

Residential Working Group - Energy Modeling, Prescriptive Path, and Renewables
Meeting #1
May 19th, 2022
3 p.m. – 4 p.m.

Introductions:

1. CPD: Antonio Navarra, Robert Pruett, Mike Walton, Christy Collins
2. CASR: Katrina Managan, Courtney Anderson, Tom Gleason
3. Attendees: Sean Denniston (NBI), Robby Schwarz (BuildTank/Noresco), John Dutch (Koebel Co.), Bill Rectanus (Thrive), Jonathan Fertig (Davis Partnership Architect), Shawn LeMons (Mitsubishi Electric Trane), Rob Buchanan (Xcel), Mark Rodriguez (SunRun)

Review of Denver’s Goals and Related Policies: these proposals get us from above our emissions goals to nearly on target – high impact proposals with opportunity to get us on the path to net zero energy while also being feasible and workable for Denver

Review Proposals:

1. [#67](#) IECC R404.4 - Minimum Renewable Energy System
 - a. Proponent: Denver
 - b. Summary: Summary: minimum requirement for about 20% of annual energy consumption for onsite renewables. Exceptions (must meet at least 2 of 3) for all electric buildings, buildings that achieve 17 energy efficiency credits from R408 table, or buildings with off-site renewable energy system(s) with dedicated capacity for the customer
2. [#47](#) R408 Additional Efficiency Options
 - a. Proponent: Denver
 - b. Summary: New all-electric properties where no less than 75% of the space and water heating loads are served by equipment with a rated COP greater than 1.0 shall achieve a total of 3 credits from Table R408.1. All other buildings shall achieve a total of 18 credits from Table R408.1. Credit calculations shall be as specified in relevant subsections of

Section R408

3. [#31](#) R406 Energy Rating Index Compliance
 - a. Proponent: Robby Schwarz (BuildTank/Noresco)
 - b. Summary: makes energy rating index compliance pathway more usable in a few ways. The first thing striking additional energy efficiency approach in R401.2.5 because the energy rating index threshold score that's required for new buildings is low enough to already take into account the efficiency that would be gained by the additional efficiency packages. The second thing is an updated table in R406. In R406 this proposal aligns the Energy Rating Index score directly with the ANSI RESNET 301 standard. Lastly, ERI score needs to be less than or equal to 50 when compared to the ERI reference design.

Summary of Topics Discussed:

- c. [#67](#) IECC R404.4 - Minimum Renewable Energy System
 - Managing off-site solar subscriptions
 - Applicability to all buildings
- d. [#47](#) R408 Additional Efficiency Options
 - Discussion about point values incentivizing electrification and consideration of potential unintended consequences of point values like partial electrification being more attractive, or the use of highly efficient gas systems
 - How to encourage greater efficiency through a better building envelope in addition to incentivizing electrification.
- e. [#31](#) R406 Energy Rating Index Compliance
 - Improving existing ERI compliance pathway
 - Passive House certification as an alternative compliance pathway

Detailed Notes:

1. [#47](#) R408 Additional Efficiency Options
 - Rob: Seems to be a discrepancy between 408.1 and 408.2 text and the table. Table says 408.4.1 says less than 3 ACH50 the text says less than 2. The same for 408.4.2
 - Sean D: Will need to double check values, verify, and update the draft.
 - Katrina: if you do all electric should you not have to do any additional credits, should we recalibrate the points for electric space and water heat, or is the proposal okay as is?

- Shawn LeMons: It's hard to say whether or not those points are beneficial or not. If it's just a matter of, if you go all electric, you end up with more points. You're going to be forced to do more points. Does seem counterintuitive.
 - Katrina: I think that came from the fact that the credits align with the energy savings. I think it's kind of a strategic question if a building is all electric should perhaps, they should not have to get any additional credits. Currently it has three additional credits still required. This amendment is a shift from picking efficiency packages to having to get a certain number of credits.
 - Sean D: the three credits roughly align with the value of the packages that are in 2021. Unless we want to allow all electric buildings to be less efficient than the model code that we're using, then we need to require at least three credits from them having the 15 credits for each of the partial electrification options.
- Robby: Would it make sense that the all-electric house that needs 3 credits if you take away the possibility of choosing electric credits? If you're already installing a heat pump, why should you get credit for that? You're wanting to do some efficiency measures beyond the electricity, if they've already chosen to do an all-electric home. I think anything that deals with electrification should be off the table for those houses and you want to encourage them to be more airtight or have a better envelope or something like that so that the you're getting the real benefit of the electrification.
- Mike: R401.2.5 – still using language that refers to packages instead of credit table below – just a matter of cleanup. Would 23% below ERI be double-dipping and disincentivize ERI as path forward?
 - Sean D: Meant to keep ERI path calibrated to prescriptive and modeling path. If R406 proposal passes, then it would wipe out what R408 does to R406. We don't want to adopt credits proposal and let paths get out of sync, but R406 does more than just calibrates ERI approach, it actually improves ERI approach. If they're both approved what we see in R408 would get replaced by the proposal that changes that language for R406.
- Shawn L: Just because you go all electric, does it mean that you have an efficient house or are you just paying for more? If you choose an entry level heat pump, for example, a 16 SEER HSPF9 heat pump versus something that is 10, 20 or 30% more efficient than that, is there recognition for that more efficient choice or are you just paying for a

higher utility bill that is powered by more efficient utility grid down the road? Is there a recognition in those tiers?

- Sean D: I think I understand what you're asking to go through the all-electric credit requirement. Since it's requiring a COP of over 1 for both space and water heating that means that they would have to be heat pumps, but they can be code compliant heat pumps. In the table, we see that there are credit options for above code heat pumps, which is I think what most people probably will get above code heat pumps because most of the heat pumps above code right now can get buyers a credit for having their above code heat pumps. I would imagine that most all-electric buildings would comply with this section with an above code heat pump for either space or water heating or both instead of just a code compliant heat pump.
- Robby: My concern is you're relying on the base energy code thermal envelope requirements for an all-electric house, but for full benefit of going all-electric, I think you need to have an exceptional thermal envelope.
- Shawn L: I support what Robby is saying. Building is long-term choice. Heat pump is mid-term choice. Allow for a market solution that is entry level but significantly better than what we're dealing with today

2. [#67](#) IECC R404.4 - Minimum Renewable Energy System

- Bill: how does exception #3 work from a new construction perspective? How does builder control homeowner behavior or program choices?
 - Sean D: quantity is meant to account for issue of time. If you buy offsite, you should buy full-production life of what the onsite system would be worth in terms of production. It's a five-year contract four times over to represent a 20-year service life of an on-site renewable energy system. It gets challenging.
 - Note - Katrina: we need to discuss this in a future meeting. How to figure this exception out to know if it's workable and/or how to make it workable.
- Mike Walton: This applies to all buildings - that's not limited to dwellings, so does this does this get applied to garages and sheds and other structures? Does that need to be thought through?
 - Courtney: That is something we will definitely put on our list to review and hopefully bring back a modified version of to discussion later.

- Mark: for including solar from a new construction perspective, if it's not in the code or a mandate, then what are you giving incentives for builders to include it? I think the 5% is your carrot.

3. [#31](#) R406 Energy Rating Index Compliance

- Katrina: code already has an ERI pathway, this proposal just makes it more usable
- Robby: EUI doesn't work well with residential buildings. We need to be able to quantify the efficiency for residential buildings and the ERI score does that and the ERI score takes into account mechanicals as well as the thermal envelope. Setting score at 50 ensures you're doing well with your thermal envelope and mechanical system
- Mike Walton: I still have a question about striking the building thermal envelope, backstop. I know the renewables are limited in terms of the impact the 5%, but what level can mechanical equipment affect an ERI score? Could you get to a place where the thermal envelope is less than ideal because you've put in the 5% for the renewables and done such an outstanding job with your mechanical equipment? What's the harm of leaving that in there?
 - Robby: lessens flexibility for builder to determine specifications for how they want to build their house. In essence, it's regulating mechanical efficiency as well as building thermal envelope efficiency and setting the score at 50 ensures the envelope is not going to be a poor building thermal envelope.
- Jonathan: Could passive house certification as a compliance method?
 - Sean D: The code official can approve above code programs to be used as code compliance, but then that is something that is up to the discretion of the code official as opposed to these compliance paths. Also it's not an ANSI standard, so enforcing it can be a little bit challenging for some building officials.
 - Robby: passive house not in alignment with certificate of occupancy – CO issued before house has demonstrated/achieved passive house certification
- Shawn L: Couldn't the city apply a fairly easy one-pager to verify a passive house project?
 - Robby: It's already there – the building team could choose the easiest compliance pathway which would be the prescriptive pathway.

4. **Next steps/upcoming meeting topics:**

- a. June 2nd - Minimum Renewable Energy System & Additional Efficiency Options

- b. June 16th – Energy Rating Index
- c. June 30th – Finalize Proposals and Additional Discussion (as needed)

Meeting adjourned