DOCKETED	
Docket Number:	21-BSTD-01
Project Title:	2022 Energy Code Update Rulemaking
TN #:	238866
Document Title:	Transcript of May 27, 2021 for Lead Commissioner Hearing
Description:	N/A
Filer:	Amber Beck
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	7/14/2021 4:07:21 PM
Docketed Date:	7/14/2021

CALIFORNIA ENERGY COMMISSION

In the matter of:	)	Docket No. 21-BSTD-01
2022 Building Energy Efficiency Standards (2022 Energy Code)	)	

2022 BUILDING ENERGY EFFICIENCY STANDARDS

LEAD COMMISSIONER HEARING

REMOTE VIA ZOOM

THURSDAY, MAY 27, 2021

9:00 A.M.

Reported by:
Marlee Nelson

APPEARANCES

COMMISSIONERS

Andrew McAllister, Lead Commissioner

CEC STAFF

Payam Bozorgchami, Building Standards Office

Amber Beck, Efficiency Division

Danny Tam, Building Standards Office

Jeff Miller, Building Standards Office

Peter Strait, Building Standards Office

Maziar Shirakh, Building Standards Office

James Qaqundah, Building Standards Office

Michael Shewmaker, Building Standards Office

Cheng Moua, Building Standards Office

Javier Perez, Building Standards Office

TODAY'S SPEAKERS

Derek Benson, EnergySource

Dr. Rebecca Paisley, Cornish Lithium

Fernando Leiva, Professor, UC Santa Cruz

Lindsay Buckley, CEC

Richard Rojas

Alexandra Prisjatschew

PUBLIC COMMENT

Jon McHugh

Kevin Messner, Association of Home Appliance Manufacturers

Aaron Phillips, Asphalt Roofing Manufacturers

Will Allen, Consol

Mike Moore

Laura Petrillo-Groh, Air Conditioning, Heating and Refrigeration Institute

P R O C E E D I N G S

9:04 A.M.

THURSDAY, MAY 27, 2021

MR. BOZORGCHAMI: Thank you. So good morning, everyone. My name is Payam Bozorgchami, project manager for the 2022 Building Energy Efficiency Standards. I want to welcome you to the Energy Commission's Virtual Lead Commissioner hearings for the upcoming California Energy Code. The Lead Commissioner overseeing the work that's being done for the 2022 Energy Codes is Commissioner Andrew McAllister.

We have scheduled three hearings on the 45-day Express Terms, and we had our first hearing on Monday, May 24th. And this is the second hearing where we would like to receive your comments regarding the proposed language for Part 1 and Part 6 of Title 24. This hearing, we will not be taking, or we will not be taking any comments, or we will not have any discussions on the Environmental Impact Report.

MS. BECK: Payam, I'm sorry. I'm going to stop you for a moment.

MR. BOZORGCHAMI: Yes. I forgot.

MS. BECK: Can you please record?

MR. BOZORGCHAMI: Yes.

MS. BECK: Thank you.

MR. BOZORGCHAMI: So once again, we will not be --

COMMISSIONER MCALLISTER: Hey Payam, why don't you -- why don't you start over. Just at least do a quick version so we can make sure it's all recorded.

MR. BOZORGCHAMI: Sure.

COMMISSIONER MCALLISTER: Sorry about that.

MR. BOZORGCHAMI: Sure. Sure. Sure. I Apologize, everyone. I kind of got carried away for a bit there. So again, this is Payam Bozorgchami, project manager of the 2022 Building Energy Efficiency Standards. The lead commissioner overseeing the work that's being done for the 2022 Energy Code is Commissioner Andrew McAllister. And this is the second hearings that we're having on the 45-day Express Terms. We had our first one on Monday, May 24th, and we will have our third and last hearings on the 45-day Language tomorrow, Friday, May 28th. And like I said, these hearings are being led by Commissioner Andrew McAllister. And we do really

want to get your inputs on Part 1 and Part 6 of Title 24.

Before we start, I wanted to provide you guys some -- with some housekeeping rules. We will be muting everyone, and after each proposed subchapter's presented, you can either raise your hand and we will unmute you or you can submit your questions in the question and answer window. And we will have a group of panelists who will try to answer your questions. And if we can't, we have your information, we will reach out to you and have a discussion. Also, if you're participating by phone, you can use *9 to raise your hand and *6 to mute and unmute yourself. One important thing to remember is that when we do unmute you, you also need to unmute yourself from your side. That's just how Zoom works these days. So I may remind you if you don't unmute yourself.

This workshop is being recorded and it is being transcribed, as you saw me make that mistake earlier. I apologize for that. But when you do come to the mic or please state your name and your affiliation, so we know who we're talking to and who we need to reach back out to

if needed be. We are also going to implement a 3-minute rule today and we will ask for one speaker per organization to provide comments. But depending on the number of presenters or commenters that would like to make a comment, we may shorten that time period so we could get through everything we want to. And we have a lot to cover today. And one of the areas that we're going to be covering today is the multifamily. That's very extensive, very detailed change that we've done this Code cycle to the standards. Before we start, Commissioner McAllister, would you like to give a few words?

COMMISSIONER MCALLISTER: Yes, sir. Thank you, Payam. Thanks, everyone, for being here. I thought Monday was a very productive day and I'm really looking forward to today as well, where we get through the Single-family and then move on to the Multifamily in the afternoon. We may be able to modify that and accelerate or have to push back, depending on how much comment we get and how much discussion there is.

So really appreciate folks giving us some indication of their desire to comment so we can kind of manage the time and make sure everyone

has a chance to comment. And then also, you know, more or less keep on the schedule that we've set out. As Payam said, there is a lot to cover. So I want to just encourage people to help the whole proceeding be efficient with time. But absolutely, we want to hear from everybody who has something to say to add. I would ask that to the extent possible people, you know, kind of respecting that process and being aware of everyone's attention here when we have a lot of people on the call and, you know, the right staff on line at the right moment, throughout the course of the day, if you can -- if folks who have comments about the specific sections try to make their comments at the time for that section, and then more general comments that aren't sort of specific to a given section or the language that we're going through, but if you could hold that until the public comment period, that would be helpful. That lets us manage the flow of the day and make sure that we that we get everybody in at the appropriate moment in a way that kind of helps the content develop as optimally as possible. So we really appreciate that.

I want to just thank Payam, Staff, Will

Vicent, the lead of the -- office manager of the Building Standards Office, Mike Sokal, the lead on the Efficiency Division, the deputy over the Efficiency Division. I want to -- just really appreciate you and all the staff who will be presenting today. Lots of work, obviously, has gone through this proposal to get to the point we are today with this proposal, with literally many, many hundreds of comments and dozens and dozens of workshops and just an extensive process. So really appreciate everyone's commitment to really pushing the Building Code to be all it can be and sort of be the appropriate assertion of California's leadership in this arena. Building codes are you know, they're a big, big deal. They're a great policy instrument that we have in the State.

Speaker1: And there's a lot of alignment now with the federal government. And I think there's a lot of really good, positive momentum in the direction we're trying to go. So hearing that together with Europe, hearing that across the different states, you know, folks are looking at this and I think it's a, you know, happy with all the engagement that we've gotten.

Certainly, the stakeholders that are here with us today are really the lifeblood of the process. So I want to thank you again all for being here on Monday, today, and tomorrow. It's a long week of hearings, so I really appreciate everyone. So with that, I think and again, as Payam said, I don't think -- I don't think he said it again in a recorded piece, but this is about the Express Terms, the 45-day language. It's not about the Environmental Impact Report. There will be a separate process for that. That report has been posted and is available for everyone to look at, but it is separate from this. So I just wanted to be clear about that. So with that, thanks a lot. And looking forward to today. And back to you, Payam.

MR. TAM: Payam, I think you're I mean, muted.

MR. BOZORGCHAMI: Sorry, I'm having a little bit of computer issues this morning. Apologize.

So what we're going to be covering today, as Commissioner McAllister alluded, we're going to be starting out with the Low-rise Residential Requirements for Mandatory Performance, Prescriptive Additions, and Alterations. What

you see in red in the agenda, these areas and these sections and subsections were presented on Monday, May 24th. So we will not be presenting on these areas again today. We will try to provide a break, either after Subchapter 7, we will have a quick open up to the microphones for any questions and answers after Subchapter 7 and 8, or after every subchapter. And we will make it, we'll look and do a time check and see if we need to take a break and we'll take a break either between Subchapter 7 or after Subchapter 8. After the residential sections are done, we will open it up for all comments on the residential sections. And if there is not, we will do another time check and see if we should go ahead and start Multifamily Section Subchapter 10. We -- starting with the mandatory requirements. If not, we'll just jump into lunch and do a 30 minute lunch break. Unfortunately, we have a lot to cover, and I just want to make sure that we're done before 5:00 o'clock.

So with that let me start like I always start with the quick history of the -- of all this process and how this all started.

Two California Assemblyman Charles Warren

and Al Alquist co-authored what is known today as the Warren Alquist Act. This Act gives authority to the Energy Commission to develop the Energy Code on a triannual basis and local jurisdictions to enforce the Energy Codes through the building permit process. The Energy Code is developed to reduce the wasteful uneconomic, inefficient, and or unnecessary consumption of energy.

This Act was signed into law in 1974 by Governor Ronald Reagan. The California Energy Commission was launched by Governor Jerry Brown in 1975 with the appointment of the first five commissioners and the Commission immediately set out to meet the extensive mandates of the Warren Alquist Act, including the adoption of the first Building Energy Efficiency Standards that went into effect in 1978. Other goals that have been recently bestowed on us here at the Energy Commission to the Energy Code. We need to consider reduction of greenhouse gases and some of the ideas in some of the areas that we've looked into, and we're still looking into, is self-utilization of PV generation, looking at reducing residential building impact on the electricity grid and other areas that where we

can ensure cost effectiveness to society and to the building owners as we move forward.

I always bring this slide up and a lot of people are tired of this slide. But I just need to make sure everyone's clear that California's climatic zones are different than what IECC has for California. IECC has Death Valley and Sacramento in the same climate zone, that's Climate zone 3. And that really doesn't make sense for us here in California. So earlier on in in Code development, back in the early 80s, California decided to investigate the State and look at heating degree days and cooling degree days. And we came up with the 16 climate zones that we are familiar with for California today. California has -- Death Valley has Climate zone 15, one of the hottest regions in the country, if not the world, and Climate zone 12 is Sacramento.

Staff, with the help of our consultants and our utility partners, being Pacific Gas and Electric, Southern California Edison, San Diego Gas and Electric, Sacramento Municipal Utility District, Los Angeles Department of Water and Power, who with their consultants help support our efforts and move into measures for 2022

forward.

For this Code cycle our utility partners conducted or had 25 workshops where they presented their proposed measures that they're going to be proposing to the Energy Commission, to the public and try to get feedback from the public to make sure that they've picked up all the concerns and comments and they have a proposal that makes sense for California. California's staff --Energy Commission staff conducted 18 workshops during our Pre-Rulemaking to present the proposed language as the proposed measures that we're going to be discussing in these hearings. And also what's been presented for the 45-day Express Terms.

The Energy Commission also did receive proposals from two entities, one being the California Energy Alliance and another one from a company named Furtive [ph.]. One thing I do personally want to do, I would like to thank Alana Torres, Heidi Warner from Energy Solution, and Kelly Cunningham from Pacific Gas Electric, who really did a fabulous job keeping the coordination for the Pre-Rulemaking and the continued support throughout the release of the

Express Term and the 45-day Language. Really, without the three of them, we would not be where we're at today. We'll still be at the drawing board trying to figure things out. Everything that we are presenting today did go through a Lifecycle Cost Analysis using the latest TDV values to show the cost effectiveness to the building owner.

Attached is a schedule of bar codes for now to the effective date. One question, one comment, one request, one favor I have for everybody is from these hearings that you're hearing this week, these three Commissioner led hearings, we would love to get your comments sooner than later. Yes, formally, we were supposed to get comments by June 21st, but if the sooner we get your comments, the better we could work on and get a better set of Standard Language out for public review and adoption at our business meeting that's going to be held on August 11th. That doesn't mean that we're done. We still have to work on a lot of things from now to the effective date. That we still have software to develop, we've got compliance manual, the electronic documentations needs to be -- all

be developed. And we have to go to the California Building Standards Commission for approval by January of 20 -- or excuse me, I think our date is set for December of 2021.

We're hoping that meanwhile, Staff and consultants and the public, you folks were working together to develop the compliance manual and have those ready. Our goal is to have them ready a year in advance of the effective date, but I think with everything going on for this Code cycle, with the Covid and all of the other issues, I think we're might be a few months late for that. So we might have -- we will have those, at the latest, ready by February of 2022.

Earlier on, both myself and Commissioner McAllister alluded that this workshop is not for the discussion of the Environmental Impact Report. We will not be taking any comments, or we will not be presenting on any topics within the Environmental Impact Report. This pretty much is the only slide you will see on the Environmental Impact Report. But if you're interested, this is the website and the Docket Number 21-BSTD-02, where you can get a copy of the report, evaluate it, and if you have

comments, public comments are due by July 8th for the Environmental Impact Report.

One ask I have is please do not make the mistake of submitting comments to the Docket for these hearings to this Docket Number. It will not be evaluated. We have for this hearing, the Docket Number is 21-BSTD-01. Once again, it's 21-BSTD-01. And our comments, we're hoping that we get them sooner than later, but at the latest, we need them by June 21st. You'll see this Docket come up over and over again through the -- through the hearings today.

The Building Energy Efficiency Standards email address and link, excuse me. The website is here. This is where you can get the latest information on Title 24, Part 6 and Part 1. All the compliance documents and all the information you need for compliance. And you can get a copy of the latest or you could get directions to go to the latest proposed measures for 2022. Our Pre-Rulemaking Workshop Docket is where we have all of our comments that we receive. All of the Express Terms that we drafted during the Pre-Rulemaking is on this website. And the last one is the website to the utility sponsored

stakeholder website where the utilities have comments and draft case reports of what they proposed to the Energy Commission.

Once again, and I said that earlier, you will see this slide over and over again. I just want to make sure that you guys have the proper information to submit comments to us. Here is the link. And if you do want to, and I encourage not to, but if you do want to, you can submit your comments in writing at the address below. And the reason I'm not encouraging you to do that is because we're not in the office. And by the time myself or Peter Strait or someone else gets those comments, it might be a little bit short on time to really dig in and try to evaluate the comment and the concern.

With that, is there any questions? And if not, we're going to go right into the presentation by Danny Tam on the Mandatory Minimum Express Terms for Residential Rise Single-Family Buildings. Danny?

MR. TAM: Hi. Good morning. Hi. I'm Danny Tam, CEC staff. I'll be presenting, along with Jeff Miller, the Proposed Mandatory Changes for Single-Family Buildings in Subchapter 7.

First, in Section 150.0(a), we are proposing to add a new mandatory requirement for roof deck insulation in climate zones 4, and 8 through 16. The maximum U-factor would be .184. There is also the exception if the ducts and air handler are located in the conditioning space. This U-Factor is based on R-4 below the deck of a 2.416 entron [ph.] center.

Okay. Section 150.0(j)1 is the mandatory requirement for EnviroSource tank insulation. We have a longstanding requirement for external insulation wrap for unfired tank. And the proposed changes are for clarity and to update that required R-value based on the current federal minimum standard for unfired storage tank. We also have an existing alternative to the wrap, and that has been written as an exception. 150.0(j)2 is the mandatory pipe insulation requirements. The proposed changes we move some legacy Part 6 pipe insulation requirements to align the Part 6 requirement with the Part 5, the California Plumbing Code. This is done to reduce confusion and for better code compliance and enforcement.

Okay. Section 150.0(k), this is where we

organized to
improve usability and to reflect changes in lighting. There are some updates to the subsections to reflect changes in the lighting marketplace from legacy light source to LED light sources, as well as clarification of the indoor lighting control requirements. There are also updates to table 150.0(a), with clarifications on inseparable SSL luminaires, LED tunable light sources. Title 20 general service LED lamps and others.

Currently there are two proposals 15-day language change. One is to acquire -- require JA10 flickering tests for LED tunable sources. The second is to remove the color light source from item 2. Item 4 has already included colored light sources.

Okay. Now I turn over to Jeff Miller. He will be presenting the rest of the section

MR. MILLER: Good morning. This is Jeff Miller, Energy Commission staff. Are -- can you hear me okay?

MR. TAM: Yes.

MR. MILLER: Thanks. Okay. Requirements in 150.0(m)1B were revised to reduce the duct R-

value that is required when that system is located entirely in conditioned space. Oops, sorry. R-values were specified based on research that determine moisture condensation on ducts would not be expected to occur when ducts have insulation with at least R-1 when the duct surface emissivity is greater than or equal to 0.8. Or alternatively, insulation with at least R-3 when the duct surface emissivity is less than 0.8.

Exception 1 was clarified to better describe the characteristics of the exempt types and their locations. The ducts intended to be exempt are rectangular sheet metal ducts that completely fill interior wall cavities, which cannot be insulated due to there being no room in the wall cavity to add insulation. CEC staff are in dialogue with California homebuilder stakeholders and space conditioning system manufacturer stakeholders who have proposed changes to this 45-day language. Therefore, the R-value requirements shown in Section 150.0(m)1B and the 45-day language may undergo revisions for the 15-day day language, depending on the outcome of CEC staff discussions with stakeholders and

further evaluation of the available research. Next slide.

Section 150.0(m)11, which covers duct sealing and duct testing was revised to delete the reference to Residential Appendix Table RA3.1-2 to explicitly reference the air handler airflow specifications in Section RA3.1.4.2 and to clarify terminology used for air handler airflow. Section 150.0(m)12, which covers air filtration, was revised to clarify that make-up air systems must comply with the same requirements as required for other supply ventilation systems, and to add a new requirement to specify air filter racks or grills be gasketed or sealed to eliminate any gaps around the filter to prevent air from bypassing the filter. Requirement was needed because air filter bypass can greatly degrade the air filter effectiveness. Next slide.

Section 150.0(o) covers ventilation and indoor air quality. The 2022 California Energy Code Update proposes to adopt the most recent version of ASHRAE 62.2 with the 2019 version. ASHRAE 62.2 is the ANSI Standard for Ventilation and Acceptable Indoor Air Quality in Residential

Buildings developed and published by the American Society of Heating, Refrigerating and Air Conditioning Engineers. The 2022 California Energy Code Update also proposes California amendments to the 2019 version of ASHRAE 62.2. Section 150.0(o) was updated to specify the sections of 2019 ASHRAE 62.2 that are not proposed to be adopted by reference, which is necessary in order to clarify the California amendments to ASHRAE 62.2.

Mechanical ventilation, air flow rate requirements are now specified only in Section 150.0(o). Thus the required ventilation airflow is no longer specified by reference to ASHRAE 62.2.

Section 150.0(o)1B was updated to clarify the requirements for central fan integrated ventilation systems, including specifications for use of outdoor air dampers, controls and variable ventilation controls. The same requirements are specified in the multifamily section. Next slide.

Section 150.0(o)1G: Local Mechanical Exhaust was added to incorporate the ASHRAE 62.2 Section 5 requirements entirely, to place them

into 150.0(o)1. This was done to better facilitate specifying the proposed California amendments to these local mechanical exhaust requirements. The updated restrictive ventilation duct sizing table in ASHRAE 62.2 is included as a table 150.0-H. And ASHRAE 62.2 Table 5-2 is included in -- as table 150.0-F. Next slide.

The next few slides describe the California amendments to ASHRAE 62.2 local exhaust requirements. ASHRAE 62.2 Table 5-1 is included as Table 150.0-E with amendments to incorporate the California proposed increased airflow rates and capture efficiency for range hoods. The ASHRAE 62.2 exception to Section 5.1 for alternating designs is not included in Section 150.0(o)1G, thus it is not proposed to be adopted by reference. Table 150.0-G, which is new for kitchen range hood - kitchen range hood ventilation rate and capture efficiency. Justifies the California proposal for kitchen range hood compliance for increased airflow rates or alternative compliance using ASTM E3087 capture efficiency ratings. Next slide.

These are the proposed -- these are the

proposed new compliance targets for kitchen range hood airflow or capture efficiency. The applicant will be required to install a kitchen range hood that is rated to meet or exceed either the required capture efficiency or airflow target as specified in this table, based on the floor area of the dwelling unit and the fuel type available in the dwelling units kitchen. Next slide.

This slide continues the description of the California amendments ASHRAE 62.2 local exhaust requirements. The ASHRAE 62.2 Section 5.3 reference to ASHRAE Guideline 24 was not included. This is because ASHRAE has withdrawn guideline 24. Airflow rate measurement for local exhaust by the installer was clarified in Section 150.0(o)1Giv as follows: Only the measurement methods given in RA3.7 are specified. Option for use of manufacturer's other airflow measurement methods are not included. The airflow rate required when capture efficiency is used for compliance is specified to be greater than or equal to the airflow rate corresponding to the capture efficiency rating point. And Table 150.0(H), which a prescriptive duct size table

may be used when capture efficiency is used for compliance, regardless of the static pressure at the capture efficiency rating point. Next slide.

And these are the remaining California amendments to 2019 ASHRAE 62.2. Sound ratings specified in Sections 150.0(o)1Gvi and 150.0(o)1H where it clarified to reference the flow rates specified in Sections 150.0(o)1C and 150.0(o)1G instead of the air flow rates specified in area 62.2 sections 4 and 5. And this is because all airflow rates are now specified in Section 150.0(o) instead of by reference to ASHRAE 62.2.

Air flow measurement of whole-dwelling unit ventilation in 150.0(o)1H specifies only the methods in RA3.7. This is not a change for California Energy Code, which has always specified the protocols in RA7, but it is a California amendment to ASHAE 62.2. The labeling requirement for whole-dwelling unit system on-off control in Section 150.0(o)1J was revised to improve clarity. Section 150.0(o)1K is new, it references the relevant combustion air and outdoor makeup air requirements in California Mechanical Code and ASHRAE 62.2 Section 6.4 and limits use of atmospherically vented or a solid

fuel burning appliances to dwelling units greater than 1000 square feet of floor area when the appliance is installed inside the dwelling units pressure boundary. Next slide.

And these are the changes to the HERS Field Verification requirements in Section 150.0(o)2. Section 150.0(o)2A, whole-dwelling unit ventilation airflow measurement has added the ASHRAE 62.2 to specification for determining balanced ventilation system air flow rate and the ASHRAE 62.2 specification for measurement of systems with multiple operating modes. Section 150.0(o)2B, kitchen local exhaust was clarified to be applicable to vented range hoods. Also the specification for use of capture efficiency ratings for compliance has been added in accordance with the proposed use of ASTM capture efficiency ratings. In Section 150.0(o)2C is new, it includes verification of the HRV or ERV fan efficacy ≤ 1.0 watt per cfm. And this was added to be consistent with the mandatory requirement specified for multifamily systems.

And I believe that concludes my presentation.

MR. BOZORGCHAMI: Thank you, Jeff. Thank

you, Danny. So we're going to open it up now for questions and answers if you want. One thing I do want to bring up, that if you feel that this is not ample time, three minutes or less, you can always submit your comments to our Docket, and we will review those one more time and submitted comments is just as valuable as raising your hand and us hearing your comments here today. And also, one thing I wanted to bring up one more time is the sooner that we get your comments from today's hearing, the better we are. If we could get them by next week or the week after would be best. Thank you.

And for that, I'm going to raise -- John McHugh has raised his hand. Please state your name and affiliation.

MR. MCHUGH: Can you hear me now?

MR. BOZORGCHAMI: Yes.

MR. MCHUGH: This is John McHugh representing myself as a private citizen. The following comments are concerning the changes to Table 150.0(a), and then ultimately how this is reflected in the new Table 160.5(a) for the new multifamily section. In the EIR document I submitted detailed comments

describing how the proposed changes would remove consumer and health -- public health protections associated with the JA8 requirements for testing, listing, and labeling of lamp's in regards to color, quality, flicker, longevity and which lamps are suitable for installation in enclosed or recessed luminaires. However, these comments today are about the enforceability of the proposal. Earlier this year, I downloaded the JA8 database with a listing of all the quality and performance characteristics described for 62,000 LEDs. Of these, 54,000 of the entries are for inseparable luminaires and under the proposed change, perhaps none of these would be required to be JA8 tested, listed or labeled. There are also 1,600 omnidirectional lamps in the JA8 database, and as Title 20 general service lamps, these would no longer be required to be JA8 tested, listed or labeled. There are also 1,700 directional lamps, a substantial fraction. You know, it's a little bit more difficult to understand which is Title 20 regulated general service lamps. So there's some, you know, that's -- that creates another level. For the remaining 6%of the sources in the database, some fraction

of these would be exempted if they are dim to warm or color tuning.

So this change is a major change to the standards. And my concern in regards to enforcement is that the proposal undermines the relatively unambiguous regulatory regime of the JA8 test list in labeling and renders this simple, unambiguous and unenforcement of LED efficacy and quality standards into something that is ambiguous and difficult to enforce. Under the current enforcement mechanism, if you have an indoor luminaire that is capable of providing white light, the luminaire or its light source shall be labeled JA8. Under that proposal, the building inspector would now have to determine whether an inseparable light source or colored light source is providing general lighting or is providing decorative, accent, display, utility, under cabinet, or special effect. Has there been any discussion with standards enforcement about the feasibility of parsing this? I can imagine that there could be some lawyering.

MR. BOZORGCHAMI: John.

MR. MCHUGH: Yeah.

MR. BOZORGCHAMI: I apologize, but you need to wrap it.

MR. MCHUGH: I'll wrap up. Some were kind of [indiscernible] for the Title 20 lamps. These are not labeled so how does the inspector know whether or not the Title 20 lamp is labeled? I'll provide more detailed comments to the record, but --

MR. BOZORGCHAMI: Thank you, John.

MR. MCHUGH: Yeah. Thank you.

MR. BOZORGCHAMI: Comment due noted. Thank you, John. Peter, do you want to respond, or do you want to respond later?

MR. STRAIT: I can -- I can provide a limited response. But again, I think there's a larger more detailed topic. And I would look forward to going through the comments in writing. There have been some differences in interpretation of how the changes to the Table 150.0 would apply. You know, how many would of the inseparable luminaires have either dim to warm functionality or a color changing functionality, etcetera? And the intent of how we're trying to scope this, the intent of the changes are that lamp -- luminaires that have dim

to warm or color shifting features necessarily have ballasts rather than kind of like a ballastless lamp. That would be theoretically possible to connect directly with the line voltage if it was operating a single color.

Because of these features, the question is, is there a -- is there a similar risk of flicker that there was for lamps that were considered when these were -- regulations were adopted? And if so, is there a risk that's sufficient for a government intervention to be appropriate? These are lamps that were, or these are luminaires, I should say, that were not originally considered when these regulations were adopted. And so continuing to apply these regulations to these new class of luminaires, we have to evaluate whether it's appropriate too. So and which requirements out of JA8 are appropriate to do so.

We do agree that there may be a reason to retain flicker requirements specifically, but possibly not requirements in other areas. We're going to be evaluating how we might either edit J - edit the Table 150.0-A or edit JA8 to make sure that we're applying appropriate standards to

appropriate products. But for example, we still have a lumen maintenance requirement that was critically important when LED lamps were first emerging as a technology. But nowadays, every luminaires that we see listed practically has a lifespan well in excess of 100,000 hours, meaning that it's questionable whether the -- a burn and test that requires thousands of hours for a manufacturer to complete remains necessary for this technology.

So we're -- we will be evaluating some of these on the subject of lamps that are regulated by Title 20, this is just a question of removing duplicate regulation. The requirements in Title 20 are substantively highly similar to, if not identical with the requirements that we have here for JA8. So we're bringing these two into alignment. It wouldn't be true if these would be unregulated, we would simply allow the Title 20 process to regulate these products and hold them to an appropriate set of quality standards.

So we will -- we will consider the comments that John McHugh is promising to prepare and submit. We are going to be making some revisions to how these apply. It is likely that

we will be retaining flicker standards, but that other standards that don't -- that for where the -- where these new class of products have not demonstrated to have a shortcoming in need of some sort of government oversight, we might pare back what's required to apply to those products. Again, in part because these products weren't part of the original consideration when these regulations were drafted. And we want -- we need to do our due diligence to make sure that these are still appropriate to apply and provide material value in doing so.

Payam, if you are trying to speak you are muted.

MR. BOZORGCHAMI: Kevin Messner, please unmute yourself and state your name and your affiliation.

MR. MESSNER: Thank you. This is Kevin Messner, the senior vice president at [indiscernible] Association of Home Appliance Manufacturers. I will, debrief --

MR. BOZORGCHAMI: Kevin, I believe we just lost your audio. Kevin, can you --

MR. MESSNER: I'm here.

MR. BOZORGCHAMI: Sorry about that. I

don't know what's going on.

MR. MESSNER: Okay. No problem. It's Kevin Messner with the Association of Home Appliance Manufacturers. I will be -- try to be brief and will submit more detailed comments in writing. But I just wanted to touch on a couple issues. First of all, I really do want to thank CEC staff and others. The work, I think it's been -- you know, you all have been listening.
Speaker5: We still have some concerns with issues. But I believe that you guys are listening and have -- and have worked through some things and some areas in a positive way. So I want to thank you for that.

Couple of those are the issue that's been around for a while with the issue with LED lamps and range hoods with exhaust fans and the problems that deal with LEDs degrading over time. So it looks like that's been addressed in 150.0(k)1. Also, the addition of [indiscernible] new directory in the building codes. That's good to see. The table that looks at -- it treats the gas, the CFM requirements are a lot higher for gas than electric.
We may be commenting on that if it's realized

there's a overall objective to disadvantage gas, but wanted to try to - we think that it's a -- it may have gone, the scales might have gone a little too far on that in an effort to try to disadvantage it more than the data shows. But we'll provide more details on that in our written comments.

I think I'll just stop there and really, again, wanted to say thanks for the collaboration and the back and forth from Staff throughout. This has been a long process. This goes back for a long time. So I think some things are actually being addressed in a good way, from our perspective, and others gone a little too far. But thanks again. I'll stop there.

MR. BOZORGCHAMI: Thank you, Kevin. Next, Aaron I'm going to unmute you. Go ahead and state your name and affiliation. Thank you.

MR. PHILLIPS: Thanks, Payam. This is Aaron Phillips. I'm vice president of Technical Services for the Asphalt Roofing Manufacturers Association. And we just want to thank Commissioner McAllister for hosting this hearing and the CEC staff for providing this opportunity for input. We've had good exchange with the

staff throughout this process and just to thank them for that.

I do want to start out by saying many of the proposed changes that are brought forward in the Express Terms that affect the roofing industry are reasonable, and ARM doesn't oppose most of those, although we do not fully agree with the cost justification for all of those provisions. But I do want to share ARM's objection to the proposed mandatory provision in Subchapter Seven, Section 150.0(a.)1 that requires a minimum amount of insulation at the roof deck level of all newly constructed single-family residential buildings and all additions to such buildings. This provision was introduced very late in the development process, providing limited opportunity to assess it. Let me just highlight a few concerns and we have offered written comments as well into the docket.

First, when we mandate insulation at the roof deck level. We're fundamentally changing the design of attics and the dynamics of moisture management in attics and potentially permitting moisture build up, which can lead to mold and mildew growth and create health issues for

occupants. This mandate permits numerous combinations of insulation types and locations, some of which may not function properly. And I'm curious to know what steps have been taken to validate that functionality for all the combinations that the proposed language permits.

Second, all roofing systems have to comply with other building code provisions of the building and residential codes. And again, when we just mandate putting insulation at a particular location in the building, we potentially affect compliance with those existing provisions and create a conflict between the buildings residential codes and the Energy Codes. Just want to know if CEC has considered the effect of this provision on potentially creating such conflicts.

And then finally, just as a general point, ARM is not a fan or an advocate of mandatory requirements. We believe those preclude innovation and apply a one size fits all approach. We support flexibility in design and construction as the best approach to achieve the needed energy efficiency improvements.

So again, thanks to Commissioner

McAllister and CEC staff. We appreciate this opportunity to offer our comments. Thank you.

MR. BOZORGCHAMI: Thank you, Aaron.

MR. SHIRAKH: May I ask a question?

MR. BOZORGCHAMI: Sure.

MR. SHIRAKH: This is Maziar Shirakh. So this requirement is a R-4 roof deck insulation. The prescriptive requirement currently is an R-19 in most cooling climate zones and all. So I guess I'm a little bit puzzled at how is the industry complying with the current R-19 prescriptive requirements. Are they -- this is a substantial credit for R-19. Is it being traded away, and if it is, what measures are being used to trade away the R-19.

MR. PHILLIPS: Mazi, I don't -- I can't speak directly to that. I can offer an opinion, but we're not directly involved in the installation of the insulation. That's more a question for the designer and the insulation installers.

MR. SHIRAKH: Mm-hmm.

MR. PHILLIPS: But my expectation is they're probably using and installing all the insulation at this -- at the roof deck level.

This provision really talks about splitting that insulation and putting a portion of it at the ceiling level and portion of it at the roof deck level, which I think creates a lot of confusion and a lot of potential problems.

MR. SHIRAKH: So I don't know, maybe Payam can explain this, but this is not splitting. I mean, we assume that this R-38 at the ceiling level. And so this would require just a minimal amount of insulation at the roof deck and research has shown that even R-4 can dramatically drop the attic temperature by 30 degrees Fahrenheit. And we're trying to basically take advantage of that. And --

MR. BOZORGCHAMI: So one thing, Mazi. I need to jump in real quick. When you say both insulation at the roof deck and at the ceiling, we're talking about a ventilated attic and a study done by Ian Walker at LBNL on homes in the Fresno Region and other regions around California, showed that by doing so also, we really did not see any mold or mildew growth, per se. And as long as it's ventilated.

MR. SHIRAKH: Right. So if it's ventilated, then we got two layers of insulation,

one at the roof deck, one at the ceiling. And yeah, the LBNL and others have demonstrated that there is no, potential no moisture issues. In unventilated sealed attics all the insulation is going to be at the roof deck anyways, and so I don't know how that conflicts with this provision. It's usually they use a spray foam, and you automatically meet both the mandatory requirement and the prescriptive requirement at the same time. So you probably have to have another --

MR. BOZORGCHAMI: Yeah. I think -- I think, Aaron, we're going to have to have a discussion offline on this issue.

MR. SHIRAKH: I want to understand your issues better.

MR. PHILLIPS: Well, that would be appreciated, Gentlemen. Thank you.

MR. SHIRAKH: Thank you.

MR. BOZORGCHAMI: Thank you, Aaron. Thank you so much. Will, I'm going to unmute you. Go ahead and state your name and affiliation.

MR. ALLEN: I think I just unmuted myself. This is Will Allen with ConSol. I just

wanted to comment on the duct insulation exceptions that were mentioned earlier. I'd like to thank, first of all, Payam and everyone else at the CEC staff for the ongoing discussions we've been having on that and note that we will be submitting, you know, written comments in advance of the 21st of June deadline. I just wanted to note that we consider this to be the tightening of the regulations compared to 2019. Seems to be a solution in search of a problem, given that the research that we're aware of suggests that any condensation on uninsulated ducts and cavities would not be an issue for either building safety or energy use. And so with that, again, thank you all for -- thanks to Staff for the ongoing discussions we're having.

MR. BOZORGCHAMI: Thank you, Will. And we look forward to keep that discussion and dialogue going on that topic. Thank you.

MR. STRAIT: Given that there are no more bystanders, should we do the typed Q&As?

MR. BOZARGCHAMI: Yes, please.

MR. STRAIT: All right. So taking these in order, Laura Petrillo-Groh asks, Section 150.0(j)1 appears to have a conflict with the

Federal Standard for Unfired Hot Water Storage Tanks. The Federal Efficiency Standards for Unfired Hot Water Storage Tanks are established with an insulation of R-12.5. Would we explain how proposed insulation requirements -- our proposed installation requirements do not create a conflict?

MR. TAM: Yeah. This is Danny Tam, CEC staff. I'll take that one. So the requirement, it's the insulatio9n wrap. So that's a longstanding requirement going way back to the 80s. So there would -- the actual requirement is the insulation wrap. So we provided an alternative to that requirement if you have a tank insulation of R-16 or above. So that -- that's why that section was rewritten so that, you know, that's more clear. That's written as the exception. But the actual requirement is the wrap itself.

MR. QAQUNDAH: And if I can just jump in, if there's any more detail or anything, we would encourage that comment to be submitted in writing with any more detail so we could take a close look at it as well.

MR. BOZORGCHAMI: And that was, Jimmy,

please state your name and affiliation.

MR. QAQUNDAH: Sorry. James Qaqundah. Jimmy Qaqundah, from CCO.

MR. BOZORGCHAMI: He's a staff member at the California Energy Commission.

MR. QAQUNDAH: Correct.

MR. STRAIGHT: Next question then is from Gino Rota [ph.] who asks, with the new mandatory roof insulation requirements, are there no options to use the performance method to provide an alternative solution?

MR. BOZORGCHAMI: The answer to that is no, because this isn't mandatory. So the other way is if you have no ducts, if you have no mechanical system in the attic or so, they're either in the living space or in the crawlspace, that -- or if you do not have an attic. So a rafter roofs -- so rafter roof, you do not need to meet this requirement. This is for roof that has an attic underneath it.

MR. SHIRAKH: What about the ducts in conditioned space, Payam?

MR. BOZORGCHAMI: I said that ducts in conditioned space or in the crawlspace.

MR. SHIRAKH: Yes.

MR. BOZORGCHAMI: Are also exempted.

MR. SHIRAKH: So there's other ways you can do away with this.

MR. STRAIT: Those are the only questions currently in the Q&A box.

MR. BOZORGCHAMI: Okay. I'm going to open it up. Any more comments, concerns, questions regarding the mandatory residential? If not, and if you have comments, please submit them to our docket sooner than later. And I just received one raised hand from Mike Moore. Go ahead and state your name affiliation.

MR. MOORE: Thank you, Payam. This is Mike Moore with Stator LLC, representing HVI. And thank you for the opportunity to speak today. I did submit, on behalf of HVI, roughly 20 pages of comments on this section and a few others. I understand that we won't have the time to go over those in detail today. But I just wanted to express my desire to communicate further with CEC staff on this and work through those details and hopefully it can result in a -- in a clearer standard and better outcome for everyone. So I look forward to that opportunity.

MR. BOZORGCHAMI: Thank you, Mike. So

with that, Michael Shewmaker, would you like to share your screen?

MR. SHEWMAKER: Sure. Give me one second. All right. Hopefully, you guys can see that. All right.

MR. BOZORGCHAMI: Perfect. Go ahead, Mike.

MR. SHEWMAKER: All right. Thank you, Payam, and good morning, everyone. My name is Michael Shewmaker and I'm an Energy Commission specialist in the Building Standards Office. And this morning, I'm going to present to you the proposed changes to Subchapter 8, Section 150.1.

Before I begin, I want to reiterate that I will not be covering the proposed changes to Space Heating and Space Cooling, Domestic Water Heating, or the PV Requirement because that information was covered in our Monday hearing. So for those of you who are interested in those topics, I would implore you to view the presentation from Monday's hearing, a copy of which can be found in the docket.

So this change did not make it into the 45-day Express Terms, and so we plan to include it in the 15-day Language. But in Section

150.1(b)1, we plan to provide some clarification on the various Energy Design Ratings and their bearings on compliance. To summarize the changes quickly, EDR 1 is based on source energy. EDR 2 is based on TDV energy and has two components, the Energy Efficiency Design Rating and the Solar Electric Generation and Demand Flexibility Design Rating.

Your total EDR accounts for both the Energy Efficiency Design Rating, as well as the Solar Electric Generation and Demand Flexibility Design Rating. And last, the proposed building shall separately comply with the Source Energy Design Rating, Energy Efficiency Design Rating and the Total Energy Design Rating.

In Section 150.1(b)3B, we consolidated a few of the field verification protocol references, or EER, SEER, CEER, HSPF, and were all consolidated into Subsection i. Additionally, we added a reference to the Variable Capacity Heat Pump protocol in subsection ii.

In Section 150.1(c)10C, we added fan efficacy requirements for central fan integrated systems with small duct high velocity air

handling units. This was done to be consistent with the mandatory requirements, and 150,0(m)13 with small duct high velocity and efficacy. I should also note that for the 15-day Express Terms we planning to move all of Section 150.1(c)10 with Section 150.0(m)13. This would be a non-substantive change since there are no performance compliance trade-offs applicable to 150.1(c)10.

In Section 150.1(c)11, we did a little language cleanup and where we previously said solar reflectance, we clarified that we are in fact referring to aged solar reflectance.

In Section 150.1(c)12, we revised the ventilation cooling requirements for whole-house fans, and now references the Home Ventilating Institute Certified Products Directory, instead of the CEC's Title 20 Appliance Efficiency Database, as it previously did.

And lastly, we added an exception to accept detached accessory dwelling units from a Whole House Fan requirements. So that's it for the changes to Subchapter 8. And now, as much as time will allow, we can open things up for questions. Thank you.

MR. BOZORGCHAMI: Thank you, Mikey. I don't have any raised hands. Peter is there any?

MR. STRAIT: There is one comment, and I'm seeing if there is a question here. Bruce Severence has a comment, but not a question. It might be better if they make the comment live, as it's -- the purpose of the Q&A box is not for comments. I want to make sure that the Q&A box, although we will retain these, is kept as a vehicle for questions.

MR. BOZORGCHAMI: So technically, I'm not seeing any questions, or I don't see any raised hands either. So with that, I thank you, Mikey. Excuse me, Mr. Shoemaker. So I think you want to open it up for a quick break for about a 10 minute break, Commissioner. If that's OK with you.

COMMISSIONER MCALLISTER: Yeah. I was going to suggest the same. And that'll perhaps give people a little more opportunity --

MR. BOZORGCHAMI: Sure.

COMMSSIONER MCALLISTER: -- to formulate questions if they do have questions, but really appreciate everyone for their attention and questions. Very, very helpful. So ten-minute

break.

MR. BOZORGCHAMI: Thank you. Okay. So we will be back, how about at 10:20 we will restart.

(Off the record from 10:08 a.m. until 10:19 a.m.)

COMMISSIONER MCALLISTER: All right. Are we ready to jump again?

MR. BOZORGCHAMI: I think we are. Thank you.

COMMISSIONER MCALLISTER: Okay.

MR. BOZORGCHAMI: And I apologize for earlier today. I may -- I could not see on my computer screen. So whatever I did, I sincerely apologize. So I think if Peter's online, I think we have one comment that just came in or a -- or a question came in, in the Q&A. Peter, do you want to take that, or should I take that? Okay. I think I'm going to take that as a comment from Laura Petrillo-Groh, asking us for Section 150.1(b)3B may need to be updated to reflect a new efficiency metrics for residential AC and heat pumps.

We'll take a look at that and see if we need to update that. Yeah, we'll communicate

with you, Laura, and we'll work with you. Thank you.

We have a comment that came -- is coming in from Russ King from CalCERTS. Can you please elaborate on changes mentioned regarding Section 150.1(b)1 and the EDR?

I don't see any edits to that section in the Express Terms.

MR. SHEWMAKER: Yeah, this is Michael Shewmaker. So those changes did not make it into the 45-day Express Terms. So they will be included in the 15-day Language. But maybe we could update that slide Payam, to include some of those bullet points to share that information is out there.

MR. BOZORGCHAMI: Sure.

MR. SHEWMAKER: So we'll update these slides before posting it to the docket.

MR. BOZORGCHAMI: So we'll update that Russ, and hopefully the new slides will be available on our docket by tomorrow.

MR. BOZORGCHAMI: And another question -- a question that's coming from Laura Petrillo-Groh is, would CEC please explain its justifications for proposing to restrict atmospherically vented

combustion products from the dwelling unit over 1,000 square feet? And this is pertaining to 150.0(o)1K. Jeff, can you answer that question? Jeff, if you're on call, you're muted

MR. MILLER: Sorry. Can you hear me now?

MR. BOZORGCHAMI: Yes.

MR. MILLER: Thanks. The Energy Commission is proposing higher airflow rates for kitchen range hoods. And so this requirement only applies to atmospherically vented combustion products that are located inside the air barrier of a dwelling units. And so for smaller dwelling units, the higher airflow rates from the kitchen range hood poses a problem for back-drafting. So that's the idea behind that. Does that answer your question?

MR. BOZORGCHAMI: Laura, do you want to raise your hand and I can unmute you and we can have a dialogue, or if you're good, guess we're going to move on, and we can have a side conversation on that.

So Jeff, the question that is coming from Laura is which case report is this covered in?

MR. MILLER: I think it should be in the Indoor Air Quality Case Report, although I have

to go looking to find that.

MR. BOZORGCHAMI: Okay. Okay. Thank you, Jeff. Thank you, Laura. Any other? If not, I think Cheng, go ahead and start on the Additions and Alterations for Residential, please.

MR. MOUA: I'm sorry. I was muted. So just to confirm, can you hear me okay?

MR. BOZORGCHAMI: Perfect. Go ahead.

MR. MOUA:? All right. And you see my screen, right?

MR. BOZORGCHAMI: Yes, we can.

MR. MOUA: Okay. So thank you and good morning, everyone. My name is Cheng Moua. I am a mechanical engineer here in the Building Standards Office. I'll be covering the 2022 Standard Subchapter 9. This is the Requirements for Single-Family Additions and Alterations. The subject matter areas that were revised include some HVAC, some clarifying language relating to IAQ, and some new envelope requirements. And I'll be presenting them in that order.

So for HVAC there were, in general 4 revisions to the existing requirements. The first one being the trigger for duct sealing and

duct insulation requirements. This is found in Section 150.2(a) Exception 5 for additions, and Section 150.2(b)1B for alterations.

For additions, duct sealing and duct insulation requirements are now triggered if you extend the ducts of any length to serve ana addition, you have to do that first test and insulate to prescriptive levels. For the system alterations, duct sealing and duct insulation requirements are triggered when more than 25 feet of new or replacement ducts are installed. So in comparison, the current 2019 Standards trigger is 40 feet of ducts for both additions and alterations.

The Duct Sealing Leakage Target was also revised in the 2022 Standards. This is again pertaining to prescriptive HERS duct testing in Section 150.2(b)1D for altered ducts. And 150.2(b)1E for altered space conditioning systems. They now to now require the HERS rater to test the ducts and verify that the duct leakage is equal to or lessthan 10% of the system airflow or 7% or less leakage to the outside if you choose that option. So again, 2019 Standards are 15% and 10% respectively, to the outside.

Duct Insulation [indiscernible] for Alterations are revised. This is to align with new construction prescriptive requirements. Doing that increases insulation levels for Climate zones 1, 2, 4, 8, 9, 10, 12, and 13 from R-6 to R-8, as summarized in this Table. There's no change to the other Climate zones.

There is a revision to Section 150.2(b)1G that prohibits electric resistance heating for certain conditions. This is when the electric resistance heating is being replaced. So current Code allows replacement equipment to be the existing fuel type. The 2022 requirement prohibits electric resistant heating when that heating system is part of a new or replacement ducted cooling system. So this is intended to move to heat pump technology when both electric resistance and the cooling equipment is being replaced. Again, does not apply to non-ducted systems. Does not apply if only the electric resistance heating equipment is being replaced, or if you have no cooling.

Lastly, it doesn't apply to Climate zone 7 or 15. So moving onto the IAQ of ventilation revisions. The revisions that were made were

mainly to clarify the requirements for specific components of ventilation systems when it's part of a addition or being altered from the 2019 Standards, in general, requires new or altered components to meet the mandatory measures, which the IAQ requirements are and points to those applicable Sections in 150.0. The revisions here are meant to be more explicit to describe what IAQ requirements apply and when.

So for Whole Dwelling Unit Mechanical Ventilation Section 150.2(a)1C, which is the prescriptive requirement for additions and 150.2(a)2Cia, which is the Performance Requirements for Additions. They were revised. This revision moves the exception for additions less than or equal to 1,000 square feet from the Whole Dwelling Ventilation Requirements, down to these new sections. So this also clarifies that junior accessory units that are additions to an existing building are also not required to meet the Whole Dwelling Ventilation Requirements. So junior accessory dwelling units are dwelling units less than 500 square feet that are contained within an existing single family building. This is a new definition for the 2022

Standards.

Section 150.2(a)1Cii and Section 150.2(a)2Cii were revised for Local Mechanical Exhaust Requirements in Section 150.0. So it's basically there to clarify that it does not apply, I mean does apply to additions. Sorry about that. So if you add a kitchen or bathroom, it has to comply with the Local Mechanical Exhaust Requirements.

For alterations, Section 150.2(b)1L was added for Entirely New or Complete Replacement Ventilation systems. So this is installing a new ventilation fan and at least 75% of new ducting. So entirely new systems must comply with the same mandatory requirements as new construction.

Section 150.2(b)1M was added to clarify when Altered Ventilation Systems occur. It specifies when replacement whole dwelling ventilation fans must comply with airflow requirements and be HERS verified. So it also specifies when kitchen exhaust systems need to comply with local ventilation requirements for airflow or capture efficiency.

So in general, homes that were required by a previous building permit to meet whole-

dwelling ventilation or kitchen exhaust requirements, the replacement fans must, again, meet the current requirements. So homes that were built when Whole-dwelling or Kitchen Exhaust Ventilation Requirements did not exist, don't need to comply with the current Code. Replacement bathroom fans must comply with Local Ventilation Requirements in Section 150(o). Same as new construction. And all replacement fans must be rated for airflow and sound in accordance with ASHRAE 62.2. And those requirements in Section 150(o). And of course, replacement fans must be rated with an airflow greater than the airflow required for compliance.

Section 150.2(b)2A, which is the Performance Approach for Alterations, was simply revised to clarify that entirely new or altered ventilation systems must comply with the sections we just went over. So that's 150.2(b)1L and 150.2(b)1M.

Next we get into the Envelope Revisions in Subchapter 9, Section 150.2(b)1I for Roof Replacement and Roof Recovers was revised to expand the current cool roof requirements for steep-sloped and low-sloped roofs to additional

Climate zones. So this revises some of the -- this also revises some of the exceptions. As you can see in the Table, for steep-sloped roofs in Climate zones 4, 8, 9 now require a Solar Reflectance of .2. And a Thermal Emittance of .75.

For low-sloped roofs, Climate zones 4, 6 through 12, and 14 require a Solar Reflectance of .63 and Thermal Emittance of .75. So the revisions to this section also add a requirement for above roof deck insulation for low-sloped roofs. For this, requirement is R-14 above deck in Climate zone 1, 2, 4, and 8 through 16.

Section 150.2(a)1B was revised to align Attic Insulation for Additions less than or equal to 700 square feet to the prescriptive new construction requirements. So this increases insulation levels for Climate zones 2, 4, 8, 9, 10 to R-38. Section 150.2(b)1B and Section 150.2(b)1J was revised for Attic Insulation During Alterations. So when the entire duct system located in the attic is in place, it also now triggers the Attic Insulation Requirements. Revisions also increased the attic insulation when it's altered for some Climate zones. So

depending upon what the existing insulation level is, that's showing in the Table here. Revisions add requirement to air seal all accessible areas of the ceiling plane between the attic and the conditioned space. This is in accordance with Section 110.7 of the Standards. And recessed luminaires must be covered with insulation to the same depth as the rest of the attic. But this requires recessed luminaires to get IC rated.

Lastly, we have some known updates for Subchapter 9 that we'll be revising for draft -- for the draft 15-day Language. First is to revise exceptions to Section 150.2(b)1Ji and iii, eliminate the Third Party Verification of Existing Conditions requirement. This is when ceilings are being altered. But this change is due to concerns over verification costs.

Also, Section 150.2 requirements has quite a few references to the Mandatory 150.1 and Tables that are currently being referenced in Section 150.2 for additions and alterations. So revisions to the 15-day Language will correct some of these references.

So this completes my presentation for Subchapter 9, the Additions and Alterations for

Single Family. We can take any questions if there's any, Payam. Thank you.

MR. BOZORGCHAMI: Thank you, Cheng. Do we have any raised hands. I don't at this time. Peter, do you have any questions and answers?

MR. STRAIT: We do have one question in the Q&A box, and this is from Laura Petrillo-Groh who asks, are the cases when the kitchen fans, in Additions or Alterations need to meet the higher exhaust limits but is impacting atmospherically [indiscernible] cases. I'm sorry. Not [indiscernible], where these kitchen fans impact atmospherically vented combustion equipment?

MR. MOUA: I'd be --

MR. BOZORGCHAMI: Okay. Go ahead.

MR. MOUA: Oh, I was going to say the Kitchen Range Hood requirements would be triggered for Alterations and Additions where again, the requirement's applied at the time of permit. So any additions and alterations where the requirement applied at the time of a previous permit, then they would need to comply again when that kitchen fan is replaced.

Jeff, if you have anything more, to add there.

MR. MILLER: Can you hear me?

MR. MOUA: Yes.

MR. MILLER: I -- I'd have to double check the references. My best recollection is that all of the requirements for local ventilation should be required to be met for an addition. So that would include the requirement that atmospherically vented appliances should not be used in the very small dwelling units, those smaller than 1,000 square feet. But I have to double check to see if its language is actually structured that way. That's the intention, I believe.

MR. MOUA: Yeah. Thank you. Yeah. The question was. Yeah. For Alterations and Additions so it's different scenarios there, but yes, we'll get -- we can a double check on that.

MR. STRAIT: We did receive one additional question. Bruce Severence asked -

MR. BOZORGCHAMI: Peter?

MR. STRAIT: Yes.

MR. BOZORGCHAMI: Can I interject real quick? Laura just raised her hand too.

MR. STRAIT: Oh. Okay.

MR. BOZORGCHAMI: Let me, since we're on

the same topic, let's --

MR. STRAIT: Yeah.

MR. BOZORGCHAMI: Let's -- sorry about that, Bruce.

MR. STRAIT: No that was a good catch.

MR. BOZORGCHAMI: Go ahead, Laura. State your name and affiliation.

MS. PETRILLOI-GROH: Hello. This is Laura Petrillo-Groh with the Air Conditioning, Heating, and Refrigeration Institute. Thank you for entertaining all my questions, especially about the atmospherically and the atmospheric atmospherically vented combustion products. So I just want to make sure I understand you all correctly. So in the case of alteration, the code applied, and the code that -- it does not need to meet the new code so I could install a atmospherically vented combustion product in its -- in an alteration under 100 -- under a 1,000 square feet. Is that correct?

MR. MILLER: Golly. I'm probably don't completely understand your question. There are differences in the requirements for additions as compared to alterations. And if there was a pre-existing appliance there, we wouldn't -- we

wouldn't force it to be removed. That's the way we usually handle alterations. So is a question about alterations or additions?

MS. PETRILLO-GROH: It was about both, but I think you cleared up the additional portion with your response, Jeff, so appreciated that. I was just more interested if there was a -- atmospherically vented water heater in a dwelling under a 1,000 square feet, would it appeared to be -- would it -- would this Code a replacement in kind of that equipment type?

MR. MILLER: I would not expected it -- that to be the case. You know, with that said, these kinds of installations are not likely to be present in newly constructed buildings. And increasingly, I think these types of installations are being replaced with closed combustion appliances, which are safer for the building occupants. Do you agree with that?

MS. PETRILLO-GROH: I know I live in a, not in California, but in a 1,100 square foot townhouse built in 1850 and I have an atmospherically vented water heater.

MR. MILLER: Right.

MS. PETRILLO-GROH: So I'm just trying to

transpose the situation into California. I appreciate the response.

MR. MILLER: Sure.

MR. BOZORGCHAMI: Peter, go ahead. Thank you. Thank you, Laura. Thank you, Jeff.

MR. STRAIT: No problem. Bruce Severance asks, if additional attic insulation is required at time of duct replacement, is the additional insulation required to be blown varieties that burry insulation. And our new ducts consequently required to be on the floor of the attic so they can be buried?

MR. SHEWMAKER: This is Michael Shewmaker. I can take that one. No. We do not require any specific insulation type. So you can use pretty much whatever you want. And no, there is no proposed requirement that those dust be located on the attic floor. But if that's, you know, the route you kind of choose to go, you're certainly open to that option.

MR. BOZORGCHAMI: Thank you, Mikey.

MR. STRAIT: I don't have any other questions in the Q&A box currently.

MR. BOZORGCHAMI: Okay. So right now, I think we're going to open it up for the question

and answer for the morning part. And I'm, like I said, I'm going to put this slide back up for people to know that you can submit your comments in writing to our docket and this is just as valuable as you presenting or participating live here with us today. So any comments, any questions on anything that you've heard so far this morning? If not, Commissioner, are you okay with us moving forward with the first part of the afternoon, the Mandatory Minimum Requirements for Multifamily Buildings? Commissioner?

COMMISSIONER MCALLISTER: Sorry about that, Payam. I was using the wrong microphone. Yeah, I'm fine if we're wrapped up with the morning's agenda. I think it makes sense to continue on and just push forward until our previously scheduled lunch time.

MR. BOZORGCHAMI: Sure. Sure. Sure. Thank you. And folks if we could get your comments and questions to our dockets sooner. Like I said again, I'm going to say it over and over again by next week or the week after would be very beneficial for us to get the proper language out for adoption in August

With that, Javier Perez is going to be

taking over from here on. And he's going to be presenting the Multifamily Mandatory Measure Requirements.

MR. PEREZ: All right. Can you hear me okay?

MR. STRAIT: Yes, we can hear you.

MR. BOZORGCHAMI: Yeah. Perfect.

MR. PEREZ: Okay. Thank you. So my name's Javier Perez with the Building Standards Office. I'm an Energy Commission specialists, and I'll be doing all three subchapters for multifamily buildings, this include, Mandatory Measures, Prescriptive Requirements, and then Additions and Alterations to Multifamily Buildings. It's going to be a long day for me, so hopefully you guys aren't too annoyed with my voice.

So one of the things that we tried to take care of with the Multifamily Requirements is to try to merge the requirements as they pertain to low-rise and high-rise multifamily buildings and also relocate them to specific subsections dedicated only to multifamily buildings. If you're familiar with the 2019 Energy Code, or really anything back to probably the 80s, there's

been a line drawn between low-rise residential buildings, which are buildings with three or fewer habitable stories, and high-rise multifamily buildings, which are buildings with four or more habitable stories. A habitable stories is just a story that's 50%or more above grade with -- designed for eating, living, sleeping or cooking conditions, generally, and above grade. I think conditions, generally, and above grade is kind of how we describe it.

So having said that, what we try to do, and this is something that industry and different stakeholders requested, was to separate that line and move all of the language into a separate section to make it a little bit more simple for navigation and determining which requirements apply to these types of buildings. So we created three new Multifamily Subchapter, Subchapters 10, 11 and 12. 10 being mandatory where we're at. And then 11 and 12 later.

Where appropriate, we blended the requirements, or merged them, and it was cost effective and technically feasible. You know, we applied the more restrictive requirement as much as we could. And in areas where that was not an

option, clear lines were drawn to say we're going to follow business as usual with low-rise requirements following different requirements, and high-rise requirements. There were also increased efficiency measures that were introduced, and I'll try to highlight all of that material this afternoon. Or it's not afternoon. Right now.

Okay. So what subchapters were affected in the 2019 Energy Code High-rise Residential Subchapters for Mandatory Requirements, existence of Chapters 3 and 4, grouped in with nonresidential and hotel motel requirements. And for low-rise, this is in Subchapter 7. So all of that language was moved into Subchapter 10, which is what we're discussing today. All right. So let's get into it.

Ceiling and Roof Insulation. One of the things that was identified in this process was that in multifamily buildings that don't have attics, there can be significant challenges. And we wanted to create a separate pathway for multifamily buildings without attics, and as compared to those with attics. So for Mandatory Insulation, R-22 is the expectation when you have

a building with an attic. And this follows the low-rise residential mandatory requirements currently and previously found in Section 150.0.

Buildings without an attics -- without an attic, the requirements vary by assembly type. This generally follows the nonresidential mandatory insulation requirements that previously and continue to be found in 120.7. So whether you have metal frame, metal building, wood frame, those requirements vary, and they're treated differently than buildings with attics. Okay.

Moving on to the Wall Insulation Requirements. Again, we tried to merge the requirements, and if you have wood frame, 2x4 assemblies, max U-factor of 0.102, which is the result of having R- 13 and 2x4. But [indiscernible] on center, if you have 2x6, the expectation is R-19, or U-factor 0.071 in the event that you have different types of wood framed assemblies. And this follows -- low-rise res also follows the high-rise res requirements that were previously in the 2019 Code. Or I guess that are currently in the 2019 Code. And for all other assemblies, similar to the roof level or ceiling that one insulation's

requirement they vary by. Assembly type, whether it's a metal building, metal framed, or the light mass, the requirements will vary.

So Raised Floor Insulation or Soffits, we merged those requirements as well. Similarly, if you've got a wood framed assembly and 2x6, R-19 is the mandatory requirement or U-factor. This follows low-rise res requirements and applies to all multifamily buildings moving forward. And all other assembly types, again, vary by what is designed, whether you raised mass, heated slab, etcetera. Those requirements do vary, and again, they're just pulled over from existing language in the non-res high-rise res and hotel motel mandatory requirements that currently exist in 120.7.

I tried to group these together and to try to simplify some of the requirements that they're just going to be common practice and I don't think this is too much of a change. But Vapor Retarder requirements exist only in the low-rise residential sections and the mandatory sections, and they apply to unvented and controlled-ventilated crawl spaces, as well as to assemblies in Climate zones 14 and 16. What

we've done is we've expanded those to apply to all multifamily buildings, regardless of floors.

And similarly, for Fenestration Products, low-rise residential has a mandatory maximum weighted average U-factor of 0.58. If you're curious what that looks like, it's dual pane non-metal fenestration product. Operable is the reference point for that. And that's not to say that you can't install something that doesn't meet that Weighted Average U-factor. The weighted average component is essentially there to stay as long as overall your windows can average out to meet the U-factor of .058, you're in compliance. And those numbers are pretty reasonable as far as a mandatory measure.

Fireplaces, Decorative Gas Logs, and -- Decorative Gas Appliances, and Gas Logs. There are specific requirements for these systems in low-rise residential buildings and again, have been translated to apply to all multifamily buildings moving forward.

Okay. Now, getting into the dwelling units filtration indoor -- and indoor air quality requirements. Jeff Miller spoke to that in some detail this morning. And for the most part, the

dwelling units ventilation requirements follow the single-family indoor air quality requirements, with the following exceptions: the ventilation rate requirements are a little bit more restrictive in the sense that they require a little more airflow. For multifamily unit, that's consistent with current practice and multifamily airflow rates are a little bit higher than single-family dwelling units.

We also clarified terminology for balanced and supply or exhaust systems with compartmentalization. And we've also, again, similar against low-rise res, introduced the new maximum 1.0 watt per cfm for fan efficacy requirements for balanced ventilation systems that have heat recovery ventilators or energy recovery ventilators. And again, these are for systems serving individual dwelling units. So that's -- this is the caveat for this requirement.

Moving forward between 45 and 5th-day -- 15-day, we'll be modifying language to identify which protocols are more appropriately identified, which protocols are applicable for testing of these systems with that reference --

the residential reference dependency testing protocols applying to buildings with three or fewer habitable stories. And then the nonresidential appendices for buildings with four or more habitable stories.

Okay. For multifamily buildings with central ventilation systems, language has been modified to more clearly describe what tolerances are available for determining how much the ventilation requirements can vary from dwelling to dwelling when the system serves multiple dwelling units. The idea is that the Energy Code does require a minimum ventilation rate. From there, the design ventilation rate, which is what the designer will specify, can be higher than that. And that higher point is where any variances are measured.

So if you're here for the ventilation requirements, this is language that was developed and has some industry to make sure that we're clear about how to apply those tolerances for systems serving multiple dwelling units. And Jeff Miller has been working on that extensively to try and get that language to a place where it's palatable for all audiences.

Now, with regards to HRV and ERV system efficacy, we'll talk about this a little bit later. But there are the prescriptive requirements for ERVs and HRV for balance systems serving individual dwelling units. There's an establishment of minimum sensible recovery efficiency and fan efficacy requirements. That language, we'll hit on that a little bit later. And 170.2 in the prescriptive section will likely be moved over to this ventilation section to more appropriately encompass all ventilation requirements within one section for dwelling units. So you may see some transplanting of language at 15-day related to this requirement.

In this section for HRV also incorporates certain HERS verification requirements for fan efficacy and sensible heat recovery efficiency requirements. Also as part of the 2022 requirements, central ventilation systems to have to meet duct sealing requirements and leakage testing requirements for those systems.

Okay. Common Areas. Common areas are following the nonresidential ventilation requirements of 120.1, which generally follows ASHRAE 62.1. And 15-day Language, i's expected

to be modified to more appropriately identify the common areas that we're talking about. We've got a few definitions that we're trying to hone in on, and the ventilation requirements for dwelling units are very specific to dwelling units and any common areas should follow nonresidential ventilation requirements. And again, at 15-day, you'll likely see modifications to more appropriately reflect that intent, which follows suit with ASHRAE 62.2 and 62.1s requirements.

Now, the last thing we did for ventilation was if you're familiar with the 2019 Energy Code, there are ventilation requirements for parking garages in the Covered Process Section 120.6. That language has, generally a reference to it has been reproduced here to make sure that if you're looking for ventilation requirements, that parking ventilation requirements are also included in that section for ease of readability and hopefully navigation.

All right. Now let's move on to HVAC System Controls. We require a setback thermostats in dwelling units and common living areas, and that's consistent with the low-rise res requirements or single-family in 2022. The

setback thermostats and been around as long as I have, with regards to working on Energy Code. And that goes back to at least 2005 and then possibly further than that.

Common Service areas follow nonresidential control requirements. And if there were any changes to the non-res control requirements, those were discussed on Monday. Suffice to say that they follow non-resident, not the residential requirements, although that language has been reproduced in this section.

All right. Now, with regards to dwelling units and space conditioning systems and ducts, their insulation requirements follow, again, single family expectations, though our current draft does require 4.2 for ducts inside a conditioned space. And if you were in attendance during the morning session or the morning portion when Jeff talked about the delineations that happened for those sections, that will be replicated here with R-1 or R-3 being the expectation, depending on surface emissivity of these ducts? And furthermore, like you mentioned, there are continuing discussions with manufacturers in the industry who are pushing for

a reduction to 0 per duct soon, 0 insulation for ducts inside a conditioned space.

So there's that. There's research going on. The point of that is to say it may go lower, but this language is certainly subject to change. But as of right now, the expectation is to have this R-1 and R-3, depending on surface emissivity.

All right. As far as duct ceiling leakage and testing is concerned, this language has been updated to match the single family residential requirements in 2022. The leakage targets are unchanged for multifamily buildings. But one thing that I do want to point out, and I think you'll find this consistently throughout this presentation, is that any HERS verification component that was applicable only to low-rise residential buildings will continue to only be applicable to low-rise residential buildings. And that includes low-rise multifamily buildings. We weren't looking to extend any HERS verification measures beyond the three habitable story line in this Code cycle.

And furthermore, in multifamily buildings with four or more habitable stories in Climate

zones 1, 3, 5, and 7, it -- the testing requirement really can pencil out cost effectively. So that leakage testing is not applicable to high-rise multifamily buildings in those climate zones. In the climate zones where it is applicable, it it'll be self-certification, the installers going to perform that and is expected to perform that test and satisfy the leakage testing requirements.

All right, Airflow and Fan Efficacy Requirements. And this is again, still talking about systems serving only individual dwelling units. These requirements, like the duct leakage testing requirements have been extended to apply to low-rise, I'm sorry. Extended to apply to high-rise multifamily buildings as well. Efficiency targets are still the same .45 or .58 watts per cfm, depending on the fuel source for the ducted system. And airflow is still 350. And there's the language pertaining to small duct high velocity systems. Some language that was introduced, I think in the 2019 Code cycle continues to apply in the event that these systems are used, though they seem to be very infrequently used.

And again, the HERS measure will continue to only apply to multi -- HERS verification component of this service measure – of this leakage – of this measure, will continue to only apply to systems serving multifamily dwellings with three or fewer habitable stories. If it's four or more, the expectation is that a test be completed, only that the installer is the one responsible for that test.

For Water Heating, mandatory requirements have been expanded. Low-rise heat-pump ready requirements have been expanded to apply to all multifamily buildings, and this is applicable when a gas or propane water heaters installed to serve individual dwelling units. The idea is that we want those buildings to still be heat-pump ready in the event that the building owner or occupant wants to replace their gas appliance with an electric heat-pump and all other mandatory watering heating requirements were merged. And Danny spoke to some of the changes that did happen to the water heating insulation requirements in the Single-family Section.

All right. Moving on to Lighting and Mandatory Requirements. Inside of dwelling and

common living areas where we're at right now is that these spaces will follow single family lighting requirements. And when we say common living areas, the best way that I can describe it is a space that is shared by maybe multiple, multiple families. Or if you think efficiency dwelling units where maybe they have a shared living room or shared kitchen, in general, that that's a common living area. You know, we're still trying to home in on these common areas terms. Some discussions about moving to communal living areas. So I would say stay tuned to find out where we land on these terms. But and where we are right now is that common living areas follow single-family lighting requirements. And this is the same convention in 2019's Energy Code. If you're familiar with that in Section 130.0, it essentially says the dwelling units in high-rise res, as well as guest rooms and hotel motel follow the low-rise res indoor lighting requirements so that that convention continues through 2022.

Now, for common service areas, which function more like nonresidential spaces, you know the expectation of the requirement is that

they follow the nonresidential lighting requirements, which is most appropriate for these spaces. If you're familiar with the 2019 Energy Code, there is language that allows for an 80/20 that allows, or that requires, nonresidential lighting requirements if common areas are over 20% of the conditioned floor area. So that was removed as part of the merging of the multifamily requirements.

With regard to the Outdoor Lighting Controls Equipment, assuming the outdoor lighting is not controlled from within the dwelling units, so like a porch light where you have the switch inside of the dwelling, it's going to follow the nonresidential requirements. And this is again, an effort at simplifying where we draw these lines and generally follows the 2019 Code.

All right. In the event that a sign is installed in a multifamily building, it'll follow the sign lighting requirements. That's not a significant change in the Lighting Control Acceptance Requirements are applicable to lighting controls that are installed in common service areas. So if you're familiar with the non-res requirements, they're are acceptance

testing requirements for motion sensors, day lighting control met responsive control requirements. And those testing procedures continue to apply to those systems in areas where they act like more nonresidential spaces and/or common service areas. And this again, still continues to follow the 2019 Convention.

So Service Electrical Metering is reproduced in the multifamily section, and it's the same as the 2019 Energy Code again. So it's just an attempt to relocate these -- language that applies to multifamily buildings and to multifamily sections, rather than have you flip back and forth in pages. So it only applies to electrical service or feeders providing power to common use areas. And that's whether interior or exterior.

As far as Separation of Electrical Circuits are concerned for future metering or determining energy consumption monitoring, this follows non-res requirements, again, and there are specific exclusions or exceptions added to exclude these systems when they provide power to dwelling units or common living areas.

The Voltage Drop, again copy and paste

requirements from the nonresidential section and the controlled circuits, or 120-volt control receptacle requirements have been reproduced, again in the multifamily section. Now these apply the common service areas. And if you want to get into the weeds, they apply to specific spaces in common service areas, which include office areas, lobbies, conference rooms, kitchens, I'm sorry, kitchens in office spaces and coffee rooms. And again, this is -- follows the nonresidential requirements.

So the covered processes that likely will apply or likely will exist in multifamily buildings, were addressed in Section 160.7 elevators and multifamily buildings, and pool and spa systems. For elevators, efficient lighting requirements in HVAC are ventilation requirements, and fan efficacy power, limitations, and occupant sensing control requirements that make sure that these systems aren't running when the space is vacated for a specific period of time. There's no need to have the lights on in an elevator when those elevators are closed. And that's not new. That's been around for, I believe two Code cycles already.

Pool and spa systems, whether in multifamily or serving multifamily or single-family buildings, have always had to comply with Section 110.4. Anything in the 110s applies to all buildings, not to non-res, not res all of them.

Now, what's changed in this Code cycle is that we've got requirements in Section 150.0(p) that address pool pumps and require multispeed pumps, depending on the horsepower of those pumps, as well as some pipe requirements. So those system requirements have been expanded to apply to pools in high-rise residential buildings, but only when that pool is exclusively for a single tenant. So I don't know how often that happens, but in the event that it does, there's no reason that those systems shouldn't be efficient. So for that reason, those requirements were expanded.

All right. Solar ready buildings. This is again, minor changes in Section 110.10. But in general, newly constructed buildings have to meet solar ready requirements unless they already have or are planning to have a PV system installed. There are a number of exceptions to reduce that size or get out of the requirements

in certain scenarios, but yeah, that language is unchanged and exists in 110.10.

Electric-Ready. I do want to briefly highlight that these requirements were introduced, they were a significant part of Monday's hearing. They have been added to Section 160.9 and essentially require electric-ready components or infrastructure for systems serving individual dwelling units, space conditioned systems, as well as cooktops, and clothes dryers. Now if you've got clothes dryer that's in a common use area or they're likely multiple [indiscernible] requirements. Again, that material was discussed in Monday's hearing. I do want to make sure that it is identified, that it exists here, but comments on that certainly would be encouraged to be submitted in writing to our docket.

And that's all of the mandatory requirements. Payam, I'll open it up to you to see if there are any questions.

MR. BOZORGCHAMI: Thank you, Javier. I think we have two questions in the Q&A, but I don't see any raised hand as of right now. Peter, do want to read those out?

MR. STRAIT: Sure.

MR. BOZORGCHAMI: One -- let me pause here real quick. I -- we do have one question on 150.2(b)1G. We'll wait and answer that at the open session right before lunch. If that's OK.

MR. STRAIT: Okay.

MR. BOZORGCHAMI: I want to make sure -- I want to make sure we deal with these questions I have a mandatory minimum for multifamily.

MR. STRAIT: Sure. So Gina Rota asks, will the new mandatory roof insulation requirements talked about earlier be applied to multifamily?

MR. BOZORGCHAMI: Mike, do you want to take that one?

MR. STRAIT: Yeah. Go for it.

MR. SHEWMAKER: This is Michael Shewmaker. No, we are not proposing that mandatory roof insulation requirement for multifamily at this time.

MR. BOZORGCHAMI: All right. Michael Joanny [ph.] asks, from a lighting perspective, there are no changes in the requirements, as best as I can tell. So rather than repeat the

requirements where they are the same, can the Standard simply refer to the section number and only have New Standard if the requirements differ from elsewhere in the Standard?

I'll go ahead and quickly respond to that. The purpose of the multifamily chapters is to be standalone chapters so that a person building to those standards does not need to hop over to the Residential or Nonresidential chapters of the Energy Code. And that's why there is duplication of requirements in the multifamily chapters.

MR. PEREZ: Yeah. And this was, you know, at the behest of industry. You know, one of the comments that we've received. You know, a few times is that often, to find the requirement for one specific components, you may have to jump to two or three different sections and traverse a lot of pages. And this attempt was to limit that and to address those concerns. I think that we would result, you know what you're requesting would result in a significant number of less pages for our Standard. But I think the usability of it is something that we were trying to capture and trying to address and satisfy

different stakeholders.

MR. BOZORGCHAMI: Thank you. I -- is there any other questions? If not --

MR. STRAIT: Bruce Severance just submitted a question.

MR. BOZORGCHAMI: Okay. Let's see.

Bruce Severence asks, are multifamily requirements going to allow individual heat-pump water heater units with compressors within a conditioned space. And if so, have the case teams fully considered the impact of having a large air conditioner in conditioned space in small apartments year round. And the impact this configuration has on both water heater system efficiency and air source pump efficiency.

MR. TAM: This is Danny Tam, CEC staff. We allow them. We don't -- we specify how it needs to be installed, but certainly the people want either could be located on a outdoor balcony. If it's inside it can be ducted, and then [indiscernible] can ducted outside or elsewhere. So it doesn't affect the space conditioning load. So we're silent on how it needs to be installed. We leave that up to the designers.

MR. STRAIT: Yeah, there are multiple options for the water heating systems serving multifamily buildings. And we'll get to it in probably 15 slides or so. But yeah, Danny's answer takes care of it.

MR. STRAIT: Bruce Severence just following up. If you're allowing non-ducted variations, have you verified impact on efficiency?

MR. TAM: Those – that will be modeled in the software. The software does take in account of the, you know, and all the effect. So just, it is being dealt with in the software.

MR. BOZORGCHAMI: So that – so pretty much that you have to do a performance evaluation when you're doing this type of system. Correct Danny?

MR. TAM: Let's allow prescriptively. That's always been the case. Again, we just leave it up to the designer. In most cases, if it's non-ducted, it is perform equal or better than being outdoor.

MR. BOZORGCHAMI: Okay. Thank you.

MR. STRAIT: And I believe that's all the questions that we have in the Q&A box with you

understand that we're holding the questions asked by Laura Petrillo-Groh to answer later.

MR. BOZORGCHAMI: Yeah. Thank you. Thank you, Peter. Commissioner. If you're okay, I'm going to open it up for everything we've heard this morning so far and open it up to all questions and comments.

COMMISSIONER MCALLISTER: Go ahead. [indiscernible].

MR. STRAIT: Should we go ahead and jump in. Yeah, we missed that.

MR. BOZORGCHAMI: Yeah. Hold on one second, Peter. And we'll take a earlier lunch break if possible.

COMMISSIONER MCALLISTER: Yeah, that sounds good. Do you want to do some cleanup Q&A on specific things that have been discussed this morning?

MR. BOZORGCHAMI: Yes.

COMMISSIONER MCALLISTER: Just kind of apprehensively, and then we can open up to a more general public comment and then we'll call till the previous time that we had schedule for lunch. Just some people have a time certain.

MR. BOZORGCHAMI: Sure. Sure.

COMMISSIONER MCALLISTER: Great. Thanks a lot.

MR. STRAIT: All right. I'll go ahead and read these two questions while folks that are attending can raise their hand if they want to ask additional questions. The question from Laura Petrillo-Groh is; a question regarding 150.2(b)1G, is electric resistance heating proposed to be prohibited as a part of heat-pumps?

It is common for strip heat to be installed as emergency backup in the event the heat-pump becomes inoperable during the heating season. In freezing temperatures, emergency strip heat would prevent pipes from bursting.

MR. MOUA: Yeah. I can take this one. This is Cheng from the California Energy Commission. It's not intended to apply to electric resistance that are part of a heat-pump system. So 150.2(b)1G is applicable to a electric furnace, electric resistant furnace.

MR. STRAIT: And Laura asks a follow up, also on the same section.

Eliminating resistance heat and relying strictly on the heat-pump could result in a

system that is oversized in cooling. How would this situation be addressed?

MR. SHIRAKH: This is Maziar. We're not -- we're not proposing to eliminate electric resistance from heat-pumps. Yeah, we presented on Monday where electric heating is going. And single-family heat-pumps are going into single-family, multifamily, and nonresidential buildings, and they're all allowed to have a backup electric resistance.

MR. STRAIT: Those are the only questions I'm seeing in the Q&A box.

MR. BOZORGCHAMI: Okay. Thank you, Peter. Thank you, Maziar. Thank you, Danny and Cheng.

Commissioner, what's your thoughts? I'm not getting any other questions coming in in the in the queue here. So should we maybe do a quick lunch and then come back?

COMMISSIONER MCALLISTER: And there's no -- there's no public comment. Just general public comment. I just want to make sure absolutely.

MR. BOZORGCHAMI: We had two so far.

COMMISSIONER MCALLISTER: Okay. Okay.

MR. STRAIT: There was one that was submitted to the Q&A and I can read it into the record if you would like.

COMMISSIONER MCALLISTER: Yeah, I mean all the questions that I've heard have something to do with the provisions that we've got over. So I'm not just, you know if there's any member of the public who just wants to comment on generally the Building Code. We just want to make sure that they've had a chance.

MR. BOZORGCHAMI: Sure. Sure. So --

COMMISSIONER MCALLISTER: It doesn't look like it, does it.

MR. BOZORGCHAMI: Yeah. The floor is open if anybody would like to make a comment, or raise your hands, or submit something in the Q&A. And we'll try and answer it?

COMMISSIONER MCALLISTER: Okay. I'm not seeing anything. Let's see, you guys are monitoring the chat as well, right?

MR. BOZORGCHAMI: Yes.

COMMISSIONER MCALLISTER: So there's nothing there.

MR. BOZORGCHAMI: We have one. We may oversite one area, Pipe Insulation and 160.4.

I'll tell you, we'll tackle that right after lunch. We have to develop a slide for that.

COMMISSIONER MCALLISTER: Oh. Okay.

MR. BOZORGCHAMI: And then that will be the first thing we -- have Javier bring it up right after lunch.

COMMISSIONER MCALLISTER: Okay. That sounds good.

MR. STRAIT: All right. Well, so going once, going twice.

MR. BOZORGCHAMI: We got one raised hand.

MR. STRAIT: There we go.

MR. BOZORGCHAMI: James, go ahead and state your name and affiliation, please.

I'm sorry. You're having. I apologize. I Apologize. There's a bad connection.

MR. STRAIT: We're not able to understand any of --

MR. BOZORGCHAMI: I had to. I'm sorry, James, I had to mute you. We are not understanding anything. It's -- I think you're having a bad connection. I'm going to unmute you one more time. Hopefully, something's adjusted. Go ahead.

No. Yeah, we're still having the same

problem, so I had to mute you. How about this right after lunch? When we come back, if you could reset your system, we could take your question first and move from there, if that's okay, Commissioner?

COMMISSIONER MCALLISTER: Yeah. That's fine.

MR. BOZORGCHAMI: Okay.

COMMISSIONER MCALLISTER: Well, I think with that that we're ready to take a break. What time were we convening?

MR. BOZORGCHAMI: Reconvene at 12:30. Do an hour lunch, actually, if you like.

COMMISSIONER MCALLISTER: Yeah, that's good. So the originally planned time of 12:30, let’s reconvene for the afternoon session.

MR. BOZORGCHAMI: Yes.

COMMISSIONER MCALLISTER: Thanks, everyone.

MR. BOZORGCHAMI: Yeah. Thank you. So we will reconvene at 12:30.

(Off the record from 11:23 a.m. until 12:31 p.m.)

MR. BOZORGCHAMI: Peter, would you please read the comment that came from Mr. James Brown?

MR. STRAIT: Yeah. James Brown -- James Brown had some technical issues and commented; I represent a coalition of organizations and community members in the City of Ventura called the Westside Clean Air Coalition. If you are paying attention to climate science, you may be aware that the electrification of buildings needed to happen yesterday. It won't be an easy task. It'll be expensive, but the consequences of inaction will be so, so, so, so, so much more expensive and destructive that we cannot afford to not do everything in our power as quickly as possible. Waiting another three years to require electrification would cost Californians one billion dollars in unnecessary gas infrastructure and lock them into 3 million tons of additional carbon emissions by 2030. Please act ambitiously with our future in mind. Thank you.

MR. BOZORGCHAMI: Thank you, Peter. So if you guys remember, Mr. Brown was the participant who was not able to get on before the lunch break.

MR. STRAIT: Yeah. So now if I could. I'd like to get the direction just to general stakeholders. Although the Q&A box, we want to reserve that for questions so that we can sift those out to make sure they are answered. If anyone is having any technical difficulties that prevents you from commenting, then let us know when we can have you take type it into the Q&A box and read that into the record that way.

MR. BOZORGCHAMI: Yeah. And Peter's right. And if that's not possible, you can always submit it to the docket too. Thank you, Peter. So now back to Javier. Javier, do you want to share your screen and go over what we needed to add to the presentation for this morning? Javier, if you're talking, you're muted.

MR. PEREZ: Can hear me okay?

MR. BOZORGCHAMI: Yes, perfect.

MR. PEREZ: Okay. Thank you. Okay. Great. And can you see my screen now?

MR. BOZORGCHAMI: Yes, we can. Thank you.

MR. PEREZ: Okay. Great. Okay. So continuing on with where we left off. One thing

that I failed to mention earlier, and we've got a slide for it, and we'll reinserted it in the appropriate location before posting this. I'll make sure to do that. Is that one of the requirements that did change for multifamily buildings, or water heating systems and pipes, for systems that serve multifamily domestic hot water systems was that for any pipe that's one and a half inches or greater, the required installation thickness has increased from one and a half inches to two inches. That's represented in this table in Table 160.4(a). And that's also represented in the slides. Like I said, we'll move this into one 160.4 and make sure that that's posted after the session.

All right. You know, another thing that that I think is important to address is that, you know, with regards to the duplication of language and the redundancy that may exist or does exist in some of these sections. Another intent of reorganizing this language in a way that multifamily is grouped together was that, for -- in -- for scenarios, where appropriate that the multifamily specific requirements can evolve independently from any nonresidential

sections that might be applicable or single-family sections that might be applicable. So it's fairly likely that in future Code cycles you'll see less duplicity in some of those sections where it might be appropriate to deviate or increase or change requirements. So that is addressing one of the comments that we had earlier.

All right. Let's move on to the Performance and Prescriptive Compliance Approaches for Multifamily Buildings.

MR. BOZORGCHAMI: Javier, one second. I'm sorry. I just wanted -- I just wanted to make sure if there's any questions that came on to -- on the topic they just brought up.

MR. STRAIT: I think there's one unrelated question in Chat, but it's a very easy answer. It's Laura Petrillo-Groh asks; does Title 24 apply to manufactured housing?

And the answer is indirectly. Manufactured Housing is regulated under Title 25 and Title 25 does make some reference to Title 24 Building Standards Code. Walking through exactly how that interaction occurs and where it would apply is tricky. So we can provide a detailed

answer in writing later. But not directly, but indirectly, Title 24 provisions often will end up applying to manufactured housing (sic).

MR. MILLER: And I'll look that up at the next question session to see if they can more appropriately, you know, more directly answer that question. The challenge with manufactured homes and factory built homes is that there are very specific definitions and some of them have to be Title 25 and some of them have to be Title 24, including the Energy Code. And those waters are a little bit tricky to traverse.

MR. BOZORGCHAMI: Yeah.

MR. MILLER: So I do have some language that that kind of addresses that and maybe we can maybe do that in formal responses in writing rather than, you know, try to stumble through my words. That may be the best way to do it.

MR. BOZORGCHAMI: Yeah. Yeah.

COMMISSIONER MCALLISTER: Sorry [indiscernible] raised his hands to continue to answer that question.

UNKNOWN SPEAKER: No. I'm sorry. That was -- that was my mistake. Sorry, Chair, or sorry Commissioner.

COMMISSIONER MCALLISTER: Oh thanks. Thanks. Appreciate it.

MR. PEREZ: All right. Okay. Well if that -- are there anymore, Peter or Payam, before we get started again? MR.

BOZORGCHAMI: I don't have any raised hand. Peter, do you have any coming in?

MR. MILLER: No. Ted -- Tiffany is -- I'm going to restate this as a question as he's saying that it's unclear also how -- when it comes to accessory dwelling units, ADUs that happened to be manufactured housing are simply considered manufactured housing. So there's some overlap because some ADUs are accomplished through using a manufactured home, but not all ADUs are created by installing a manufactured house. So those are technically distinct topics. And then we can follow up with Laura for a more detailed answer regarding manufactured housing.

MR. STRAIT: Any other ones?

MR. BOZORGCHAMI: Yeah, we're good. Thank you, Peter. I think Javier, go ahead.

MR. PEREZ: All right. So continuing on. Let's get into the Prescriptive and Performance Compliance Approaches and Requirements for

Multifamily Buildings. Now, the way that the 2019 Energy Code exists, High-rise Residential Subchapter is relative to Prescriptive and Performance Compliance options. They're in the 140s, generally, 140.0 to 140.8 and low-rise is in 50.1. And similar to the other sections, you know, that language was moved into the 170s for addressing all multifamily buildings moving forward.

Now, what you are seeing here, the gold text, represents language that has been modified for the Standard and proposed design relevant to the Performance Approach and how those budgets will be determined. You know, this is something that we're still trying to home in on and trying to get this thing look right and making sure that we are applying the appropriate energy metrics for multifamily building moving forward. So what's so interesting is that source energy and time-dependent valuation energy is going to be the metric for multifamily buildings moving forward. Currently low-rise, multifamily and low-rise single-family follow energy design rating scores, and moving forward, for multifamily buildings were shifting to these

metrics.

In Section 170.1(d), so we're still in the Performance Approach. There are still references to energy design rating scores. Those have been taken out already. And again, the 15-day Language will represent the modifications that we previously just went over. As far as low-rise residential or multifamily buildings with three or fewer habitable stories, any HERS performance combines options that were in existence will continue to be in existence for those low-rise residential buildings to allow credits and with the caveat that what's in 170.1 now, doesn't directly match within the low-rise residential requirements. And that 150Day Language will be matching.

All right. So moving to the Envelope Component Requirements and Requirements for Roofing Products or Cool Roofs, what's the more common term. We've unified the roofing product requirements across low and high-rise multifamily buildings now. You know, if you know those requirements, you know that they're variants -- or they vary based on the pitch of the roof and the Climate zone. Now, for

multifamily buildings, there are two added layers. You know, the bottom being a scenario without an attic, which is something that's new, a prescriptive option that's been created for 2022 to more appropriately address and create assemblies that are efficient but that do not have a vented attic. In high-rise multifamily buildings, that's less and less common. And one of the movements, or one of the intents of adding this section was to appropriately address those assemblies and apply efficiency requirements that are specific to those buildings more appropriately.

The top two rows, if you're looking at the left, I guess the ceiling insulation, and between rafter roofs, and ducts in attic, and a vented attic. And then the second one with ducts conditioned space, those are mirrors of the High-Performance attic requirements at low-rise residential. And when they do exist in high-rise, the requirements are following through. You'll note that, again, depending on Climate zone and depending on pitch in roof, the roofing product requirements vary. But we did make an effort to try to unify these requirements across

low and multi, low and high-rise multifamily buildings. There previously was a requirement for .55 in some climate zones for the Aged Solar Reflectance requirement that was bumped up to a .63 because in some climates it was found that the added cost was zero. So in order to unify that, t didn't make a difference with regards to cost. So that was an attempt to, again, more streamline and unify those requirements.

Continuing. As far as roof insulation requirements are concerned. Again, this is -- this is a scenario for high-performance attics. And, you know we, expanding on that scenario for buildings without attics, insulation requirements vary depending on assembly type. If it's a metal building, you can see the U-factor there, and those are maximums for wood framed and other. Depending on your Climate zone, the requirements are different.

You'll find that Climate zone 7 being the most mild of all our climate zones, or less temperate. .039, it’s the most lenient as far as efficiency requirements because of the lack of heating and cooling demand for those spaces, or those buildings in those Zones or in that Zone.

With regards to Radiant Barriers, expanded this across low-rise and high-rise multifamily buildings that do have attics. In the event that there is an attic, if the building has duct and air handlers in the attic in climate zones 2 and 7, the requirement is to install the Radiant Barrier. If the attic does not have a space conditioning system in it, the rating barrier requirements are triggered for climate zones 2 through 15.

With regards to wall insulation, one of the things that was introduced here, along with efficiency requirements, was trying to address high-fire rated wall assembly types and the challenges that they may encounter when trying to achieve some of the higher efficient insulation requirements that we have in our standard. So we introduce variances that will be seen on the next slide. And as far as insulation in general, for walls, that the requirements to vary based on assembly type, whether it's metal buildings, heavy mass, and you've got all this there, and the high-fire rating if it's framed, depending on if it's 0 or 1, or 2 or 3 fire hours, or fire rating.

All right. So this table is split up into two slides because our tables are really large. So depending on the wall type, again, insulation requirements vary by climate zone. Some of this was meeting in the middle, meaning high-performance wall requirements, some requirements were increased. But and you'll see the less restrictive variance for walls that have 2 to 3 hour fire rating in the middle of this table.

With regards to heavy mass and light mass, insulation again varies by climate zone. Colder climates obviously have different requirements than the harder climates or the milder climates, light mass is probably the simplest of all of our insulation requirements for these walls.

All right. And if you've done low-rise or if you've dealt with low-rise and high-rise multicompany requirements, or just low-rise and high-rise residential requirements in general, you'll know that we have two different area of limitations for windows. Essentially, the more window you have, the less efficient that wall is, right. So there's some limits for low rise-rise

and high-rise is currently in 2019 Code and they are different. Now what we've done in 2022's proposal is to apply both thresholds. And what that means is there is a 20% window-to-condition-floor-area limitation. So say, for example, you had 1,000 square feet, you are limited to 200 square feet of window. Now there is now also so that that limit applies to all multifamily buildings. And similarly, on the high-rise side, there is a 40% window-to wall ratio limitation and a 5% skylight to roof. Those requirements are similar to being extended across all multifamily building. So two thresholds, two requirements, both have to be met, and we did remove the 5% window to condition for area limitation for west-facing glazing for multifamily buildings moving forward.

Okay. With regards to Fenestration Properties. Again, unification was the target here. As much as we could, you know, we unified the requirements across these different types of multifamily buildings. There's different categories for curtain wall and storefronts, Performance Class Architectural Windows and then the all other category. And the Architectural

Windows are something that's new to this Code cycle. And this is something that was introduced as part of the multifamily proposal to address these windows a little bit differently in the same way that we addressed the high-fire rating for insulation requirement for walls. But that's the similar variance there.

So we've got three categories. AW windows are in the middle, architecture windows. Those are in the middle of that. You'll note that those requirements slightly vary from the general or all other window and from the curtain wall. Now, one thing that I do want to point out, or a point of emphasis here is, so the asterisk for the all other window, which are typically going to serve your dwelling units.

In low-rise buildings there is no solar heating coefficient limitation for climate zones 1, 3, 5, and 16. That's in 2019 Code. 2016 had similar exceptions, and I and 2027 will follow suit. The idea there is that those buildings were found to benefit from solar heat gain. So for that reason, they have no requirement. So that will continue. That exemption from the solar heat gain coefficient requirements will

continue to exist for low-rise multifamily buildings or multifamily dwellings with three or fewer habitable stories.

All right. With regards to determining the effect of shading the SHGC value for fenestration products. And where we settled was to follow solar heat-gain coefficient calculation or requirements for, currently only four multifamily buildings. And we're applying that across all low -- sorry, currently only for a high-rise. We're applying that across all high and low-rise while buildings against an attempt to try to simplify what we're doing here and just go with one way to determine these efficiencies moving forward.

All right. Exterior doors have different requirements, dwelling unit entry doors, if they separate the dwelling from unconditioned space or ambient air, if there's certain dwelling units for bringing over the low-rise residential prescriptive maximum U-factor 0.2. And if they are common use area entry doors, they follow the high-rise residential requirements, which variance depending on climate zone and also whether they are swinging or non-swinging doors.

So treating common areas more like high-rise or non-rise and dwelling units, continuing more like res, but applying that across the board, regardless of height is, again, the intent there.

QII was something that was introduced prescriptively in, I believe 2019 for low-rise multifamily buildings. That will continue to apply, but only to low-rise multifamily buildings and obviously still to-low rise, single family as well. But we did not expand the QII requirement to any buildings that are more than three habitable stories. Again, there was, not this Code cycle, but may evaluated next Code cycle and see where kind of the chips fall. There's some challenges with determining cost and testing procedures and various requirements. So stay tuned. We'll see where we land in the Code cycle.

All right. The nonresidential or multi high-rise residential 2019 requirements have day light requirements for large, enclosed spaces, which I don't think are very common in multifamily buildings. But in the event that they do exist,

There is a minimum daylight requirement. And the

idea is if you've got a really large open space, over a 5,000 square feet and a reasonable ceiling height, there's an opportunity to introduce daylighting or skylights to reduce some of the demand that might exist on the lighting load. Those open spaces, you can get a reasonable amount of illumination with a fairly small skylight, and that's something that's been crossed over to multifamily, really. In any event, that you have a really large, enclosed space in the multifamily building. Once again, I don't know if that's too common, but it would be a requirement.

All right. So what you find in the common area Space Conditioning, Sizing, Equipment Selection and Calculation requirements is that those calculations follow the 2019 Energy Code requirements, which essentially say to figure out the demand or the load for the system that is needed, or the capacity of the system that is needed, according ASHRAE's Handbook, Fundamentals Volume. And then select a smallest size available to satisfy that. Though that's business as usual. That's not changing. Again, that's for common areas.

With regards to Dwelling Unit Space Conditioning Systems or systems that serve dwelling units, we have made some edits to more appropriately identify the systems that we're intending to regulate. And some of this language, well actually this requirement was discussed in Monday's hearing, but again, I feel it might still be appropriate to identify that it does exist, and therefore dwelling units, there are heat-pump space conditioning system requirements depending on climate zone and then some variance depending on if it's a building with three or fewer habitable stories or four or more. But again, these are prescriptive requirements that nonperformance. And this was addressed during Monday's session.

Refrigerant Charge. Coming back to HERS verification measures that only existed in low-rise residential buildings, it will still exist as a HERS verification measure only for low-rise residential building. But the testing procedure or the test is going to be applicable to all systems serving individual dwelling units. And I mean, assuming the qualifiers for those requirements are triggered. But again, we're not

expanding the HERS verification component of that to high-rise multifamily buildings, only the testing. So the self-certification for installers is with the expectation for multifamily buildings with four or more habitable stories and again, climate zones 2 through -- 2 and 8 through 15. The few other qualifiers, but those qualifiers haven't changed from 2019.

There is language on Central Fan Integrated Ventilation Systems within the section as well. Which is Dwelling Unit back here in 170.2(c)3B. But that language is likely going to be moved over to the ventilation section, and you -- this echoes what you heard in the morning session, the Prescriptive Chapter from, I think, Michael Shewmaker spoke to that. We're relocating this to the Ventilation Section for multifamily as well.

New, this is a new requirement for 2022's Energy Code. This is, again, Dwelling Unit Space Conditioning Systems in climate zones 1, 2, and 11 through 16 in the event that the designer or builder decides to install a balanced ventilation system to meet the whole building ventilation

requirements, then the heat recovery ventilator or an energy recovery ventilator must be installed. And there are additional hoops with regards to efficiencies for these systems. So they're a little bit layered and detailed. They're on the screen here, but this is a new measure and there are efficiency targets for these systems, and they serve individual dwelling units and also when they serve multiple dwelling units. And similarly to the other ventilation requirement that we just spoke of, this language likely will move to IQ Ventilation Section at 15-day Language.

Now, with regards to spaces serving common use, Air Conditioning System Serving Common Use Area -- Space Conditioning Serving Common Use Areas. They essentially follow the nonresidential space conditioning system requirements, though that language was reproduced in this section and any new measures that were proposed for nonresidential mechanical systems and that were discussed on Monday's session are reproduced here. And the intent is to treat these in the same manner.

All right. Water Heating Systems. In

the first bullet it says not a change. This is not new. If a recycling system is serving individual dwelling units, then prescriptively, the requirement is that it must be manual demand-controlled recirculation system.

Now moving into Water Heating Systems that serve individual dwelling units. The three options, and these are all ors because there is no requirement to install one or the other. You have three. The first one, and actually, if I do this a little bit differently, I might make it better. But it's following the Codes organization. But number two is probably the most simple one in the event that a heat-pump is installed. If you install a heat-pump that is fairly efficient and it’s a NEEA Tier 3, I believe switch, I think was probably going to recon in place or higher at this point. There are no additional requirements except for in climate zone 16, at which point there's water heat recovery system requirements with the colder climate has some different demands. Now in the event that you do not install a highly efficient water heater, heat-pump water heater that satisfies the NEEA Tier 3. The expectation is

that in climate zones 1 and in 16, and keep in mind these are the colder climate zones in California, . Compact hot water distribution system be installed. And then again, in climate zone 16, there's still a prescriptive requirement for drain water heat recovery system.

And the last option, again, these are independent of each other, and the designer can choose one of three. A gas instantaneous water heater is still allowed, as long as it has a max input of 200,000 btu's and no storage tank.

Was that -- not too much change there, but a couple identified additional drain water heat recovery system requirements.

Okay. Now moving into Systems Serving Multiple Dwelling Units. I'm using the word option here because there are multiple options and there are requirements depending on the option that's selected. So in the event that a central heat-pump water heater is installed to serve multiple dwelling units, then there is a recirculation loop tank requirement. The heater for the tank must be electric and capable of multipass operation, with minimum tank temperature requirements and a few other

measures, along with design documentation, as described in JA14.4.

And the next option is in the event that one decides to install a gas or propane water heating option to serve multiple dwelling units, then the requirements -- additional requirements are triggered in climate zones 1 through 9. And we'll explain why not 10 through 16 in a -- in a slide here. So stay with me. These requirements are triggered and aligning with ASHRAE. They're triggered at -- when systems with total gas water heating input capacity of one million BTUs or greater. So minimum efficiency requirement of 90%, but that is a weighted average requirement. So in the event that there are individual gas water heaters as part of a larger system, as long as the average satisfies that 90% efficiency, that is in compliance. In the event that a water heater is installed, that's part of that system that is below 100,000 btu's, that will not be counted towards our weighted average calculation. That can be excluded.

And the final exception here is kind of leading us into the next slide. So if this central water heating system, whether it's gas or

propane, has at least 25% of its energy coming from site-solar energy or site-recovery energy, then everything I said is not applicable. And this 25% exception is why the climate zones are limited to 1 through 9. And more to the point, that is because of the additional requirements that we have on this slide. Right. So essential water heating systems still have to include a recirculation system, except for buildings where there are fewer dwellings. But a solar water heating system is required. And efficiency requirements are described in 1 and 2.

One has a minimum solar saving fraction of .2 in climate zones 1 through 9. So you'll note that doesn't satisfy the 25%exception that we have, but in climate zone 10 through 16, regardless of the option you select, you'll find that the minimum solar savings fraction is over that 25% recovery efficiency requirement. And for that reason, the requirements on previous slide do not apply in climate zones 10 through 16. And again, these requirements vary depending on the option you choose.

All right. Lighting Within Dwelling Units. This is -- in dwelling units, the

expectation is that lightning will follow the single family requirements. Common living areas, and we talked about this a little bit earlier and we're still trying to home in on how to kind of appropriately use these terms and not step on the toes of other terms that are already defined in Part 2. So this is something that we're still revising. Common living areas, again, think of a shared living room or a shared kitchen as a draft language, as the 45-day Language is written now, and those spaces are required to follow the residential lighting requirements. We're looking into this. We're still homing in on the right way to address these spaces. So there may be slight modifications here at 15-day Language. Staff is still in discussions with stakeholders and [indiscernible] try and make sure that we appropriately apply efficiency requirements to lighting systems in these common living areas. So stay tuned on that one. But otherwise, you know, these lighting and dwelling and just follow single-family lighting requirements and any changes to those requirements were covered in this morning's session with Danny Tam.

Now, as far as common service area

lighting, that will follow the nonresidential lighting requirements. And to summarize that in two bullet points; there's lighting power limitations and control requirements. Whereas in residential lighting, it's really about efficacy, light quality and less restrictive control requirements and that's kind of how these two vary. With regards to outdoor lighting, assuming it's not controlled from within the dwelling units that will follow the non-res outdoor lighting requirements, and this is a slight deviation, but it does significantly simplify compliance or determining what requirements should follow. Inside lighting, again continues to follow nonresidential sign lighting requirements.

All right. And this, again, was something that was discussed in Monday's hearing. This is the end of Section 170.2. This is where we address the portable tank system, battery storage requirements for low-rise and high-rise. This is a very brief summary. The requirements are a little bit different, depending on if there are three or fewer habitable stories or four or more. And it currently is written that language

in Section 172.2(f), (g), and (h), points to the non-res and the single-family residential respective sections, we'll be moving that over a 15-day. There were significant concerns about the amount of edits that were being made and making sure that we could make both of those sections appropriately match each other. So at 15-day, we'll have that hammered out will be replicated here.

That is the end of the Performance, Prescriptive subchapter and I'll hand it over to my Payam to see if there are any questions.

MR. BOZORGCHAMI: Thank you, Javier. I don't have any raised hand as of right now, so I'm going to have Peter jump on the Q&As and read those out if possible.

MR. STRAIT: Sure.

MR. BOZORGCHAMI: And I think, apologies Peter. Let me jump in here one more time. Laura Petrillo-Groh, you have quite a few comments in here, questions in here that I think we need to have a verbal discussion with you because, here during this hearing, because there's some questions that we're not really getting a good grasp of, so we need to ask some questions so we

can answer your concerns correctly. But meanwhile, Peter, could you read Scott's comment?

MR. STRAIT: Sure. So Scott Blunk [ph.] asks, why not use the term Time Dependent Source in parallel with Time Dependent Valuation? While gas may not be time dependent, electricity is and the correlation with TDV is nice.

MR. SHIRAKH: This is Maziar. I can perhaps answer that. I'm Maziar Shirakh, CEC staff. So TDS is, in our opinion, is a -- not a well-defined term. It stands for Time Dependent Source Energy. The source of energy that we use for our analysis and is being currently used in his CPEC [ph.] is a particular kind, it's called Long-run Marginal Source Energy. So there are other variations of that. There's a Short-run Marginal Source Energy and there is an Average Source Energy. So they all have different components and consequences. Again, the one we use is the Long-run Marginal Source Energy. Marginal refers to the fact that what is on the margin for a particular hour of the day. A day like today, very sunny, mild, it's probably right now, solar is on the margin, and later on in the day when the sun starts going down, it will

probably be a gas turbine. So this captures those implications.

Long-run also considers the changes to the grid as the grid becomes cleaner in California. You know, we have these RPS goals for 2030 and 2045. So the Long-run part of it captures that, the Short-run does not. So the TDS is used outside of California. Again, it's just not well defined. But you know, having said that, if says someday there is a convergence between the two terms, you know, we can use it. I mean, TDS rhymes well with TDV. But for now, you know, we felt like because our source energy has a specific meaning, we need to stick to that. Thank you.

MR. BOZORGCHAMI: Thank you, Maziar. Laura, I've unmuted you. Would you like to ask your questions, verbally?

MS. PETRILLO-GROH: Yes. Absolutely. This is Laura Petrillo-Groh with the Air Conditioning, Heating, and Refrigeration Institute. So looking at the proposed change in 170.1 for the Energy Budget for the Proposed Building Performance Approach, I was wondering what the impact of those changes are as it

relates to equipment that is supposed to only be able to comply, even if it's [indiscernible]. So it's my understanding that some of the changes described on the Monday hearing require that products such as gas furnaces and gas water heaters would only be able to comply with Title 24 if using the Performance Approach. And so I was just wondering if with -- if the -- if the changes described here further impact those products and want clarity to understand if minimum efficiency products would still be able to comply using the Performance Approach.

MR. BOZORGCHAMI: Maziar, do you want to answer that question, based on the baselines that we have designed?

MR. SHIRAKH: Yeah. The baselines are all designed with the federally compliant products for that product class. So you know, if the building complies with all the other prescriptive measures for windows, walls and everything else then you know, the baseline allows compliance with a minimally compliant product. So I think that is -- that is the case. Did that answer the question?

MS. PETRILLO-GROH: Thank you. Yes, it

does.

MR. SHIRAKH: You know, the slides that I showed on Monday for the different building categories, multifamily, single family, nonresidential and all the different climate zones, and were even given building types, well then non-res had several different categories, all the baseline recommendations included either a minimally compliant heat-pump, or a minimally compliant heat-pump space heater, or a minimally compliant heat-pump water heater.

MS. PETRILLO-GROH: So yeah. I understood that from your presentation on Monday, and I was just seeking to understand what the pathways were for certain products, such as furnaces and water heaters.

MR. PEREZ: So the way that, first space conditioning systems, the way the prescriptive requirements are modified for system serving dwelling units is that the baselines are going to be based off of heat-pump space conditioning systems. I think your question is what effect will modeling a natural gas appliance --

MS. PETRILLO-GROH: Okay.

MR. PEREZ: -- space conditioning

appliance --

MS. PETRILLO-GROH: Yeah.

MR. PEREZ: -- for source energy, what effect would that have?

MR. SHIRAKH : So, you know, all of our approaches allows the natural gas path. It has to either be done through the performance path. And you may have to improve other building components, such as windows or, you know, more insulation. But there's always a path for natural gas appliances to comply.

MR. PEREZ: Now, to answer the second part of your question, Linda, as far as water heating systems are concerned, there are three options for system serving individual dwelling units. Heat-pumps prescriptively, right. So you've got heat-pumps and then you have gas or instantaneous, I'm sorry, gas or propane instantaneous water heaters. So that component doesn't apply to multifamily in the way that you think it does. With regards to systems serving multiple dwelling units, again, you'll find that there is a central heat-pump water heater option and then a gas or propane water heating option. I think that, hopefully, answers your second

part.

MS. PETRILLO-GROH: This does help. So just to make sure that I'm crystal clear, and since we're running a little bit ahead, I hope this is okay that I'm taking the time like this. If I was going to, I guess I'll ask it separately. For single-family and multifamily, if I was going to build a house or a building and install minimum efficiency -- and I wanted to install a minimum efficiency gas furnace and a minimum efficiency gas water heater in that, in each of those locations, multifamily and single family, there's a pathway for that combination. Is that correct?

MR. SHIRAKH: There is a pathway for that. Correct. It might involve installing additional non-preemptive features, such as better insulation in the walls, or better windows, or more roof-deck insulation. But yeah, there is a path.

MR. BOZORGCHAMI: Yeah. The performance path to allow you to go beyond the prescriptive requirements. So, yes. Y you do have a pathway going forward.

MS. PETRILLO-GROH: Thank you.

MR. SHIRAKH: There are other technologies like dual-fuel heat-pumps. They can come in handy, and they come with a standard furnace and there's a variety of options available.

But in general, yes. You can have a path power for standard water heater or space heater, or gas.

MS. PETRILLO-GROH: Thank you. My next question is on 170.2. I just wanted to clarify that the proposal is for climate zones 1 and 16. That they are not -- that you would not be permitted to use a traditional heat-pump prescriptively, and multifamily four stories and above? Is that -- am I understanding that correctly?

MR. SHIRAKH: Yes.

MR. TAM: Are you talking about space heating?

MR. STRAIT: I think so.

MS. PETRILLO-GROH: Yes.

MR. SHIRAKH: Yeah. They --

MR. TAM: Okay. So currently 116, the prescriptive requirement is the dual-fuel pump so prescriptively, you know, it cannot be a straight

heat-pump. So you can do it under performance.

MR. SHIRAKH: But if you do it on their performance and you put a straight heat-pump instead of dual-fuel, you'll have a penalty. So you have to make that up. And in very cold climate zones, dual-fuel heat-pumps actually perform better than straight heat-pumps.

MR. PEREZ: I think your, Linda, your question is answered at the bottom of the slide here.

MS. PETRILLO-GROH: Thank you.

MR. PEREZ: Sure.

MS. PETRILLO-GROH: I appreciate the time and answering those question.

MR. PEREZ: Well thanks for participating. I certainly appreciate it. Otherwise, I'm just talking to myself.

MR. BOZORGCHAMI: Yeah. Thank you, Laura. Those are good questions, and I think a lot of people may have had the same questions. Thank you.

Peter, anybody else? Any other questions?

MR. STRAIT: Yes. Let me resolve both of these. Danny, I see that you started typing an

answer to Laura, I'll need you to close that so I can resolve the question.

MR. TAM: Oh. Sorry.

MR. STRAIT: Thank you. And then an anonymous attendee asked the email site says that comments must be received by 5-21-21. Has this changed? And can we send comments via email still?

MR. BOZORGCHAMI: The answer to that is yes. Absolutely. 5-21-21 is the end of the 45-day Language. So if you would like, actually, we encourage you to submit your comments to us earlier than later. So even by email, that would be best. Most likely we will docket that email as a comment to the records, but the sooner we get your comments, the better we are.

COMMISSIONER MCALLISTER: Hey, Payam and crew, I just wanted to chime in. So just a second. What you just Payam, you know the docket really is the place where comments need to go. So if, just know everyone, if you send staff an email or you kind of, you know, take a slightly more informal route with communication with staff, it's pretty much assured that that communication will go into the docket. So just

wanted to --

MR. BOZORGCHAMI: Yes.

COMMISSIONER MCALLISTER: -- we're basically obligated to keep the docket updated with that sort of communications. So I think, just that expectation, I wanted to make sure it was clear that.

MR. BOZORGCHAMI: Yes, exactly. Exactly.

MR. STRAIT: That -- so I'm sorry – June 22nd, not May 22nd.

MR. BOZORGCHAMI: That is true.

MR. STRAIT: Yeah.

MR. BOZORGCHAMI: It is June 22nd.

MR. STRAIT: 21st. 21st.

MR. BOZORGCHAMI: Oh, what did I say? 21st. Sorry, Peter. I'm getting confused with my numbers.

MR. STRAIT: Yeah. Sorry. So yeah, I'll mark these as answered. And those are the only questions I have at this time in the question and answer box.

COMMISSIONER MCALLISTER: All right. Well if there's nothing else, Payam, I'll -- do you want to truck through or do you want to take a break? How are you feeling?

MR. BOZORGCHAMI: I think -- I think we need to take a 10 minute break.

MR. TAM: I think that we probably need to change the recording on the - for the court recorder.

COMMISSIONER MCALLISTER: Okay.

MR. BOZORGCHAMI: So if it's possible, Commissioner, can we take a break till 1:30?

COMMISSIONER MCALLISTER: Absolutely. Yeah. Thanks a lot, guys. Nice job, Javier.

MR. PEREZ: Thank you.

COMMISSIONER MCALLISTER: Nice job, everyone. Appreciate it.

MR. BOZORGCHAMI: Thank you. Thank you. And meanwhile, if anybody would like to submit a question to the question and answer, you're more than welcome to and we'll, before we reconvene with the Additions and Alterations, we will try to answer. Thank you.

(Off the record from 1:20 p.m. until 1:30 p.m.)

MR. BOZORGCHAMI: Yeah. Go ahead, Javier. You're -- yeah. Go ahead and present your first screen.

MR. PEREZ: All right. The home stretch. Thanks for your patience. And before I forget, I

certainly do want to say thanks to the entire team. This is a lot of information. And I've been able to bother a lot of people to make sure that we get this right, whether it's on our team or on the Case teams, or even other stakeholders. So I certainly appreciate everyone's willingness to help get this language to a point that's palatable and that's enforceable, and able to be compliant with at the state level. So all right. Let's wrap this thing up.

So we've got Multifamily Requirements for Additions, Alterations and Repairs in this final subchapter. Where they existed previously in High-Rise Residential was Subchapter 6, The Residential, Additions, Alterations and Repairs Chapter, or 141.0 if you're familiar with our code. And for a Low-Rise, they exist in Subchapter 9, which was gone over this morning, that now only applies to single-family residential buildings. Now, all of this language has been moved and where efficiencies were increases -- increased, you know all that language now exists for multifamily buildings in Subchapter 12. So four sections, 180.0 through 180.4. I think that's right. I may have to

double check that. But Subchapter 12 is where the Additions, Alterations and Repairs Requirements exist.

All right. So right off the bat, our Additions Section has multiple exceptions to kind of exempt specific systems or specific components from the requirements. And this first exception is actually something that may be removed, and not because these ventilation systems are not subject to this requirement, and naturally, my cat snuck into this room, so I may have to kick him out. I apologize.

MR. BOZORGCHAMI: Apologies, these things happen when you work from home.

MR. PEREZ: You've met Ghost. He is hungry. This is the name of the game.

All right. So as far as Ventilation, Airflow, Grate Requirements for Additions under 1,000, the language in the appropriate section where this is required has been modified to no longer apply to systems for additions under 1,000. So that exception is likely going to be removed when we get that language honed in pretty well, which will be a 15-day. Roofing product requirements are exempt for additions 300 square

feet or less. Pipe insulation requirements for existing inaccessible piping, that exception's been applied across the board. If you're familiar with our pipe insulation requirements or our water heating alteration requirements, what we say is only accessible pipe while the watering heating system is being replaced shall be insulated, unless it already had insulation. But if it's inaccessible, then there's not much to talk about.

Some extensions, exceptions, and probably one of the more important ones that I do think we need to highlight is that the PV and battery storage system requirements are not applicable to additions, nor are they applicable to alterations. Those are strictly newly constructed requirements. And they're -- we're still, again, modifying language just a bit to make sure that we address that, the heat-pump specific requirements that apply to newly constructed buildings or newly constructed multifamily buildings for systems that serve dwelling units are not referenced within the Additions Section. With regards to additions and for alterations, the replacement system can be a

heat-pump or a gas heating system that follows some common practice.

All right. As far as envelope requirements are concerned, the low-rise residential requirements had variance for the envelope insulation requirements depending on the size of the addition. In other words, additions over 700 had stronger requirements and then under 700 have less restrictive requirements for those alternatives were moved over and some insulation, what do we want to say, variances or concessions were made for existing assemblies and that, again just follows through from what existed in the low-rise residential buildings.

In the High-Rise Residential Alteration Requirements Section for 2019 there was an exception for the solar ready requirements for built -- for additions that increased from areas of by 2,000 square feet or less. We brought that over to apply to all low-rise, sorry, multifamily buildings. So if an addition increases the roof area of a building by more -- by 2,000 square feet or less, Solar Ready Requirements do not apply

All right. Mechanical Ventilation

Requirements for Indoor Air Quality for dwelling units will match the requirements for a single-family dwelling units. And ventilation requirements, as described here that, you know, the dwelling unit ventilation will follow single-family, is consistent throughout Subchapter 12. So additions, alterations, all of the language that Cheng discussed as far as ventilation requirements for these additions or alterations for single-family, extrapolated or expanded, are equally applied to multifamily dwelling units.

With regards to the Performance Approach and the options, this is language probably looks familiar. It's -- there's still the option to comply with the additional alone, kind of treating it like an island, or existing plus addition plus alteration. Which means, you know an addition, maybe it's not as efficient, so you're going to alter some of the existing components to make up for that lack of efficiency. And that's just kind of following through to all multifamily buildings.

All right. Alterations. Again similarly, exceptions where they existed and they

applied to high-rise systems, some of that language was brought over to apply to all multifamily buildings. In the event that, you know, you have existing space commissioning systems, there isn't an expectation to replace or for that, say for example air handler, to meet additional efficiency requirements if you're just extending that. And then it should go without saying, but the exceptions there to make sure that we're appropriately applying only requirements to altered components and identifying what those altered components are. A few other exceptions, VAV, an economizer, FDD or Fall Detection Diagnostic exceptions were added in mirroring what was previously in existence in the high-rise residential sections.

All right. So as far as envelope requirements for Envelope Mandatory Requirements for Insulation, this language was brought directly over from the High-Rise Multifamily Mandatory Installation Requirements. So what existed there with regards to different assemblies, whether it was metal building, metal frame, would frame, or other, those mandatory insulation requirements were brought over to

apply to all multifamily buildings rather than just high-rise res, as they existed in 2019. And the exception was added of light and heavy mass walls.

All right. With regards to the roofing product requirements, again, we've merged requirements to apply to 50% of roof area alterations, or more than 2000 square feet. So when you do exceed one of those thresholds, either/or, there are roofing product requirements. So the first requirement that you'll see here is for low-sloped roofs in climate zones 2, 4, and 6 through 15, minimum aged solar reflectance and thermal emittance requirements, or a SRI, which is a Solar Reflectance Index. So the Reflectance Index requirement of 64. And if you're not familiar with that calculation, it's just a blend of the two, aged solar reflectance, thermal emittance values and punching it into a calculation and see where the chips lie.

All right. Below is the insulation tradeoff for aged solar reflectance requirements. Essentially, what we're saying is in the event that, you know, aged solar reflectance

requirements might be prohibitive or not desirable for a designer or a builder, then that reduction -- that requirement can be reduced to minimum aged solar reflectance requirement can be reduced as we see on the left hand column, if insulation is installed as follows in the subsequent columns. Depending on your climate zone, the requirements to vary.

All right. Continuing. This is roofing products section is a little bit long. But moving to steep-sloped roofs in climate zones 4, and 8 through 15, this is the same trigger, 50% or 2,000 square feet of roof. A aged solar reflectance requirements .20. And thermal emittance, not aged, this is strictly just thermal emittance, is 0.75 or a minimum SRI of 16. There are a number of exceptions to the roofing product requirements. At every cold cycle, the exceptions are, my preference is alternatives, but in Code language, this is an exception to a requirement. It is that we've got four this time around, insulation being an easy trade off. Radiant barriers in the attic, that's fine as long as it's not directly above spaced or skipped sheathing. If you don't have ducts in

your attic in the climate zones listed in the second to last bullet, 2, 4, 9, 10, 12, and 14, then there's no roofing product requirement for these steep-sloped roofs. And if you have R-2 or greater continuous insulation above or below the roof deck, again it's an alternative to installing a roofing product that meets the values of top care.

All right. Now this is a new measure, and it was discussed in the Low-Rise Alterations Section. And I'm going to try and also describe it because it's got some qualifiers. So we've got insulation requirements when duct systems are entirely new. And I'm going have to read this because it's very meticulously worded, and I worded it this way, so I have to read this one to make sure I get it right. So duct systems are completely -- are new or completely replaced as part of an alteration, and, and again this second qualifier has to exist for the following requirements to apply, and the air handler and ducts are located within a vented attic. So if these two things are satisfied, then the following applies, okay.: So in climate zones 1 through 4, it has R-49 insulation requirement or

a max U-factor 0.020.

Now, there are exceptions to all of these requirements. The first one has exceptions in climate zones 1, 3, 4 and 19 with dwelling units with at least R-19 existing insulation. I went back to 1982's Energy Code and even at that point there were mandatory R-19 insulation requirements for residential buildings. So to expect say, if the building was built in the last 40 years, it would likely have been a mandatory requirement to have at least R-19. You go back to 80 and 78, the U-factors are a little bit tricky, and it depends on the assembly type. And I don't know, I can only go back to 82 before I can -- I can't make any sense of the Energy Code. So in climate zones 2, and 11 through 16, I'm moving away from that insulation requirement. There is an air sealing requirement. I'm sorry, a sealing requirement for the ceiling. Saying that twice. Sealing with an S and then ceiling, as in the top portion of your conditioned space between the attic and conditioned space.

Again, exception if you have that R-19 mandatory insulation requirement. And in the last 40 years, if it was built to code, you

likely have it. And even then, older buildings may have already been weatherized or updated to be a little more efficient. For example, this home was a 1920s home, so there certainly wasn't any Energy Code requirements and I don't have R-19 in my attic. So that's how it is for this building. There's also an exception for dwelling units with atmospherically vented space or water heating combustion appliances within that pressure boundary.

So the 15-day language -- so as described here, is the intent of where we are for this requirement. The wording in the 45-day is still being worked on. So at 15, this is likely where we're going to fall. But, you know, just know that this language is still being massaged a little bit to make sure that we can fully encompass the intent and when these requirements do apply.

Okay. So similarly, following on the requirements for attics in existing buildings when the systems are completely new or if they're entirely replaced and where the air handler and ducts are located within a vented attic, any recessed downlight luminaries in ceilings need to

be -- need to be covered with insulation, the same depth as the rest of the ceiling and any non-IC rated cans need to be fitted with fire-roof cover to make sure that there aren't any issues. Non-IC is non-insulation contact. And then in climate zones 1 through 4, 8 through 10, again, if you've got R- 19 already, keep it moving, the requirement does not apply. And again, we're going to hopefully get this language in a place where we want it, probably in the next week. So that should be fine.

All right. The last component of this requirement is exceptions to all the requirements that we just talked about before that trigger where you're replacing the entire duct system, or it's completely new and the HVAC is in the attic. Dwelling units, if you've already got R-38, if there's asbestos, knob and tube wiring, which the 1920s house does have, or where accessible space in the attic is not large enough to accommodate, you know, the requirements. And we've had that exception or some variation of it for a little while now in the Residential Alteration Section. Essentially what we say is just fill the cavity,

but also don't forget some of the added language to make sure that you don't forget that there are ventilation, attic ventilation requirements in other parts of Title 24. So if necessary, add baffles. You know, make it so that you can still satisfy the appropriate ventilation requirements in these attic assemblies.

All right. The last exception is if the attic space is shared with other dwelling units and only -- and not -- and the other dwelling units are not triggering this requirement. All right. Another section that is still being massaged, but I think the intent of the requirement is appropriately depicted here. And this is tied to roof alteration. So the same trigger as the roofing product requirements if the roof's being replaced, recovered, or recoated, and if more than 50% of the roof, or more than 2,000 square feet of the roof is undergoing that change, then in specific climate zones, 1, 2, 4, and 8 through 16, there's a continuous insulation requirement of R-14 or equivalent U-factor.

A few exceptions, that R-10 there, then you're fine as is. There are scenarios where

mechanical equipment create challenges, limitations, and those exceptions previously existed, and they will continue to exist in multifamily buildings and in scenarios where insulation has to taper at drains or other low points. As long as you increase the insulation requirement or the insulation installed at other portions to net out an average of R-14, then that's still in compliance with the requirements.

Okay. Fenestration Requirements. And when I say follow the high-rise residential language, I mean kind of the way that it's been broken down. You know, there are prescriptive alteration requirements for U-factories, solar heating where applicable, or visible transmittance. And we have a table for that. Now alternatively, you know at the builder or designer's discretion, they can go in and just meet the newly constructed requirements and the weighted average requirements and [indiscernible] and call it a day.

The exception from the Multifamily Section for replacements of up to 150 square feet being only subject to U-factor requirements, is being again, reproduced here and applicable to

all multifamily buildings. And that was replacement, so you're going in the same size or smaller for the hole in the wall that was there. Alterations that add fenestration area, let's see, maybe something bigger or punching a hole in a wall, they have to meet the area limitations. We talked about that earlier, 20% for the condition floor area, or 40% window to wall ratio, and U-factor, RSHGC, VT where applicable as described in the table on the next page.

Now, there are a few exceptions. The 50 square foot threshold will get you out of that. And for skylights, 16 square foot -- square feet is the exception to allow a reduction down to a maximum of 0.55, down to a less restrictive maximum U-factor. It's probably the more appropriate way. And so we gain coefficient requirements.

For this one, this is what the table looks like. It, as far as the breakdown, this is -- for categories, this is similar to the newly constructed requirements in that we have curtainwall requirements, we have architectural window requirements, we have all other window requirements and then skylights. There's a

delineation between three stories or fewer and four or more. And similarly to what we talked about earlier, for a newly constructed low-rise multifamily building requirements where there is no solar heat gain coefficient requirements in climate zones 1, 3, 5, and 16, that exception still applies to this table or these requirements. And you can't read it, but it's the smallest footnote on this table. And similarly, VT, the Visible Transmittance Requirements are not applicable to multifamily dwelling with three or fewer habitable stories.

Okay. Now we're going to get into HVAC systems and there is a number of different ways you can alter HVAC systems, right? You can install a completely new system, or completely replace an existing system, which is where we are. And then you can alter components. So let’s talk about completely new systems here.

To completely replace systems, and we're now under 2Ai, and in general, these follow low-rise previous dwellings requirements. You have to meet all the requirements specific to new constructed except for that heat-pump fuel type requirement. Again, the heat-pump specification

for newly constructed multifamily buildings, or systems that serve those dwelling units, is not applicable to this, nor is it applicable to alterations.

Okay. Now for altered duct systems, like Cheng said this morning, the activation threshold was reduced to 25 feet of new a replacement space conditioning ducts, and that was previously at 40. And consistently throughout the Multifamily Chapter, anytime there was a high-rise verification requirement that applied to low-rise residential buildings, that will continue to only apply to low-rise residential buildings. That's the verification component only. In other words, the test testing has to be done, but it'll be self-certification by the installer for buildings with three, with four or more habitable stories.

As far as duct installation requirements are concerned. this mirrors the residential single-family requirements that were discussed by Cheng under the Alterations Section this morning. Depending on your climate zone, it’s either R-6 or R-8. And you'll see that it went from R-6 to R-8 in the middle row there for those climate zones.

Okay. So moving on from complete replacements and from duct alterations, this Roman numeral iii, or triple i. For altered space conditioning systems is really talking about when you replace the air handler. I think that's right. I'm going to go check that. But yeah, this is not a complete replacement. So when you alter a space conditioning system, there are leakage test requirements. And those leakage tests are going to follow what previously existed for low-rise residential. Again, the HERS verification component of that is only applicable to buildings with three or fewer habitable stories.

Last one on the list here on the bottom is the refrigerant charge verification requirements are specific to mechanical cooling systems. So when a refrigerant containing components are altered, and since you have to recharge the system, well let's make sure that the system has the appropriate refrigerant charge, because if it doesn't, you're going to lose a lot of efficiency. And that's been in the Energy Code for low-rise res for as long as I can remember. But anyways, it's being expanded again

to high-rise multifamily buildings, but not the HERS verification component. HERS verification stays with low-rise multifamily only.

All right. This is very similar to what Cheng described this morning, as far as the prohibition of electric resistance heating, though, I do want to point out that, you know, he did receive a comment, or maybe he or Maziar, about whether or not this prohibits the use of electric resistance, kind of strips in heat-pump space conditioning systems, and that's not the intent. This is really speaking to electric resistance heating systems, not heat-pumps with that electric resistant component to kind of satisfy the demand where they're not capable.

So with that said, the exceptions are the same. It's not applicable to replacements of non-ducted electric resistance systems, not applicable to ducted electric resistance if you're not touching the cooling system. And by not touching, I probably should say not replacing. And doesn't apply if you have an electric resistance existing heating system in climate zones 6, 7, or 8 through 15. And 15-day language will be updated to match what's in the

single-family, or what will be in the Single-Family Section. Again, we're really trying to home in on how this is worded to make sure that we're disallowing electrical resistance space heating systems, prescriptively in appropriate situations.

Okay. Moving on to Space Conditioning Systems that Serve Common Use Areas for Nonresidential. They, I'm sorry, they follow the nonresidential alteration requirements and any changes to that section, if there were, would have been covered on Monday's hearing. But essentially, these are, again, following the nonresidential convention.

As far as water heating systems are concerned, you know, we still have delineations for systems serving individual dwelling units. And this is where that begins. We've got mandatory pipe insulation requirements in 160.4(f), which if you remember, after our first break, we discussed the pipes that are greater than one and a half inches -- one and a half inches or greater in diameter have to now have two inches of insulation versus 1.5 under the 2019 Energy Code. And similarly, if it is a

recirculation system, we want manual, prescriptively, the requirement of the demand recirc control manual and not automatic.

Continuing with water heating systems altered to replace water heating systems that serve individual dwellings units. These systems have four different options here. The two in the middle are both heat-pump options. One is a little more efficient. And the second one that you see, number two, doesn't meet that Tier 3 threshold, and that option would be required to be placed on a rigid R-10 insulated surface. And there's still an option for natural gas or propane water heating systems. And in the event that the existing water heating system was electric resistance, then following that up with or replacing that with a consumer electric water heater is acceptable.

All right. Lighting. Alterations to lighting systems within multifamily buildings if it’s in a dwelling unit, you follow residential or the low-rise residential, which again is high efficacy and generally some control requirements depending on the space. And if it's common area lighting, or sign lighting, or alterations to

electrical power distribution systems, they follow the nonresidential requirements.

And lastly, the Prescriptive Approach for ventilation requirements are really ventilation requirements. Again, the intent for dwelling unit ventilation systems is to match what the single family requirements are for dwelling units, so that will follow through.

That's the end of my slides. Payam, do you have any questions or are there any questions that we might need to address?

MR. BOZORGCHAMI: Thank you, Javier. Folks, if you have any questions, please either raise your hands and I'll unmute you or submit a question in the Q&A.

MR. STRAIT: I don't see any questions currently in the Q&A, but we can give people a couple minutes.

MR. BOZORGCHAMI: Yeah. Let's give about 30 minutes. 30 minutes. 30 Seconds.

COMMISSIONER MCALLISTER: 30 minutes?

MR. BOZORGCHAMI: 30 seconds. Sorry Commissioner. We are -- we are ahead of schedule by three hours, which is good. But I really, really want to

leave enough time to open up and you -- open it up for comments and questions for what you've heard all did today.

So I think -- I think we're -- Javier, can you go to the next slide, please.

MR. PEREZ: Sure.

MR. BOZORGCHAMI: I think, Commissioner, I think we need to open it up now for any comments or questions regarding today's hearing.

COMMISSIONER MCALLISTER: Yeah. That sounds right. You know, I do want to thank everyone who did have questions. Laura in particular, you brought up a lot of good issues. And so just thanks for --

MR. BOZORGCHAMI: Yes.

COMMISSIONER MCALLISTER: -- thanks for your diligence there and really drilling in to make sure the details are right or at least, you know, understood. So appreciate that. And anybody else who wants to make either a specific or a general comment, please go ahead. And if your thoughts aren't sufficiently collected now, there's always the written comment period. And again, as Payam has said repeatedly, sooner is better because, you know, now is the time. The

45-day language is relatively easy to change. And the closer we get to the --- to the end of the 45-day period, the less malleable things get. So I just want to encourage people to to get on that sooner rather than later.

MR. BOZORGCHAMI: Thank you, Commissioner. We do have one raised hand. Laura, I'm going to unmute you. Go ahead and state your name and affiliation.

MS. PETRILLO-GROH: Hi. Good afternoon. This is Laura Petrillo-Groh with the Air Conditioning, Heating, and Refrigeration Institute. AHRI represents more than 332 manufacturers of heating, ventilation and air conditioning equipment, water heaters and commercial refrigeration equipment. There's just one last thing I wanted to flag today.

We have been reviewing possible federal preemption issues related to proposed changes to Single-Family, Multifamily, and Nonresidential Sections regarding space heating, space cooling, and water heating systems. These proposals have removed actions for certain equipment with federal energy efficiency standards to comply with the Energy Code using the Prescriptive

pathway. It appears that these proposals CEC is considering the prescriptive and performance pathways to be separate. However, they are not separable. The prescriptive path sets forth specific requirements the HVAC systems and equipment must meet in order to comply with the Code if a building does not comply with the performance based compliance path. As we continually review of federal preemption issues, we remind CEC that the concept of compliance to Energy Codes through multiple pathways using multiple -- using minimum efficiency equipment is a fundamental aspect of [indiscernible]. If proposal from 45-day language differs from the proposal made in December of 2020 and the January 2021 presentation, so our review is ongoing. AHRI will submit more detailed comments in writing. Thank you.

MR. BOZORGCHAMI: Thank you, Laura. Laura, can we have that submitted to our docket, please? What you just read, please.

MS. PETRILLO-GROH: Absolutely.

MR. BOZORGCHAMI: Thank you so much.

MR. SHIRAKH: Yeah. Laura, again, this is Maziar. I appreciate the comments and the

sooner we get those in writing, you know, will be better for us to prepare an answer. So appreciate the written comments to us as soon as possible.

MR. BOZORGCHAMI: Thank you, Maziar. Thank you, Laura. Peter, do we have any comments in the Q&A, or questions in the Q&A?

MR. STRAIT: The -- Someone named Sarah asks the R-49, I think that might have been typo from R-19, but I'm not sure.

MR. BOZORGCHAMI: No. It's R-49.

MR. STRAIT: R-49 installation for the attic, can it be rigid insulation?

MR. BOZORGCHAMI: Yes, it can. The installation, the only requirement for the Energy Commission is that the proper insulation be installed based on what's certified with the Bureau of Home Furnishings, Thermal Insulation, the energy part of Consumer Affairs. Okay, in California. But yeah, as long as it's done properly and it's placed properly, and it meets the Qii requirements, yes, it can be installed in the attic, as a residential.

So I do have John McHugh, who raised his hand. I'm going to unmute you John. Go ahead

and state your name and affiliation.

MR. MCHUGH: John McHugh speaking on behalf of myself. I just wanted to go back to the Table 150.0(a) and Table 160.5(a). One thing that was brought up and I wanted to clear up during the conversation was the change in technology since the 2016 standards. And one of the issues that was brought up was that back in the -- during the 2016 Standards dim to warm and colored tuning luminaires were rare at that point in time. These are -- these are luminaire types that are growing in the market. I wanted to point out that because these have drivers is no reason to expect that their flicker is low. And in fact, the ANSIEEE [ph.] organized group, the Next Generation Lighting Industry Alliance wrote a white paper called Dim to White - Dim to Warm white paper, they evaluated four luminaires. Two of those luminaires were unable to pass the Flicker Requirements in J8. So this is somewhat -- this was written in 2019, so this is somewhat indicative that the belief that a driver technology results in low flickers is maybe not correct.

Also new since the 2016 standards was the

adoption of NCIEEE, i triple e Standard 1789, which actually for the first time, you know, created a referenceable standard of what is low Flicker operation. And we didn't know that back, you know, it hadn't gone through the process. The current California standard is three times higher in terms of the modulation of light. And so if anything, we should be more restrictive than we were in 2016, now, now, now that there is a referenceable standard. And there is a, ASHRAE 189.1 is actually using the J10 test method to evaluate that. And that is going to be adopted into the IGCC, the International Green Constructions Code.

Finally, you know, it's pointed out the, you know, that the test, the testing requirements are onerous. But instead of throwing out the baby with the bathwater, I'm somewhat encouraged to see, you know it's hard to tell, right, from a you know, a very high overview slide what the 25th, with the 15-day changes might be. But actually looking at the Lumen Maintenance Test, which requires a 3,000 hour test, that's probably, you know, the 80-20 rule in terms of reducing regulatory burden on manufacturers for

the -- for the inseparable lighting fixtures, and I think would be widely appreciated by the industry.

For lamps I think, you know, the Commission needs to think about, for lamps and LED light engines, the commission might want to consider, you know, should we -- should we be remaining to align with the Energy Star requirements for these two light sources? They do still require a lumen maintenance requirement, and it would probably be worthwhile to talk with Energy Star to see what their thoughts are about the value of that part of their standard. Thank you very much.

MR. BOZORGCHAMI: Thank you, John.

MR. STRAIT: I think just to quickly clarify some of the comments that I made earlier. The comment was not to indicate that we think there is 0 issue with flicker and in those, in the categories lighting of dim to warm, or color shifting, but more to indicate that those products necessarily need a more advanced driver. Flicker behavior is driven by the driver that is supplying power to the LED. And in order to provide those functions where you have this

dimming between two or three different color modules, and typically if you're using, for example, pulse with modulation, you have to have a driver that that's operating at a pretty high, you know, Hertz, pretty high speed. So it would be less likely for such a driver to fall into that red zone that we're trying to block off of impact because we're trying to identify for these devices. But it's not that the product wouldn't be designed that way. It's if were we to evaluate that product today, what would be the likelihood of discovering that that there was enough of a problem in the marketplace to require a -- the government to intervene, basically.

Just, so to clarify that, it's not to say that that problem doesn't exist, it's that these products ultimately were not evaluated when the Standard was adopted. It's not clear to staff whether it is necessary that this Standard be applied to these products. But given the Standard has been applied to this -- these products to this point, we're internally considering how we might retain JA-10 requirements for those products and maybe make modifications to other JA8 requirements.

So that's what we're saying, is that Staff are still going to be considering these comments. We find that it's likely that we should retain the Flicker for at least the time being, the current Code cycle. And that we would also agree that if we receive industry comment about the relative burden of the different testing that JA8 requires, including JA10, that would be valuable information to us, because certainly the, you know, lifespan of these products, we adopted that Standard back when these products were far more expensive and far less proven and still had a lot of issues. For example, with heat. Nowadays, if a LED lamp fails, a replacement LED lamp is relatively inexpensive. And for these installed integrated luminaires, we're seeing that it's hard to find a product that won't last well in excess of the minimum standard that we borrowed from the Energy Star. So yeah, in terms that balance point between burden and cost to the manufacturer that gets passed on to the consumer, and that consumer protection to ensure that the consumers are getting products that will reliably perform, especially if the products are installed in the

house before they arrive. We're interested in continuing that conversation and trying to find the right balance point there.

MR. MCHUGH: That's outstanding. I appreciate how responsive the Commission staff is, and I'd recommend that it's that potentially some of the data to make this evaluation actually already exist in the MADAD's [ph.] database and would recommend to take a look at the dim to warm products that are already in the -- in the database and what their performance is. Thank you so much.

MR. BOZORGCHAMI: Thank you, John. Thank you, Peter for the response. Any other? Any other raised hands? Questions? Answers.

So if not, Commissioner, are you okay with adjourning today's session?

COMMISSIONER MCALLISTER: I am. As long as everyone has been heard and we've had the back and forth it's appropriate to have today. I think we are ready to wrap up and just to reiterate for more detailed comments and to expand on anything that was said today with a little more ability of time to put it down properly on paper. Please do that and submit it

to the comments as soon as possible.

MR. BOZORGCHAMI: Yes.

COMMISSIONER MCALLISTER: I really appreciate everyone's attention. Good attention. Good turnout, both Monday and today. And we'll hope for the same tomorrow when we pick it up and do our final day of hearings on the Express Terms. So thanks to everybody, and back to you for any final logistics and to close it out, Payam.

MR. BOZORGCHAMI: Thank you, sir. So, again, I'll reiterate what Commissioner McAllister had said. Please, please, please by either next week or the week after, please submit your comments. We really, really value your input. And we really want to do the right job and get the right message out in our next Set of Standards or Energy Codes. So I thank you and I hope you have a nice rest of the day. The session has adjourned.

(Session adjourned at 2:13 p.m.)

CERTIFICATE OF REPORTER

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a certified electronic court reporter and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

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IN WITNESS WHEREOF, I have hereunto set my hand this 7th day of July, 2021.

MARTHA L. NELSON, CERT**367

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Myra Severtson
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