

BEFORE THE
CALIFORNIA ENERGY COMMISSION

In the matter of Staff Workshop on)
Draft 2013 Building Energy)Docket No. 10-BSTD-01
Efficiency Standards Revisions for)
Residential and Non-residential)
Buildings)

CALIFORNIA ENERGY COMMISSION
HEARING ROOM A
1516 NINTH STREET
SACRAMENTO, CALIFORNIA

FRIDAY, JULY 15, 2011
9:30 A.M.

Reported by:
Peter Petty

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INDEX

	PAGE
Introduction/General Information about 2013 Title 24 Rulemaking Calendar	4
Mazier Shirakh, CEC	
2103 Residential Prescriptive Component Package A	
Bruce Wilcox, CEC	6
Questions and Comments	10, 27, 28
Residential Mandatory Requirements for Ceiling, Wall, Floor, Fenestration, and Ducts	
Bruce Wilcox, CEC	78
Lunch	
Zone Air Conditioning Credit	
Bruce Wilcox, CEC	91
Questions and Comments	115
Advanced Envelope Assemblies	
Abhjeet Pande, Heschong Mahone Group	141
Elizabeth McCollum, Heschong Mahone Group	142
Questions and Comments	155
Guest Room Occupancy Sensors	
Cathy Chappell	164
Public Comments	
Adjourn	
Certificate of Reporter	

1 P R O C E E D I N G S

2 JULY 15, 2011 9:31 A.M.

3 MR. SHIRAKH: We should get started. Welcome,
4 this is the July 15, 2011 Staff Workshop. We have a few
5 topics to present today. After the introductions, the
6 first topic is going to be the 2013 Residential Package
7 A, which is the staff's recommendation for the
8 Prescriptive Package for the next round of Standards.
9 And that is going to be presented by Bruce Wilcox, who is
10 sitting to my right, to my left is Martha Brook, we are
11 the co-leads for this round of Standards.

12 At 11:00, approximately, is going to be the
13 recommended Mandatory Requirements for Ceilings, Walls,
14 Floors, Fenestrations and Ducts. And after that, Bruce
15 will talk about the Zone Air Conditioning Measures.
16 We'll break for lunch and then come back, start with
17 Advanced Envelope Measures, and then the Non-residential,
18 the only topic of the day with the Non-residential
19 Guestroom Occupancy Sensors. And then we should probably
20 be able to adjourn about 3:00.

21 I have my presentation here, but by popular
22 demand, I'm going to skip most of it, I know Mike and Bob
23 are really looking forward to it.

24 So, the only thing I'm going to show here is
25 basically the schedules. So this is the schedule that

1 we've developed for this round of Standards and we're
2 pretty much down here, we're wrapping up the staff
3 workshop process and, after this, we're going to be
4 creating the complete draft for the 2013 Standards. We
5 should be available in the September-October timeframe.
6 And then, soon after that, we'll start the Rulemaking
7 process, the 45-day language, and the 15-day language if
8 needed, and we're hoping for adoption in March of 2012.
9 The publication date of the entire Building Code is going
10 to be July of 2013 and the effective date, we hope, will
11 still be January of 2014.

12 Previously, we talked about having some workshops
13 next week on July 22 to present the REACH Standards;
14 we're not going to have those workshops. And, instead,
15 we're proposing another, probably hopefully the last
16 workshop is going to be in mid-August, the date to be
17 determined, and in that workshop, we're going to present
18 the so-called "Hollywood House," production model homes
19 for orientation, glazing and PV tradeoff, you know, we're
20 going to mention this briefly today and this is an
21 attempt to allow a tradeoff between photovoltaic and
22 glazing in a dwelling. This will get tradeoff against
23 the 20 percent total area limit and the five percent west
24 facing glass. And there are several approaches you can
25 take to accommodate this and we'll present those in the

1 August workshop.

2 One of the items that was pulled from today's
3 workshop was the Refrigerant Charge and Verification
4 because we're still working with HRA and the
5 manufacturers on some of the things we're recommending,
6 so we pulled that from today's workshop and it's going to
7 be presented in August.

8 And we're also recommending a bunch of changes to
9 the administrative sections, Section 10-103 through 114.
10 This would impact the forms, but mostly it's going to
11 impact the way the compliance options and things like
12 that are treated in the future. And we'll also have a
13 brief discussion of the REACH Standards and how we're
14 going to approach it. Essentially what we're doing with
15 the REACH Standards, we're going to go to a target, a
16 savings beyond the Base Code -- a percentage, and the
17 percentage may be the same for all climates zones, it may
18 vary, and then what we will do, we will develop packages
19 which will go into compliance manuals, as recommended for
20 reaching those targets. So that's it for me, unless
21 there are any other questions, I'm going to turn it over
22 to Bruce.

23 MR. WILCOX: So -

24 MS. BROOK: Hold on, Bruce. I just wanted to
25 mention that there's a package like this out front that

1 hopefully everyone grabbed because some of the slides
2 that Bruce is going to show is going to be easier to read
3 off the paper.

4 MR. WILCOX: Thank you, Martha. That's what I
5 was going to say. You could argue that this whole
6 presentation has way too many numbers, but that's just
7 the way it is.

8 So what I'm going to present is an analysis and
9 discussion and a proposal for what we're going to call
10 Prescriptive Package A in the 2013 Standards. Is that
11 better? It works? Okay. That's a change of name. This
12 is what is currently called "Package D" in the 2008
13 Standards, and so we're trying to rationalize the
14 standards and make them simpler, so we're going to make
15 it Package A. It's the basic prescriptive requirements
16 for new residential construction. And just to make sure
17 it's clear, "prescriptive" in California doesn't mean the
18 same thing as "prescriptive" everywhere else in the
19 world; in California, the Prescriptive Standard
20 essentially defines the level of performance that's
21 required in new buildings, and it's used in what we call
22 the Standard Design for the Performance Analysis
23 Compliance Method to establish the performance that's
24 required for any proposed building. Except for mandatory
25 features, which we're going to talk about in the next

1 presentation, none of these Prescriptive requirements are
2 absolute, all of them can be flexibly traded away for
3 other measures at the builder's option, as long as they
4 show that their performance is equivalent to their house,
5 with all of the Package A Prescriptive measures, then
6 they comply with the standard.

7 This analysis is based on a combination of the
8 P2700 and P2100 prototype houses, the 2100 is a 2,100-
9 square-foot, single story house that is defined in the
10 Residential ACM Manual, and the 2700 is a two-story
11 slightly larger prototype house that is also defined in
12 the ACM Manual and we've used a combination of the
13 results for those two houses, and we've also used the
14 combination of the results for shingle roofs and titled
15 roof as representative of construction in the state, as
16 well as the variation on the 16 Climate Zones.

17 This analysis does not include any energy savings
18 or costs for the Zoning measure, which we're going to
19 discuss later on today. It doesn't include any of the
20 costs or savings for the Solar Ready Measures, just so
21 it's clear what we're talking about here. And in doing
22 this analysis, we've assumed that the 2013 AFUE and 2015
23 SEER EER Requirements that have recently been announced
24 by DOE are in place and, so, those are part of our
25 analysis for both the Base case and the proposed Measure

1 Package. What are they? The DOE announced recently
2 that, in 2013, the Furnace AFUE will go up to 80 percent;
3 in 2015 for southwestern states, including California,
4 the SEER will go up to 14 and the EER will go up to
5 either 11.7, or 12.2, depending on the rate of capacity
6 of the air-conditioner. So, for this analysis, we've
7 assumed the 80 percent AFUE is in effect, the SEER 14,
8 with an EER of 12.2. So these standards are scheduled to
9 go into effect a year before the DOE --

10 MR. SHIRAKH: I'm getting looks from the Court
11 Reporter. Please come up to the podium. The last
12 comment was, what, Bob Raymer, he was wondering what the
13 requirements were, the year, for the 2015 requirements.

14 MR. WILCOX: Okay. And the other background
15 piece of information here is that the results here are
16 for single family homes, only. We haven't included any
17 results for multi-family in this analysis, and we've
18 weighted the results by Climate Zone according to a set
19 of Housing Start predictions that were developed by the
20 Case Team. So when we say the statewide impact is X,
21 that's determined by using the results from each climate
22 zone, weighted by the number of housing starts expected
23 -- or the fraction of statewide housing starts expected
24 in each Climate Zone.

25 Okay, so I'm going to present actually four

1 packages, but here is the first part of this, has got a
2 comparison of three different packages of measures. And
3 the packages are shown up here in the upper left, Package
4 A1, which represents a maximum cost-effective TDV savings
5 package for all the measures that we analyzed. And the
6 way we created that is that we looked at the lifecycle
7 cost-effectiveness of each measure --

8 MR. KEESEE: I'm Mike Keese from SMUD. Could you
9 describe what's in each of the packages?

10 MR. WILCOX: We're going to get there in a
11 minute, Mike. I'm just giving you background.

12 MR. KEESEE: Thank you.

13 MR. WILCOX: So the Package A1 represents the
14 most efficiency measures that you could put into the
15 house without making it cost more than the same house
16 would have cost under the 2008 Standards. Well, it's not
17 the most measures, it's the most energy savings that you
18 could get from a package of these measures without
19 putting in so many things that cause more than 2008, so
20 that's one definition of what "cost-effective" means. We
21 save a bunch of energy and it still costs less on a total
22 life cycle basis than it would have cost under the
23 previous versions of the Standards.

24 Package A2 is an alternate approach in which
25 we've picked the lowest lifecycle cost set of measures in

1 each climate zone, so this is the set of efficiency
2 measures in a house that, when you consider the first
3 cost plus the present value of future energy costs, the
4 total life -- the sum of those is the lifecycle cost and
5 that package represents the lowest total lifecycle cost
6 for all of the packages, all the alternates that we could
7 analyze.

8 And then the third package is the staff's
9 proposal for this Package A, and it's a less aggressive
10 energy efficiency proposal than either of the other two,
11 but we're going to talk about all three to kind of put
12 things in perspective here. The Package 1A, the maximum
13 package, costs on a statewide basis about \$5,500 plus per
14 house, added costs compared to the current Standards. It
15 saves 44 percent of the Time Dependent Valuation, TDV
16 energy compared to the 2008 Standards. For historical
17 comparison purposes, it saves about 31 percent of the
18 energy when you calculate it using the older source
19 rules, and then the savings are also listed there for
20 Kilowatt hours, therms, and kilowatts, as well. The
21 Package A2, lowest lifecycle cost package, costs \$3,900
22 roughly and saves 39 percent TDV, and the staff proposal
23 costs a modest \$2,882 and still saves 33 percent of the
24 TDV energy. You can see in the bar graphs all the same
25 information graphically. So now we'll go on and talk

1 about the details, but first a little for those of you
2 who are kind of into engineering science approaches, this
3 shows, for each of those energy calculations, the savings
4 in percentage terms vs. the first cost and there's a
5 slight amount of linearity there that might be of
6 interest.

7 So here is the "too many numbers to look at"
8 presentation and there are a lot of details in this
9 package stuff, so we're trying to be really upfront and
10 just show what it is, and I will go through in some
11 detail this one just so we understand what it is we're
12 looking at, and then we'll go on to look at the rest of
13 this package and the other two, yeah, the three packages.

14 MR. KEESEE: Excuse me, Mike Keese again from
15 SMUD. Could you define the peak period, where you're
16 getting the savings?

17 MR. WILCOX: We could do that. Should we do that
18 now, or can we wait until we get done with answering your
19 first question before we answer your second question?

20 MR. SHIRAKH: I think we should go through the
21 package and then, once we're done, then we'll take
22 questions.

23 MR. WILCOX: Okay. So, this table is laid out
24 with the 16 climate zones down the left-hand climate
25 here, Climate Zone 1 through 16, and then there's a set

1 of columns which are the main efficiency measures that
2 we've considered in putting the packages together. The
3 first column is the ceiling insulation and roof truss,
4 and so R-38 RHT means that Climate Zone 1 in this
5 package, we have R-38 ceiling insulation and RHT stands
6 for Raised Steel Truss, which is a type of roof truss
7 that has certain efficiency advantages compared to
8 Climate Zone 16, which has an R-38 Standard truss which
9 is the type of truss that is predominantly used in
10 California at this point.

11 And those of you who are familiar with the
12 Standards will see that the insulation R values are the
13 same as the current 2008 Standards, so, for this set of
14 analyses, we did not consider anything in terms of
15 sealing our value other than what was in the current
16 Standards. We did look at alternative trusses.

17 The second column -- there is somebody messing
18 with my screen -

19 MR. WARE: Hold on just a second.

20 MR. WILCOX: Okay. So the second column has to
21 do with the outside reflectance of the roof surface, the
22 cool roof characteristics of the roof. And for this
23 package, we're showing a tile with a .2 solar reflectance
24 for all the Climate Zones, and this is the basic proposal
25 that the staff is putting forward, that the requirements

1 for tile would change from .15 reflectance, which it is
2 under the 2008 Standards to .2 reflectance. The other
3 requirement for shingle roofs, our proposal is that that
4 remains the same as it's been, which is a .2 reflectance
5 in Climate Zones 10 through 15, and no requirement in the
6 other Climate Zones. So this column is basically static
7 in this set of proposals.

8 The third column is Domestic Hot Water Heating
9 System and what we're requiring here is a package of
10 measures which includes a compact hot water distribution
11 system, increased piping insulation for large pipes, and
12 a limited length of large pipes as part of the
13 distribution system. This is being proposed, it was
14 developed as a utility sponsored measure and is being
15 proposed as required in all new single-family houses, in
16 all Zones. And that's what the "Required" in this column
17 means. The Glazing Package is the one that was proposed
18 by the Case Project and it's been presented earlier in
19 staff workshops, and basically it is a U Factor .32, a
20 solar heat gain of .25 in the hot climates, and the same
21 requirements in the gold climates, except the solar heat
22 gain coefficient is relaxed to allow higher solar gain in
23 the cooler climates. That's also a constant in all of
24 these packages, alternate packages we're going to be
25 looking at.

1 So the fifth column is the Insulation R Value of
2 the duct system that is located in unconditioned spaces;
3 in California, that's primarily in the attic. And in
4 this package, we're showing R-8 ducts in all of the
5 climate zones except for Climate Zone 6, 7 and 8, which
6 are the mild Southern California coastal zones. And
7 otherwise, we're increasing the R Value of insulation to
8 R-8.

9 The next column over is the Air Conditioning Air
10 Flow and Fan Watts Requirement, and the proposal here is
11 that we extend the current prescriptive requirement that
12 is in Climate Zone 10 through 15 to all the Climate
13 Zones, hence they're required in all 16 zones. ACH50 is
14 a measure of the envelope air leakage of the house, it's
15 measured by a blower door test and the proposal would be
16 that each house would have to have a blower door test to
17 show that they had reduced the air leakage to the level
18 specified, three levels are specified here, ACH50 of 3,
19 that's three air changes per hour of air through the
20 blower door at 50 Pascal. There's a second level which
21 is 4 ACH50, and then the 7.6 in one Climate Zone is the
22 default level, that is the current default in the 2008
23 Standards and would not require a test, that's basically
24 no requirement.

25 The fourth column is called QUII and that stands

1 for Insulation Construction Quality Inspection and this
2 is a measure that's been defined in the Standards since
3 2005, and it's been an optional credit, and in this
4 package, that would become a requirement in all Climate
5 Zones. And it requires a special inspection to show that
6 the insulation was installed without defects.

7 The next column is the roof deck insulation and
8 this is a measure in which the insulation is added to the
9 roof deck at the top of the attic to reduce heat flow in
10 and out of the attic, primarily to reduce heat flow down
11 in the summer time, and reduce cooling loads on the house
12 and reduce duct losses from the attic duct system. For
13 this package, there's a mixture of R-13 Batt insulation
14 which would be installed below the roof deck, inside the
15 attic, and R-8 insulation which would be installed on top
16 of the roof deck as a foam layer.

17 The next column has to do with the radiant
18 barrier and ventilation in the attic. Radiant barrier
19 are required in a number of climate zones currently. And
20 this "No" here means that it's not required and "RB"
21 means that it is required, and because of the R-13
22 insulation installed inside the attic, it's an unfaced
23 Batt, there's no radiant barrier possible when you have
24 this measure, so in these zones we have no radiant
25 barrier, and in the zones where there is an above deck of

1 insulation for the roof deck, then we're assuming the
2 radiant barrier is still possible and that is what is
3 required in this package. We've made a significant
4 change in the treatment of attic ventilation in that
5 we're, rather than the 2008 Standards, which has
6 requirements for the attic ventilation area and the
7 location of the vents, the proposal here is we would stop
8 doing that and really require a minimum ventilation as
9 required by the Building Code. And so that is reflected
10 in -- the "/300" is the common designation for one set of
11 minimum ventilation requirements, which is one square
12 foot of ventilation-free area for each 300 square feet of
13 attic floor area, so 1/300. And then the final column
14 here, it is the wall insulation. And in this proposal,
15 we've increased the wall insulation requirements vary
16 significantly to require 2 X 6 framing in all the 16
17 climate zones and, in most zones, R21 insulation in the
18 cavity with an additional R4 foam sheeting layer around
19 the outside. So R21/4 means that it's an R21 insulation
20 with an R4 exterior foam sheeting layer on the outside of
21 that. And then, in addition, we considered requiring 24-
22 inch center spacing for the framing in this wall and it
23 turns out that, if you assume that that doesn't cost
24 anything, which is one popular assumption, that it's
25 always cost-effective, and so that's what ends up in this

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1 Maximum Cost-Effective Package in every climate zone.

2 So that's the Package A Maximum Cost-Effective
3 Package. And then the other half of this table, which
4 unfortunately I can't get on the screen in this format
5 here at the same time, is a similar table, same columns,
6 and the contents of the column are the added first cost
7 to implement this measure in our typical house, you know,
8 representing a combination of the two-story and one-story
9 houses with and without the shingle roofs and tile roofs.
10 So this is a way of looking at what the first cost is and
11 establishing the lifecycle cost calculations.

12 A positive number here means that it costs more
13 to do this measure than what was required in the previous
14 standards, so as you can see, there's \$427.00 in all but
15 one of the zones for the ceiling insulation and that's
16 our estimated cost for the Raised Steel Truss, which is
17 an upgrade vs. the Standard Truss since Standard Truss is
18 allowed under the current Standards and, in Climate Zone
19 16, we have a Standard Truss and there is no cost upgrade
20 for that.

21 So each one of these columns, the numbers here
22 represent the dollars per house required to pay for the
23 measures that are proposed in the standard as an upgrade
24 from the 2008 Standards. And I don't want to go into
25 great detail here, but you can see there is, you know,

1 costs for most of these things. We're not changing the
2 roof reflectance for asphalt shingles and the Energy
3 Commission's analysis indicates that the .2 reflectance
4 tile is actually a no cost upgrade, so there is no cost
5 for the roof reflectance stuff.

6 The Domestic Hot Water Heating Package is
7 estimated at \$306.00 per house, the glazing package at
8 \$388, the Duct R Value depends on where the starting
9 point was and whether we ended up at R8 or R6, but that's
10 \$152 for the R8 and \$36 to upgrade to R6. The Air
11 Conditioning Air Flow Prescriptive Package is estimated
12 at \$200 ACH50, depending on the level, is \$813 or \$656,
13 QII is \$709, etc. And over at the right-hand side, we
14 have the total added cost, which for this package ranges
15 from a high of \$5,900 and some to a low of about \$4,900,
16 and the statewide average weighted cost is \$5,559.

17 If you look at it zone by zone, this is the 16
18 climate zones across the bottom, and this is the
19 percentage energy savings compared to the 2008 Standards
20 for the blue bars are the TDV Energy and the red bars are
21 the source energy, and the one on the right here that
22 says "Weighted" is the statewide weighted by construction
23 starts average savings. And so, for this package, we're
24 about 45 percent savings on TDV and about 30 percent
25 savings on source energy. And the kilowatt hours,

1 kilowatts and therms, are similarly.

2 So that's sort of everything, almost everything,
3 we could find to analyze that gets into this package in
4 terms of being cost-effective by the current adopted
5 lifecycle cost methodology if you make this assumption
6 about maximum savings at no more than the current cost.

7 The second approach here is picking the lowest
8 lifecycle cost in these climate zones, instead of the
9 most energy savings in each climate zone. And this
10 changes the measures that get included pretty
11 significantly. You notice that, well, it doesn't change
12 the roof surface for solar reflectance, or the domestic
13 hot water heating, or the glazing because those are
14 assumed, and we didn't actually analyze alternatives for
15 those in this analysis, so they're assumed to be in the
16 package because there's very strong analysis in their
17 individual proposals.

18 In the roof, we get Standard Trusses instead of
19 Raised Steel Trusses in about half the Climate Zones when
20 we go for lowest lifecycle cost. We get R6 in many more
21 Climate Zones, and R8 in only a few, about half R8 and
22 about half R6.

23 We've assumed the Air Conditioning stuff is
24 required, still, and that wasn't included in the
25 Lifecycle Costing here. And the Air Leakage Reduction

1 for the Envelope, that's not cost-effective in the mild
2 coastal climates and the R3 very tight envelope is only
3 cost-effective in Climate Zones 9 through 16. And the
4 QII, the Insulation Construction Quality, is cost-
5 effective in the more severe climates, but not in the
6 less severe coastal climates. Whole House Fans, which is
7 the Ventilation and Cooling column here, are cost-
8 effective in Climate Zones 8 through 14, and so they're
9 in the minimum cost package. And the roof deck
10 insulation changes to be in fewer climates and to be more
11 R13 and less above deck, which the R13 is a less
12 expensive alternative. And if we get some radiant
13 barriers and zones where we didn't have it before, it's
14 because of the interaction with R13.

15 The wall insulation doesn't change as much. We
16 back off to R19 in several zones, but we still end up
17 with 2 X 6 in all of the climate zones if we do this low
18 lifecycle cost approach. Again, the lower table here
19 shows the assumptions on the added cost. This package
20 reduces the added cost to \$3,894, weighted statewide, and
21 there's a different pattern of the added cost in each
22 climate zone, you can study that if you are interested.
23 Again, a different pattern of TDV and source savings, but
24 it's all laid out for you.

25 And then we have package A3, which is the staff's

1 proposal for what should be adopted into the Standard.

2 So this is - you want to focus attention here and

3 discussion here, if possible.

4 So one of the goals here, there were several
5 goals that were used to put this package together, this
6 package does not have as many measures as the lowest
7 lifecycle cost package, so clearly, maximum energy
8 savings wasn't the goal here. One of the goals was to
9 make the Standards more understandable and clear and less
10 complicated, so there's been a tendency to group climates
11 together and use the same measures in groups of climates,
12 so there is, for example, the ACH50 column, we only have
13 ACH50 of 4, and the 7.6 default, which is basically a No
14 Requirement for these zones. So, rather than having a
15 mixture of three ACH53 in some zones of 4 and others, the
16 attempt here is to make this as simple, you're either in
17 a zone that requires it, or not, and it's always the same
18 requirement. There's no QII -- well, the other goal here
19 was to reduce the first cost to less than the full lowest
20 lifecycle cost package, so there were measures left out
21 in order to reduce the cost. So, for example, these are
22 all standard roof trusses and it's all with the 2008 R
23 Values, so the proposal here is to not change the roof
24 truss or the ceiling insulation requirements from 2008,
25 which saves costs compared to the previous package,

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1 there's no QII, no insulation quality inspections
2 required, so that saves cost, the whole house fan
3 requirements are still the same, but the roof deck
4 requirements are cut way back so that there's R4 foam
5 above deck required in Climate Zones 9 through 14, and R8
6 in Climate Zone 15, but no requirement in the other
7 zones, so that's a significant statewide reduction in
8 cost. And the wall insulation requirements are
9 significantly scaled back from the Lifecycle Cost case,
10 although there is still more insulation required than in
11 2008. So there is one way to look at this package is
12 that, in all the zones that they currently require R13
13 wall insulation, which is Climate Zones 2 through Climate
14 Zone 9, through Climate Zone 10, so all these - the
15 milder parts of the state, 2 through 10, currently
16 require R13 wall insulation, so in those zones the
17 requirements increased R15, which is a slightly higher
18 density of fiberglass Batt, plus an R4 sheeting. And in
19 the current zones that are already requiring 2 X 6 walls
20 with R19 insulation, or R21 insulation, the change here
21 is to go all those zones to R21 and then add the R4 foam
22 sheeting. So, the big change here is to essentially
23 require R4 exterior foam sheeting in all the climate
24 zones, but not to change the framing to require 2 X 6
25 framing. And the result of this package comparatively,

1 the added cost decreases down to \$2,882 for our
2 combination of typical houses. And the wall systems are
3 significantly less expensive, the roof decks are
4 significantly less expensive, etc. No cost for the
5 ceiling. And that's how the cost reduction happens. And
6 again, we can see the statewide energy savings is a
7 somewhat different pattern, but we still manage to get a
8 little over 30 percent TDV savings and about 20 percent
9 source energy savings from this reduced package of
10 measures.

11 So when we discuss this with -- we've been
12 looking at this and beating around on the actual
13 proposal, and talking about it with various people, and
14 one of the concerns that was raised had to do with the
15 air ceiling that was required in a bunch of the zones.
16 And so we looked at an alternate staff package, so
17 basically we're presenting two alternatives here, A3 and
18 A3B. And this comparison here is a comparison between
19 those two packages and the three packages I just
20 discussed where we have an alternate that I'm going to
21 add on here, which is A3B. As you can see, the cost is
22 very slightly higher. The energy savings TDV terms are
23 almost identical. It's basically in many ways completely
24 equivalent package and what we've done in A3B is we've
25 taken out the requirement for low leakage ACH50 Blow Door

1 Testing of the houses in all the zones and replaced that
2 with the insulation quality procedure being required in
3 the more severe climate zones, so it would be required
4 everywhere except Zone 6 through 10. And this is
5 essentially the same cost and essentially the same energy
6 savings and, from the staff's point of view, this is
7 equivalent and equally acceptable. It is the staff's
8 position that they're interested in energy savings and
9 results and not particularly wedded to any particular
10 measures to get there.

11 So that's, I guess, if you want to look at the
12 staff's proposal in summary, there are two alternatives
13 here, one is the A3 that we discussed, and the second one
14 is this alternative that is slightly different, but about
15 the same savings and cost. Both of those cost slightly
16 less than \$3,000 and both of them save about 33 percent
17 of TDV energy.

18 So now we can answer questions, or take comments
19 or - yes, okay, so to answer Mike Keese's question, what
20 we're presented here is a new estimate of peak effects,
21 which is one that was developed by the consulting team at
22 E3 in San Francisco. It's related to and derived from
23 essentially the TDV metric that's used for the time
24 dependent valuation that is used to weight the value of
25 energy on an hourly basis in each climate zone, and it's

1 significantly different than what people are used to
2 seeing in the past. In the past, the idea was that you
3 were looking for the absolute peak hour, or the absolute
4 day with a peak hour period of several hours on that day
5 and judging the peak reduction based on one day, or one
6 hour, that represents the worst of the year. This new
7 method that is being shown here is based on looking at
8 the hundred worst hours of the year as rated by TDV
9 valuation in each climate zone, and looking at weighting
10 the peaks during those 100 hours by the TDV value for
11 those hours. So the highest TDV valued hours get the
12 most weight, and then using that to estimate the peak
13 demand for each measure package house, whatever.

14 So one of the things that happens is it doesn't
15 weight the absolute peak hour nearly as highly as when
16 you only consider the absolute peak hour. If there are a
17 lot of hours that are less severe, I think E3's argument
18 is from a utility system perspective, that they think
19 that is a valid way to look at the cost and savings on
20 peak measures, and so they proposed that and it's in the
21 methodology document, and we're calculating it here.

22 It's clear that, as we get these big percentage savings
23 number here, you wouldn't get that big a number of
24 savings if you looked at one hour, the absolute peak of
25 the year, in most of these climate zones, I think. Mike,

1 you have to come up to the front.

2 MR. KEESEE: What's the time? What's the time of
3 those hours? Is it 4:00 to 5:00, 5:00 to 6:00, 7:00 to
4 8:00?

5 MR. WILCOX: Well, it's related to your other
6 favorite topic, the TDV Value stuff, which is based on
7 statewide demand and distribution in each climate zone,
8 and so forth. It's a combination number, and so there
9 isn't any particular hour, and it's not determined by the
10 clock, it's determined by the model.

11 MR. KEESEE: It should be determined by the time
12 --

13 MS. BROOK: We can actually summarize that and
14 provide it to you, but right now we're doing it
15 automatically by 8760 Stream and letting the model
16 compute it, but we can summarize it for you.

17 MR. KEESEE: You know, because we know what it is
18 in our climate zone. It's 4:00 to 7:00 p.m.

19 MR. SHIRAKH: It is, but unfortunately we have to
20 use the statewide and we can't use climate zone specific
21 --

22 MR. KEESEE: But you just said you calculate it
23 for the 100 worst hours in each climate zone --

24 MS. BROOK: That's right.

25 MR. KEESEE: So I'm curious what it is --

1 MS. BROOK: We'll summarize it for you --

2 MR. WILCOX: Well, and I have a bunch of
3 information for you, Mike, that I haven't tried to
4 compare yet in detail, but I think that's the next step,
5 to answer your question.

6 MR. KEESEE: Thank you.

7 MR. SHIRAKH: So I want to kind of re-emphasize
8 one of the points that Bruce made. He presented two
9 packages which are staff recommendations, and they
10 basically have the same TDV and source energy savings,
11 but different measures. And the point of that is that,
12 you know, what we're interested in is the savings, not
13 necessarily how we get there, as long as we get there,
14 you know, we can accommodate -- the package, A1, that he
15 presented basically has all the goodies in it, and we can
16 probably reach in there and pick measures that are more
17 palliative, in fact, we can build packages that are
18 different and are all equivalent, which has been our goal
19 all along. And as you commented, it would be helpful to
20 help us understand what the concerns are and how we can
21 actually do these substitutions.

22 So, with that, I'd like to ask if anybody has any
23 -- Bob.

24 MR. RAYMER: Thank you, Mazi. Bob Raymer with
25 the California Building Industry Association and I have

1 several questions and comments. First off, when would
2 you like to have comments back on this latest set of
3 releases?

4 MR. SHIRAKH: We're saying three weeks from now,
5 that would be August 12th.

6 MR. RAYMER: The 12th, that would be much better,
7 okay.

8 MR. SHIRAKH: August 5th, I'm sorry, Friday,
9 August 5th.

10 MR. RAYMER: Okay. That's tight, I understand,
11 probably another week would be very helpful on that.

12 MR. SHIRAKH: Would August 12th be good?

13 MR. RAYMER: Yeah, that would be much better.

14 MR. SHIRAKH: Okay.

15 MR. RAYMER: Thank you. On some specifics here,
16 during the case studies, I believe it is the one, the
17 last one held at UC Davis, I presented some information
18 that had been passed on to me from the timber industry,
19 in particular, the California Forestry Association, the
20 Western Wood Products, and there was one other group,
21 these are all entities that we work closely with in the
22 development of the Green Building Standards adopted by
23 HCD and the Building Standards Commission. And they had,
24 you know, I have been trying to keep other groups
25 apprised of some of the things that you're proposing

1 here, it's been a relatively moving target, but in
2 particular with the timber industry, they were quite
3 concerned about making a quantum shift to 2 X 6 and 2 X 8
4 studs; certainly, you can do that, there are very
5 effective examples of that being done, particularly going
6 to 24 on center, the problem here is, apparently,
7 according to them, going to 2 X 6 and 2 X 8 results in
8 the need for more trees being cut down because you're
9 taking things out of the center cut, you know, if you're
10 using linear programming, I guess you're not really
11 maximizing the amount of board feet, in particular,
12 coming out of here. They can explain it much better than
13 I, but they were seriously concerned that, inadvertently,
14 this could have an unintended environmental impact of
15 being able to build a more efficient home, but having to
16 cut down more trees in the process. And that is
17 something you should probably take up with them, and I
18 can certainly put you in contact with the people that
19 provided that information, first.

20 Also, with regards to marketable packages, as
21 always, we will be doing now that we're getting a clearer
22 picture, particularly, of Package A3 and 3B, we will be
23 looking at those and, particularly with Con-Sol will be
24 looking at marketable packages that they've been using in
25 the past and how to integrate all this into where the

1 building industry is today and we would like to, of
2 course, work with you and bounce some of these figures
3 off. I know, in terms of energy consumption, Con-Sol has
4 already discussed working with Bruce and Ken Nittler on
5 energy analysis. We'll also be looking at what is this
6 impact on marketable cost, marketable designs, and all
7 that. So we would also like to bounce some of that
8 information off of you to make sure that we're not using
9 inappropriate assumptions. So, we look forward to
10 working with you on that. Obviously, you know, not to
11 beat a dead horse, but with the economy where it is right
12 now, builders, those who are building, are going through
13 some massive cost cutting procedures right now and many
14 of them are dusting off plans and getting ready to go
15 forward -- very slowly, I might add -- and they're
16 completely unaware of what's being discussed here. And
17 so, like I've said many times before, there's going to be
18 a huge educational effort that's going to be needed,
19 particularly in 2013, so that these individuals are not
20 necessarily blindsided by some rather significant design
21 changes that they have to now incorporate into the plans
22 that they're submitting in late 2013, early 2014. Thank
23 you.

24 MR. SHIRAKH: So, on that training and education,
25 we have started dialogue with the IOUs and we're hoping

1 we can get some help from them and actually we would like
2 CBIA to consult with part of this group to develop these
3 programs and --

4 MR. RAYMER: We would love to help you with that.
5 We can kill a couple birds with one stone, the training
6 stuff that we had previously done incorporated both Green
7 Building and Energy, we kind of maximize the number of
8 people attending it because some had more interest in
9 Green Building than energy and vice versa. I can tell
10 you with the changes that are being proposed here that
11 there's going to be a huge interest in this. And for
12 both building officials, subcontractors and buildings.
13 Thank you.

14 MR. SHIRAKH: Thank you, Bob.

15 MR. FRANCISCO: I'm Jim Francisco, I'm with
16 Sierra Consulting, they represent some of the contractors
17 in the state that do foam work. And before that, I
18 worked with NCFI out of North Carolina, a foam
19 manufacturer.

20 I'd like to bring up a couple of points that,
21 during that time, you had proposed a 2 X 6 before, and we
22 were concerned about what it would eat up as far as the
23 environment, so we went to the US Forest Service in
24 Washington, D.C. and asked them to use their computers
25 and using California's average building rate to tell us

1 what was going to happen as far as the environment. They
2 came back and told us, by using a 2 X 6 rate, you were
3 going to have to cut down one and a half more trees per
4 house that went up, and that it had the potential of
5 deforesting at least 192 square miles a year. That's
6 canopy that they didn't feel they could lose. They were
7 really concerned about it and, at that time, they did
8 call CEC and talked to them about it, but that has been
9 an ongoing concern of all of us with the environmental
10 issues on this.

11 MR. SHIRAKH: I think, if I may just add one
12 point. What we're proposing here is basically the basis
13 for the U Factor for the walls and you can get to that U
14 Factor any way you want.

15 MR. FRANCISCO: Okay, you should put a package
16 forward to get to it in another way using the 2 X --

17 MR. SHIRAKH: Right and the proposal is that, you
18 know, we're going to have a table that is going to have a
19 U Factor based on these assemblies, you can get there any
20 way you want, as long as you meet or beat the U Factors.
21 You could go with 2 X 4 with an inch and half of foam.

22 MR. FRANCISCO: Well, the gentleman who spoke
23 before me was right, you take the center cut out of a
24 tree, so you use more forest.

25 MR. SHIRAKH: We're not disputing that.

1 MR. WILCOX: Actually, to be clear, the framing
2 requirement in the staff proposal is identical to the
3 2008 Proscriptive Standards, so there's no change in the
4 Proscriptive Standards here in terms of the framing
5 assumed.

6 MR. SHIRAKH: Mr. Hodgson.

7 MR. HODGSON: So let's just continue that. Mike
8 Hodgson from Con-Sol representing CBIA. So, the U Values
9 that you'll be using for the packages will reflect the
10 same framing that's in the 2008 Standards, which is my
11 understanding is 16" on center, not 24" on center.

12 MR. SHIRAKH: Right.

13 MR. HODGSON: Okay, so if I take a look at
14 Climate Zone 11 in Package A3, B, it says R21, you're
15 going to put a 2 X 6 stud in there with a R21 batt and
16 16" on center. Okay? So, questions or concerns. I'm
17 not sure -- I presume eventually you're going to get to
18 Mandatory Features and I'm not sure if that's today or
19 not, but I think it is later, right?

20 MR. SHIRAKH: Right.

21 MR. HODGSON: And there's a concern -- I'm just
22 going to try to go column by column here -- on Domestic
23 Hot Water about the pipe lengths and the limited pipe
24 length, I think, that is still unresolved and probably a
25 significant concern to the industry because that

1 especially becomes a mandatory feature and I'd like to
2 find out how common a practice it really is. I think
3 there is a misconception between staff, consultant, and
4 the field, and we need to clarify that. The framing
5 issue, it sounds like we've talked about. On glass, the
6 concern I have is the solar heat gain coefficient, it's
7 significantly lower than what most manufacturers in the
8 market are using. I understand the presentation was that
9 people can do it, but when you actually go to the big box
10 stores that were quoted as actually carrying this
11 product, over 60 percent of their product wouldn't meet
12 the .25. There's other issues. You should take a look
13 at some of the big box stores and walk through them and
14 find that there are no labels on the windows, and that
15 would be helpful if you could encourage window
16 manufacturers to label their products. However, Energy
17 Star's newest version of Windows, which is -- excuse me,
18 the Energy Star requirement Version 5, which is their
19 newest version, recommends a solar heat gain co-efficient
20 of .30 in this climate zone. And actually there's a
21 couple of climate zones that they have for California,
22 but that would be the more stringent one, and that's the
23 one that we think the manufacturers who are now national
24 manufacturers are shooting for. So this is going to be a
25 different target and we would prefer a target of .30.

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1 The other issue I think we have is we're still
2 concerned about putting any type of insulation on the
3 underside of roof decks or on the top of roof decks. As
4 I mentioned in previous comments, the American Plywood
5 Association has put out a release in the spring about
6 concerns about moisture on covering roof decks, either
7 from spray foam on the underside. I'm not sure about --
8 they're really not a technique that's in the marketplace
9 of putting in residential housing R4 or 8 on the topside,
10 so I don't think they've addressed that yet. But I think
11 we need to have a serious conversation with that product
12 manufacturer and the trade association as to whether or
13 not that is a concern. With lower levels and just
14 possibly R4, and that's being possibly a staple product
15 or something like that, rather than a blown product that
16 may resolve the issue, I don't know, but I think that's
17 something we should explore before we go too much
18 further.

19 MR. SHIRAKH: Can we just respond to that? Do
20 you want to talk about the building science?

21 MR. WILCOX: Yeah, we have a project underway to
22 analyze moisture concerns related to roof deck insulation
23 and we have a draft report which is not - we haven't
24 completed reviewing it, so it hasn't been posted, but it
25 will be very soon, and so I think we're trying to answer

1 that concern in a pretty detailed and scientific way.

2 MR. HODGSON: Yeah, and I appreciate that and
3 we'd love to see the report; my concern is, when the
4 primary manufacturer and the trade association that
5 represents that manufacturer says "don't put this stuff
6 on my roof deck," and that's probably too strong a
7 statement, but, "we have concerns when you put these
8 things on my roof deck," concerns tend to lead to
9 warranty problems and liability issues is what the
10 building industry is very concerned about. So that's --
11 I'm not saying it's not a good thing to do, I think we
12 need to explore it and find out where those concerns come
13 from, and resolve them if we can prior to making this
14 requirement.

15 MR. SHIRAKH: But they're saying, even above the
16 roof deck it's a problem?

17 MR. HODGSON: Mazi, they don't really see above
18 roof deck insulation, so they haven't addressed that.
19 What they have seen is spray foam on the underside of
20 roof decks and that's what they're addressing in their
21 technical report, so I'm not saying there's a problem
22 above, but the issue is basically covering up a roof deck
23 when it's moist with a product that's not that
24 breathable.

25 MR. SHIRAKH: I mean, the way that physics works,

1 it actually makes sense when you have the insulation
2 below the roof deck, the temperature of the interface of
3 the roof deck and insulation will be lower. When the
4 insulation goes above the roof deck, the temperature
5 actually goes up at the lower part of the roof deck,
6 which actually helps in not having moisture problems.

7 MR. HODGSON: Okay, so I just think there's a
8 fairly -- this is not a California issue, it's a national
9 issue and it's come up in the recent adoption of National
10 Codes and Green Codes, and so there's a fairly active
11 discussion about it and there's people whose livelihood
12 and manufacturing products depend upon this, and so I
13 think they would be the experts and we would love to see
14 the report.

15 MR. WILCOX: One of the issues, Mike, you said
16 it's a national problem and I think one of the issues is
17 that it depends on climate to some significant degree.
18 And so we've done the analysis specifically for the
19 California Climate Zones, and I think the results are
20 actually probably significantly different than you would
21 find in many climates in the United States.

22 MR. HODGSON: Yeah and it sounds like we've had
23 that discussion with these folks and it seems to be about
24 20 inches of rainfall is where they start to get worried,
25 that's the Central Valley, and I know it's not Las Vegas

1 and that's where most of this building science has
2 occurred is we've put this in Las Vegas, it gets 2.7
3 inches of rainfall. And, you know what? There's no
4 moisture problem there. And there is some correlation to
5 climate. So, I'm just saying it's an issue and we need
6 to explore it. We don't want to induce a liability here
7 or something that voids warranties on roof for structural
8 failure.

9 MR. WILCOX: Yep, absolutely. We're trying to be
10 very careful of that.

11 MR. HODGSON: One, I really appreciate -- or, we
12 really appreciate staff's 3D proposal, we are very
13 sensitive to the ACH50 issue, it's not bad building
14 science, we just don't understand indoor air quality and
15 I think, together, Mark has invited us to a workshop next
16 week or something that we can push and hopefully add
17 comments to say let's explore this issue and find out
18 more about it. And then, Bruce, you offered other
19 potential alternatives would make there and other issues,
20 which I would love John to be involved with, Mr. Proctor,
21 as soon as we can. So I think that's a very positive
22 response. We have some issues, obviously, with lumber,
23 with roof decks, with domestic hot water. We've resolved
24 the issue with air changes, which is great, so we'll
25 continue the dialogue and look forward to those

1 discussions.

2 MR. SHIRAKH: Thank you, Mike, appreciate it.
3 Jamy.

4 MR. BACCHUS: Jamy Bacchus, Natural Resources
5 Defense Council. And I would concur that I applaud the
6 Energy Commission's review of all these different
7 measures together and I would encourage them to push for
8 whatever is cost-effective, whatever you show to be cost-
9 effective. We're looking at the broader goals of 2020 at
10 being Zero Net Energy for residential construction, we
11 need to make some marked changes within the 2014 Code
12 Cycle and hopefully by 2017, we'll finish it up, but
13 otherwise it could be a very sharp drastic turn by 2020
14 to try to make up whatever we miss.

15 MR. SHIRAKH: Do you want me to respond to that?

16 MR. BACCHUS: Please, sure.

17 MR. SHIRAKH: You know, you were showed two
18 packages, the A1 and A2, which are everything that is
19 possible, but, again, I think Bruce explained the goal,
20 you know, we're not trying to get to Zero Net Energy in
21 just one cycle.

22 MR. BACCHUS: Yes.

23 MR. SHIRAKH: And we're not indifferent to what
24 the market conditions and so forth that are going on,
25 we're trying to balance the goal of Zero Net Energy with

1 the realities of the market, so we're getting pushed from
2 both directions and, so, our proposed package is an
3 attempt to basically try to bridge that gap. And, you
4 know, we have two more cycles after this.

5 MR. BACCHUS: Yes.

6 MR. SHIRAKH: If you look at A1, if we did
7 everything that is A1, essentially we'll get almost over
8 to zero net energy goal that we had set forth earlier,
9 but we can't do that in one cycle, it's just not
10 realistic.

11 MR. BACCHUS: Oh, I don't think we could hope to
12 achieve it in one Code Cycle. I'm just making sure that
13 we're on track and we do the things that we're showing to
14 be cost-effective today.

15 MR. SHIRAKH: I think we agree with that.

16 MR. BACCHUS: Martha, did you want to add
17 something?

18 MS. BROOK: Oh, I just wanted to mention that I
19 think we need to be careful when we're thinking about -
20 when we're saying statements like we think we're going to
21 meet the goal of Zero Net Energy because we're only -
22 these analyses are only looking at regulated loads, and
23 ZNE's definition is all loads in the building, and so we
24 know we also have to be very aggressive with our
25 appliance efficiency work in the coming years and, so,

1 anyway, just a caveat there that, you know, these goals,
2 the savings that we are expecting and we are planning for
3 are aggressive, but it's a small part of the house's
4 overall energy use, so we need to keep that in mind.
5 Another reason they keep pushing hard.

6 MR. WILCOX: Yeah, and another thing, just to
7 make clear, the Package 1A that I presented doesn't
8 include all of the measures that are possible. That
9 analysis was focused on the base code here, not on Zero
10 Net Energy, so we didn't look at a lot of the more exotic
11 and expensive possibilities, including many of the things
12 that were looked at and proposed in the case projects.
13 You'll see in the case exterior wall analysis that's
14 going to be presented this afternoon, there's lots of
15 system there that are proposed, that have higher
16 performance than anything we considered in our package
17 analysis here.

18 MS. BROOK: The other thing I think is important
19 as kind of a way to characterize these packages in our
20 proposal is that we really are thinking about the
21 envelope in a major way for this standards update because
22 we think that the path to zero really should be focused
23 on the envelope first, and trying to reduce the loads in
24 the envelope to the greatest extent possible, and then
25 looking at systems. So we do have some work in water

1 heating distributing and air, you know, air flow and duct
2 sealing, but most of our focus is on the envelope this
3 time.

4 MR. BACCHUS: I would concur. The active systems
5 should follow after all the envelopes are addressed,
6 reducing loads as much as possible, and then focusing on
7 the energy efficiency. That's the right loading order.
8 I will add that Air Change 3, 50 Pascals, isn't really
9 necessarily a measure of indoor air quality, it's just
10 how big or how small your holes are on your envelope, and
11 not where they occur, but just how many you have. So, I
12 wouldn't construe the two together, that if you want
13 effective indoor air quality, you really need mechanical
14 ventilation, and I think Title 24 in a Mechanical section
15 addresses that in its requirements for toilet exhaust.

16 MS. BROOK: Right. Yeah, you're right and it
17 does, but one of the issues we have is that we just
18 instituted -- we just created that requirement in 2008
19 and we really don't have any good field data that says
20 that it's serving up everything that we expect it to
21 serve up. So that's one of the issues, was really
22 depending on that and making that a defense for
23 everything that we do for tightening the house because we
24 don't have the data to support that what we've tried to
25 do is actually working.

1 MR. SHIRAKH: In fact, one of our sister
2 agencies, the ARB, has issues with this proposal, so...

3 MR. WILCOX: You should dialogue with ARB.

4 MR. BACCHUS: Yeah.

5 MR. SHIRAKH: George?

6 MR. NESBITT: George Nesbitt, Environmental
7 Design/Build, CalHERS, Passive House California. Okay, I
8 had been waking up at 6:00 a.m. every morning, so I did
9 not set my alarm. I woke up at 6:00 a.m., and then at
10 7:00. So I rushed out of the house without my hat, I got
11 to AmTrac and the train was on the platform and it left,
12 so there you have it. So I ended up driving and
13 hopefully I will save more energy by my efforts here than
14 I expended getting here. And I take my hat off
15 sometimes. It gets serious when I take my hat off, then
16 you've really got to worry.

17 Question on packages. Can anyone tell me what
18 percentage of compliance is done with the package or
19 proscriptive method for new construction, even? Do we
20 know --

21 MR. WILCOX: Well, I don't know that we have any
22 recent solid statistics, but the thinking is that it's
23 less than 10 percent.

24 MR. NESBITT: Right, so from a new construction
25 perspective, and compliance, most of its performance, so

1 really exactly what the package is doesn't matter because
2 when you do the computer, you do whatever you need and
3 you've got to get the equivalent savings. But when we
4 get to alterations, you're probably driven a lot higher
5 percent of the time by the package requirements, so we
6 are then essentially specifying exactly what you're going
7 to do because, if somebody is going to do a roof, or
8 windows, they're usually not going to go through, you
9 know, if they're doing one measure, even several
10 measures, they're not going to go through and do a
11 performance tradeoff; if they're doing an addition, you
12 know, a remodel, then they might, or are more likely to.
13 So, in that sense, I agree that what the exact mix
14 doesn't matter, as long as the savings are equivalent.
15 And I want to reiterate Martha's statement that we need
16 to focus on the building enclosure first. All my
17 calculations on existing buildings show I can usually
18 save more energy by improving it than by putting in the
19 best mechanical system. So, and that's also the passive
20 house approach, of course, is build a very energy
21 efficient enclosure and need to make up very little with
22 the mechanicals.

23 So, the other thing is, when I approach existing
24 buildings, I will not insulate without air sealing first.
25 So the question is, would it be more important to try to

1 get an air-tightness first than to increase insulation
2 levels? You know, we can keep throwing more insulation
3 at the problem, although we are getting, you know, some
4 of the building practice has tended to get us a little
5 tighter, we're really not anywhere close to what we need
6 to be. So, I would say, even before we put more
7 insulation in, that insulation needs to be installed
8 right; before we install the insulation right, we need
9 more air tightness because, if there is so much air
10 waving through it, most of it is not going to work as
11 well as it should, so I would say we need to focus on the
12 things like air tightness, QII, before we focus on adding
13 more insulation. I also have to agree with CBIA on the
14 sort of roof deck insulation.

15 There's a lot of things in our industry people
16 don't understand and don't do right and that causes lots
17 of troubles and I think this is one I'm not -- I know
18 what the goal is, I'm not sure -- I'm not sure it would
19 be a good thing to do yet, I think it's something we need
20 to look at harder and longer. And luckily, since 2014 is
21 a ways off, we have some time for education in the mean
22 time. And then, also, if we do want to increase
23 insulation levels in walls, I say staying with 2 X 4 and
24 going to continuous exterior insulation is a lot better
25 approach than typically just going to a 2 X 6, or -- I'm

1 a little worried about a lot of our passive house
2 projects going to 2 x 8's but not eliminating the thermal
3 bridging, so as we make a wall thicker, make it better
4 insulated, we've reduced its capacity to dry, there's no
5 enough energy to drive through and drive the moisture out
6 anymore. So, really, we need to focus on things that
7 eliminate condensing surfaces and the easiest way to do
8 that is exterior insulation, so that the Package 3B is
9 mostly a default of a 2 X 4 with exterior, until you get
10 into 11 through 16 plus one. But, as an approach, that's
11 something we should promote over just building a thicker
12 wall. And I'll leave it at that for now, I guess.

13 MR. SHIRAKH: Okay, thank you, George. Mike.

14 MR. KEESEE: Mike Keesee again, just a couple
15 quick questions. I'm assuming LCC saved is in TDV
16 Values? That column?

17 MR. WILCOX: It's in dollars.

18 MR. KEESEE: It's in dollars.

19 MR. WILCOX: It's the net present value of the
20 lifecycle cost savings.

21 MR. KEESEE: Would QII apply to roof deck
22 insulation?

23 MR. WILCOX: Yes, if it's fiberglass.

24 MR. KEESEE: Okay. How about for the rigid?

25 MR. WILCOX: Well, we've -- there's going to be

1 argument that QII should not apply to rigid insulation
2 and I --

3 MR. KEESEE: Does it currently apply?

4 MR. WILCOX: What?

5 MR. KEESEE: Does it currently apply?

6 MR. WILCOX: I believe it does, but mostly
7 because of the way the QII credit is structured, it's
8 based on the U Factor of the wall, so it applies to the
9 combination of both.

10 MR. KEESEE: Right.

11 MR. WILCOX: And so --

12 MR. KEESEE: So that would have to be verified.

13 MR. WILCOX: Yeah, the proposal is that it be
14 separated in 2013, QII would not apply to exterior
15 sheeting.

16 MR. KEESEE: But that's not what's being proposed
17 here.

18 MR. WILCOX: That is what is being proposed --

19 MR. KEESEE: That is being proposed, so that no
20 rigid would have QII?

21 MR. WILCOX: That's right. And, in fact, the QII
22 that is the lifecycle costing here is not including any
23 impact on foam sheeting.

24 MR. KEESEE: Okay. I'm assuming, but if you
25 could confirm, that you're still defining a whole house

1 fan as the on-the-floor belt-driven type?

2 MR. WILCOX: Yes.

3 MR. KEESEE: In your work on air-tightness, I'm
4 assuming also that it's still -- it's not true mechanical
5 ventilation, but you're using just exhaust fans for your
6 ventilation?

7 MR. WILCOX: The standard references actually
8 622, which allows several different ways to do that
9 ventilation.

10 MR. KEESEE: And what did you assume in your
11 costing for that?

12 MR. WILCOX: There's nothing in here about
13 costing for indoor air quality ventilation --

14 MR. SHIRAKH: We're not changing anything.

15 MR. WILCOX: We're not changing any of that at
16 this point.

17 MR. SHIRAKH: Still the same as 2008, so we're
18 not --

19 MR. KEESEE: So the cost for getting down to a
20 lower ACH50 is just ceiling cost?

21 MR. SHIRAKH: That's right.

22 MR. KEESEE: Okay. What was the last one -- I'm
23 returning back to peak, you can tell what's on our minds,
24 do you have numbers also on relative numbers of kW
25 saved? Like an average kW saved over that average 100-

1 hour period?

2 MR. WILCOX: Well, what that --

3 MR. KEESEE: Can you tell me if it's like 2.3 kW?

4 MR. WILCOX: I don't have that in any of these
5 reports, but we know what that is and we could figure it
6 out. I think the thing to do, Mike, as I said, I think
7 we should sit down and look at your idea about what the
8 kW is and compare it to what we got here and generate the
9 numbers you'd like to see.

10 MR. KEESEE: Fine, okay. I look forward to that,
11 thanks.

12 MR. SHIRAKH: Thank you, Mike. Mike Gable.

13 MR. GABLE: Mike Gable, Gable & Associates. Just
14 to follow-up on the comments on the alterations, I think
15 that there are some practical problems with alterations,
16 how you meet some of the proposed requirements and it
17 would be good just if staff made a notation to look at
18 maybe an alternative set of proscriptive requirements for
19 alterations only. My concern is that you would be
20 driving the market toward a performance approach for
21 every time someone does an alternation, unless you can
22 maybe rework some alternatives to the way the
23 proscriptive requirements fit together as an alteration.
24 Specifically, for example, the exterior wall insulation
25 with the exterior foam, obviously, is an alteration

1 having a part of a wall that you're going to change with
2 that requirement. In a larger home, it's not too
3 practical. So, maybe there's a way of putting into the
4 standards an alternative package just for alterations to
5 address those. So that's my only comment.

6 MR. SHIRAKH: Yeah, we have thought a little bit
7 about it, I mean, in fact, if we end up with any kind of
8 a roof deck insulation, that will not be a part of the
9 alterations for the same reason you are --

10 MR. GABLE: Okay.

11 MR. SHIRAKH: -- describing. But I think that's
12 a very important topic. Alterations are totally
13 different creatures.

14 MR. RAYMER: Bob Raymer, CVI, kind of like the
15 cool roof alteration that you gave a half dozen
16 alternatives, that would be perfect here.

17 MR. SHIRAKH: Right. Mr. McHugh.

18 MR. MCHUGH: Mr. Shirakh. Jon McHugh, McHugh
19 Energy. I just have a couple of comments. I guess the
20 first comment is that, if I look at the lowest lifecycle
21 cost package, if I understand this correctly, on average,
22 this has basically a benefit cost ratio of around 2:1.
23 Is that correct? It might be because, if I look at the
24 lowest lifecycle cost, it says the savings on average, -
25 well, I don't know, the savings are somewhere around --

1 you haven't weighted it, you've only weighted the cost
2 increase, right?

3 MR. WILCOX: Yeah.

4 MR. MCHUGH: But the lifecycle savings is
5 somewhere which is, in addition to that first cost, I'm
6 guessing somewhere around \$6,000, or something like that,
7 so that means that the dollar savings is something around
8 \$9,000, maybe I'm wrong here, maybe it's a total
9 lifecycle cost energy savings is around \$9,000, and our
10 first cost increment is the \$3,900, so probably somewhere
11 between a B/C ratio of 2 and 3 for that lowest lifecycle
12 cost. I understand it has a large first cost, but it's
13 something to consider in terms of what is our policy
14 goals for Title 24.

15 The next comment is around the issue of saving
16 wood and the issue around 2 X 6 construction. And as
17 long as I can remember, 2 X 6 construction has
18 proscriptively allowed someone to go to 24" on centers
19 and, in fact, I was looking at something on the Internet
20 that related to structural engineering and he was citing,
21 I think it was a 1993 Uniform Building Code, which has
22 those tables of spacings for studs, and so even way back
23 then, and up to the current California Building Code, 24"
24 on center is proscriptively acceptable for those kinds of
25 walls, which is up to two stories, you know, so the 2 X 6

1 and 24" centers, you don't have to do any framing or
2 anything like that to support a two-story building.

3 Now, I heard earlier that Mr. Raymer and the
4 fellow from, I guess, Sierra Consulting, was talking
5 about the issues on our forests associated with
6 construction, and yet I'm hearing that, as our
7 proscriptive baseline for those framing categories where
8 we're using R19 in the cavity, which would be a 2 X 6
9 construction, you're just not going to be able to hit
10 that with 2 x 4's, that the proposal be that we base
11 those U Factors on 16" spacing. And if you think about,
12 okay, so we're trying to do something right for the
13 environment in terms of using less wood, we're trying to
14 do something right in terms of the environment, in terms
15 of saving energy, so in 24" spacing as a lower U Factor,
16 and at the same time, the building industry is describing
17 concerns about cost; surely, putting less studs in the
18 wall reduces the cost of the wood for that building, what
19 is possibly the rationale for using 16" spacing for those
20 building constructions.

21 The other thing that's been brought up is
22 concerns about the ACH -- the three air changes per hour
23 at 50 Pascal. My understanding is that this is the basis
24 of the 2012 ICC which is the basis of the National Energy
25 Code, you know, ultimately California is going to need to

1 show that our building standard is more energy efficient
2 than that national standard, so this is the basis of a
3 standard moving forward. Yes, it's not typical practice
4 now, but given that there's something like 14 states that
5 use the ICC, clearly the building industry is going to
6 figure this out over the short term. So, the question
7 is, regardless of whether we pick ACH3, ACH4, 7.8, is
8 there not some particular benefit to having some actual
9 knowledge by the people sealing the building what the
10 feedback is? And, you know, this just goes back to the
11 issues associated with duct sealing. I was involved in
12 this about 15 years ago, we worked with various
13 contractors and they said, "Come visit our buildings."
14 And so they're picking their better buildings and, you
15 know, we would then bring someone with a duct blaster to
16 those spaces and they're picking their best buildings -
17 it seems like every time we went to a building, there was
18 a problem because the contractor was not getting the
19 correct feedback in terms of "is my duct sealed well
20 enough?" Well, the similar kind of discussion is likely
21 true for the sealing of buildings, unless you have this
22 kind of feedback, you don't know what you're getting.

23 But nonetheless, I think it's appropriate that,
24 you know, these are proscriptive, they're not mandatory,
25 there's different options that are available, and so

1 tradeoffs with QII probably makes a lot of sense and, of
2 course, there's all the other measures that the state is
3 not allowed to address, such as equipment efficiency.
4 So, for any builder that is worried about liability
5 associated with any of these measures, whether it's roof
6 insulation, sealing their building, whatever, they have
7 an option to look at something that I don't think anyone
8 is really worried about being sued about in terms of
9 purchasing a higher EERSER piece of equipment or higher
10 combustion efficiency equipment.

11 And then finally, in terms of insulation, my
12 understanding for roof deck insulation, my understanding
13 is that something like 50 percent of roofs are tile, is
14 that about right, Bruce?

15 MR. WILCOX: Eighty percent.

16 MR. MCHUGH: Oh, 80 percent --

17 MR. SHIRAKH: In new construction.

18 MR. MCHUGH: In new construction. And it's also
19 my understanding that, for tile roofs, the opportunity
20 exists actually to put the insulation on top of the roof
21 deck and my understanding, all the concerns about
22 moisture have been with insulation below the roof deck,
23 so it's my take that there is a substantial opportunity
24 for significant savings for that 80 percent of the
25 market. I'd like to hear your thoughts, Bruce, on the

1 issues associated with moisture when the insulation is on
2 the top of the roof deck vs. the bottom. Thanks.

3 MR. SHIRAKH: Well, before -- your very first
4 comment about the cost benefit ratio, were you suggesting
5 that we're not aggressive enough in our staff recommended
6 package? What was the --

7 MR. MCHUGH: You -- I think that could be an
8 interpretation, something to think about that, you know,
9 everybody is concerned about the economy, the issues
10 associated with unemployment, you know, we're not in a
11 good situation right now, you know, the building
12 construction industry has been a -- I spent a good part
13 of my teens and all of my 20s in the construction
14 industry, so it is really an important part of our
15 economy. That being said, you know, the average cost --
16 I just looked on Zillow the other day -- the average cost
17 of a house in California is \$300,000, and when you start
18 looking at the issues associated with what has partially
19 been behind some of the problems we're seeing has to do
20 with people being able to not afford the combination of
21 their mortgage and their energy costs. And everything
22 that you're proposing here, all the way up to your
23 highest package, is something that reduces that
24 combination. So, the question is, you know, what is in
25 the best financial interest of the state? And this

1 question about trying to not be so aggressive that you're
2 increasing the first costs so much, but is that really in
3 the best interest of the state? So, when we have a
4 situation where, when you look at the total of your
5 mortgage costs and your energy costs are being
6 substantially reduced by going further than your
7 preferred package, it raises a policy question.

8 MR. SHIRAKH: Okay, thank you. I will let Bruce
9 respond to that more.

10 MR. WILCOX: Our understanding of the primary
11 moisture problem with insulated roof decks and attics is
12 a winter problem that has to do with moisture
13 condensation on the roof deck, on the inside, and this
14 already can happen and that's why we need added
15 ventilation. And you make the situation worse when you
16 insulate on the inside with a vapor permeable insulation
17 because the roof deck gets colder when it's insulated and
18 so that the tendency for condensation is increased. So
19 the primary focus of our concern here has been the below
20 deck fiber glass insulation and looking at what the
21 potential is for moisture problems there. If you put
22 insulation above the roof deck, then in the winter time
23 the roof deck is warmer and the condensation potential
24 goes down, there's less condensation issues, less
25 condensation problem than you would have if you had no

1 roof deck insulation at all. So, I think the focus here
2 has been on the less expensive, below deck, fiberglass
3 insulation option as being the one we have to worry
4 about, and so that's what we've looked at most
5 intensively and that's what the big study is about, and I
6 think we'll be able to satisfy the concerns hopefully
7 with the analysis that's been done. I haven't heard of
8 anyone who is worried about moisture problems when you
9 insulate above the roof deck. Maybe Mike is worried
10 about it, I don't know, but...

11 MR. SHIRAKH: Okay, Pat.

12 MR. EILERT: Pat Eilert, PG&E. So, I have a
13 question for Commission staff, specifically.

14 MR. SHIRAKH: Martha.

15 MR. EILERT: You first, Mazi.

16 MR. EILERT: So, I'm following up on this issue
17 of what's driving the decision-making here because, you
18 know, if we look at Package A2, for example, that's
19 clearly cost-effective and I haven't heard anyone sort of
20 say that it's not feasible. I've heard people say that
21 they don't want to do it, so I'm sort of wondering what
22 the criteria are for moving to something different from
23 A1 or A2.

24 MS. BROOK: So I guess I'll start and then Mazi
25 can chime in. I don't have a long history with Standards

1 development, but just in the last few years, I have
2 learned that we have many constraints when we are making
3 those policy decisions about how to go forward with the
4 Standards update and they go beyond the lifecycle cost
5 metric, so we have always considered first costs of the
6 affordability, product availability, federal preemption,
7 all these things are constraints that we -- I describe
8 them as constraints, I mean, we also have to consider all
9 those things, as well as make sure that the package is
10 lifecycle cost-effective. So, in my opinion, that's what
11 we're doing with our staff proposal is that we're - and
12 also enforcement and compliance, so trying to get less
13 variability across climate zones for compliance and
14 enforcement purposes. So all of these are additional
15 constraints that we have when we're going forward and
16 making a recommendation for an update and I'm pretty sure
17 you can find all those things in the Warren-Alquist
18 mandate, but, you know, it would be an exercise that we
19 could do, but I'm pretty sure that there are additional
20 concerns that we are required to consider.

21 MR. EILERT: Would you agree -- what I always
22 hear about, and I haven't read Warren-Alquist lately,
23 it's feasibility and it's lifecycle cost, and you're
24 saying that, if affordability is in there, well, you
25 know, we're talking about \$3,000 or \$4,000 here on E2

1 relative to a \$300,000 home, that saves the inhabitant a
2 lot of energy here, so I'm just still not quite getting
3 where these decisions are coming from.

4 MS. BROOK: And I think that, you know, we are
5 going to be briefing our Management, basically the
6 Efficiency Committee, and explaining all the issues, both
7 sides of, you know, the full range of perspectives that
8 we're hearing through these workshops, and they're going
9 to help us make those decisions because, you know, that's
10 what their job is, is they have to weigh the balance the
11 same as we do --

12 MR. EILERT: But how did staff come up with the
13 decision for A3 when A2 is clearly cost-effective and
14 it's feasible?

15 MS. BROOK: I think I've tried to explain it to
16 you, that we are also trying to help with compliance by
17 having more consistency across Climate Zones, we're
18 trying to figure out where there is risk that we are -
19 that where there hasn't been a lot of construction
20 practice that we, then, need to figure out how many
21 different options we can allow that sort of moves that
22 construction practice forward without the risk that it's
23 never been done in the nation; so, for example, even
24 though 3ACH50 is in the I Codes, how much of it has
25 actually been done? I mean, we know it's being done on

1 existing buildings, we need somebody to step up and tell
2 us that "it happens all the time," "there's no indoor air
3 quality issues," "here's all the data to support that on
4 existing buildings," that would go a long way for us, but
5 you have to really push on that for new buildings. We
6 are not hearing anybody coming up to the table to tell us
7 that and to provide that information to us, so it makes
8 it difficult. So those are the kinds of things,
9 feasibility, you know, it still has to have field
10 demonstration of that and so a lot of our decisions, you
11 know, we're challenged by paper studies vs. field
12 experience, and we need more and more of the latter and
13 we're encouraging people to step up and help us with
14 that.

15 MR. SHIRAKH: See, Pat, if lifecycle costing was
16 the only criteria, we wouldn't need these workshops, I
17 mean, you could just demonstrate this is cost-effective
18 and be done with it, but it never worked like that, there
19 are all these other factors that Martha described.
20 Again, even, take the roof deck insulation as an example,
21 it hasn't been done. You know, we have some simulations,
22 we've contracted with someone and now he's done models,
23 but to know for certain that this is going to work? You
24 can't just jump to A1 and say "these are all cost-
25 effective," and you can put it in there. You know, our

1 own Commissioners, the Legislators, the Governor's
2 Office, they're all very interested in this, they want to
3 move towards zero net energy, they want aggressive goals,
4 they may or may not agree with what you are recommending,
5 but they are also all going to consider what is the real
6 impact of this, whether this is feasible and it can be
7 done, people are going to get sued or not, you know, what
8 kind of training and education you need, can we do that
9 in the timeframe that we have left, we have to really
10 look at the whole spectrum before you come up with a
11 final package.

12 MR. EILERT: I appreciate that and I'm not
13 proposing that we jump to something that's not feasible,
14 I just, you know, some of the specific arguments here
15 around some of these issues are just part of the
16 proscriptive baseline and this is ultimately a
17 performance approach here, going forward. I'm just
18 saying that I haven't heard compelling arguments why we
19 can't move to something like an A2 yet.

20 MR. SHIRAKH: If you look at the difference
21 between Package A2, which is the lowest lifecycle costing
22 and what we are proposing, it's about 3 percent. Again,
23 the package A1 is potentially what will take us to zero
24 net energy, but nobody said we're going to get there in
25 one cycle, you have two more rulemakings beyond this one,

1 and you've got to go in a way that is not disruptive to
2 the market, and people can understand it, they can build
3 it, and you know, it's --

4 MR. EILERT: Okay, so I guess what I'd really
5 like to see is, you know, a bit more definition about
6 what the criteria are, about what's a solid proposal and
7 what's not because, you know, there's been a lot invested
8 in developing these proposals for the Commission and, you
9 know, it just seems like it's a moving target to figure
10 out what ultimately gets recommended and what doesn't.
11 Thank you.

12 MR. SHIRAKH: Thank you, Pat.

13 MR. FRANCISCO: Jim Francisco, Sierra Consulting.
14 Last time we were here, Mr. Varvais and myself, gave
15 cards to you and told you, as far as closed attics,
16 decking, we would take you to live situations and we'd
17 like to share that information with you. So I'd like to
18 reiterate that we're open to bring our experts in, give
19 you our studies, and take you out on field trips to show
20 you where it's being used.

21 MR. SHIRAKH: Okay, thank you. Abhijeet.

22 MR. PANDE: Abhijeet Pande, Heschong Mahone
23 Group. Two comments, one, I would like to support what
24 John mentioned earlier about an alternate package where
25 the builders are prepared to use higher efficiency

1 equipment and they can trade away features that they may
2 not like in the base package that you guys are
3 recommending here.

4 Second, ACH50 and going back to Martha's comment,
5 I agree that we need to have field data, but we do have
6 field data based on work that was done for PIER and for
7 the utilities, and on average, if I remember correctly,
8 the results are that houses are being constructed more
9 tight than the 7.6, which is what we have in the
10 Standards, so we can argue that a 3, a 4, or a 5 is
11 right, but the fact is that most of the homes are tighter
12 than what we are assuming they are. So what is the harm
13 in reducing the level to where houses are already?

14 MR. SHIRAKH: Well, one thought is that, on your
15 comment on having alternative packages that have high
16 equipment efficiency, that is certainly something we're
17 going to be talking to CBIA and Con-Sol. You know,
18 again, we showed one alternative where, you know, you do
19 away with ACH50 and QII, there are other tradeoffs
20 definitely possible. George.

21 MR. NESBITT: George Nesbitt. This is a good
22 time to bring it up, as I've been bringing up the issue
23 of existing buildings and alterations on a lot of the
24 various topics that have come up, I suggest that we do
25 have a workshop just on applying the Code to existing

1 buildings and alterations because the Package A is, of
2 course, the basis for what you've compared to. And also,
3 the complexities, as Ken Nittler has told me and I've
4 also read the Code, of how complex it is to figure out
5 how you actually apply things. We have gaps and, you
6 know, we've got people opening up walls and they don't
7 even bother to insulate it, the Code doesn't say you have
8 to, but if you have to put in a window, you've got to
9 meet Package D. Plus, although (modeling) existing plus
10 addition is so easy to comply with, the way you get
11 compared if you do not come up to the current package
12 requirement, you then sort of get penalized in a way. So
13 I think there are a lot of issues around existing
14 buildings and existing plus addition that really deserve
15 -- even if it's only myself, Mike Gable, and Ken Nittler,
16 and maybe Pat Splitt, but you know, it probably deserves
17 a public hearing.

18 MR. SHIRAKH: I think we agree with you, George.
19 Alterations definitely need special attention. Mike.

20 MR. HODGSON: Yeah, I just wanted to reiterate
21 that I think that's a very good point, the alterations
22 section is really a across the counter, it has to be
23 user-friendly and some of the features in Package A are
24 going to be very difficult for retrofit markets to do.
25 Walls was brought up, I'd like to bring up solar heat

1 gain coefficient, those issues, we're going to have to
2 think those through in order to make sure they're
3 practical.

4 But I wanted to bring up a couple of other things
5 that we really haven't talked about, but are in your
6 packages, one of which is QII. We've mentioned before
7 numerous times that the implementation of that in the
8 field is difficult and not very uniform, and so we really
9 want to reiterate that we need to revisit that QII and to
10 make it more implementable. One of the things that comes
11 to mind is you can't have any structural steel and do
12 QII, well, if you look at today's housing, there's
13 structural steel and we want them to have QII, so if you
14 automatically disqualify them, why are we doing that?
15 Why don't we fix it and find a way to make them work? If
16 you have more than an eighth inch depression anywhere, in
17 any of the insulation in the building, you just get
18 disqualified from QII. I find that kind of hard to
19 believe, but most contractors don't have that level of
20 skill. So, things like that, I know there's an intent.
21 RESNET has done some fairly good work on Grade 1
22 insulation and have some kind of uniform quality
23 standards, and I'm not saying - we should at least review
24 them and look at them, and make them, I think, more
25 practical and implementable. Because right now the way

1 QII is written, and the forms that you have to fill out,
2 really discourages that practice. And in this package,
3 if we're looking at 3B, we want to encourage that
4 practice rather than discourage it.

5 The other issue, which I'm very sensitive to is
6 the mechanical design issue. I mean, the whole thing
7 that we're doing is trying to reduce peak load. Peak
8 load is Air Conditioning load. And what we really want
9 to do is talk about not only our requirements for JD&S
10 which are not only in your Code, but also in the Green
11 Building Code, but how to do right sizing correctly, and
12 how to protect the liability of the mechanical designer,
13 as well as the HVAC subcontractor if they put in a
14 correctly sized system. And we've had these discussions
15 at the beginning of some of the workshops, I haven't seen
16 them float up to the discussion level again and I just
17 wanted to refresh staff that I would like to talk about
18 those and, as an industry group, I think we should
19 involve the HVAC subcontractors also.

20 MR. SHIRAKH: I actually did talk to one of our
21 attorneys recently about this, I think I'll talk to you
22 offline about it.

23 MR. HODGSON: Okay, that would be great because I
24 think it's a fairly open discussion and it's really the
25 intent of what the Commission is trying to do with their

1 Building Standards as we relate to TDV instead of just
2 annual consumption, so the more we can encourage this
3 practice, I think, the better. Thank you.

4 MR. SHIRAKH: Thank you, Mike. Sir.

5 MR. VARVAIS: I'm Dan Varvais with Bayer Material
6 Science and today I'm here representing the Spray Foam
7 Alliance, and we'll provide our comments in writing by
8 the August 12th deadline.

9 MR. SHIRAKH: Please.

10 MR. VARVAIS: I do have a question, though, on
11 the proposal to increase the insulation value of air
12 permeable insulation, but then not to inspect it to
13 verify that the increases you're shooting for to improve
14 the U Value is met because you're not inspecting for it
15 with QII.

16 MR. WILCOX: I don't think --

17 MR. VARVAIS: You increased the R Value from the
18 2008 Standards to R15 and R21, but now you're not
19 inspecting it to make sure that it's installed properly.

20 MR. WILCOX: I'm not sure how you derived that
21 conclusion.

22 MR. VARVAIS: It says no QII is required.

23 MS. BROOK: Yeah, one of our packages -

24 MR. WILCOX: Yeah, one of our packages --

25 MR. VARVAIS: The staff requirement says QIIIs

1 installed.

2 MR. SHIRAKH: You have two staff packages and one
3 of them has QII in it and one doesn't. But look, from
4 what we're hearing is, QII is where we're going to land,
5 requiring QII.

6 MR. VARVAIS: Requiring QII still?

7 MR. SHIRAKH: I think it's very likely that QII
8 will be in the proscriptive package, rather than ACH50.

9 MR. VARVAIS: Okay, thank you.

10 MR. HODGSON: Mike Hodgson again, Con-Sol. Since
11 we're talking spray foam, real quickly, realize that
12 spray foam's packages were not included in QII
13 originally, and we need to accelerate that so that they
14 can be part of QII and I'm sure that's part of your
15 workload, but you know, we can have spray foam, but if we
16 don't allow it to qualify for QII, which currently it's
17 not, then it doesn't make sense.

18 MR. SHIRAKH: I mean, I think what we need to do
19 is, if you're going that way fairly soon, the next few
20 weeks, we should sit down and look at the QII language.

21 MR. HODGSON: All right.

22 MR. SHIRAKH: At the same time, try to make it
23 more user-friendly and -

24 MR. HODGSON: And expand it for multiple
25 installation types.

1 MR. SHIRAKH: When we have more experience with
2 it, we have an opportunity to revise the language.

3 MR. HODGSON: That's great.

4 MR. SHIRAKH: Mr. Splitt?

5 MR. SPLITT: It's Pat Splitt from App-Tech, just
6 a couple of clarifications. It was mentioned that you're
7 going to require a minimum attic ventilation. By that,
8 does that mean it's also the maximum? But can we -- by
9 "require," exactly what do you mean?

10 MR. WILCOX: We're going to basically not require
11 anything for attic insulation, we're going to assume that
12 the house meets the minimum Building Code requirement.

13 MR. SPLITT: I meant ventilation.

14 MR. WILCOX: I'm sorry, I meant ventilation, yes.

15 MR. SPLITT: Okay.

16 MR. WILCOX: I think a corollary to that is to
17 say that we're not going to give credit for attic
18 ventilation either, which is a change from the current
19 2008 Standards.

20 MR. SPLITT: Okay. And for the insulation on the
21 exterior, the sheathing, is there going to be a
22 definition of how that has to be done and how extensive?
23 It seems like that's not included in QII, but, say, are
24 we just, when we get to window and door penetrations, are
25 those framing numbers also going to have to be covered by

1 the sheathing or not? Has that been determined?

2 MR. WILCOX: We haven't talked about any details
3 of that. If you think there's an issue there that should
4 be covered, you should propose what it is and how to do
5 it.

6 MR. SPLITT: Okay. Then I noticed, just looking
7 at the various climate zones and the way the numbers were
8 coming up, it's apparent that the algorithms are
9 different in this calculation than what we have now
10 because things aren't coming out in the Climate Zones the
11 way they do now.

12 MS. BROOK: I'm not sure that's algorithms, it
13 might be that there is new weather data and also changes
14 in the TDV.

15 MR. SPLITT: Okay.

16 MS. BROOK: And then, I mean, it's probably all
17 three, to be honest with you.

18 MR. SPLITT: Just, that's one example, in Climate
19 Zone 16, the SHGC of .25, you know, right now I wouldn't
20 have thought that that would work out. Assuming that the
21 new calculation says it's really true, then I just want
22 to make sure that, for people who basically are building
23 a ski chalet, that they can still put in their high solar
24 gain glass and somehow, in the algorithms in the
25 performance method, be able to accurately calculate the

1 solar gain vs. thermal mass to trade off against not
2 having the .25 as HGC.

3 MS. BROOK: I think we're doing a much better job
4 of that.

5 MR. WILCOX: I think that's still there. The big
6 change in Climate Zone 16 has to do with the weather in
7 that -- we for many years have used Mount Shasta as the
8 weather file location for Climate Zone 16 and we decided
9 to change, with the new weather files that were
10 available, there were actually, I think, eight options in
11 Climate Zone 16. So, we moved to a much more central,
12 more representative location, which is due east of here
13 up on Highway 80, Blue Canyon.

14 MR. SPLITT: Okay.

15 MR. WILCOX: And it has more cooling than we had
16 previously.

17 MR. SPLITT: All right. So I just wanted to be
18 sure, not just for 16, but for all the climate zones,
19 that we will be able to model passive solar and tradeoffs
20 between thermal mass and more glazing area, or higher
21 SHGC, so we can do passive solar.

22 MR. WILCOX: Well, you know, the current
23 direction is to be able to do that modeling at about the
24 same level of detail as you can now, and I think the
25 results are much more accurate and solid than they used

1 to be, and so the results may turn out different, but -

2 MR. SPLITT: But we can model it.

3 MR. WILCOX: You can model it.

4 MR. SPLITT: Okay. Then the final comment is
5 just about the QII. It seems to me that that should be a
6 mandatory feature because the QII requirements are
7 basically what the Manufacturer Representative
8 organizations say you're supposed to be doing it. So I
9 can't see why we don't make it a mandatory feature, not
10 proscriptive, and then verify it not with the special
11 HERS report, but make it part of the installation
12 certificate for the installer. So that's my suggestion.

13 MR. SHIRAKH: I mean, it's an option, typically
14 we go from Compliance Option to Proscription, then to
15 mandatory, I mean, it's rare where we go directly, but we
16 have to have that discussion. It's going to be hard to
17 trade that off anyways because it's such a big portion of
18 the savings if you put it in there, so essentially it'll
19 be mandatory whether it is proscriptive or not. But we
20 can have that discussion.

21 MR. SPLITT: Okay.

22 MR. SHIRAKH: Thank you. I know this is an
23 important topic, this is kind of like the culmination of
24 everything that was done, but we're also running a little
25 bit late. Are there any other comments on the Package A

1 presentation? Anybody online?

2 MR. WARE: Yes, there are questions online.

3 MR. SHIRAKH: Okay.

4 MR. DEVITO: Eric DeVito. Sorry, my name is Eric
5 DeVito, I'm with BBRS, I represent Cardinal Glass. I've
6 been online this whole time and I originally raised my
7 hand because I had a question on something Bruce Wilcox
8 presented, but that's since been answered. However,
9 while I was online and in the queue, I'd like to respond
10 to a couple things that Mr. Hodgson discussed with regard
11 to the SHGC.

12 Just a quick background on Cardinal, a very large
13 residential glass manufacturer, makes insulated glass
14 units and coated glass products, and many of you probably
15 heard of us, but we have a presence in California, two
16 plants, and over 30 facilities across the country. But
17 the glass, to meet the .25 SHGC, is readily available not
18 just by us, but by four other glass manufacturers in all.

19 Just last night, I pulled some manufacturer data
20 from four different manufacturers. The product is
21 readily available, at least they provide it. Whether it
22 is filtered in through all the stores in California, you
23 know, you guys would know better than I would on that,
24 but the product is definitely available. If you just
25 look at, you know, one of the toughest products to me

1 would be a picture window, a fixed frame picture window,
2 which usually has the smallest profile frame, and several
3 of these manufacturers I was just discussing have picture
4 window products that can meet the .25 SHGC.

5 Just in 2009, which is a couple years data, dated
6 over 50 percent of the products with NFRC ratings could
7 meet the .25 SHGC, so it's out there, it's available, and
8 it will filter through particularly as the standard comes
9 through. The IEC in 2009 had moved already to the .3
10 SHGC, the one that Mr. Hodgson had recommended here, so
11 by going to a .3 SHGC only in California, it would be
12 equivalent to the 2009, and since then, 2012 has already
13 moved to the .25 SHGC, at least through Climate Zone 3,
14 which does cover a lot of California.

15 So, if you had to pick, you know, window values,
16 I commend the staff and folks like Bruce and Ken have
17 done the runs to show the .32 and .25 because those are
18 the very good high water marks to set for the windows
19 that are most appropriate for most of California. So I
20 would encourage you to keep those numbers and I also
21 would reiterate that they are available. I will put one
22 caveat on that, my comments are related to windows, I
23 know there are some issues with skylights and some
24 exceptions you might need to address with regards to
25 those, and I'm not speaking to skylights at the moment, I

1 am speaking towards the window issue.

2 So I wanted to make sure, if I did nothing else
3 while I was participating online here, to leave you with
4 the notion that the .25 is achievable, it's feasible,
5 it's available, and it is the right number to set for
6 California. Thanks.

7 MS. BROOK: Thank you.

8 MR. SHIRAKH: Thank you, appreciate it. One
9 thing we can do if we're going to continue this
10 discussion, we can move the Zone Air Credit to after
11 lunch. Are people okay with that? Any other questions
12 online?

13 MR. WARE: Yeah, Ryan Ware, WebEx Operator. A
14 message from Chris Decareau, I apologize about the
15 pronunciation: "Will 2013 incorporate explicit air
16 barrier requirements vs. air sealing?"

17 MR. WILCOX: The proposal for providing ACH50
18 criteria also included eliminating the specific air
19 barrier requirements because they're redundant with
20 testing approach. And I think the intention here would
21 be to carry through with that, even if the ACH50 was only
22 a compliance option.

23 MR. SHIRAKH: Any other questions online?

24 MR. WARE: Yeah: "Will 2013 incorporate explicit
25 air barrier requirements from ASHRAE 90.1 proposed vs.

1 air sealing?

2 MS. BROOK: Yeah, I think we're still studying
3 that, we have a little work scope underway to look at air
4 sealing for non-residential buildings, so we haven't made
5 a determination on that yet.

6 MR. WARE: Message from Wendy Ong: "Will we
7 update open cell spray foam to qualify it to take QII
8 credit?"

9 MR. SHIRAKH: I think we just - Mr. Hodgson
10 talked about that and, yes, we'll be looking at revising
11 the language. George, you need to come up.

12 MR. NESBITT: I believe Monday the 25th is a
13 workshop on QII and load and city spray foam.

14 MR. SHIRAKH: And I think - Dave Ware, are you
15 going to be there?

16 MR. WARE: Yes.

17 MR. SHIRAKH: Okay, thank you. He said yes. The
18 28th, I believe, is on indoor air quality. Any other
19 questions online?

20 MR. WARE: No further questions.

21 MR. SHIRAKH: No other further questions on this
22 one. Again, my suggestion is just to cover the mandatory
23 measures, then break for lunch, and then come back and
24 start with Zone Air Conditioning, and after that Bruce is
25 going to present. And this next topic shouldn't take

1 very long.

2 MR. WILCOX: Okay, so the topic here is changes
3 to be made to the Mandatory Requirements for Ceiling,
4 Wall, Floor, Fenestration, and Ducts. So, these
5 requirements are located in the Standards Section 150,
6 which is titled "Mandatory Features and Devices." So,
7 we've spent all morning here talking about what we call
8 the Proscriptive Requirements and, as I had said to begin
9 with, in California that means something that's different
10 than maybe people in the rest of the country think of
11 when you say "proscriptive." But there is also a
12 parallel set of requirements in Section 150, which are
13 much closer to what people would normally call
14 "proscriptive."

15 And so what the mandatory requirements are, are
16 the absolute minimum levels of measured performance that
17 you have to provide, regardless of the results of your
18 performance calculations, or tradeoff calculations, or
19 computer simulations, however you want to look at it.
20 The California Standards are fundamentally a performance
21 standard and, so, it's the overall performance of the
22 building that counts. But in order to prevent egregious
23 errors and misallocation of resources, and so forth,
24 there is a back-up level of mandatory requirements that
25 are independent of the performance standard, and that's

1 what we're talking about here.

2 So what's been proposed are changes to insulation
3 requirements, so these are minimum mandatory requirements
4 that you basically can't trade away and go below these
5 requirements, and so the minimum insulation R Value,
6 mandatory for ceilings, in the 2008 standard is R19, and
7 the proposal here is to change that to R30. For walls
8 it's been R13 in 2008, and the proposal is to change it
9 to R15. Raised floor is proposed to be changed from R13
10 to R19. And for ducts and unconditioned space, the
11 proposal is to change it from R4.2 to R6. So these are
12 the requirements that, as I said, are the minimum
13 mandatory, can't tradeoff below this level of
14 performance.

15 One of the things to understand here is what it
16 means to have to comply with a minimum R30 ceiling
17 insulation, for example, and the way the Standards are
18 written, there are three different provisions there. The
19 basic one is that, if it says "R30," then you install R30
20 in all the cavities between all the wood framing. So
21 that's the simplest way to describe it - wherever you've
22 got insulation, it's the minimum R Value, or better.

23 The second, well, it shouldn't say "walls" here,
24 but anyway, the second option here is you provide an
25 equivalent U Factor -- I copied this out of one section--

1 you provide an equivalent U Factor in all those surfaces,
2 so ceilings, walls, floors, whatever it is, that you
3 would have had if you had the minimum requirement in
4 between the wood framing. So this allows you to do
5 advanced framing with the different framing factor, it
6 allows you to put sheathing -- insulated sheathing -- on
7 the inside, the outside, or anywhere you want, and use
8 all kinds of alternative systems.

9 And then the third here, number two, the third
10 option, is you can do an Area Weighted U Factor for all
11 of the surfaces in this category that shows that it's
12 less than or equal to the equivalent U Factor. So, you
13 can even go further, you don't actually have to have R30
14 in all the surfaces, some of them could be R19 if some of
15 them are R49 and the weighted equivalent U Factor comes
16 out to be what it would have been with R30. So, just to
17 be clear what we're talking about here. This is part of
18 the simplification move -- I would say "not," but
19 anyway... So what I just showed you is the current
20 language in the standards now, there's not a change in
21 that.

22 Okay, so another minimum that's proposed here is
23 for Fenestration U Factor, and the proposal is that
24 Fenestration products must have a U Factor less than or
25 equal .57. You just saw the Proscriptive Package

1 proposed U Factor of .32, so .57 is twice -- almost twice
2 as high, it's significantly less conserving window and I
3 think the idea here is that you could still do almost any
4 double-glazed window is what will comply with this.

5 MR. SHIRAKH: Aluminum frame.

6 MR. WILCOX: Aluminum frame, double-glazed will
7 meet this requirement is the idea. And you can also meet
8 this requirement by the weighted average U Factor, so you
9 could have some windows that were better and some that
10 were worse, as long as the total is less than .57, so
11 that would allow you to even have mixes of single-glazed
12 and high performance windows if you wanted to do that.
13 And then there's the exception which is basically the
14 Option 3 here, which says that you can exclude eight
15 square feet of fenestration area from the calculation
16 entirely, so you can put in your 2' X 4' stained glass
17 single-glaze lead window with, you know, not even
18 included in the calculation, then you're okay. All
19 right, so that's the proposed new mandatory fenestration
20 U Factor requirement. That's it, basically.

21 MR. SHIRAKH: Any comments on this presentation?

22 MR. BACCHUS: Jamy Bacchus, NRDC. What was the
23 reason, Bruce, for the tradeoff option if you -- I'm
24 sorry -- why the exception for the previous, let's say,
25 leaded glass window, or something, when you've already

1 got a tradeoff built in on the previous exemption?

2 MR. SHIRAKH: Just basically for compliance and
3 enforcement, somebody is doing a small project, you know,
4 just let it be done.

5 MR. WILCOX: Partly, I think, in the alterations
6 and additions world, if you've bought a window that was
7 stolen from the Chartres Cathedral and you want to
8 install it in your house, and you're not doing anything
9 else --

10 MR. BACCHUS: That's an unlabeled product.

11 Mr. SHIRAKH: A lot of these are coming from
12 Building Departments, you know, they're trying to move
13 along projects that are fairly small in scope and they
14 don't want onerous forms and calculations, so --

15 MR. BACCHUS: Is there something behind the eight
16 square feet? Or arbitrary?

17 MR. SHIRAKH: They seem to be asking the same
18 questions, so -- not a huge amount of glass, they're only
19 2' X 4'. And, again, this is just mandatory measures
20 they still have to meet the overall budget for the
21 building, which includes, you know, all the glass and
22 based on the proscriptive requirements that are far more
23 stringent. Mike.

24 MR. GABLE: Mike Gable. So, what are you guys
25 going to do about modifying that, or an exception to that

1 for greenhouse, garden windows and skylights? It seems
2 to me that you have to kind of make some accommodation
3 for those because --

4 MR. SHIRAKH: This .57 does not apply to
5 skylights, it's only for --

6 MR. GABLE: Well, what about greenhouse, garden
7 windows, as well, also?

8 Mr. SHIRAKH: So are they going to have a problem
9 meeting the .57 U Factor?

10 MR. GABLE: Just looking at the default table,
11 116, you know, you just might want to take a look at that
12 and think about it.

13 MR. SHIRAKH: Okay, well, I mean, if you think
14 there's a problem, let us know, but we didn't think there
15 should be a problem meeting that U Factor and we don't
16 have SHEC in there.

17 MR. GABLE: Yeah, I'm just looking at the default
18 table and so --

19 MR. SHIRAKH: The default table is based on
20 what's the worst of the worst, and then some.

21 MR. GABLE: Right, but I think if you look at
22 that, I think the greenhouse garden window is
23 substantially higher than .57.

24 MR. SHIRAKH: Yeah, but, again, those are
25 default, I think the actual products we need to look at,

1 I mean --

2 MR. GABLE: Right, I'm just -

3 MR. SHIRAKH: -- I'm not saying it's not a
4 problem, but I wouldn't go by default because default is
5 the worst.

6 MR. GABLE: Okay.

7 MR. SHIRAKH: Nelson, do you want to comment on
8 that - George, can Nelson respond to that?

9 MR. NESBITT: George Nesbitt -- oh, sorry.

10 MR. PENA: Nelson Pena, CEC staff. We have not
11 looked at the default version of the greenhouse, we
12 thought those values were, as Mazi has said, those were
13 the worst case of the worst, so we're going to leave
14 those alone. As far as NFRC listing greenhouses, there
15 are plenty available, I think I counted less than 10, but
16 they do meet the efficiency standard requirement as
17 listed in the NFRC Product Directory List.

18 MR. SHIRAKH: So, Nelson, if you can, verify that
19 and we can communicate that to Mike, that would be good.

20 MR. PENA: Okay.

21 MR. SHIRAKH: And we don't have NESH
22 requirements in here specifically with greenhouse windows
23 in mind. George. Thank you, Nelson.

24 MR. NESBITT: George Nesbitt. Yeah, the .57
25 looks fine. I think on skylights, as long as - I think

1 with skylights, there are, like Velux has an aluminum
2 curve mount skylight which has an internal vinyl frame,
3 and I believe other smaller manufacturers have them and
4 should be able to make them, and I imagine that should
5 get below that. You know, so as long as that would fall
6 under that, I would say we shouldn't exempt skylights, if
7 we can get rid of just the plain curve mount aluminum
8 skylights, that would be a good thing.

9 On the Insulation Mandatory Measures, I think
10 that's basically all fine for new construction. On
11 existing, we may want to think about whether -- I mean,
12 it's not always possible, or it's harder, and I think the
13 one perhaps clarification would be that you don't take
14 that R30 batt and slam it into a 2' X 4' or 2' X 6', I
15 mean, that's obviously not the intent, but in R30
16 fiberglass, say, in a fiberglass batt is a high density
17 batt in a 2' X 10' or a low density batt in a 2' X 12',
18 so if you want to go to the Exception language, the next
19 slide, I don't know -- did you say these were current
20 exemptions, still?

21 MR. SHIRAKH: The exceptions are not new.

22 MR. NESBITT: Yeah. Perhaps 1A really needs to
23 be reworded that the required R Value is installed in a
24 framing - in the appropriate framing, so when you go to
25 the Appendix, look up that you don't -- there is no R30

1 for a 2' X 8' in the Appendix lookup because you can't do
2 it without compressing the batt, and you no longer have
3 an R30. So, I think that would be perhaps one clarity
4 that maybe we need to say the R Value is installed in the
5 assembly, that it has to be installed in the assembly in
6 the Appendix lookup, or that meets that same equivalent U
7 Value because we do see plenty of that smashed in places
8 they shouldn't be, so that would be, like I say, the only
9 existing alteration, and the question will be whether
10 some of those levels are hard at times.

11 MR. SHIRAKH: Pat.

12 MR. SPLITT: Pat with App-Tech, just one comment.
13 I'm from Santa Cruz and we have a lot of Victorian houses
14 there, so when they're going to put in an addition, or do
15 some remodeling, especially in front of the building,
16 what they want to do, first, they want to be green, so
17 they want to re-use the existing fancy windows they have,
18 which may be single pane, and not throw them away because
19 there's no way of finding a window that's going to match
20 all their other windows, that's going to have all the
21 features they want. So, for instances like that, I'd
22 like to come up with some sort of more simplified way of
23 trading off keeping that window by saying, well, if on
24 the back of the house we just exchange an equivalent
25 square footage of existing glass that meets the standard,

1 without having to remodel the entire house, to do a
2 weighted average of all the windows.

3 MR. SHIRAKH: Okay, I think as part of this
4 discussion, we're going to relate it to alterations, I
5 think and we can address this.

6 MR. HUDGSON: Mike Hudgson, Con-Sol. Real
7 quickly, a minimum mandatory insulation in the ceiling
8 going from 19 to 30, so we're going to go from 2' X 6' to
9 2' X 10' potential rafters as a minimum, right? In a
10 sloped ceiling. So that's one of the things that you are
11 recommending. The other is, does this minimum mandatory
12 also apply, then, to retrofits? Or renovations?

13 MR. SHIRAKH: Well, again, that will be part of
14 this discussion we're going to have. But, at the moment,
15 it would, not unless we exempt it.

16 MR. HODGSON: Okay, and I think that's an issue,
17 you know, if you're not changing out your roof or your
18 ceiling members, and you're trying to do something
19 similar, what we may have to do is put a batt in a foam
20 on top of it, which we have issues with that potentially,
21 too, right? So I'm just concerned about changing that in
22 the rafter portion, the ceiling portion, or attic
23 portion, if we've got room, it's not a problem, but where
24 there's no room, changing out structural members, you
25 know, remodel is pretty costly.

1 MR. SHIRAKH: Bruce had the same concerns,
2 actually.

3 MR. WILCOX: Actually, John Proctor pointed out
4 that the staff proposal was to make the air flow and fan
5 watts requirement for Air Conditioning systems mandatory,
6 and it somehow didn't get into this presentation. That
7 doesn't mean that it's not being proposed. And it
8 doesn't go in Section 150, it goes somewhere else, so
9 that's why we didn't get it in here now. So -- no, this
10 is getting in here before lunch! That is still proposed.
11 It was, in fact, in all the package stuff we showed you
12 earlier.

13 MR. SHIRAKH: It is a proscriptive requirement,
14 now the proposal is to make it mandatory. We can have a
15 discussion about that.

16 Any other comments on -

17 MR. VARVAIS: Dan Varvais with SBFA. We'll
18 provide comments by August 12th.

19 MR. SHIRAKH: Thank you. I appreciate it. So
20 any other questions online?

21 MR. DEVITO: Eric DeVito again, BBRS,
22 representing Cardinal Glass. Real brief, we will be
23 providing some written comments, but I understand, you
24 know what Bruce explained, how the U Factor cap for the
25 windows is setting it at .57 and, you know, really it

1 seems the goal was to allow a lot of the products that
2 are currently being used to still be used. I just draw
3 some comparisons to the IECC again. Since 2004, in fact,
4 the IECC has had these type of mandatory measures, which
5 we refer to as caps, the U Factor cap in IECC's Zones 4
6 through 5 is .48, they also have an SHGC cap in Zones 1
7 through 3 of .5. The reasons they adopted these caps,
8 which are for comfort, condensation reasons and others,
9 you know, I know there is - you all have specific reasons
10 why you're proposing what you're proposing and I'm not
11 going to certainly - like I said, I'll provide written
12 comments to that effect, but I would ask you to at least
13 consider, you know, if you're going to have these caps,
14 to fashion them in maybe a slightly different way and
15 maybe exempt some of the things that you are concerned
16 about, like passive solar design and greenhouses and
17 skylights, of course, but with the goal of focusing on
18 the residential punched opening window that you're going
19 to put in, you know, do you really want to be allowing
20 clear glass in certain situations. And, again, for
21 comfort and condensation reasons, you've had a .4 U
22 Factor, .4 SHGC, in your prescriptive package for many
23 years. The next step would obviously be trying to
24 prevent any backsliding from those types of windows. So,
25 I would just ask the Commission to look at it, if there

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1 is any way to ratchet down the caps a little further.

2 Thanks.

3 MR. SHIRAKH: So this is Mazi Shirakh, CEC staff.
4 Can you -- I'm really interested in the interaction with
5 the passive solar design. Now, we don't have a SHGC
6 requirement specifically for that reason.

7 MR. DEVITO: Right.

8 MR. SHIRAKH: Why would the U Factor be a
9 consideration?

10 MR. DEVITO: It wouldn't. I was suggesting you
11 consider an SHGC cap and then if you wanted to protect
12 the passage of solar design, then you work up some type
13 of exemption for it.

14 MR. SHIRAKH: So can you include those in your
15 written comments to us, please?

16 MR. DEVITO: Sure.

17 MR. SHIRAKH: Appreciate it. Any other comments
18 online? So why don't we meet back here at 1:00? And
19 we'll start with the Zone Air Conditioning.

20 (Recess at 11:52 a.m.)

21 (Reconvene at 1:07 p.m.)

22 MR. SHIRAKH: Okay, we're good. So we're going
23 to start with the item that was left behind from this
24 morning, the Zone Air Conditioning, and Bruce is going to
25 present that.

1 MR. WILCOX: Thank you, Mazi, this is a topic
2 called Residential Zoned Air Conditioning and so the
3 background on this is that this was a proposal that was
4 sponsored by the California Statewide Utility Codes and
5 Standards Program, it's what they call a "Codes and
6 Standards Enhancement" or "Case Study," and the study
7 authors were myself, John Proctor, and Rich Chitwood.
8 John Proctor is here and can help in terms of answering
9 questions and so forth.

10 So, we're going to talk about what the current
11 Code requirements are for zone air conditioning, zoned
12 air conditioning, typical practice, we're going to
13 summarize our Code change proposals, we'll talk about
14 research data and findings from that, and then we'll talk
15 about the Code change proposals in detail. One of the
16 things I like to sort of make clear, just before we start
17 here, is that the purpose of this proposal, all the
18 analysis and work that was done here was not to try and
19 prohibit zone control systems for air conditioning. The
20 purpose was to ensure that zonal systems operate with
21 energy efficiency that is equal to non-zone air
22 conditioning systems, just a very simple concept that
23 zone control systems should be equally efficient with
24 their single zone counterparts.

25 There are several aspects to this proposal that

1 we'll talk about, but there are basically three major
2 areas we're going to talk about: bypass ducts and how
3 they work and what they do, I want to talk about air flow
4 and fan watts related to air conditioning, getting the
5 supply air that goes through the cooling coils to the
6 house, and then we're going to talk about the performance
7 credit in the current standards for zonal systems.

8 Okay, so the current Code requirements in
9 California related to this subject is that there is a
10 proscriptive requirement in the 2008 Standards that says
11 that you need to demonstrate that you have 350 CFM per
12 ton in every zonal mode and meet the fan watt
13 requirements. That's a proscriptive requirement and it's
14 only in the hottest climate zones, and since it's not
15 mandatory, that can be traded away and so it's not as
16 universally applied.

17 There is also a performance credit for zonal
18 systems that's been implemented in the simulation
19 performance method as a set of alternate heating and
20 cooling set points, that make it -- basically, the
21 cooling set point is higher in zones during different
22 parts of the day and the heating set point is lower than
23 it is for single zone systems, which means that you don't
24 need as much calculated energy to maintain those set
25 points, and that results in a compliance performance

1 credit.

2 There is some requirements specific to that
3 credit. You have to have a return duct, a return
4 register in each zone, you can't have more than 40 square
5 feet of uncontrolled opening between the zones, and you
6 can't have any measurable air flow at registers in any
7 location except the zones that are calling for air
8 conditioning. So you have to have a very well controlled
9 system in order to comply with this performance credit.

10 Our understanding is that it's not often used,
11 partly for the reason that it's difficult to meet all
12 these requirements. There are no restrictions on
13 variable capacity, or control type, or number of units,
14 or commissioning, or anything related to the zoning
15 systems, specifically, other than the above.

16 And one of the other sort of contextual things
17 going on here is that the California standards require
18 mandatory setback thermostats in all their new houses
19 regardless of whether it's a zoned system or not, so
20 there is already an assumption that there will be heating
21 and cooling setbacks and those are built into the
22 analysis assumptions that are being built for normal
23 systems in meeting the Code.

24 So the typical practice for zonal air
25 conditioning systems, there are two types that are common

1 and you see in California, the first type is where you
2 have multiple separate systems, generally one in each
3 zone, and a typical example might be a two-story house
4 where there is a system to supply the bedroom zone
5 upstairs and a separate system to supply the living zones
6 downstairs. They have their own thermostat and they have
7 their own duct systems, and they basically operate as two
8 separate split systems. These systems generally perform
9 pretty well and have a higher cost. The other system is
10 where you have a single system with a single air handler
11 and outdoor unit and you put dampers in a system of
12 supply ducts so you can turn the air supply on or off to
13 zone since the thermostats are calling for heating or
14 cooling. Typically, return ducts are not zoned, either
15 there is no dampers on the return side, so you're always
16 pulling return air from the same place, regardless of
17 whether the zones are calling for conditioning or not.

18 Typically in California we see single speed
19 compressors and fans that can't modulate to track the
20 load. Supply air flow is low, even with all the zones
21 calling; this is typical of California systems, in
22 general, but we find that the situation is worse in zonal
23 systems and we'll show you some data on that. And there
24 are bypass ducts in many of these systems, and a bypass
25 duct being a short circuit from the supply duct side of

1 the system to the return. And we'll talk about them in a
2 few minutes, as well. The results of this is a low EER,
3 Energy Efficiency Ratio, in other words, a low efficiency
4 at delivering cooling to the house compared to the
5 electric inputs to the air conditioning system.

6 So what we're proposing here is a mandatory
7 requirement to eliminate bypass ducts or not to allow
8 bypass ducts in zonal systems, particularly air
9 conditioning systems. A second change is to delete the
10 current zonal air conditioning performance compliance
11 credit, in other words, not allow an easier set of
12 heating or cooling set points if you claim zonal air
13 conditioning, and to require air flow and fan watt
14 verification in all cooling, in all zonal cooling modes.
15 And by the way, this is a mandatory requirement that is
16 proposed to apply also to all single zone systems, so
17 it's just an attempt to make sure that the zonal systems
18 work equally well with the normal single -- what we
19 expect of a normal single zone system.

20 We did a bunch of work and produced a field
21 survey, a project called the California New Home Energy
22 Survey, and we did a field survey of a sample of 80 new
23 2007 California homes and found in relation to this topic
24 that air conditioning systems generally have a load
25 capacity of efficiency, that cooling duct pressures are

1 very high, the cooling fan watts are very high, and
2 generally that the systems aren't working all that well.

3 One of the interesting things, what is the makeup
4 of the systems you find in new California houses, of the
5 80 systems that we looked at, 12 percent of them were
6 dampered multi-zoned systems, the kind of thing we're
7 talking about here. So this is a significant part of the
8 market, and this shows the range of all the other stuff
9 that we found. There were also the multiple split system
10 approach, there were 17 of those. So we're talking a
11 significant fraction of all the new homes are doing one
12 sort or another of a zonal air conditioning system.

13 So the results from that survey show that damper
14 multi-zone systems have low CFM per ton and high cooling
15 fan power per CFM. So, if you look at this upper left
16 graph here, this is air flow in cubic feet per minute per
17 nominal ton of air conditioner capacity and these are the
18 average values, it's the blue striped bar, and the
19 maximum values are the blue solid bar, of all the 80
20 systems that we looked at in the survey. For single
21 zoned systems, the average was about 340 CFM per ton with
22 multi-zone operating with all the zones calling, the
23 average was 280, roughly, CFM per ton, so significantly
24 less. And then, if you operate the zonal system with
25 only one calling, the airflows is lower yet and it's down

1 at 250 CFM per ton. So, the zonal operation of these
2 typical systems affects the cooling air flow
3 significantly, based on this data. And then the fan
4 watts is --

5 MR. SHIRAKH: Do you have a question, Jamy? Can
6 you pick up your voice?

7 MR. BACCHUS: Jamy Bacchus, NRDC. What did you
8 mean by "low capacity?" Is that related to the nominal
9 capacity of the actual units installed? Or the actual
10 delivery of cooling?

11 MR. WILCOX: No, if you have a four-ton system
12 and, you know, the nominal -- a four-ton system is 48,000
13 Btus of cooling total capacity, nominally, and we often
14 find that the real capability of the system to deliver
15 cooling to the space is much less than that. And so, if
16 you had a four-ton system that only was capable of
17 delivering two tons of cooling, that's what we mean by
18 low capacity.

19 MR. BACCHUS: [Inaudible] the reduction in
20 capacity based on its nominal [inaudible]

21 MR. WILCOX: I think you might have to come up to
22 the front because I can't hear you, let alone -

23 MR. SHIRAKH: If we can't hear you, he can't hear
24 you.

25 MR. BACCHUS: I think you're just saying that the

1 capacity of the unit, the manufacturer's rated capacity,
2 the nominal capacity, whatever it might be, is not what
3 you're actually getting out of it. You're getting
4 reduced capacity --

5 MR. WILCOX: That's correct.

6 MR. BACCHUS: -- not that their unit is not right
7 sized to the load, or under-delivering cooling.

8 MR. WILCOX: No, it doesn't have anything to do
9 with sizing, it has to do with the output of the system
10 compared to what you would expect it to be.

11 And then, on the lower right-hand plot here is
12 the fan power consumed by the furnace fan of these split
13 systems in terms of watts per CFM of air flow and cooling
14 mode, and the single zone systems, the fan watts on
15 average, is about a little over half a watt per CFM and,
16 in multi-zone systems, on average, even if all the zones
17 are calling, delivering air to all the zones
18 simultaneously, the average air flow is about .75, not
19 the average air flow, the average watts per CFM is about
20 .75, and in the average case where you're doing multi-
21 zone with one zone calling, the fan watts to deliver CFM
22 to the zones is about .8 watts per CFM on average, so
23 there is a significant difference between single zone
24 systems and multi-zone systems in both the amount of air
25 that they're delivering and the amount of power they take

1 to deliver that air, so that's part of the context here.

2 So this is a little diagram of a typical dampered
3 multi-zone air conditioning system, or the bypass duct.
4 So the box here in the upper middle is the furnace with
5 its cooling coil and its fan that blows the air through
6 the house, and then you have a return register that takes
7 air from the house, and it goes into the furnace, then
8 that blows the air out and it can go to, in this case,
9 zone 1 if this damper is open, and zone 2 if that damper
10 is open, and the bypass duct runs from the supply right
11 around here and goes back into the return. And the way,
12 if only zone 1 is open, then typically part of the air
13 goes through the bypass duct, instead of going to the
14 house, it goes through the bypass duct and back around
15 into the furnace again. So this is a damper multi-zone
16 air conditioning system with a bypass duct.

17 So how does this thing work? How does this
18 bypass duct work? So, in theory, when all zones are
19 calling, like in the previous example, if both those
20 zones, the thermostat is requiring cooling, then the
21 bypass damper closes and the bypass has no effect because
22 all the air goes to the zone just like it would if it was
23 a single zone system, and all the zones get the design
24 air flow. When only one zone calls, whatever isn't
25 delivered to that zone is bypassed to the return to

1 maintain the cooling coil air flow, and also to avoid
2 increased air velocity of noise that you would get if you
3 put all that air into one zone.

4 Actually, in our opinion, what happens here is
5 that, when you mix the bypass air that comes back into
6 the return duct, you're lowering the return air
7 temperature that enters the cooling coil, and this always
8 significantly lowers the energy efficiency ratio of the
9 air conditioner. This is the absolute physics of the
10 situation that the air conditioner efficiency depends on
11 the temperature of the return air, and the bypass duct is
12 always going to lower that and cause the EER to go down.

13 And then, in addition, because the dampers and
14 the duct design that typically ends up, the air flow is
15 typically low even when all the zones are calling, you
16 have more fittings and more dampers and more
17 restrictions, and so forth. And then, in addition,
18 because of those extra dampers and ducts, systems are
19 more prone to construction failure, construction errors,
20 these are very common, and because the duct system is
21 bigger, you get bigger duct losses, as well. So, just so
22 you know, we've seen these things. This is a typical
23 California kind of installation where you have the
24 furnace here and the air conditioning system - this is
25 kind of a distorted picture, but that's what's operating

1 right here, there is the flu from the furnace and you
2 have ducts running around in this hot attic, and this
3 duct right here is the bypass duct for the system, so it
4 runs from the supply plenum over here to the return and
5 cold air comes from the supply, goes over here, and comes
6 back into the return, and goes around and around.

7 Here is another example in one of the houses we
8 surveyed where there is this 16-inch metal duct here that
9 goes from the return supply over here to the return over
10 here, and you can see the arm here of the gravity damper
11 that is supposed to open and close when the pressure in
12 the duct system changes so that the air can go back
13 around in the bypass.

14 Okay, so one of the things we wanted to
15 acknowledge is the comments from some stakeholders based
16 on our case presentations. The Air Conditioning
17 Contractors of America and the American Heating and
18 Refrigeration Institute, AHARI, both commented that they
19 want to maintain the current credit for zone systems and
20 have argued that, in some cases, there is energy savings,
21 and they want to maintain the use of the bypass duct.

22 There has been some research presented on damper
23 multi-zone systems, well, these are two papers, I think
24 they're related to maybe the same experiments that were
25 done at the National Association of Homebuilders Research

1 Center, sponsored by NAHB and Carrier and, you know,
2 we've looked at those studies and there's some
3 interesting conclusions in there, one is quoted here, it
4 says that "studies have demonstrated that a multi-zone
5 system will use more energy than a central thermostat
6 system when a constant set point is used." "And a 35
7 percent increase was documented as a direct result of
8 multi-zone systems being more responsive to the cooling
9 needs of the entire house." So, you know, the research
10 indicates that, at least in some cases, you put in a
11 multi-zone system and the energy use goes up.

12 There's an ASHRAE paper which says that zoning
13 with no thermostat set up uses more electricity for
14 cooling than the system in a central configuration with
15 no thermostat sub point scheduling. And, again, part of
16 the reason is that you're getting better temperature
17 control and the unit is responding to the loads in the
18 house better and using more energy to do that.

19 So one of the things that we attempted to do as
20 part of this project was we made a model of a zoned air
21 conditioning system with the kind of characteristics here
22 that you find in California houses, and tried to look at
23 how much impact the zoning system would have on the
24 efficiency. And this is a theoretical model that we're
25 showing here, and what's plotted on here is the results

1 from this model and, on the left-hand side, what we have
2 is the Net Sensible EER and its' in percentage terms and
3 it's relative to the rate of value at 350 CFM per ton and
4 no bypass, so this is just saying what's the relative
5 performance of the system compared to its rating. Across
6 the bottom, we have the CFM of air delivered to the
7 condition space and, again, relative to the rated values
8 at 350 CFM per ton, and the various lines here show the
9 combination of different percentages of bypass and of
10 total system air flow to the zone. So, up here at the
11 upper right-hand corner, where we have no percent of air
12 that goes through the bypass ducts, we have 100 percent
13 air flow to the zone and we have, at that point, we get
14 100 percent of the rated EER. So, this is what the
15 nominal system would do is right here. So, if you take
16 that line with no bypass, and just follow it across here,
17 what it's saying is that, if you reduce the air flow
18 through the system by just putting in more restriction or
19 turning the fan down, or whatever it is to get the air
20 flow to be less than, but then you get down to 50 percent
21 air flow, which is the 175 CFM per ton, then you are
22 about 83 percent of the nominal EER. So the system
23 efficiency is 17 percent lower than rated when you cut
24 the air flow down. And then these additional lines here
25 are looking at the combined effect of that plus different

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1 percentages of air that goes through the bypass duct.
2 So, for example, this line down here is 50 percent of the
3 air is going through the bypass duct and the total air
4 flow to the zone is 50 percent, and at 50 percent you're
5 now down at efficiency is 77 percent of what you would
6 expect for the nominal system and its rating.

7 And we're doing this in terms of Sensible EER,
8 which is -- we think it makes sense in California
9 climates where we're not really all that interested in
10 dehumidifying most of the time and we're really looking
11 for big cooling capacity when it's very hot outside and
12 typically dry, so that's the reason for Sensible EER.

13 So this is what the theoretical model - this
14 model is derived from Standard Air Conditioning
15 Manufacturers Extended Data Tables. You can look for
16 most residential equipment and you'll find the
17 manufacturers' supply of data that you would need, and
18 that we used to plot this result.

19 So the other thing we did is we went out and
20 measured the detailed operation of zone systems in three
21 houses that we surveyed in that field survey. Each one
22 of these houses, we spent a whole day with a crew of
23 people and measured the Net Sensible EER of the zone
24 systems based on measuring - it's the tons at the
25 register approach, you measure the air flow and

1 temperature of the air at each supply register and the
2 air flow and temperature of the air at the return
3 register, and you can calculate how much cooling was
4 delivered to the space. In this case, we're talking
5 about sensible cooling, and then we manipulated the
6 controls in the systems manually to achieve different
7 levels of bypass and different levels of CFM.

8 And just to see what the impact would be on our
9 net sensible EER number here, again, same terms, it's
10 percentage of the nominal, and down at the bottom is the
11 percentage of the CFM delivered to the conditioned space.
12 And you can see that, when you're up here at the 100
13 percent air flow to the space, you know, we're in the
14 neighborhood of 100 percent of the nominal capacity. The
15 dark blue line here is Field Study House No. 3, the gold
16 line is Field Study House No. 2, and the green one is
17 Field Study House No. 1, so we actually did this in three
18 different houses, these three houses, and so what you see
19 is basically similar to what we showed in the last graph,
20 that as you reduce the amount of air flow that goes to
21 the conditioned zones, and increase the bypass, then the
22 EER goes down, and this is at 27 percent bypass, this is
23 at 45 percent, this is at 39, it depends on the -- the
24 details depend on the system and there is lots of
25 interactions between things like how leaky the ducts are,

1 where they're located, and are you running more air
2 through the ducts in the attic that have the big leaks,
3 or not. These are the systems as found in the field,
4 it's only three houses, but that the results all agree
5 with each other pretty well.

6 So it's interesting that, if you plot our
7 theoretical model right from the air conditioning
8 manufacturers' data, over the top of this field data, the
9 field data actually shows that the situation is worse
10 than what the manufacturers' data would have indicated,
11 that the percentage lost in Sensible EER is actually
12 bigger. And part of that is because -- we think that
13 part of that is because the manufacturers' data that
14 we're using here is extrapolated and down at these low
15 levels, and they don't actually spend a lot of time
16 testing things, they don't really want people to be
17 operating down here anyway. And plus we're talking about
18 real systems installed in buildings where there are duct
19 losses and so forth, and that's not included in the
20 Manufacturers data. So there's more things operating
21 here than there are in the theoretical model. One of the
22 interesting things that we discovered recently is that
23 there's the Air Conditioning Contractors of America,
24 ACCA, has a new standard that's been out for public
25 review called Manual ZR, there's a reference down here at

1 the bottom, it's a standard for how to do zoned air
2 conditioning systems for residential low-rise buildings,
3 and we looked at their draft which, as I say, has been
4 out for public review, and it's not a final document.
5 And there's a set of data in there that shows what you
6 would expect - what ACCA thinks you should expect from a
7 zone system where you have certain levels of bypass and
8 certain levels of air flow and, you know, their curve,
9 which is the blue line here. Basically, it matches the
10 field data from our -- we were comparing it to Field
11 Study House No. 2 here, just for example, but it's
12 basically the same pattern. So the stuff we're finding
13 in the field seems to be what the people who know about
14 zone systems would expect you to find.

15 So a question about why are these bypasses so
16 bad. And kind of as a thought exercise, imagine this
17 system here where you have your furnace and your cooling
18 coil and your fan, and you're taking air and you're
19 blowing it out, and all the air is going through the
20 bypass and back into the return duct, and no air is
21 getting delivered anywhere; so what happens then is that,
22 if you're in heating mode, the temperature very quickly
23 goes up to the outlet temperature of your furnace and, at
24 that point, you can't add anymore heat to the air, well,
25 what actually will happen is it will start running on the

1 safety switch and turning off the gas valve, but in
2 cooling the temperature drops down, you know, keeps going
3 down colder, colder, colder, until again you end up with
4 the system going off on safety controls, but it gets
5 harder and harder and harder to supply cooling when the
6 air coming back to the system is actually at the
7 temperature you're supposed to be making it with the air
8 conditioning. So this is what's going on with the bypass
9 duct.

10 So an example of that situation with real
11 measurements that we made in these houses that we
12 studied, this on the left-hand side is the return plenum
13 air temperature, and the dark blue bar is no bypass, the
14 striped middle bar is mild bypass, and then the open bar
15 is maximum bypass, so that the open bar is not 100
16 percent of the air going back, but the most that we could
17 set this system up to do, which was maybe on the order of
18 150 percent and look what happens to the return
19 temperature in cooling with the no bypass going to the
20 return temperature air coming essentially back from the
21 house, which was about 78 degrees, which was sort of in
22 the range of what you'd expect, with half the bypass
23 operating, you've got the return temperature down to 68
24 degrees, and with the maximum bypass, you're getting the
25 air temperature down to 55 or so, so the air entering the

1 cooling coil is, you know, mid-50's. And here's the
2 cooling capacity, the sensible cooling capacity of the
3 air conditioning system for that same condition, 33,000
4 Btus in the case with no bypass, 18,000 in the case with
5 the medium bypass, and it drops down when you're running
6 55 degree air in there, it drops down to 7,000 Btus, so
7 this is another version of reduced capacity, as we've
8 talked about earlier.

9 And from an efficiency point of view, a
10 simplistic way of looking at this that I find useful is
11 that, for most air conditioning systems, the amount of
12 electricity input to the system is generally pretty much
13 independent of the capacity. An air conditioning system
14 draws -- it's not exactly the same, but about the same
15 amount of electricity, regardless of what's going on
16 here. So you're producing 7,000 Btus of cooling for the
17 same amount of electricity that you could have gotten
18 32,000 Btus of cooling, so that's the reason it's of
19 concern, I think. Here's a different way of looking at
20 it based on measurement in a different house, this is
21 comparing what would happen based on, you know, we did
22 all these measurements and manipulated the system,
23 figured out what its capacity was, and so forth, and we
24 figured out that if you eliminated the bypass duct, that
25 would increase the sensible efficiency air delivered to

1 the house by almost 50 percent. If you eliminated the
2 bypass duct and you got the full 350 CFM per ton of air
3 flow, then you're getting the efficiency up 60 percent.
4 And how big a deal is that? Well, that's what happens
5 when you go from 13 to 14, that's an eight percent
6 number, so these efficiency changes, we think, are
7 significant compared to the other things we're doing in
8 the world of efficiency.

9 So based on our survey study, in typical homes
10 with dampered multi-zone systems in California new homes,
11 we think the air conditioning SER to ER degraded by 17
12 percent with the systems designed and installed the way
13 they are now. And although the heating impact is much
14 smaller, it's still not zero and we think that's a four
15 percent reduction in AFUE due to the change in the return
16 air temperature, basically.

17 So how do you improve this situation? How can
18 you get full CFM through the system, not get a lot of
19 noise, etc.? So how do you get rid of that bypass and
20 make the system work? Well, the answer is there are many
21 ways to do that. And we're having little problems here
22 with versions of the Powerpoint, I think, I'm sorry for
23 the format glitches here. One answer is this one, this
24 is a system that people have used successfully where you
25 have the return duct, return register, here's your

1 handler, and with your cooling coil, and then you go to
2 -- for illustrative purposes here, two zones, and each of
3 those zones has two registers, or two supply ducts with
4 registers, the bonus supply and the regular supply for
5 Zone 1, and bonus supply and regular supply for Zone 2,
6 and the damper is on the bonus supply and, so, when Zone
7 1 is calling for cooling and Zone 2 is not, you open the
8 damper on the bonus supply on Zone 1 and, for example
9 purposes, two-thirds of the air will go to Zone 1,
10 assuming these were all equal supply, or they wouldn't
11 have to be, but assuming they were, two-thirds of the air
12 would go to Zone 1 and then one-third of the air would go
13 to Zone 2. So you would still be supplying some air to
14 Zone 2, you would be supplying twice as much air and
15 twice as much cooling to Zone 1 in response to its call.
16 The opposite would happen when Zone 2 was calling, and
17 then when both zones were calling at the same time, you
18 close both bonuses and supply the right amount of air to
19 both zones, or you partially close both bonuses, but
20 anyway, using this approach, you can keep basically the
21 same amount of air flow through the system, regardless of
22 whether it's one zone, or two zones, you can have normal
23 register flows through the register so that things really
24 aren't noisy, etc.

25 And notice there's no bypass here, there is no

1 bypass damper, no duct, and we think this system for a
2 small two-zone operation is obviously cost-effective in
3 that it's not significantly more equipment than you need
4 for the normal system.

5 Another answer is you do a system just like this
6 and you set it up so that the zone dampers don't
7 completely close, and you can get basically the same
8 effect that we got in the previous version, so if Zone 2
9 is not calling for anything, you close the damper so that
10 it only gets one-third of its flow, and then you'll get
11 two-thirds of the flow roughly going through the other
12 zone, and if you set up the duct sizes correctly, you can
13 do this without reducing the air flow in the one zone
14 case. The register flow does change from both zones
15 calling to one zone calling, so it's not as ideal a
16 situation from a register flow and distribution point of
17 view.

18 So the other answer is this separate system for
19 each zone, where you get a completely separate system
20 that is sized and designed for the correct air flow that
21 operates for upstairs and a separate one for downstairs,
22 and they operate independently. This system is used a
23 lot in California and we think it has lots of advantages.
24 Another operation, or another option moving forward, is
25 probably mini-split system where you have a small split

1 system in each zone that maybe doesn't even have ducts at
2 all, and that's a way of supplying zonal cooling at high
3 efficiency.

4 Another way to do this same thing and get a
5 system that can have high efficiency is to use variable
6 capacity equipment, so that if, for example, again, you
7 have your two-zone system and only one zone is calling,
8 if you have a variable speed compressor and a variable
9 speed fan, you can run your compressor at half speed and
10 run the fan at half speed and get the appropriate air
11 flow for the reduced capacity of the system, reduced
12 capacity of the compressor, and actually in many cases
13 that will result in an efficiency increase at part load.

14 So, our conclusions here are that bypass ducts
15 should be prohibited because they intrinsically reduce
16 energy efficiency. We're very concerned in California
17 standards that, to maintain equipment efficiency, and we
18 have appliance regulations to do that, and we're
19 particularly interest in air conditioning systems because
20 of their peak electricity impact, and bypass ducts, we
21 think the impact is very clear that they reduce the
22 energy efficiency of the system below what the appliance
23 efficiency rating would tell you you're going to get, and
24 below the requirements, in effect, that we're implicitly
25 all thinking that if you are buying a SEER 15 unit that

1 you're getting a SEER 15 installed in the house and
2 operating, but the evidence is that, with a zone system
3 with bypass ducts, that's not the case.

4 One of the couple of quotes here, one of which is
5 that multi-zone systems -- well, the conclusion is multi-
6 zone systems are for comfort, not for energy savings.
7 And, you know, the comment is from Glenn Hourahan from
8 ACCA was that properly designed installed multi-zone
9 systems improve comfort. And if they're done right,
10 that's certainly a potential outcome. But do they
11 provide energy savings? That's the other question. And,
12 in fact, we think the multi-zone systems often can
13 actually increase energy consumption. Glenn's comments
14 also say that properly designed systems may or may not
15 save a significant amount of energy or may increase
16 energy use to some extent. So that's part of the context
17 here.

18 So our proposal specifically is that there be a
19 new mandatory requirement for zone systems. That
20 requirement is now part of the proscriptive air flow
21 option and standard, but it's not a mandatory
22 requirement. And that mandatory requirement would
23 disallow bypass ducts, would require a minimum CFM per
24 ton and a maximum watts per CFM in all of the zone loads,
25 so as part of the commissioning process for the air

1 conditioning system, the contractor would measure the air
2 flow with Zone 1 calling and the air flow with Zone 2
3 calling, and the watts, and show that that met the
4 standard, and that would meet this requirement. And then
5 we're also proposing to eliminate this credit that always
6 gets you an energy credit if you claim that you have
7 zoning in the performance method. The way the
8 thermostats are set up, you always use less energy if you
9 claim that credit, and that's because the presumption is
10 that, when you have a zonal system, you will in fact do
11 much more aggressive setbacks, and it's not clear there's
12 any evidence that, in fact, that's what happens, that
13 just because people have a zonal system, they will keep
14 their bedrooms at 83 degrees until 11:00 at night every
15 night in the summertime, thus saving lots of cooling
16 energy. I kind of have my doubts whether that's really
17 going to happen, especially - imagine the houses with the
18 young children upstairs, putting them to bed at 10:00,
19 "Sorry, kids, we can't turn the air conditioning on until
20 11:00, but it'll be better than." Anyway, that's our
21 proposal and send all the comments to Mazi!

22 MR. SHIRAKH: And cc Bruce, please. John.

23 MR. PROCTOR: John Proctor. I'd like to make a
24 correction to what Bruce said. If you go back to the
25 field data, those three curves, any one of those that

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1 show the three curves, that data is not at the house,
2 it's the flow, the flow measured is going to the house,
3 but the temperature drop through the unit is measured at
4 the unit, so it's the same thing that, when you look at
5 the ACCA graph, which I think is a couple slides further,
6 it is looked at the same thing, it's what is happening
7 actually at the unit.

8 MR. WILCOX: So these two are really comparable?

9 MR. PROCTOR: Those are comparable.

10 MR. WILCOX: Yeah, okay.

11 MR. NESBITT: [Inaudible]

12 MR. SHIRAKH: George, you should know better by
13 now. You can't yell from -- go ahead, please.

14 MR. CROUCH: John Crouch with HPBA. We're the
15 vented gas heating fireplace people. Ninety-five percent
16 of all gas fireplaces in the state come through our
17 members. And I know this is about zonal cooling, but
18 we're very concerned that zonal heating will get thrown
19 out with this bathwater, if you will. And I appreciate
20 now seeing the presentation that the focus is on the
21 application of a lot of this in cooling, but zonal
22 heating is very intuitive in homes and is used a little
23 bit in the state in new construction, and we anticipate
24 it'll be used a great deal more in new construction in
25 the coming cycles, and we really want to encourage the

1 staff to keep attitudes towards zonal heating and zonal
2 cooling separate, and preserve the zonal heating
3 opportunity, especially --

4 MR. SHIRAKH: What do you mean by "opportunity?"
5 We're not disallowing it.

6 MR. CROUCH: I know you're not and I appreciate
7 that, seeing the presentation is very helpful now, but we
8 are also concerned about the software in the new engine.
9 If the software doesn't allow -- we hope the software
10 will allow zonal heating and credits for it.

11 MR. SHIRAKH: But there is a difference between
12 allowing zonal heating or taking credit. What are you
13 talking about?

14 MR. CROUCH: We are interested in taking credit
15 for it and having it recognized in the software, and
16 we'll provide more comments.

17 MR. SHIRAKH: Thank you.

18 MR. CROUCH: You're welcome.

19 MR. HODGSON: Mike Hodgson, Con-Sol, representing
20 CBI. Bruce, I had a question. On your 12 percent ducted
21 system that are dampered, I couldn't follow the math and
22 so are you saying that 12 percent of the market uses a
23 two-zone approach, or a multi-zone approach?

24 MR. WILCOX: The multi-zone is a larger fraction
25 of the market than that and, of the systems we surveyed,

1 12 percent of them were dampered multi-zone systems.

2 Well, actually -- 12 percent are the ones that had ducts.

3 In other words, leaving out the wall furnaces.

4 MR. HODGSON: So 12 percent of the market - 12
5 percent of the new construction market in your survey
6 were dampered multi-zone systems? Twelve percent of the
7 new construction market were dampered, multi-zone
8 systems? I'm just trying to understand your math.

9 MR. PROCTOR: No, this is John Proctor, 12
10 percent of the ducted systems in the sample were ducted,
11 multi-zone systems, they had ducted damped systems.
12 There are not 80 ducted systems in the sample. Radiant
13 floor systems are not ducted, etc. etc.

14 MR. HODGSON: Right, so of the 70, or whatever,
15 that had ducts, 12 percent of those have dampers and are
16 multi-zoned?

17 MR. PROCTOR: That's correct.

18 MR. HODGSON: Okay.

19 MR. WILCOX: In addition, there were 17 multiple
20 split systems. There were more, actually, more of the
21 houses we saw that had multiple systems than had damper
22 systems.

23 MR. HODGSON: And that's where I'm going. My
24 understanding of the market would be that, if you "two-
25 zoned" a house and tried to get credit for it, the

1 majority of those would actually have two separate
2 systems, living and sleeping, type thing --
3 upstairs/downstairs, but your proposal is for those
4 systems also not to get a two-zone credit, correct? All
5 right, and the rationale is, on the air conditioning
6 side, you don't see setbacks working in the sleeping
7 zone.

8 MR. WILCOX: Yeah.

9 MR. HODGSON: All right.

10 MR. WILCOX: As far as we can - yes, that's
11 basically it.

12 MR. HODGSON: Okay, so the concern going forward,
13 not necessarily this Code cycle, but for future Code
14 cycles, we get smaller and smaller, are we still going to
15 have the ability to model those small loads as living and
16 sleeping areas in whatever version of software we have?

17 MR. WILCOX: You mean with different set points?

18 MR. HODGSON: Yes.

19 MR. WILCOX: Well, that depends on what we decide
20 here. If we go ahead with the proposal to eliminate that
21 zonal credit, then I would say not.

22 MR. HODSON: Okay, so I think the issue for us
23 would be then, not disagreeing with the air conditioning
24 side of it, but on the heating side, I think there is
25 some logic to having separate set points and we don't

1 want that to go away because we think, in the long terms,
2 as we get smaller and smaller loads, we're going to have
3 smaller and smaller appliances to service those loads,
4 and we think those will be in multiple zones. Okay?
5 Thank you.

6 MR. SHIRAKH: Thank you, Mike.

7 MR. KEESEE: Mike Keese from SMUD. A couple
8 questions and then a personal observation. I'm concerned
9 about the air flow and the setback thermostat
10 requirements in these conditions because, if you look at
11 the mini splits, they have very low air flow. I don't
12 think they achieve the 350 CFM per ton, at least not what
13 I've seen. And the ones I've seen don't come with
14 setback thermostats. Now, of course, that may have
15 changed recently because I have an older unit, but I
16 haven't seen anything coming out of them, so you might
17 want to let the mini folks know that -- I mean, I've told
18 them they should come out with a setback thermostat, that
19 would be easy for them to do. I would echo the comments
20 from the fireplace insert guy because I have one, they're
21 great. And sort of an observation about zonal, in
22 particular, this I think has great applications for
23 additions, which again are covered by the standards, this
24 is a good way to condition an addition. And I don't know
25 how this is going to impact what happens with additions

1 because, if someone were to come to me and ask my advice
2 at SMUD how to deal with that, I would go, "Do zonal
3 systems." No judgment there, but those little Rinnai
4 water heats are great, I think, yeah, absolutely. And I
5 think people use them when they're needed, I mean, it's
6 pretty intuitive, you know, you don't condition your
7 space unless you're in it. I don't know if too many
8 people would just go in there and turn it on and walk
9 away, maybe. Maybe that's why you have the setback
10 thermostat requirement, although we all know how they get
11 used, too. They don't get used at all. I mean, the
12 little sampling we've done at SMUD is people just set
13 them at one temperature and leave it.

14 MR. WILCOX: Well, I mean, that's part of the
15 reason that the research that says that if you don't do
16 setbacks, the zonal system will not save energy. In
17 fact, it might use more energy, and that's important
18 because I think there's quite a bit of at least anecdotal
19 evidence that our ubiquitous setback thermostats are
20 really not used the way we think they are in the current
21 standards.

22 MR. SHIRAKH: Mike, you left before I had a
23 chance. So what you're saying is, we're not saying you
24 can't have zonal, we're just saying you can't have
25 credit.

1 MR. KEESEE: I think people should get a credit
2 if they can.

3 MR. SHIRAKH: For both heating and cooling? Or
4 just heating?

5 MR. KEESEE: Both heating and cooling.

6 MR. SHIRAKH: And if the data suggests that the
7 cooling doesn't save energy --

8 MR. KEESEE: You're looking at a pretty limited
9 set of data here, I would say. I mean, 2007, things have
10 happened since 2007. I mean, mini splits weren't even in
11 the equation in 2007 whatsoever, and Mike's comments
12 about reducing load, minis might work really well if we
13 reduce load and then the zonal heating, I'll just tell
14 you from experience, yeah, I mean, that's why I did it in
15 my house.

16 MR. SHIRAKH: I don't think anyone here is
17 disagreeing with the bypass --

18 MR. KEESEE: You know, that sounds to me like
19 it's a technology fix. I would urge you to talk to some
20 of the manufacturers to see, you know, 2007 is a world
21 away from what it is today, you know, they may have fixed
22 their system since then, you know? That's sort of like
23 Introduction to VAVs in the commercial sector 20 years
24 ago, or whenever it was done, right? They had problems
25 then, too. Maybe this has been taken care of. I'm just

1 saying, you know, we should encourage people to do
2 zoning. Let's not take away the credit if we can get it
3 right.

4 MR. SHIRAKH: Thank you, Mike. Jamy.

5 MR. BACCHUS: Jamy Bacchus, NRDC. I have a
6 question for Bruce or John. In the diagrams and the
7 samples, the houses you looked at, did you find any zone
8 system that actually had multiple return grills, actually
9 zoned for the return?

10 MR. SHIRAKH: John is saying no.

11 MR. PROCTOR: We didn't find any that had zoned
12 returns, we had a few that had multiple returns.

13 MR. BACCHUS: Is there any reason, in the systems
14 that had zones with them, returns within those, rather
15 space to one common location, was there additional energy
16 saved? Is there a reason we should be looking at that
17 here at the Commission?

18 MR. WILCOX: Well, we didn't try and measure
19 that. So the question has to do with, is there any
20 reason to believe that having the returned zoned would be
21 a good idea, and I think that obviously there are reasons
22 to think that that might work better, for sure. I mean,
23 if you're proposing to maintain, you know, one zone
24 unconditioned and the other zone conditioned, if you're
25 continuously mixing air between the two zones by pulling

1 air from one to the other with the return, you know, how
2 well can you actually maintain the temperature
3 difference? But we didn't try to measure that in the
4 field, it just seems obvious. The current zonal rules do
5 not require that there be any dampers on the returns,
6 but it does require that you have a return in each zone.
7 So, I don't know, it's sort of half-way between. That's
8 to get the credit. There's no requirement that, if you
9 want to put a zone system in, that says you have to do
10 that.

11 MR. NESBITT: George Nesbitt. On the field
12 studies, did you break out the data at all between PCS
13 motors and ECMs, or the results? Are they dramatically
14 different or --

15 MR. WILCOX: Well, in theory, I think they could
16 be, I think these were all PSE motors that we found.

17 MR. NESBITT: Okay. To answer the one, well, I
18 would say yes, ban the bypass, absolutely, get rid of it.
19 Mike Keese kind of asked about technology changing and I
20 think a lot of manufacturers, now that we have -- oh, one
21 of the solutions, as you say, we need variable capacity
22 equipment, which I think the field data shows that zonal
23 systems are actually variable capacity, they just come at
24 the price of efficiency. So, with the ECM motors and
25 variable capacity, or two-stage compressors, it seems

1 that zonal systems are going away from bypass, that would
2 be my impression, because they can reduce the air flow to
3 match statics and whatnot; now, whether or not they're
4 actually performing any better or not, because of issues
5 like not doing load calcs or duct designs, which is a
6 humongous issue, probably the only thing that is violated
7 more than not pulling a building permit is not ever
8 submitting your load calc and showing that you're meeting
9 that standard. But, anyway, so I don't know, John, have
10 you looked at variable capacity of airflow zone systems,
11 any other studies? Are you seeing similar results or
12 better results, but still not good results?

13 MR. PROCTOR: Yeah, John Proctor. Unless
14 Brushless permanent magnet or ECM motors provide a higher
15 efficiency, generally provide higher efficiencies of the
16 air conditioner, and it is a way of doing multi-zoning
17 that eliminates some of the problems associated with a
18 single speed machine. And we've modeled all that, there
19 isn't a lot of measurement on it. One other thing I like
20 to point out is that the question here is whether or not
21 there is an energy savings, the reason why there's a
22 credit in Title 24 is for energy savings, not for comfort
23 improvement. And zone systems, I don't think anybody is
24 going to argue, a zone system can't provide more comfort.
25 And I think that it should be sold based on that, rather

1 than a somewhat questionable claim or, in my opinion,
2 totally questionable claim, that on the average you're
3 going to save any energy.

4 MR. WILCOX: I think the answer is we haven't
5 measured any of them, George.

6 MR. NESBITT: Okay. Although, of course, with
7 high static pressure, the whole energy efficiency of the
8 air flow is -- but -- so -- do you actually get credit
9 under the zonal credit on space heating currently? So
10 this is not an air conditioning only credit like most of
11 the other credits that have to do with air flows or
12 anything else?

13 MR. WILCOX: No, it's -- you get a bigger setback
14 and you have to be able to zone on a sleeping vs. living
15 zone basis, and then you're assumed to not condition the
16 living zone at night and not condition the sleeping zone
17 during the day time.

18 MR. NESBITT: Right, okay.

19 MR. WILCOX: It's a very optimistic set of
20 assumptions, I would say.

21 MR. NESBITT: Yeah. Well, and the whole setback,
22 I think there's a misconception that setback thermostats
23 are required for all conditioning systems, it's only
24 really essential systems, so by putting in a wall
25 furnace, I don't need a setback. If I put in a mini-

1 split, technically I don't need it if I'm reading the
2 Code right. I've had that misconception, too, but
3 perhaps that's something that needs to be made more
4 clear, or we just need to say all heating and air
5 conditioning systems shall have a setback thermostat,
6 even though I think many of us realize they don't always
7 work the way they should. In fact, well, yeah, that's a
8 whole other discussion. On the one hand, yeah, it seems
9 like if you do a zonal system right, you can get energy
10 savings, but that's probably not what happens most of the
11 time. On the one hand, it does seem like it would be
12 nice to leave the credit and it doesn't seem like a
13 credit that's taken often. On the one hand, people are
14 constantly encouraging people to do the zone systems,
15 that's one of the selling points of radiant floors is,
16 you know, throw a zone in every room with an additional
17 85-watt pump and, well, there goes your savings. So, I
18 have kind of mixed feelings. I tend, when I zone a
19 system, I tend to go to two systems, and I suspect on
20 multi-story houses, especially, it's cheaper to go to two
21 systems than it is to go with all the additional controls
22 and dampers and getting ducts between floors, but it
23 would be interesting to know why the multi-system zoned
24 projects were actually done that way, whether that was a
25 cost issue or what. And then I guess, the clarification,

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1 so, John, your clarification on the ACCA results, as well
2 as your field results, those are measuring things in the
3 same place, but are you saying that the theoretical loss
4 in efficiency taken from the manufacturers' data was then
5 actually taking those as different measurement points,
6 and that's why it's a straight line and they don't match?
7 Is that --

8 MR. PROCTOR: The original model that is shown in
9 the previous slide is an extension of the manufacturers'
10 data tables, extrapolated. And so, there's good reason
11 to not believe the left-hand side of those lines.

12 MR. NESBITT: Okay. Right, so we shouldn't make
13 anything, the fact that the field data doesn't match it,
14 but that ACCA and you agree, basically, the field. Okay.

15 MR. SHIRAKH: Okay, any other comments in the
16 room? The zonal, Pat?

17 MR. SPLITT: Pat Splitt from App-Tech. First,
18 just a couple of observations. I do mechanical design,
19 mainly radiant out in Santa Cruz because we don't have a
20 lot of air conditioning, and one of the reasons that we
21 get into these systems or multi-zoned systems is that the
22 architect didn't put anyplace to put the ducts anyway, so
23 you can't run one duct system throughout the house. So
24 it has nothing to do with energy efficiency or cost-
25 effectiveness, or anything, it's just they needed to come

1 up with a feature to cover up their mistake. And I
2 almost never -- I probably never have used the credit for
3 multi-zone, but I know the few systems that do take
4 credit, probably half of them don't actually qualify
5 because they just have a two-zone system and they take
6 the credit and nobody knows that it's not right because
7 very rarely do you have all the bedrooms clumped on one
8 side of the building and the living area in another,
9 there is always the master bedroom is over here, and the
10 kids are over there, and it just doesn't work. So even
11 those few that do take this credit, probably most of them
12 don't qualify. I had a question about some other systems
13 like high velocity duct systems, or fan coil systems
14 where maybe you can't get that 350 CFM a ton, and have
15 you looked at those and seen how those are affected by
16 some of your requirements?

17 MR. PROCTOR: I think the 350 CFM per ton and the
18 .8 watts per CFM, there are particular things that we
19 need to look at such as the mini-split that we were
20 talking about and the high velocity systems, and we
21 haven't talked about that yet.

22 MR. SPLITT: Yeah, I ran into situations where
23 I'm putting first company of fan coils because I can't
24 run ducts all over the place, so I may just have -
25 usually you have to find a bathroom or something like

1 that where you can draw this and put in a system, and
2 then to radiate out to the rooms right around it, so
3 those might be very low loads, and you might need four
4 different systems to meet your load, but they've sort of
5 eliminated all the really small unit. To get a small fan
6 coil, you have to basically go to a European system and
7 they're not really set up with all our controls, and you
8 end up having to put in transformers and fan switches and
9 a lot of stuff, and it gets expensive fast. So, if we're
10 talking cost-effectiveness --

11 MR. WILCOX: You're talking about a heating
12 system, only if it's a fan coil?

13 MR. SPLITT: Mine are mostly heating, but they
14 could be heating and cooling.

15 MR. PROCTOR: Because the CFM per ton is only a
16 cooling requirement, right?

17 MR. SPLITT: Well, here comes the next question,
18 then, and I think this is the last one. Are you
19 considering eliminating bypass for forced-air systems
20 that are heating only? Because a lot of times what
21 people will do is they'll put in a four-stair system,
22 especially in my area, and prep for air conditioning, so
23 there is no air conditioning there, but they put the
24 boxes in there for the coil.

25 MR. PROCTOR: And a bypass duct.

1 MR. SPLITT: No, they didn't actually put the
2 bypass in, but it's set up for it, so it could be put in
3 there, but it's not actually there. Some of them are
4 there, it depends on the manufacturer. So, anyway, if
5 you don't eliminate it for the heating system, then it's
6 going to be there when they put the coil in. So that's
7 it.

8 MR. SHIRAKH: Thank you, Pat. Any other
9 question? Mike?

10 MR. HODGSON: Mike Hodgson, Con-Sol. So it looks
11 like we have about 10 percent of the market using bypass
12 ducts and, if we are, that's a significant portion of the
13 market, and I understand the energy implications and
14 we're saying that we're going to fix it by basically
15 prohibiting them from doing that. Why are they doing
16 that? Are they doing it because they're getting a credit
17 in energy efficiency? My guess is the answer is no,
18 they've probably been sold a system by some HVAC or
19 subcontractor, or a manufacturer rep that says this does
20 something, and I presume it's related to comfort. So if
21 that's true, and the market is responding to that, I
22 mean, 10 percent is a significant response, then the
23 homeowner likes this for some reason. I'm not saying it's
24 a good thing or a bad thing, I'm just say why are they
25 doing it, and my guess it's not you're going to save

1 \$45.00 a month on your air conditioning bill, it's a
2 variety of reasons. Now, whether it's health-related,
3 don't know, and so I'm thinking you're solving a problem
4 here with a larger stick than possibly you need. I
5 understand the energy implications and so maybe the
6 credits should become negative rather than positive
7 because I don't know why the market is doing this and
8 this is not -- it's not an energy issue, and so I really
9 think we should dig a little deeper on this issue and
10 say, "Why are you using a bypass?" Is it because you've
11 been sold this as a healthier home, or you have asthma
12 and allergies, and this ventilation system helps filter
13 the air more? I don't know the answer, I'm making that
14 up, but this is not one or two houses, this is 10
15 percent, right?

16 MS. BROOK: What you're saying is not make it a
17 proscriptive requirement, but make it that you can't put
18 in a duct because you could be putting it in for a non-
19 energy reason, but instead you treat it -- you just deal
20 with the energy part by making the credit negative or
21 something like that?

22 MR. HODGSON: My concern, Martha, is I don't know
23 why people are doing this, and the result of the
24 recommendation is bypass ducts should be prohibited.

25 MS. BROOK: Right.

1 MR. HODGSON: I understand it from an energy
2 standpoint that you guys have data to say, you know,
3 30,000 sensible load s going down to five, that's silly.
4 But there may be another motivation for people who want
5 to do this. Obviously, it's not energy. I doubt they're
6 being sold the energy story here, right? If it's not,
7 then there may be a health issue, there may be other
8 issues that people -- I don't know why people buy the
9 system, so I think a little bit of exploration and, then,
10 if it sounds like there is a market segment that is
11 responding, 10 percent is a big market segment, then say,
12 "Okay, this is an energy loser," and the energy user
13 needs to be penalized, and then you penalize them.

14 MR. WILCOX: Interesting idea.

15 MR. HODGSON: Yeah, just different options. I
16 don't know the answer to that, but my concern is, any
17 time you start dealing with that big of a market segment,
18 and we don't know what we're doing with it or why it's
19 responding that way, I mean, if we said we had 10 percent
20 cool roofs at .3, I mean, that's a huge number, right?
21 We'd all get excited about that. I'm saying 10 percent
22 would bypass ducts and we don't know why they're there.

23 MS. BROOK: Well, so you could guess, right? You
24 could guess one of the reasons they're putting in zonal
25 systems is because they're getting advertised as energy

1 efficient and comfort improvements, right?

2 MR. PROCTOR: I think I can answer that question,
3 actually. The reason why the bypass is in there is
4 because of the velocity and noise; if you didn't have it
5 and you made no other adjustments --

6 MR. HODGSON: You mean the ducts are undersized?

7 MR. PROCTOR: Yeah, meaning you can't put 400 CFM
8 or 350 CFM per ton through half a system, you can't even
9 put it through a whole system in California, but you
10 certainly can't put it through half a system. And there
11 are other options that Bruce mentioned and that is to
12 have some that basically have some spillage into the
13 other zone, and the other zone still has some load, so
14 there are other and better options than the bypass, and I
15 don't think the customer is sold the bypass, the customer
16 is sold the zoning.

17 MS. BROOK: Right, right.

18 MR. PROCTOR: I mean, they don't even know
19 there's a bypass, they've never been up to their attic
20 and seen it and wondered what the heck it was.

21 MS. BROOK: Right.

22 MR. HODGSON: Okay.

23 MR. GABLE: Mike Gable. But looking at the data,
24 though, it looked like to give it the proper penalty
25 would be really complicated. I'm concerned that,

1 actually, if you don't model the way the system is going
2 to function, some reasonable way, you're actually not
3 going to give them enough of a penalty in many cases. So
4 I'm actually concerned that that's actually a real
5 problem to implement Mike's idea. Mike's idea
6 conceptually makes sense, but to actually implement that,
7 to my eye, looked kind of hard. I don't know if you
8 wanted to comment on that, Bruce, or --

9 MR. WILCOX: Yeah, I've never thought about doing
10 it this way. But it seems inherently more difficult, but
11 maybe it's -- if Mike thinks it's a good idea, then we
12 should look at it.

13 MR. SHIRAKH: I mean, going by what John said,
14 that it is basically an attempt to get around the problem
15 of having too much air and half the ducts, it seems like
16 there are other solutions to that, rather than having a
17 negative credit. Any other questions or comments? We
18 kind of need to -- we're only about an hour behind
19 schedule.

20 MR. NESBITT: George Nesbitt, I just quickly
21 wanted to say fan coils are just like any other air
22 handler, there's no issue with air flow other than
23 design, but the high velocity systems are, by design, a
24 lower CFM per ton, and how that works with efficiency in
25 reality. I actually duct tested a system I installed and

1 it appeared to be horrendously leaky, even though I
2 sealed every single stinking seam, joint, intersection,
3 connection blah, blah, blah, so they kind of pose some
4 interesting questions.

5 MR. SPLITT: Well, I'm not going to comment, I
6 just commented on my comment, but I just wanted to make
7 one comment that you should look at, is the Green Code
8 now is requiring manual JD&S ACCA calculations and, once
9 it finally gets into the system, that people are actually
10 going to start looking for that stuff, and your systems
11 are actually designed more correctly, some of these
12 problems might not be as big a problem if people really
13 do put in a system that leaks, that they design to.

14 MR. SHIRAKH: Okay, thank you, Pat. So any
15 questions online?

16 MR. ROY: This is Aniruddh Roy with the Air
17 Conditioning, Heating and Refrigeration institute. Can
18 everyone hear me?

19 MR. SHIRAKH: If you speak louder, it would be --

20 MR. ROY: Okay, this is Aniruddh Roy with the Air
21 Conditioning, Heating and Refrigeration Institute.

22 MR. SHIRAKH: That's a lot better, thanks.

23 MR. ROY: Okay, sure. We submitted our comments
24 to both Bruce, as well as CEC with respect to some of our
25 concerns on the way the test set up was conducted, or the

1 test was set up and that could have also affected the
2 results. And also, you know, we provided some studies
3 which show that there are energy savings associated with
4 zoning, one of them was the NAHB study that was
5 referenced in Bruce's presentation. We do have some
6 concerns with respect to the current presentation,
7 today's presentation, and would like to submit further
8 comments after we get it reviewed by our members. I know
9 the deadline says July 25th, but we would appreciate some
10 more time.

11 MR. SHIRAKH: Actually, we're allowing people to
12 submit comments by August 5th if that's possible.

13 MR. ROY: Okay, because, you know, earlier in the
14 call I heard August 12th for some reason -

15 MR. SHIRAKH: Right, our preference is August
16 5th, but if you must have until August 12th, by all means.

17 MR. ROY: Okay, we will try to submit that by the
18 deadline of August 5th, but, if not, definitely by August
19 12th, you'll hear from us.

20 MR. SHIRAKH: So you mentioned there might be
21 energy savings associated with zonal controls. Are you
22 specifically talking about the bypass duct system or the
23 other strategies to achieve zonal controls?

24 MR. ROY: With mainly talking about the fact
25 that, you know, the whole zoning credit that has been

1 offered, the manufacturers feel that zoning is a way to,
2 you know, get energy savings and that's where we sent in
3 our comments, we sent those two studies, which explain
4 exactly, which have all the details on how the energy
5 savings can take place.

6 MR. SHIRAKH: Yeah --

7 MR. ROY: It's a combination of bypass, as well as
8 the zoning systems.

9 MR. SHIRAKH: Okay. So we will appreciate your
10 comments, by the way, by those deadlines.

11 MR. ROY: Sure.

12 MR. SHIRAKH: Any other comments online?

13 MR. WARE: A few comments. The question is from
14 Craig Messmer. "What is the proscriptive air flow
15 requirements for SDHV system?"

16 MR. SHIRAKH: Say that again?

17 MR. WARE: SDHB System, proscriptive air flow
18 requirements?

19 MR. SHIRAKH: But we don't understand what SDHB
20 is. If the commenter can clarify that?

21 MR. WARE: We'll go back to that.

22 MR. SHIRAKH: HVAC, maybe it was?

23 MR. WARE: It might have been a typo.

24 MR. WILCOX: What's the proscriptive requirement?

25 Is that what the question was? The proscriptive

1 requirement is 350 CFM per nominal ton in cooling mode.

2 MR. SHIRAKH: Three hundred and fifty, right?

3 Any other questions?

4 MR. WARE: Another question from Craig Messmer.

5 "In your example for House 41, you mentioned mild and
6 maximum bypass. How would you define mild and maximum?"

7 MR. PROCTOR: This is John Proctor. I have to
8 figure out which one of these is House 41, but it appears
9 to me that roughly at 27 percent bypass was mild and
10 something between 40 and 45 percent was maximum.

11 MR. WARE: Another comment from Craig Messmer.
12 Zoning for modulating capacity systems should still get
13 credit. Your presentation speaks mostly about single
14 capacity units, multi-capacity equipment will almost
15 always show an increased efficiency. If you have to
16 limit zoning only, do it for single capacity equipment.

17 MR. SHIRAKH: Well, and that's the kind of
18 comment we've heard from others. Thank you. Any other?

19 MR. WARE: Gregg Harrod asks, "Would dump zones
20 be prohibited along with bypasses?" Dump zones.

21 MR. PROCTOR: This is John Proctor. The
22 unfortunate definition of a dump zone is a zone that's
23 unconditioned and you throw your capacity away by putting
24 it into a dump zone, which seems to me just about as
25 equally stupid as the bypass. There's no reason that we

1 shouldn't put that conditioning into space that's
2 normally conditioned, so it doesn't outlaw dump zones,
3 but probably it should.

4 MR. SHIRAKH: Thank you for bringing that to our
5 attention. Any other questions?

6 MR. WARE: Thomas Trimberger. "People are using
7 bypass because they have been sold a piece of trash."
8 [Laughter] As shown, zoning could be used without
9 bypass, it's been sold for years in commercial and
10 residential and it's trash, just ban it.

11 MR. SHIRAKH: Well, thank you, Tom, for sugar
12 coating your comments. I appreciate it.

13 MR. WARE: That's it.

14 MR. SHIRAKH: That's it.

15 MS. ADOLPH: Tiger Adolph from Building
16 Performance Institute. I'd like to commend the
17 Commission on taking really what's the next step in the
18 code. You've done all the fruit on the ground, now
19 you're going up to the fruit that's off the ground, and
20 it's going to require a lot of support in the contractor
21 community for actually being able to do some of their own
22 measurements and diagnostics. And fortunately for
23 California, Building Performance Institute actually has
24 professionals out throughout the state now, with over
25 2,000 BPI certifications that can do everything from the

1 ACH measurements for the blower door testing, blower door
2 guided air sealing, and even the duct testing, so that's
3 a support mechanism that hasn't been there in the past,
4 that is certainly available to the building contractors
5 all throughout the state now. That's it.

6 MR. SHIRAKH: Thank you, Tiger. Appreciate it.
7 Jamy, I really want to move on.

8 MR. BACCHUS: Building on the last comment, not
9 Tiger's, but the previous, perhaps we should look not
10 just at omitting the bypass duct, but the bypass dumper,
11 wherever it's dumping, in case they decide to put the
12 unit in a return air plenum of some kind.

13 MR. SHIRAKH: Okay. All right, then let's move
14 on to the next -- again, I don't want to discourage
15 people from commenting on this, you just have to do it in
16 writing to us by the deadline.

17 So the next topic, we're about an hour and 15
18 minutes behind, it's Advanced Envelope Framing and
19 Abhjeet is going to present that for us. Thank you.

20 MR. PANDE: Okay, this is Abhijeet Pande with the
21 Heschong Mahone Group and I'm going to just give the
22 introduction and Elizabeth McCollum from HMG is going to
23 do the overall presentation. But just to set the
24 context, what we are going to present here are two
25 related topics, one deals with proscriptive requirements

1 for wall insulation, and the other one deals with some
2 compliance options. And just as an overall note, the
3 proscriptive options that we are recommending are based
4 on the maximum efficiency measures that you can cost-
5 effectively justify and are feasible, so it's similar in
6 concept to what was presented earlier today as the A1, or
7 the first package of the max potential. So, just keep
8 that in mind while you go through the presentation, and
9 then Elizabeth will talk a little bit more about some of
10 the differences when she talks about the details. So,
11 Elizabeth, if you are on, you can take it from here.

12 MS. MCCOLLUM: Okay, have I been unmuted?

13 MR. ABHIJEET: Yes, you are.

14 MS. MCCOLLUM: Okay, thank you. So, as Abhijeet
15 mentioned, we're presenting two case topics here in one
16 presentation. The first I'll go over is our recommended
17 proscriptive standard for wood framed walls in
18 residential buildings, and the second is a set of
19 compliance options in the form of Lookup Tables in the
20 JA4 Appendices.

21 So our aim here was to find the lowest U Factor
22 meeting the cost-effectiveness and feasibility
23 requirements by Climate Zone, so we were looking for the
24 highest energy savings with a negative lifecycle cost,
25 and not necessarily the most cost-effective improvement

1 or highest cost savings. And the variables we looked at
2 in the study were a framing size that's basing cavity
3 insulation type in our value and external insulation type
4 in our value. And in our cost assumptions, and there are
5 different ways to achieve an R Value within the cavity,
6 these are the assumptions that we used in our costing of
7 the measures. So, for cavity insulation of R13, 15 and
8 19, we're using a standard batt insulation, for R15 and
9 21, we were looking at high density batt insulation, and
10 in 17 and 29, we were looking at closed cell medium
11 density foam filling the majority of the cavity, and then
12 for R24 and R26, we were looking at a flash and batt
13 scenario where we had two inches of closed cell or medium
14 density foam with a batt in there with that.

15 So here is one of the cost tables. This cost
16 table looks over the cavity insulation costs, so
17 everything from the interior wall up through the framing
18 and cavity insulation, and I have a note here that the
19 cost that we used per inch for the high density batt
20 insulation was seven cents per square foot wall, the CEC
21 Package A analysis used \$.13 per square foot, so that's
22 one of the reasons why our recommendations differ. We
23 averaged across location and similar products to come up
24 with these values. And you'll note here that we have
25 both 16-inch on center and 24-inch on center in the 2' X

1 6' framing size, and we have a lower cost for wall
2 framing in 24-inches on center, so, in our analysis we
3 focused on that 24-inches on center because we could get
4 additional energy savings with the lower cost.

5 These values look at the cost from the outside of
6 the stud to the façade of the home and, well, first off,
7 note that in our zero column, that last digit under three
8 coat cement stucco, and exterior cost should be deleted.
9 But the data that we have from RS means for three coat
10 concrete stucco and synthetic stucco suggests that
11 synthetic stucco, which includes an inch of foam
12 insulation on the outside, is more expensive, however,
13 the feedback we've received from the industry is that
14 it's actually 20-25 percent less expensive to go with the
15 synthetic stucco, which includes that R4 external
16 insulation instead of the three coat concrete stucco,
17 which doesn't have any exterior insulation included with
18 that. So, that's another influence that the CEC is aware
19 of, that may have affected their recommendations, and
20 that in any scenario, having R4 on the exterior would be
21 less expensive than going with the same wall assembly
22 with just the three coat concrete stucco on the outside.

23 MR. SHIRAKH: Elizabeth, there is comment here
24 from Mike Hodgson.

25 MR. HODGSON: Elizabeth, quick question. Why are

1 you looking -- at are you looking at EIFS systems for
2 synthetic stucco?

3 MS. MCCOLLUM: Yes.

4 MR. HODGSON: Okay, the building industry doesn't
5 use EIFS systems. We use one coat stucco with a drain
6 plane and an EIFS system is a sealed commercial synthetic
7 stucco system, so I'm kind of curious why you would be
8 looking at EIFS in the residential market?

9 MS. MCCOLLUM: When we started to investigate the
10 different products out, EIFS seemed to be most readily
11 available and well understood, so there are standards
12 written for EIFS insulation and, so, less error for
13 moisture problems and that sort of thing because they've
14 addressed all those issues through the EIFS Association.

15 MR. HODGSON: Okay, I just give you a heads up,
16 it's not used in new construction on the west coast.

17 MS. MCCOLLUM: Thank you, and that may explain
18 the reason that we have a different cost estimation than
19 what we're hearing from the construction industry.

20 So this is the lifecycle cost calculation and
21 I'll talk a little bit more about the variables here in a
22 minute. You'll notice the blue highlighted cells, those
23 are the recommendations that we are making. In many
24 cases, it was cost-effective to go up to an R8 exterior
25 insulation, however, we did not find much precedent for

1 RA in residential construction and, so, feared that
2 pushing things that far might result in installation
3 errors and other problems in the field, so we capped it
4 off at R4. Additionally, we were trying to make this
5 such that, to achieve the U Factor in any given climate
6 zone, you had alternatives to achieve that, that were not
7 so far off from the current requirement. So, in each
8 climate zone, we found an alternative that only required
9 one variable to change. That may not be the most cost-
10 effective combination of variables. I guess I'll jump
11 into this now, okay, so the variables we looked at were
12 external insulation value, cavity insulation value, stud
13 spacing, and stud size. So, to get the U Factor in
14 Climate Zone, let's see, so Climate Zone 2, R19 cavity
15 insulation with R4 external insulation, we used R19 and
16 R4 in our cost analysis and it came out cost-effective,
17 but an alternative would be to stay within your 2' X 4'
18 framing, 16-inch on center, R13, and add R8 external
19 insulation. So you have alternatives to meeting this
20 requirement. You could go with R19 or R4; we know that
21 that's feasible and that people are doing that out there
22 in the industry. We could push it further and do R8 on
23 an R13 wall, and therefore we are pushing in multiple
24 directions here, we're both encouraging folks to move
25 into 2' X 6' construction with R19 and encouraging folks

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1 to take that internal insulation to a higher value if
2 they choose to go with the 2' X 4' wall, so the thought
3 here is that, if we can make our assumption a 2' X 6'
4 wall and push the industry that way, there will be more
5 room for improvement in the future. If we just push the
6 external insulation, we're going to get to a point where
7 you can only add so much external insulation to a 2' X 4'
8 wall. I hope that makes sense to everyone. You'll
9 notice in Climate Zone 7 that it doesn't appear to be
10 cost-effective here. We wanted to do Climate Zone 7 with
11 6 and 8 according to our cost analysis, it was not cost-
12 effective to change the insulation at all in that Climate
13 Zone, but if you consider that we're hearing from the
14 industry that it's cheaper to do a synthetic stucco,
15 which includes R4 exterior insulation, then that R13 with
16 R4 exterior insulation, which should be cheaper than just
17 R13, would also meet the U Factor requirement for that
18 climate zone. So the R19 cavity insulation with zero
19 exterior insulation is a very similar U Factor to R13
20 with R4 exterior insulation.

21 Another difference that we have from the CEC
22 recommendations is that we pushed Climate Zones 13 and 15
23 a bit farther and recommend R26 cavity insulation, which
24 requires flash and batt insulation, or some use of medium
25 density insulation. The CEC recommendations stuck to a

1 cavity insulation value that could be met with batt
2 insulation alone, and maybe that's the reason that they
3 kept it at R21, and the other reason would be, you know,
4 with the insulation values that are currently used in the
5 2008 Proscriptive Standards, the highest is R21, so that
6 may be among the reasoning, I'll let them comment on why
7 they choose not to take it further, even though we have
8 found it to be cost-effective.

9 So in our energy analysis we looked at cavity
10 insulation for both 2' X 4' and 2' X 6' assemblies from
11 R13 up to R29, continuous insulation values from R0 to
12 R10, and we didn't have cost information on all of these,
13 we simplified our lifecycle cost analysis to include only
14 R0, R4, and R8.

15 And we looked at different framing factors for
16 16-inch on center, we're using the standard 25 percent
17 framing factor, and then for 24-inch on center, 22
18 percent framing factor. This is just the studs facing,
19 this does not include any other advanced wall framing
20 techniques. And these are the standard framing factors
21 that have been used in the Code in previous cycles.

22 Here, I'm showing the current standard compared
23 to the proposed standard and you'll notice in every case
24 we're switching to 24-inch on center framing with 2' X
25 6'. Again, in Climate Zones 2 through 10, the current

1 requirement is only R13, which can be achieved in a 2' X
2 4' wall, so we capped those climate zones off at R19, R4,
3 so that there is still an option to achieve compliance
4 within a 2' X 4' wall, using R13 cavity insulation and R8
5 external insulation. That said, it was cost-effective to
6 go further in most of those climate zones.

7 MR. SHIRAKH: Comment?

8 MR. SPLITT: Pat Splitt, I can't follow this at
9 all. Didn't we just decide that we were going to have R4
10 insulation for our packaging on everything? So what is
11 this - what are we talking about?

12 MR. PANDE: This is Abhjeet. I'll answer that.
13 So this analysis was done prior to the CEC putting
14 together the packages, this is the case recommendation
15 for what we attained as the most efficient you can get in
16 terms of still being cost-effective and feasible. These
17 may not necessarily line up with the CEC Packages that
18 were presented this morning.

19 MR. SHIRAKH: We used elements of this to come up
20 with a package that Bruce presented this morning and they
21 don't always line up because we had different assumptions
22 for the cost and the different interactions with others.

23 MR. SPLITT: So we should have done this first
24 and then said, well, now that we have this, we're going
25 to do that because we changed Package A, right? It's now

1 -- isn't that the proposal, exterior for everything?

2 MR. SHIRAKH: The packages that you saw this
3 morning, Package 3 and 3B, is what staff is recommending.
4 We drew upon this analysis, that's why we're presenting
5 it.

6 MR. SPLITT: And we're saying here -- we're doing
7 an analysis --

8 MR. SHIRAKH: It doesn't line up, we understand
9 that.

10 MR. PANDE: And just to reiterate my earlier
11 point, this is probably closer to the first Package, the
12 A1, or whatever the 1A Package.

13 MR. SPLITT: Right.

14 MR. SHIRAKH: So this just established the basis
15 for a lot of the things we did, but we changed it
16 somewhat to come up with Package 3A that you saw this
17 morning. Go ahead, Elizabeth.

18 MS. MCCOLLUM: Okay, we can move on to the next
19 slide. And this just shows graphically the proposed
20 change, so the light blue being what the U Factor
21 requirement was in 2008, and the dark blue being our
22 proposed 2013 U Factor. So for the compliance options,
23 we, well, in addition to proposing these new proscriptive
24 standards for wood framed walls, we also revised the JA4
25 Table for Wood Framed Walls to exclude bias towards

1 certain insulation types and add additional cavity
2 insulation options, so you can achieve a higher R Value
3 per inch. We added new lookup tables for advanced wall
4 framing and insulating concrete forms, and we revised the
5 fifth table to include tables, there were three of them,
6 to include additional products.

7 So this is what the JA4 table looks like for
8 2008, and you'll notice that it calls out batt
9 insulation, and that's to assume that is going to be the
10 primary insulation used in the field and I'm sure that
11 that's the case. This table separates out foam plastic
12 or cellulose insulation to one category and it doesn't
13 very well accommodate medium density foam insulation.
14 And so, in the 2013 proposed table -- go to the next
15 slide -- we excluded all mention of insulation types in
16 the table itself, and this is the first half of the
17 table, so this is just the 16-inch on center half. And
18 you'll notice we go all the way up to R17 in the 2' X 4'
19 up to 29 and a 2' X 6', and if you want more information
20 about special requirements under these R Values or what
21 it takes to achieve these R Values in a cavity, those are
22 in the notes in the bottom of the table. So here is the
23 16-inch on center, the next slide will show the 24-inch
24 on center values.

25 MR. SHIRAKH: So this is Mazi, and this is

1 another reason why we're showing this, because JA4 is
2 going to look different because of this proposal.

3 MS. MCCOLLUM: And we used easy framed to do
4 these calculations consistent with previous versions of
5 the table. And so the next slide we have the notes for
6 these tables. Continuous insulation may be installed on
7 either side of the wall. For some of these, certain R
8 Values can only be met with certain insulation types
9 currently, so we mention when medium density insulation
10 is needed, when high density batts are needed, and we
11 also call out that the R Value for low density
12 installation shall be 3.6 per inch thickness, and the R
13 Value for medium density insulation shall be 5.8 inch per
14 thickness. Next slide, please.

15 And just continuing on, these notes are - there
16 are notes in there for when certain types of insulation
17 are required to meet those values, so that people don't
18 just go pick any value and assume you get there with the
19 batt.

20 So, for advanced wood framing, we came up with a
21 set of techniques and practices with our Project Advisor
22 Committee and agreed on a definition for advanced wood
23 framing and that includes 2' X 6' at 24-inch on center
24 wall framing, precise engineering of headers on load
25 bearing walls, 2' X 4' headers on non-load bearing walls,

1 eliminating triple studs at windows and door openings
2 less than four feet in width, aligning door and window
3 openings with standard stud spacing, two stud corners
4 instead of three stud corners, ladder blockware interior
5 partitions intersect exterior walls instead of three stud
6 channels, eliminating unnecessary double floor joints
7 underneath non-bearing walls, using metal lead and T-
8 Bracing on non-shear walls and including detailed framing
9 plans and elevations on permit sets. And we use the
10 tables developed by Jon Leber to calculate framing factor
11 and altered them to include these practices and came up
12 with 17 percent framing factor in a 24-inch on center
13 framing assembly, as opposed to the 22-inch that is
14 current assumed in Title 24.

15 We plugged these into each frame, again, and our
16 typical advanced wall framing U Values range from .021 to
17 .065, the average cost savings was up to \$1,441 per
18 prototype D home. So, obviously, it is cost-effective if
19 we're paying less and savings more energy.

20 So our proposed Code changes just include adding
21 a lookup table to JA4. The credit for this compliance
22 option would include quality insulation installation,
23 inspection, and on top of that QII, they would an
24 inspection of the framing to make sure it met the
25 requirements I listed earlier.

1 So the next table, we can see what this looks
2 like. We took the same format that we used in the
3 standard wood frame wall assemblies table and repeated it
4 for advanced wall framing. So this is just the top
5 portion and it continues on through 2' X 12' assemblies.

6 For insulating concrete forms, we're talking
7 about stay in place panels of insulating material for
8 constructing cast in place solid concrete walls, for this
9 study we used a one-dimensional - let me get the right
10 terminology here -- we used a one-dimensional calculation
11 as documented in the 2007 ASHRAE Handbook of HVAC
12 applications to construct the lookup tables. Our values
13 do range from .022 to .058. The increased construction
14 cost we found was \$6,036.00 per home, and all we're doing
15 here is adding a lookup table for a compliance option, no
16 inspection required.

17 So this table is on three slides, so you can see
18 here, it's broken down by insulation type and we have the
19 U Factor and heat capacity listed here. So here you see
20 we also have XPS and polyurethane insulation types. And
21 then finally, cement EPS compound which is used in waffle
22 screen-type ICF, so the notes here, we have flat
23 insulated concrete forms, the waffle and screen type
24 inflated concrete forms use a cement EPS compound rather
25 than a rigid insulation, and then just our value

1 assumptions given the density of the EPS insulation.

2 And finally, we altered the SIP Assembly options
3 to include the blind types and additional core insulation
4 values, so for anyone that is not aware, SIPs have a foam
5 plastic insulation core bonded between two structural
6 facings, and we looked at walls, floors and ceilings, for
7 SIPs. So next slide, please.

8 So here you can see that we've added the spline
9 type and that's the main change, we've also added
10 additional panel thicknesses, and we have similar tables
11 for roofs and floors, this is just the wall table. And
12 the notes for the SIPs table: inflation value must be at
13 least R14 in order to use the table, you know, just some
14 different assumptions and values assumed in this table.

15 MR. SHIRAKH: Okay, thank you, Elizabeth. Any
16 questions for her in the audience? Pat.

17 MR. SPLITT: Pat Splitt, App-Tech. I had a
18 question about the section on ICFs, there are wall
19 assemblies that basically are either inverse of an
20 insulated concrete form where the insulation is in the
21 center of the concrete wall, and I didn't see anything
22 there about that, that there are several different types
23 of systems, Shotcrete and others, it's formed in place
24 and are there tables for those?

25 MS. MCCOLLUM: No, we only looked at those

1 systems that have foam on the outside, so we're
2 insulating the concrete. We didn't look at those other
3 system types.

4 MR. SPLITT: Will there be tables?

5 MR. SHIRAKH: Are there - in J4 we have them.

6 MR. SPLITT: But I think they should be expanded.

7 MR. PANDE: Just to understand, you are talking
8 about a system where the insulation is in the middle and
9 you have structure -

10 MR. SPLITT: Concrete on the other side.

11 MR. PANDE: So that is addressed in the SIPs
12 tables because that is essentially what it is.

13 MR. SPLITT: But there's no mass taking credit
14 for it.

15 MR. PANDE: The mass -- that's right.

16 MR. SPLITT: But there is something now.

17 MR. SHIRAKH: We can always add 2J4 because
18 that's kind of like, you know, we can do it in between
19 cycles, too. So even if there is -- okay, there's our
20 expert.

21 MR. WARE: Dave Ware, Commission staff. The
22 objective is to update the thermal mass portions of the
23 JA4 table so that they're a little easier to use, and I
24 think that would accommodate your question, Pat, related
25 to thermal mass wall techniques where there is insulation

1 placed on the outside or on the inside.

2 MR. SHIRAKH: Thank you, Dave. George.

3 MR. NESBITT: George Nesbitt. A couple things
4 with the lookup tables. On the walls, there's a couple
5 of assemblies that I believe show either a 2' X 4' wall
6 insulation and a 2' X 6' wall, or a 2' X 6' wall
7 insulation and a 2' X 8', which we know creates large
8 convection currents and doesn't work, yet I believe the
9 values in those tables really don't reflect a reduction
10 in the performance. And it's not a practice we want to
11 encourage, especially with QII.

12 MS. MCCOLLUM: Right, all of the values here are
13 -- well, with the exception of medium density foam, which
14 also creates an air barrier, all of these assumed values
15 fill a cavity.

16 MR. NESBITT: Right, right. I see that. I see a
17 2' X 8' with an R19, and if that's a batt, that a) does
18 not meet QII, and we know that doesn't work in the real
19 world, which I would say, having lots of notes on tables
20 is a bad idea - who reads notes? It's like asking for
21 directions. I would say maybe we should make more
22 tables, but split it between product types, so have one
23 table for batts, and so you would never show an R19 batt
24 and a 2' X 8' wall for a wall, and even though it means
25 more tables, it would probably provide greater clarity

1 than trying to make one table fit multiple materials with
2 totally different R Values per inches and having to read
3 every little note that -- so that would be one thing.

4 And the other comment is --

5 MS. MCCOLLUM: Wait, can I respond to that before
6 you move on?

7 MR. NESBITT: Yeah, go ahead.

8 MS. MCCOLLUM: So we considered that option and
9 one of our goals here was to encourage development of new
10 insulation products, and I guess evolution of existing
11 products. So if we had a table for each product within
12 limiting the options to that list of products, and so the
13 reasoning behind making this one table that is complete
14 generic was not to deter people from finding new
15 insulation products and being innovative.

16 MR. NESBITT: Right, yeah, it just may complicate
17 it. And another point is an R19 batt and a 2' X 6' wall
18 is an R17, we may want to make that more clear to people,
19 that using an R18 and a 2' X 6' is actually a penalty
20 because you're only getting R17 on the cavity, so you're
21 not getting what you're paying for. And then the other
22 thing is the cellulose note always says you have to have
23 a binder, yet it is -- and I'll bring this up at the QII
24 thing on the 25th, again, is we as HERS Raters are -- we
25 are verifying jobs with wall insulation, with spray-in

1 cellulose and fiberglass behind netting, under QII, as
2 well as we have been passing spray foam before 2008 Code
3 and have and will do high density foam which is -- sorry,
4 low density foam, which is currently not in QII, so we
5 are not recognizing several insulation systems as it is
6 because you do not put in a binder with a dry pack
7 cellulose or fiberglass in a wall behind a net, you only
8 do that when you wet spray it, and we can do fiberglass
9 in a wet spray, as well as cellulose.

10 MS. MCCOLLUM: Thank you.

11 MR. VARVAIS: Dan Varvais with the Spray Foam
12 Alliance. First, we really appreciate all the work you
13 did to go through and to address the tables. One of the
14 things that we're on record with right now by letter, and
15 we can continue, we want to push especially for this Code
16 revision, we think it's important that our manufacturers
17 get credit for the R Value of the product that they
18 manufacture, not the lowest denominator that's based on
19 less than five percent of our marketplace.

20 MR. SHIRAKH: Actually, I was in discussion with
21 your industry last year, our problem is we can't do field
22 verification. We asked the industry to come up with some
23 process that, you know, would enable building officials
24 or the HERS Raters to act, verify what product that goes
25 in there and we haven't really had a response directly,

1 you know, we made some suggestions, maybe you should use
2 a different pigment for different R Values, but the
3 industry didn't like it because I guess different
4 manufacturers have a preference for different
5 pigmentation, and we didn't hear any other alternatives.
6 But, you know, we're not opposed to that idea, it's just
7 you need to tell us, help us, work with us to do the
8 field verification part of it.

9 MR. VARVAIS: We'll be glad to do that, we're
10 trying to do that, and I think that the hearings on the
11 25th will help cover all that. That's a big one as far as
12 efficiency and the wall cavity, and then the rest of our
13 comments we'll provide in writing by the 12th.

14 MR. SHIRAKH: We appreciate that.

15 MR. VARVAIS: Thank you very much.

16 MR. KEESEE: Mike Keese, SMUD. Just a question.
17 How would you handle more advanced insulation types like,
18 I'm thinking Aerogel? Is that the name of the company?
19 Right, or the one I just read here, or, jeez, face change
20 materials. I didn't realize there's a commercialized
21 product, but how would that be handled in this?

22 MR. SHIRAKH: You know, again, the way that JA4
23 works, it's actually a living document and we created it
24 like that for that reason, so we don't want to be a
25 static thing between Code changes. If somebody comes up

1 with a dandy product like that, you can actually get it
2 into JA4 through an approval by the Executive Director.

3 MR. PANDE: And just further on that, that's also
4 one of the reasons why this table is structured the way
5 it is and not different tables for different insulation
6 or types, so leaving it open actually makes it easier to
7 add more products in there.

8 MR. SHIRAKH: Any other comments from inside the
9 room? Anybody on line?

10 MR. WARE: A few comments online. First
11 question, Chris Decareau: "Advanced walls, two types,
12 the EIFs, traditional barrier sealed, the EIFs are no
13 longer used in residential, too high a liability, leaks
14 and wood decay. Drainage or one-coat, two-coat used,
15 still a liability from water leaks, though. Don't base
16 estimates on RS means EIFs?"

17 MR. SHIRAKH: Okay, any other comments?

18 MR. WARE: Question from Bruce: How will the new
19 Code allow thermal mass contributions towards positive
20 energy efficiency results? These materials have
21 relatively low R Factors that modulate heat transfer
22 using mass."

23 MS. MCCOLLUM: You said that question was *for*
24 Bruce, not *from* Bruce, right?

25 MR. WILCOX: Well, it depends. The models can

1 handle all kinds of things; there are restrictions on
2 inputs that probably need to be revised, but currently,
3 you know, the inputs are specified mostly in JA4, unless
4 you have a compliance option. So, I'm not exactly sure
5 what kind of materials you're talking about, but the
6 model can handle basically anything, I think, that you'd
7 like to have it do.

8 MR. WARE: One more comment from Bruce regarding
9 thermal mass, earth is assigned 2.5 R Value in the table
10 for 12-inches and, in a rammed earth wall, it is
11 counterproductive to place continuous insulation anywhere
12 on such a wall."

13 MR. WILCOX: So the question had to do with the
14 conductivity of earth in ground?

15 MR. PANDE: Rammed earth walls.

16 MR. WILCOX: Well, rammed earth was the second
17 part. Was the first part also about rammed earth?

18 MR. NESBITT: The first one, I think, was a 12-
19 inch - an R Value of 2.5 for a 12-inch earth wall is what
20 it sounded like.

21 MR. WILCOX: I'm not familiar with the specs for
22 rammed earth walls. And I'm not -- we haven't tried to
23 work on that or look at it, so I'm not up to speed on it.

24 MR. NESBITT: Actually, since someone raised -
25 or, since the thermal mass issue got raised, if we have

1 minimum U Values of currently R13 for a wall, two mass
2 walls, to get an exemption in the performance --

3 MR. WILCOX: No, I believe the statement is that
4 those are minimums for framed walls.

5 MR. NESBITT: For framed walls, okay.

6 MR. WILCOX: Yeah, it's not the same requirements
7 for other than wood frame.

8 MR. NESBITT: And speaking of the minimum
9 requirements for insulation, I believe the software does
10 not disallow you, as a new run, or as an altered
11 assembly, or it does not always tell you, or does not
12 allow you to not put in a value below the mandatory
13 minimum.

14 MR. WILCOX: Yeah, I believe -- my understanding
15 is that mandatory minimums are not enforced by the
16 software -- in some cases, anyway.

17 MR. NESBITT: Yeah, I have a colleague who just
18 had with Energy Pro modeled thermal mass properly and she
19 went from like a 50 percent compliance margin to less
20 than 15, so there's like some serious thermal mass
21 modeling issue in Energy Pro at the moment.

22 MR. WILCOX: And I don't take ownership of that
23 issue, at least until I'm told something different than I
24 currently am.

25 MR. NESBITT: None was assigned.

1 MR. SHIRAKH: Any other comments? Okay, if there
2 are no more comments, we're going to move to the last
3 topic of the day, which is a non-residential topic,
4 that's the hotel guestroom occupancy controls. Cathy
5 Chappell will be presenting this.

6 MS. CHAPPELL: Cathy Chappell, Heschong Mahone
7 Group, and we're obviously switching gears here, looking
8 at guestroom controls, occupancy controls, and
9 hotel/motels. And I think there have been maybe some
10 confusion and different starts on this measure in the
11 past that we have looked both at HVAC savings, and
12 there's been some investigation in the lighting savings,
13 and what we've done now is combine those, as well as
14 other plug-load controls. And this work is done by
15 Elizabeth McCollum on the HVAC side and Owen Howlett from
16 HMG on the lighting side, and both of them should be
17 unmuted at this time and can address any questions or
18 jump in.

19 MR. HOWLETT: I believe I'm unmuted. Can you
20 hear me?

21 MS. CHAPPELL: Yes. Thanks, Owen.

22 MR. HOWLETT: Thanks.

23 MS. CHAPPELL: So as a summary, what this measure
24 is looking at is the installation of occupancy controls
25 for HVAC equipment, lighting fixtures, and including

1 plug-in lighting or receptacles. And when we're talking
2 about occupancy controls, we're looking at both car key
3 controls, as well as occupancy sensor-based controls, and
4 not limiting it, but looking at all the options. And as
5 we'll see in the language, what we are proposing now is a
6 mandatory requirement for automatic controls for HVAC
7 lighting and approximately half of the receptacles and,
8 again, in the specific Code language I can show what that
9 means, exactly. And what we're requiring is that the
10 HVAC equipment is set back and the lighting is turned off
11 and the receptacles are shut off, half of the
12 receptacles, when the room is vacated.

13 And again, what we're looking at is a mandatory
14 change to Section 150 with some references to Section 150
15 in the HVAC and the lighting pieces, then we're also
16 looking at updates to the ACM Manual and changes in the
17 occupancy usage patterns, and including specific
18 occupancy patterns for the lighting and the HVAC in
19 hotel/motel rooms, and then temperature setbacks at
20 different set points for unoccupied period of the room,
21 and then also looking at changing the lighting schedule.
22 So, what we've done so far, we're in the process of
23 finalizing the analysis, the energy analysis, and we've
24 got some data on some field studies and some other
25 analysis and what the site energy savings is. Most of

1 these have been done for existing hotels and obviously
2 we're applying this to new construction, but we see that
3 the range that's found, there was a CLTC field study that
4 was done, that was looking at a large range of 70-73
5 percent of heating and cooling savings, an Edison study
6 done in Palm Springs that had an average of about 43
7 percent savings, and these are for the heating and
8 cooling savings only. There was a study done by
9 Architectural Energy Corporation, AEC, that we're also
10 looking at that has 28 percent average savings, and then
11 they also had some lighting savings. So we're looking at
12 those and looking at the models that we've done that have
13 shown that it's cost-effective actually at a lower level,
14 we're revisiting those and we'll have some additional
15 final results.

16 So going back one, basically the takeaway here is
17 that the energy savings here for the heating and the
18 cooling are the values that we're looking at for HVAC,
19 only. And then what we're looking at for the lighting
20 energy savings is we're considering the energy that saved
21 when the guest room is rented out, but that the guest
22 leaves the room without turning off the lights. So this
23 is a fairly conservative estimate that we need to look
24 at, that we have to assume that some of the guest rooms
25 are unoccupied, you know, unrented, and so the lights

1 will already be off; there are other instances where the
2 guests will leave the room and turn off the lights, and
3 there's not really any explicit data that describes that.
4 And the closest that we have is a PIER study that was
5 looking at hotel bathroom lighting and lighting controls
6 in the bathrooms, and so, after an extensive search, we
7 determined that that was the best available data that was
8 there for occupancy-based savings, so we used that and
9 applied it to other areas.

10 MR. SHIRAKH: But you're trying to be very
11 conservative because you could also argue that, in the
12 absence of any controls, the light would be on the in
13 room even if there is no guests there, or the air
14 conditioning might be working.

15 MS. CHAPPELL: Yeah.

16 MR. SHIRAKH: So you're not assuming that, you're
17 just --

18 MS. CHAPPELL: Yeah, so we are making some
19 conservative assumptions, you know, to come up with kind
20 of minimum levels, prove to ourselves that it's still
21 cost-effective, and therefore still makes sense.

22 So this table here is basically just a summary of
23 some hourly data that we'd gotten from the PIER study
24 that had the on/off assumptions for, again, just for
25 bathrooms, by hour. We looked at the energy savings

1 between 11:00 and 5:00 and basically what that is, again,
2 is a conservative estimate of when people would leave the
3 room and when they would come back, that if the lights
4 are on that, you know, they could be turned off, nobody
5 is in the room. And so, the information that we'll have
6 in our case report, obviously, will have more details on
7 those assumptions and explain that.

8 And then we took that information and applied it
9 to bedside and desk lighting, which is basically the plug
10 loads, as well as the general overhead lighting. The
11 other thing that we didn't include in our saving
12 estimates was any additional savings from the plug loads
13 that would come from coffee pots or TVs. Then we also
14 looked at some system costs and we actually did this data
15 collection over a year ago, and maybe close to two years
16 ago now, and we're also in the process of getting
17 additional data, some more information on the card key,
18 or key card controls, and there's more information that
19 we've identified recently that we'll be using. But we
20 looked at both the key card product and other occupancy
21 sensor-based, and looked at stand alone systems as
22 opposed to a central system, the central systems are a
23 bit more expensive. And then we took an average of those
24 costs to look at the total system costs.

25 And then we also added in additional lighting

1 control costs, \$30.00 for wired systems to the lighting,
2 an additional \$45.00 for the receptacle controls, and we
3 didn't look at wireless systems, they may have some
4 additional higher component costs, especially for new
5 construction, the wireless systems for the retrofits are
6 actually much more - well, I don't know if they're much
7 more cost-effective, but they're much more doable for
8 retrofits using the wireless. Again, we looked at the
9 wired cost.

10 So what we have assumed here are the total
11 installed costs, one with the card key with the cost of
12 the lighting and the plug load relays at \$175.00 per
13 room, I believe -- is that value correct, Owen? Right,
14 at the top of the page.

15 MR. HOWLETT: Yes -

16 MS. CHAPPELL: And then occupancy sensing devices
17 using the average from the previous table, we came up
18 with a total cost of \$350.00. And so, again, when we did
19 - we don't have our cost-effectiveness, the final
20 lifecycle cost numbers, we're revisiting those, but these
21 are the assumptions that they're going into and we should
22 have those numbers shortly, we'll have something
23 available and that we'll be posting sometime in August,
24 prior to the September meetings.

25 So basically what we're proposing here is in

1 Section 122, where there is space conditioning system
2 requirements, and 122C, making the note that the hotel
3 guest thermostats must meet Section 150Q for the lighting
4 requirements, 130B for hotel guestrooms, adding that the
5 lighting controls in hotel guestrooms need to meet 150Q;
6 and then 150Q, we've added that these I, K and Q must
7 apply, that's what is in 150, and specifically what Q is,
8 it says that all hardwired lighting, HVAC equipment, and
9 half of the receptacles, serving at each guest room,
10 shall be controlled so that no more than 30 minutes after
11 the room is vacated, the lighting and the control
12 receptacles are turned off, and the HVAC system set
13 points are raised by at least five degrees, raised and
14 lowered accordingly. And we make the note that the
15 captive card key system is considered an automatic
16 control. And for the control receptacles, we've added
17 the specific language, which more clearly defines the
18 half of the receptacles, that what we're looking at is
19 that there will be like in a duplex receptacle, there
20 will be one controlled and one uncontrolled receptacle,
21 and that they will be identified as such. And this is
22 consistent with another case proposal that we've
23 submitted and presented previously on office plug load
24 controls, that it's the same Code language.

25 And the other thing real quickly is just the

1 additions to the tables, that they'll be the hotel in
2 Table N27, the schedule for guestrooms with occupancy
3 controlled setback thermostats, so there will be the
4 temperatures and also the lighting on/off, and then
5 adding the residential occupancy sensor, adding an
6 additional table to include the hotel/motel guestrooms,
7 with the setbacks for the thermostats and lightings.

8 MS. BROOK: Just one question there. Why are we
9 -- if we are making it a mandatory requirement, why are
10 we adding instead of just replacing these schedules?

11 MS. CHAPPELL: I think, Owen, I don't know if
12 Elizabeth is still on the line, or Owen?

13 MR. HOWLETT: Yeah, I'm here.

14 MS. MCCOLLUM: Yeah.

15 MS. CHAPPELL: I think that's a good question.

16 MR. HOWLETT: It is a good question, I was
17 thinking the same thing when I was looking at the slides.
18 I think the answer is that we developed these schedules
19 initially because we were picking this as a performance
20 option.

21 MS. CHAPPELL: I think you're right, I think this
22 would be replacing that.

23 MS. BROOK: Okay.

24 MR. HOWLETT: It would be replacing it. There
25 may be something that is worth keeping in there to give

1 people more of an understanding, more of a breakdown of
2 where the savings come from in rooms, but, yeah, I think
3 strictly it wouldn't be needed anymore.

4 MS. BROOK: Okay, thank you.

5 MR. HOWLETT: And, Cathy, if we are -- do you
6 want to mention briefly this slight issue over the split
7 between HVAC and hotel rooms being a non-res issue,
8 whereas lighting in hotel rooms is a res issue? And
9 we've tried to develop with the language and mention in
10 the non-res section that there are requirements in the
11 res section, and then vice versa in the res section and
12 say there are requirements in the non-res section to make
13 sure that people can find the requirements from either
14 end, but it is a little bit of a strange split.

15 MS. CHAPPELL: Split, yeah.

16 MR. HOWLETT: So we'll have to pay attention to
17 that in terms of -- or perhaps somebody at the Commission
18 will have to pay close attention to that to make sure
19 that it actually meets your needs for Code writing.

20 MS. BROOK: Okay, can you just reiterate that
21 just briefly, the requirements for high-rise residential?
22 Or lighting only?

23 MS. CHAPPELL: The res --

24 MR. HOWLETT: From -- in hotel rooms, the HVAC in
25 hotel rooms is covered under the non-residential section,

1 Section 130, whereas the lighting in hotel rooms is
2 covered under 150K.

3 MS. BROOK: I see.

4 MR. HOWLETT: Lighting point of view hotel rooms
5 are classified as being residential.

6 MS. BROOK: I see. Thank you.

7 MS. CHAPPELL: And this requirement applies to
8 both.

9 MS. BROOK: Okay, thank you.

10 MS. CHAPPELL: And we tried to do it such that
11 it's just in one place and referenced.

12 MS. BROOK: Okay, I see, thank you.

13 MR. SPLITT: I'm still not clear. This is Pat
14 Splitt. Are we just talking about hotel/motel? You
15 flipped through some slides that referenced also high-
16 rise residential. And I couldn't read through to see
17 where you made the distinction, so are these controls for
18 high-rise residential also? Or are you now going to
19 split up your -- before, high-rise and motel lighting was
20 the same, so now are you going to split it up and have a
21 different set of requirements for motel/hotel lighting,
22 then for high-rise?

23 MS. CHAPPELL: What we're saying, yes, so this
24 does not apply to high-rise residential, but what we have
25 in Section 150Q is specifically - so this is in the

1 residential portion since it's lighting, and we're having
2 this specific requirement added to hotel guestrooms. So
3 every -- well, our thinking, and I guess this is up to
4 the Commission, as well --

5 MR. MCHUGH: Could you go back to that slide for
6 a second where it talks about -- I -- thank you.

7 MS. CHAPPELL: Yeah.

8 MR. MCHUGH: So I and K are things that in the
9 past have already applied to dwelling units in not just
10 hotel/motel, but also the dwelling units in high-rise
11 multi-family, and so the I and K part is clarifying that
12 and I has to do with the residential thermostat, that
13 also applies to multi-family dwelling units, and K is the
14 lighting requirements, the residential lighting
15 requirements, which applies to the high efficacy-type
16 requirements that are in dwelling units in those
17 occupancies. So it's actually just a clarification of
18 the preexisting standard. So if you go back to Section
19 130, and I forget the other place, you'll see that they
20 already refer to that, so it's just a clarification.

21 MS. BROOK: Okay.

22 MS. CHAPPELL: Correct. If you follow, as John
23 was saying, if you follow this, that when your dwelling
24 units in high-rise res or in hotel/motel, shall meet the
25 applicable requirements in I, K, and Q. And then, so I

1 and Q are clarifying what is required for both of those,
2 which is not changing, and then Q specifically is saying
3 it's for hotel/motel guestrooms.

4 MR. HOWLETT: I just want to throw it out that it
5 seems to me that hotel guestrooms are sufficiently
6 different from residential, that it may no longer make
7 sense for the two to be covered by the same section of
8 the Code --

9 MR. SHIRAKH: They're not the same thing --

10 MR. HOWLETT: And it may be more logical to treat
11 hotel guestrooms as a commercial space and give them a
12 lighting power density requirement like other commercial
13 spaces. That's a little beyond what we're talking about
14 today, but for working through, it seems like it would
15 reduce the complexity if that change were made.

16 MR. SHIRAKH: Now, Pat, you're not arguing that
17 we should cover high-rise residential under this?

18 MR. SPLITT: No, it's just a clarification and
19 there are some occupancies like -- well, right now I'm
20 working on a Zen Center, you know, they're taking a big
21 existing -- actually, they're taking an Alzheimer's
22 Center out in the country and changing it to a Zen
23 Center, so instead of putting a lot of little rooms in.
24 And to model it, I'm sort of modeling it as a
25 hotel/motel, but it's not really a hotel/motel. So I'm

1 saying, well, I think maybe there needs to be a little
2 bit better definition of just exactly --

3 MR. SHIRAKH: I think we're specifically, I mean,
4 there's a definition of a hotel/motel in Section 101.
5 Where I'm a little bit fuzzy, what about like dormitories
6 and things like that?

7 MR. WILCOX: Or Zen Centers.

8 MR. SPLITT: Or group housing of some sort.

9 MR. SHIRAKH: Maybe we should think a little bit
10 about how this --

11 MS. CHAPPELL: How else this applies, yeah. And,
12 I mean, our analysis was looking specifically at
13 hotel/motel data, and applying that further to
14 dormitories and so forth, where Zen Centers would be a
15 different set of assumptions.

16 MS. MCCOLLUM: This is Elizabeth. I've got to
17 jump off now. Thank you, Cathy and I guess any other
18 questions that Cathy can't answer, I'll have to answer at
19 a later date. Thank you.

20 MS. CHAPPELL: Thanks, Elizabeth.

21 MR. SHIRAKH: I was -- just one thing that I was
22 thinking for the lighting, we may want to consider exempt
23 one high efficacy source at the entrance of the room. I
24 only say that because I was sitting in a hotel in Vienna
25 and they had a key card and it worked really good, but

1 when you walked in the room, it was very dark, so what
2 happens is people are going to probably leave a floor
3 lamp or something on all the time. But if you provide a
4 switch at the door with just one high efficacy source,
5 that may be enough, so they can turn that on, see where
6 the key card thing is, and they can do their business. I
7 had a really hard time with that at night.

8 MR. NESBITT: Or make the key card have a little
9 LED so you can - so I guess Motel Six is going to have to
10 change its marketing motto, "We'll turn the light off for
11 you, at least in California."

12 MR. HOWLETT: Mazi, that's a great point.
13 Sometimes they don't put the light switch near the door,
14 but maybe this will give them incentive to make sure that
15 they do put it near the door which is where it should be.

16 MR. NESBITT: They'll have to pay me a lot for
17 that marketing campaign. But I won't quit my day job.
18 So, I think there's really two levels of control we need
19 with this kind of occupancy, that's a control whether the
20 room is rented or not. And then, even when it is rented,
21 not having lights on when whoever has rented it is not in
22 it, so pretty common these days are the little
23 refrigerators, they're in the vast majority of
24 hotel/motel rooms these days, and they're on even when
25 the room is not rented. So that's kind of like a big use

1 that should be controlled when the room is not rented.

2 So, I mean, when the room is not rented, there isn't much
3 reason for anything to be on.

4 MS. CHAPPELL: Yeah, that could -- let me just
5 interrupt real quickly - but that can be addressed with
6 these receptacle controls. I don't know how the Code
7 could directly regulate that, but this is a step in the
8 right direction.

9 MR. SHIRAKH: Whichever receptacle they want, we
10 have no control over that.

11 MR. NESBITT: Yeah. Well, there is that, I mean,
12 I have rented plenty of rooms where the air conditioning
13 has been left off and, you know, the second floor, really
14 insulated, dark roof, you know, Roseville, and it's
15 pretty hot when you get in there. So in that sense, I
16 guess the non-occupancy setback gives at least a five
17 degree setback, so at least you're not saying you let it
18 go up to 100 degrees and you walk in, but that's kind of
19 where I say there's a little bit of difference between
20 whether the room is rented vs. not, and if it's not
21 rented, there's really no need for a minimum of a five
22 degree set point; but, then, if it's rented you'd want it
23 to be in a more comfort range, and same thing with the
24 fridge. I mean, I see a lot of fridges in my multi-
25 family projects, they put the fridge in and it may be

1 nine months before the unit is occupied, and the fridges
2 are plugged in and churning away.

3 MR. SHIRAKH: I don't think we're done with the
4 presentation yet.

5 MS. CHAPPELL: Yeah.

6 MR. NESBITT: She got to the question mark.

7 MS. CHAPPELL: I got to the question mark.

8 MR. NESBITT: But generally, this is a good idea
9 and I guess in the bathroom, because it falls under
10 residential, the occupancy sensor will be required at
11 this point in the bathroom, which is probably one of the
12 highest uses, or often a light that is likely to get left
13 on the most.

14 MR. SHIRAKH: Thank you. Any other comments?
15 Okay, so with that, this is the public comment period.
16 Seeing none, I'm going to close this, just to let you
17 know that there will be one last staff workshop, it's
18 going to be in mid-August, and Martha is going to decide
19 that and send the notice when I'm gone in the next couple
20 weeks, and so this would be basically our last staff
21 workshop. After that, we're going to get into drafting
22 up our final language and go to the rulemaking. So thank
23 you for attending and we'll see you later.

24 (Adjourned at 3:35 p.m.)

25