moved under CB 103.3. If you want something to get a minimum percentage, it has to be an exception to CB 103.3 and then that gives you an opportunity to put some type of percentage

clause in there to say maybe where the building licensed design professional certifies that the solar zone can only meet 20% of the roof area, are you excepted?

- i. Elizabeth and Anthony support this idea
- h. John: design professional can quantify the solar zones on their building plans
- i. Mark J: require 40% (or whatever the number is) to require 40% of the roof area except whatever the number is with these exclusions, in other words, rooftop units.
- j. Chuck: Just mentioning the plumbing vent termination. The 2021 IPC has been updated to allow plumbing vents to be covered by a solar panel in section 903.1.3, so I don't know how that affects the plumbing vents that are prohibited here, but would be allowed by the IPC to be covered with a solar panel
- k. Courtney: Thank you all for your time. I understand it's 1:00. Sounds like we're on agreement with moving this forward. And John can look at this language and make sure we're aligning with the plumbing code.

#### Action Items:

- a. John/Noresco review proposal language and make sure we're aligning with the plumbing code and incorporate stakeholder feedback before moving proposal forward
- b. Stakeholders can email John with feedback on the proposals we didn't get to today ([62](#) and [4b](#)).