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CALIFORNIA ENERGY COMMISSION

STAFF WORKSHOP

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| In the Matter of: |) Docket No. |
| |) 15-BSTD-04 |
| 2016 Draft Building Energy |) |
| Efficiency Standards |) |
| Residential and Nonresidential |) |
| ACM Reference Manuals |) |
| and Compliance Software |) |
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CALIFORNIA ENERGY COMMISSION

THE WARREN-ALQUIST STATE ENERGY BUILDING

ART ROSENFELD HEARING ROOM

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1516 NINTH STREET

SACRAMENTO, CALIFORNIA

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

2 August 10, 2015 9:02 a.m.

3 MR. FERRIS: Welcome today to the Draft Workshop
4 on the 2016 ACM Reference Manuals, Res and Nonres, and also
5 a quick look at the new software packages for the 2016.

6 Before we start the workshop I've got to go over
7 some housecleaning items or housekeeping items. If there's
8 an emergency you'll follow the CEC staff out to Roosevelt
9 Park, which is diagonal across the street. Restrooms are
10 out in the Atrium. If you guys need something, a snack or
11 coffee or something to drink, there's Beyond the Edge
12 Marketplace Café on the second floor.

13 Let's see, during our morning session we'll
14 discuss the items listed on the Residential Agenda. We're
15 going to go over the changes to the ACM Reference Manual
16 and software updates. We're going to review the phases for
17 the software releases. We're going to talk about the Draft
18 PV Tradeoff Compliance Credit. We'll have a session for
19 public comments and then we'll talk about next steps.

20 In the afternoon, we'll switch to the
21 Nonresidential ACM Manual and software. Again, we'll talk
22 about the changes in the ACM Manual as well as the
23 software, have a chance for public comment, and talk about
24 next steps.

25 So the workshop today is being broadcast over

1 WebEx and also recorded. For those of you who have not
2 already done so, we ask you to sign in or staple your
3 business cards to the sign-in sheet, so that we can contact
4 you for future meetings.

5 And there are also hard copies of the
6 presentations presented today out there for you. We'll
7 post those on to our website, so you can get them
8 electronically also. So the hard copies are for you to use
9 today.

10 We'll take comments from people in person first,
11 and then we'll switch to those people who are participating
12 via WebEx online. If you'd like to make comments during
13 the public period, basically it's first come, first served,
14 so just line up behind the podium and we'll listen to all
15 the comments. And we ask that you limit your comments to
16 three minutes, so that everybody gets a chance to speak.

17 WebEx participants, if you want to present during
18 that period, please use the "raise your hand" function and
19 the WebEx Coordinator will basically unmute your telephone
20 and allow you to speak.

21 And just as a side note Commissioner McAllister
22 is going to show up today, but he's being pulled in
23 multiple directions, so we're going to give him a chance to
24 do his opening speech when he has a chance to get here.

25 So with that, I will turn it over to our first

1 presenter, which is Dee Anne Ross.

2 MS. ROSS: Good morning. Can you hear me? Oh,
3 they can hear me, a little too much. I'm Dee Anne Ross,
4 and I work in the Building Standards Office. Boy, that is
5 loud.

6 So I will be going over the 2016 Residential
7 Alternative Calculation Method or ACM Manual -- Reference
8 Manual excuse me -- and I'll be covering very quickly the
9 changes throughout the manual in this order, which is not
10 necessarily the order in the manual.

11 The ACM Reference Manual documents how the
12 software models are building in the performance compliance
13 approach. CBECC-Res is the public domain residential
14 compliance program. And as with all performance compliance
15 programs it calculates a standard design or energy budget
16 for a building and compares the proposed design to
17 determine if it complies with Part 6 of Title 24.

18 Your Certificate of Compliance Energy Budget is
19 going to look something like this on the screen. Proposed
20 revisions to the ACM Reference Manual reflect the 2016
21 changes and represent what the software can model and
22 describes how it is modeling a given feature.

23 Mazi, to my right, will be presenting how the PV
24 Credit works and how it's reflected in the compliance
25 calculations a little bit later. But in the ACM Reference

1 Manual it's included in Section 2.2.3. It requires at
2 least 2 kW DC and the credit amount depends on the floor
3 area and climate zone.

4 Section 150.1 of Title 24 Part 6 contains the
5 prescriptive compliance requirements, specifically Package
6 A. A building with the features of Package A is what is
7 modeled to determine a building standard design. And new
8 in 2016 is a high-performance attic. This is what we mean
9 by "high-performance attic." It may have above-deck
10 continuous insulation or below-deck insulation. It has
11 insulation installed on the ceiling and there may be a
12 radiant barrier.

13 In prescriptive compliance Package A includes
14 three options. Option A has above-deck insulation plus
15 ceiling insulation and the ducts are in the attic. Option
16 B has below-deck insulation and again, has ceiling
17 insulation and ducts in the attic. And Option C is a
18 typical attic and the ducts are actually in the condition
19 space. So if you don't want to have above or below-deck
20 insulation that would be Option C prescriptively and you
21 can't have your ducts in the attic.

22 So the standard design is based on Option B and
23 that has insulation on the ceiling. It's R-30 in the mild
24 zones, which is 3 and 5 through 7 and R-38 in the remaining
25 climate zones.

1 (Colloquy regarding slide projector.)

2 So the high-performance attic for Option B
3 includes below-deck insulation. The value shown and it's
4 in contact with the roof deck. It includes a radiant
5 barrier in Climate Zones 2, 3 and 5 through 7 and no
6 radiant barrier in the remaining climate zones. And high-
7 performance walls -- actually, I shouldn't have said high-
8 performance, because I'm not positive it's high-performance
9 walls -- but the walls are wood frame and has the
10 insulation amounts. Zones 6 and 7 have R-15 plus R-5 and
11 the remaining zones have R-19 plus R-5.

12 And then we go to mass walls, above-grade mass
13 walls have interior and exterior insulation in accordance
14 with Package A and those are the amounts.

15 And next we have below-deck, below-grade mass
16 walls. They have interior insulation only and it's R-13 in
17 Zones 1 through 15 and R-15 in Zone 16. All these numbers,
18 I have to keep them straight.

19 Okay. And then floors, it's R-19 in all climate
20 zones in a wood frame floor. Zone 16 is the only one that
21 has slab edge insulation for a typical floor and raised
22 concrete floors have continuous insulation in the amounts
23 shown. And again, that's from Package A.

24 And then moving on to mechanical, the term CID
25 just becomes fault indicator display or FID. And duct

1 leakage changes from 6 percent to 5 percent. And duct
2 assumptions are based on -- go ahead, this one's the only
3 one of the two that's animated -- our values are based on
4 Option B, because it varies where the ducts are located.
5 And so these are our values required in the different
6 climate zones.

7 And whole-house fans, the total -- it reduces
8 from 2 CFM per square foot to 1.5 CFM per square foot of
9 condition floor area. It changes from 1 square foot of
10 attic free vent area for 750 CFM, which was previously 375
11 of rated capacity, so that's the change from 750 -- I'm
12 sorry, from 375 to 750. And then the climate zones don't
13 change. The climate zones that required a whole-house fan
14 in the past continue to require one.

15 And then my last slide has to do with -- I'm
16 sorry, it's not my last slide, it's my last mechanical
17 slide -- for zoned cooling we included more refined
18 language for the minimum airflow requirement for single-
19 speed compressors. Because much of this information's
20 unknown by a consultant who's modeling the building, we've
21 included more specific requirements. When the system's a
22 single-speed system the default condition is going to be
23 the exception that allows 150 CFM per ton and that's to
24 capture the worst case, which is that there may be a
25 bypassed duct and they can't achieve 350 CFM.

1 And then this is my last slide, for water
2 heating. The water heating in the standard design building
3 becomes a tankless gas water heater. As it was explained
4 to me, even if natural gas is not available, the standard
5 design is still natural gas tankless water heater. And for
6 systems serving multiple dwelling units not much has
7 changed. One of the options in the prescriptive
8 requirements changed, but that does not affect the standard
9 design. And that's it.

10 MR. FROESS: Good morning. My name is Larry
11 Froess and I'm a Senior Mechanical Engineer and Project
12 Manager of the ACM manuals and the Software Tools Group. I
13 will be discussing the proposed timelines of CBECC-Res 2016
14 moving forward.

15 Now, this first slide here is a quick summary of
16 the five anticipated software releases. Alpha 1 is the
17 currently available version that's available for download
18 and for research purposes. Next will be Alpha 2, which is
19 a proposed version that'll be used at the second
20 Residential ACM Workshop in September. And Version 1 will
21 be the version presented for approval at the November
22 business meeting and will be available for use in
23 compliance.

24 We have, going into next year, a Version 2 Alpha
25 that is slated for a public release for a March workshop to

1 go over some new updates and features. And then, the final
2 Version 2 will be presented for approval at the June 2016
3 business meeting to be used for compliance. Next slide.

4 These next few slides will go into a little more
5 detail of each release. CBECC-Res 2016 Alpha 1 is what is
6 currently available as essentially CBECC-Res 2013 Version
7 4, which is the latest release available for 2013 with the
8 updated Time Dependent Values, or TDVs, to 2016 values. It
9 also updates the baseline values to 2016 Standards for the
10 envelope, duct insulation and domestic hot water heating
11 equipment. It also includes a draft version of the PV
12 Credit that will be discussed shortly by Mazi. Next slide?

13 This next release will be the CBECC-Res 2016
14 Alpha 2. This is proposed to include changes made after
15 reviewing public comments from this workshop and also
16 implement the existing plus addition plus alteration
17 modeling options. Next slide.

18 CBECC-Res 2016 Version 1 will incorporate all the
19 changes made by the public at the second residential
20 workshop in September. This version will be presented for
21 approval at the November business meeting and if approved,
22 will be able to be used to show compliance with the 2016
23 Standards for early adopters and for builders and designers
24 who want to see how their projects will comply under the
25 new 2016 Standards. Next slide.

1 Next year we're planning on having a workshop in
2 March to present a few new features in CBECC-Res 2016.
3 It'll include updated domestic hot water calculations that
4 contain an updated hot water draw schedule, enhanced heat
5 pump water heater simulation. And include an integrated
6 solar thermal calculator and if available, incorporate a
7 new water heating efficiency rating system currently being
8 proposed by the federal government.

9 This should also include a draft version of the
10 energy design ratings for buildings to show a score for use
11 with CalGreen's ZNE. And it should also include an
12 integrated PV calculator, so that a separate PV calculator
13 isn't necessary.

14 And finally, in June 2016, we are proposing to
15 present CBECC-Res 2016 Version 2 for approval at the
16 business meeting after incorporating any changes due to
17 public comments from that March 2016 workshop.

18 So that's the synopsis of the software releases.
19 And next will be Mazi with his presentation.

20 MR. SHIRAKH: Good morning, I'm Mazi Shirakh,
21 Project Manager for the Building Energy Efficiency
22 Standards.

23 What I'm going to do today is talk to you a
24 little bit about the PV Credits and that there's been a lot
25 of interest in it. You know, how it came about, what's the

1 magnitude of it or what it can be used for. There's some
2 concerns maybe that in other PV Credits with that we can
3 trade away too much of the envelope features, basically
4 build a shed with a bunch of PVs on it and still comply
5 with the Standards or even move towards ZNE. And the goal
6 here is to demonstrate how it works and that it is in fact
7 a modest credit.

8 So a little bit of background here -- on June
9 10th of this year the Commission actually adopted the
10 express terms, the Building Standards and associated
11 documents, including the Residential Standards which moved
12 us very close to our ZNE goals. We're not quite there, but
13 there were four main features of the 2016 Standards that we
14 include in the package in cooperation with the industry.
15 And those are high-performance attics, high-performance
16 walls and I think we just talked about those. And also,
17 the other two features included instantaneous or tankless
18 water heaters and also high-performance lightings and
19 controls throughout the house.

20 So how did we get here? The ZNE goals have been
21 there for a number of years now and it started actually in
22 earnest in the 2013 Standards, although you could argue
23 2008 was also part of it. But in 2013 is when we tried to
24 push towards ZNE goals. And we had a set of -- a list of
25 measures in 2013 Standards, which also included at the time

1 high-performance attics and walls.

2 But we had to drop those two measures from
3 consideration, because at the time these measures were a
4 significant departure from common building practice. As
5 you can imagine, you know, they have been the low-hanging
6 fruit in the buildings. Making the windows a little bit
7 more efficient or adding insulation here and there these
8 are the type of things we've been doing over the years and
9 we're tapped out. So from here on out, to get to ZNE we
10 have to do things that actually changes building
11 construction and practice.

12 And it requires retraining the trades people, it
13 includes the builders and people who are doing the framing
14 and installing the insulations. So we didn't have enough
15 time to do all that as part of 2013, so that was one of the
16 reasons why we had to drop it.

17 And also we couldn't demonstrably show that these
18 measures were cost effective, at the time. So anyway we
19 ran out of time, we had to drop it. And then we brought it
20 back as part of 2016 Standards, but you live and learn.
21 And after you've been through 2013 then you realize you
22 have to do things a little bit differently. Next please.

23 So for the 2016 Standards to make this a reality
24 for high-performance attics and walls and other measures we
25 embarked on a new approach. We actually, instead of

1 focusing on specific measures, prescriptive measures which
2 we have traditionally done, we've decided to define the
3 performance levels for high-performance attics and walls.
4 And then ask the industry, which includes the builders and
5 insulation manufacturers and others, to come up with
6 different solutions. As long as they meet the performance
7 levels the Commission doesn't care. It's the performance
8 is what is important for us.

9 And this whole thing started with two CBIA-CEC
10 forums that were held at the SMUD building. Once was in
11 April of 2014 and one was in November of 2014, about eight,
12 nine months apart. And it was during those forums and the
13 intervening months where we had the workshops here, where
14 we communicated the goals and performance levels. And we
15 asked the builders and the manufacturers to innovate and
16 come up with products and procedures that would help us
17 meet the ZNE measures.

18 And it actually worked. There was a lot of
19 collaboration between all the stake holders. And builders
20 were experimenting with different systems -- I see a lot of
21 heads being nodded here -- throughout the state, different
22 climate zones, different strategies, so this approach
23 actually worked.

24 And beyond that we also talked, worked very
25 closely with the CPUC and IOUs, and also our own

1 Commission's EPIC Program to come up with incentives,
2 training and opportunities for the builders. So folks can
3 experiment with these techniques before the effective date.
4 So these incentives are in place right now, builders are
5 taking advantage of them and both the IOUs and the EPIC
6 Program are and will be providing training opportunities to
7 retrain the trades people.

8 And also part of that vision was to propose a
9 limited PV Credit that would allow the tradeoff for high-
10 performance attics and walls. As you can imagine there are
11 hundreds of builders in the state. There are some that are
12 more forward thinking, some are maybe a little bit more
13 conservative. And there was a lot of angst about whether
14 all of them can actually perform high-performance attics
15 and walls at the effective date. Although we think most of
16 them won't, there will probably be some that would want to
17 use this credit especially to trade away the high-
18 performance walls. Next please?

19 So here are the definition or performance levels
20 for high-performance attic. This is a vented attic, a
21 traditional attic, that would have a roof deck insulation
22 of R-13 that's below deck in cavity, blown-in insulation.
23 And with an R-38 ceiling insulation, which is the existing
24 ceiling insulation requirements. And the choices of
25 insulation maybe include spray foam, batt, blown-in or

1 other type of insulation that can be placed in the cavity.

2 But there are other ways of doing the same,
3 meeting the same performance requirement. One example
4 would be to have R-6 continuous insulation at the roof
5 deck, either below or above.

6 And each of these strategies have advantages and
7 disadvantages. There's cost involved. The performance is
8 about the same to issues related to moisture, but you can
9 have sealed attics, you can have vented attics. When you
10 have sealed attics there's opportunities to save money by
11 not having so many venting and things like that.

12 So R-6 continuous insulation is one strategy.
13 Hybrid roofing systems that combine some level of embedded
14 insulation and higher roof reflectance that can meet the
15 performance level, that's another option. Ducts in
16 conditioned space, sealed attics, SIP panels or other
17 strategies, they all meet the same performance levels.

18 These are some examples of a high-performance
19 attic. You know, the one on the top left is an above deck
20 insulation, this is over the OSB the insulation is laid
21 out. This is actually I think about R-4 or R-5 and then
22 the tiles are laid on top of it. So that's one strategy.

23 The hybrid roofing, this is a strategy where this
24 glob that you see here, is both an adhesive and also
25 provides an equivalent to about R-3 insulation, so it

1 doubles and this is actually pretty strong. My
2 understanding is they use this in Florida where there are
3 hurricanes, so it's actually a pretty good system. And if
4 you combine this R-3 with some high reflectance of the
5 roofing material you can actually get pretty close to the
6 performance. And then if you're using the performance
7 approach, which most builders do you can make up any
8 deficit that there may be.

9 This one, the sealed attic with blown-in
10 insulation is the one that has turned out to be the
11 favorite of some of the builders and I think we'll from
12 that. It's called boxed netting. They put the netting
13 underneath the OSB and then they blow in high-density batt
14 insulation. If you touch it, it's pretty packed, it's
15 pretty neat. You can have any amount, from R-13 to R-30,
16 presumably. Is that correct, Elaina?

17 MS. CARPINO: (Indiscernible)

18 MR. SHIRAKH: Yeah, so it provides flexibility
19 and also it creates a semi-condition attic environment,
20 where you don't have to have all the extra venting devices.
21 And you could also eliminate the require for the R-38
22 ceiling insulation.

23 And another example is obviously ducts in the
24 conditioned space where this is a hallway, you have a
25 dropped ceiling. So that's another possibility.

1 Same with high-performance walls, we defined it
2 as R-19 cavity insulation with R-5 continuous insulation.
3 But you could have any number of different strategies, with
4 maybe less cavity insulation, more continuous insulation,
5 or you go to advanced framing. So all of them would need
6 to -- the performance level is defined as a U-Factor of
7 0.051 and you can see most of these actually meet or beat
8 it. And also other strategies would include the staggered
9 studs or structured SIP panels or other.

10 And again as I mentioned the builders also have a
11 choice of compliance credits and one of them is the PV
12 Credit that we're talking about. They also have a choice
13 of the traditional compliance options, which we've always
14 had and probably will in the Standards, including high-
15 performance windows and also the high EER air conditioning
16 system, among others.

17 So how does the PV Credit work? The software
18 determines the standard design for the high-performance
19 attics and walls based on the building size and the climate
20 zones. So that's something that is internally done by the
21 software.

22 And the size of the PV Credit is just limited to
23 what's needed to trade away high-performance attics and
24 walls. So the software determines the standard budget for
25 the high-performance attics and walls and the PV Credit

1 cannot exceed that.

2 It's only available in climate zones where high-
3 performance attics and walls where both are prescriptively
4 required. I think there are two climate zones, 6 and 7,
5 that nothing is required, high-performance attics and
6 walls. And there's a couple of three other ones where only
7 high-performance walls are required. But the rest of them,
8 especially including climate zone, which of interest to us
9 require both high-performance attics and walls.

10 A minimum of 2 kW PV system is required for
11 buildings that are 2,000 square feet or less. For
12 buildings that are more than 2,000 square feet, then the
13 size will get scaled based on the size of the building and
14 also the climate zone. So you can imagine like when you go
15 to the more severe climate zones like 15 and the size of
16 the building, the standard design for high-performance
17 attics and walls increases, so you need more PVs to trade
18 that away.

19 The credit is flexible, meaning that you can use
20 it for high-performance attics and walls, but you can also
21 use it to trade away other features in the building like if
22 you want to have more windows. But if you do that then
23 that is like money in the bank, you've only got so much
24 money. If you use it for other features then that money is
25 not available for your attics and walls and you have to

1 install those. So that's a key thing to remember. I'm
2 going to have four examples and then I'm going to have
3 screen shots of CBECC-Res and we'll get into details of
4 this approach.

5 So even if the building uses the proposed PV
6 Credit to build a house with the high-performance attics
7 and walls you still end up with a building that's more
8 efficient. Just looking at the efficiency, ignoring the
9 PV, it's still going to be more efficient than the 2013
10 standard building.

11 The building would still have to meet the
12 equivalent of the 2013 prescriptive requirements, including
13 the R-38 ceiling insulation and the R15+4 of wall
14 insulation. And on top of that it still has to install --
15 well, it doesn't have to install the tankless water heater,
16 but it has to meet prescriptively, you know, it's required.
17 So if you want to you can put a tankless or you can trade
18 it away, but the budget has to meet that level. And it
19 also would have to have high-efficacy lighting and controls
20 throughout; that's a mandatory measure.

21 With less than 18 months to go, to the effective
22 date, many production builders are already experimenting
23 and I'm hoping we will hear from some of them today. And
24 they've been collecting data on these high-performance
25 attic strategies that they have been experimenting

1 throughout the state. And some of them have more than a
2 year's worth of data in different climate zones. And so
3 far it looks pretty promising, from both performance
4 viewpoint and also moisture.

5 And the hope is that when more builders gain
6 experience with high-performance attics and walls, then
7 there will be less desire to use the PV Credit as we move
8 forward towards the 2019 Standards.

9 We would like to see that the builders and the
10 manufacturers continue to innovate. Even though there are
11 some strategies out there for high-performance attics, but
12 there are more that can be done. One of our concerns is
13 that since the November forum we don't see a flurry of
14 activity any more related to product development. There
15 was a lot of activity between April and November, but maybe
16 there are things going on, but we're not aware of it. We'd
17 like to see that continue.

18 Again, there are good strategies, but there are
19 still other viable options related to vented attics,
20 continuous insulation. So we'd like to see those continue
21 to be worked on. And if those products are there and they
22 are cost effective by 2019 then this credit will go away.

23 So here we get into a few examples on CBECC-Res
24 about how this option may be used, but these are the
25 features that are common for all the scenarios that I'm

1 going to show you. It's a 2,700 square-feet, two-story
2 prototype building. It is a vented attic. The ducts are
3 in unconditioned space, including the air handler. It's
4 Climate Zone 12, 5 percent total duct leakage and R-8 on
5 duct insulation.

6 So this is Option 1, builder complies with high-
7 performance attics and walls with no PV Credit. So this is
8 what we're hoping that people would do. And in this case,
9 this is the attic construction. This is the type of
10 selection about what's important here, cavity insulation
11 below deck, R-13. And also for the wall you've got R-19
12 cavity insulation and about R-5 continuous insulation,
13 which is R-1 for sheathing and R-4 for the exterior.

14 So if you do that your building will just comply,
15 with a zero compliance margin. So this is what ideally
16 should be happening when the builders build with high-
17 performance attics and walls.

18 Now, Option 2 would be what if there were -- this
19 is not a real option, but just for illustration -- what if
20 there is no high-performance attics, no high-performance
21 walls and no PV Credit? This is close to on building
22 (indiscernible) very close to the 2013 Standard. Our
23 compliance margin drops, it's almost a 9 TDV per square
24 foot per year. So not having the high-performance attics
25 and walls creates a big hole.

1 So Option 3 would be the builder builds with no
2 high-performance attics, no high-performance walls, but
3 with the PV Credit. And that's the alternative we're
4 offering. So if you look at the attic insulation, attic
5 assembly, the difference is that you still have the R-38,
6 but you don't have the -- the R-38 ceiling insulation is
7 still there, that has not changed, but the R-13 cavity
8 insulation is gone. So again, we're going back to a 2013
9 attic.

10 And with the walls, again this is very close to a
11 2013 wall with R-15 and R-4. And we're now peaking at 2.2
12 kW kilowatt PV system to trade away. And again, because
13 this is a 2,700 square feet home it takes a little bit more
14 than 2 kW to do the trade-off. And the building now
15 complies with less than 1 point margin. So that's the
16 idea, no high-performance walls, no high-performance
17 attics, you still have 2013 attic, you 2013 walls and 2.2
18 kW system -- and your building just barely passes. So that
19 was Option 3.

20 Now, another option would be a builder is
21 building -- and this building's got -- you have this
22 wonderful view out there. Your client wants more glazing.
23 You're on a hill, you want to look at the ocean, you want
24 more windows, so how does the PV Credit play into that?

25 So the builder would, in this case, put in the

1 high-performance attics and high-performance walls and the
2 PV Credits. But how much additional glass are they going
3 to get?

4 So this is the standard design, and I use the
5 same file that came with the CBECC, and this is a 2016
6 Standards building with PVs, minimum compliance. It has
7 450 square-feet of total glazing and 135 square-feet of
8 west-facing glass. And so this was basically the way the
9 west-facing glass was modeled in a standard design.

10 So here again we have not added the windows yet,
11 but we have high-performance attics, high-performance walls
12 and a PV Credit. So your compliance margin is plus almost
13 10, so again that's money in the bank. Now you can use it
14 to trade away other features. In this case we're going to
15 be trading away windows. So I increased the amount of
16 west-facing glass until the compliance margin goes almost
17 to zero.

18 So if you do that the PV Credit buys you another
19 8 percent of glass to that condition floor area and the
20 standard design is 20 percent. The requirement, the
21 prescriptive is 20 percent glass area to condition floor
22 area. With a PV Credit you can go up to 28 percent. Or
23 you can add another -- what is it? -- for a total of 750
24 square feet of glass or 216 square feet of additional west-
25 facing glass again. So that would be the limit, for the

1 high-performance attics and walls and the PV Credit, you
2 can buy this much credit.

3 So in summary it is proportional, the PV Credit
4 is proportional with the high-performance attics and walls;
5 a minimum of a 2 kW system more for homes larger than 2,000
6 square feet. It is a flexible credit and it can be used
7 for other features. And if the builder takes full
8 advantage of the PV Credit it's still more efficient that
9 then -- the building is still more efficient than the 2013
10 Standards.

11 And our hope is that as more builders gain more
12 experience with the attics and walls there will be less
13 desire to use this. And that credit will probably go away
14 if there are sufficient energy-efficiency systems out
15 there. Thank you.

16 MR. FERRIS: So next we'll have Jacob Atalla.

17 MR. ATALLA: Good morning everyone and thank you
18 for having us here to present our perspective on the PV
19 Credit.

20 First, I'd like to continue to applaud the
21 California Energy Commission and the State of California
22 with its leadership on solar. We are certainly a world-
23 wide leader on solar and that didn't come easy. There were
24 a lot of investments by the citizens of California and the
25 CEC and CPUC to make that happen. And we hope that we will

1 continue to have policies to foster that and grow it as a
2 world-wide leadership.

3 Additionally I think the state of California got
4 the bar raised with the State of the State speech by the
5 governor indicating a new standard or measure for solar in
6 California. And of course we have Net Zero intentions by
7 2020, which again all these things cannot be maintained if
8 we do not continue to invest and support solar, going
9 forward. This is not to say that energy efficiency has not
10 been a very big goal of the state. And we do have policies
11 and we are moving forward to Net Zero and more
12 efficiencies.

13 So as Mazi discussed the Title 24 for 2016 is a
14 lot more stringent than 2013. And of course we still have
15 one more cycle before Net Zero at 2019. So the bar for
16 energy efficiency will continue to go up, but adding PV
17 credits so there are no carve-outs, we're not favoring one
18 technology over another, but keeping everything kind of
19 even-handed. And giving the market the chance to be
20 competitive and be innovative, I think, is the right policy
21 going on forward.

22 As Mazi mentioned, the EPIC program and things
23 similar to the EPIC Program are taking place right now. I
24 think the staff is reviewing proposals for the EPIC Program
25 and probably the staff have noted that a lot of builders

1 have decided to jump in and support the EPIC Program, learn
2 from it and use it to move forward with our knowledge and
3 with the market readiness for high performance attics and
4 high performance walls.

5 So the builders are sending a strong signal that
6 we're not rushing to the lowest common denominator, we are
7 ready to work forward towards high performance attics and
8 walls. At the same time we also send a strong signal, and
9 I'll show some examples, of how we would like to maintain
10 the affordability of homes and keep the market competitive.

11 So first slide I'd like to show is KB Home's
12 focus on high performance homes is totally focused on the
13 fact that we are trying to lower the total cost of home
14 ownership for home buyers; that's very important to us. So
15 KB Home does not build standard-to-code homes, we build
16 above-code voluntarily. We have 90,000 ENERGY STAR
17 certified homes in the country and 19,000 of them in
18 California. And before that we were building an energy-
19 wise program that CONSOL had put together for a long time,
20 I think, with the support of the CEC. We have about 40,000
21 of them.

22 Three-thousand eight-hundred solar homes we built
23 overall. In California 3,700 homes. Even though these
24 homes have solar none of them are regressive on the energy
25 efficiency. As it was alluded earlier, us and other

1 builders are investigating how to get Net Zero, and how to
2 do the high-performance attics and so on. So KB has done
3 thirteen Net Zero Energy homes across the country, four of
4 them in California. And three out of the four had high-
5 performance attics that we are learning from, monitoring
6 their performance and working very closely with the
7 industry on other alternatives as well.

8 So quickly, on one of these Net Zero homes this
9 is our latest, this one is in El Dorado Hills. I just want
10 to mention a few things about it that are significant to
11 today's conversation. First I'd like you to know that what
12 I'm going to mention as figures are national HERS figures,
13 not California HERS. Keep that in mind, please. But this
14 home again is an R&D platform, or an R&D home, for us. And
15 when we built it to ENERGY STAR to California 2013 Title 24
16 and ENERGY STAR on top of it, it achieves a national HERS
17 score of 64.

18 Our mantra all the way for Net Zero homes is
19 reduce before you produce. That means add more energy
20 efficiency before you put solar on the home and that's what
21 we've done here. We added more energy efficiency features
22 and brought the HERS score down to 45, 19 points lower.

23 And you will see on the screen on the right-hand
24 side the measures that we've done to reduce the HERS points
25 by 19 including the high-performance attic including box

1 netting.

2 We're squeezing the pie when it comes to these
3 things and the numbers at the bottom in red illustrate
4 that. If you continue with measures, efficiency measures,
5 on the way to Zero you will get to a point where each one
6 of these 19 HERS points at this house cost us about a
7 thousand dollars each. And that's without California
8 Advanced Homes programs, credits and the number I'm going
9 to mention for solar is also without any SHB credits --
10 incentives, sorry.

11 So this 45 points, from HERS 45 to HERS 0, costs
12 us \$550 per point, with solar. That's the difference and
13 that's what I mean about "We're squeezing the pie." And we
14 should allow a full credit for PV, so that we can maintain
15 the affordability of homes. We can get to Net Zero
16 together by the targeted date set by the state.

17 So in conclusion I'd like to summarize by saying
18 that market transformation towards Net Zero does require
19 solar. We need both advanced envelopes, but we also need
20 renewable generation. Let's maintain what we have invested
21 in as citizens of California in solar and give full credit
22 for the solar to move forward.

23 The building solutions needed for the high-
24 performance attics and walls, as Mazi alluded to, were not
25 there a few years back and they're still questionable at

1 this time. They're getting better, we're resolving them.
2 We have an EPIC Program to work with to continue to reduce
3 risks and costs, but we're not there yet.

4 Additionally, as Mazi indicated earlier, the
5 trade offs as a technique has been there with all of the
6 California residential energy standards. And builders have
7 never misused it. We've been judicious about it. We
8 didn't build homes with all glass and to just offset that.
9 We used it judiciously. It's based on using it for really
10 achieving the performance level at the lowest cost
11 possible.

12 And also at the lowest risk, we still have some
13 risks and I think these will get resolved in the next few
14 years. But currently we still have them. So we do call
15 for -- we understand that the minimums from 2013 will be in
16 place, that's a safety net for everyone -- but we do call
17 for full credits for solar and eventually just let the
18 market decide on what is the right thing for a lower carbon
19 economy here in California.

20 Thank you.

21 MR. FERRIS: Next we'll hear from Jim Peterson
22 from Lennar Homes.

23 MR. PETERSON: Good morning. Thank you for
24 allowing me to speak in support of a flexible Title 24.
25 Let's see here, which one to do, can you go to the top one?

1 Oh, there we go.

2 First I'd like to start by just reviewing the
3 California Energy Commission's goals. California is
4 leading the nation in energy efficiency. We as national
5 builders definitely pay attention to that, use that as our
6 test bed for what we do in the rest of the country. So
7 it's definitely something we pay a lot of attention to.

8 And I think the goals are worth reviewing here,
9 because we're looking at Zero Net Energy in low-rise
10 residential as Jacob said in 2020. That's only five years
11 away. And so we need to continue to get better at
12 renewables to meet that goal, so having a code that allows
13 us to continue to use renewables and gives us a reasonable
14 credit helps us move in that direction.

15 Again leading building energy efficiency, one of
16 the nice things about having some flexibility in the Code
17 is it allows us to build at the lowest cost as well as the
18 lowest risk, which I think is something that every State
19 Energy Commission wants us to do is to make sure that we're
20 building cost effective homes and homes that have the
21 lowest possible risk for those consumers that are buying
22 those homes.

23 Another goal is 33 percent of retail energy sales
24 from renewable by 2020. Smart Grid, storage and other
25 infrastructure that integrates renewable energy -- we

1 continue to work in that direction. Many of us are doing
2 storage already. We'll be starting storage later this
3 year, so it's definitely one of those things that we're
4 working on to make sure we're there for 2020.

5 And of course removing nontechnical barriers to
6 the emerging clean energy solutions; we applaud that goal
7 as well.

8 So Lennar and SunStreet, I just want to review
9 that we're in this on two sides. We're in it as a home
10 builder. We're the second largest home builder nationally.
11 And to serve our solar needs we've started our own
12 subsidiary, SunStreet, dedicated to installing solar on all
13 solar viable Lennar homes nationwide.

14 We're currently serving approximately 70 percent
15 of Lennar's California new single-family homes. That will
16 amount to 2,600 homes in 2015 alone that are standard
17 solar.

18 We use a PPA Model, which has made our solar very
19 attractive to our home buyers. And we're working with
20 leading technology partners to make sure that we do have
21 the solutions for a Smart Grid and storage going forward.

22 And like Jacob said, like KB does, our California
23 subdivisions, our developments, use solar as a marketing
24 plus. Not to decrease our energy efficient features, it
25 helps us sell in this very, very competitive state and so

1 building beyond code.

2 I went and pulled one house that we're building
3 in Southern California. It's probably our best-case
4 scenario, but has a national HERS of 67, which meets code.
5 Due to the orientation of that home and the rough design
6 we're able to put 5 kilowatts on that home and take it to a
7 national HERS of 28. So we're able to build some very,
8 very highly energy efficient homes with solar in this
9 state.

10 I think we need to continue to stress that house
11 cost is very, very important. We still haven't totally
12 recovered as an industry. We still have challenges on the
13 mortgage side. We continue to have more challenges on the
14 regulation side.

15 And as homes become more and more efficient, as
16 Jacob just stated, the cost of reducing consumption rises
17 while the cost of solar or the production of energy
18 continues to decrease. So it becomes more and more
19 attractive as we build homes that are more energy
20 efficient.

21 So the increase of cost in housing continues to
22 price more and more people out of the new home market. I'm
23 going to quote NAHB August 2014 study, so it's a little
24 dated, but I believe many of the things that were in place
25 then are still in place in the market. So at that time

1 they said that a \$1,000 increase in house costs would
2 exclude over 14,000 households in California from being
3 able to qualify to purchase that home.

4 We already know that with 2016 Title 24 we're
5 looking at a house cost increase of 3 to 5,000 depending on
6 which solution we choose, which path we go. Right there we
7 disqualify somewhere between 43,000 and 72,000 potential
8 households in California from being able to afford our
9 homes over where we are today with 2013.

10 So having that flexibility, being able to build
11 to the lowest cost I think is key, to make sure that we
12 maintain affordability, and continue to have a robust new
13 home market in California.

14 High-performance attics, we've done high-
15 performance attics in single-family for a long time, but
16 they're not 100 percent proven technology in every climate
17 zone. We do have some challenges, we do have some
18 learning. So with that in mind we really do support the
19 flexible trade-offs that are in Title 24, so that we can
20 build the best product at the lowest cost and the lowest
21 risk for the homebuyer.

22 In closing, please maintain the flexibility that
23 we have in Title 24 2016. We support allowing the larger
24 credit for solar. As I said production of energy is
25 becoming more and more cost effective every year. The PPAs

1 and leases that are out there increase affordability, not
2 only of the solar but of the home for eligible home buyers.
3 You know, our current PPA plan has no cost to the consumer
4 up front and offers them a 20 percent savings on the cost
5 of energy that comes from the rooftop production.

6 And then the increased credit creates a strong
7 drive for solar going forward. I believe that will have
8 two positive effects. We'll see installed system sizes
9 increase. We see a lot of people putting in the minimum.
10 I think you'll see system size increase. And I think more
11 new homes are going to have solar as we move towards the
12 2020 goal, which I think helps prepare us for that 2020
13 goal.

14 Thank you.

15 MR. FERRIS: Next we'll hear from Mike Fischer
16 from PIMA, representing the Insulation Manufacturers
17 Association.

18 MR. FISCHER: Good morning. Thanks everyone for
19 being here on a Monday in Sacramento. I am Mike Fischer
20 with Kellen. We're a management firm and we're involved
21 with typically trade association management. But today I'm
22 here speaking to you on behalf of a coalition of interests,
23 specifically representing the Polyiso Manufacturers
24 Association, but also on behalf of -- kind of taking the
25 lead here on behalf of some other insulation producers.

1 We were part of the forums that were presented
2 last year and did participate and did present information
3 about new technologies, new systems, new installations.
4 And I use the word "new" somewhat disingenuously, because I
5 think even as Jim said the reality is that high-performance
6 attics and walls are being constructed all across the
7 country, including California. And have been for some
8 time.

9 And there may be specific climate zone issues in
10 certain parts of California and the country, but I don't
11 think those are the rules or the default. Those are the
12 exception. And we got this thing to work, that's great.

13 The insulation industry interests that I am here
14 somewhat speaking on behalf of: American Chemistry
15 Council's Center for the Polyurethanes Industry, the
16 Extruded Polystyrene Foam Association, XPSA, NAIMA -- North
17 American Insulation Manufacturers Association -- as I
18 mentioned PIMA and also the Spray Polyurethane Foam
19 Alliance. There are some other representatives of these
20 interests in other groups that will probably be speaking
21 during the public comment period.

22 We represent the major insulation technologies
23 used in residential construction. And we've outlined some
24 concerns. We've had some discussions with CBIA, also with
25 the CEC staff and others during this process.

1 We believe that the PVCC approach that's being
2 somewhat expanded from the 2013 Standards should be
3 modified to be more aligned with the charging orders from
4 the Commission to maximize energy efficiency and still
5 provide the appropriate flexibility that the builders are
6 asking for and that they need.

7 California's loading order, the Energy Action
8 Plan has a loading order to address the future energy need
9 for California. And it establishes the state will invest
10 in energy efficiency like the building envelope, followed
11 by renewable sources. There's some hierarchy that's been
12 established there. Basically start with a robust home, a
13 robust envelope, robust equipment, and then look at the
14 renewable sources as the next step in that.

15 It appears to us that the PVCC in its draft form,
16 with the version of the software that's available today, is
17 not quite aligned with that loading order.

18 Now I do have a caveat before I proceed further
19 and that is that we are working to review the software in
20 detail and we're playing with a lot of home designs. So
21 we're going to present some concepts here. I do believe
22 we'll be back at the next workshop to provide some more in-
23 depth comment hopefully. So what we present today and what
24 we come back with next month may be different in the terms
25 of some level of detail.

1 But I will say that we do have people that are
2 working on the software. I spent some time last night in
3 the hotel with my colleague, John Woestman, going through
4 some designs, some what-ifs. And we found it sadly
5 fascinating to be working through that and looking for
6 those glitches.

7 So with that we have a series of some options and
8 recommendations we want to put on the table. And none of
9 these are by stretch deal-breakers, but we want to kind of
10 put them before you in this order.

11 The way we see it today the high-performance
12 attics and walls -- as was explained during the forums
13 last year that these options today, our options, they
14 should be mandatory in the standard but they are optional
15 based on the credit -- provide long-term efficiency
16 benefits for residential homes, as has been demonstrated by
17 the CEC.

18 What we recommend is the PVCC should be resized
19 to limit one of the two options, not allow you to trade off
20 both. To us that makes sense. And part of the reason is
21 that looking at life-cycle analysis if you use the PV as a
22 first embedded cost then that helps manage that part of the
23 process. But beyond, its trade off for both options, we
24 think is taking it too far.

25 We also think that we should not be trading away

1 the long-term core of the building and its robust envelope.

2 If we really want to get to this Net Zero Energy
3 homes, we think that limiting it in this way will be a more
4 cost-effective approach and it should also stimulate
5 participation in the training processes. That also kind of
6 leads us to look at perhaps there should be some
7 consideration of sunsetting the final version of the PVCC.

8 What we've been hearing is that the idea here is
9 this is to provide time for builders to incorporate high-
10 performance walls and attics into the designs. We think
11 that that's too much time.

12 And we also think that the technologies are
13 available today. And we heard presentations that basically
14 indicate that: ENERGY STAR homes using high-performance
15 attics and a couple of leading builders in California.
16 Those technologies are available today, so we are urging
17 that the program be considered to have some sunset. We
18 propose January 2018 here. The Utility Funding Training
19 Program should be available by 2016-2017, so if that's the
20 case and we have this time to ramp it in then getting to
21 that sunset time should be appropriate.

22 We believe that the insulation industry has the
23 knowledge and products to implement high-performance attics
24 and walls today across the board in California; we don't
25 think it's that tricky. And with that I'm going to move on

1 to the next item.

2 We believe that there is the need to have some
3 mandatory type of training to move towards high-performance
4 attics and walls. And basically this may seem like it's
5 not doable, but what we're asking is, is there some type of
6 incentive to get builders who have questions about high-
7 performance attics and walls? If they are going to use the
8 PV Credit to trade off those two elements then maybe we
9 should encourage them through some measure taken by the CEC
10 to have a certified completion of one of these funded
11 training programs. And again if that's the goal then let's
12 help them get there.

13 Number 4 is requiring documentation. And again,
14 we've heard that there were some barriers. And some of
15 this could be under the form of requiring documentation,
16 some of it could be under the form of trying to gather more
17 information to help develop the training programs, but
18 we've got questions. Why did the builder elect the credit?
19 What was the cost? And I think we really need to get our
20 hands around some of those cost problems if we're going to
21 get, again, to ZNE. What are the difficulties? What are
22 the issues with HPWs, HPAs? What are the homeowner
23 preferences?

24 And then if we use that application process to
25 require this documentation, that can help us get to that

1 next generation of the standards in California.

2 Number 5 is another option that we're floating
3 here for discussion today to actually look at the builders
4 who aren't already using high-performance attics and walls
5 as part of their standard offering. If a builder today is
6 using that then they obviously don't need that extra
7 training, so let's really sort through that.

8 And I'm going to refer back to Jim's
9 presentation. He's basically saying that today he's
10 already -- and in the slide it says -- and if I mistake
11 this please interrupt me -- that in 2015 about 70 percent
12 of the new single-family homes in California will have PV
13 on them. So what I'm reading in that means that 70 percent
14 of those homes will be built the same in 2016, 2017, 2018,
15 2019. There will be no change for those 70 percent of the
16 homes in the standard. So in effect, other than -- .

17 MR. PETERSON: That's not what I said.

18 MR. FISCHER: No, I know that's not what you were
19 saying. That's what I'm reading. I understand that there
20 are other changes to the Standard; I'm talking about the
21 envelope, the envelope points.

22 And I'm not really intending to get into cross-
23 speaking. I'm just hoping that you can respond to that
24 during the public comment process.

25 The point I'm making here is that if 70 percent

1 of the homes have PV today in that offering then that means
2 that the PV offering should be taken advantage of at least
3 70 percent in the next set of the standards, meaning that
4 only 30 percent of the homes will have to be looked at for
5 improvements of the envelope.

6 The other thing that we think is actually pretty
7 important too is also to make sure we had the assumptions
8 defined.

9 Again my caveat is we're still playing with the
10 software, we're still playing with a plethora of the
11 additional documentation that's required. The modification
12 that we're proposing here is that let's get a complete list
13 of the underlying assumptions in one place. I think right
14 now we have to search through several different documents
15 to find out what those assumptions are. And let's get them
16 all in one place so we can have a true analysis.

17 Number 7 -- and this is something I'm pretty sure
18 from looking at the other power points that some of this
19 information will be addressed by some of the reps from the
20 solar group -- but we think that there needs to be probably
21 some additional consideration to the PV systems themselves.

22 The way I'm going to put this to you is that
23 windows have to go through NFRC certification, which
24 includes third-party quality control as part of their
25 labeling process. There's a lot of very robust

1 requirements for that. Insulation products have the same
2 issue.

3 So what we're basically saying here is that the
4 installed photovoltaic systems need to meet certain
5 eligibility requirements. What are those criteria? You
6 know, what are the minimum home size; what are the
7 criteria; what are the siding issues, orientation issues?
8 And again, we're discovering some of that in the software
9 based on the assumptions of orientation. But we're hoping
10 that some of this will be better defined as we move
11 forward.

12 We believe that the technology of the high-
13 performance walls and high-performance attics is here. If
14 you just want to look at the attics I'm here speaking on
15 behalf of a lot of groups including the spray foam
16 interests, including our friends in the fiberglass
17 industry. But the reality is that combinations of those
18 systems are available today. But there is already in
19 California a pretty significant market already in place for
20 spray polyurethane-sealed attics. They're already being
21 built that way. So that high-performance attic solution is
22 already there.

23 The requirement in the 2013 Standards to use
24 continuous insulation on the walls is already there, so we
25 don't see that as a huge shift. There may be some changes

1 in framing as part of that, but again we're not talking
2 about reinventing the wheel here, we're talking about
3 changing wall depths and things like that.

4 So what we would urge you to do is consider with
5 the adoption of the PV Credit are you really getting a
6 change in the envelope for the 2016 standards? Or are you
7 just getting an extension of 2013? And if that's the case
8 so be it, but let's not pat ourselves on the back for a
9 change in the envelope performance if we're not going to
10 get to it.

11 The other thing I would say is that it would be
12 nice for us to get kind of a firmer idea of what's going to
13 happen in 2019 from that. And I think we're seeing some
14 mixed messages about that as well and what is the intent?
15 Is that a firm commitment that in 2019 that the option to
16 use the PV Credit, as an envelope tradeoff, will be gone or
17 not? And so we're hoping that we get some feedback on that
18 point.

19 And again, thanks to you all very much for being
20 here today and for putting up with me. Thanks.

21 MR. FERRIS: All right, next we'll hear from
22 Steve DeLorenzi from SDI Insulation. Steve do you have a
23 presentation?

24 MR. FROESS: I don't think he's here.

25 MR. FERRIS: Oh he's not here, so we're skipping

1 Steve.

2 MR. FROESS: We're going to skip Steve.

3 MR. FERRIS: Okay then we'll move on to Matt
4 Brost from SunPower.

5 MR. BROST: Thank you. Again, yeah Matt Brost
6 with SunPower. By way of background SunPower is a Tier 1
7 global manufacturer serving residential, commercial, power
8 plant customers.

9 I'm here representing the New Homes Division,
10 which we founded in 2007 about the time the new solar home
11 partnership was launched. Prior to that spent about ten
12 years where I know about half of the people in this room
13 actually from my previous career consulting with the
14 utilities on energy efficiency programs, program design,
15 and program evaluation, which I'll talk a little bit about
16 today.

17 (Colloquy between speaker and staff.)

18 So what I learned in my previous career is that
19 the rate-payer funded programs that we have in California,
20 what they're really designed to do is help emerging
21 technologies become part of the Energy Code. And they do
22 that through incentives, through training, through
23 marketing and various other techniques of market
24 transformation.

25 And that's exactly what we're working with today

1 is the New Solar Home Partnership, which provides
2 incentives to home builders to install solar systems as
3 part of the construction of their home. The program had a
4 10 year goal of installing 360 megawatts in new
5 construction with a \$400 million budget, so a substantial
6 amount of rate-payer money has gone into this program and
7 will continue to go into this program. However we also
8 know that the program's slated to exhaust its funding
9 sometime, likely next year, depending upon the velocity and
10 the demand that we're expecting to see in the industry.

11 And we've seen meaningful penetration. We've
12 really gone from about 0 percent in 2007 to maybe 15 to 20
13 percent by the end of 2015, if not higher. And I think if
14 I went back and put on my evaluator cap and looked at the
15 New Solar Home Partnership I would say, "This has actually
16 been a wildly successful program." I would ask the
17 homebuilders to say whether they would be installing solar
18 at any rate that they're installing today without the
19 existence of this solar partnership and they would shake
20 their heads no.

21 And beyond that I think, you know, you can
22 eliminate free ridership, but there was also the mention of
23 spillover. So they're doing -- they're taking what they
24 learned in California they're applying it. Not only in
25 California within the non-IOU territories, but outside

1 California. I've absolutely seen the learnings from
2 California translate into solar programs in many of the
3 other states. So I think that's a true measurement of a
4 successful program.

5 The key will be though if we measure the program
6 in a couple of years how effective the program will be.
7 And I think the decisions that are being made today or over
8 the course in the next month or two will actually determine
9 the success of the long-term program. Because if we run out
10 of program funding during the program cycle, the Code cycle
11 and there's not many with full code credit, then we don't
12 have the ability to transition to a Net Zero environment,
13 which I'll talk a little bit more about.

14 The other thing that's important to understand is
15 that we as an industry need to basically mature. So we've
16 gone from 0 to 20 percent as an industry, right? But there
17 are many other parts of the solar industry we have to think
18 about. We're already constrained with labor, just finding
19 enough trained labor to install solar systems, right. We
20 have to continue to innovate with those labor partners,
21 trade partners to bring down costs. We're currently not at
22 a Net Zero cost point that we would like to be at in order
23 to keep housing affordable, which we need to do with our
24 home builders.

25 There's a lot of interactions between the

1 different trades, whether it's the roofer, the plumber, the
2 electrician, the insulators. And we're still trying to
3 figure out those relationships and understand what the best
4 practices are.

5 We have more training to do, more marketing to
6 do, more education. And that again includes everybody, not
7 only just the builders and the trade partners, but the
8 customers have to understand the programs as well and what
9 Net Zero is going to mean in the future. And we have to
10 continue the progress that we're making in the '13 code
11 cycle.

12 There's going to have to be an evolution in the
13 architecture and the design of homes to basically get to
14 Net Zero. We're starting to see that happen right now
15 where there is some forethought going in. I think builders
16 are actually buying land today that will have Net Zero
17 homes on them in the future and we're in that phase
18 already.

19 The HERS Rating industry, it has got to mature
20 and develop to keep up with the type of volume that we're
21 talking about and that comes back to Title 24 as well. I
22 mean, Title 24, the software that we use in Title 24 is
23 going to have to progress to capture the true benefits of
24 solar. Today it's a credit, but looking forward we can't
25 treat every kilowatt of solar exactly the same just like we

1 don't treat every air conditioner with the same SEER
2 exactly the same. We have to think about the efficiency,
3 the type of technology, the effective use of the life of
4 the technology. A lot has to be done over the next code
5 cycle in order to, I think, get PV right in the software.

6 And then lastly, the authorities having
7 jurisdiction so the permitting agencies, the inspectors,
8 everyone who's involved with seeing homes get signed off
9 and through the field process, also have to be educated.
10 There's a lot of efforts going on with SunShot right now
11 that will help that, but we have to continue to penetrate
12 the market with solar to make sure that when we get to a
13 Net Zero environment we're ready.

14 So in conclusion my point would be we have to
15 walk before we can run. The '13 code got us up to 20
16 percent penetration. It did that through New Solar Home
17 Partnership incentives, very minor code credits that
18 actually really had very little impact on our industry.
19 But there were supporting credits. Builders are now
20 thinking about the solar area, they're thinking about pre-
21 wire requirements.

22 We're going to transition to the 2016 code and
23 this is the key, right? We have to continue to market
24 penetration. In this code we go to 20 to 50 percent. I
25 actually don't think it'll be 70 percent. I believe that

1 builders are going to continue to test high-performance
2 attics, high-performance walls, so that when the next code
3 cycle comes that they're prepared for that. But we need
4 that stronger code credit in order to maintain, to get to
5 basically a position of walking.

6 And then finally, we'll be at Net Zero by 2019.
7 So we'll have no incentives at this point whereas we had
8 just partial incentives before, but we had the Code helping
9 us. We'll get full credit for it and we'll be at Net Zero.

10 So in conclusion I would just very much push that
11 we continue to have the tradeoff in the Code for the '16
12 code cycle.

13 Thank you.

14 MR. FERRIS: Great.

15 Next we'll hear from Marshall Howen from
16 SolarCity and Marshall if you could wait just one second
17 while we load your presentation?

18 MR. HOWEN: There we go. Good morning, my name is
19 Marshall Howen. I'm the Director of Sales for the Western
20 Region for our new home programs, new builder programs.
21 And again, I just want to start by saying thank you for
22 allowing me the chance to represent SolarCity as well as
23 the other new home builders that are here with regards to
24 new home solar.

25 As my dad used to say, "The difference between

1 influence and manipulate is where your agenda is." So I
2 want to start off with where our agenda is. We are in the
3 business of providing best in class financial products to
4 new home builders to offset the cost of integrating solar
5 into the homes that they build.

6 With that we'd love to echo both Mr. Attalla and
7 Mr. Peterson with their basic belief that you have to
8 reduce before you can produce effectively. Everything
9 starts with the builder having as many options as possible.
10 And so we believe the standards should allow builders the
11 flexibility to use a variety of measures to meet the
12 anticipated demand of their buyer. At the end of the day
13 new home building is all about "the buyer." There is no
14 way to get around that.

15 Everything that constrains a builder is involved
16 in a market in different places, California being one of
17 the most diverse and sophisticated homebuyer markets in the
18 nation. SolarCity recognizes there are significant
19 challenges in that market validating the need to
20 incentivize builders to go green.

21 We also believe that the spirit of the standards
22 needs to be carried forward, not redefined or abandoned.
23 And what I mean by that is kind of exactly what we've
24 talked about, the idea that the 2016 is simply an update.
25 There are lots of different reasons to look at the

1 sophisticated nature of the standards, but really I'd like
2 to echo the sentiment that was expressed by Matt. We're
3 hoping that this is a continued education to deepen the
4 understanding of all of those people participating in the
5 industry: builders, vendors, manufacturers, associates.
6 Everyone should be looking towards deepening and
7 understanding and an education.

8 With that I want to -- for the new home builder
9 agenda up on the board too -- in general, builders evaluate
10 utilizing energy conservation measures and solar, in a
11 context of consumer demand and profitability.

12 In my experience dealing with folks at the table,
13 having conversations, there are really "three buckets."
14 Builders look at all of these measures at existing mandates
15 and programs, but really to create more selling
16 opportunities.

17 Marketing overall program and project development
18 is designed to create more selling opportunities. If there
19 is one sentiment that has lasted since 2007 it's curb
20 appeal. I'm shocked every time I go into a builder or
21 seller environment and hear about sales agents who are
22 talking about not only curb appeal, but other options in
23 the home.

24 Selling homes at a higher margin though is
25 something that as a vendor, as a subcontractor, we hear

1 repeatedly. It is almost the tattoo that we should put on
2 our foreheads as trade subcontractors, "The builders need
3 to sell homes at a higher margin."

4 And the third bucket now is complying with
5 mandates.

6 But something I want to mention though is that
7 right there, that new home builders find that in general
8 most buyers have no depth of understanding, but great
9 sentiment about being environmentally conscious. That is
10 really true with regards to understanding something that
11 Mike said about the preferences of homeowners. I would
12 venture to say that there are very few homeowners that have
13 a deep understanding of what "building envelope" really
14 means to them, but they are very environmentally conscious.
15 They want to believe in it and they want to see it. But
16 homebuyers don't have a sophisticated --

17 The basic concept there is design centers. You
18 know, design centers are oriented towards homeowners being
19 able to customize a very basic offering. And both Lennar
20 and KB are committed to design centers, which is really
21 about educating with regards to finished schedules and
22 values as well as the overall performance.

23 The CEC agenda -- I very much appreciate the
24 public conversation, but really the CEC: "To properly
25 identify the significant challenges related to costs

1 incurred to implement the conservation and energy measures
2 and incentivize builders properly to ensure the long-term
3 success of the Standards."

4 This is one of the most sophisticated and
5 complicated conversations in the building industry, by far.
6 We're not talking about post-tension slabs. This is
7 amazing. And so I would again, in the spirit of the
8 Standards as well as the ACM focus, they have always been
9 rooted in the great diversity of climate regions in
10 California. It is crazy.

11 When I mention to folks that I don't have a
12 forced-air unit in my house, because we don't need one
13 living in Santa Barbara -- I know, you all can feel sorry
14 for me -- the value of having a forced-air unit was
15 substantially diminished as opposed to putting a PV system
16 on the top of my house. There is a very real benefit from
17 doing that.

18 But again the ideas and the notion of tradeoff or
19 a loading order, when you take them as a generalization or
20 an absolute, are really short-sighted when you consider
21 that the California Energy Commission has gone to great
22 lengths to clearly define 16 distinct climate zones. And
23 builders are saddled with that.

24 KB Home, great example, they have a central plan
25 bank in Pomona. They build in the desert, the low desert,

1 the high desert. They build in the coastal and Orange
2 County. To minimize costs they're utilizing the same plan
3 bank, but having to change that based on where that dirt
4 actually is. They also have a longstanding history of low
5 cost dirt or lots. But also very high cost too, because of
6 the relations they have with banks and with some historical
7 projects that they have in their cache.

8 Lennar, same strategy, by acquiring small and
9 regional builders throughout California they have pulled in
10 some very expensive, per-lot costs. And so to drive down
11 those costs is really important. But again there is no
12 cookie-cutter way to look at building envelope, because
13 they could be building in any one of 16 climate zones.

14 And also just to mention that the ACM should
15 continue to enable buyers to evaluate -- enable builders to
16 evaluate their home buyer, project location, home design
17 and incentivize the use of conservation and energy
18 production on a broad scale.

19 One other map that we haven't talked about with
20 regards to solar is SolarCity would say that the solar
21 credit needs to be independently analyzed, because the
22 solar efficiencies and the solar value proposition is
23 diminished by a changing utility environment.

24 I'm reminded right now of the situation in Nevada
25 where the NV Energy and the State Legislature is

1 contemplating the Net Metering 2.0 Agreement. And so for
2 SolarCity we have had to actually start relocating internal
3 energy consultants who have been selling retrofit
4 installations, because the net metering situation might
5 completely become adverse, with a monthly fee going to
6 people that choose to use solar.

7 I mention that because the other piece that's
8 here, the larger picture in California, is there are lots
9 of utilities. The three largest public utilities in this
10 New Solar Homes Partnership obviously are all on board.
11 But we are working with another builder -- three builders
12 in Lathrop where there is a new Lathrop Irrigation District
13 Utility. They don't even have Solar Adoption Standards.
14 They are still working through, as Matt alluded to, the
15 jurisdiction. They can't figure out how to do solar, how
16 to make it worthwhile, let alone how it relates to their
17 Tier 1 incentives.

18 And so in closing I would just ask that the
19 standards maintain the spirit of what the CEC is, and PUC
20 have really tried to do, which is to look "big-picture" in
21 considering how to integrate new measures, new standards
22 with regards to the building envelope with regards to solar
23 PV and that incentive to produce onsite. With Mike and his
24 group I agree that the building envelope technology is
25 here.

1 Unfortunately like other partners in the industry
2 we all exploit certain things. That solar exploited the
3 new solar homes partnership incentive when it first
4 launched, those credits were absurd for early adopters.
5 And yet that didn't mean that early adopters, early
6 builders didn't still get burned. You can ask Castle &
7 Cooke how they feel about solar still in Bakersfield,
8 because they were an early adopter and didn't net the
9 benefit of doing that.

10 With regards to a building envelope you can ask
11 Meritage Homes. They were an early adopter in full-scale
12 building envelope. And they lost dollar-for-dollar sales
13 to D.R. Horton who was featuring free upgrades to granite
14 countertops. It's a very sophisticated piece. And we just
15 need to continue to look "big-picture" at what we're really
16 trying to accomplish.

17 SolarCity completely supports the value
18 proposition of the building envelope. High-density attics
19 and conditioned space are great for us, because it removes
20 vents and lowers the complexity of putting solar onto a
21 rooftop. At the same time we also are very committed to
22 battery storage.

23 It was not too long ago, just five years, I think
24 Jacob, when we were with Southern California Edison looking
25 at a grid-tied battery backup system. And I think "crazy"

1 was the word that was used. And here we are yet just five
2 years later with your new home with the storage up in El
3 Dorado Hills, SunPower having a storage unit up on that.
4 With SunStreet going and working with the micro-inverter
5 storage technology and SolarCity pressing forward with its
6 power wall concept five short years. And again, we will
7 wait for the utility and the tariffs to catch up.

8 But again, thank you for your time today. I
9 certainly appreciate the opportunity to speak.

10 MR. FERRIS: Okay so now we're going to be moving
11 into the public comment portion. I will remind you that
12 we're going to do in-person public comments first. And
13 those of you participating online please use the "raise
14 your hand" and we'll take you in alphabetical order once
15 we're through with the in- person.

16 MR. RAYMER: Thank you. I'm Bob Raymer. I'm a
17 Technical Director with the California Building Industry
18 Association. And obviously, I could probably spend the
19 next couple of hours up here talking about this. It's been
20 a long history with this.

21 For those of you that may not be aware, when the
22 PUC and the Energy Commission initially started discussing
23 Zero Net Energy as a policy goal we started looking at
24 solar PV as a potential credit in the Energy Efficiency
25 Standards. Which means the first time we were seeking

1 this, although with limited information, was the 2008
2 update. So by no means is this sort of a new proposal.

3 We were successful in getting a very limited
4 Solar PV Credit in the 2013 regs. However, it could only
5 be applied to a portion of the HVAC budget and that gives
6 you an example of what happens when there is too much
7 limitation put on the PV Credit. I'm not aware of much
8 usage of all of that credit to date. And so that's why
9 we're very supportive of what the CEC is now coming
10 forthwith.

11 I must say that going back to April, 2014, when
12 Bruce Wilcox first mentioned that the PV Credit was going
13 to be limited to an amount of credit equal to the high-
14 performance attics and the walls, at that time I was
15 concerned. We wanted an open-ended credit. Effectively,
16 if you put in four kilowatts you should be getting twice
17 the amount of credit that you're getting for two kilowatts.

18 At the same time there's a reasonable basis for
19 why the CEC is doing this. This is the first big step for
20 a PV Credit and we need to move forward in a marginal and
21 reasonable way. So quite frankly we've learned to live
22 with that. However please keep in mind we were the ones
23 that were looking for an open-ended PV Credit.

24 Now looking at how the Standards have progressed
25 for the last 35 years, as we move forward we've always had

1 access to compliance options. Usually you'll see one or
2 two compliance options move into the prescriptive path that
3 helps generate the budget. And over the course of time
4 you'll see things from the prescriptive path move into the
5 mandatory measures. That's just historically how the
6 standards have worked over the years.

7 But if you look at what's been going on for the
8 last three updates of the Standards, the 2008, 2013 and the
9 2016 Standards, we've been moving a significant number of
10 items out of the compliance option vote and into the
11 prescriptive path mode. And that has left us with, I would
12 say, a lack of compliance options and we definitely need to
13 backfill this.

14 The PV Credit is one of those. I'd have to think
15 that as the time we get to 2019 that perhaps plug load
16 strategies, plug load reduction strategies, appliance
17 efficiency measures could become part of that backfill as
18 well. But the long and the short of it is we've spent so
19 much time moving things out of the compliance option area
20 that we now have simply design issues.

21 Consequently, I'd like to kind of move into what
22 are we going to be using the PV Credit for? And as Mazi --
23 and I'm really glad that you did this with the windows --
24 that's simply going to be the number one compliance option
25 that we choose to use the PV compliance credit on and that

1 is more windows. Head and shoulders above anything else
2 the windows, the increased glass area in the front and back
3 of a home is very marketable. And quite frankly having
4 allowance for that PV Credit is going to help us with that.

5 In addition, the number two priority is being
6 able to meet compliance with the reach codes. We're
7 probably going to have five to six dozen local
8 jurisdictions that will be adopting one or more types of
9 reach codes whether it's 15 or 30 percent increases in the
10 compliance margin. Lots of jurisdictions are going to be
11 adopting this in advance of 2020.

12 Lastly, the third most important reason for
13 having this PV Credit in there, is to get builders familiar
14 with solar. We've heard today from Lennar, we've heard
15 today from KB Home.

16 The factor is we've got hundreds and hundreds of
17 companies across the state. You've got many small and
18 medium-sized builders out there that have no familiarity at
19 all with solar right now. That needs to change in a big
20 way as we get close to 2020. We cannot wait until New
21 Year's Eve on 2019 and hope that they're going to get it
22 right the following day. That creates a huge log jam. It
23 makes transition to Zero Net Energy far more difficult than
24 it needs to be.

25 So we're very supportive of the PV compliance

1 Credit even though the CEC has seen fit to limit it to just
2 the amount of credit for the walls and the attics.

3 And moving on, last Thursday afternoon I had the
4 opportunity to have a conference call with the North
5 American Insulation Manufacturers. And they went over
6 their proposed suggestions on how to modify what the CEC is
7 proposing here. And I'd like to state for the record
8 unfortunately we don't like any of these, with the
9 exception of Number 6. And that is, "Effectively define
10 the photovoltaic compliance credit assumptions." That's
11 the whole point of the ACM proceedings.

12 In essence, come up and articulate in a very
13 clear manner how this compliance credit can be used, what
14 needs to go into the assumptions, the extent to which these
15 assumptions can be applied and where they can be applied.
16 That's the whole idea of the ACM process and so that we can
17 support. The others, to be blunt, seem sort of designed to
18 limit or make the PV compliance credit, so administrative
19 burdensome that the builder and the designer will simply
20 choose to go another direction.

21 And for a basis you could look at what's
22 currently going on with the 2013 Compliance Credit. That's
23 extremely limited and we've seen what's happened with that.
24 And so with that I would hope that we can get all of this
25 resolved over the next 30 days.

1 We need the PV Compliance Credit. There's no if,
2 ands or buts. And in leaving today I'd like to leave you
3 with this thought. What happens if you don't do this now?
4 If this isn't part of the 2016 Regs what is going to
5 happen? And it's not a good picture. Industry needs to
6 get familiar with this technology. Right now we've got
7 builders that have no familiarity at all with solar. And
8 like I said, that has to change.

9 Thank you.

10 MR. CAIN: Hello, my name is Joe Cain. I am with
11 SunEdison. I'm doing this with no notes, without a safety
12 net. I am Chair of the Solar Energy Industries Association
13 Codes and Standards Working Group. I've been Chair of that
14 group for about three and a half years.

15 In that group, the Solar Energy Industries
16 Associations, and in the California Association of Building
17 Energy Consultants we've joined together for the greater
18 good. For the time being we've set aside of our idea of,
19 "What I bring to market is somehow better or somehow more
20 important than what you bring to market." We work for the
21 greater good.

22 I've noticed a paradox in the State of
23 California. And that is that in we have the California
24 Solar Rights Act which says, "Rapid deployment of renewable
25 energy systems is a matter of statewide importance." This

1 was emphasized in the California Solar Permitting Guidebook
2 under the California Governor's Office of Planning and
3 Research. This was also reiterated by the California State
4 Assembly in AB 2188, that rapid deployment of renewable
5 energy is a matter of statewide importance.

6 So we get to this situation here and it seems
7 like what we're doing is because of the way this was
8 structured -- and I saw a statement, "HPA, HPW" -- it seems
9 like we're competing with each other. If you look at any
10 green energy standard what you see is an emphasis on
11 synergies, what you see is an emphasis on bringing the
12 entire thing together and working together. What you see
13 is bringing together teams that can collaborate and make
14 things compatible.

15 Say, for example, if you do -- I'm a civil
16 engineer, I do structural engineering. I saw a system that
17 had foam above a roof and I saw a tile. If I'm thinking
18 about coming after the fact and doing a retrofit of solar,
19 which many people will want then I'm thinking about, "How
20 do I get that attached to the roof? Am I going to take a
21 lot of tile that was just installed and the cost of that
22 and I'm going to unstack that tile and put it in the corner
23 of the garage. And then I'm going to duplicate the cost of
24 that tile by putting on solar tile. Or am I going to try
25 to get some kind of a tile hook to attach through foam?

1 What am I going to do?"

2 So I think that it is important to bring these
3 technologies together. We've got rapid advancement in
4 building technology. We've got rapid advancement in solar
5 industry. We've seen, essentially, a tipping point in
6 cost. I'm mean when the loading order was established --
7 and I think it's 2006 -- what was the state of building
8 science at that time? What was the state of the cost of
9 solar at that time?

10 I think I'm going to make a statement that it --
11 loading order -- I'm going to ask the question, "Has it
12 exceeded its shelf life? Has it served its purpose? Is it
13 time that loading order is done? Is it time that loading
14 order is ready for a major overhaul? I think these are
15 things we can work through together. I want to see the PV
16 Credit in there.

17 As a matter of fact, I'm even concerned at any
18 thought that the PV Credit would survive one more code
19 cycle and then be abolished in 2019. That doesn't make any
20 sense to me when we're going to Zero Net Energy.

21 So we're trying to get the industry to go from
22 whatever it is today in terms of percentage of new homes to
23 solar to 100 percent of new homes to solar in a few years.
24 It doesn't make sense to me to marginalize or reduce
25 credit. So I'd like to see us all work together, working

1 with these synergies, keep the PV Credit in there and even
2 strengthen it.

3 Thank you.

4 MR. HAMMON: Good morning everyone. My name is
5 Rob Hammon. I'm here representing BIRAenergy.

6 My company requests that there be a sunset in the
7 ACM for the PV option and that it sunset no later than
8 January 1st, 2019. And the reason for that is to put a
9 clear deadline for the state to move to high-performance
10 envelopes.

11 MR. SHIRAKH: Can you give me the date again?

12 MR. HAMMON: At January 2019, the last year that
13 the codes would be in place.

14 And the reason for that is that the envelope is
15 the most important part of the building. It needs to be
16 built today so that we don't need to retrofit it later.
17 It's too expensive and too intrusive to be practically
18 retrofitted later. It's going to be there for the next 50
19 to 100 years. We need to do it right now.

20 And we need training for how to do that and
21 that's in place as part of this tradeoff. But that
22 tradeoff should sunset and be changed to some practical and
23 appropriate tradeoff for things in the building other than
24 the envelope.

25 I have submitted comments to the docket and I

1 think they can completely inform this position.

2 And I'll leave it there. Thank you.

3 MR. ELLIOTT: Good morning. My name is Gareth
4 Elliott. I'm with the Solar Energy Industry Association. I
5 will echo all the comments the others in the solar industry
6 have made. I would just like to really voice our strong
7 support for providing compliance credits for rooftop solar.
8 We really strongly believe that it's important for both
9 home builders and homebuyers to have flexibility in meeting
10 in their needs and desires.

11 I'd also like to echo the point that as the NSHP
12 Program phases out and winds down, with the funding
13 expected to be exhausted next year this is a really
14 important incentive for the industry.

15 And so we hope that this can move forward. Thank
16 you.

17 MR. FAY: Good morning. My name is Bill Fay.
18 I'm the Executive Director of the Energy Efficient Codes
19 Coalition.

20 Our group is the group that helped boost the 2015
21 and the 2012 IECC's efficiency by 38 percent over the 2006
22 IECC. Now I know that's the rest of the world outside of
23 California, but I have to tell you that California has been
24 a model for our efforts. And we were trying to get the
25 rest of the nation to start catching up with California.

1 We're supported by an incredibly broad array of
2 unlikely stakeholders. We have labor and we have business,
3 we have environmental groups and manufacturers, we have
4 utilities and rate payers. But I think one of the most
5 interesting parts of our support group is literally the
6 low-income housing efforts. We have six national low-
7 income housing advocacy groups.

8 And first of all I want to apologize for being
9 such a latecomer to this process, because we came as soon
10 as we saw the PVCC details, but obviously we weren't there
11 earlier. But I have not yet seen comments from the one
12 group that I think is really a serious element of this and
13 that is the homeowners and the low-income housing
14 advocates.

15 The Energy Efficient Codes Coalition, with their
16 support, has several guiding principles. One of them is
17 the envelope efficiency comes first. You know, we heard
18 Jacob say that it's, "Reduce before you produce." But we
19 want to make sure that of the envelope, we generally oppose
20 tradeoffs that weaken envelopes.

21 And in fact we led the effort that eliminated the
22 equipment tradeoff in the 2009, 2012 and 2015 IECCs. And
23 we were told by an analysis by ICF International that that
24 saved 6 to 9 percent in the efficiency, nation-wide of
25 homes, and as much as 22 percent depending upon how many of

1 the tradeoffs the builder used. And so we ended up with
2 dramatically more efficient homes as a result of that
3 elimination, that tradeoff.

4 As was mentioned earlier many of the improvements
5 that you make to the envelope last 70, 80, 90, 100 years,
6 whatever the life of the home is. They are very expensive
7 to retrofit. And tomorrow's retrofit is today's first
8 construction, so we need to build them right first.

9 And if you take a look at an NAHB poll, found
10 that nine out of ten Americans are willing to pay two to
11 three percent more for a home with permanent efficiency
12 features. And I think that really speaks a little bit to
13 the issue of that, of where the homeowner is.

14 I have many questions and I know that there's
15 going another process down the road, I think next month, to
16 try to address this. We'll try to erase those questions as
17 we study and understand this a little better. But we want
18 to make sure that you -- we hope that the Commission keeps
19 in mind, the impact on low-income families.

20 You know, heat waves and cold snaps are when
21 strong envelopes perform best and when weak envelopes put
22 homeowners in arrears. It's the time when we find that
23 there is a greater chance of foreclosure is when those
24 homeowners get behind in their payments. And in fact the
25 low-income housing advocates have said very clearly that

1 they believe that it is the leading cause of foreclosure,
2 outside of loss of income, is the inability to pay energy
3 bills. And so, the one thing that PV is not going to help
4 is those hot and cold times, I think, that really when the
5 home is not going to perform as well. And so I'm concerned
6 about those tradeoffs.

7 And in addition to that net metering, when it
8 comes about, may even put a greater burden on low-income
9 families that don't own homes that -- that own homes that
10 may be smaller and may not have the PV, as well.

11 We look forward to working with you as this moves
12 along and I appreciate the opportunity to speak today.

13 Thanks.

14 MR. COTTRELL: Good morning. My name is Charles
15 Cottrell. I represent the North American Insulation
16 Manufacturers, a name that represents the manufacturers of
17 fiberglass and rock wool products. Thank you for taking
18 the time this morning to hold this workshop and consider
19 our concerns regarding the PV Credit. I'll try not to
20 repeat previous comments in depth, but will emphasize the
21 issues our members feel are important.

22 First, the size of the PV Credit, I've done
23 numerous runs using the CBECC software and have seen a
24 credit of up to 24 percent. In looking at the CEC
25 information this shows that Zone 8 allows a credit of up to

1 27.7 percent, almost a third of the budget. These are
2 quite large and should be reduced.

3 At a minimum we would like to see the credit
4 limited to only attics or walls, but not both. We urge the
5 Commission to limit the time the credit is available. We
6 believe once the training programs are completed, the PV
7 Compliance Credit should be eliminated.

8 Finally, I'd like to address the issue of
9 constructability of high-performance attics and walls.

10 In '92 I had a small construction company and
11 built two by six walls and walls with foam sheathing.
12 These are not new or difficult construction details. They
13 do increase cost and require change, so we support the
14 training programs. But NAIMA has done analysis that show
15 high-performance attic and walls are affordable.

16 We urge you to reduce the size of the credit and
17 the time the credit is available. Thank you.

18 MR. NESBITT: George Nesbitt, just a brief
19 background on me, I'm a general contractor. I've done
20 every trade, mostly remodeling, a little new construction
21 certified energy consultant, green rater and HERS rater.

22 MR. SHIRAKH: No hat?

23 MR. NESBITT: Yeah, it's in the back. I wanted
24 to show off my haircut, because I got a new razor the other
25 day. So I'm really proud of it, it's better than the last

1 haircut I gave myself.

2 So someone said, "What's new is old." We've had
3 a solar credit in the Energy Code as well as the HERS
4 Rating system for decades. It's called, "solar hot water."
5 Our discussion today, and essentially around ZNE, is only
6 about PV. We really need to get beyond PV.

7 We need to have other technologies and we've also
8 got to get over the house. We've got to think about remote
9 systems, community systems, so that someone can maybe
10 invest, because design and constraints may not always get
11 us there.

12 And then we've got this sort of mess. We have
13 the national HERS system. California has a HERS system.
14 You've created a design rating as well as we have a CAP
15 score. Now the saying, "As a rose by any other name is a
16 rose," and -- the design rating and the cap score are
17 really are HERS. And also the Greenpoint-rated index is
18 also a HERS, which is a mess.

19 The HERS rating system, national or even
20 California, well it has its issues. It's also a great tool
21 and it should really be used to sell the efficiency and the
22 renewables and the cost savings. Unfortunately I think the
23 mortgage industry is still dragging its feet in realizing
24 what those things affect. Of course, we've got bigger
25 problems with utility rate schedules and the duct curve and

1 there's a whole bunch of other stuff.

2 So and when I think we talked about ZNE,
3 obviously we have to get a PV Credit into the Code. And
4 with ZNE it's always going to be there. It's part of it.
5 You can't separate it. It will always be a credit. I
6 think what we have to ask ourselves is, "How much credit?"
7 I think a) in the short term how much credit?

8 In the long term, 2020, if we get there we have
9 to think -- well, we also have to think about how much.
10 Does it mean you can build a HERS 100 or 110 and zero it
11 out with renewables? And then we talk about loading order.
12 It's as people say it's a way more expensive to fix
13 buildings and building enclosures.

14 Systems change. HVAC systems, water heating
15 systems, PV systems, they do fail. You know, you've got to
16 change inverters or panels. People will upgrade them even
17 before the end of their life. A lot less people will
18 upgrade the building enclosure, other than windows.

19 So I think we need to think the way the Code is
20 structured is yeah there's the whole prescriptive path and
21 that's what sets the budget. The reality is most people
22 then do what they want. And there's nothing necessarily
23 wrong with that, but you can trade off everything. So the
24 PV Credit is not trading off high-performance walls or
25 attics. It's about doing whatever the heck you want.

1 And I think we need to think about making the
2 building enclosure right, first. Let them trade off water
3 heaters, HVAC systems, even windows. Windows aren't
4 forever.

5 And then I just want to make a comment about the
6 public workshops. Democracy does not start at 9:00 a.m. in
7 Sacramento. When we got an agenda with a lunch break --
8 and it sure in heck's not going to go to 5:00 o'clock.
9 It's an extra hour and half for those of us from out of
10 town to get here.

11 MR. SHIRAKH: I just wanted to respond to one of
12 your comments, but not about the lunch. We can skip that
13 if you want.

14 MR. NESBITT: You can buy me lunch though.

15 MR. SHIRAKH: You said the PV Credit is integral
16 to ZNE. Actually it's not. You know that PV Credit and
17 design rating are two different things. There's a common
18 misconception and people confuse the two.

19 The PV Credit is not going to move your design
20 rating at all theoretically. If you have a certain design
21 rating, say 75, you don't do high-performance attics and
22 walls and then you put in equivalent PV your design rating
23 will still be 75. So that's a different thing then.

24 To move to the ZNE of score, then you need this
25 whole different algorithms and the way you treat the

1 orientation and all that is all different. So I just
2 wanted to emphasize that the PV Credit for the PV and the
3 design rating are two different animals.

4 MR. NESBITT: I'll agree with you and disagree.
5 Yes, if you're not -- your design rating would be based on
6 the building without the renewables. But in the HERS
7 Rating system you get two scores. You get your building
8 without drugs (phonetic) and with drugs, so you get both.
9 And ENERGY STAR, DOE Zero Energy Homes all have a
10 requirement for a HERS score before renewables.

11 So I agree and disagree with you. We're both
12 right.

13 MR. SHIRAKH: Okay, we agree to disagree then.

14 MR. HODGSON: Good morning. Mike Hodgson, ConSol
15 CBI Energy Committee Chair. And I'm going to steal Matt's
16 presentation without his permission.

17 I think this is a very interesting slide to talk
18 about what we're doing today. I think it really goes to
19 the point of what's going on in the market. And to me it
20 implies -- and I wholeheartedly agree that you need some
21 market penetration to go from learning curve to mobility --
22 and that is about 20 percent.

23 If we take a look at high-performance attics and
24 high-performance walls, which a lot of people have said
25 are commonplace and in the market -- ConSol actually did a

1 fairly extensive survey of the five leading metropolitan
2 statistical areas with the large builders -- and found that
3 currently as of approximately June of this year less than 3
4 percent of the builders are using high-performance attics.
5 So we counted everything we could imagine about high-
6 performance attics whether it's vented, unvented,
7 cathedralized, spray foam. So there's not a lot of market
8 share in high-performance attics.

9 Two by six framing or high-performance walls, we
10 kind of ignored the Commission's definition of 0.051, but
11 we just said, "Okay, who's generally building with two by
12 six walls with or without foam exterior whether it's a
13 sided wall or a whatever? We could find approximately 5.1
14 percent of the market with an experience of the majority of
15 the exterior walls using two by six, whether they're 16-
16 inch on center or 24-inch on center.

17 So high-performance attics and walls don't make
18 Matt's -- we're in the pre-crawl stage for both of those
19 topics. Yes, there are techniques that we have in the
20 market place. But no, they are not widespread nor are they
21 being used.

22 So my first point is we need to change our
23 construction practices if we are going to meet the 2016
24 Standards. Any construction change comes with risk to a
25 production builder. They warranty the product, they have

1 to learn how to do the product, they have to have
2 workforce, they have to train their workforce, they have to
3 understand the longevity of that product. We need time to
4 do that.

5 And so one of the things we need to do is have
6 flexibility. There is issues in high-performance attics
7 with concerns about moisture. Some builders are going to
8 say, "I've had a bad experience with that," possibly in a
9 different market entirely, and not adopt high-performance
10 attics. This flexibility gives them the ability to meet
11 the 2016 Standards.

12 The other thing is we mentioned that there is two
13 very interesting processes that are going to help the
14 market get ready for high-performance attics and walls.
15 The first is the Investor Owned Utilities pilot programs
16 which, by the way have not started yet. So we would like
17 the Energy Commission to talk to their friends at the
18 Investor Owned Utilities and encourage those pilot programs
19 to start. PG&E is ready to come out the door. We're very
20 excited about that. But that's only half the service
21 territory. We need Edison and we need SDG&E to step up
22 also and get those pilot programs going.

23 So first point is we need help to be able to
24 crawl. We're not to walk yet, we're still trying to crawl,
25 all right.

1 Second is, is once we resolve this, which is
2 going to be a multi-year process, we need to get to zero.
3 And we did not do the estimate on how many homes are using
4 solar. Matt's numbers are maybe 15 to 20 percent. If I
5 include both single-family and multi-family that number is
6 going to go down a bit. And so we're probably in that 5 to
7 10 percent range, maybe 10 to 15 percent range. So again
8 we need builders to install solar to get ready for the
9 really next big step, which is Net Zero.

10 So the third point I would like to make is people
11 are talking about the solar credit going away. I'm not
12 quite sure what that concept means, because if we're going
13 to get to zero we have to have solar. So I think the
14 discussion would be is how do we level the playing field
15 that solar and energy efficiency basically compete on the
16 same terms, with the Energy Commission and the building
17 industry's support for an envelope backstop, for good walls
18 and attics.

19 But not saying any credit goes away. We need to
20 say, "We need to encourage solar." Not that we're going to
21 push it away with lack of credit. I would say we're going
22 to give more credit to solar in 2020, because that's the
23 only way we are going to get there.

24 Thank you.

25 MS. CARPINO: Good morning, Elaina Carpino, with

1 Owens Corning. And on behalf of Owens Corning we wish to
2 thank the Commissioner as well as the CEC staff for all of
3 the work through this process of due diligence. And it's
4 wonderful to see so many people here supporting this very
5 important topic.

6 I'm here today to talk about high-performance
7 attics as an industry leader in the market and talking
8 broadly around this. And to my right, looking at KB Homes
9 is one of the ones that helped us innovate around this new
10 solution in the market. We recognize that education and
11 innovation is paramount in order to have a market-leading
12 type of solution for builders to provide choice.

13 Certainly we come from the standpoint of
14 optimizing energy efficiency for the home, but we also
15 recognize that as we look around the room and think of
16 those in the solar area that there's certainly an
17 opportunity for perhaps some synergies, that as you look
18 for unvented attics specifically and think about the
19 footprint of the roof, applying more surface area, looking
20 at low-profile roofs, that unvented attics certainly play a
21 role as far as how do you play with that relative to both
22 energy efficiency and renewables.

23 So I think as we look broadly around all of the
24 options that are available to builders, available as choice
25 for homeowners, we must recognize and have the free market

1 play out as we wish to have.

2 So thank you very much for this opportunity. And
3 we certainly will take any comments and questions moving
4 forward.

5 MR. WARE: I'm David Ware with Knauf Insulation.
6 And our company supports the position that the National
7 Insulation Manufacturers has presented. We also support
8 the Energy Commission's evolution of getting closer to Zero
9 Net Energy.

10 Our company works with builders throughout the
11 country, both on the energy efficiency side and helping to
12 partner and marry cost-effective, renewable energy systems.
13 So going forward that continues to be a challenge for us in
14 this state as well.

15 But I'm not going to reiterate a me too, to some
16 of the comments, because I think there were very good
17 comments that we support that have already been made. But
18 what I'd like to speak to is some very specific things that
19 are in the Reference Manual.

20 The PV Section is contained in 2.2.3. And my
21 main concern in that -- and I did submit some comments to
22 this effect on the compliance manuals, but they speak to
23 this and I will submit comments as well -- we would like to
24 limit any PV Credit to single-family townhome buildings,
25 not for multi-family. And it was the individual from Solar

1 City who mentioned the issue of net metering and that's
2 where the problem arises.

3 The compliance manual talks about you can do
4 compliance on a building-by-building compliance or you can
5 do whole-building compliance yet Section 2.2.3 doesn't
6 describe that at all. It describes -- it has a table for
7 multi-family single building performance by climate zone,
8 but it doesn't describe when and where the trigger would
9 happen within the program for doing multi-family
10 construction.

11 Somewhere else in the manual there's actually a
12 description of, I don't know if it's air infiltration or
13 something, but it talks about buildings for compliance
14 purposes and proposed building. They are treated as, "All
15 single-family and townhomes are treated this way and all
16 other buildings are treated this way." No such statement
17 is in 2.2.3. So it's not clear exactly, at least to me,
18 not clear how that modeling is to occur.

19 My primary point though is that -- and it was
20 stated by one of the other solar advocates -- that multi-
21 family buildings to a great degree are very much
22 represented by the low-income strata of our society. And I
23 think that we would be doing an injustice by having those
24 individuals, those renters or possibly homeowners,
25 depending upon the nature of that building not realizing

1 the savings that could accrue from both the envelope
2 savings and the PV Credit through a net metering.

3 So as a consequence that's why I'm advocating
4 that you limit the PV Credit to building-by-building
5 analysis when a multi-family building is being used for
6 compliance purposes.

7 I'll submit individual comments related
8 specifically to the manual and I hope can clarify some of
9 that. Thank you.

10 MR. MCHUGH: Jon McHugh with McHugh Energy.

11 I guess these are a series of questions, but the
12 first question is, is when I was reading through the PV
13 Credit my understanding is the only criteria in the
14 criteria currently for the 2013 Standards is you have to
15 have at least 2 kW. And I'm wondering if, at the very
16 least, to receive the PV Credit that you'd actually have to
17 comply with the same requirements for solar-ready? So
18 which has things such as orientation has to be between 110
19 degrees and 270 degrees, that there not be obstructions on
20 the roof, I think what is it -- there's a certain geometric
21 relationship between obstructions. So those things that
22 are in Section 1.10.10 seems to me would be pretty
23 reasonable to have.

24 You know, that's just for solar-ready. We'd have
25 that for the actual solar systems.

1 The other question is some of the things that
2 have been the backstop for the consumer associated with the
3 New Solar Homes Partnership are sort of the withering away
4 of the state, so some of those things are going away.

5 And it's probably reasonable to have some kind of
6 requirements about, at a minimum inverter efficiency or if
7 -- you know, and that might be a yes/no thing or it could
8 be something that then modifies the savings associated with
9 the efficiency of the inverter, something related to
10 warranty or longevity of the system that's being installed?

11 Some question about whether the system is -- what
12 is the lifespan of that equipment? And that could also be
13 the financial life span of the equipment. So the question
14 is I'm not against leasing, but I kind of wonder if there
15 should be pre-paid leases rather than leases where when the
16 house is sold the lease is somewhat onerous to the next
17 owner and the next owner decides not to pick that up. And
18 so you have something that maybe only lasts 5 or 6 years,
19 not 20 years.

20 And then related to -- there's also the rest of
21 the building standards. And I don't know if we're going to
22 talk about this at this meeting, but adjustments to the
23 mini-split heat pump model. Is that something that's on
24 the agenda for this meeting or is that for a further
25 meeting?

1 MR. FERRIS: A further meeting.

2 MR. MCHUGH: Okay. Similarly, I notice that for
3 many of the high-efficiency buildings there's also an
4 increased interest in heat pump water heaters. And I'm
5 wondering if there's any plan for a model that actually
6 models the efficiency of those water heaters, with respect
7 to ambient air temperature? Is that on the agenda?

8 UNIDENTIFIED SPEAKER: As Larry said, there's a
9 revised water heating model that's proposed for release
10 next spring. And one of the major features of that is an
11 upgraded heat pump water heater model.

12 MR. MCHUGH: Great, thank you.

13 Those are my comments. Thank you.

14 MS. WALTNER: Meg Waltner with NRDC and maybe
15 since we entered on water heaters I'll start there. I just
16 am glad to hear that that update is coming in the spring.
17 We've had many conversations in the past about how water
18 heaters are treated and have raised concerns about the
19 current baseline of a natural gas water heater.

20 One thing that I hoped that spring 2016 change
21 addresses is this issue with water heating loads in the
22 model that we've raised before, that the hot water load for
23 a heat pump water heater is different than the same size
24 gas storage water heater. I'm not sure where that is
25 coming from but hope to see that fixed in the model.

1 And then moving on to the PV Credit I'm going to
2 be brief today and submit more detailed written comments,
3 but throughout this process we've been supportive
4 conceptually of the concept of a PV Credit that would be
5 limited in scope and duration. We do see the benefits of a
6 PV Credit easing the pathway for increased energy
7 efficiency in the Code, but want to make sure that it
8 indeed becomes something that does eventually achieve that
9 increased efficiency in the Code.

10 To that end we would like to see a specific
11 sunset date for the PV Credit as was discussed today. Some
12 stakeholders have proposed 2018, 2019. Conceptually those
13 both make sense to us. And then we'll be submitting more
14 in detailed writing and written comments.

15 And then finally this is more of a question, but
16 I'd be interested in seeing more analysis behind the
17 minimum size system by house size. So there's a table, but
18 I'm curious where those numbers came from. Would that be
19 possible somehow?

20 (Colloquy between staff.)

21 MR. SHIRAKH: Yeah, we can give you that.

22 MR. FERRIS: Yeah, we can provide that
23 information.

24 MS. WALTNER: Okay, great. Thank you very much.

25 MR. NESBITT: George Nesbitt.

1 Just had a couple quick, last things I wanted to
2 hit on. Someone I think mentioned -- it was Bob Raymer --
3 talked about a 4 kilowatt system getting more credit than a
4 2 kilowatt sort of thing. And I think that the way the
5 solar credit is being handled -- I think on the back end
6 you're doing some TDV thing or you've got certain
7 assumptions. Although maybe to the user it really comes
8 out as like an AC sizing thing.

9 In the HERS Rating System we use the CEC PV
10 Calculator, which does the TDV. So we have the tools to do
11 it and actually value the production and the time.

12 And then also on the PV size issue a minimum of 2
13 kilowatt the last time I ran the numbers for my 1923
14 Craftsman bungalow I only needed a 1 kilowatt system. So I
15 wonder to what extent you've looked at and thought about
16 the system size versus actually hitting Net Zero TDV?

17 Because ultimately I mean from a -- I'm also a
18 homeowner. Someone said homeowners didn't speak. Well, I
19 mean from an economic standpoint if we're making people pay
20 for PV systems that don't provide some value -- which
21 hopefully means they're paying less per kilowatt hour to
22 own the system versus what they get or than what they pay
23 for electricity -- so we're not (indiscernible) burden
24 them.

25 I guess what happened in San Diego when people

1 had to go to time-of-use rates a lot of people couldn't
2 afford and didn't put in PV systems that were big enough to
3 be net generators and their bills skyrocketed. So to what
4 extent are we going to burden people with a cost that they
5 may not be happy with?

6 And I mean some of that is, of course, CPUC and
7 rate schedules and all that crazy stuff.

8 MR. HAMMON: Rob Hammon from BIRAenergy.

9 I think we need a clarifying comment here that
10 from my point of view there's the PV option and there's PV
11 Credit. And I think they are two different things that
12 will happen in two different time periods.

13 Right now I think we're talking about a PV option
14 that provides time in for training and for builders to
15 specifically learn and deal with high-performance attics
16 and walls. And in 2020 I think we'll be looking at PVs on
17 a playing field with other options, hopefully not the
18 envelope, but exclusive of the windows.

19 And those two things, the future of integrating
20 solar completely into the Standards, I think that's a
21 completely different discussion. And I may be wrong, but I
22 think that's a completely different discussion than the
23 current one, which is focused on high-performance walls and
24 attics.

25 MR. SHIRAKH: I think our understanding is that

1 the PV Credit, the way it's currently proposed, is
2 essentially to provide that option for builders to become
3 familiar with the practices. And if that credit goes away
4 in 2019 then only thing PV will be used for is to actually
5 move the design rating to zero to achieve the ZNE goal. So
6 that's our current -- at least that's my understanding. I
7 don't know of others.

8 But once the high-performance attics and walls
9 become commonplace and builders are putting them in then
10 the PV is used to basically move the design rating down to
11 zero to get to ZNE.

12 MR. FERRIS: Okay, I think we've heard from
13 everybody in -- oh, Bob? Nope.

14 MR. PETERSON: I have a clarifying remark.

15 MR. FERRIS: Okay.

16 MR. PETERSON: You know, I just want to answer
17 Mike's comment about yeah, we currently are serving -- we
18 have solar on 70 percent of the homes that we're producing
19 in California right now. To make the connection that those
20 homes with the new code would not be using high-performance
21 attics or high-performance walls is a huge leap.

22 I think what I would like to say from a building
23 science standpoint is it's pretty common knowledge that
24 whenever you make any system more energy efficient, whether
25 it be a wall, it be a roof, be an attic we have less energy

1 to handle moisture. So we have to learn in every climate
2 zone in this state what will work for us in being able to
3 handle that moisture that we have. So in a hot, dry
4 climate it's easy. We get up around San Francisco it's not
5 so easy. And not all solutions are created equal. We all
6 know that we're going to have to make sure that we're using
7 the right solution in the right climate or we're going to
8 have huge risks.

9 So I just want to say that that 70 percent of our
10 homes in California that are solar today, none of them are
11 using the current credit, okay?

12 What we find is it's a huge generator of sales
13 pace for us, it's something that consumers want. And as
14 long as financially it makes sense to them it's something
15 that they want to do for the environment. And that's how
16 we market it and that's how we've gotten to that market
17 share of 70 percent, which I think is much higher than the
18 state average of 20 percent.

19 MR. FERRIS: Okay. So we've had everybody in the
20 room have a chance to talk. We'd now like to open it up to
21 people participating online, so if you're online please
22 raise your hand and we'll open the mic so that you can ask
23 your question.

24 (Off mic colloquy.)

25 We're going to try something, because nobody is

1 raising their hand. We're going to, for a brief moment,
2 unmute everybody. Those who are experiencing technical
3 difficulties of letting us know they want to ask a question
4 will be able to speak. And then we'll try to --

5 UNIDENTIED SPEAKER: They can unmute themselves.

6 MR. FERRIS: Oh, yes. Okay. So I've been told
7 you can unmute yourself individually and you don't have to
8 raise your hand. So we'll make that offer to you, okay?

9 (No audible response.)

10 So we're going to assume that nobody
11 participating online has any comments. So we are finished
12 a little bit early this morning, partially due to everybody
13 being very efficient in their questions and also having one
14 less speaker than we planned.

15 So I need -- I don't know how many of you are
16 returning for the afternoon session for the Nonres. Would
17 you prefer to have more time for lunch or meet back here at
18 12:30 and get this over sooner?

19 I see the leave early and get back early, so
20 let's return at 12:30 and we'll start the Nonres.

21 Oh and I need to go over the next steps before
22 you all rush out of the room. So basically as a couple of
23 the people talked about who are familiar with this process,
24 written comments on what was covered in this workshop are
25 due to the Commission August 20th, by 4:00 p.m.

1 The Workshop Notice explains how to submit
2 written comments. Basically you go to the CEC website, go
3 to the Efficiency Tab, 2016 Standards: Post Adoption
4 Implementation. And we're Docket 15-BSTD-04 and you can
5 submit right there. At the top of that web page there is a
6 "submit button" and it'll walk you through the process.

7 You can also watch -- that same location we're
8 going to post the recording first. And then when we get
9 the transcript, written comments, we will put those up.

10 And as we've talked about in this meeting we're
11 going to have a second Residential Workshop September 28.

12 I thank you.

13 (Off the record at 11:39 a.m.)

14 (On the record at 12:38 p.m.)

15 MR. FERRIS: We're back in session for this
16 afternoon's workshop on Nonresidential ACM Standards and
17 Software.

18 We're going to start this off with Larry Froess.
19 He's the Senior Mechanical Engineer from the Software Tools
20 Unit and he's going to discuss the changes in the ACM
21 Manual.

22 MR. FROESS: Good afternoon. My name is Larry
23 Froess and I am the Senior Mechanical Engineer and Project
24 Manager of the Alternative Calculations Method Manuals,
25 also known as the ACM Manuals.

1 I will be discussing the changes made to the 2016
2 Nonres ACM, which also affects the 2016 Compliant Software.

3 This first slide is a quick overview to describe
4 the purpose of the ACM Manual. It details the procedures
5 required for creating compliance software. It also
6 describes how the compliant software is supposed to create
7 a baseline energy model. The compliance procedures that
8 the proposed building is compared against are mostly based
9 on the prescriptive requirements of the 2016 Standards, but
10 do not necessarily include all of the exceptions that go
11 with it.

12 The purpose of the ACM Manual is to provide the
13 public with software that can show the performance of a
14 building and incorporate design flexibility when it can't
15 meet the prescriptive requirements. And the ACM Manual
16 describes and provides a set of software test files that
17 the proposed compliant software uses to show its accuracy.
18 This method is also known as the reference method.

19 This slide shows a quick overview of the
20 anticipated timeline of the CBECC-Com software releases.
21 I'll go into the details of the CBECC-Com 2016 Alpha 1
22 release in the next few slides, but wanted to go over the
23 next few versions of the software that are anticipated to
24 be created.

25 CBECC-Com Alpha 2 will be released for a

1 September workshop if one is deemed necessary. It would
2 include changes made after reviewing the public comments
3 from this workshop and would also implement additional
4 features as the software progresses towards its November
5 version.

6 Whether there is an Alpha 2 release or not the
7 version presented for approval at the November business
8 meeting will be called CBECC-Com 2016 Version 1. If
9 approved this version can be used to show compliance with
10 the 2016 Standards for early adopters and for builders and
11 designers who want to see how their projects comply under
12 the 2016 Code.

13 Next year we are planning on having a workshop in
14 March to possibly present a few new features. The CBECC-
15 Com team is striving to incorporate new features and more
16 options to improve the software. The workshop will be a
17 means of presenting this to the public and the software
18 release would be called CBECC-Com Version 2 Alpha.

19 And in June 2016 we are proposing to present
20 CBECC-Com 2016 Version 2 for approval at the June business
21 meeting after incorporating any changes due to public
22 comments from that March 2016 workshop.

23 This slide shows the features that have been
24 implemented in the CBECC-Com 2016 Alpha 1 version. We
25 essentially took CBECC-Com 2013 Version 3C and incorporated

1 the updated time-dependent values or TDVs for 2016. It
2 also updates the envelope values and there are no changes
3 made to the windows and skylight performance values in the
4 2016 Standards. It updates the minimum HVAC equipment
5 efficiencies to match those in the tables of the 2016
6 Energy Standards Section 110.2. It also updates the
7 allowed indoor lighting power densities to match to the
8 changes made in the 2016 Standards Section 140.6. And it
9 also updates the lighting power adjustment factors or PAF
10 to match the same sections.

11 These are the changes of the 2016 Standards made
12 to the opaque envelope for nonresidential buildings. You
13 can see that there aren't too many changes. The wood
14 framed and other category had a couple updates. Metal
15 buildings were revised across the board for all climate
16 zones. And for walls only two climate zones in the wood
17 frame and other category changed. And three climate zones
18 changed for the metal frame. All other envelope values
19 remain the same as the 2013 Standards.

20 This slide shows the envelope updates made for
21 high-rise residential buildings and hotel/motel guestrooms.
22 Again, not too many changes. Again, it's with the wood
23 frame and other category where four climate zones changed.
24 The metal buildings again were changed across the board.
25 For walls, metal-framed, almost all or all climate zones

1 except Climate Zone 7 has changed since the 2013 versions.

2 Minimum HVAC efficiencies have also been updated
3 to the 2016 Standards as shown in the tables of the
4 Standard Section 110.2. Most of the changes are with the
5 water source heaters, chillers, and packaged terminal
6 equipment such as packaged terminal air conditioners and
7 packaged terminal heat pumps. Section 110.2 also shows
8 updated part load IEER efficiency requirements that will be
9 validated upon the user input in the software.

10 This slide shows the adjustments to the lighting
11 power densities that have been made according to the
12 lighting tables in the Standard section 140.6. There are
13 also two new subcategories added to the transportation
14 function called Concourse & Baggage and Ticketing with the
15 lighting power density being .5 W/sf for the Concourse &
16 Baggage and 1.00 W/sf for the Ticketing areas.

17 The lighting power adjustment factors have also
18 been updated to reflect the changes made in the Energy
19 Standards Table 140.6-A. It includes a new category for
20 dimming plus off as one control type and also includes
21 institutional tuning. Institutional tuning is essentially
22 the adjustment of lighting levels in the building through
23 commissioning a technology to meet specific location and
24 task needs or various building policies.

25 The version of CBECC-Com that will be presented

1 for approval at the November business meeting will be
2 called CBECC-Com 2016 Version 1. This should have new
3 features and upgrades incorporated into it such as
4 upgrading the simulation engine EnergyPlus 8.3. It will
5 also have the mandatory minimum envelope U-Factor
6 validation function that will let the user know if the
7 envelope meets the weighted average U-Factor requirements
8 indicated in the Energy Standard Section 120.7 for new
9 construction and Section 140.0 for alterations.

10 We are also anticipating the modeling of a new
11 type of equipment called a Thermally-Driven Chiller. This
12 is a type of chiller that uses heat or waste heat in the
13 form of hot water, but not steam, to produce chilled water
14 for space cooling. It will also -- CBECC-Com will also
15 have Waterside Economizer modeling feature added for
16 waterside HVAC equipment.

17 It will also incorporate a duct leakage and
18 sealing feature to model duct work that under certain
19 conditions is seal tested and HERS verified.

20 This next topic is not necessarily a change, but
21 I wanted to give it further discussion to bring it to the
22 light of the users. The term is called Unmet Load Hours
23 and is abbreviated as UMLH. It is a term used to indicate
24 how well the HVAC equipment is sized for a project. It
25 means that there are a certain amount of hours within a

1 year that a thermal zone is undersized and that the room
2 temperature would not be within that temperature sub-point
3 range.

4 An Unmet Load Hour is counted any time a thermal
5 zone exceeds the temperature set point by more than one
6 degree Fahrenheit in any one hour period. This only
7 applies for certain types of zones that are normally
8 occupied for human comfort. Other zones that would not be
9 counted toward the Unmet Load Hours would be rooms that are
10 not normally occupied such as hallways, restrooms, storage
11 rooms etc.

12 Unmet Load Hour is a common metric used in energy
13 simulations to determine adequate HVAC sizing for both the
14 baseline and the proposed model. Prior to CBECC-Com 3B the
15 simulation would stop whenever any thermal zone exceeded
16 150 Unmet Load Hours either in the cooling or in the
17 heating mode. At that point the simulation stops and the
18 user would have to upsize the heating or cooling equipment
19 and rerun the simulation to see if there are less than 150
20 Unmet Load Hours. If there are less than 150 Unmet Load
21 Hours the simulation then will continue on to completion.

22 Users of EnergySoft's EnergyPro nonresidential
23 compliance software are probably not familiar with the
24 Unmet Load Hours, so the user was never aware of Unmet Load
25 Hours occurring. But in April of this year EnergyPro 6.5

1 began using CBECC-Com as its simulation engine. At that
2 point Unmet Load Hours would have been implemented, but in
3 order to help the EnergyPro users become familiar with
4 Unmet Load Hours it was decided to temporarily lift the
5 Unmet Load Hours, so all users can continue the simulation
6 without stoppage. But the zones with Unmet Load Hours that
7 exceed 150 hours would be reported on the compliance form
8 PRF-1.

9 In CBECC-Com instead of Unmet Load Hours that
10 exceed 150 hours stopping the simulation it became a
11 warning with a hyperlink pointing the users to a resource
12 about Unmet Load Hours to help them understand what needs
13 to be done when Unmet Load Hours exceed 150 hours. It is
14 anticipated that this simulation stoppage will be brought
15 back in the June 2016 approved version of CBECC-Com. So we
16 wanted to let the users know what is happening in terms of
17 the Unmet Load Hours.

18 And the final topic of discussion is with the
19 VRFs or Variable Refrigerant Flow technology. VRF is
20 becoming more commonly used in the HVAC community, but it
21 cannot be modeled for compliance in the software currently.
22 Instead it is modeled as minimally efficient heat-pump
23 systems. The reason there is not a compliance option
24 available within the software to model VRFs is because
25 there hasn't been a simulation method submitted to the

1 Energy Commission to demonstrate the accuracy of the
2 simulated VRF System yet.

3 There is a procedure in the Energy Standard
4 Section 10-109 and 10-110 that outlines the requirements to
5 submit an application to the Energy Commission to review
6 regarding any design, material or device that cannot be
7 adequately modeled in the software.

8 We have heard that the VRF community is currently
9 getting together to prepare and provide an application for
10 the Energy Commission to review in the near future once we
11 see if there are timelines dictated in the Standards
12 regarding that review process. This would involve an in-
13 depth review of the report and data submitted to show the
14 accuracy of the proposed simulation method.

15 There would be a public workshop where the
16 simulation properties will be publicly vetted. There will
17 then be a public comment period and then once all the
18 issues have been resolved it would be presented for
19 approval at a business meeting.

20 Once approved, it would then be incorporated into
21 a version of the software that could be used for
22 compliance. So this is the reason why VRF and other
23 technologies are not currently compliance options in the
24 software.

25 And that basically concludes all the changes to

1 ACM Manual. And at this point we would open up to any
2 public comments or questions.

3 MR. NESBITT: George Nesbitt, HERS Rater. I
4 guess I have a lot of questions, probably more than
5 comments here. Well, you know, comments, questions,
6 they're the same thing sometimes.

7 High-rise multi-family especially has been weird.
8 The 2008 Code and prior you have high-rise in a non-air
9 conditioning climate. The cooling budget was always the
10 largest budget in the standard design. These are buildings
11 that have no air conditioners.

12 If you took that same building using EnergyPro
13 and said it was a low-rise building it would become a
14 heating-dominated building, which is the reality. A little
15 bit of what I've seen of the 2013, it looks like maybe you
16 changed the internal loads. I don't know if it was
17 previously using an office building internal load and have
18 you changed that?

19 MR. FROESS: I don't know for sure.

20 MR. ARENT: Larry, I --

21 Yeah, as far as I know George, the internal loads
22 for the high-rise should be representative of a residential
23 space. So both in terms of the equipment obviously there's
24 not much equipment and then the occupant density is lower
25 than it would be form an office.

1 I mean, as far as what you're seeing, the
2 phenomenon, I don't doubt it. I would have to do a
3 comparison probably of the low rise versus the high-rises
4 spaces to see why there would be such a discontinuity
5 between the cooling loads in one case versus the heating in
6 the other case. But I'm not aware of any -- we hadn't made
7 any changes in terms of the interior specifications and
8 whatnot.

9 MR. NESBITT: I mean currently the water heating
10 is based on low-rise res, which I assume is implemented
11 actually, as well as mandatory measures for lighting and
12 dwelling lighting. Honestly, I feel that high-rise multi-
13 family and the other occupancies really are more low-rise
14 residential like than commercial buildings, at least the
15 residential portions.

16 The other kind of -- I really like the fact
17 there's a graphical interface with the option. I think the
18 big problem we have in energy modeling is you get plans and
19 you do manual takeoffs and come up with things. And what
20 you enter into the software is not necessarily the
21 building, so a couple of questions.

22 To what extent are there different interfaces
23 that can export to CBECC-Com? Also, whether your SketchUp
24 Interface could export to CBECC-Res and whether there's any
25 compatibility in files between the two?

1 MR. FROESS: There wouldn't because CBECC-Res has
2 a CSE, which is its own Compliance Simulation Engine, which
3 is a custom-built residential engine. The Nonres uses
4 EnergyPlus, which is a completely different simulation
5 engine. So because of those differences bringing a
6 residential file into the CBECC-Come version there would be
7 mismatches --

8 MR. NESBITT: Right, but CBECC-Com is an
9 interface over EnergyPlus. I mean, and I think the file --
10 I mean the --

11 MR. FROESS: Right, it would take some work to --

12 MR. NESBITT: The interface of the two, I think,
13 is similar. I mean, as much as I dislike EnergyPro, which
14 I've probably said before. The big advantage has been that
15 you can do both with the same file, with the same inputs,
16 and so as an energy modeler having that kind of
17 compatibility.

18 And then also thinking about having compatibility
19 and not having to do redundant effort in multiple software.
20 So in residential we have Right-Suite, which is HVAC-
21 designed software that can -- well is approved and can
22 export to CBECC-Res. So that kind of interchange of
23 information and that a product is not just an island.

24 And, you know, I mean people are obviously
25 designing buildings with computers and there's a lot of

1 that information. And the more we can eliminate error and
2 also fraud, because I have seen plenty of buildings that
3 were not what they are.

4 So there are just sort of some global comments to
5 think about software and whatnot.

6 MR. CONTOYANNIS: Okay, if I could speak just
7 really quickly? This is Dimitri Contoyannis, NORESO. So
8 EnergyPro, there are certified versions for both Res and
9 for Nonres, so you'll have to pardon my ignorance. But do
10 those two not speak to one another? Is that one of the
11 issues you're seeing? Are they not compatible with one
12 another?

13 MR. NESBITT: Actually, I can't answer that. It
14 may actually still work even though they have different
15 engines and they always did have different engines, but
16 yeah.

17 MR. CONTOYANNIS: And another question you posed
18 at the beginning was what other software tools are
19 available as an interface to CBECC-Com?

20 MR. NESBITT: Yeah, yes sir.

21 MR. CONTOYANNIS: And you're aware of IES?

22 MR. NESBITT: Yeah.

23 MR. CONTOYANNIS: There is a third that's
24 preparing an application as well. I don't know if you're
25 at liberty to say anything about it though.

1 MR. FROESS: Yeah.

2 MR. CONTOYANNIS: But the software tool is called
3 Symergy. (phonetic) It's also an EnergyPlus user interface
4 and they're working to incorporate CBECC-Com for compliance
5 analysis as well. So there's a growing number on the
6 nonresidential side.

7 Now, as for cross-walking between Res and Nonres,
8 there's no functionality like that built into CBECC-Com or
9 CBECC-Res I would talk to your favorite software vendor
10 about that. Essentially, the procedure would be to write a
11 translator between the data model in Res and Nonres. So
12 it's certainly doable. It's not trivial to do, but I don't
13 believe that's part of the CEC's plan at this moment in
14 time.

15 MR. NESBITT: Yeah, well just planting seeds,
16 hopefully they'll grow.

17 MR. FROESS: Sure.

18 MR. FERRIS: Okay. So it looks like we've
19 exhausted all the comments in person. I would again reach
20 out to those people who are participating online. If you
21 would like to make a comment I will open up the mics and
22 we'd love to hear from you.

23 (No audible response.)

24 MR. FERRIS: Okay. So it looks like we're
25 letting you out early.

1 MS. ROSS: Do you want to do next steps?

2 MR. FERRIS: Yeah, I'll go over the next steps.
3 Basically you guys heard them just before lunch, so you are
4 like, "Really? Do we have to listen to this?"

5 So same as with Res. We'll be posting both the
6 audio recording of this meeting and the transcripts once we
7 get them, on the -- what is it -- the Docket 15-BSTD-94.
8 So you can check that part of the website for any upcoming
9 information, the PowerPoints that we presented today and so
10 forth.

11 We'd like written comments on this presentation
12 by the same date, August 20th at 4:00 p.m. And the only
13 difference is with Nonres is if it turns out to be that the
14 industry really has no comments to make, because those
15 changes are very minor, we may choose not to have Nonres
16 participate in the September 28th meeting.

17 And with that I thank you for coming.

18 (Whereupon, at 1:00 p.m., the workshop
19 was adjourned)

20 --oOo--

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REPORTER'S CERTIFICATE

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

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 24th day of August, 2015.



PETER PETTY
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IN WITNESS WHEREOF, I have hereunto set my hand this 24th day of August, 2015.



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