

Commercial Electrification Working Group

Meeting #3

June 7, 2022

3 p.m. – 4 p.m.

Introductions:

1. CASR: Katrina Managan, Courtney Anderson,
2. CPD: Chuck Bartel, Antonio Navarra; Joshua Armstrong; Robert Pruet
3. Attendees: Sean Denniston (NBI), Christine Brinker (SWEEP), Mark Jelinske (RMH), Mike Reynolds (Nava Real Estate), Teresa Gray (RJA) Engineering, Erik Johnson (Boulder Housing Owners Rep), Aaron Esselink (Xcel) Libby Coleman (Group 14) Mike Fulton

Review Updated Proposal:

1. P38 Water Heating electrification
 - a. Denver City Council has asked new buildings to lead over existing buildings;
 - b. Align new buildings with Energize Denver requirements
 - c. Fossil fuel and electric resistance storage and instantaneous are prohibited with exceptions
 - d. Exceptions target to align with Energize Denver; Doesn't apply to low-boy water heaters; If you do electric resistance, you have to do on-site renewable energy; end uses that require 180-degree water temperature

Summary of Topics Discussed:

1. Instantaneous Water Heaters
2. Solar Thermal
3. Split Systems
4. Indirect hot water storage system
5. Noise & Venting of Cold Air

Detailed Notes on Partial Space Heating Electrification Proposal:

1. Instantaneous Water Heaters
 - a. Mark J. - if it's an instantaneous water heater, it will have a storage capacity less than 20 gallons. Recommend a kW limit based on minimum water volume be included. Otherwise, you can do large instantaneous water heater with 19 gallons.
 - Sean - 12 kW is standard or 4.5 kW; If we think people would do that, then we can add a requirement
 - Mark – 5 gpm would need 20 kW; (needed for public toilet restroom group) 12-20 kW can be a break room
 - Katrina – we can refine that number
 - b. Mike – Why did we exclude instantaneous?

- Katrina – We want to disincentivize instantaneous, so we don't run up people's electric bills
- Sean – they are part of Energize Denver – If they're installed now, they'll have one cycle before they need to be replaced.
- Mike – for MF Heat Pump water heater or electric resistance with solar on the roof
 - Sean - Central gas boiler too
 - Mike R struggles with balancing and repair. Would encourage owners to stick with tank water heater in each unit
 - Sean – For high rise, hpwh can be vented to exhaust ventilation system. Handle noise and air and get waste heat recovery

2. Solar Thermal

- a. Erik J – How does this interact with solar thermal used for domestic hot water systems? Does exception #3 allow for solar panels doing solar thermal if electric resistance can be the backup?
 - Sean – Would we see these systems in commercial or MF buildings?
 - Erik J– There are some issues, but we live in a climate where solar thermal makes sense.
 - Sean – would there be a reason not to back up solar thermal with a heat pump water heater? Would it be a capital expense?
 - Erik J – Yes. His own house has electric resistance backup with water
 - Sean – X % served by solar thermal system
 - Mark J – If there's solar, you should get credit. Suggest this is intended to be the easy button for mandatory. If you did want to go with solar, push it into modeling path.
 - Mark J - Regarding establishing a threshold of a % of annual service hot water usage - I recommend keeping this path easy and prescriptive. Determining annual water usage will require some level of modeling
 - Sean – Added language and wants to revisit the right threshold.
 - Chuck – exception 3. require minimal amount of PV when you provide solar thermal?
 - Heat pump water heater with solar thermal system is ideal; pretempering the water is great

3. Split Systems

- a. Chuck – a lot of larger systems have remote condenser; Most equipment stops producing hot water at 40 degrees.
- b. How often would split systems?
 - Sean – primarily replacements for boilers; larger capacity systems not addressed here. In the future, some people like a more domestic sized hpwh of split system, but not seeing that wide scale now. He doesn't think it's a big issue because they are meant to serve central systems.
- c. Katrina – Does this make sense
 - Chuck – Seattle is leading the way with hpwh with case studies. Most case studies are split system water heaters that serve 6 units vertically; Put condenser in the garage

- Katrina – We didn't address larger systems because of Energize Denver. But is it going too far to ask more?
 - Chuck – what energy savings are going from larger system to smaller systems. You get a lot of thermal systems of larger systems.
 - *Anything over 20 gallons is excepted?
 - **Sean – we can add clarity
 - d. Libby – agree larger systems shouldn't be required to electrify
 - Way to incentivize to do hybrid water systems, heat pump with natural gas backup
 - Katrina – good for new building incentives
4. Indirect hot water storage system
- a. Add a new exception
 - b. Exception 2 and 3 how do they mix together?
 - They are stand-alone exceptions.
 - Chuck – point of use would fit under #2?
5. Noise & Venting of Cold Air
- a. Sean - MF are manageable through design solutions
 - Can vent to unconditioned space, into HVAC system itself, sometimes outside
 - HPWH come with optional venting kits, they have a lot of options. Once you vent, then you deal with noise and venting at the same time.
 - b. Erik J – Real world experience in Boulder. There are design solutions where instead of plugging into closet, you have to think more about it. Vent kits. If going to unconditioned space, are there issues with fire dampers going through rated assemblies? If there are individual split systems to allow condensers to go in separate locations
 - Mark J – There aren't a lot of split systems out there. Domestic water to outdoors and bringing it back in, which is problematic to our climate. If you don't put condensing unit outdoors, then what are we buying? We would just draw heat out of space. The only way you get credit for domestic water heat pump for C406 is if it doesn't draw from conditioned space.
 - Christine – She hasn't experienced any issues with noise or ventilation. Has both a ASHP and DWHP. The ASHP had to work a little more, but it was a clear win.
 - Katrina – you still gain efficiency. You do even better if you draw from exhaust air for heat recovery.
6. Cost
- a. Multifamily
 - Upfront cost: 9%
 - Operating cost 20% lower
 - b. Commercial
 - c. *Can you share studies with this group? Numbers seem interesting.
 - Christine – cost and performance improved dramatically in last couple of years
7. Overall Ratings and Remarks
- a. 4, 3, 5, 3, 4, 3, 3, 3, 3
 - b. Send comments in writing on space heat by this Friday, so we can send you final versions next week

- Can provide a walk-through review on space heating if requested.
- c. Chuck
 - Guardrails where it's applicable. If we're just going for smaller systems be very clear
 - Supporting information – to gain support, we need to address energy savings and carbon savings; cost parity to other systems; installation and operational cost vs a gas water heater (are those in parity with social cost of carbon?)
 - Katrina – We have shared cost studies and can share in follow-up.

Next Steps & Upcoming Agenda:

8. 6/21 – Finalize both working group commercial partial space and water heating electrification proposals to be voted on in upcoming IECC/DGC Energy Code Committees

Meeting adjourned