

Commercial Electrification Working Group

Meeting #4

June 21st, 2022

3 p.m. – 4 p.m.

Introductions:

1. CASR: Katrina Managan, Courtney Anderson,
2. CPD: Antonio Navarra; Joshua Armstrong; Robert Pruet; Danny Boncich
3. Attendees: Sean Denniston (NBI), Jennie Gonzales International Brothers of Electrical Workers, Mark Jelinske (RMH), Matt Joens (Milender White), Erik Johnson (Boulder Housing Owners Rep), Mike Fulton (Western Mechanical Solutions); Darin Ramirez (RIA);

Review Updated Proposal:

1. Overview: New buildings need to lead and be successful for Energize Denver
2. P38 Water Heating electrification
 - a. Fundamental of proposal to align with Energize Denver
 - b. Does not apply to boilers or electric resistance storage water heaters larger than 20 gallons
3. Space Heating Electrification
 - a. Only for new buildings, not new construction. Energize Denver will handle existing buildings.
 - b. Allows for emergency power and standby power systems
 - c. Align with first round of requirements for Energize Denver

Summary of Topics Discussed:

1. Water Heating
 - a. Instantaneous Water Heaters
 - b. Electric Resistance Elements
 - c. Solar Thermal
 - d. Electric resistance comply with C407 is allowed
 - e. High Temperature Water Heater
2. Space Heating
 - a. Low W

Detailed Notes on Partial Space Heating Electrification Proposal:

1. Water Heating
 - a. Instantaneous Water Heaters
 - Size water heater by distance
 - Darin – likes location of water heater but not following 6' rule.
 - Jennie - Any electricity within source of water needs to be GFCI protected.

Anything beyond 6' so not plugging into GFCI.

- Darin - Defeats purpose because you would need reheat
- Jennie – put it out of 6' range, but won't need 6'
- Sean – if beyond 6', it becomes the designers choice to be GFCI. What are the normal distances?
 - Mark J. - The whole point is to minimize recirc lines so obligated to be close to recirc line or water heater. Public lavatory, it's going directly under the lavatory. Break room will also go directly under the cabinet. GFCI better than recirc.
 - 6' is within practicality. Could be 10' to get it away from GFCI range.
 - Darin – 10' Allows flexibility.

- *Conclusion: change to 10'

b. Electric Resistance Elements

- Darin – 1st exception should say integral into heat pump “system”?
 - Sean – We do see them used sometimes, but need to be careful with the language so we're not allowing a little heat pump water heater with a lot of electric resistance.
- Darin - % of annual consumption
 - Sean - Recirculation loop temperature maintenance?
 - Darin – with these % requirements, it's difficult to model.
 - Mike Fulton – used to sell water to water heat pumps, so he bought a meter to track hot water. Shocked that it uses such little water. Modeling gets difficult.

c. Solar Thermal

- 100% with solar, but only 75% with solar thermal?
 - Sean – exception #5 mirrors Energize Denver. Energize Denver doesn't address solar thermal but can discuss if they should be the same number.
 - #5 includes 7, but desire to have solar thermal called out specifically.
 - Jennie agrees

d. Electric resistance comply with C407 is allowed

- Taylor – comment to allow electric resistance to comply with C407 like space heating proposal allows.
- Taylor – to add flexibility. In Boulder – heat pump permit comments had issues with venting into a corridor but were able to go different directions that this proposal also allows.
- Sean – If Site Energy path gets allowed, then it's a free path for electric resistance in any modeled building.
- Sean – if limited to energy cost or pEUI target, that would limit how much electric resistance.
 - Taylor – non typical buildings. But could be a concern with Site Energy. You could then get a Multifamily modeled electric resistance to pass.
- Darin agrees with the exception

- *Conclusion: Buildings that comply with C407 – creates exceptions for those two modeling paths.

e. High Temperature Water Heater

- Mark J. - practical for high temp water. If you do it with a heat pump water heater, resistance heat will do the rest of the work. Practical way would be to have one tank all heat pump heated, and then boost it for minimal amount of water being used for hot water application. Allow for this.
 - Sean - #7 can be re-written as booster tank.
 - Sean – is 180? The right number?
 - Darin – part of issue is with refrigerant itself. R10A doesn't work above 160 degrees.
- *Concludes: Drop to 141 degrees and above

2. Space Heating

a. Boilers

- Darin – Are we just steering people to doing natural gas boilers?_
- Is there a type of system that would be prohibited by this that a central boiler would replace?
 - Darin – Fan power VAVs
- Sean – Do you use those in buildings that follow the prescriptive path?
 - Darin – Yes all the time
- Mark J – Terminal heat using electric resistance is an example. Gas fired hydronic heat at the terminals.
 - Darin – Good thing about people going to boiler system is that when they're redoing it again in 10 years, then electrifying the boiler may be an option.
- Mike – If you're doing a water to water heat pump to replace boiler, COPs aren't going to be efficient. If goal is to get gas out of building, allowing a boiler in is setting up for failure.
 - Katrina – boilers are hard to electrify
 - Mark – it maintains a path for gas, but should push next code cycle. It's doing what you promised at the stakeholder meetings. Tall buildings will go boilers and will have option.
 - Mike – Does this allow you to do electric VAV in prescriptive?
 - Sean - It would allow it as long as terminals are under 5W
- Katrina – is there something you would propose?
 - Darin – If goal is electrification above efficiency, that's one thing. He doesn't know what the outcome is. Doesn't think it's necessarily bad now.

b. Low W

- Mike F – Modeled conventional developer building, but have a heat pump with ERV. Set up for 65 degrees, then only heating up from 65 instead of 55. Getting 2 or 3 COP instead of 1. That's biggest problem with exception 5. If he put a heat pump, he would need to use 10W per SF. Limiting prescriptive paths and picking a winner.

- Darin – Get intent, but too small W for exception
- Mike F – Get you don't want to drive up cost, but require modeling so people understand cost or give EUI target to overcome it? Prescriptive, most buildings go prescriptive? End up with systems that might not be the best.
 - Sean – This would allow all systems you're talking about would need to be modeled.
- Darin – How much of it goes prescriptive path?
 - Danny – Most of tenant finishes are prescriptive. New buildings are modeled. Probably 60% prescriptive on all new construction projects they see.
 - Danny – office buildings 4 stories or less are going prescriptive
- Taylor – Similar to threshold of GBO requirements and Xcel qualifications. If you're above 50k most are going performance
- Katrina – is there a new number for 10W?
 - Mike – 5-9W psf
 - Darin – North of 5W psf. Does that defeat the purpose?
 - Sean - Besides VAV with terminal, are there other system types?
 - All perimeter. Radiant, baseboards. Two pipe fan coils
 - Mark J - 5 w/sf across the full building gross sf is a good number that would allow for meeting perimeter heating loads
- Jennie – because these are new buildings, rules and standards would alleviate some of their stress. What is this doing to the size of service on these buildings?
 - Sean – There are some buildings that might increase service based on their design decisions. Similar to what they have now.
- If you change exception 5, do you need exception 6 anymore?
 - Exception 6 might not be necessary, but helps clarify. Mike – when talking 5 W are we talking at the perimeter or integral to rooftop and perimeter?
 - Sean – It's a whole building budget.
 - Sean – do we want to raise electric resistance from 55-70?
 - Darin – Confusion if 5 W is whole building budget.
- *Conclusion: Clarify if the 5W is whole building budget.
- Mark -
 - 3 additive things for electric resistance
 - Any resistance heat when unit out of capacity (ventilation load problem)
 - Resistance heat integrated into heat pump equipment. There's no limit to that.
 - 5 W sf of resistance heat of conditioned floor area in the building gives for a sufficient heat if ventilation loads are taken care of elsewhere. (Reduce ventilation load) Challenged, but can do it.
 - Darin – a lot of things required to get there.

3. Overall Ratings and Remarks

- a. Mike – 4, but is exception 5 going to drive people to boilers?

- b. Mike F & Darin – Feedback on the working groups: Good group of stakeholders and process

Next Steps & Upcoming Agenda:

- 4. Proposals will be cleaned up and finalized. Final drafts will be shared with committee. Vote will take place at either the July 7th or the July 19th code committee hearing.

Meeting adjourned