

Commercial Energy Modeling Working Group

Meeting #1

May 11th, 2022

11 a.m. – 12 p.m.

Introductions:

1. CPD: Chuck Bartel, Antonio Navarra
2. CASR: Katrina Managan, Courtney Anderson, Tom Gleason
3. Attendees: Sue Reilly (Group14), Taylor Roberts (Group14) Elizabeth Gillmor (Energetics), Sean Denniston (NBI), Michael Deru (NREL), Mohit Mehta (ME Engineers), Linda Morrison (Ambient Energy)

Review of Denver's Goals and Related Policies :

1. NZE Implementation Plan
2. Energize Denver
 - a. Ensure targets for new buildings are at least as stringent as requirements for existing buildings, across all different building types.

Review and Discuss Proposals: [#18](#): IECC C407.1 – Limit Modeling to Appendix G

1. Proposal Overview (Sean): proposal tells you how to use appendix G and how to calibrate appendix.
 - a. Impact of process loads becomes a concern, so added a way to calculate without process loads. Add site energy metric to the modeling path. Creates Site Energy BPF specific to Denver.
2. Summary of topics discussed:
 - a. Modifications to Appendix G
 - PV minimums
 - Treatment of process loads
 - How does Appendix G work for high energy use buildings with high unregulated loads?
 - Review unregulated loads, the DTA, and assumptions being applied and parity between different occupancy types and groups of buildings
 - How to make appendix G more clear/understandable for developers and building teams
 - b. pEUI

- Development of targets – need to be clear how those targets were selected/arrived at
 - Defining EUI targets across all building types and occupancy types is key
 - Guardrails for predictive modeling. Could use comnet or something similar to Boulder to direct the review teams how to review it. CPD doesn't have modelers on staff. Regulate the models or the modelers
 - All the same inputs have to happen from a modeling standpoint as in comparative models. Need rules on what schedules have to be included, etc (actuals or standard schedules, more standard modeling, but less true to real life)
 - Narrow to a few building types – multifamily, office, hotel
 - Appendix G is the catch-all. Narrow procedures for that also
- c. C407
- Potential for loopholes and/or updates needed
 - Energy cost savings required by C407 vs C406
 - Options for design teams
 - Do we achieve our goal of making sure new buildings actually perform at the levels required under Energize Denver and on a path to net zero energy with more options?
- d. Other topics
- Framework that looks at time value of carbon is even more important than EUI. Might be beyond scope of this code cycle, but is a helpful and worthwhile goal. Key to how we operate buildings
- e. Next steps/upcoming meeting topics:
- 5/25 Focus on pEUI (brief discussion on Appendix G at the end)
 - 6/8 Appendix G
 - 6/22 Consideration of paths and how it fits in the GBO. Please provide dates for these meetings.

3. Detailed Notes of Discussions/Questions

- a. Modifications to Appendix G
- Taylor Roberts – confused by plug loads statement – asked Sean to clarify.
 - Sean – clarified that it's process loads (e.g. manufacturing) and not plug loads, but plug loads in healthcare deemed as process loads
 - Mohit – are medical offices considered healthcare facilities?
 - Sean – that's up for discussion
 - Linda – do you have to meet both site energy cost and energy cost?
 - Sean – you can meet either
 - Taylor – Does this get rid of the minimum amount of PV right that you could account for? ASHRAE does not have that, so the ICC did. Flexibility is important
 - Sean - It either it raises the minimum or it gets rid of it. I don't

remember where we landed.

- Sean – site energy approach incentivizes electrification quite a bit. In just by moving to site and not creating site baseline, you end up incentivizing electrification even more.
- Chuck – question with the Denver target value being applied to regulated, unregulated loads and regulated loads, how does that apply across high energy use buildings? Does that create parity or equity issues between different occupancy types and groups of buildings? If you have a low energy building that Denver target it's applied to unregulated loads and there's very little that needs to be made up in the regulated loads whereas if you have a high unregulated load building that Denver target gets applied there and you must make up for that unregulated load.
 - Sean - When we compare the determination study EUI versus energized Denver, for those high process load buildings, the actual buildings are performing far better than what we're seeing out of the determination study.

b. pEUI

- Taylor/Elizabeth – nothing that says you have to get pre-approval to use pEUI in Boulder.
- Taylor – developers understand EUI's. The ASHRAE methodology, is definitely robust but is incredibly confusing with all the calculations. Appendix G is a lot more confusing. Not that it's not robust or makes sense, but developers don't understand that where they do understand an EUI.
- Katrina – is there a need to add pEUI or shift to pEUI models?
 - Linda and Mohit agreed
- Mohit – we need to be more open and clear about how targets arise – if you go down the pEUI path everyone needs to be clear how we arrived to those targets
- Chuck – building dept. doesn't review pEUI. Prospective modeling is a lot more intense than comparative modeling. Currently we don't have energy modelers on staff. pEUI is a good idea but seems like a bit lift right now.
- Elizabeth – trust the stamp or certification or require qualification for

modelers. All the inputs, schedules, efficiencies, etc. are the same – shouldn't increase the review time or reporting.

- Taylor - I think a solution too could be like Boulder and even maybe go further is like really narrow the building type. You could really only do multifamily and office, maybe hotel. Even multifamily and office, that's going cover a huge amount of the construction in Denver, but really be narrowed - that's what Boulder does too. Appendix G is the catch all and can be used for every single building type no matter what. Whereas this is really kind of a more focused approach.
- Sean – in pEUI approach you either need to regulate the models or the modelers. As modeling becomes more widespread, that increases the demand, and that creates an incentive for other people to step into the market. From the city standpoint of ensuring that their code is actually being enforced, they would need to look at one of those, or a combination of those two of regulating the models or regulating the modelers. I think that I've laid out the challenges with app EUI approach.
- Katrina – we can define metrics that need to be reported and to make sure it's realistic. So there could be metrics around what the assumptions need to be for plug loads for lighting loads, for schedules. Boulder has an example of how to do that.
- Develop pEUI first, then appendix G, and lastly decide whether or not to keep C407
 - What is needed to queue up to be ready: multifamily, offices, hotels as the targeted building types

c. C407

- Sean: section C407 considered to be flawed in the code development world. No major update since 2009. We've seen divergence between C407 and prescriptive path in ICC. Appendix G has gotten continuous maintenance whereas C407 has not. Advanced jurisdictions have mostly replaced C407 (Seattle, WA State, New York, Boulder). Seattle and Boulder have target-based approach, but our modeling protocols aren't really set up for targets.
- Elizabeth – thinks C407 is a better building path than appendix G. If it's a

prescriptive requirement, it's a baseline. And if I have a deficit relative to prescriptive requirement, I got to make it up somewhere. So just because it doesn't mean it's a mandatory requirement doesn't mean that those savings aren't still happening.

- Sean – C407 will continue to be a loophole.

d. Other topics

- 3 categories of conversations
 1. Do we like proposed modifications for appendix G, site EUI option, treatment of process loads, Denver target adjustments
 2. Site pEUI - what needs to be developed further to have a robust proposal for how that would work in code
 3. Do we want to keep C407 or not?
- Sue – Energize Denver has made us step up and be responsible as energy modelers. Customers are coming back years after project completion asking energy modelers why energy use intensity is above what was originally projected.
- Linda – framework that looks at time value of carbon is even more important than EUI. Might be beyond scope of this code cycle. That is a helpful goal.
 - Sue – I agree Linda. Time value of carbon is so key to how we operate buildings.
 - Linda – it seems like we're all interested in getting there. Time value of carbon might be technically challenging, but worthwhile

e. Next steps/upcoming meeting topics:

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- 6/22 Consideration of paths and how it fits in the GBO. Please provide dates for these meetings.

Meeting adjourned