

Residential Working Group - Energy Modeling, Prescriptive Path, and Renewables
Meeting #2
June 2, 2022
3 p.m. – 4 p.m.

Introductions:

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

Review Updated Proposals:

1. [#67](#) IECC R404.4 - Minimum Renewable Energy System
 - a. Updates Made: removed offsite renewables and added option to get more energy efficiency credit from section R408 which gives mixed fuel projects to make it through. An all-electric building automatically complies.
 - b. Summary of Proposal: Summary: minimum requirement for about 20% of annual energy consumption for onsite renewables. Exceptions (must meet at least 2) 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. Updates Made: all-electric has been integrated into this section. Credits have been modulated to help encourage all-electric over partial electrification – would require more efficiency than all-electric. Homes would need to end up doing either partial electrification or some renewables.
 - 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

Summary of Topics Discussed:

- c. [#67](#) IECC R404.4 - Minimum Renewable Energy System
 - Definition of all-electric
 - Emergency back-up generators and small gas appliances/uses

- Exceptions for tiny homes and ADUs
 - Additional experts to engage
- d. [#47](#) R408 Additional Efficiency Options
- Definition of all-electric
 - Clarifying language around HRVs
 - The value of higher efficiency buildings rather than higher efficiency equipment

Detailed Notes:

1. [#67](#) IECC R404.4 - Minimum Renewable Energy System

- Mike Walton: Aren't we requiring 18 credits just to follow the prescriptive IECC path compliance?
 - Sean D: There are 17 credits required in addition to the 18 credits for IECC prescriptive compliance
- Jonathan: What is definition of all-electric property? Also wondering about emergency generators – there's no provision in the commercial code for emergency generators
 - Sean D: All-electric property has no natural gas or combustion equipment. The discussion that had been had previously with the committee was to not handle issues of emergency generation in the definition, but to do it in the requirements. It's emergency power backup power that's being clearly defined and we can do that outside of the definition. This does highlight a good point that there's been so much churn on these proposals that we need to make sure that it persists, particularly in commercial.
- Bill: Does all-electric include cooking and fireplaces? This would be different from Xcel's definition which allows for gas cooking and fireplaces. I would advocate for alignment with Xcel's definition.
 - Sean D: Current definition of all-electric includes cooking and fireplaces.
- Katrina: The other thing I have in our notes, in the minimum renewables proposal is that we have a discussion in our last meeting specifying the requirement is not for all buildings on the site. So garages and sheds wouldn't have to meet this requirement, but we had the question: should we allow garages and sheds to contain PV that would contribute to the requirement? I assume the group would think, yeah, why not let a garage or shed have solar on it. That was another question we had as we started

drafting based on your last comment.

- Mark: Wouldn't a garage already be exempt since they're not conditioned floor area, and if they are conditioned floor or should they be part of the calculation?
 - Sean D: That's how it's structured right now. If you have unconditioned, either auxiliary buildings or area in your home for whatever reason, that wouldn't be included in the calculation. And then with the definition of on-site renewable energy system that lets you put your renewable energy anywhere. You can put it on the roof of your home, you can put it on a detached garage you can put it in a installation art piece in your front yard wherever you want.
- Mark: I know in California we have accessory dwelling units the state removed the requirement for renewables on accessory dwelling units only because we have a housing crisis and that increases the cost of housing. That'd be the only other consideration I can think of in this language.
- Sean D: Something that we're seeing in some other codes is dwelling units that are under a certain size are exempt from certain requirements to exempt both ADUs and tiny houses. Is that something that the group thinks should be utilized in minimum renewables? And if so, what's that threshold?
 - Mark: Yeah, I can look it up for California real quick. I think it was 500 square feet.
- Jonathan: One thing I was wondering was whether there was room in the air leakage points to establish another level where if you hit Passive House levels of airtightness, which would be .6 that's another four points or something to sort of acknowledge that at that point you're starting to get into really good buildings and I think we should be doing everything we can to encourage continuous insulation. It's kind of insane not to be building new construction right now without continuous insulation. Also I'm a big fan of ERV's.
 - Bill: I would say as far as continuous insulation, one thing to consider from a builder's perspective is that it's a significant change and a lot of detailing when you start adding continuous insulation. And the construction defect risk for litigation out there is so extreme in the state of Colorado. Personally, I will be

trying to meet the energy code every way I can without going to continuous insulation to limit my risk based on those detail changes that are going to have to happen. I would be a huge advocate of continuing those additional options as opposed to really pushing towards continuous installation too quickly.

- Bill: As far as building permit process, how this is going to be this requirement going to be tracked? Typically, we're not including the solar and our energy calculations or in our one lines and those are added later with a separate permit by the solar installer. How do we marry those two to make sure that we'd be in compliance down the road procedurally?
 - Mike: I think that that is something the city still has yet to work out the same with mechanical, electrical, plumbing. They're all separate, they're permitted separately. So that process will have to be refined within the city.
- Katrina: anything other feedback?
 - Mike: I think it would make sense to get some of the Mechanical Engineers with the city and on this as well – Keith Fox or Chuck Bartel.
 - Bill: From my perspective, it'd be great to have another builder or two look at this from their perspective.
 - Robby: seems like we could reach out to John Dutch or other builders on this committee.
- Sean: The only thing that I will note is that we probably need a little bit better integration on our 406 and the minimum renewables. They work right now, but making it more explicit to improve usability I think will be something that we need to include in the next draft.

2. [#47](#) R408 Additional Efficiency Options

- Jonathan: Definition question – would this forbid a wood fireplace in addition to forbidding a gas fireplace?
 - Mike: No wood burning fireplaces allowed due to air quality impacts
- Rob: want to talk about 408.9.1 and 408.9.2. ERV might be more efficient option in an arid climate than an HRV. Xcel team looking into this. Don't want to limit ourselves technology wish
 - Sean D: an ERV is technically an HRV as well. ERV is marginal additional energy

savings for more than marginal additional cost. We could certainly be more clear with the text and just in case people don't know that ERVs in Denver do save more energy than HRV's, however, once you begin to take into account construction costs, the cost effectiveness on an ERV versus an HRV, the balance really shifts. That's why the requirement here was for an HRV. We wanted to make it as cost effective as possible, but we could clarify the language to say heat or energy recovery just in case people don't realize that that an ERV is an HRV as well.

- Shawn L: I would support that clarifying language because there's a lot of building professionals that still are unclear of the difference for the benefits.
- Shawn L: Are you requiring duplicate testing or quality installation details that are now becoming more prevalent in new construction, but not a guarantee if they're not doing, say, a HERS rating or Energy Star?
 - Robby: Quality installation of insulation was not added in the 2021 code more than just the requirements of the air sealing insulation, installation table.
- Shawn L: And is this is this a total duct leakage or a leakage to outside test?
 - Robby: Yes, the base code is total leakage. Duct leakage outside is only used in the R-405 performance path and ERI path against
- Sean D: The restrictions for all electric buildings where they can't use above code efficiency equipment to get credits. Is that a good limitation to force those buildings to get efficiency elsewhere or does that raise red flags for anyone or even yellow flags?
 - Shawn L: The building is going to be there longer than the equipment and it's generally always almost always makes sense to make the building better than it does to require better equipment. I would certainly encourage a better building shell over trying to push higher efficiency equipment.
- Katrina: Bill, if you did electric space, heat and electric water heat, and then you'd have to get those extra 3 + 17 efficiency credits, unless you put renewables on like, does that look doable?
 - Bill: I'm generally ok with the 20% renewables number. I'm adding up points in my head to try and figure out how I get to 35 points most effectively. This 5% reduction in UA or 10% reduction in UA above 2021, what does that include?

That seems like a pretty big leap, but I'd have to look to someone like Robby that has more rating expertise than I do.

- Robby: With the modeling that I've done in the past with your homes your current package is already close to or at that 5% better.
- Rob: We're talking about with respect to the 21 UA right? I think next week I could probably let you know exactly where. I think I'm of a mind with Robbie that just knowing how your wall assemblies typically look, it's going to be pretty darn good, even with respect to 21. I can try to look up exactly what kind of percent reduction UA relative to 21 we're seeing right now. It might take me a couple days to get that rustled up.
- Katrina: Anything else you want to add or think about Bill?
 - Bill: I haven't spent much time looking at it, but it seems like a heavy lift to get to 35.
- Shawn L: Just systems that will do the job to and moving past those to systems that do the better job and are better for us in terms of health and longevity etcetera and exterior insulation and ERV's are two of those important items to think about.
 - Katrina: Is there something you might propose that would give more points for those? Or how would you see solving that?
 - Sean D: You could always link the HRV requirement to choosing a continuous insulation option out of for complying with the base code since you know there are different ways to meet the wall insulation requirements in the base code, you could say if you want this option you have to have a wall assembly that includes this minimum amount of continuous insulation to manage the dew point.

3. Next steps/upcoming meeting topics:

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

Meeting adjourned