Meeting Notes

Posted April 7, 2023

Notes from 2025 Title 24, Part 6 Code Cycle Utility-Sponsored Stakeholder Meeting for:

Multifamily Restructuring (Envelope & HVAC), Compartmentalization & Balanced Ventilation

Meeting Information

Meeting Date: 2/21/2023
Meeting Time: 8:30 am – 12:30 pm
Meeting Host: California Statewide Utility Codes and Standards Team

Meeting Agenda

Time	Topic	Presenter
8:30 AM	Welcome and Meeting Directions	Cosimina Panetti Javier Perez Kelly Cunningham
	Compartmentalization and Balanced Ventilation	
8:50 AM	Indoor Air Quality	Marian Goebes
9:40 AM	**BREAK**	
9:45 AM	Multifamily Restructuring	Elizabeth McCollum
9:50 AM	Additions and Iterations Clean Up	Elizabeth McCollum
	Multifamily Restructuring - Envelope	
10:15 AM	Skylight Properties (Additions and Alterations)	Grant Marr
10:35 AM	Visual Transmittance	Grant Marr
10:50 AM	Slab Perimeter Insulation	Grant Marr
11:10 AM	**BREAK**	
	Multifamily Restructuring - HVAC	
11:20 AM	Verification (HERS/ATT) Clean Up	Lucy Albin
11:45 AM	Central Ventilation Shaft Sealing	Lucy Albin
12:05 PM	**Discussion and Wrap Up**	Lucy Albin
12:30 PM	Meeting Adjourned	Cosimina Panetti

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Meeting Participants (available upon request by emailing info@title24stakeholders.com)

Action Items from Meeting

- The Statewide CASE TEAM followed up on all questions or comments that required a response and were not discussed during the meeting.

Key Points from Meeting

These proposals for Multifamily Restructuring (Envelope and HVAC), Compartmentalization and Balanced Ventilation are important because:

Multifamily Restructuring (Envelope and HVAC)

Multifamily Restructuring streamlines code language and aligns requirements across multifamily buildings regardless of the number of stories.

Compartmentalization and Balanced Ventilation

Compartmentalization and balanced ventilation protects public health by providing a high level of Indoor Air Quality (IAQ) while other Title 24, Part 6 requirements call for homes to be built with improved insulation and lower exterior air leakage.

Because compartmentalization tightens a unit's envelope on all sides—with the exterior, and with adjacent spaces (e.g., corridor, adjacent units, trash chutes, etc.), the measure would save energy by reducing leakage to the exterior, thereby reducing heating and cooling energy. The measure would also provide indoor air quality (IAQ) benefits by reducing pollutant transfer between units and comfort benefits by reducing noise transfer between units. In addition, a mechanical source of supply air for ventilation is important for IAQ as a unit's envelope is tightened to ensure adequate outdoor air.

MEETING NOTES

During the meeting, questions and comments were submitted in three distinct formats which are provided in these meeting notes in these [hyperlinked for quick access] sections:

1. **In-Meeting Questions / Comments:** Questions and comments submitted verbally during the meeting via the 'raise hand' function in GoTo Webinar, where participants were unmuted to speak, or in some cases, comments submitted in writing were discussed verbally during the meeting (in which case the person that commented may not be identified in these notes).
2. **Questions / Comments Submitted Via GoTo Webinar:** See this section for questions and comments submitted in written format via the GoTo Webinar question pane.
3. **Public Input Submitted Via Mentimeter:** This section includes public comments and questions, including screen shots of the polls that were conducted during the meeting, and responses to those polls.

Not all written questions and comments were discussed during the meeting, but all have responses available in these meeting notes.

In-Meeting Questions / Comments

Compartmentalization and Balanced Ventilation: Indoor Air Quality, Marian Goebes

1. **Audience question: What filtration level are you proposing for the supply ventilation?**
   a. CASE Team response (Marian Goebes): We are not proposing changes in the filtration level. It will continue to be the 2019 code level of MERV 13 filtration.

2. **Audience question: ASHRAE 62.2 sets their compartmental ventilation level at 0.20 cfm50 – why are you proposing a different a higher level?**
   a. CASE Team response (Marian Goebes): The main reason is cost concerns. As you get tighter it requires more attention to detail by contractors and it's more expensive. Contractors that serve on affordable housing are concerned about cost. Balancing IAQ needs as well as cost concerns. We originally proposed aligning with ASHRAE 62.2 but we changed it based on this feedback.

3. **Audience question: Will these MF IAQ be required for all-electric units?**
   a. CASE Team response (Marian Goebes): Yes, we make no difference between electric and gas units. If they're using gas stoves there are additional benefits because of NO2 emission concerns from gas appliances. There is still good reason to require these requirements in electric units. We still need a dedicated source of indoor air and there is certainly still pollutants released from cooking over an electric stoves and we want to make sure doesn't travel over to the neighboring unit, especially if they choose not to run their exhaust fan.

4. **Audience question: Field studies in building simulations show that exhaust systems do not bring significant amounts of air from other [dwelling] units. The critical parameter is air tightness, so why not allow exhaust systems?**
   a. CASE Team response (Marian Goebes): I'd be curious to see what the simulations are that are showing that; please share that data or studies. The concern is that we need to provide enough air. Right now, code says you can have a 40 CFM supply fan or a 40 CFM exhaust fan; from using simple logic, you know that running that 40 CFM bathroom fan will provide partial indoor and partial outdoor makeup air, so we'll have less than 40 CFM of outdoor air coming in. I'd love to see the data that went into that question.
   b. CASE Team response (Marian Goebes) - summary of email correspondence with commenter after he provided references: I have reviewed each reference. I did not find any that showed an exhaust-only ventilation can provide outdoor air at the 62.2-2019 ventilation rates.

5. **Audience comment: ASHRAE 62.2 tightness level[s] were based on knowing many builders already achieve[e] this level so the cost should not be that much of a concern.**
    a. CASE Team response (Marian Goebes): We haven't gotten into cost yet, but we'll get to that.
    b. CASE Team response post-meeting (Marian Goebes): Agreed, the cost to compartmentalize to 0.3 cfm50/sf is moderate (not high): estimated as approximately $450 per unit for wood-framed units and $475 for metal-framed units. Also, data from two research studies that included four buildings that are not targeting compartmentalization found average cfm50/sf in each building ranged from 0.13 to 0.30 cfm50/sf.
6. **Audience comment: I don't understand how higher MERV rated filters save energy. [they] put more load on the system. Also, homeowners aren't going to replace these filters and they get loaded up (quicker than MERV 8), this will not help.**
    a. CASE Team response (Marian Goebes): That is a concern, but the MERV 13 requirement that was added by the CEC included additional language on the filter depth to reduce the pressure drop across the MERV filter so it wouldn't have additional load.
7. **Audience comment: The only advantage to balanced ventilation is the ability to transfer heat between the incoming and outgoing airstreams. It does not neutralize indoor pressures.**
    a. CASE Team response (Marian Goebes): This goes back to why we are allowing supply-only ventilation in addition to balanced. If it's balanced ventilation, there is the ability to run scheduled fans or continuous fans. If you run continuous fans you are exhausting and supplying air at the same rate. But any time you run a local demand-controlled fan (like a vent fan over stove, or a boost fan in your bathroom, for example), then it does become unbalanced, which is why we're allowing supply-only ventilation. (see also #12 below)
8. **Audience question: For the HRV, would the exhaust fan of restroom need to be ducted to the HRV or does the HRV need to have its own grill separate from the restroom?**
    a. CASE Team response (Marian Goebes): We don't specify this, but we typically see at least one bathroom is ducted to the HRV (and many multifamily units only have one bathroom), but it's not a design requirement. Sometimes people will locate the HRV in the ceiling of the bathroom so it's a short duct run to the HRV and then you can remove the cost of the bathroom fan, but its not a requirement.

9. **Audience question: What, if any, consideration made, is offered for over-supplied spaces? And its not uncommon to see fans running at full speed which really wastes energy yet meets the code.**
    a. CASE Team response (Marian Goebes): Ventilation rates are the same as what's been in the energy code for a few cycles and come from ASHRAE 62.2. If people choose balanced [ventilation] it would be a low-level of continuous exhaust, and there would be that balance or exhaust and supply air. but …energy savings we provided (see mandatory measure slide) includes something and introducing unconditioned outdoor air and we still see positive savings from this proposal, and I think this sounds like a vote for exhaust only ventilation.

10. **Audience comment: No changes for makeup air for kitchen/dryer exhaust.**
    a. CASE Team response (Marian Goebes): That is correct, we're not making any changes to make-up air requirement; those live in T24 Part 4. The requirement for balanced or supply-only should help with that.

11. **Audience comment: Negative health impacts to the occupants and associated energy costs of poor IAQ far outweigh the incremental energy/installed costs of IAQ equipment.**
    a. CASE Team response (Marian Goebes): Regarding the energy concern about over-ventilating spaces, when I showed the slide with the cost-benefit ratios for the mandatory measure, that includes the fan energy and the energy of introducing unconditioned outside air, and we still are saving positive energy savings from this proposal

12. **Audience question: For a balanced system, if both the exhaust fan and the supply fan are running continuously, can the exhaust fan be dual speed to have a higher flow rate when switched? Won't that affect balancing of the [dwelling] unit?**
    a. CASE Team response (Marian Goebes): The answer is yes and yes. Some people use a 'dual-duty fan' which is a bath fan with two speeds where one is a low-level, continuous speed, and one is a higher level and removes humidity effectively when someone is bathing. If they choose the higher rate on the fan, it's not balanced but still considered a balance system for this purpose. Same thing with a kitchen fan, people can choose a higher rate and it's no longer balanced but it's acceptable for this code provision.

Multifamily Restructuring (Envelope and HVAC), Elizabeth McCollum

13. **Audience question: Are you considering change of occupancy requirements when converting from warehouse to apartment?**
    a. CASE Team response (Elizabeth McCollum): There are guidelines in the 2022 additions, alterations, and repair section. We are not planning on changing these.

Skylight Properties, Grant Marr

14. **Audience question: Can you please define the word 'replaced'?**
    a. CASE Team response (Grant Mar): Yes, if you're replacing just the glass in a skylight, that's not considered an alteration, that is considered a repair.

15. **Audience question: Why remove [the] limit of 16 sf per dwelling unit?**
    a. CASE Team response (Grant Mar): To simplify the code in this way in the building and not dwelling unit, we haven't seen a lot of skylights above dwelling units; they're mostly above common areas. Leaving this exemption (16 sq ft for all top floor dwelling units), is a significant exemption.

16. **Audience question: Regarding the existing skylight requirements (0.30 etc.) these have been exten[sive] and commented on for so long in the code, I had assumed they were intentionally discouraging skylight?**
    a. CASE Team response (Elizabeth McCollum): generally speaking, we don't put technically infeasible requirements into the code.
    b. CASE Team response (Grant Mar): if you have to replace 'X' number of skylights, we want to make sure you can feasibly do that.

17. **Audience question: Skylights are so rare in MF, why even make this change?**
    a. CASE Team response (Grant Mar): It's essentially a cleanup measure. To make sure the existing requirements are technically feasible and clean up and simplify the code.

18. **Audience question: Curious as to your thinking about an absolute number (i.e. 50 sq ft) instead of a relative metric (ratio of CFA)?**
    a. CASE Team response (Grant Mar): There is a cap on skylight area that can be added, but we're not addressing that with this change.

Visible Transmittance, Grant Marr

19. **Audience question: Wouldn't lower [visible transmittance (VT)] for units increase energy usage because lighting would be left on if less daylight is available?**
    a. CASE Team response (Grant Mar): I'm assuming they're asking because eliminating a VT for dwelling units would be a concern because it would increase electric lighting usage? If this is with regard to minimum verses maximum. The intent of a VT is to ensure there is enough visible light coming through the window to reduce electric lighting requirements. The intent is to align with automatic controls, you'll see energy savings because you're letting more light into those units.
    b. CASE Team response (Elizabeth McCollum): in absence of controls, energy savings entirely dependent on occupant behavior and we don't put things that are under occupant control in the code.

20. **Audience Comment: ASHRAE 90.1 is only for common areas so this proposal is consistent with that standard.**
    a. Yes, our proposal is consistent with this requirement.

Multifamily Restructuring – HVAC: Verification (HERS/ATT) Clean Up and Central Ventilation Shaft Sealing, Lucy Albin, TRC

21. **Audience question: How common are central fan ventilation cooling systems (CFVC) in MF buildings? Also clarify what you mean by DFVC?**
    a. CASE Team response (Lucy Albin): Base on stakeholder interviews we've conducted so far, we expect this to be an uncommon measure in MF buildings. We are aware that these are less popular with MF buildings as they originated with single family buildings, but where it logistically possible, we want to open up that option for high rise as well.
22. **Audience comment: Training or proper procedure for air filter changes in supply fans or air filter changes in HRV/ERVs.**
    a. CASE Team response (Lucy Albin): Is this a suggested enhancement for all the measures, four or more stories in height, or for all of the measures unrelated to building height? Please follow up with us for further discussion.
23. **Audience comment: Proper training in all field verifications should take place, you're asking a HERS rater to verify refrigerant charge and airflow at multiple levels.**
    a. CASE Team response (Lucy Albin): I'm not sure if the question is related to building height, or if the asker wants to see a change in the existing HERS process in general, but we are looking at extending the existing compliance options where it makes sense rather than making changes to training or process for field verifications.
24. **Audience question: Has this question been answered for single family and low-rise? (Poll Question: Would requiring HERS verification for relevant measures increase energy savings in buildings with four or more stories?)**
    a. CASE Team response (Lucy Albin): I'm not aware of what decision went into making this requirement for single family in the first place.
25. **Audience comment: Removing the conflict of interest in having the developer pay the HERS Rater would save a lot more energy.**
    a. CASE Team response (Lucy Albin): We're not investigating HERS procedure and program with this measure; I know the CEC has an effort to restructure the HERS system, but we aren't addressing that with this proposal.

26. **Audience comment: HERS raters should be limited to MF under four stories; the HERS program has serious flaws.**
    a. CASE Team response (Lucy Albin): See above response to question #25. I'd love to understand more generally where this commenter is coming from – please feel free to reach out for further discussion.

Central Ventilation Shaft Sealing, Lucy Albin

27. **Audience question: Where can we find the proposal language?**
    a. CASE Team response (Lucy Albin): In handouts and on the website. Combined with other measures presented today.
28. **Audience Comment: For IAQ, I would argue against having supply fans because they would bring in non-tempered air, either cold or hot. People would just want to turn them off. Air filter changing would be complex – ERV/HRV air filter changing would be complex for residential.**
    a. CASE Team response (Lucy Albin): Please reach out to discuss your concerns further.
29. **Audience Question: Is the motivation for all these changes/updates to reduce energy consumption or increase benefits to user? From a commercial real estate perspective, especially in affordable housing, we seem to [be] making it harder to build in CA.**
    a. CASE Team response (Lucy Albin): For the restricting topics specifically, the primary motivations are to save energy while making it simpler.

Wrap-Up

- All Draft CASE Reports will be posted March through June at title24stakeholders.com
- Round 2 meetings begin in April
- Meeting adjourned at 12:30 PM

Questions / Comments Submitted Via GoTo Webinar

The questions and comments below are provided verbatim (as-submitted) in the GoTo Webinar Question pane.

Name	Time Asked	Question / Comment	CASE Team Response
Amalie Besson	09:21:23 AM PST	Regarding cost of compartmentalization/tight envelop, I encourage you to look at The Passive House Network study of LIHTC projects in Pennsylvania going after Passive House certification (which has a much tighter envelope requirement than what you are proposing) vs not. They found that while there was a slight cost increase to projects in the first year, and that by year three projects pursuing Passive House certification were on average slightly less expensive than projects not pursuing the certification	Thank you for this comment. We will look into this reference.
Thomas Culp	10:33:35 AM PST	ASHRAE 90.1 only imposes their VT requirement where lighting controls are required for the same reason that Elizabeth said. That is consistent with your proposal doing it only for common spaces	Thank you for your comment.
Eric Martin	08:21:09 AM PST	Hi Nikki, can you please add me as a Staff instead of Attendee?	Added
Jon McHugh	12:15:04 PM PST	Where is [the] RA code language?	Please see the measure summary for multifamily restructuring
Jon McHugh	12:15:26 PM PST	Where [are the] reference appendices code language?	Please see the measure summary for multifamily restructuring.
Jon McHugh	12:20:41 PM PST	I am not seeing changes to duct sealing here	
Jon McHugh	12:21:48 PM PST	Is this just adding MF to introductory language in NA7.1 and NA3.1?	Yes. We are proposing only an extension to all multifamily buildings with central ventilation shafts and do not propose changes to the test procedures. Yes, it is changing the applicability of the measure from "high-rise residential" to "multifamily," which would include low-rise.
Lucas Morton	10:31:11 AM PST	You might mention that there are also different control requirements in dwelling units and common spaces.	Thank you for your comment.
Bob Raymer	09:10:12 AM PST	Sorry I signed on late. Will these MF IAQ measures be required in all-electric units?	Yes, these requirements will apply to all units.

Name	Time Asked	Question / Comment	CASE Team Response
Nehemiah Stone	10:12:18 AM PST	On Grant's slide #17, please define "replaced."	Glass replaced in an existing sash and frame, or sashes replaced in an existing frame are considered repairs. In these cases, the code requires that the replacement be at least equivalent to the original in performance.
Ari Usher	10:28:36 AM PST	Wouldn't lower VT for units increase lighting energy use, because residents will leave lights off if daylight is available?	The requirement is for a minimum VT in common use areas to ensure daylight is available. Regarding removing the VT requirement for dwelling units, the absence of automatic daylighting controls requirements prevent us from assuming lighting savings from VT. We are unable to assume savings from occupant behavior.
Ari Usher	10:30:59 AM PST	Are you proposing removing the min in units?	Yes, we are proposing to remove the VT requirement for dwelling units (currently only applied in buildings with four or more habitable stories).
Iain Walker	09:16:29 AM PST	Field studies and building simulations show that exhaust systems do not bring significant amounts of air from other units. The critical parameter is air tightness. So why not allow exhaust systems? And the ASHRAE 62.2 tightness level was based on data showing that many builders were already meeting this requirement. The cost issue does not seem to be a real one.	Marian met with Iain Walker and another researcher that has looked into this (Mark Modera, UC Davis) on 2/27/23, and presented field-calibrated modeling results showing that the outdoor air provided under an exhaust-only approach is less than the minimum ventilation rate.
Iain Walker	09:20:28 AM PST	Here are some references: Bohac, Hewett and Grimsrud, 2004. Reduction of Environmental Tobacco Smoke Transfer in Minnesota Multifamily Buildings using Air Sealing and Ventilation Treatments. Center for Energy and Environment, Minneapolis, MN. Bohac, D., Hewett, M. and Grimsrud, D. 2007. Measured Change in Multifamily Unit Air Leakage and Air Flow Due to Air Sealing and Ventilation Treatments. Proc Buildings X. Bohac, D., Hewett, M., Hammond, S. and Grimsrud, D. 2010. Secondhand smoke transfer and reductions by air sealing and ventilation in multiunit buildings: PFT and nicotine verification. Indoor Air. 2011. 21:136-144. doi:10.1111/j.1600-0668.2010.00680.x	Thank you for these references.

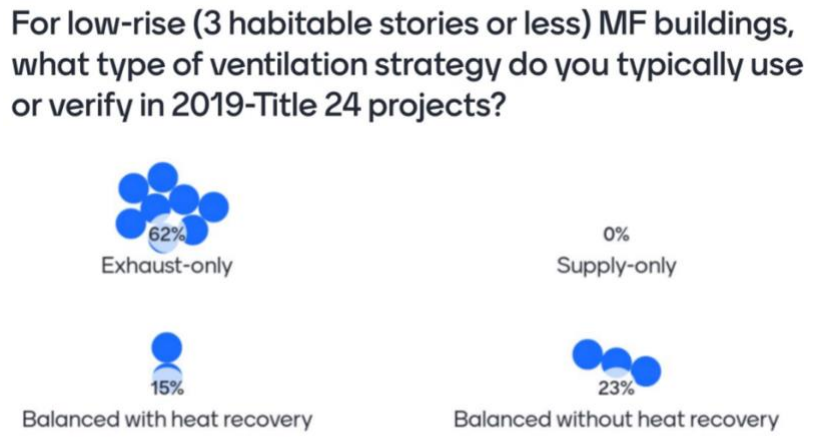
Name	Time Asked	Question / Comment	CASE Team Response
Iain Walker	09:20:49 AM PST	Ricketts, L and Straube, J, 2014. A field study of Airflow in Mid to High-Rise Multi-Unit Residential Buildings. 14th Canadian Conference on Building Science and Technology, Toronto, ON. http://rdh.com/wp-content/uploads/2015/01/CCBST-2014-A-Field-Study-of-Airflow-in-High-Rise-Multi-Unit-Residential-Buildings-LR-JS.pdf	Thank you for this reference.
Iain Walker	09:22:43 AM PST	Federico Noris, Gary Adamkiewicz, William W. Delp, Toshifumi Hotchi, Marion Russell, Brett C. Singer, Michael Spears, Kimberly Vermeer, William J. Fisk. 2013. Indoor environmental quality benefits of apartment energy retrofits. Building and Environment vol 68, 170-178	Thank you for this reference.
Iain Walker	09:22:59 AM PST	Ken Eklund, Rick Kunkle, Adria Banks, and David Hales. 2015. Pacific Northwest Residential Ventilation Effectiveness Study. NEEA report E15-015	Thank you for this reference.
Iain Walker	09:23:50 AM PST	I will talk with Marian offline about these and other studies. It's clear that installation and operation of systems and air tightness matter a lot. The ventilation type is not really an issue.	
Randy Young	09:37:23 AM PST	I am unsure if HERS rate[r]s should be doing all the verification of air flow rates. I have recently seen dockets on the CEC website surrounding inaccurate reports.	Thank you for your comment. This proposal is independent from CEC efforts to improve field verification and diagnostic testing (FV&DT). We are following that effort.

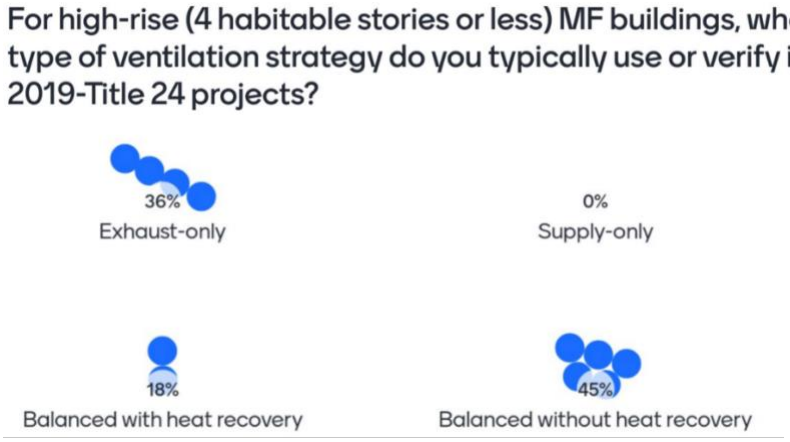
Public Input Submitted Via Mentimeter

Note: all questions and comments submitted via Mentimeter are anonymous. **Those that were discussed during the meeting are incorporated into the 'In-Meeting Questions / Comments' section above; others are shown below.**

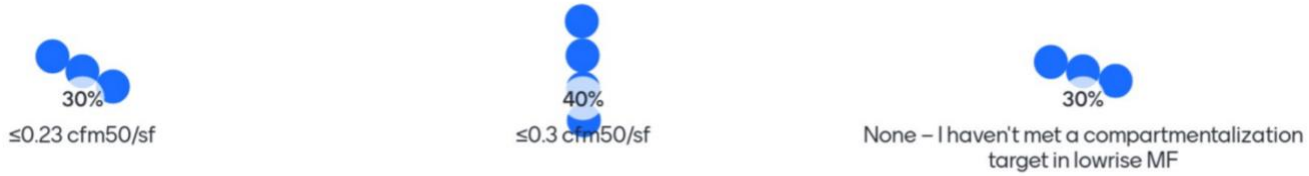
Mentimeter Polls & Responses

Compartmentalization and Balanced Ventilation

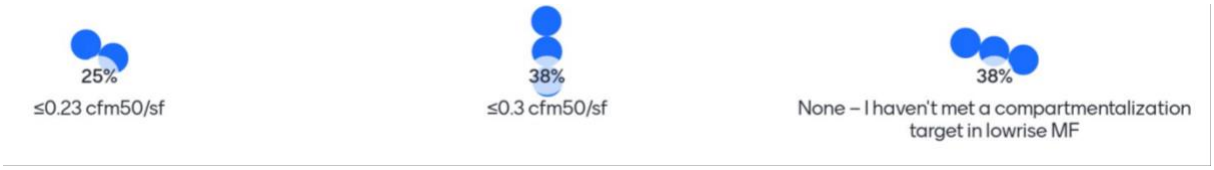




For your low-rise (3 habitable stories and lower) multifamily projects, what level of compartmentalization have you met for a 2019-Title 24 project?



For your high-rise (4 habitable stories or higher) multifamily projects, what level of compartmentalization have you met for a 2019-Title 24 project?



What comments or questions do you have about compartmentalization?

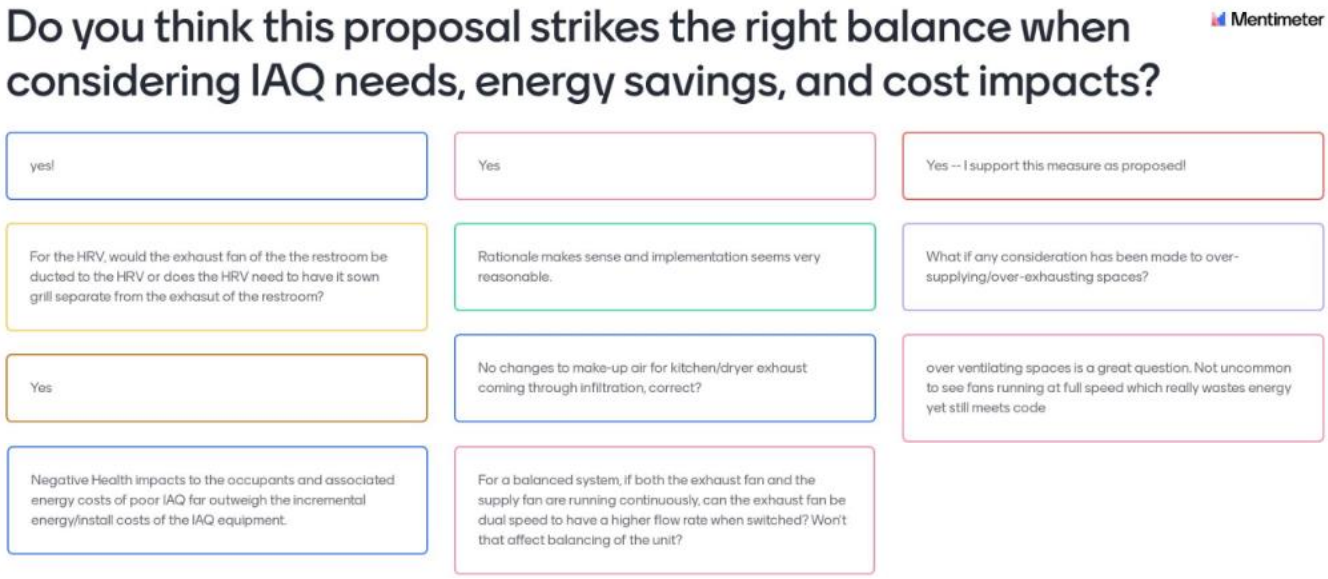
(No comments submitted.)

What comments or questions do you have about the energy or cost savings analysis?

What Recovery Efficiency did you assume?

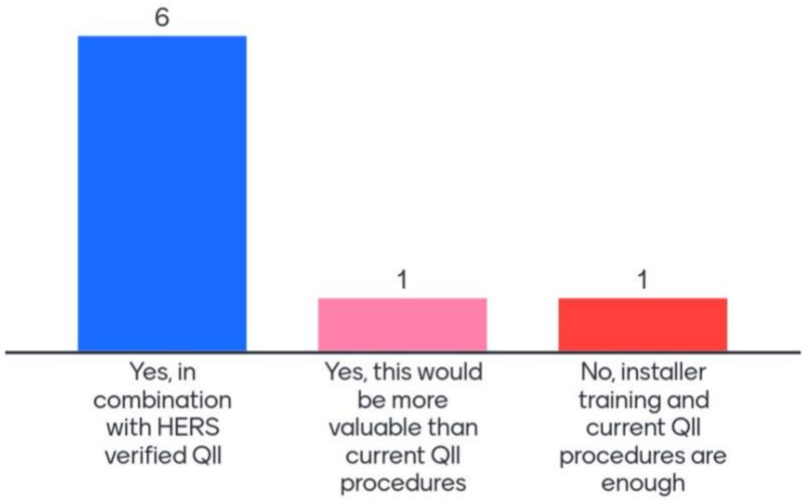
What comments do you have about compliance and verification of balanced ventilation or compartmentalization?

(No comments submitted.)



Multifamily Restructuring

Would requiring insulation installers to undergo QII training increase insulation installation quality?



Please provide feedback and suggestions on the methodology and assumptions for energy savings estimates for this proposal.

when lowrise market went through this shift, the installers absolutely charged an increase fee for labor and air sealing material. Its assumed that its no cost NOW because it is normal to use in SFD

Nice to have snapshot qii as option for low-rise MF but at compliance penalty

Floor by floor inspections. Ideally you combine visits so one floor is ready for the air barrier inspection and one with installed insulation. I would assume most builders will do floor 1 and floor two

If you are going to require contractor training, you have to add that cost.

How could we time Snapshot QII visits so the building is in the right phase of construction to verify air sealing and insulation quality?

Require that the HERS rater be identified when registering the LMCC forms

requirements for at least each stage for each floor of the building. Count of dwelling units as Seperators for requirements.