Meeting Notes

Posted June 2, 2020

Notes from 2022 Title 24, Part 6 Code Cycle
Utility-Sponsored Stakeholder Meeting for:

Multifamily Chapter Restructuring

Meeting Information:

Meeting Date: May 7, 2020
Meeting Time: 8:30AM – 12:00PM PST
Meeting Host: California Statewide Utility Codes and Standards Team

Meeting Agenda

Time	Topic	Presenter
10 minutes prior to call	Live Attendee Poll	
8:30 – 8:35 am	Welcome & Meeting Ground Rules	(Energy Solutions)
8:35 – 8:45 am	California Energy Commission Introduction	Payam Bozorgchami (California Energy Commission)
8:40 – 8:45 am	Utility Team Welcome & Overview	Kelly Cunningham (Pacific Gas & Electric)
8:45 – 9:45 am	CASE Presentation I: Multifamily Chapter Restructuring • Proposed Code Structure • Envelope Submeasures • HVAC Submeasures	Elizabeth McCollum (TRC) Matthew Christie (TRC) Alea German (Frontier Energy)
11:45 pm	Wrap Up & Closing	Statewide CASE Team

Meeting Attendees

Statewide Utility Codes and Standards Team – Utility Staff:

First Name	Last Name	Email	Affiliation
Jim	Kemper	james.kemper@ladwp.com	Los Angeles Water and Power
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Kelly	Cunningham	KACV@pge.com	Pacific Gas and Electric
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Codes and Standards Enhancement (CASE) Team Members:

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Stakeholder Attendees:

First Name	Last Name	Affiliation
Garth	Torvestad	2050 Partners
Rebecca	Everman	3M
Maureen	Kavanagh	3M
Stacie	Bagnasco	831 Conserve
Shannon	Corcoran	Air-Conditioning, Heating, and Refrigeration Institute (AHRI)
Dominic	Butler	Argento/Graham
Mike	Fischer	ARMA
Reed	Hitchcock	Asphalt Roofing Manufacturers Association
Nick	Young	Association for Energy Affordability
James	Benya	Benya Burnett Consultancy
Dan	Johnson	Beyond Efficiency Inc

Thomas	Culp	Birch Point Consulting, LLC
Sharon	Block	Bright Green Strategies
Nick	Brown	Build Smart Group
Jeremy	Wikstrom	CalCERTS
Russ	King	CalCERTS
David	Choo	CalCERTS, Inc.
Pat	Wong	California Air Resources Board
Robert	Raymer	CBIA
Jeanne	Fricot	Center for Sustainable Energy
Gregory	Mahoney	City of Davis
Alice	Chen	City of San Mateo
Todd	Van Hyfte	Climatemaster
Tom	Paine	ConSol
Abhilasha	Wadhwa	CPUC
Therese	Fisher	D+R International
Hiroshi	Yoh	Daikin
Jeremiah	Ellis	DuctTesters
Tamara	Dias	DuctTesters, Inc.
Derrick	Yeung	DuctTesters, Inc.
Joel	Pearson	Efficiency First of California
Cassandra	Trester	Ei Companies
Meg	Waltner	Energy 350
Neil	Placer	EnerNex
George	Nesbitt	Environmental Design / Build
John	Woestman	Extruded Polystyrene Foam Association (XPSA)
Avery	Colter	Fard Engineers
Kyaw	Soe	Fard Engineers, Inc.
Navid	Saiidnia	FEI
Marina	Blanco	Gabel Energy
Gina	Rodda	Gabel Energy
Kevin	Gilleran	Gilleran Energy Management, Inc.
Robert	Glass	Goodman Mfg. Company
Ted	Tiffany	Guttmann & Blaevoet
Abraham	Hui	Heatcraft Refrigeration Products
Michael	Pennington	Heatcraft Refrigeration Products
Shawn	Winters	HERS Raters SoCal
Liam	Buckley	IES Ltd.
Jennifer	Rennick	In Balance Green Consulting
Emily	Bowers	International Association of Lighting Designers
Jr	Babineau	Johns Manville
Chris	Giovannielli	kawneer company

Brendan	Dineen	Malarkey
John	Kouba	Malarkey Roofing Products
Tank	Reid	Masonite
Marshall	Hunt	MBH Associates
Amelie	Besson	MidPen Housing
Jack	Ernest	Mortex Products
John	Bruschi	N /A
Jeffrey H.	Greenwald, P.E., CAE	NAMBA
Christopher	Ruch	National Energy Management Institute (NEMI)
Glen	Clapper	National Roofing Contractors Association
Sean	Denniston	New Buildings Institute
Rahul	Athalye	NORESCO
Sally	Blair	NORESCO
Erica	Dilello	Noresco
Elizabeth	Staubach	NYSERDA
Lucas	Morton	Pete Moffat Construction
Marc	Connerly	RCAC
Sean	Armstrong	Redwood Energy
Anna	Larue	Resource Refocus LLC
Vrushali	Mendon	Resource Refocus LLC
Allison	Skidd	Rheem
Diane	Jakobs	Rheem
Ramon	Gutierrez	Rmax a Sika Co.
Scott	Bunk	Sacramento Municipal Utility District
Randy	Young	SMART local 104
Josh	Rasin	SMUD
Joseph	Briscar	SMXB
Eric	Devito	SMXBLaw
Joe	Cain	Solar Energy Industries Association (SEIA)
Nehemiah	Stone	Stone Energy Associates
Rob	Geltner	TRC
Mayra	Vega	TRC
Wayne	Alldredge	VCA Green
Javier	Saucedo	VCREA

Meeting Resources

- Agenda
- Presentation
- Proposal Summary
- Multifamily Chapter Restructuring Submeasure Tables

Meeting Notes

1.1 Proposed Code Structure

1. Reed Hitchcock (Asphalt Roofing Manufacturers Association): When will draft reports will be released?
    a. Title 24 Advocacy Team Two: Draft CASE Reports are released on a rolling basis. The Draft CASE Report for the Multifamily Chapter Restructuring Topics is scheduled for release in September 2020. Additionally, all other Draft CASE Reports will be released in May and June on a rolling basis, so those will be available sooner. Last point about Draft CASE Reports, there are four reports currently available on the Title24stakeholders website: https://title24stakeholders.com/measures/cycle-2022/
2. Joe Cain (SEIA): Definition of Multifamily Building might need to consider California Residential Code "one- and two-family dwellings and townhouses" in addition to California Building Code occupancy groups.
3. Ted Tiffany (Guttmann & Blaevoet): Where will dormitory space lie?
    a. Elizabeth McCollum (TRC): Statewide CASE Team will confirm with you.
4. George Nesbitt (Environmental Design / Build): Duplexes, accessory dwelling units (ADUs) (attached)?
    a. Matthew Christie (TRC): We will need to re-investigate how to capture duplexes and attached ADUs. Thank you for the comments.
    b. Payam Bozorgchami (Energy Commission): How do you have an ADU attached on a multifamily building?
5. George Nesbitt (Environmental Design / Build): An ADU with a single family (SF) is "SF", an ADU to a duplex becomes multifamily (three units or more).
    a. Matthew Christie (TRC): This will take careful attention to writing the regulatory language.
    b. George Nesbitt (Environmental Design / Build): Has a "passive house" that went from SF to SF with ADU, he wanted to add a junior ADU, but it pushed him into multifamily.
    c. Gina Rodda (Gabel Energy): How do we know it is not multifamily? The answer is not apparent.
6. George Nesbitt (Environmental Design / Build): Are Hotel / Motel "multifamily"?
    a. Gina Rodda (Gabel Energy): No. Over three stories is multifamily.
7. Joe Cain (SEIA): CRC (California Residential Code) occupancies are same as Group R3. Want to make sure multifamily definition works for CBC occupancies and CRC definitions.
    a. Elizabeth McCollum (TRC): There is back and forth in the Chat [about what falls under the definition of multifamily], we will circle back to this discussion. Aim is to include townhouses in single family.

8. Gina Rodda (Gabel Energy): Requirements for all pools and spas, not just "residential" are found here: https://energycodeace.com/site/custom/public/reference-ace-2019/Documents/section1104mandatoryrequirementsforpoolandspasystemsandequipment.htm
9. Randy Young (SMART Local 104): Cost effectiveness cannot be the sole determining factor for indoor air quality, especially in light of the current pandemic we are facing.
10. Joe Cain (SEIA): I see "Solar Ready" ... is there a path toward "solar required"?
    a. Joe Cain (SEIA): How is the photo-voltaic solar (PV) prescriptive requirement impacted when it transitions from "low-rise residential" to removing high-rise/low-rise from multifamily?
    b. Elizabeth McCollum (TRC): Solar still being developed, will not be covered today, we would love to hear your thoughts.
    c. Avery Colter (Fard Engineers): The question of PV requirement is important, as I have tangled with City of Fremont over their ordinance with regard to high-rise multifamily, as CBECC-Com does not calculate EDRs, so there is no way to document how much PV reduces 55% from EDR on a high rise.
        i. Gina Rodda (Gabel Energy): Avery, for 2022 all buildings will be using EDR (per the Energy Commission).
        ii. Ted Tiffany (Guttmann & Blaevoet): The Nonresidential EDR is very different in intent Gina. Nothing I've seen shows any PV contribution in nonresidential.
        iii. Gina Rodda (Gabel Energy): Ted, correct, but there will be an infrastructure that could.
    d. Matthew Christie (TRC): The Statewide CASE team recognizes that PV requirements will need to be reviewed and addressed. We do not have details on that topic area in this presentation. We have added that need to the parking lot, and will follow up with some commenting individuals at a later date
11. Thomas Culp (Birch Point Consulting, LLC): Is that chart by building numbers or square footage? (Slide 38, Multifamily Construction by Prototype)
    a. Elizabeth McCollum (TRC): By dwelling units.
12. Liam Buckley (IES Ltd.): Can you please explain what the differences in the "heat gain algorithms"?
13. George Nesbitt (Environmental Design / Build): Are we going to have CBECC-Res, CBECC-Comm, & now CBECC-multifamily? Ideally CBECC would be able to do SF/MF/Non-Res in one software.
    a. Nick Young (Association for Energy Affordability): I second George's request for a single software tool. Physics is the same regardless of building type.
    b. Elizabeth McCollum (TRC): We don't anticipate a single software in 2022. We may be able to offer guidance on which of the available software tools is appropriate.

c. Kelly Cunningham (PG&E): The Statewide CASE Team makes recommendations through CASE studies to the Commission for consideration. The Commission will examine options and make decisions about the software and the timeline.

d. Marina Blanco (Gabel Energy): Please do not split the software. This is not a simplification for multifamily but will further confuse the industry. Which software for which type of building will still be an issue.

e. Avery Colter (Fard Engineers): It seems like there will be more than one software as long as SF has more HERS items than multifamily or NR.

f. George Nesbitt (Environmental Design / Build): Advocating for unification of CBECC since the beginning. At a minimum, a uniform input file should be provided.

g. Elizabeth McCollum (TRC): The Statewide CASE Team agrees that a single software tool would be simpler. There is a question of whether it is feasible to get the necessary algorithms under one software in the immediate term, and how that might impact modelers accustomed to one tool or the other. The software discussion is ongoing. Draft CASE Reports will include outlines of the software capabilities necessary to implement the proposed code changes.

1.2 Envelope Submeasures

1.2.1 Roof Products and Roof/Ceiling Insulation

1. Mike Fischer (ARMA): The energy benefits for low-rise and high-rise are different based on the relative percentage of exterior area (roof to wall ratios). Why not maintain that difference by using building height as a trigger?

    a. Matthew Christie (TRC): Benefits from better envelope components is a function of a building's aspect ratio which is often proportional to building height. The Multifamily restructuring proposal aims to align requirements based on building characteristics (roof slope, wall assembly type, window type) rather than creating a divide based on building height.

2. Mike Fischer (ARMA): Is the cost based on new construction or reroofing?

    a. Julianna Wei (TRC): Costs are based on new construction costs, and additional replacement costs at year 15 or 20.

3. Dan Johnson (Beyond Efficiency Inc): Many low-rise residential (LRR) buildings do not have attics, and the attic-based requirements still apply to these. Why create a new category now?

    a. Matthew Christie (TRC): Challenging and complicated for modelers to understand. Makes it easier for prescriptive compliance.

    b. Elizabeth McCollum (TRC): For attic roofs, performance is more complex than can be captured through a single u-factor. For non-attic roofs, we do intend to provide a u-factor requirement.

    c. George Nesbitt (Environmental Design / Build): LRR multifamily have attics with some frequency.

4. Dan Johnson (Beyond Efficiency Inc): Is it possible to provide a U-value and let designers pick the construction that meets this (using the Appendices).
    a. Matthew Christie (TRC): This is exactly what the Statewide CASE Team is attempting. R-value for the attic floor and a different R-value – Flat roof U-factor will address this confusion.
5. Dan Johnson (Beyond Efficiency Inc): Currently all wood-frame high-rise residential (HRR) get a metal-framed Standard Design in the performance simulation. Can we fix this?
    a. Elizabeth McCollum (TRC): For attic roofs, performance is more complex than can be captured through a single u-factor. For non-attic roofs, we do intend to provide a u-factor requirement.

1.2.2 Wall U-Factor

6. Marina Blanco (Gabel Energy): Is this table for exterior walls only? there are demising wall requirements. Are those addressed in this presentation? (slide 54: Multifamily Unification: Wall U-factor).
    a. Cathy Chappell (TRC): Marina, yes exterior only.
7. Dan Johnson (Beyond Efficiency Inc): Also, in the software, if the building has several wall types, the Standard Design only uses one of these for the entire Standard building. Can we get Standard walls to map to each proposed wall type?
    a. Avery Colter (Fard Engineers): No, the ACM has not mapped walls to type as far as I know.
8. Nick Brown (Build Smart Group): uirements; just because nonresidential has a different U factor now doesn't mean it should stay that way. Prequel: Perhaps we should unify <1 hour rated U-factor wood framed.
    a. Julianna Wei (TRC): The Statewide CASE team is looking to unify U-factor requirements across climate zones for each wall type as cost effectiveness results dictate.

Poll Two: Linking wall assembly energy requirements to the wall's fire rating is:

9. Gina Rodda (Gabel Energy): How would we identify fire rating in performance modeling so that wall U-factor follows?
    a. Matthew Christie (TRC): Would necessitate a new data point (probably a dropdown box) self-reported there, and then plan-approved. Don't believe it can be programmed into CBECC effectively – too complicated and nuanced.
10. Avery Colter (Fard Engineers): For this topic, will quality insulation installation (QII) be prescriptive now for HRR?
    a. Matthew Christie (TRC): We are recommending creation of a new QII specific to larger building – over 40k square feet. High-rise and large low-rise.
11. Meg Waltner (NRDC): When merging requirements into the new multifamily code, did you also consider changes that you found cost-effective for 2022? For example, it appears that you didn't include the updated nonresidential cool roof requirements proposed in the previous webinar for nonresidential envelope.

a. Elizabeth McCollum (TRC): Likely yes. The Statewide CASE Team is trying to treat this topic separate from the other topics. But will need to address this after the other topics have been finalized.

b. Matthew Christie (TRC): In other words, if multiple CASE proposals are accepted, they would be added.

c. Meg Waltner (NRDC): Thanks -- that sounds like the right approach.

12. Kevin Gilleran (Gilleran Energy Management, Inc.): Would the regular QII also be available?

    a. Julianna Wei (TRC): The regular (full) QII option would remain a requirement for buildings < 40k of conditioned floor area (CFA), and an option for all buildings (below and above 40k CFA).

13. Dan Johnson (Beyond Efficiency Inc): I don't see an adequate feedback loop with regards to inputting the fire rating to CBECC. The modeler could put in their own values, it would appear on the forms, but the plans checker doesn't have time to find it and track it to every wall. How about consider building type VA, VB, IIIA, IIIB, etc. which applies to the entire building not wall-by-wall?

14. Marina Blanco (Gabel Energy): Where do skylights and glazed door fit into this table? (slide 61, Multifamily Unification: Fenestration Properties).

    a. Matthew Christie (TRC): Let's place that in the parking lot for later discussion.

1.2.3 Fenestration Properties

15. Tank Reid (Masonite): Are opaque doors part of this proposal?

    a. Elizabeth McCollum (TRC): Opaque doors will be included in the restructuring CASE Report, but are not covered in today's meeting.

16. Dan Johnson (Beyond Efficiency Inc): Skylights are currently penalized in LRR performance but allowed in HRR.

    a. Avery Colter (Fard Engineers): Doesn't credit or penalty depend on amount and NFRC numbers of the skylights?

    b. Elizabeth McCollum (TRC): The Statewide CASE Team did consider application by building type and decided that by assembly type was better aligned with current requirements and energy performance.

    c. Dan Johnson (Beyond Efficiency Inc): LRR performance Standard Design has no skylights.Tracking wall by wall might be beyond the abilities of the modeling and enforcement process.

        i. Elizabeth McCollum (TRC): Statewide CASE Team appreciates this consideration for enforceability and will bring this into the discussion as we move forward

    d. Avery Colter (Fard Engineers): There are no standard skylights. Has not encountered them very ofetn, they probably consider them an easily trade-offed item in a whole building.

i. Dan Johnson (Beyond Efficiency Inc): These are very hard to trade off due to the solar gain penalty to air conditioning

e. Elizabeth McCollum (TRC): Attendees are encouraged to review the proposed chapter language on how skylights are treated. What is provided is a draft and the Statewide CASE Team is looking for stakeholders to test it out so that a robust, final version can be proposed.

f. Avery Colter (Fard Engineers): The degree of solar gain penalty of a skylight would be a function of its SHGC. This is a selling point for skylights - and skytubes - with high VT/SHGC ratios.

i. Dan Johnson (Beyond Efficiency Inc): Good skylights are worse than an opaque roof.

ii. Avery Colter (Fard Engineers): This is partly a one-sided penalty because there's no daylighting credit in LRR.

iii. Dan Johnson (Beyond Efficiency Inc): Is there a daylighting credit in Nonresidential or HRR? Because the Standard Design will match the same daylighting. How can you get a credit?

iv. Avery Colter (Fard Engineers): LPD isn't a thing in LRR or HRR, and in NR daylighting goes usually to prescriptive.

v. Avery Colter (Fard Engineers): Perhaps that's something to consider for the code, tempering the solar gain of skylights with a daylighting factor based on VT, as VT currently has no role in residentials. VT incentivizes selection of low-VT windows and skylights for the sake of very low SHGCs in hot climate zones.

g. Thomas Culp (Birch Point Consulting, LLC): There are no lighting controls in dwelling units, so no energy savings related to VT.

i. Matthew Christie (TRC): It is somewhat self-limiting since homebuyers like more light in the building. No automated controls requirement and so no change in LPD in the modeling. We are not able to capture the statistical impact of that behavioral impact.

ii. Thomas Culp (Birch Point Consulting, LLC): Agreed, it is self-limiting based on occupant requirement/ market.

h. Avery Colter (Fard Engineers): For low-rise residential buildings, the tradeoff for a skylight would be higher than prescriptive *SolRef* on the opaque roof.

14. Eric DeVito (SMXBLaw): Will there be specific criteria added to the Standards for meeting the "AW" classification?

a. Matthew Christie (TRC): Yes, criteria will be added for AW window products.

17. Poll Four: Which window property is more challenging to find at a reasonable price?

a. Eric DeVito (SMXBLaw): This question deserves a fourth option for those who believe neither are challenging.

18. Marina Blanco (Gabel Energy): I am concerned that we are limiting the market to vinyl windows. Planning departments frequently require certain looks that may make meeting these windows requirements near impossible.
    a. Matthew Christie (TRC): This is the result. This is the standard in residential.
    b. Gina Rodda (Gabel Energy): Berkeley won't allow in street-facing facades because they think they are ugly.
        i. Elizabeth McCollum (TRC): Thank you for the information about Berkeley. This context is an important consideration.
    c. Chris Giovannielli (Kawneer Company): Vinyl is not environmentally friendly.
        i. Elizabeth McCollum (TRC): Thank you. Any environmental impacts will be included in the Draft CASE Report.
    d. Avery Colter (Fard Engineers): There are still wood & fiberglass framed windows.
19. Tom Paine (ConSol): When the developer bears the cost burden, but the occupant reaps the savings you are increasing the cost of housing, any measures that do that should be considered with skepticism.
    a. Elizabeth McCollum (TRC): The Statewide CASE Team is considering the split incentive issue in all of the code change proposals.
20. Dan Johnson (Beyond Efficiency Inc): In Climate Zones 1-3, the performance standard still sets SHGC to 0.35; this should be set to match the *Proposed*. We use low-SHGC for buildings without air conditioning in Climate Zone 3.
    a. Matthew Christie (TRC): The Statewide CASE Team can revisit whether the requirement should be explicit or a non-requirement.
    b. George Nesbitt (Environmental Design / Build): above .35 SHGC is a credit usually.
    c. Dan Johnson (Beyond Efficiency Inc): NR means Not Regulated. Please don't set an arbitrary value for this if it's NR. Please match *Proposed* as with other NR features.
        i. Marina Blanco (Gabel Energy): Seconds Dan Johnson's request for a standard to match proposed for NR climate zones.
    d. Dan Johnson (Beyond Efficiency Inc): If you have an apartment building in Climate Zone 3 without air-conditioning, it's better to set windows to SHGC-0.23 to maintain summer comfort. Standard Design uses 0.35 and takes an unfair winter credit for a feature not regulated by the code. If the Energy Commission wants it at 0.35, then set prescriptive to 0.35, not "NR."

1.2.4 Window Area Limits

21. Javier Perez (Energy Commission): To simplify things, was requiring only one or the other considered, rather than both? (Slide 69: Window Area Norms)
    a. Matthew Christie (TRC): This was considered by the Statewide CASE Team.
22. Marina Blanco (Gabel Energy): Area requirements; are these two separate requirements?

a. Matthew Christie (TRC): Prescriptively, you have to meet both. In the software, there would be quite a high-performance penalty. Mostly impacts high-rise, heavily glazed installation and they will have to choose offsets.

23. Dan Johnson (Beyond Efficiency Inc): What about matching *Proposed* design window locations? Currently LRR evenly distributes windows, but HRR matches exact locations of *Proposed*. The LRR method can create cooling penalties for constrained sites

    a. Matthew Christie (TRC): The Statewide CASE Team does not anticipate changing that dynamic. A few code cycles ago, the decision was made to prioritize optimized. We did remove the west-facing requirement because it would be more impactful.

24. Dan Johnson (Beyond Efficiency Inc): Urban sites don't have a choice on orientation. Point that may have been missed: 4 stories will match *Proposed* locations, but 3 stories will evenly distribute. Which method will carry forward?

    a. Matthew Christie (TRC): Agreed, which is why we removed the 5% threshold requirement.

    b. Dan Johnson (Beyond Efficiency Inc): It is not "cost effective" to have fire-rated windows facing into neighbor's concrete wall (urban site).

1.3 HVAC Submeasures

1.3.1 Introduction

1. **Poll Five: Who should conduct the proposed field verifications for multifamily buildings 4-storeis and greater?**

2. Dan Johnson (Beyond Efficiency Inc): Are mechanical ATT's enforced? I thought there were no mechanical ATT's because not enough of them have been accredited yet?

    a. Alea German (Frontier Energy): Very recently there weren't, but I thought that a couple providers have been certified. There is a question of whether that is enough to enforce. The hope is that as there will be more as time goes on.

        i. *Clarification added after the meeting: Per the Energy Commission website: "Mechanical acceptance tests may be completed by the field technician until the mechanical threshold requirement has been satisfied."*

    b. Avery Colter (Fard Engineers): It is for HERS until there are mechanical ATTs.

    c. Wayne Alldredge (VCA Green): Third party HERS or mechanical ATT providers.

    d. Tom Paine (ConSol): Flexibility is valuable where there's no concern for quality and training differences.

    e. Gina Rodda (Gabel Energy): Certified ATT not required yet, but all testing to be done by installing contractor.

    f. Dan Johnson (Beyond Efficiency Inc): Mechanical ATT work is currently self-certified by the installing contractor. California State set a threshold of 500 accredited individuals before mechanical ATT work is enforced.

i. Gina Rodda (Gabel Energy): The threshold is 300, and yes self-certified at this time.

g. Wayne Alldredge (VCA Green): There's no point in getting your mechanical ATT because it's not enforced, and mechanical contractors won't certify their people because they are already getting paid for the work.

h. Avery Colter (Fard Engineers): OK so does that mean right now either installer or ATT testing is basically CF-2R and HERS is CF-3R?

i. Gina Rodda (Gabel Energy): @Avery, this is about NRCA forms

i. Amelie Besson (MidPen Housing): From a developer's perspective, not multiplying consultants would be better if their qualification to do the job is similar.

j. Wayne Alldredge (VCA Green): NRCA is non-res, CFxR is Res

k. Stacie Bagnasco (831 Conserve): Mechanical ATT would have to add training criteria to existing to perform certified duct testing.

l. George Nesbitt (Environmental Design / Build): Independent Third Party Verification. No installer self-certification.

m. Dan Johnson (Beyond Efficiency Inc): Agree with George, mechanical ATT effectively doesn't exist, and won't exist, then please make it HERS to take away contractor self-certifying ability.

i. Wayne Alldredge (VCA Green): In agreement with George Nesbitt and Dan Johnson, should be third party verification.

n. Bill Dakin (Frontier Energy): Currently the proposal is not considering self-certification. Third party certification is what the Statewide CASE Team is recommending.

o. Avery Colter (Fard Engineers): If unification is going to happen, either mechanical ATTs would become qualified to deal with CF2Rs or HERS Raters with NRCAs, or possibly both. Perhaps there is a need for a merging of the entry items so that mechanical CF-2Rs double as mechanical NRCAs for residential buildings. How else would a unified approach be possible in the HERS registries, which presumably will bring in HRR units?

Bill Dakin (Frontier Energy): The Statewide CASE Team will look into as we move forward.

1.3.2 Duct Insulation R-Values

3. Marina Blanco (Gabel Energy): Has it been reviewed if the thicker insulation can fit within existing soffit sizes or does soffit size need to be increased therefore adding to the cost?

a. Nick Young (Association for Energy Affordability): Interested in the response to Marina's question about soffit clearance.

b. Alea German (Frontier Energy): The Statewide CASE Team has begun collecting stakeholder feedback on implementation issues to address this specific question. It does add thickness, not very much, but where clearances are tight it might be a concern. In low-rise residential, the current requirement is for R-6 unless ducts

are tested to be low leakage verified, which we don't find happens very often. Do people use R-4.2 or R-6?

4. **Poll Seven: What level of duct insulation is typically installed?**

5. Marina Blanco (Gabel Energy): Will the multifamily chapter get its own set of forms? If software will still be split are we still subject to 2 different sets of forms for multifamily?

    a. Elizabeth McCollum (TRC): The Statewide CASE Team will advocate for a single set of forms. whether those forms are independent of residential and nonresidential forms, or a revision to those forms is a subject of conversation with the Energy Commission.

    b. George Nesbitt (Environmental Design / Build): Three types of forms (SF, MF, Non-Res) is not ideal, especially if they are the same tested measure. The distinction between Nonresidential & LRR forms (for HERS Measures) is arbitrary.

1.3.3 Duct Sealing/Leakage Testing

6. Randy Young (SMART local 104): It is not difficult to seal duct as it is installed.

1.3.4 Fan Watt Draw & Airflow

7. **Poll Ten: Individual dwelling unit HVAC systems installed in multifamily buildings 4-stories and greater typically meet what range of airflow?**

    a. George Nesbitt (Environmental Design / Build): "High Rise Res" individual systems are no different than SF & LRR multifamily systems.

    b. Marina Blanco (Gabel Energy): It depends on the system types used. VRF fan systems use very small fans with low w/cfm ranges.

        i. Alea German (Frontier Energy): Typically, it is difficult to get a measurement for fan power with mini-split heat pumps. The appropriate baseline across different system types is difficult.

    c. Wayne Alldredge (VCA Green): Electronically commutated motors (ECMs) should be required for fan coil units, and the airflow should be kept up at 350.

        i. Alea German (Frontier Energy): That's essentially what this measure would require, at least on the air flow side. Doesn't require ECM motors, but would be much easier to meet the requirement with ECMs.

8. Avery Colter (Fard Engineers): I do have one concern about fan watt draw in multifamily buildings from past experience – if the air handler is hardwired to a panel or is 240V, it's unpleasant to choose between pulling out cables to clamp meters or telling the occupants to depower everything except the HVAC.

    a. Alea German (Frontier Energy): Good point. Similar to challenges with mini-split heat pumps. There may be situations where it will be difficult to get accurate readings for fan power.

1.3.5 Refrigerant Charge

9. George Nesbitt (Environmental Design / Build): All AC should be verified in all climate zones.

    a. Alea German (Frontier Energy): Thank you for your comment, we can look into that as a potential change. The proposal presented today is to unify existing requirements.

10. Marina Blanco (Gabel Energy): Would a weigh-in pathway still be required for mini split systems? Would this apply to VRF systems?

    a. Alea German (Frontier Energy): Yes, the proposal does not incorporate any changes to the existing protocols.

    b. Bill Dakin (Frontier Energy):This requirement would not apply to central HVAC systems

11. Dan Johnson (Beyond Efficiency Inc): There is a need to clearly spell out how to verify charge for VRF, multi-split, packaged terminal air conditioner heat pump (PTHP), and packaged thermal air conditioners (PTAC).

    a. Alea German (Frontier Energy): The Statewide CASE Team has heard this feedback. The reference appendixes have all the protocols, but some clarifying language could be added for when each applies.

1.4 General Comments

12. Nick Young (Association for Energy Affordability): Why is QII optional for taller buildings? Is it about cost-effectiveness?

    a. Elizabeth McCollum (TRC): There is a separate CASE Report topic for this. Essentially it is very difficult to inspect 100% of insulation in a staged project. The Statewide CASE Team is proposing a “snapshot” QII inspection for a portion of the credit. Inspecting the entire project for the full credit is possible, but not required. But we understand that inspection is difficult for large buildings – not high-rise, but large buildings.

13. George Nesbitt (Environmental Design / Build): Multifamily high-rise and low-rise are more alike than different. 3-floor wood frame over a podium with a commercial unit under the podium almost doubled the energy TDV. There’s always been a mixing of residential and nonresidential spaces. I’m doubtful that taking multifamily into its own chapter will do anything to make the code simpler. I’m worried that if the software will continue to be split along the current low-rise/high-rise factors, we actually make it more complicated. Also, any time you duplicate the code, you run the risk of making the code more complicated.

    a. Elizabeth McCollum (TRC): One example, 8-car parking and 20% common area requirements will be dropped.

       In regard to duplications of sections, the intent here is to create a baseline for multifamily where multifamily-specific solutions can be proposed. In the future, the multifamily sections will deviate further from single family and nonresidential and have multifamily-specific solutions. The software is an ongoing discussion with the Energy Commission.

    b. Dan Johnson (Beyond Efficiency Inc): In my experience, a lot of this looks like more complication, a 3rd category, not consolidation.

c. Kelly Cunningham (PG&E): If you have to search all the documents in the Standards at once, try the Reference Ace tool. https://energycodeace.com/content/reference-ace-2019-tool

d. Dan Johnson (Beyond Efficiency Inc): Regarding the "20% common area," there is no ability in CBECC-RES to model unconditioned spaces, indirectly conditioned space, corridors and nonresidential spaces. Even if these are <20% of the building and have their own systems.

14. Ted Tiffany (Guttmann & Blaevoet): Most systems in high rise, VTAC, PTAC, are factory installed refrigerants. The rest are VRF or other custom split systems that are field installed.

    a. Bill Dakin (Frontier Energy): HERS requirements for refrigerant charge, fan watt draw apply only to ducted individual HVAC systems.

        i. *Correction added after the meeting: The HERS requirements for cooling coil airflow and fan watt draw apply only to ducted individual HVAC systems.*

    b. Ted Tiffany (Guttmann & Blaevoet): Those are fairly uncommon in mid-high rise.

    c. Bill Dakin (Frontier Energy) This would not apply to central systems like VRF and packaged non-ducted.

15. Judy Roberson (Energy Commission): Where are the ventilation proposals for the HVAC measures?

    a. George Nesbitt (Environmental Design / Build): This has been covered in other sessions on multifamily / LRR & HRR, and should flow into this.

16. Sean Armstrong (Redwood Energy): What happens to prescriptive requirements if QII is removed?

    a. Matthew Christie (TRC): I agree the ventilation requirements are not high enough, but I don't think removing QII will solve the problem. Loosening the envelope might address the problem at certain times of the year only. This would be addressed under the QII topic and potentially under safety standards beyond Title 24, Part 6.

    b. Sean (Redwood Energy): My concern is that we knowingly creating an issue.

    c. Matthew Christie (TRC): We are also requiring ventilation requirements to the level of ASHRAE and if those are not sufficient, we need to address it.

    d. Gina Rodda (Gabel Energy): There is a current multifamily indoor air quality (IAQ) CASE Report addressing this issue.

    e. Kevin Gilleran (Gilleran Energy Management, Inc.): Most appliances are now sealed combustion. The units commonly are airtight regardless of QII.

    f. Wayne Alldredge (VCA Green): What if you required balanced ventilation if there are gas appliances?

    g. Peter Strait (Energy Commission): Sean, are you saying that an absence of QII will necessarily result in draftier buildings despite the underlying insulation

standards not changing? Or are you proposing that underlying insulation and tightness requirements be lowered?

h. George Nesbitt (Environmental Design / Build): Leaky buildings do not have good IAQ.

i. Kevin Gilleran (Gilleran Energy Management, Inc.): There is no code that says you have to have a gas stove or oven.

j. Dan Johnson (Beyond Efficiency Inc): Why not adopt makeup air for cooking exhaust as required by IRC, to address this issue of IAQ?

k. Russ King (CalCERTS): QII is primarily intended to address conduction losses and gains. It requires air barriers to make sure the insulation works well. It is not intended to address the overall tightness of the building.

l. Kevin Gilleran (Gilleran Energy Management, Inc.): Gas piping is costly, I am seeing a move away from gas in the units.

m. Avery Colter (Fard Engineers): Outdoor air has to come in either through mechanical supply, or if there is only mechanical exhaust there has to be a measurable outside air inlet. The range hood would be pulling more air through either of these.

n. Russ King (CalCERTS): The same building sealing requirements that are in QII are in the mandatory measures.

o. Jon McHugh (McHugh Energy): Aren't there harmful pollutants from cooking regardless of cooking heat source? This is the basis of the 62.2 ventilation requirements.

    i. Tom Paine (ConSol): This is true,

p. Avery Colter (Fard Engineers): Buildings near highways should not have exhaust only but have powered supply stages which can be filtered.

q. Russ King (CalCERTS): Getting rid of QII will adversely effect the quality of the conductive properties of walls without necessarily affecting the tightness of the building. The only real difference with QII is that the HERS rater inspect the building sealing requirements. Without QII the same requirements are required. they are just not inspected by HERS raters.

    i. Dan Johnson (Beyond Efficiency Inc): In agreement with Russ.

    ii. Matthew Christie (TRC): This is an incredibly valuable clarification. QII doesn't change the air-seal requirement. It confirms that the air seal was done to manufacturer's specifications.

r. Tom Paine (ConSol): In terms of IAQ and energy issues, the trouble is that improving IAQ usually requires an increase in energy use, making Title 24 not the ideal place to address IAQ issues.

Poll Results

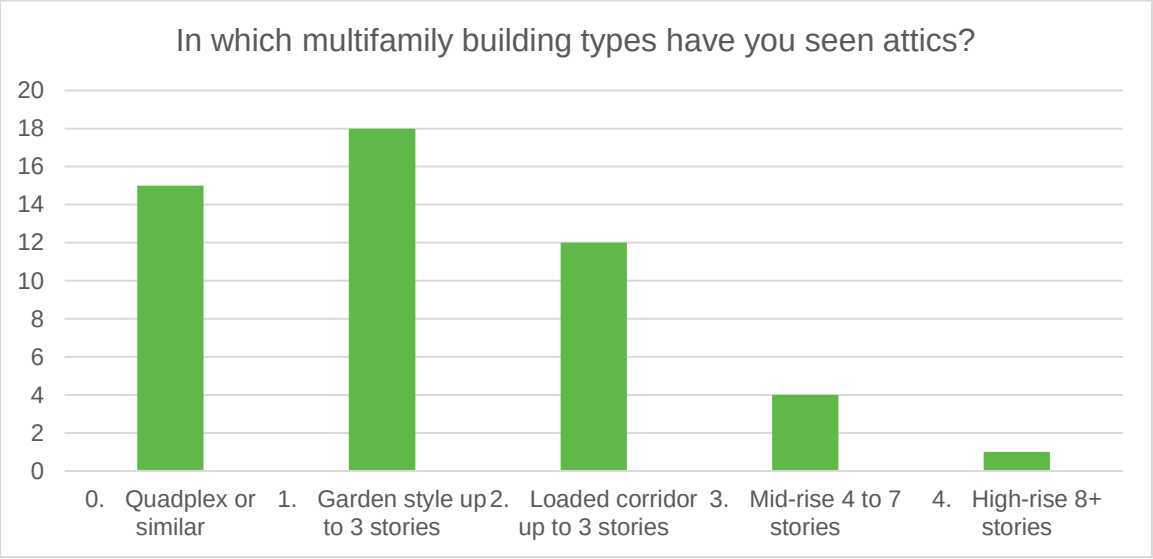
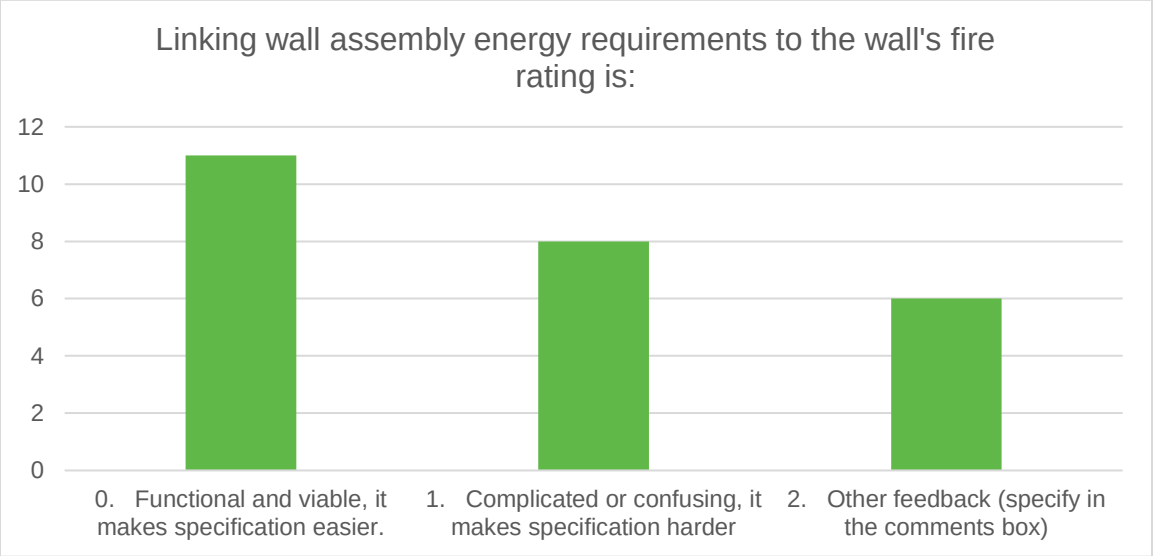


Figure 1: Results of poll 1, multiple answers.



Other: please specify
Give a performance rating like a fire rating and then list walls as a Fire/Energy rating system B/A for instance
Need more time to study implications of this
too many wall types/U requirements already, would benefit from unifying U-factors across wall type
Confusing because walls next to other high rise buildings will have different fire ratings than the front or back facades.
Differentiate between walls and ceilings. Would a table work?
I think fire and energy are two separate hurdles for a building designer and likely stay that way, so may not be necessary to link them

Figure 2: Results of poll 2, single answer.

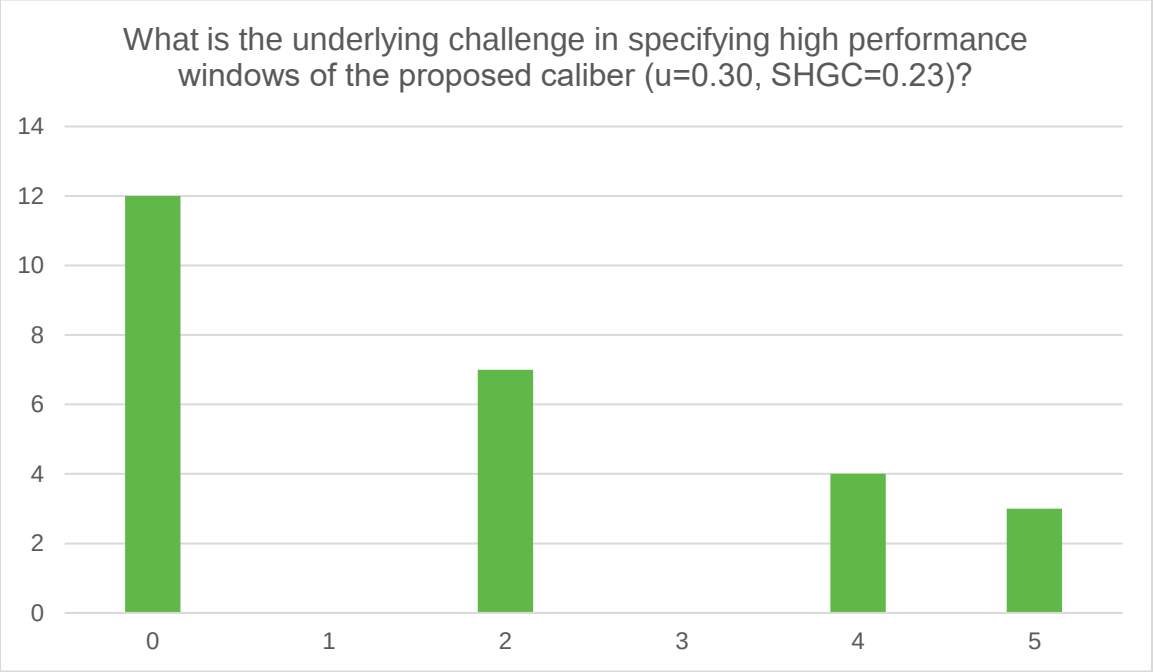


Figure 3: Results of poll 3, multiple answers.

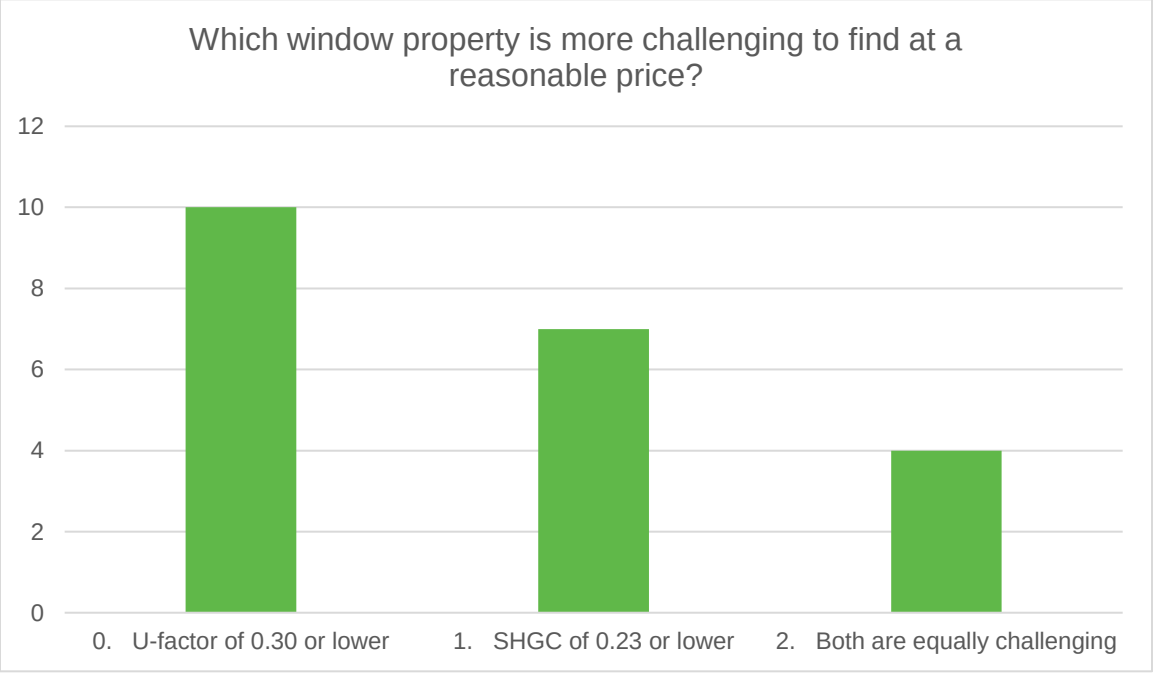


Figure 4: Results of poll 4, multiple answers.

<Missing Poll 5: Responses not captured for publication.>

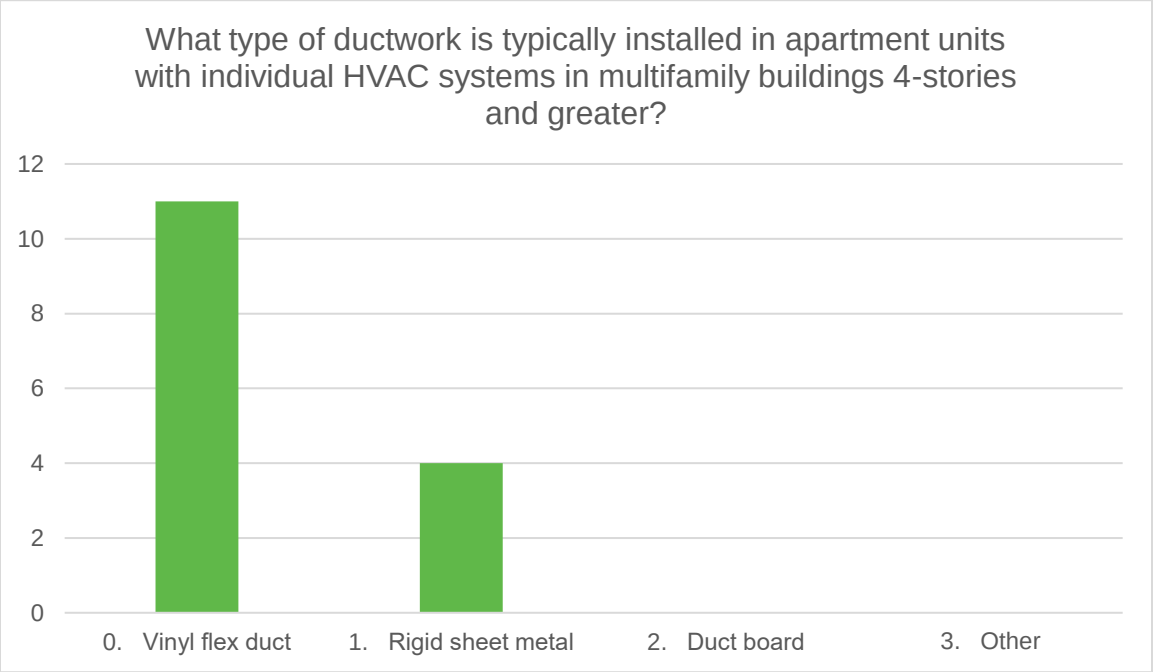


Figure 5: Results of poll 6, single answer.

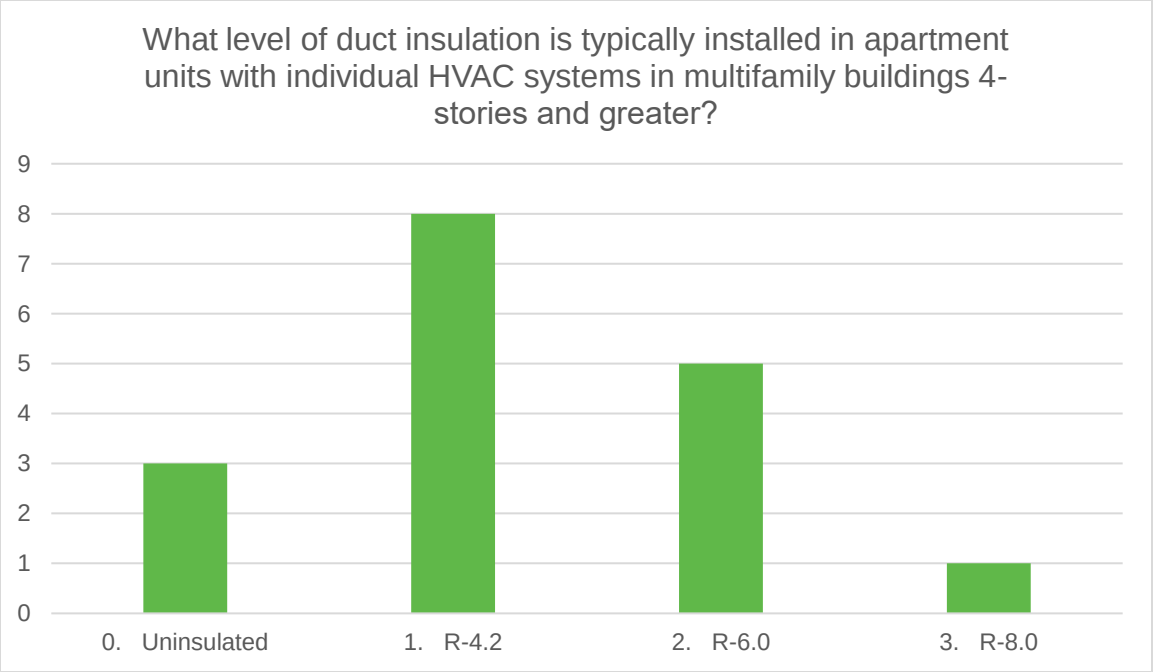
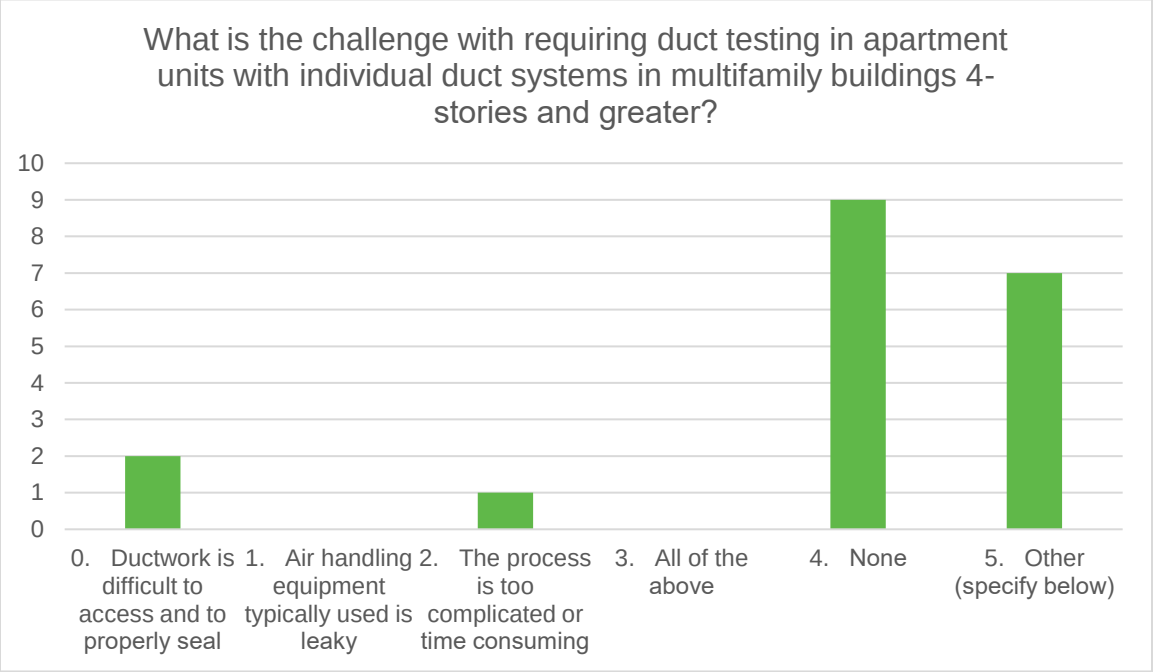


Figure 6: Results of poll 7, single answer.



Other - specify here:
ducts are difficult to access only after the ceiling is dry walled. I think an emphasis on rough testing is needed.
There can be issues with the return when a building cavity used. This can happen when a fan coil unit is in a closet
requires pretesting of a typical system to evaluate overall system leakage pre-drywall
Coordination with HERS rater to construction schedule
Is this aligned with compartmentalization testing of apartments per Ventilation requirements? does duct leakage to "outside" include to neighbors apartments? Usually drywall creates the compartmentalization boundary, but ducts may be concealed behind this
The contractors don't seal the equipment when it arrives, and they don't seal the ducts properly when installing it. This is an owner-driven construction compression issue.
Installers should generally want to do rough DLV while stuff is open.
No problem if you coordinate and sample!
Mainly VTAC & PTAC is used in low income housing and the only ductwork is freshair systems and exhaust IAQ. Will these need to be duct tested?

Figure 7: Results of poll 8, single answer.

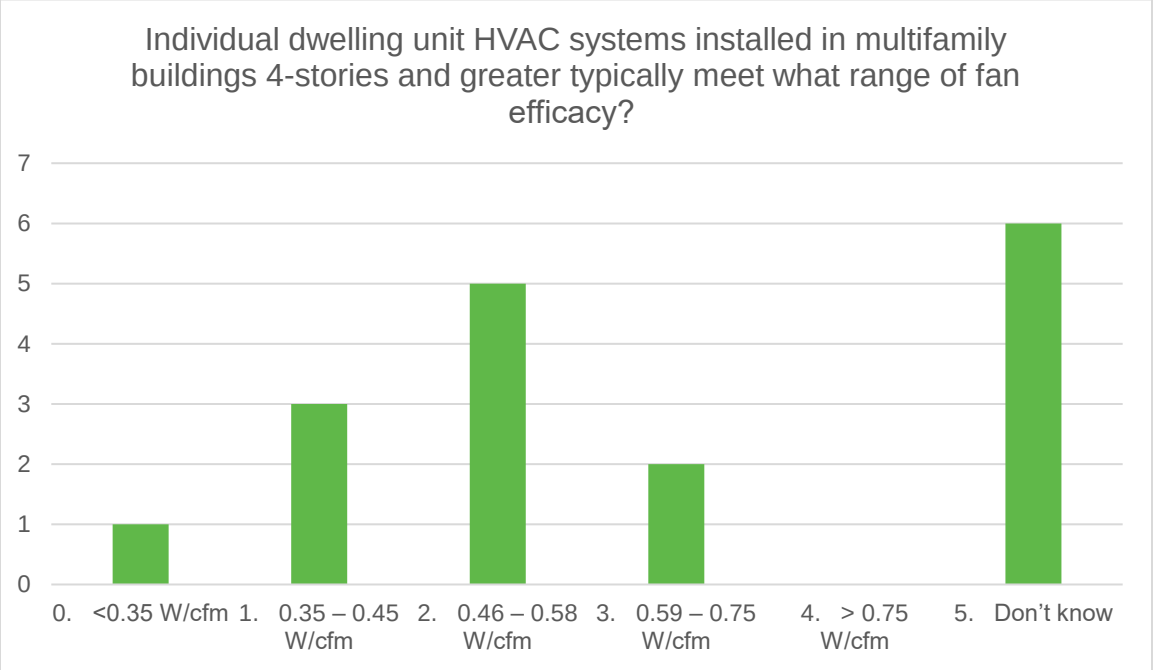


Figure 8: Results of poll 9, single answer.

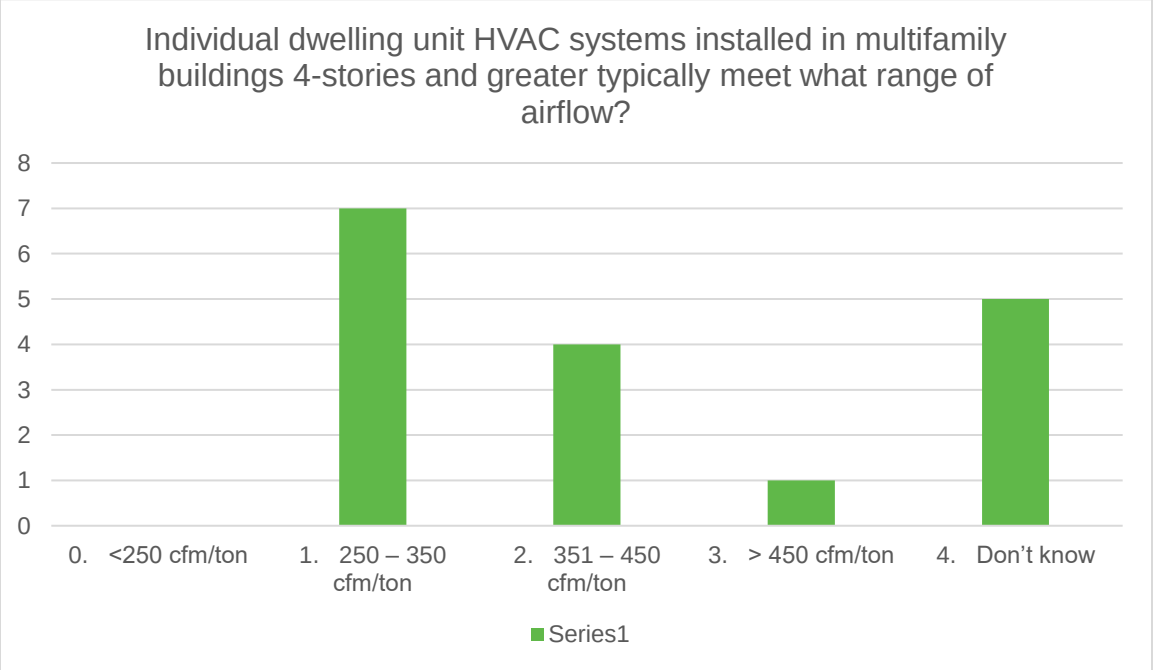


Figure 9: Results of poll 10, single answer.