STATE OF CALIFORNIA – THE RESOURCES AGENCY
BEFORE THE
CALIFORNIA ENERGY COMMISSION (CEC)

In the matter of,	)	
	)	Docket No. 16-NSHP-1
	)	
Design of the New Solar Homes Partnership	)	

Staff Workshop on
Solar on New Residential Construction

California Energy Commission
Hearing Room A
1516 9th Street
Sacramento, California

Wednesday, December 5, 2012
9:00 A.M.

Reported by:
Tahsha Sanbrailo

APPEARANCES

COMMISSIONERS

Carla Peterman
Andrew McAllister

ADVISERS

Saul Gomez, First Adviser to Commissioner Peterman
Pat Saxton, Second Adviser to Commissioner McAllister

STAFF

Le-Quyen Nguyen
Craig Hoellwarth
Piamer Vund
Eli Harland
Martha Brook
Farakh Nasim
Rena Nakar
Elizabeth Hutchison
Kevin Barker
Bill Pennington

Also Present (* Via WebEx)

PANEL I

Le-Quyen Nguyen, Moderator, CEC
Walter Cuculic, SolarCity
Matt Brust, SunPower
Jacob Atalla, KB Homes
Bob Raymer, CBIA
Joachim Seel, LBNL

PUBLIC COMMENT

George Nesbitt, Cal-HERS
Mark Byington, President, Cobalt Power Systems
Smita Gupta, ITRON
Meredith Griffith, SunPower
*Steve Zuretti, Solar Energy Industry Association
Bonnie Corwin, Cobalt Power Systems

APPEARANCES (CONT.)

PANEL II

Eli Harland, Moderator, CEC
*Albert Luu, SolarCity
Eric Weingarten, SolarCity
Lew Milford, CESA
Ethan Sprague, SunRun
Matt Brust, SunPower
*Sheila Berger, SCEIP

PUBLIC COMMENT

Kathy Fogel, California Public Utilities Commission
George Nesbitt, Cal-HERS
Mike Hodgson, ConSol Energy

PANEL III

Farakh Nasim, Moderator, CEC
Jacob Atalla, KB Home
Bob Raymer, CBIA
Mike Hodgson, ConSol Energy
Matt Brust, SunPower

PUBLIC COMMENT

Dan Chia, SolarCity
Tim Tutt, SMUD
George Nesbitt, Cal-HERS
Kathy Fogel, California Public Utilities Commission
Jacob Atalla, KB Home

APPEARANCES (CONT.)

PANEL IV

Elizabeth Hutchison, Moderator, CEC
Jacob Atalla, KB Home
Eric Weingarten, SolarCity
Lew Milford, CESA
*Scott Weber, Contractors State License Board
*Melanie Bidwell, Contractors State License Board

PUBLIC COMMENT

George Nesbitt, HERS

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P R O C E E D I N G S

DECEMBER 5, 2012 9:00 A.M.

MS. NGUYEN: Good morning everybody, it looks like we're ready to start. So, thank you very much for taking the time out of your busy days to attend our Solar and New Residential Construction Workshop.

So, I'll first welcome everybody and then provide some brief housekeeping before we get to the exciting stuff.

In case of a fire, please -- or some other kind of an emergency, please follow staff out the doors and we'll meet in the park that's kiddie corner to here, and then once everything's safe we'll come back here.

If you do decide that you need to take a break or use the rest room, the rest rooms are -- if you exit the double doors and make a left, the rest rooms will be on your right side.

And if you do need to take a break and get a snack, or a drink of water or some other refreshment, you can go up the stairs and there is a little café at the end of our atrium that you can use the vending machines or you can go into the store and buy something.

So, we'll be doing a panel format for today's workshop. We'll be talking about different topics, so the first one will be the Market Outlook for PV on New

Construction, and then we'll go over Solar Financing Models, and Energy Efficiency, and then Outreach and Marketing, Warranties and Consumer Advocacy/Protection.

So, what we'll do is we'll ask questions of the panelists for them to discuss and then at the end of each panel we will allow some time for an audience discussion.

And we do have participants on WebEx so what we'll do is we'll take questions from the audience that are at the Energy Commission and then we'll go to WebEx, and ask for any questions from WebEx.

So, I'd like to quickly introduce the people who will be participating. Each of the panelists we'll introduce prior to the panel, but staff here from the Energy Commission. We have Commissioner Peterman up on the dais and to her right is her first adviser, Saul Gomez.

And then we also have Andrew McAllister's second adviser, Pat Saxton.

From the Energy Commission we have Craig Hoellwarth, and we have Piamer Vund, and we have Eli Harland, Farakh Nasim, Rena Nakar, and Elizabeth Hutchison, and I am Le-Quyen Nguyen.

And so I guess we'll get started, Commissioner, if you'd like to make opening remarks.

COMMISSIONER PETERMAN: Sure, thank you. Good morning everyone and welcome. It's a good day to be inside and out of the rain and here focusing on a little sunshine.

It's been a very busy and exciting year for the New Solar Homes Partnership Program. The program received funding earlier in the year and so now we have adequate funding to continue to meet the demand we see in this market.

We had a tremendous amount of interest and applications in the program at the end of the last year and it really spiked my interest in understanding more what's been changing and how the market has been involved in both construction and solar on new homes.

I'll be joined throughout the day, as well, by Commissioner Andrew McAllister, who's our Lead Commissioner in Energy Efficiency.

Because, indeed, we both appreciate that we need to work together to move forward to meet zero net energy home goals and better integrate our energy efficiency, and residential solar programs.

There's been so much positive movement within the construction sector, as well as in the PV sector with prices going down that it's a great opportunity to continue to expand Solar New Homes and reach our goal of

400 -- approximately 400 megawatts of solar on new homes by 2016.

Also, the Commission's considered the amount of innovation in the financing of residential solar and we need programs to be flexible enough to account for different financing mechanisms, while still maintaining the integrity of the program.

As we move forward to reach our goals in this program, I wanted to hold this workshop to better understand some of the innovations that are happening in this sector.

Staff will be working on a new, revised guidebook for the program in 2013 and this workshop will form a foundation for some of the issues that the staff will be considering, although staff will be having future meetings and workshops on the actual guidebook, itself.

So, thank you in advance for being here, look forward to all your comments both verbal, today, as well as written, and looking forward to working with you in the next few months on this program. Thanks.

MS. NGUYEN: Okay, thank you, Commissioner.

So, for those of you who are unfamiliar with the New Solar Homes Partnership, I'll go over a brief background so you can keep that in mind when we're

discussing these topics.

So, the program began in 2007. It's a ten-year program so we'll stop accepting applications at the end of 2016.

We have three main goals; help establish a self-sufficient solar industry. As Commissioner Peterman mentioned, we do have a megawatt target goal. And we also seek to place solar energy systems on 50 percent of new homes by the end of our program.

Key eligibility points, it has to be new residential construction, you must be an electric customer of PG&E, SCE, SDG&E, or Bear Valley Electric, and your project must achieve high levels of energy efficiency.

So, it's an expected performance-based incentive that's based on the anticipated output of your system and it's a one-time, up-front incentive.

And then some basic statistics, so far we have 32.3 megawatts reserved and we've also paid on 20.3 megawatts.

So, now we'll start with our panels and the first one is the Market Outlook for PV on New Construction. And we'll begin with a guess presentation on the state of the PV market by Joachim Seel from the Lawrence Berkeley National Laboratory.

MR. SEEL: Thank you so much for the invitation to speak here today, it's going to be a pleasure for me to introduce some of the most recent numbers from a publication which the Lawrence Berkeley National Laboratory recently published, the *Tracking the Sun Number 5 Report*, where we track PV installation prices for systems installed across the United States, including the year 2011. We don't really have a lot of data going beyond that but, yeah, looking forward to giving you a brief overview of some of our recent research.

To give you a brief overview of my presentation, at first just capacity additions in the United States overall, then a brief work on price development, and a brief analysis on prices as a comparison between new homes and retrofits, especially in California.

To conclude, I would like to point out an analysis which we did on international experiences, which highlight further opportunities to reduce costs in the future, in particular in soft costs.

To start, however, I would like to give a brief overview of installations in the PC sector in the United States. This builds on the research by David Feldman of Robert Margolis at NREL.

The numbers here presented come from GTM, in

particular, and Bloomberg New Energy Finance.

So, overall we have seen a very strong first half of 2012, with 1.2 gigawatts installed. This is double the capacity which we had installed at, you know, a similar time period in 2011.

However, many analysts forecast that the market growth will slow down a little bit towards the end of the year so that we reach around 3 gigawatts this year.

California has been, again, the leading State in the nation, with 217 megawatts installed in the second quarter of 2012, followed by Arizona, New Jersey, and then Nevada, Texas, Illinois, and North Carolina.

In terms of PV systems installed in California, as many of you know the California Solar Initiative, the CSI Retrofit Program, the incentives are nearly depleted. There's quite a bit of uncertainty in the market how we will go after that, whether prices will have to be reduced in order to maintain attractiveness for customers, or whether just the quantity will reduce and less people will decide to build.

In many states we saw a decline in nonresidential installations due to the uncertainty associated with the REC prices and the decrease there.

This graph now comes from out publication, *Tracking the Sun*. Overall in the year 2011 we saw a

continuous trend of declining prices. So, in general, as many of you know, utility-scale prices are lower than commercial and residential prices.

The median price is followed by a 70 to 90 cents a watt, so that's a decrease of 11 to 14 percent from the year 2010 until 2011 across all prices.

When presenting these median prices of course the distribution of prices is much larger across states, with Texas being one of the lowest cost states and Washington D.C. being one of the highest cost states, California ranging more in the upper segment of the price distribution.

Now, I would like to turn to California and the prices which we observed for the year -- well, 2007 through the year 2011.

It is a little bit difficult to compare pricing between retrofits and new home installations because of a distribution of system sizes. So, in the new home segment we saw a cluster of systems in the 2 to 3 kilowatt segment and another cluster around 5 kilowatts.

And that size distribution is a little bit off in comparison to the traditional retrofit market and because of the economies of scale of which we observed where larger residential systems are cheaper on a per-watt basis, the comparison is a little bit tricky, which

is why here we focused only on the very small sector of 2 to 3 kilowatts.

And we saw overall that the prices reported for the -- in the New Solar Homes Programs are lower than the prices for retrofits. So, on average, that is roughly a dollar.

The prices of building integrated PV are roughly similar to rack-mounted prices in the regular CSI program.

And we were not able to distinguish in this pricing analysis between systems installed by third-party programs versus systems installed by -- which are customer owned. But to my understanding, in the NHSP program so far, of the completed programs only a few have been third-party owned.

Overall, we saw in the reports for the completed programs we saw a strong decline for systems being completed in the year 2010 and 2011, which I believe has to do with the overall stagnation in the housing sector.

For the first time, rack-mounted systems became more common than building integrated PV systems. However, building integrated PV systems are still more common in the small NSHP program in comparison to the overall California CSI program.

And last, a brief word on an international

comparison. This graph here shows PV prices for customer-owned PV systems, so excludes any kind of third-party pricing, between the United States and Germany.

And we see that for the year 2010 until 2012 German prices were roughly $2.50 to $3.00 a watt lower in comparison to U.S. prices.

So, I think we can talk about that maybe a little bit later, but the purpose of this slide was only to indicate that we have not reached, yet, the possible floor of pricing in the United States, but that there are further opportunities to optimize the system.

This is just a very brief overview of a recent analysis which we have done, which indicates some of the sources of the price differences, where we see them. Most of the price differences come from the so-called soft balance of system costs.

And with that, I think I would like to conclude this brief introduction. Thank you very much for your attention.

COMMISSIONER PETERMAN: Thank you. I have one initial follow-up questions and I imagine other questions will be covered through the panel. On your slide five, where you show median prices for 2 to 3 kilowatts, can you speak to the CSI third-party line

there? It looks pretty linear. I'm just kind of curious a bit more about that data, and how many observations, and what share of the CSI were third-party releases?

MR. SEEL: Sure, sure. So, the third-party systems which were included here, only those third-party systems where there has been an actual transaction between a third-party installer and so it's a non-integrated third-party installer. For example, like someone where we actually were able to observe a transaction price.

COMMISSIONER PETERMAN: Okay.

MR. SEEL: We excluded any kind of third-party pricing which might fall into the realm of the value-based pricing due to the uncertainty of what, exactly, is included and these value-based pricing reports.

Overall in the year 2007 and 2007 we didn't have that many third-party systems, yet, so it really only picked up in 2009, 2010 and 2011.

I believe in 2011 we had 600 systems here included for the third-party -- this is our program for the then 2 to 3 kilowatts.

COMMISSIONER PETERMAN: Great, thanks. And I saw that Bob Raymer was raising his mic to ask a couple questions.

MR. RAYMER: A couple questions, Bob Raymer with California Building Industry Association.

First off, will the Power Point presentation be available after today's workshop because I'd like to get my hands on it and kind of get warm and fuzzy with it. Thank you very much.

And with regards to integrated versus rack mounted are you seeing -- it seems to me my experience that we're seeing a lot more rack-mounted on new construction, which is a trend I didn't expect because of the leasing programs and the high popularity of the leasing programs. Are you seeing a whole lot more rack-mounted systems going on new homes than integrated, in the last two years in particular?

MR. SEEL: Yeah, so we don't have a lot of visibility of projects which have applied at the moment and which are not yet completed, so we only see data on projects which have been completed.

But I think what this graph here shows, on slide number six, speaks to the experience that we have seen an uptake in rack-mounting systems versus building-integrated systems, yes.

MR. RAYMER: Thank you.

MR. SEEL: Yeah, please.

MR. NESBITT: George Nesbitt, Cal-HERS. To what

extent are these prices priced before any rebates, any kind of things like that, and especially with the comparison with Germany?

MR. SEEL: Yes.

MR. NESBITT: It's not a cheap place to live so, you know, my German relatives do need a little profit to afford their houses, and Mercedes, and Audis.

COMMISSIONER PETERMAN: Mr. Nesbitt, I almost didn't recognize you without your hat.

MR. NESBITT: Well, you know.

(Laughter)

MR. SEEL: Well, thank you very much for your question, that was -- it's great that you asked it.

MR. NESBITT: It looks like you have a new hairdo, too.

MR. SEEL: Great that you asked that question and provided me an opportunity to clarify.

So, all the prices which are reported are pre any kind of incentive. So, it is the incentives of the NSHP or the CSI rebates are not included in any of these prices.

Also, the prices in Germany, basically, most of the systems in Germany are -- well, the subsidy -- it's not really a subsidy, but the electricity is sold with a feed-in tariff and there's no up-front rebate

whatsoever. So, it's only a guaranteed sales price for the electricity, but no up-front rebate is received. So, the $3 a watt or, now, for Q-3 at $2.50 or so is the actual transaction price between the installer and the residential customer.

MR. NESBITT: And on the third-party releases, I imagine perhaps one of the difficulties is the sales price or lease price actually includes the fact the third party is getting the tax credits, and so you may not be able to see the true installed cost versus the cost to the customer, which is being subsidized by Federal tax credits in the rebates.

MR. SEEL: So, the prices which we have here exclude any kind of -- well, so the ITC or any kind of rebate is not in particular taken into account for. It's just the prices which are charged for the system.

With the third-party folks it mirrors, again, so the third -- the ITC, the 30 percent ITC is included in that price. In general, I guess there are some difficulties with assessing exactly in transaction prices for third-party PV systems because they bill some additional services, maintenance over a certain period of years into it, which is why for most of our analysis we tried to exclude them. But as best as we could, we tried to report accurate pricing here.

COMMISSIONER PETERMAN: Any other questions from the panel?

MR. BRUST: I might just add, to Bob's point earlier, there are no manufacturers, anymore, building BIPD products at scale, so I think that, you know, you're going to see a very substantial drop off, obviously, in the market for that.

And that, really, the reason for that, I don't believe, had as much to do with leasing as it did have to do with the general acceptance of panels in the market where there wasn't really a market need for the BIPD product.

And then to the last point here, I would just make the point that Germany's obviously a much more mature solar industry with what I would call a screaming value proposition. That means that your customer acquisition costs are you don't really have any versus California where we're a much more immature relative to these -- we're the most mature state in the Union, but at the same time we have much higher customer acquisition costs here, relative to there. So, I think that's a big part of the cost, actually, than the soft costs there that they don't have, that we certainly have here in the States.

COMMISSIONER PETERMAN: Great, thanks.

Well, Le-Quyen, do you want to get going with the next panel or with this panel?

MS. NGUYEN: Thank you, Joachim.

And our next guest presentation is going to be from Bob Raymer, from the California Building Industry Association.

MR. RAYMER: Thanks. Thank you, Le-Quyen, Commissioner. I'm Bob Raymer, I'm the Senior Engineer with the California Building Industry Association and today I'd like to give about a five-minute presentation on sort of just the raw housing data, sort of where we've been and where we're heading and while if you take this into its entirety, the chart in front of you, it's not necessarily overall a very happy chart.

The good news is since we bottom out in 2009 things have been getting better, albeit very slowly.

Anyway, the past six years, obviously, have been a very difficult time for the housing sector.

And by the way, I've put copies of this chart out in front so that if you leave and want to grab a copy, go for it.

We're slowing emerging from the worst economic downturn that the housing industry has experienced in the last 60 years. And we have -- and that involves our Construction Industry Research Board, which is the basis

for this information, now housed in Sacramento with our California Home Building Foundation, our nonprofit education and research arm.

This data has been compiled, this is one of the sources for the real estate data that you see every Sunday in the newspaper, whether it's the *L.A. Times*, *The Sacramento Bee*, or et cetera. It's been a long-standing institution.

And one of the nice things about its data gathering techniques is that it will go back, CIRB will go back in future years and retool the data to make sure that it stays very accurate.

For example, the numbers for 2010 and 2011 have been tweaked a little bit once we got final data coming in as the years and the time went by.

If you look at 2007, we did a total of 113,000 units, that's both multi-family and single-family.

Putting this into perspective, 2007 was an absolutely disastrous year for the building industry. Normally, given we're always going through these economic cycles, upturns, downturns, or whatever, but given past practice going back 25 years, when you normally have a downturn of that magnitude you go right into a very strong resurgence simply because housing demand being what it is you go through your cycle and by

the time we bottomed out in 2007 we should have been spiking back up within a very prominent way. That didn't happen.

The collapse of the housing sector continued for two more years and in 2009 we hit the all-time low in the 60 years of keeping this data.

On a positive note we're coming out very slowly, but the recovery has been quite anemic, at best.

2010 was the second worst year on record, 2011 was the third worst year on record and so on, you get the picture.

Now, the interesting things that you can take away from this date, over the past 30 years single-family homes have, on average, usually outpaced multi-family by a factor of two to one.

For the short term that has changed substantially. In 2012 we will be building more multi-family units than single-family. I think that is only the second time in the past 35 years that we have seen that happen.

And by the way, when I say single-family, I mean one and two family dwellings. It's a single-family and a duplex unit. Multi-family is anything three units or more.

In 2013 we anticipate that multi-family units

will once again equal single-family units and by 2014 single-family will start moving ahead.

You may have recently heard from a UCLA report that they're projecting in and around 105 single-family units being built in 2013. I have no idea where they came up with that figure.

We don't have enough finish lots in the State of California to do 105 single-family units in 2013. I suspect they're probably looking at what the demand is for single-family units and not what we'll actually be constructing here.

Anyway, on a negative note, in 2009 industry lost about 80 percent of its workforce. Some jurisdictions it was even worse than that. And you need to keep in mind, particularly when you're looking at implementation of any type of regulation, including the Energy Efficiency Standards, the same thing happened to building departments throughout the State.

So, the plan checkers and the site inspectors, those local offices with the building departments have lost, I would say, at least 80 percent of their workforce.

A good example I like to use is a jurisdiction close to Chula Vista, in the San Diego area. They used to have a staff of 42 building inspectors and plan

checkers. They now have two and one of them is a transfer due to seniority, he came in from planning and land use.

And so, effectively, they've gone from 22 [sic] people down to one with experience in Building Code plan checking and inspection.

Now, things are turning around but, as you can see, terribly slowly. And, usually, we start to see a resurgence in these building departments about a year after industry comes back because, of course, their funding comes directly from building permit plan check fees.

This turnover labor has a direct impact, of course, on implementation and enforcement of the Energy Regs.

And one thing to keep in mind, of the thousands and thousands of site superintendents, that's what we call the foremen for the building industry, the subcontractors, the thousands of subcontractors, and the plan checkers and building inspectors are out there, not very many were around when the last set of Energy Regs took effect in 2010 and, certainly, they're not up to speed on the regs that are going to take effect in January of 2014.

So, in 2010 the regs saw an increase in

stringency of 20 percent. The 2013 regs that take effect January 2014, with 25 percent, there's a lot of change that is happening with building design, subcontractor work, and with plan check and inspection.

There are tens of thousands of individuals throughout the State who need to get up to speed on this, who have kind of been out of the market for the past five years.

And one of the things we'll be talking about today is the need to get education and training so that both solar and energy efficiency kind of gets back on track at the field level.

And that concludes my presentation. Were there any questions?

Thank you.

COMMISSIONER PETERMAN: Thank you. I think you raised a lot of interesting points, but I'll hold off on any questions, I think they'll probably be answered during the discussion.

Any questions?

MS. NGUYEN: Thank you, Bob, for the presentation.

I'll finish introducing the rest of the panelists. So, so far you've met Joachim Seel, he's with the Electricity, Markets and Policy Group at the

Lawrence Berkeley National Laboratory.

And you've also met Bob Raymer, he's a Senior Engineer and Technical Director at the California Building Industry Association.

Next to him is Jacob Atalla, he's the Senior Director of Sustainability at KB Homes.

Next to Jacob is Matt Brust. He's the National Residential Sales Director at SunPower.

And rounding off our panel we have Walter Cuculic. He's the National Manager of Home Builder Programs at SolarCity.

So, if each of the panelists would like to provide a two- to three-minute introduction of themselves and their background on the PV or new residential construction markets, and we'll start with Joachim.

MR. SEEL: Thank you. Is this on? Yes, it is, okay.

So, I have been with the Electricity, Markets and Policy Group for nearly two years, now, at the Lawrence Berkeley National Laboratory and have done their PV pricing analysis, and a little bit of wind analysis.

I have a master's in science at the Energy and Resources Group at UC Berkeley, and a master in public

policy from the Goldman School of Public Policy at UC Berkeley. And just recently enrolled in a PhD program at UC Berkeley, as well, focusing on electricity market design.

And I recently published a study on cost comparisons between German PV systems and the United States, the US PV systems, and I'm happy to talk about that later on, as well.

MR. RAYMER: Thank you, Le-Quyen. As I've already indicated, I'm Bob Raymer, I'm Senior Engineer with the Building Industry Association.

We're a statewide trade association and we have a little over 5,000 member companies. Our primary interest is residential construction, but about 15 to 20 percent of our members are also involved in light commercial construction.

I've been representing CBI at the local, state and national level for, geez, 31 years now, mostly on issues of buildings codes, but this takes place in front of both the Legislature, and probably about ten different state agencies primarily, the Energy Commission, the Building Standards Commission, the Department of Housing and the State Fire Marshal, to name a few.

And I've been involved with the development and

adoption of energy regs, representing CBI and before the Energy Commission since 1981.

MR. ATALLA: I'm Jacob Atalla with KB Homes, Senior Director of Sustainability. KB Home is a national builder based in California.

We have been involved with the solar industry since 2005 we installed our first systems with PV. And since then transitioned to panel systems, for reasons that were mentioned, and others that I will be happy to expand on later.

Initially, we started solar as an option. Over the years and particularly in 2011, we started installing solar as the standard in select communities in Southern California and continue to do so at this time.

MR. BRUST: So, I'm Matt Brust and a slight clarification, I'm the National Field Director for the New Homes Division within SunPower.

I have been with the company for over six years. I began my career with the company working under the ERP program, so at the time we developed -- we recognized that the new homes was a substantially different market or channel than residential retrofit or commercial, and that we needed to have a business focused purely, pure play on homebuilders and, basically, adapting a business

model that adapted to the homebuilders business model.

So, I think we delivered our first homes in 2006. Today we'll reach, I think, our ten thousandth new solar home sometime in January or February of next year.

So, we have a substantial amount of experience and I would just say that, you know, over the last five or six years we've seen a tremendous amount of change and the New Solar Home Partnership has been incredibly important, I think, to the success that I believe that we have had, and are having.

Recent data that we acquired from the New Solar Home Partnership, as well as the data from CBIA and CIRB indicates that in 2012 we'll deliver 18 percent of all newly constructed single-family homes in California will be solar homes. That's 18 percent, up from 7 percent last year.

So, we'll talk more, I think, about what has caused that large spike in adoption.

So, thank you for having me here.

MR. RAYMER: Wow, that's huge.

MR. CUCULIC: Similar to Matt, my name's Walter Cuculic, I'm with SolarCity, I'm in a similar role as to Matt. I'm the National Sales Manager for SolarCity's builder programs.

I've been with SolarCity almost two years, now. Prior to that I was actually in a similar role to Jacob, running Pulte Groups, they're the nation's largest home builder, their sustainability programs, as well.

So, obviously, I understand both sides of the builder equation, as well as the solar equation. So, thank you for having us.

MS. NGUYEN: Thank you. So, I guess we'll get started with all the exciting questions. Question number one, are you guys ready?

(Laughter)

MS. NGUYEN: Okay, well, I guess I sent these to you ahead of time so you're ready.

Solar PV system costs have significantly decreased in recent years. Have total system costs bottomed out? If not, which costs can be expected to decrease in the short- and medium-terms?

And then following up, how can further cost reductions be encouraged to the point that PV is cost-effective without incentives?

So, what we'll do is anybody who wants to offer an opinion or an answer to this can go ahead and speak, and if nobody speaks then I will randomly pick a lucky winner.

(Laughter)

COMMISSIONER PETERMAN: I think maybe picking on one panel and I like it, you'll be picked for more of these.

MR. BRUST: I'll be happy to get the conversation going.

MS. NGUYEN: Great.

MR. BRUST: So, you know, when you talk about solar costs we're talking about a stack that includes a whole bunch of different components and, you know, what used to be a major component of that cost is the PV panels.

And we've seen, over the last couple years, a significant drop in the cost of PV panels to -- from what they had been. And I think it's really important to point out that the price is not necessarily -- we haven't gotten there, necessarily, because we've gotten the industry to scale, but because we're in a consolidation period.

So, there's basically an over-supply in the market or, you know, with not as much demand as we have for supplies and that kind of stuff.

And if you look at the financials of the major solar companies, you know, in the world, particularly we compete primarily against Chinese and European panel manufacturers and you find that they're either going out

of business or they have negative gross margins between, you know, 6 percent and 25 percent, which means they're selling the product at a price that is less than what they're manufacturing it for. And it's just not a sustainable market and we expect that to change over the next few years.

So, to answer the question, you know, where do we expect to see continued price decreases? Is it possible that panels will continue to go down?

In the future, yes. In the short term I think, you know, we're not going to see anything near what we've seen in the past and we have to wait for this consolidation period or event to take place before we kind of come back into a healthy market where companies are profitable, you know, to the point that they need to be.

Outside of that, the panels, there's obviously several other components of the cost stack that we look at very closely. SunPower is a downstream integrated business, so we're not just interested in the panels, we're interested in every piece of that cost act and figuring out ways to reuse those things.

So, you know, to address a few of them, one of them is obviously labor and I feel like in the homebuilding industry, anyway, we're working with very

sophisticated labor providers, and sophisticated customers, and the builder and that they've learned how to work with trade partners to get the cost as low as possible and get the volume and scale that they need to out of their labor partners.

And so, I think as Bob mentioned, you know, we lost 80 percent of the workforce and now, all of the sudden, we see a rebound in the market and there's a major workforce shortage out there.

So, one could foresee that as we get back to recovery, and there's a workforce shortage, that you could potentially start to begin to see cost increases on the labor side.

And in fact, I think Jacob could probably report that they're seeing -- they are seeing across their trades workforce or trade cost increases due to labor and lack of or shortages of labor.

Then there are the other components like inverters. We have not seen major improvements in inverter pricing, certainly not in line or didn't toe with what happened in the panel manufacturing business.

And then you get into some of the other, I guess, fixed costs of racking systems. You know, we don't see any major, you know, innovative things that are going to happen that are going to have substantial

increases and decreases in price there, but there are opportunities, surely, to save on labor and save on racking through innovation, which will certainly take place over time.

And then it would take me to sort of the soft costs. You know, your administration of the programs, you're administration of the NSHP, utility interconnections, the managing of the customer, and the expectations of the jurisdictions.

And I believe that there's cost savings available there, but we're going to have to work to get it. There isn't any major component or low-hanging fruit left anymore and the cost act has gotten so small, and when you look at all the different pieces of it there's more investment required to get less out than what we've seen in the past, which is good. It means that we're getting closer and closer to good parity in terms of cost.

And the last thing I would mention is, in comparing back to Germany is our customer acquisition costs are still expensive in the U.S., in California, whether it's a residential retrofit or a new home customer, the cost to go out and get the customers, and to build these systems, and to manage the customer because we're not in a mature environment is, perhaps,

one of the biggest opportunities to reduce.

And that is only going to happen through market maturity, and education of the consumers and the homebuyers, to the point where it becomes standard in a home much like an air conditioner did in a car years ago. At that point we'll be able to reduce, you know, further reduce the costs because we're at maturity.

MR. RAYMER: And Bob Raymer, with CBIA. Following -- by the way, I'll be speaking to questions number 3 and 5, I didn't expect to speak to 1 and 2 today, but I --

COMMISSIONER PETERMAN: Oh, and Bob, let me just interject a couple of questions, now, for Matt to respond to, as well as for you to follow up on or others to follow up on.

When you talk about consolidation within the industry are you also saying consolidation within the contractor market, as well, in addition to the module market?

MR. BRUST: I think a little bit. I mean, honestly, I think the -- are you talking about the broader market or are you talking about the new home market because I think --

COMMISSIONER PETERMAN: For the new home.

MR. BRUST: Yeah, I think --

COMMISSIONER PETERMAN: I imagine probably less, uh-hum.

MR. BRUST: -- we're actually growing the new homes because we've gone from 7 percent to 18 percent and we need more partners, or more sophisticated partners, or we're helping them grow their business from an insulation stand point.

In a retrofit, I would say that the introduction of these third-party financing programs have helped, you know, sustain sort of the residential business which looks, obviously, quite a bit different than I believe the new ones do.

COMMISSIONER PETERMAN: And the other follow-up question I have is you mentioned the opportunity, possibly, for some labor supply constraints going forward, and I'd welcome your thoughts, kind of acknowledging that about what you see as the potential impact of required certification programs, such as the NABCEP certification. I think there's about 12 states that have some requirement with NABCEP in terms of providing their incentives. And it's just something I've been curious about, about that potential additional barrier to entry with licensing and certification requirements.

MR. BRUST: I think additional requirements such

as that, right now, would have a major impact on potentially cost and just the ability to install systems if we didn't have a substantial trained workforce working for the types of partners that we're working with today to do that.

Because it's very difficult to stop midstream and change your installation partner, there's so many back-end processes set up around those trade partners that you work with to switch and it is extremely costly and difficult.

COMMISSIONER PETERMAN: Thank you.

Bob?

MR. RAYMER: Yeah, like I said, I hadn't expected to respond to question one, but a point that Matt had brought up is very telling.

The market penetration of solar in the new residential market has skyrocketed, primarily due to the success of the New Solar Home Partnership.

But if you look back, just three, four years ago, there was a penetration of around one percent, very small. We had a very steep hill to climb.

And while we're not still out of this, when you've got probably a half-dozen of the major production builders that have decided, at least initially, to incorporate this as a standard feature, we've gone from

that 1 percent to, I would say, a 15 to 20 percent level that we're going to see in 2012, 2013.

That is an extraordinarily something I don't think I've ever seen in all the time that I've worked for the building industry where technology, number one, not only of this cost and this size has been basically brought into the industry so quickly.

I understand that the goal is to get 50 percent by 2016 and 100 percent by 2020, but it is just remarkable.

And as we get into other questions today, the ability to keep this momentum going, particularly for the next one and a half to two years will be vital because builders are in competition with each other. They want to sell their home to the home-buying public, and they want to be able to beat out the competition next door.

And when someone who's not building solar is looking at the competing market and he says, geez, these homes over here with KB, Lennar, with Shea, with other builders all have solar on and they seem to be selling quite well, that all of the sudden puts the light bulb on, maybe I should consider incorporating this.

That's the snowball effect that we can probably expect to see within the next two to three years. It

will be kind of an exciting time to see how all of this plays out. Thank you.

MR. ATALLA: Commissioner, Jacob Atalla with KB Home, if I made add to the perspective on labor. Labor shortage is very acute right now in the sense that skilled labor is not available. We still have unemployment, but skilled labor has migrated away from the construction industry to some extent during the downturn, and it's been difficult to -- so far to bring them back.

So, this labor shortage has some impact here.

But I'd like to add a different perspective to the cost of solar. For a production home builder cycle time is very important. And when we started solar several years ago, back in 2005, adding solar on a home, we knew that we had to add several days, weeks to a cycle time of that particular home to get it done with solar because there was no service providers for solar that were strong enough to work at the speed of a production builder.

Fortunately, over time that maturity in service providers came through. Providers such as SunPower, that are not just manufacturers, but here work with us on the end-to-end solution, providing the permits, everything related to interconnections, and the rebates,

all things bundled together.

Having that kind of service provider available to work at the speed that we need to build the house in made it available, and made the cost of it less for us because of the shorter cycle time.

And, finally, I would agree with Matt in terms of consumer maturity is not there, that's where we probably can -- we're spending a lot of time trying to educate the customer to take on a home that has solar as standard, or buy an optional system.

So, that time and people that were putting -- focusing on that, that's a cost that still has some opportunity here.

MS. NGUYEN: Okay, so Jacob, that was a good point you made. And I know you're on the last panel talking about consumer protection and outreach and marketing, so we'll make sure to bring that up and ask you more about that.

And then, Matt, you also brought it up. So, you're not on the panel, but we'll still ask you to provide feedback on that at the time.

So, just to be clear, not everybody has to provide an answer, but if I feel that you have something important to add and you haven't spoken up, I will point you out.

So, Joachim, your turn.

MR. SEEL: That's great. I have one more question on this. Some of the tracking, the Sun work has indicated that installed priced might be a little more sticky in California, than in other states in the U.S. And so beyond reasons that we know, that's different than the international market, just in the U.S. market -- things that might cause that would be higher electricity rates, difference in labor rates, sales tax rates, perhaps smaller systems in California.

But I wondered if anyone had any comment on that? Still, what, about half of PV systems in the U.S. are in California, I think, so it's a little surprising that California's on the high side of median for installed price.

MR. SEEL: Oh, definitely, that is very surprising and it is somewhat contradictory to the common thought that as you grow the market, necessarily prices will plummet.

At LBNL we have not done a lot of -- well, we have in my analysis we've done a little bit of detailed soft cost analysis, but overall when comparing California prices to other states we have not really gotten that much into the details, more on an overall system price level and not the individual soft cost

categories, in particular, because we didn't have data available for that. So, there are some limitations.

I think some observers have pointed out that there is so-called value-based pricing where you look at what the net present value of the system might be, and given the high electricity costs which you offset here in California, some people have pointed out that there might not be as much of an incentive to reduce prices because a PV system is already somewhat competitive with the utility. And so the drive to continue to reduce prices on a month-to-month basis might not be there as much.

Ideally, I guess, in a competitive market the different providers would compete against these other prices in order to drive down prices, but we have not seen that, yet, to an extent maybe as we would like to.

Of course, there are some other fundamental differences in costs, et cetera, and permitting, maybe.

Yeah, one of the other questions in terms of where we might see prices going, I guess the fundamental -- the fundamentals of the model industry have not changed, yet. We still have an over-supply. And although in the past, you know, people always thought, okay, we've hit the bottom, it still continued to decrease.

And at the moment, as we still have an over-supply in production capacity, I don't really see any reason why the decline in module prices should be reached now.

However, modules are a significant -- not a big share anymore in terms of the overall system price. You know, the spot market price is up 70 or 80 cents a watt, and overall system prices are up $6.00 a watt, and so it is just one-sixth of the overall system price.

So, I think one should really try to look at the other components, especially as soft costs, yeah.

MS. NGUYEN: Okay, so we've all mentioned soft costs, both of you have mentioned that and then you have mentioned different aspects of the soft costs, you know, like the labor costs or customer acquisition.

Are there any other soft costs that you guys wanted to address? You know, things that need help, and no body's mentioned permitting or anything. And, you know, some of these we'll get to later.

MR. RAYMER: Yeah, number three I've got a lot to say about permitting.

MS. NGUYEN: Okay, you want to wait until three.

And Walter, it looked like you may have had a comment?

MR. CUCULIC: Yeah, just I would reemphasize the

need for simplicity for the overall process. I think that Jacob hit on it earlier, as well, as the current NSHP process is very cumbersome for both integrators, as well as the builders, themselves.

You know, how should I say this, Arizona has basically lost many of its rebates and I've actually seen that kind of as a good thing because it just is simpler now.

And not that I want us to lose NSHP rebates, but the amount of paperwork that is required and the administrative overhead to make sure you're collecting these rebates correctly, transferring them if you pick up a new builder or, you know, you lose a builder to another one.

And that actually, from an industry stand point, is a potential barrier to entry for more integrators to get in.

If you look at the industry and the people that are servicing the new home industry, from an integrator's stand point it's pretty consolidated, there's not a lot of people serving it. And I think it's because of these -- the complexity of the processes.

And so if you want to lower it, you bring more people in by making it simpler and that will then keep

costs down, or move costs down is my thought so --

COMMISSIONER PETERMAN: Thank you for that comment. You know, when it comes to the soft costs I think, you know, as Joaquin pointed out, one of the challenges is that we don't -- that whether researchers or even regulators don't have transparency into all of what those soft costs are.

So, in terms of that comment I encourage you to continue to talk with staff, talk to us about how much you're spending on administrative costs and what this actually breaks down to in terms of number of staff that are required to do the work, because that is an area where we have some opportunity to impact.

MS. NGUYEN: Okay, so to keep things going, I guess, in a nice flow, we'll actually skip to number three, since I've heard some mention of three.

So, number three is what market barriers or inefficiencies, for example tariffs, permitting, grid interconnection, integration, NSHP are disrupting the PV market from reaching its full potential?

MR. RAYMER: I'd like to kick off on that one, Bob Raymer with CBIA, again. I'll cover issues related to local permitting, NSHP, program flexibility, repayment of loans and net metering.

Kind of kicking off on local permitting, this

has been a problem more with retrofit than it is with new construction. But still, with the sort of newness related to solar you've got over 500 cities and counties out there that have a tendency, particularly with new technology and new systems to deal with things in sort of a patchwork quilt approach.

There does need to be a need for some uniformity throughout the State. I do want to indicate that the issue of local fees and services has been a very contentious one for the past 25 years.

In terms of permitting, there is State law that's been around since the late 1980s that does require that the fee collected by the local jurisdiction has to be reasonably connected to the services rendered for that fee; which sort of raises the question of why do some jurisdictions charge zero and other jurisdictions charge $700, $1,500, et cetera, for pretty much the same type of systems.

And so I think we've already done a good job of attacking this over the last year. OPR worked with the Energy Commission, HCD and the fire marshal to come up with the permitting handbook that's being distributed to the local jurisdictions throughout the State.

We've all kind of worked together to make sure that the people how need to get that in their hands is

getting that.

And I think over the course of what's left of this year, and 2013, you're going to start to see an emergence of sort of a collective way of dealing with this and, most importantly, with the new home market.

We just simply have to get this mass of workforce out there, particularly local jurisdictions, the plan checkers and the inspectors familiar with this technology. They've got to get up and get warm and fuzzy with it so that, number one, they're not afraid.

And number two, to the extent we can hand them on the silver platter here are the things you need to check for, it's not that big of a deal.

And with, particularly, new home construction when you're dealing with production housing, you don't necessarily need to do all of these things each and every house one, by one, by one.

There's a lot of retroactivity here that plays in and can really help reduce the amount of time and effort that a jurisdiction has to do with one thing. They just need to pick up that guidebook, it's very helpful.

Moving on to New Solar Home Partnership Program flexibility, I would really like to ask the Commission to think long and hard about reinstituting the -- I

guess we called it the New Solar Home Task Force.

This is something that worked very well together in putting together I think the first two editions of the guidebook. And while you might not necessarily want to go with the same players that were around, you know, seven, eight years ago, certainly getting that group back together with the current level of -- you know, those who are the -- those who have something to add to this issue at this point in time and meet on a regular basis.

I realize that we don't necessarily need to physically meet in the same room but, you know, every quarter have a conference call, you know, get the questions out and just provide a forum where the interested parties can get together and say here's the latest that's going on with the program, here's some issues that have popped up in the field. We need to address this quickly to keep things moving strong and smoothly. That could be a real big help here.

And I suspect there's going to be other speakers saying pretty much the same thing, since I cheated and I talked with a lot of them before today's presentation.

Now, that kind of leads into the next issue, particularly right now, there is a need for timely clarification of field implementation issues in the

maintenance of these interpretations in some manner, whether it's electronically or whatever.

But the Energy Commission's done a great job with the blueprint over the years, with the Energy Efficiency Standards, where questions have come up in the field and they see it enough that they want to speak to it in a more formalized fashion.

And they'll say here's the issue that's popped up and here's how we want to see this dealt with out in the field.

And that has been a great educational source for decades. And so to the extent that, you know, we don't necessarily have to use the same format model of the blueprint, but some way we've got to be able to establish questions and answers that are repeatedly coming up in the field so that you've got this commonality that at the drop of a hat either a building official, particularly a utility representative, or the installers or whatever can gain access to, to help things moving along slowly and not dealing with a multitude of different answers or approaches to the same issue. That would be really helpful.

Regarding a specific change to the guidebook, once again I know that there will be at least one other speaker to this. But we've seen, particularly with this

skyrocketing market, that there is an unexpected, very understandable need to shift the application of solar from one project to another, whether that's called fungibility or providing fluidity within the application of the New Solar Home Program.

What we're seeing is the marketplace can be very fickle and you may have production builders who, in one location already had a new solar home reservation sent in, but we're seeing where just two, three, ten miles down the road the same builder has another project and it looks like solar is going to take off like hot potatoes in that jurisdiction.

And so it would be very helpful, since particularly we're dealing with the same climate zone, to be able to have more of a kilowatt banking approach for a New Solar Home Program whether you can either do it here, or do it there, or whatever, but have the flexibility to, at the drop of a hat, say we can't go forward with solar over there, but we certainly can go forward with solar over here and deal with it that way. That could be very helpful to us.

One of the issues we dealt with earlier in the year, as you well know the State budget hasn't been all that happy these days. With the passage of Prop 30, hopefully, things will be a lot nicer as we head into

June of next year.

But over the years, as you well know, there's been some loans that have been taken from the RRT, of the Renewable Resource Trust Fund and applied to the General Fund.

We saw $25 million repaid back in June of 2012. There's still some outstanding loans to the New Solar Home Partnership Program.

And to the extent possible we can work with the Legislature and the Energy Commission to try to see that that money comes back, particularly the sooner the better, there's an urgency here.

I think that you're going to see a dynamic change occur with application of solar as a standard feature in production housing that's taking place now, and for about the next year and a half to two years.

And if all of the sudden there's a disruption in that flow of the incentive money during this short term, that could have -- it could take years to rebound from that.

We've got the snowball running down the hill right now, it's getting larger. And to the extent that we can keep that going before it hits the bottom, so much the better.

So, anyway, once again we'll be doing whatever

we can to support the Energy Commission in getting some or all of that money repaid. Of course, that's always easier said than done.

Moving right along to the noncontroversial issue of net metering, we want to see everybody come out of this happy. We don't want, necessarily, the utilities -- they have an understandable issue, they want to make sure that the transmission grid that they've put out there is kept whole, that there aren't free riders. And we think it's very reasonable that someone with a house that's connected to the grid, indeed, have to pay some reasonable fee, which the PUC's now under-doing a study to check what that reasonable fee should be.

But we want to make sure the utilities are kept whole.

But the bigger and global issue is, as we approach 2020 and we, theoretically, are looking at 100 percent of new homes having solar on it, we've got to be able to market that. And we're not going to have incentives when it hits 2020, the incentives are going away.

And one of the best ways to effectively market solar is to be able to tell them that they're going to get a reasonable return. As that solar energy, the part

that they don't use goes back into the grid, they're going to get a reasonable return for that.

And so to the extent that we can stop figuring out what tiny percentage will increase the 2 and a half percent cap to 5 percent, and now should we change it to 6 percent, it would be nice in a great world to see 100 percent.

I realize that this is going to be a very contentious issue in the Legislature, but if we could get to a point to where the utilities are happy, everybody's happy and we're able to get a good return for putting solar on the roof, all of the sudden the common question that the homebuyer's going to have is why would you consider not putting solar on the roof.

We need to kind of get to that point and right now you can't really say with surety that they're going to be getting a good return for that investment right now. Down the road we want to change that.

So, it's a very simple equation but, politically, it's a lot harder to crack that nut.

So, that kind of concludes -- of course, the other issue that was brought up earlier, issues with China, free trade being what it is, right now U.S. manufacturers are at a disadvantage. To the extent that can be taken care of, whatever you can do to fix that,

you know, give it a shot.

(Laughter)

MR. RAYMER: Anyway, that's my comments, thank you.

COMMISSIONER PETERMAN: I already was thinking, boy, that's a lot of ground you covered and then you just throw in that international one, as well.

MR. RAYMER: What can I say?

MS. NGUYEN: Okay, so yes, those were really good comments, Bob, really helpful. And just like with Matt, I'm going to invite you to stick around for the last panel and to provide your comments, you know, on the advisory committee, restarting that and the conversation we can have with customers.

The blueprint idea, also great, so I'd ask you to bring that one up again and maybe elaborate a little bit more on that.

So, any other comments on anything Bob's had to say or any new feedback?

Joaquin, great.

MR. SEEL: Okay, so I think one of the points which Bob pointed out, already, and which we've spoken about previously already, and when it comes to market barriers I think overall investor security is a big point, that the customer has the security that the

investment, which is sizeable of, you know, $10,000 to $20,000, if he pitches it up front, into the PV system that that really pays off and that it is not, ultimately, a sunk investment.

And with all the discussions with we currently have with the net metering in front of the CPUC, I think one of the big differences, which I realized when comparing the Germany and the U.S. market is really that in Germany, where you have the guaranteed sales price with the feed-in tariff, it is just very easy for you to really understand what the value proposition of your PV system is.

Whereas here, with the potential changes in tariff structures, it is so uncertain what the marginal value of your kilowatt hour is, which you really then offset with your PV system.

If the tier structure’s going to change, how much is really the electricity worth which you’re going to produce?

I think if -- and, of course, that is a very big question and can probably not be addressed within the NSHP.

But to the extent that more security and clarity can be introduced here, I think that would really contribute to lowering the customer acquisition costs

and reducing significant market barriers here.

In terms of the permitting costs, as studied by NREL, it showed that on average in the United States you have 9 cents a watt, or so, just as a permitting fee, which you have to pay for the local authorities having jurisdictions.

In other markets throughout the world we do not see permitting fees whatsoever, and it is more a standard service which your local bureaucracy does to you. You pay your taxes and so for that you get a certain service by the bureaucracy.

And so having to pay additionally, just in order to receive a permit, you know, may be something which could be thought of. Of course, in the end the local offices have to break even and I know they fight already with the costs which they face.

Overall, to the extent that you can simplify the grid connection proceedings and the necessity that additional or extra people have to come out from the local counties to really visit each individual home and make sure that it is up to code, maybe there are some options for simplification.

In Germany, something like that doesn't exist whatsoever. It is the responsibility of the local installer to make sure that he is up to code. And if he

is not, he can be sued for it and can lose his license, so that is his incentive to provide quality work. Whether, of course, that might be directly transferrable to the United States could be in question.

But I think that's an additional point where costs could be reduced, which could contribute to lowering overall PV prices.

MR. CUCULIC: I just wanted to follow up on one thing. There's two aspects of financial security that I think are important to touch on. One's kind of the feed-in tariff and the amount of value that the kilowatt hour that is generated on.

The other goes back to the appraised value or the value both that the builder and the homebuyer get when they go to sell their home.

So, your average homebuyer, it varies, but a general rule of thumb, stays in their house seven years.

Just say, and I'm not a big fan of this term, but your average -- just say your average payback in California is seven years on a solar system, which is pretty close depending on what size of a house you live in, stuff like that.

So, many questions that homebuyers have when they go to sell their home, and I know NREL came out with a study a couple of years ago saying, oh, you get

this $3 to $5 per watt, I think, on new home construction.

Well, according to your costs here, right, the cost for installation -- and I believe, Matt, you might know, too, it's about $3 to $5 a watt is what NREL's studies came out for new home construction is.

Well, I'm not getting -- as a builder I'm not getting all my money back and as a homeowner I'm not getting all my money back if I install that and I'm only in my house three to five years, so it's a loss.

If you're not familiar with the SAVE Act, it's a national initiative, a bipartisan bill in Congress. If you could figure out a way to institute something like that at the state level, where you assure both the homebuyers and the home builder the value, because that's -- the uncertainty around that appraised value, I think, is a big part of the confusion and hesitation that both the builders -- all right, let me put a 5, 10, 20 thousand dollar system on it and the appraiser comes back and might only give you $3 a watt, $4 a watt. Well, the damn thing cost me $5 a watt. Well, yeah, that's a great economic value proposition.

Or even the homebuyer, oh, it's a seven-year payback, I don't know if I'm going to -- the average person stays in their house for seven years, so at best

I might break even and then I hope that I get a higher resale value out of it.

So, I think that's the other valuation thing that I would -- if you could figure out a way to help that situation, in addition to the feed-in tariff, that's what I would strongly recommend, as well.

MR. RAYMER: There are a lot of appraisers in the State, including right across the Yolo Causeway, that absolutely will refuse to include any cost associated or any price association, value associated with the solar and going above code on energy.

And particularly in Yolo County I found that rather odd. But it's a huge problem that we've run into, and particularly when you're doing a 3 to 4 kilowatt system, particularly on a retrofit, that's a real pain. But for new construction, when things are so tight right now, that's a huge chunk of the up-front cost of the home and it needs to be included in that appraisal. There needs to be some value that once you go to sell that home and -- we need to be able to get that.

The SAVE Act is doing its best to deal with that. You know, good luck with getting bipartisan approval of something. Right now it's got bipartisan support, but we need to get something like that to the

President.

COMMISSIONER PETERMAN: A question and an observation. On the issue of appraisal, first of all, I have to say a seven-year payback, you know, relative to where things used to be is quite good. And so I think that we're definitely moving in the right direction.

Would something like a PACE program, that type of financing be a mechanism for addressing this concern in terms of those home sales. I mean because you do get that commitment, then, from the next homebuyer to take on those costs.

MR. CUCULIC: Yeah, I still like the idea of putting it in the mortgage for two reasons. It avoids the whole Fannie, Freddy issues that potentially could come up with the PACE.

Number two that benefit of having it -- there's still, unless Congress changes it, there's still the mortgage interest tax deduction, and so there's that additional benefit that you get from that of having it in the mortgage.

I think the simplicity of putting it in the mortgage, also, it's a process that the homebuyer understands.

And PACE, it's like, okay, now I've got to understand solar and now I've got to understand PACE?

It's just when people are buying homes they're taking in so many different things, they've got to choose flooring options, you know, all these different things and then I've got to figure out what -- anything that adds to the complexity is just, I'd say, discouraged.

MR. RAYMER: On-bill financing is another way to -- if you want to try to get around the sort of hurdle that we've run into with Freddy and Fannie at the Federal level, on-bill financing within the IOUs maybe is one thing to do.

I know that that will be attempted in the Legislature again this coming two-year session. Industry will be very supportive of that.

MR. ATALLA: I would add my recommendation for on-bill financing versus PACE to address the appraisal issues.

But I'd like to just expand a little bit on Bob's mention of a couple of things. One is the kilowatt banking. I'd like to just mention that one community here versus a community just a couple of miles away, it's not about the solar, itself, and that the buyer here is a buyer that understands solar versus this buyer.

The solar comes on a house so, to a large extent, most often it might be an issue with the house,

with the product we might be building there. And we need to shift product, we may need to shift markets.

A lot of times we -- in the last couple of years, when KB Home adopted solar in a strong way, in Southern California it was for reasons to bring differentiation and attractiveness to the house to sell the overall package.

And in some times we have to shift, it's included as a standard here to here because we're trying to move the house that's here.

So, all these things, from a new home construction perspective, would help the builders in general to be a little bit more flexible to use solar for the benefit of it environmentally, and for our energy security, but at the same time in terms of selling homes.

So, I think it's -- the banking idea is one worth pursuing with the Guidebook in the future.

COMMISSIONER PETERMAN: So, let me just comment on that issue, the general issue of fungibility because it's come up in our discussions around the program over the last year.

And I understand the value of it and the need for it from the process side, the builders side, but the challenge we have to think through, and we'll continue

to think about this and engage with you all on this issue is how do you provide that fungibility while also preserve equity within the program in terms of access to funds?

And the challenge is we have a declining incentive and so a concern I would have is potential gaming. For someone more experienced with this business, reserving X block of incentives for, you know, megawatt incentives and then making the choice later on regarding which home to assign them to.

And we talk about wanting to include more integrators, making the process more easy to participate in we will get concerns about, you know, reservations not being utilized.

And so I think that's the balance we've got to work through. It's less of a challenge when you have significant funding available. It became a real concern last year, when we had a waiting list.

And so it's an issue I am committed to working through, but I did want to raise some of the challenges that do arise.

And maybe it's about thinking about some type of limitation on a time period for that fungibility or set-asides for certain types of funds, but just wanted to raise that point.

MR. ATALLA: Thank you for mentioning that, Commissioner. I'll add to that is that it was tied to that period of time of uncertainty, so to your point.

But at the end financial security, as it was mentioned, that insecurity in terms of if we face it again. I know what it did to our executive suite in terms of, you know, then pushing back on the division that really took solar and moved forward with it, you know, they started seeing a lot of risk with solar and that executive suite started pushing on our division to say, you know, no more solar standard.

So, there was that issue. And I think just keeping the uncertainty out of the program going forward would be the thing to do for sure, however mechanism that will take.

The second thing that I think Walter mentioned about the feed-in tariffs, and I know that we have a net zero energy focus discussion a little bit later on, but I'd like to mention that we give -- with the few zero energy homes that we have built, we give an energy performance guide, sort of like a miles-per-gallon sticker to the homeowner that says this is what your home will perform, and these are the type of utility bills you expect to pay per month for the home.

And in doing the net zero energy homes that we

have built, we built them to the strict California definition of you have to offset all fuels associated with the house with renewables. The house has to be net zero all fuels.

That means we are building a solar array that is offsetting the natural gas that is being used in the house. And so definitely the house, on a net basis, is using kilowatts for the house but definitely, because we're offsetting the natural gas, we're pumping electricity to the grid.

And in many tariff situations in the State, currently, the net metering stops at when the bill is zero, it does not go beyond that. So, we're pumping to the grid to offset the natural gas, but the homeowner doesn't get paid for it. However, they paid for that big array in their mortgage and they're paying for it in their mortgage.

COMMISSIONER PETERMAN: So, let me clarify because I don't know if I fully got your point. Is it offsetting natural gas use within the house, in terms of moving from gas to electrification?

MR. ATALLA: Well, no, the house still has gas and electricity. It may still have the water heater in gas, okay. There are many reasons or let's just take the cooking appliance, it still might be gas. A lot of

people, consumers prefer natural gas over electric for cooking appliance. So, we still have to offset that and we build that -- when you do the energy modeling you build a large solar array for it.

And, yet, we're putting kilowatts to the grid and not getting money back for it, the consumer is not getting money back for it. I think if we're moving and trying to create a great transition between now and the year 2020 that sort of situation would be worth addressing.

COMMISSIONER PETERMAN: Thanks for that clarification.

MR. ATALLA: Thank you.

MR. BRUST: Yeah, I would only have one final point, and I've made it earlier but it's with respect to this particular question on tariffs, and permitting, grid interconnection, outstanding in California we have a program that is built for home builders, it's the New Solar Home Partnership. We recognize that it's a separate industry.

However, a lot of the jurisdictions or utilities that we work with don't have separate process for interconnecting the system, for example for a newly built community versus a retrofit community.

So, we talk about barriers, you know, as a

homebuyer you're moving into a home that's expected to have solar on it and you're going to get all these great benefits, but because of the way the systems work you might not have that system interconnected for two months after you move in.

So, there's this whole period of confusion and kind of a dissatisfaction with the program because in the educational process of buying a home you're not getting into the nitty-gritty details of what interconnection means, or how long it will be, or why that is, necessarily. You're just getting a home, and you're signing your escrow papers and you're moving in, only later to find out that I'm not really able to energize my system and I'm not getting this benefit for quite a while.

So, to the extent that we could continue to evangelize that this industry has to have separate requirements, or processes and procedures, we're going to continue to be rammed into the residential world or with the commercial world where neither one fit well.

COMMISSIONER PETERMAN: Thank you for that observation.

Jacob, I wanted to ask you how you make the decision about whether to offer solar as standard versus optional?

MR. ATALLA: It really is a market-based decision. It's, again, for differentiation because to a large extent our relationship is with one supplier and we have a certain pricing with them. The variables are the permits in the local jurisdictions might be, you know, anywhere between -- we've seen them anywhere from $60 to $400 and that might make a little bit of an issue.

But most likely the issue is a market differentiation issue and do we need it here, or do we need it here to sell the home more effectively.

MR. BRUST: Okay, can I speak to that question? What I see across my customers is, you know, in a lot of cases there's a pro forma that's done when land is purchased and there's costs that are built into that pro forma to determine what kind of product would be sold on that based on the demographic.

And if the land was purchased based on a certain cost profile, what it would take to build that home on that lot did not include solar, then in a lot of cases it's automatically an option.

If it's planned in from the beginning, at the land purchasing and planning stages, then it's almost always included in the home.

MR. ATALLA: For sure. Thank you for that

clarification.

So, we're now getting -- as a builder we're getting to that level of maturity to start considering that when we are doing pro formas on new acquisitions, on new land acquisitions and new projects. So, it does come into play at this time and that's why stability in the program and funding would come in very handy.

COMMISSIONER PETERMAN: Thank you. I'm sure this varies, but in terms of the timing, so what's the timing between going out to do the pro forma on the land and then actually building the homes where these solar decisions will be made?

MR. RAYMER: There is no simple answer to that. Going back about a decade ago, before we just went through that huge sort of trough that I presented, you can start coming up with a plan for a project and not see broken ground for ten years. It can be exceptionally long.

That's particularly the case in Southern California and San Diego. Not necessarily that much so up here in Sacramento, but you also see cases of that in the Bay Area.

And it just has to do with a host of things completely unrelated with the actual construction of the house, the building codes or whatever, but a rather

extensive environmental review, the ability for interested parties to question that environmental review at a host of stages along the process, and in some cases quite redundant can add years to that process.

But we're seeing -- you know, as we headed into the downfall about three years was kind of a good rule of thumb that, you know, as we were moving forward with this phase of the project and that, that it would be good to have access to the funding within a two-and-a-half to three-year period.

I understand that you're looking at two years. And so that is -- that's kind of problematic. I think three years is probably a good rule of thumb to look at for the near future.

With the -- I would say with the stipulation that if you can show project advancement. You know, if the project's gone dormant, whether it's energy efficiency, the solar, or anything many jurisdictions basically say you've got six months to make progress on your home, or your project, or whatever otherwise things start expiring. You can get extensions, but you've got to show progress.

To the extent that the Energy Commission is able to incorporate that type of a judgment call where in certain cases you can show progress, but you're not

going to necessarily make this hard, fast deadline that can be very helpful.

MR. ATALLA: I'll add one more thing in relation to costs and, you know, barriers. Again, I encourage us to take a look, again, at the Guidebook and doing a mechanism where there is feedback from the field on it. As things have changed, you know, we're not at the one percent or five percent adoption rate, we're up to 18.

That sort of adoption rate came in with some flexibility and efficiencies that the new home building industry have found together with some of the service providers.

In the case of KB Home, working with the service providers, we prefer when a service provider offers us a price that is net of rebate. Meaning that the provider will take on the effort to collect -- to document and collect the rebate on behalf of KB Home.

That has helped us. Again, that's part of what I mentioned earlier, the maturity of some of the service providers to make the system or the process more streamlined for us as a builder.

We can then continue to focus on what we know best and move forward.

But when we hear back from the service provider that collection of rebate is taking many, many months to

collect and several staff people, you know, focused on it to get it done it has a cost that is a cost that's, for sure, we know they're billing us for it.

So, with that in mind, again, there are new things happening in terms of the volume where things are happening with more volume and, again, perhaps worth looking at together.

COMMISSIONER PETERMAN: Thank you. I think those are good observations. And as we move forward with the program, the incentive for the program for solar new homes is higher than what you see in the retrofit market, for a number of reasons.

And one of the -- we've heard that the benefit of the higher incentive is to account for some of these transaction costs, if you will.

And so the more we can move to reduce those transaction costs, the better. And also a part of that conversation will be, then, what is the incentive level needed to continue to put the solar on the new homes as we see these other costs come down.

And I think that's a continual conversation that would work well with the public and some type of expert advisory panel, as well.

MS. NGUYEN: Okay, so good conversation so far. I think that covered question number five, what are the

current motivations for builders to include solar on new homes, and it also touched on question number four, how can State solar policies and programs decrease non-module costs for new residential homes.

So, if anybody has anything else to add on number four or five, even?

MR. BRUST: I just have one area that I think, number four, State policies, and it's specific to the New Solar Home Partnership. We've discussed this before and it relates back to the collection of the rebates.

But as you know, we've been a big proponent of including energy efficiency with the NSHP program. Clearly, if we're going to achieve net zero by 2020, we've got to make sure that the two are harmonized and work well together.

Having said that, we are extremely challenged by having to track the energy efficiency measures within a home to the extent that we can't start a claim or submit a claim until all of the energy efficiency measures have actually been reported, checked off, and that the HERS rater has actually followed through on the completion of their tasks.

This delays the time in which we can collect the rebate. It adds the biggest cost to us in terms of being able to follow the process and get the rebate

claimed.

And I would just suggest that the solar industry be held -- not be held -- we feel as though we're being held accountable for the EE measures to go in, as well as the PV. It should be done, but there should be a separate mechanism. We should be able to collect our rebates in due process without having to administer or be part of the administration process of the energy efficiency programs and measures that go in.

And I think if we could fix that, it would probably result in one of the biggest cost savings of the entire stack that we see today because it would affect the efficiency at which we could collect rebates, the amount of staff we have on working on rebate application and claims, and managing and administering it overall.

MR. RAYMER: Are you having problems getting the HERS rater to the site on time, in a timely fashion?

MR. BRUST: We are calling HERS raters on a very regular daily basis, asking them to provide this, to what's the status of that, please finish this paperwork.

And there's, as you know, not just one or two, there's a large number of HERS raters out there that we have to work with.

MR. RAYMER: Uh-hum.

MR. BRUST: And the HERS rater has no obligation to SunPower whatsoever. They're obligated to the builder. Now, we might ask our builders to call them, but the regularity of which we need to do this is -- just I can't over-emphasize what a substantial challenge it is.

MR. RAYMER: You need them, they don't need you is what --

MR. CUCULIC: Yeah, they'll even at times try to get you to pay them to provide documents that they've already been paid for by the builder to supply you these documents.

And then to really get to -- I mean the other challenge is in California everything's Title 24. Well, Title 24 doesn't give you a whole-house energy calculation, it only gives you heating, cooling, domestic hot water heating, and so it doesn't give -- so, if you want to go to a zero energy model, the HERS rater actually has to run a separate report to really figure out what the total energy consumption for that home is.

So, that's one of the other challenges, as well, is -- you know, as part of the Title 24 calculations I've always said why isn't -- I understand it's different from HERS, but somewhere in that calculation

you should have a total energy consumption on that side, as well, not just the individual elements.

MR. GOMEZ: So, the delays that you have with the HERS rater, I mean do the builders have the same experience? Because it just may be a nature of where since the builder is transferring, you know, all the responsibilities of certain services to the installer that you kind of get this dynamic with the HERS rater. I mean, if the home builder were lead on the project, I guess is -- would it be any different?

MR. RAYMER: You know, having the site superintendent more involved can help. But sort of the problem, as we're coming out of this downturn in the economy you've got a lot of new people coming on board that are -- they're trying to get up to speed on all of these different roads and trails that the project has.

And that, in and of itself, is a huge hurdle to this. And so that is something that would normally happen with any downturn in the economy, but in particular this is happening at a bad time.

So, to the extent that the HERS rater could be convinced and be incentivized to work and play well with the solar industry and whatever to -- one of the things that Matt was focusing on was the provision of a turn-key service where the solar provider is basically doing

all of the grunt level work here.

They're taking away a headache to the builder that Jacob was referring to, and making it very simple.

One of the problems in taking away that headache is that they now have to get something from the HERS rater, but the rater isn't necessarily that involved or interested in their needs. They need to be. Everybody needs to work and play well together.

COMMISSIONER PETERMAN: Great observations and this is the dialogue we wanted to start now so that we can think about these things for the next Guidebook.

We're going to talk about energy efficiency on the next panel, but just in terms of process there are incentives for energy efficiency on new homes. In the context of a home, who's the one then applying for those energy efficiency incentives? Is it the home builder? Is it the solar installer doing that, as well?

MR. ATALLA: The home builder.

MR. BRUST: And primarily because those can't be paid to anyone other than the home builder.

MR. ATALLA: Yeah, so the CAP program, we apply for it and get paid for it, ourselves.

COMMISSIONER PETERMAN: And do you use a home rater in that process?

MR. ATALLA: Yes, we do. I think the issue here

is that to get a home completed for CAP and for maybe Energy Star, in the case of KB Home Energy Star certification, is a certain point and then we close on the house and move on when there are maybe more pieces of paperwork that are required by NSHP for the application process that are beyond what's needed for closing the home for us, and with CAP, and Energy Star.

COMMISSIONER PETERMAN: Okay, so my take away from that is that the energy efficiency side of the New Solar Homes Partnership has more paperwork than getting the incentives for the efficiency from CAP, is that -- and we'll put you on the record for this, I'm just trying to get a sense of the challenge.

MR. BRUST: Yeah, I wouldn't be able to speak specifically to the paperwork requirements for the CAP program but, absolutely, there's a lot of duplication going on there.

And I don't think that in order for Jacob to close his home for the consumer to move in that the HERS, all of the HERS activities have to be completed. There may be more activities at the office level --

MR. ATALLA: Yeah.

MR. BRUST: -- that the HERS rater then goes and does, but there's no firm or I think deadline on that, that we know it's going to be done and, therefore, we

can start our process.

COMMISSIONER PETERMAN: Thank you. Yeah, I'm just trying to get a sense of -- you know, we're talking about the role of the HERS rater in both of these processes and seeing if there are opportunities for leveraging that relationship to do what you're doing on the efficiency side.

Mr. Nesbitt, do you have a comment or question?

MR. NESBITT: Yeah, speaking for the HERS rater industry. The New Solar Home Partnership has two parts, there's the PV part and the energy efficiency part. The NSHP rebate is only for the PV, but you're required to have net the energy efficiency.

You need a HERS rater to verify the energy efficiency whether or not you get a separate rebate on the energy efficiency.

And one of the -- you know, we have -- I try hard, you know, to get out there to get the documentation but, unfortunately, we often have revisions on the energy efficiency side. It is hard to get CF6Rs from installers. We're often filling them out for them and getting them, you know, to sign.

Technically, I, as a HERS rater, am supposed to have signed off before you can actually get certificate of occupancy.

To sign off on the NSHP, all the energy efficiency stuff has to be done. You know, there is -- and it's not easy and I've been saying, you know, for four or five years that one of the difficulties with NSHP is the solar installer's rebate is dependent on other people, the builder meeting the energy efficiency.

Unlike in CSI where it just, you know, it's their own little thing and the energy efficiency is nothing.

And so it is tough. And what we really need to do is look at how the heck we can streamline this and make it easier for everyone because we HERS raters struggle. We struggle getting correct documentation, getting people to do the CF1RPVs right, you know.

COMMISSIONER PETERMAN: So, thank you for bringing that perspective and we're delve more into energy efficiency in the next panel, but I think that's a very good observation. And it sounds like everyone's aware that there is a challenge and we just have to figure out how to, to your point, streamline it, align the incentives to get the work done in a certain way.

MR. NESBITT: And it's a challenge for us and we beat our head over a lot of this on our end, too, so --

COMMISSIONER PETERMAN: Thank you.

Le-Quyen, you should move on and then I'm going

to suggest in a couple of minutes we take a five-minute break. Everyone's been sitting for a while and I think we've got the time to do it.

And also, I want to make sure you provide an opportunity for the panelists to ask each other questions, as well as get questions from the audience.

MS. NGUYEN: So, we'll move on to the last question for the panel. Number two, are there any technology types/trends that are expected to come into the market that will decrease costs or increase adoption of PV?

Okay, so panelists, any comments? Joachim, as our researcher on the panel?

MR. SEEL: Well, I cannot really speak about future technology adoption, I have not really looked much into that.

I think what we've seen in the past, building integrated PVs seem to have a difficult time to get adoption in the NSHP. So, I would assume that that might continue given the situation of the VIPB module supplies, but I have not had the opportunity to do any research in that field.

MS. NGUYEN: Walter?

MR. CUCULIC: Yes, just two of the trends that I kind of see that are affecting -- the third-party lease

ownership is a big one that's happening. And under the current NSHP Guidebook it's not an easy process to do that right now, where the builder can sign it directly. I mean a large amount of builders are moving towards this third-party lease ownership program.

And one of the things that Matt brought up is the whole interconnection. When people buy houses and they move in they want their cable turned on the day they move in, they want their electricity, they want their phone, everything. The builder's do a great job, you move in and everything's working, except for your PV system.

And when you can't sign the third-party -- when the builder can't sign the third-party lease it's like, oh, yeah, we've got to delay it and now two weeks, two months, maybe longer we'll get your system interconnected.

And it's just such a letdown and you get nasty letters, I thought I was getting a completed house. Well, it is completed we just haven't got it interconnected yet.

So, if we can address that, where builders can start signing that --

MR. RAYMER: Be the signatory to this right up front to get the things rolling and --

MR. CUCULIC: Yeah, it just makes the process more seamless and then it's easier for both the builders and integrators. You're not trying to chase down the homebuyer, you know, everybody's signing. You know, it's easy to do it that way.

The other trend that I see is net zero energy homes are becoming, I think -- I actually have a big bet about that 50 percent level, so I'm on the favor side. But that is an interesting trend that I see continuing to grow.

One of the challenges that I see under the current polices around the NSHP rebate is you've got a builder, like Jacob, and maybe two years ago, or a year ago he's like, oh, I'm going to make reservations for a 3KW system.

Well, now, I'm -- and I'm going to do it standard, 3KW standard in all of my communities.

Now, I go, I'm a year and a half into my reservations and I go you know what, this is great, great customer feedback and now I want to do zero energy standard.

Well, I can't update my reservations under the current Guidebook. And so now I'm somewhat punished as a builder if I want to upsize my systems, I can't do that, I can only do it piecemeal.

And so that's also, as we look at ways to encourage quicker adoption of zero energy and encourage people to -- once they get a taste of the solar Kool-Aid that they're like, oh, this is great, let me do more and bigger, then we need to find a way to encourage that by allowing them to either re-modify or re-up their reservations with that new system size.

MR. BRUST: A trend that I'm seeing is that -- and it's with respect to the mortgage industry is loosening up a little bit, so buyers are actually qualifying for more home, they're able to -- if you talk to builders who sell options, the option -- the amount of the home purchase that is now an option-based purchase is increasing because of the fact that banks are actually lending more.

And we're lending at, you know, historic low APRs.

When you look at the cost to finance a solar system, whether it's an option or whether it's included in your home, we're not talking about seven-year paybacks, we're talking about your cash flow positive the second you move into that home because it's costing you less to mortgage your energy than it is to purchase it from the utility.

And so, and at the same time as they're willing

to lend more, part of the reason they're lending more is we're getting over -- we're hearing less and less these days about appraisal issues.

A year ago, two years ago it was all any builder would talk about when you walked in and that's loosening up. And so I think that's a trend that we're seeing which could actually -- will help, you know, put us on this trajectory of growth that we've seen lately, so long as those conditions hold.

MR. RAYMER: I would say ditto to the -- when I say loosening up of lending regulations, they got really tight after the crash, really tight, where you had to have exemplary credit rating, plus you had to have a huge down payment.

You still need to have a relatively large down payment, usually in the area of 10 to 15 percent. The 20 percent that we spoke of about a year ago is not all that uncommon. But, still, 10 to 15 percent is a lot of up-front cash.

And to the extent that a variety of options, such as on-bill financing can be available that up-front payment to the bank doesn't increase with solar. That's why leasing has really taken off like a rocket here and is largely responsible for that one or two percent penetration jumping to 15 and 18 percent, a lot of that

has to do with leasing.

But we still, you know, if we're looking at 50 percent of the housing stock, or 100 percent of the housing stock, depending on the year you're talking about, we've got to figure out a way that once that buyer meets the credit requirements how can they make sure that they don't necessarily have to come up with another one or two thousand down payment.

So, that's one of the many eggs in the basket right now.

COMMISSIONER PETERMAN: Thank you. I'd say just from this conversation I don't know what the makeup of the original type of advisory group was, but there's so many stakeholders that are involved in making this work, everything from the HERS raters to those within the financing community, and mortgage lenders, and so there seems to be a larger audience that we should be attracting to this dialogue and so that's helpful to get that perspective.

So, sir, I'm actually going to wait and take a break now. We'll take a five-minute break and then we'll come back and we will see if there's any questions amongst the panelists, as well as any comments or questions from the public.

So, let's come back in five, thanks.

(Off the record at 10:55 a.m.)

(Resume at 11:10 a.m.)

COMMISSIONER PETERMAN: All right, let's get back on the record.

Bless you. Someone sneezed, this is not a religious overture on the workshop.

MS. NGUYEN: Okay, before we get started and have our continued panel discussion I just wanted to bring up one thing. A lot of people are mentioning appraisals and, you know, listening to the mortgage, the standards -- not standards.

I guess, so we do have a SAVE took here at the Energy Commission; it's the Solar Advantage Valuation Estimator. And staff here at the Energy Commission developed it and it's to help realtors and appraisers value the cost of a PV system.

And, you know, even the solar industry, like retailers and installers, can use it with their customers.

We do have free webinars, I think it's twice a month we have them. And the tool, itself, it allows you to enter in your utility rates, enter your system and where it's located, and then it will provide, you know, an estimation. And it gives you three values, a low value, a medium value and a high value.

So, you know, a realtor, they could look at it and if they said, okay, I don't want to go with the high value, I'll go with the low or the medium and it gives an idea, and they can tell their customer this is the value, the potential value of that system.

And we will have staff here that do work on that tool, so they'll be here for the fourth panel. So, if you guys have any questions on that, you could stay and ask them during the fourth panel.

Okay. So, I guess now if -- for the panel, if you guys had any questions that you wanted to ask each other or just topics that you wanted to raise and bring to our attention we could do that before we take questions from the audience.

A silent group.

COMMISSIONER PETERMAN: Well, we've heard they talk without us, because that's what Bob was saying earlier.

MS. NGUYEN: Okay. So, now questions from the audience. What we'll do is we'll take questions from the audience, first, and then we'll go to WebEx.

So, if you have a question just please come up to the podium, state your name and the company that you're with, and then go ahead and ask your question and we'll discuss.

MR. BYINGTON: Commissioner, Le-Quyen, thank you for the opportunity to speak. My name is Mark Byington; I'm President of Cobalt Power Systems.

We are a PV installer in Mt. View, California. We have installed about 900 PV systems over the last nine years, and about ten percent of those, or 90, have been New Solar Homes.

So, these are all custom, single-family homes which I think is one of the market segments that one of the New Solar Homes Program addresses. It hasn't been spoken of too much here, so if you have any questions, we would probably be a good resource for you.

But I have a specific item that I'd like to talk about. And by the way, we have one full time person and two part-time people on staff who do nothing but New Solar Homes, so it is a very labor-intensive program.

But our customers love New Solar Homes, I should mention, it really helps them make the decision to go forward with PV.

The reason I'm speaking is we have one customer, named Andrew and Sarah Fikes, and there was a serious problem with their rebate.

We've been told by New Solar Homes staff people to take this to the Commission, so that's why I'm here.

The job was a new custom home in Los Altos. The

home had some delays related to construction and we also had some delays related to the HERS raters, which we talked about previously.

So, the rebate expired on October 8, 2011. We did finish the installation in time, but we did not get all of the documents into the Commission before that date.

We were told by New Solar Homes staff people that we could file the NSHP-2 form before the expiration date and this would stop the clock. We were actually told this on four separate occasions.

We did submit this form, as requested, two weeks before the expiration date, and the New Solar Homes person confirmed back to us the next day that the clock was now stopped.

Fast forward to now and the CEC people are telling us that the rebate is not going to be honored. this is a $24,000 rebate.

Our customer is very upset about this and I have included a letter to the Commissioner, to this effect, from the homeowner.

Commissioners, we feel strongly that this rebate should be paid.

At the last New Solar Homes Partnership Business Meeting the Commissioners stated that they want the New

Solar Homes Rebate Program to be fair and equitable.

We feel that the fair and equitable thing to do is to pay this rebate. The system was installed, it is operating properly and there are no issues with the PV system.

The issue was that the New Solar Homes staff and staff people at PG&E told us the clock would be stopped and now the New Solar Homes Program is not honoring that statement.

Our client is very upset. She has written a letter, which I've given to the Commissioner, and we're also upset.

I thank you for your support on this.

COMMISSIONER PETERMAN: My Byington, thank you for being here and for participating in the program. And I am interested in what your experience is, particularly with custom homes because you're right, we haven't talked about that. And it is a focus of the program, as well, and as we think about improvements to the program we want to make sure that they work as well in that market. And so I welcome further dialogue.

On the issue you raise, thank you for bringing to my attention and thank you for the letter that provides the detail that you've provided.

And I will work with staff, have my staff work

with staff to get some resolution to your matter. I'll have my Adviser, Saul Gomez, who you can speak to afterwards, follow up with you. I have your card and we'll take it from there.

But thanks for being here. And if you have additional comments about the custom homes, in particular, from some of the dialogue you've heard today or later on, please come back.

MR. BYINGTON: Thank you very much and --

COMMISSIONER PETERMAN: Thank you.

MR. BYINGTON: -- thank you for the program.

COMMISSIONER PETERMAN: Thank you.

Any other audience questions or comments?

MR. NESBITT: Couple of things I want to hit on. SunPower mentioned that manufacturers are not exactly making profits right now. I believe SolarCity lost $76 million last year.

So, although low prices may be good for the customer, if those prices are too low, they're bad for the industry. If we're not making money you can't hire people, you can't give them good wages, you're not going to stay in business, you're not going to provide a service.

So, unless it's profitable, there will be no service.

I want to hit on number two. Nuclear power was going to be so cheap we weren't going to meter it, so we can never hope that the future will provide something better than we have today.

The slip side of lower costs is higher electrical costs, which we'll probably get.

Market barriers; CSI has been a severe market barrier in past years. When we started, NSHP was $2.25 a watt, CSI was $1.65. I argued with installers, well, why would we want to go to NSHP? Well, you can get a big rebate on the building.

Oh, but we have to hire a HERS rater, we have to be energy efficient, blah, blah, blah, when they could go to CSI and they don't pay for the inspection.

Plus, we've got two programs that do the same thing, different applications, different calculators, different inspection protocols and that's been a big problem.

On the NSHP side, you know, developers have resisted it, a lot of installers have been turned away from it and basically refused to do NSHP.

A lot of HERS raters have said we're not doing it just because of all, you know, all the problems we end up dealing with.

Now, obviously, that's changing with the market

now. But, you know, there's sort of the legacy there that will hold us back.

Which gets us to four, we really need to take a hard look at how to streamline the whole process, make it easier, quicker, cheaper without losing the integrity and equity.

On number five, energy-efficient mortgage, I know you can do it on a new home. It's a way to provide value to the energy efficiency as well as the renewable. HERS 2 Net Zero Energy Home, I certified the first new single-family net zero energy home in California, this last year, also a passive house.

So, we have the tools. And to do a HERS rating is the same inputs as you do for Title 24 Energy Code compliance, with a few, you know, appliances and lighting it's really not a hard thing to do and it's the same inputs we use for energy-efficient mortgage, so that's something the builders should be using.

And I just want to comment on the whole net zero, KB Homes was talking about, you know, offsetting gas with the PV system and whatnot. When you do the HERS 2 Net Zero Energy calculation you're offsetting the gas, but you're typically -- you're still less than your actual site energy electrical use.

So, the thing is when you go net zero electric

use you hit minimum monthly charges. And, of course, there's the whole net metering thing.

You know, unfortunately, we really do need a better system than -- ultimately, if we have 100 percent net zero energy homes in 2020, we can't have all these new homes come on the grid and they're not paying into the system that they're still hooked up to.

So, that's all I want to say for now.

MR. RAYMER: Could I ask a question?

COMMISSIONER PETERMAN: Sure.

MR. RAYMER: When you're talking about a new home and then looking at NSHP versus CSI, are you suggesting that in some cases the custom homes -- that the buyer prefers to wait until the home's built and then go CSI?

MR. NESBITT: Yeah, so I deal -- I don't deal in the production market because I'm in Oakland.

MR. RAYMER: Right.

MR. NESBITT: I deal with multi-family affordable housing. They're doing it because to get money they have to do it.

But on the custom home end, not going to NSHP probably does not mean they're not going to install a system, especially when CSI was a buck 65.

I think on the production end the slow uptake of

NSHP has meant those systems have never been installed and never will. You know, I mean it's going to be a lot less likely that people in newer homes are putting on systems.

And so, you know, getting production builders to offer it as a standard or install it standard I think is very important.

The custom end it's probably still going to happen.

But what does happen, and I have projects where either the client couldn't afford it or maybe they didn't -- no one explained it to them. Had they installed it when they build their home, they'd have gotten a lot bigger rebate than they're getting today.

And the other thing is I think the solar industry either doesn't fully realize or maybe -- you know, that in an NSHP project, and this is probably true of more of the custom than the production, that the builder or the homeowner can get a large incentive for the building.

And I mean my net zero energy home got $10,000 for the energy efficiency with the current -- you know, it used to be $2,000. You know, I've got projects that are in that $10,000 range, the large custom homes. It's kind of crazy what you can get.

But people just -- they don't realize they can get it and there's a learning curve. There's definitely a learning curve for all of us.

And I've actually -- I've had an application on a project rejected twice this year for NSHP. I was summarily rejected because of the Guidebook revision in January. And then after PG&E sat on my -- well, I had to fight to get my resubmission, and then they sat on it and did nothing, and then they summarily rejected it because they said things didn't match, but they matched.

And it's just -- and I'm the one that's eating it in this case.

So, yeah, custom home and production are a little different. And also, I think from a policy goal the net zero includes 50 percent of major additions and remodels net zero by 2022, and so it's an important market that we not exclude or not think about.

COMMISSIONER PETERMAN: Well, I mean going forward in the next panel we'll talk a bit about the zero -- two panels from now, the net zero energy goal.

And having had the experience with a custom home, if you have some comments during that period, as well, that would be appreciated.

And, you know, regarding your general comment about the need for businesses to be profitable, on the

next panel we'll be talking about different financing models because we want to make sure that those are sustainable.

And, you know, ultimately the challenge we're in is there's a need for incentives because the business models aren't profitable, yet, and so it's hard to get that metric to what it will take to get there.

But, you know, ultimately, we're trying to move towards a self-sustaining industry and so looking for feedback on what it takes to get there.

Mr. Byington, did you have any comments on the custom home market? Mr. Nesbitt noted that he's seen some customers decide not to pursue the New Solar Homes Partnership and wait to do the CSI. I didn't know if you had any more insight on that?

MR. BYINGTON: I believe that the New Solar Homes Rebate definitely does help homeowners go forward with photovoltaic systems.

You know, when you're building a new home there's a lot of expenses, and typically they have a budget. And it might come down to I can have solar or I can have granite countertops, or I can have solar or I can have, you know, my swimming pool.

And the New Solar Homes Rebate, I believe, makes a big difference.

COMMISSIONER PETERMAN: Thank you.

Any other panelists have any comments on some of the things you've just heard, and then we'll hear from this next member of the public.

It doesn't seem like it so please, ma'am, come up.

MS. GUPTA: Smita Gupta from ITRON. I wanted to bring up the question of NSHP addressing solar at the community level. So, one of the projects, ITRON manages the CSI RD&D program and one of the grants is to the UC Davis West Village Community.

And managing that ground, one of the challenges was new residential construction and not being able to avail of the NSHP incentive because of the definition of a system for the current Guidebook being for an individual inverter connected to a meter.

And so going on an individual home basis versus in a community setting where solar for even a residential community can be much more financially and cost-viable, and more economically efficient at a community level.

It does bring in the challenge of having, you know, virtual net metering probably offering for the market rate single-family housing, but the fact there are -- there are mechanisms, at least in the UC Davis

example, as one case, where it could have been addressed, but NSHP not addressing community solar is one of the issues, and if that's something that could be considered in the future revisions.

COMMISSIONER PETERMAN: Thank you for that comment. I think we're aware of those circumstances and so I can't speak to specifically, if anything, the Commissioner might do differently, but it's something that's come to our attention from the UC Davis West Village Project.

Yes?

MS. GRIFFITH: Good morning, I'm Meredith Griffith and I work with SunPower. I, too, started my career at SunPower with the ERP Solar Program quite some time ago, so I've definitely been in it for the long haul with the NSHP program from the beginning.

And, you know, definitely we have seen so many improvements, that the staff is always very easy to work with.

We always appreciate the ability to submit comments and input to the Guidebook whenever the staff is looking to revise that.

My comment is mostly just going to be related in kind of a blanket format overlying the statement about the number three and four, about the program

inefficiencies, market inefficiencies, things which may get very difficult to claim in an NSHP rebate.

I think that we all agree, and to further support Matt's comments about energy efficiency definitely needing to be a factor, that the most difficult thing we encounter is getting to the finish line with the energy efficiency and the PV verifications that are required.

These builders are building energy-efficient homes every time. I don't think we've ever encountered a builder who said they were going to build an energy-efficient home and ended up not building an energy-efficient home, at least in my experience.

The most difficult piece of the puzzle is getting to that finish line. And I don't think there's one particular process that is failing. I have noticed over the years the HERS stills, and abilities, and the partnerships with the installers, such as us, has significantly improved from the last few years ago.

We work very closely with a lot of HERS raters and we both try to get to the finish line. And what I have found is even the HERS raters have the same difficulties as Mr. Nesbitt was describing.

I don't want to say that it's not that they don't have any incentive to do it, or they don't want to

do it, or they can't do it. They also experience the same difficulties with the current registry. There's a lot of administrative burdens that go into that.

And to your point about the builders needing the energy-efficiency verifications in order for them to get their CAP rebates, the CAP rebates are sometimes, in some builders' cases, somewhat lower, much lower than the NSHP rebates.

They are very under-staffed. They are, you know, way too busy, they don't have time to get involved and, in some cases, I don't think that they're always tracking to what rebates they need to be getting.

So, I think the intention was, well, the builders are going to need the EE verifications and so, therefore, it should be easy for you to get the PV because it's going to be done anyway.

But I think in some cases the builders may be experiencing some delays and some headaches with collecting their EE rebates, as well, but maybe it's just not as big of an issue because the rebates are so much smaller.

But we do work very well with the HERS raters. The HERS raters, every HERS rater that we work with is definitely trying their hardest to also provide the paperwork. There's just so many other things involved,

the plan checks, the registry, the format of the registry, and there's a lot of administrative cost that goes into that and administrative time.

So, I guess my statement is it's -- or my comment more is that it's the inability or the difficulty and delays in claiming NSHP rebates is not related to builders not building to the Energy Efficiency spec, it's just the process and getting to that finish line.

And on our team, we have a group of five people who work strictly on SunPower interconnections and rebates and we can't even keep us, as well, with the keeping up on everything all the way to the finish line.

So, the application process has significantly streamlined and improved. Getting all the pieces together makes sense, we 100 percent support it. That finish line of getting the final docs and kind of the inflexibility involved in that is really what creates such a barrier for us.

So, that's all I wanted to comment on.

COMMISSIONER PETERMAN: Thank you, that's really helpful to hear your on-the-ground experience. And, again, looking forward to working on how do we streamline while maintaining rigorous standardization. And they end up oftentimes being tradeoffs, but there

seems to be room for improvement.

Is there anyone else in the audience with a question or a comment?

Then I'll suggest we turn to the phone lines and then we'll be able to do another round, as well, if people think of something they'd like to say.

MS. NGUYEN: Okay, so we have Steve Zuretti on the line and we've unmuted you.

MR. ZURETTI: Great, thanks, Steve Zuretti with the Solar Energy Industry Association. I wanted to offer a brief comment, if I could.

First, thank you to the Commission for putting these panels together. There's been some great discussion already and I look forward to the rest of the day.

But there's been plenty of viable suggestions all around that I think deserve greater consideration, but I just wanted to offer SEIA's support for what I see as the low-hanging fruit in the proposal for a task force or quarterly stakeholder meetings similar to what we see with CSI, which could serve to solicit feedback on how the program is working.

So, the CSI's been immensely successful and in speaking to stakeholders this is considered a very helpful and important feature of the program.

So, SEIA would certainly support something similar be considered for the New Solar Homes Partnership so that any problematic issues could be identified and discussed in a timely manner.

So, that's all I wanted to say at this point and I appreciate the opportunity to call up.

COMMISSIONER PETERMAN: Thank you.

All right, do any of our panelists have any additional comments they want to make?

Anyone in the audience?

Welcome, please come forward.

MS. CORWIN: My name is Bonnie Corwin, I'm with Cobalt Power Systems and the Director of Administration for our office.

COMMISSIONER PETERMAN: Can you speak a little more into the microphone, ma'am?

MS. CORWIN: Is that better?

COMMISSIONER PETERMAN: Yeah, is it even on? Is the green light on in front of you?

MS. CORWIN: Yeah.

COMMISSIONER PETERMAN: Okay.

MS. CORWIN: Okay, move closer. My name is Bonnie Corwin, I'm with Cobalt Power Systems. I'm the Director of Office Administration and I manage the staff for the New Solar Homes Program.

One thing that we run into, as Mark mentioned, we deal with custom homes and when we're dealing with a HERS rater, and inspections, and Title 24, so it is not uncommon for a custom home to have changes as the home is being built. So, a lot of our jobs we run the Title 24, we go through the plan check, everything looks good, we're ready to do the wrap-up, we're getting close to the end of the project and then we go to the HERS rater, we need the CF4R for the home, the EE, Energy Efficiency Measures.

And they come back with the Title 24 has to be re-run and it has to go through a whole new plan check, and then that whole process has to go through again, so it delays everything for the wrap-up for our jobs with our customers, so it delays it months, almost a year to do the wrap-up with the homeowner for the job.

So that's -- the HERS inspections is a major hurdle. And our HERS raters, we have two in particular that we work with on a regular basis. One of them is just overwhelmed, it's difficult to get responses from him.

Another one it's difficult to get responses, but they are more responsive, but I think they're just so overloaded because they have to re-run.

We have to get back to the contractor to get

more information, more documentation and it just is very, very labor intensive.

Thank you so much.

COMMISSIONER PETERMAN: Yeah, thank you for your comment.

MR. BRUST: I would just -- I think we see the issue where we are submitting applications to the NSHP and the amount of time that it's taking these applications to go through these approval processes is measured in months right now. And as you can imagine, builders don't wait months to begin communities. They start production within days and we're taking a risk that the application's going to be accepted and approved.

We know there's funding so, really, the risk is that we didn't submit the application correctly which we -- we've kind of cracked that code.

And I think it goes to this lady's comment as well that resubmitting applications and having to wait months and months for the application to go through the review cycle.

So, the Commission might consider that increasing the administration costs for the program could actually result in a decreased cost for the participants in the program if we can get these things

further.

I'm not required to carry rebates for four or five months longer than I would otherwise have to because we've got a much more expedited review, approval, and on-board, you know, the applications.

I know that Meredith didn't mention it, but we did discuss it recently, it's a major challenge for us waiting for these to go through the process.

MR. RAYMER: Changes in the field aren't associated with just custom homes, it happens pretty much all the time with production housing, as well, so it's an across-the-board issue.

COMMISSIONER PETERMAN: Thank you. You know, thank you for that point, Matt.

For those who may not be familiar with the way the process works, we have utility administrators and that's where the review happens and then it eventually comes up for additional review at the Energy Commission.

And the question of whether more money for administration could then -- how that could expedite that process is something worth looking into and it may be a challenge that one of the issues may be that there are certain things that need to be done that take a certain amount of time and that's something we need to better understand.

So, it's duly noted and it's something we can have a conversation with our administrators on this issue.

So, with that we are scheduled to break at 12:00, so I recommend we sit here quietly for 20 minutes.

(Laughter)

COMMISSIONER PETERMAN: That was not quiet. Since there does not seem to be support for that recommendation let's break early for lunch and I'll see you back here at 1:00.

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

(Resume at 1:16 p.m.)

COMMISSIONER PETERMAN: Hello, everyone, welcome back. We'll just take one minute for everyone to get into the room since I was late, and we'll get started. Thanks.

(Pause)

MR. HARLAND: Hey, everybody, we are going to get started here. Welcome back from lunch.

And my name is Eli Harland and I work here in the Efficiency and Renewable Energy Division at the Energy Commission. I work on the New Solar Homes Partnership with Le-Quyen.

This is our second panel of four topics today.

We're going to have the other two right after this.

So, I'm going to -- you know, before we start our panel presentation and our panel discussion I'm going to give a quick overview to help establish some context surrounding solar financing, and some of the solar financing models.

So, this overview is going to be very broad and it's not meant to try to capture anything too specific as it relates to some of the financing models. But, hopefully, we'll establish context and we'll move into our discussion.

I'm going to talk about where the financing need comes from for solar on new homes, the residential solar PV financing models that exist, some general outcomes of those models, and then we'll get into our panel discussion like we did this morning.

So, a combination of policies and incentives are used to lower the cost of installing and maintaining solar PV systems.

The NSHP incentive is based on the expected performance of a system and is paid up front.

Other incentives, like the Federal Tax Credit and Utility Savings, those are spread over the life of the system and those savings need to be kind of the basis for the financing of a system

Because NSHP benefits incentives are limited to 50 percent of a system cost, the NSHP -- the amount that needs to be financed on a system needs to be that 50 percent amount that is basically your residual amount after you purchase the system, and install it, and subtract your NSHP incentive.

So, between 2010 and 2012 the average weighted cost for a system reported within the NSHP web tool for NSHP systems was $77.76 a watt and the average weighted incentive was $2.67 a watt.

So, that means that for those systems on average the up-front capital requirement was $5.09 a watt.

If we look at a -- when we assume a 4 kilowatt system and using that average weight cost it’s about $31,000 to install that system and a capital requirement would be the incentive less that. And, obviously, the incentive depends on the system type and whatnot.

So, how to finance the capital requirement, this is where the models come in. There’s generally two financing models that exist and it’s going to be based on how the system is acquired.

And you’re going to have either customer/owner models and you’re going to have a third-party model.

So, under the kind of customer/owner purchase system financing types customers can use cash, they’ll

use a loan or property taxes. So, within the new construction sector you're going to see that -- or as we talked about this morning, that a place to put that cost for that solar PV in new construction is within the primary mortgage, but there are also lines of credit and equity lines of credit that folks can use for loans.

And I will note, too, on the property tax model that's there this is a model where local agencies uses its power to issue public money and makes loans to customers for installations of solar PV, and those are paid back through property taxes, commonly known as PACE.

And right now it doesn't apply to new residential construction, but wanted to share this as another model for acquisition.

The other model that exists is a third-party ownership model and in this model the system host is making operating payments, or purchasing electricity from a system owner.

And so under a lease agreement in a third-party model you're going to be making those operating payments and then under a PPA you're going to be purchasing the -- purchasing the electricity, and PPA stands for Power Purchase Agreement.

Within the CSI program we've seen significant

growth of the third-party model used on existing residential.

Within the NSHP program we don't have a lot of hard data, yet, on collecting how many third-party models are used, but a lot of this growth -- you know, the research attributes a lot of the growth of in the third-party models to a legislative decision in California, AB 2863, which kind of opened up the market for the third-party system to exist.

So, here is a quick graph just to show the growth of third-party financing within CSI. And this is for existing residential customers, like I've mentioned, not on new construction.

But in 2007, seven percent of all CSI rebates for residential projects were installed using a third-party model.

And in 2012, 72 percent so far have been installed using this third-party model. And so this just shows kind of the growth of this financing mechanism.

And I also would note that during this period from 2007 to 2012 CSI installations were increasing year over year, so this kind of magnifies the phenomenal growth of third-party models.

So, okay, so I want to provide a couple of

financial outcomes of some of those models. And going back to our 4 kilowatt system, at $7.76 a watt you have a system that's going to cost about $31,000.

So, if we look at that model and how it applies to either a homeowner purchase, a corporate property owner purchase or a lease, these are some of the outcomes that occur.

So, under the homeowner purchase the incentive would reduce the system price by about $7,000. This is an assumption at the current NSHP incentive rate. And that would mean that the system has a basis, for the purposes of calculating your ITC, which is your investment tax credit, and so your basis because $24,000 on a system like this, which means that you can claim the 30 percent of that as an investment tax credit and that's $7,212, as you can see there.

So, in the end the net system price for a customer in this situation would be $16,828.

For a corporate property owner or for a lease company, someone who's owning that system and is being -- or uses the tax system and reports their taxes differently, they do have the ability to use modified accelerated cost recovery, which is a way to depreciate things quicker than the useful life of an item.

And so what you see here is that the corporate

property owner, and the corporate property owner in this case would be maybe somebody who is developing and building a property, and then renting the units out, and they're going to maintain ownership of the property, so they'd also maintain ownership of the system, they'll depreciate over a five-year base.

And so I have -- I've basically just used the simple calculation of doing a 50 percent bonus depreciation in year one for this system, and depreciated it out over the next five years, and assumed a 35 percent corporate tax rate to get to that number.

And so you see the net system price is lower for the corporate property owner and it's the same under the lease situation.

So, when you start to think about the value of the system over its life, the NPV of utility savings in this sense is -- again, it's assumed at 15 cents or so a kilowatt hour, and I've increased that over 20 years and then discounted it back to come up with the net present value of those savings.

And so when you take that off of that system price and those utility savings, the net system owner cost for somebody who's purchasing a system in this example is about $4,000.

And the corporate property owner, because they

are able to take advantage of some of those depreciation expenses, they are able to actually have a surplus there and the same with the lease company.

In this case, when it comes to the lease that I'm showing here in the net system owner cost, this is the third-party owner of the system, this is their expenses shown as net system price there, less the total lease payments that they would receive for the lease. And that's a 20-year lease at $75 a month, with a 2 percent escalator. And that lease price per the month is just used to illustrate the differences here and lease prices aren't necessarily -- these aren't necessarily the lease prices that most leases will have.

And then the net system user cost, these would apply to folks who are just leasing the system, so the user in this sense would be the host customer. And so with the purchase and -- both purchase options you're not going to have a user cost, necessarily, but you are going to have under the lease your user cost.

And so this is showing that when your monthly payments for your lease and even for your PPA, if you're buying that electricity for a cheaper price than the value of the electricity that you would have bought, that's where this savings comes from here.

But the important part to illustrate for our

conversation today is that even when you calculate all these different savings, as I mentioned, everything is spread through the life of the system except for the NSHP incentive, which is paid up front.

So, under both purchase options day one you still have $24,000 of the $31,000 that needs to be financed somehow.

So, I wanted to provide quick examples of some of the projects that we have seen in the NSHP program here. I kind of just picked these out randomly and this is just to illustrate the differences that we've seen in the NSHP program, itself.

And so if you -- if you see the first project that's listed there and you have the system price on this one is $23,099, about 85 percent of this system price is actually made up in reported installation cost, and then the difference of that, about 15 percent of it is 20 years' worth of monthly payments for the lease, itself.

So, I just want to illustrate this because it's one of the difficulties we have within the NSHP program to determine system prices for third-party-owned systems that are participating in NSHP.

And then the second one that's listed there, this also illustrates this again. In the lease

document, itself, this is where -- you know, where some of this information comes from. It doesn't explicitly show how an NSHP rebate will lower the electric cost per month of the -- of the customer who is going to be leasing this system.

And this is just another example of how it can be difficult in the NSHP program to provide a reservation or issue a payment if we don't have the system price information, the system cost information. And that's because we do have a 50 percent system cost cap that's built into our NSHP incentive.

So, you know, it's the final price per watt, this is on the right-hand side there, the final price per watt is just a function of the total lease payments made over the life of the lease, divided by the watts installed, and then the purchase is the actual price that was paid after the incentive was given.

And these are just some examples to illustrate some of the different leases and some of the different purchase options that we've seen.

So, we are going to get into our panel discussion here. I know that we're running a little bit behind, so we'll be quick to get moving through it.

I'm going to ask the panelists to please introduce themselves.

We do have two panelists that are participating via WebEx today, and so after the panelists at the table are here I'll ask those that are on the WebEx to introduce themselves.

And we can go ahead and get started with the table.

MR. WEINGARTEN: Hi, I'm Eric Weingarten, I'm the Assistant General Counsel for Revenue at SolarCity.

MR. MILFORD: Lew Milford, I'm the President of Clean Energy Group. And Clean Energy States Alliance, the California Energy Commission is a member, as are a number of other State funding entities.

MR. SPRAGUE: Hi, my name's Ethan Sprague. I'm the Director of Business development for SunRun, we're a residential PPA/lease provider.

MR. BRUST: And I'm Matt Brust, the National Sales Director with SunPower Corporation New Homes Division.

MS. BERGER: Hi, I'm Sheila Berger. I'm the Assistant Program Coordinator for the Energy Independence Programs here in Sonoma County.

COMMISSIONER PETERMAN: Welcome, Sheila.

MS. BERGER: Thank you. Can you all hear me okay?

MR. HARLAND: Yeah.

COMMISSIONER PETERMAN: We can. You're coming in loud and clear.

MS. BERGER: Great.

COMMISSIONER PETERMAN: And oftentimes I find if you're on the phone with these panels, if you want to make a point don't hesitate just to comment, just to start speaking.

MS. BERGER: Okay.

MR. HARLAND: And we have -- is Albert there?

MR. LUU: Yes, hi, Albert Luu, Director for Finance with SolarCity.

MR. HARLAND: Thanks. Okay, so thank you for the panelists for coming today, thanks for the panelists who are participating in multiple panels, we appreciate it.

We'll get started with the panel question. So, the first question is what are the dominant financing arrangements and mechanisms for installing solar on new homes?

And I will throw that out there to the group to see who bites first.

MS. BERGER: Well, I guess I'll go first, this is Sheila.

And I guess what I would say to this question is for Property-Assist Clean Energy, I think Eli mentioned

that we do not fund improvements to new construction so this question, perhaps, doesn't really pertain to us. Although, if a home is new and it has a certificate of occupancy, at that point if the property owners came in and wanted to fund a solar system using PACE financing, we would do that.

MR. LUU: Hi, this is Albert; I'll take a crack at that question. For new homes it's similar to residential solar, in general and, you know, this market really has two options to the homeowner or the customer. It's a cash product or a finance product, and a finance product being a PPA or a lease.

And I think you've seen in California those markets, predominantly finance systems, PPAs and leases in new homes falls within that bucket, as well.

MR. MILFORD: Yeah, this is Lew Milford. You know, we're seeing this obviously in other states, as well, in New Jersey, Connecticut, many other states that have solar programs, I think we're seeing the same trend there with the increased use of third-party finance PPA arrangements.

Most of the states don't have, you know, a dedicated new home construction program, like you do, so these are on -- you know, they can be new construction or retrofits, but clearly we're seeing the same trends

and probably some of the same issues that you're going to be talking about, as well, have come up in other states.

MR. HARLAND: Okay, so earlier when we were talking about -- in our first panel this morning we were talking generally about the solar PV market and new construction and there were conversations about the energy-efficient mortgage, as well as other loan products that are available to be included in the mortgage. So, I guess building off of this question about dominant financing arrangements for new homes, are there any packages that are offered by companies or by builders that provide financing up front within the residential market, and a specific product type, I guess, for new residential?

MR. BRUST: This is Matt Brust, I'll try to take this one. I'm not aware of any builders that have specific financing packages. We have worked with some of our customers to try and get the energy-efficient mortgage to work to fund both energy efficiency and renewables.

Within the context of production homes we've found that to be fairly difficult and it seemed to come down to the -- the major lenders not having programs set up to do volume-based underwriting with the energy-

efficient mortgage, though it can be done and it can be done in new construction and refinancing. And I would say that if that were to work and we could figure that out, that is absolutely a fantastic way, I believe, to do this because it, again, provides the opportunity for the homeowner to finance the system. They personally monetize the tax credits, they own the system, it's very simple and generally, kind of always I would say when it goes right to the mortgage payment it would be less than what they would have otherwise paid the utilities. And it makes them a stronger homeowner in that regard.

So, we talked this morning about the SAVE Act, which is sponsored by -- and we talked about bipartisan sponsorship, the Leading Builders of America, which is your top 10, 15 U.S. home builders, the Council that they created is the lead on that bill.

And so that allows the monetization of the energy savings to happen at the mortgage and requires things like HERS ratings and things that happen.

So, I think there's positive -- we're going in the right direction. How long that would take, I don't know.

And I would just close by saying right now in the New Solar Home Partnership the great majority, I would venture to guess 70 percent of the new homes are

financed, are cash sales or financed through the mortgage.

The question I have is whether we will see the same thing happen in the retrofit market, where we saw this sort of explosion happen in new construction.

And I personally think the jury's out and maybe we would ask some of our colleagues what they think about that, what is the long-term perspective on leasing of new homes and that sort of thing.

MR. SPRAGUE: Yeah, this is Ethan Sprague with SunRun. And in new homes we just offer a lease. And one of the -- the ideal situation, I think, for new home builders and new home buyers is getting what we call a prepaid lease wrapped into your mortgage for your new home.

So, you'd have one payment to your lending institution and you would have a right to the energy from the system on your roof for 20 years. In fact, it's not just a right. You'd be guaranteed production value.

You have no further maintenance costs and the solar company who is the service provider, such as SunRun, would be guaranteeing you that the system would produce and it would all be wrapped in.

So, you'd move into your home and you've got

energy, you know, the majority of your energy's supplied for 20 years, and you're paying for that cost within the mortgage.

And the reason that doesn't happen today is because the way the leases are structured it cannot be a permanent fixture to the home, and so the lending institutions take a very narrow view of what they will lend against. And because it's not technically permanent, they feel like, you know, if there was a foreclosure or something like that that the loan company or the service company, SunRun in this case, could take the system off the home. And, therefore, the value of the home wouldn't be as great.

That isn't true because it's been prepaid and, in fact, we guarantee to produce that.

So, we went -- we've been around and around with HUD on this and they allowed, in a program called the Power Saver Program, it's a retrofit application, they allowed a prepaid lease to be financed or back-stopped by HUD in that case.

And we're hoping they widen their view of what a lease is to allow new home buyers to include leases in the mortgage, because there is a company willing to back-stop it. And the company has no interest in taking the system off the roof because the ITC would be

reclaimed if it happens within the first five years.

There's a bunch of other reasons why we have no interest in taking it off. So, anyway, that's a long answer to that.

But I think once -- if that issue gets resolved, I think we'll see the market trend like the retrofit market has towards more leases.

MR. HARLAND: Okay, so --

MS. BERGER: And to that point, Ethan, the Sonoma County Energy Independence Program, we do finance prepaid leases, too. We were recently provided that authority through State legislation, from the PACE program, so we have taken advantage of that and we have financed a couple prepaid leases.

MR. SPRAGUE: And maybe it's worth just explaining, you know, what this means. It's that you get a funding source and you pay a lease company for the full length of the contract up front.

MS. BERGER: Yes.

MR. SPRAGUE: So, the homeowner in Sonoma that got a PACE -- it's a PACE lien, I guess is the right terminology, would pay the PACE lien off bi-annually with their taxes, and they would have this guaranteed right to the energy, they'd be guaranteed 20 years of energy from the system on their roof.

And if they move, then that system just stays with the home. And leases, functionally, stay with the home, just like they were if they were permanently attached.

MR. HARLAND: Okay. So, I guess in that sense it's like the system being installed as like a purchase if it was -- if the system, itself, the system price is part of the mortgage, except for in this case you're financing all the payments you would make in the future as opposed to purchasing and then putting that into there. Okay.

MR. SPRAGUE: Yes, that's correct.

MR. HARLAND: Okay, and you were explaining that for lending they're having a difficulty guaranteeing that the system will remain intact and keep the value of the home the same way it was appraised at on the day the loan was made?

MR. SPRAGUE: I think it's sort of the new -- the attorneys in Washington, who look at this, they take sort of a narrow view of what's -- you know, given the recent history of lending and underwriting bad loans, they want to make sure that the value that they're lending against is real. And the fact that it's not permanently affixed is troublesome for them.

You know, mobile homes and other types of

property issues get into this category and I think it's just a matter of them getting comfortable with it.

Most of the money that goes to invest in leases actually comes from the same banks who are doing the lending.

All right, so if you look at the tax equity providers out there, you know, it's the Bank of America, the US Bank, you know, the big banks, and so I think we'll get there.

MR. HARLAND: Thanks. Okay, so if anybody doesn't have anything to add to that question, we'll move on to the second one.

What are the pros and cons of such arrangements, so we're talking about the financing arrangements, or mechanisms from the perspective of the end-use customer, the builder, the installer and the ratepayers who fund the incentives that are provided for these systems?

MR. MILFORD: I can just take on the last one, more from the perspective of the State player who are starting to see these kinds of financings and I think, obviously, there's some significant benefit to the end-use customer not having to up-front a lot of capital costs.

I think for the public funders, and I'll put public funders for ratepayers that are those entities

like CEC that are providing incentives to solar programs, whether it's new home construction or others.

I think for many of them, you know, this is fairly sophisticated and opaque as there are a lot of very sophisticated financial players involved in this game who have made this happen, and I think that's all to the good.

I think from the public funding entities there is a sense of uncertainty or lack of clarity about the relationship between their public funding and the nature of the financial deals that are being structured. And then that is how do you make intelligent decisions about levels of public support in programs that are difficult to understand and may not be as transparent as they should be.

You know, I'm not blaming anybody, I think it's just the nature of this business right now, it's moving, the financial engineering is moving more quickly, I'd say, than sort of the public policy is catching up with it. That's at least what we're seeing in just a rough take around the country.

And I think that just needs to get calibrated at some point so that there's a better understanding of where this is moving and then what role the public players would have.

I think the other thing I would just say, and this may or may not fit within this topic but, you know, it is that the underlying basis for the availability of these tools, you know, is tax equity and depreciation at the Federal level, largely, and obviously state support.

And from a larger perspective, you know, there is significant uncertainty in the next several years about long-term viability of ITC and depreciation allowance, and where that's all heading.

So, it's obviously every square of that, but it's a significant flag I'd say going forward. Not just to these kinds of efforts, but to all the financing efforts going forward, and whether there are alternative means going forward that look more like, you know, bond or stock structures that may not be so dependent on tax equity structures.

So, I'd just throw those kinds of issues out in this framework.

MR. BRUST: So, I would obviously say a pro of the third-party is clearly that it removes the cost barrier to, you now, kind of the solar homeowner or customer.

You know, what I personally struggle with is whether -- you know, the goal that I would have is to reach the Commission's goals, and the net zero goals and

that we're able to put solar on 50 percent of the new homes and hit our 400-watt target, we're at net zero by 2020. And what is the model that we're going to get there by and what is the most sustainable model?

And, you know, as was just alluded to with some of our tax structures and things like that will leasing be the dominant model that takes us there?

And so I see one of the risks of when you offer solar to be essential no cost to a home builder, the engagement that I've seen is very low because if they're not participating in the cost, they're not as participant in the education, the inclusion of this, the idea of getting the cost down, everything that you need to do to make this mainstream technology in new homes.

And so I would want to make sure that we're investing ratepayer funds in models that we believe are going to be the sustained mainstream models that we will be at in 2020.

And, you know, obviously leasing in residential business is very critical and will probably be there for a long time. However new homes, as I alluded in my earlier comments, is just a completely different channel than the other channels who oversee these structures.

MR. SPRAGUE: You know, SunRun takes a slightly different view in that we think that right now leasing

is providing a discount to cash to the builders. So, the builders who want to have a lease in their community they -- you know, the cost to their consumer is much less than cash would be, the financing is being provided and the lessor is back-stopping the equipment. So, if that equipment manufacturer goes out of business we're going to be there to guarantee the production, we're back-stopping the installation, we're guaranteeing that it's installed correctly and we're there to service them.

We talk to the customers about net metering and a whole bunch of other host of issues. And I've found that the builders like that -- like that model, to have someone there to explain for them the equipment and the service, and to back-stop it, frankly.

They have less liability with SunRun in between them and the solar system than if they just incorporated it into their home. The solar manufacturer goes bankrupt, the inverter goes out, whatnot, there's no -- you know, that's a headache for the builder.

And so with us in between that there's an extra level of insurance for them that the customer issues, the equipment will be supported by someone who's got the knowledge and expertise, and leverage, frankly, with other manufacturers to make sure that they live up to

their warranties.

COMMISSIONER PETERMAN: I'd just like to make an observation and we'll talk about it in the next panel, but you bringing up this additional role that one company can have in terms of being there as an intermediary, it makes me think about what are our protections to ensure that such intermediary businesses are able to back-stop that well.

Because if we focus on the wrong equipment warranty, labor warranty, but if there are expectations that there are other parties who are not engaging with us more directly who are responsible for the consumer protection. We want to have a sense of their role, as well, and how do we provide additional protection there.

MR. SPRAGUE: So, is there a question or --

COMMISSIONER PETERMAN: No, it's just a Commissioner prerogative statement.

(Laughter)

COMMISSIONER PETERMAN: Just to let you know I'm still listening.

And then on the issue of, since I'm on the mic already, tax structure at risk, you know, one of the -- you know, I was wondering we could at some point talk about that a bit more, about the -- yeah, what's the acceptable -- of those who are engaging in leasing,

what's the acceptable level of payment, that you've heard, that customers are willing to receive?

Because if something happens to the solar depreciation credit, or the ITC, I was just curious what that is and is it at what they're currently paying for electricity now, on a monthly basis? So, I want to get some sense for that, as well.

MR. LUU: Yeah, different sources, but typically you find customers want to see a 10 to 15 percent savings, that moves the needle for them.

COMMISSIONER PETERMAN: Thank you.

MR. SPRAGUE: I think the larger question that's sort of being asked is, you know, the NSHP has a certain amount of funds, it's going to run out, the ITC is scheduled to drop 30 percent, to 10 percent, makers may, you know, change and is the least structure going to survive all that?

And, you know, as I think as was mentioned in the earlier panel that the soft costs actually drive a lot of the cost. And that what we see, our best way to get customers is through referrals and customer services. And so we measure ourselves on NPM, Net Promoter Score, how happy our customers are, our bonuses are paid that way.

And our view, our strategy is to really provide

superior service to the customer in order to lower costs and get referrals, and drive market awareness of this.

And we think that, combined with efficiencies of scale on the installation side, increased purchase power and we'll be able to ride through those changes in the marketplace and be the accepted form of solar going forward.

A side note to that is, you know, the building community, currently, you know, there is a rebate but they're not getting Title 24 compliance credit for PV. And I know there's this little issue of cost effectiveness, but I think in some of the costs, you're seeing cost per watt are cost effective, and I think the builders should get some credit somewhere along the lines for installing these systems on their product.

COMMISSIONER PETERMAN: I think you've made a good point about some of the timing, as well, about all of these various incentives. So, if this program is scheduled to end in 2016, I think that might be when the ITC is scheduled to end, and so something for us to think about as a State if there is some more appropriating staggering of incentives. You know, what would the difference be between a New Solar Homes Partnership Program that stops financing in 2016, versus 2018, and just in making that transition off of

incentives. How do we do it not so abruptly, so that's something else for us to think about.

MR. MILFORD: Commissioner, I have just one comment on that. I think, as we've talked to some of the other states about this and I think you're probably struggling with the same thing, there's a bit of a data gap here in terms of from the public side understanding, you know, what the internal mechanics of what some of these deals look like and then what the affect may be on different subsidy levels on, you know, cost of capital, for example, and rate of return, that sort of thing.

And I think right now it's just difficult, I think, for a lot state players to penetrate that. There's not enough data, and whether it's possible to get, and whether there are arrangements to be had to make it possible seems like it's a challenge right now from a lot of the states around the country.

MS. BERGER: There's another big data gap, currently, is how much are homes appreciating as a result of having solar installed. We've seen in our program where we've provided financing for solar arrays and then six months to a year later that property either sells at a higher cost because they've been able to get more for their property, and then they pay off their PACE loan at that time.

So, that could be another driver if there's a larger data set out there.

COMMISSIONER PETERMAN: I will just note, this is Commissioner Peterman, that that's a good point that was raised in this morning's panel. And there is more research in this area, there's a recent -- there's a couple years ago a report, and I think there would be a more recent one, but that is an area where we can still use more data.

MR. WEINGARTEN: Yeah, I just wanted to clarify something, the Federal Investment Tax Credit in 2016, it goes down to 10 percent.

So, there is a staggering -- and I mean I think that's a good point taking a look at staggering and rationing down. I mean that is something certainly that other industries have seen and utilized. I know it's something that's being discussed, you know, in the wind industry, also.

So, if something -- you know, you take a look at the data that you're seeing in the market in terms of the take rate, and then also the cost per watt, and analyze that and take a look, kind of projecting that forward what kind of incentive is going to be necessary to continue the acceleration of the take rate of solar in new homes.

MR. SPRAGUE: I just had one follow-up point on question number two, on the benefits to ratepayers. I think from the lease side of it there's been some evidence to show that because the consumer doesn't need the capital up front that we're seeing lease systems, at least in zip codes that have lower median incomes, and so that there's some demographic appeal to the lease in that you have to have a good FICO score, but you don't have to have 20 grand in cash.

And so it's slightly -- the benefits are disbursed to a slightly broader population set.

MR. MILFORD: It's actually a great point. There's a study on the Connecticut program, which is really more of a state-run leasing program, and there's a -- I think NREL did a report on this. But what they were showing, I've got a couple notes on this, they only had about eight or nine hundred leases, I guess.

But their incomes levels were showing, on average, about $100,000 income, but there were a surprisingly large number that had about a 60K level, they were showing more than they expected at those levels, as well.

So, there's some data. We need more, other data to back that up.

MR. HARLAND: Yeah, that's an interesting point.

I've seen similar studies that show, I think it was in the Southern California area, where demand actually increases because you can now offer systems to households that weren't able to purchase them before, consumers so --

MR. BRUST: I would point out that I think that's limited to residential retrofit, though.

MR. HARLAND: Right.

MR. BRUST: FHA financing allows you to put three percent down to purchase a home. If a system costs you $12,000, you don't need 20,000 -- you know, a grand or so for additional down payment to make this work. So I think the benefit to the hard-to-reach market is -- you know, it kind of expands NSHP just in general because of the way that we're able to get, I think, lower costs in this retrofit because of the economies of scale looking at the builder, and production volume, and things like that. So, there's several factors working in that direction there, but I'd say it's program wide.

MR. HARLAND: Right, that's a good. That's a good point.

Okay, so let's move on to our third question. What is the share of financial risk borne by each of the above-mentioned parties, so the end-use customer, the

builder, the installer and the ratepayer under different financing arrangements and mechanisms?

And so far it seems we're talking predominantly about including those in a mortgage or a third-party financing so --

MS. BERGER: Well, in terms of PACE financing, the risk to the property owner is the same as any property tax assessment would be.

COMMISSIONER PETERMAN: I guess I would tweak this question a bit more broadly. I'm just not interested in only the risk, but also just the financial cost.

Also, when the point came up about the kind of various levels of skin in the game and our traditional financing model has been an up-front cash incentive and so it was understood how much the private market was contributing to the cost of the PV system, how much the State incentive was.

It's not as clear to me with some of these other models, the lease model for example, about how to think about what that share of private investment is. And we do want to have some sense of these incentives covering sufficient amount of the cost, but not all of it for a system.

And so you could also speak to that question, as

well.

MR. SPRAGUE: I mean the financial risk, I mean when I get to the financial risk I think about it, and I'm not sure I'm thinking about it the same way that you might be, but we basically have a risk to the tax equity investor that we've got to pay back the amount of money.

And so we don't want to sign a deal with the customer where they're in a worse position to pay us than they would be to pay their utility bill, we want to make sure that they save money.

We have equipment risk. We have rebate risk. Is the rebate going to come through? Is it going to come through at the rebate amount that's been specified, how much are we going to have to spend to get the rebate?

We have maintenance risk. How -- you know, are the pigeons going to nest on this roof? Are golf balls going to hit it?

For example, I think I mentioned equipment, is the manufacturer going to go out of business?

So, we have to put aside money to maintain these systems for the 20 years.

And so when you look at the cost, our costs don't add up to the turnkey costs that you might see on your sheet, our costs are greater than that. It's not

an apples-to-apples comparison.

A homeowner who buys a system, the inverter will go out and whether it goes out within the manufacturer's warranty or not is unknown. They're going to have to spend time to realize that their system is broken. We monitor all the systems.

So, it's just -- I think there's different levels of risk but I just don't -- I agree that the data is not apples to apples, so it's hard to make a comparison.

I think from the builder perspective, I think they should do due diligence on vetting their solar installer, that they take a risk if they use a solar installer that's not also their roofer because you've got a roof warranty that you don't want to jeopardize.

But if you do a good job of understanding who your solar installer is, and the finance, and the quality of their operations then you limit your risk by going with a lease provider in some ways.

COMMISSIONER PETERMAN: Thank you, that's helpful. And I would ask, the slides provided or do an excellent start to starting the conversation but, indeed, there are different ways to think about financial outcomes.

And so I would ask staff to catch up with Ethan

and others, later, who are working with leases to think about a better way for us to understand all the costs associated within.

MR. WEINGARTEN: Just one thing I'd like to add on the financial risk borne by the end-use customer in a leasing structure. I mean one thing to keep in mind here is it's important to understand the typical financing structure behind those leases and how that protects the customer because, you know, that is something clearly that the Commission is interested in and I think the industry is interested in.

Any financing structures with the tax equity investors, they don't get their return even in a -- and I'll generalize here, but in a non-prepaid structure they're not going to get their return until the full payment of leases.

Now, granted, these are prepaid leases, but these prepaid leases typically will get lumped in with a lot of non-prepaid leases.

And in the fund structures that investor's going to stay in the fund until the end to make sure that they get their return. It's a mix of assets and that whole mix of assets will then contribute to the return.

So, if the leasing company goes out of business or otherwise has difficulty, that financing structure,

there's some other operator that will come in and take over the operation of those assets to make sure that they produce the revenue for the tax equity investor.

And that's different. You know, these structures offer a little bit of that security, it's almost like having a back-up servicer, if you will. That's not really how it works but -- so, you know, leasing as opposed to maybe a cash product, with a cash product you're just buying a system and then you've got a warranty, and if that warrantor goes out of business then you're out of luck.

And in the leasing model, while you have a similar concept and you have a warranty from the folks that you're leasing the system from, you also have this financing structure.

And I think it's important to think of that financing structure as a benefit to the customer because it's a 20-year relationship and it's a 20-year relationship that is effectively back-stopped by, you know, these tax equity investors that have very, very highly rated credits, that have every incentive to make sure that those assets generate.

So, I think in the leasing structures or the PPA structures, however you call them, because again these funds are mixed as PPAs and leases, both retrofit and

new-built homes, they're viewed the same by the investors, it really is limited financial risk, I think, for the -- for the homeowner because of that structure, which is kind of a unique -- it's interesting. It's not, from an academic level, something that you would expect, but it is a natural conclusion based on the structure.

COMMISSIONER PETERMAN: Eric, thank you for that more detailed explanation because indeed, although we're interested in the pros and cons from a lot of different angles, representing the State and the public investment I'm particularly interested in the end-use consumer and the ratepayer perspective.

Because I'm going to assume if the contractors and builders are coming in with models it would suggest they like them, and we don't get to have that same feedback from the end-use consumer, so I appreciate that perspective.

MR. SPRAGUE: I was just going to say, and this is probably different across lease providers but, essentially, if that fund structure or the servicer doesn't -- if it breaks its obligations, right, it stops maintaining the system, sort of the remedy is you basically own the system.

So, like you pay less to begin with if the

provider doesn't satisfy their side of the contract then, you know, then the remedy is essentially, at least in our contract, is that you have a right to the remaining ownership of the system.

So, you know, your worst case is you become the cash owner, right? So, it's not a bad deal.

COMMISSIONER PETERMAN: Thank you. And you've brought up something that more pertains to the warranty protection panel, but how to think about this topic as it relates to future Guidebook revisions is -- the Commission would be interested in knowing if there's anything that we need to be doing within the program in terms of requiring that such language exists in contracts and getting a sense of how standard such provisions are because we won't be privy to them, but we do want our -- those receiving the incentives to know what kind of the best standard of practice that they should expect, as well.

And so it's something for more discussions as we get more into the Guidebook revisions in future meetings, but I just wanted to queue that up.

MS. BERGER: And I think that's an important point when I think there's a fifth party to consider, too, and that's the perspective of the mortgage lender, and their perceived risk. And we've already noted that

there is somewhat of a resistance to the prepaid lease arrangements, perhaps. Certainly, when we provide them further assurance then vast more money would be leant or new lending products would be created by the lenders that would allow for an uptick in leases and purchases.

We know in the PACE world there's a huge resistance to PACE financing on the residential side, so we're dealing with that and trying to do what we can to lower that risk for -- perceived risk for the mortgage lender.

MR. HARLAND: That's a good point, thank you for pointing that out, Sheila, the lender risk there.

So, we'll move on to question number four, this is our last question. The current NSHP incentive structures, the eligibility rules, program administration; are they aligned with dominant financing arrangements and mechanisms?

So, again, these would be the systems that are financed for the mortgage, typically, or with cash, or with systems that are installed using a third-party arrangement.

COMMISSIONER PETERMAN: And, particularly, how could they be better aligned. Kind of noting the comments earlier, and wanting this program to -- and loose comments about the financial engineering behind a

bit ahead of the policy, we're trying to correct that.

MR. WEINGARTEN: Yeah, I'll take that first. You know, one of the things that -- and it's really just the details in the Guidebook and I think it's ultimately just something that -- you know, it's just the rules may need to be revisited and just sort of aligned a little bit in terms of how builders work and how leasing companies work with their financing structures.

I think the current Guidebook doesn't have a lot of clarity about builders taking leases and a lot of the financing structures require -- it is a mixer of how the financing structures work with just the way the builders work in terms of getting paperwork signed and getting solar installed early in the process.

Individual buyers at that point aren't necessarily identified, but the tax equity funds need -- before they make their investment, they need to make sure that the incentives have been secured.

And if you have builders that can't sign leases and then transfer then on that clogs the wheels a little bit.

And you have to kind of come up with some convoluted structures that they work, but they are a little bit more cumbersome.

And if your goal is to disseminate solar into

new-build homes, you want to strike a nice balance between process to make sure that the money's going into the right place, and that you're not having a grab, sort of a land grab on rebates but at the same time making sure that you have just the necessary structure to flow those rebates down.

And taking a look at the eligibility rules specific with builders signing leases, I think that that would help the industry and just recognizing that that's how this tends to work.

And having appropriate controls, though, at the same time to make sure that builders aren't just signing tons of leases just to grab rebate and I appreciate that, you know, that that's something that is a concern.

But it's just a reality of how the builders work and how the leasing companies work that leases are going to have to get signed by builders and then moved over to homeowners.

And the other thing is that -- and I think across the industry you don't, particularly after what's happened in the last three or four years, five years, is that builders aren't wanting to put solar on homes that are just spec homes. They're putting solar on homes that they're planning on selling.

So, it's not as if they're trying to grab rebate

just on a speculative basis.

So, that being the backdrop, I think looking at those -- the Guidebook and focusing on the ability to take the dominant structure in the third-party market, which is a lease, get that signed by the builder and then move that through the system in the appropriate way so that it's clear what benefits flow down to the customer. That's not a problem because, ultimately, that's the whole purpose of the program.

And then just, you know, working within those structures and understanding them.

MR. MILFORD: I just have one comment and it relates, again, to the data, you know, policy question and just a suggestion that is not directly related to the new home construction.

But, you know, given that a lot of these parties obviously operate in multiple states, you know, it might benefit from a multi-state conversation around this, at least among the public players who I think are all facing the same issues.

I mean I think they like this trend, they see it's a good trend, but at the same time want to make sure that their public dollars are well spent.

So, there may be some benefit in that to try to figure out some data disclosure questions and alignment

of subsidy, and lease structure, and maybe some standardization as well.

COMMISSIONER PETERMAN: Great. You know, let me suggest that we open it up for a couple of audience questions. We can go a little bit past the time, but I don't want to go too far past, to keep us on schedule, but we've got a break built in as well so --

MR. HARLAND: So, yeah, so if there are audience questions there are blue cards right there by the podium.

And please state your name clearly so that our -- and the spelling of the name, yeah. Here you go.

MS. FOGEL: I'll do that. My name's Kathy Fogel; I work at the California Public Utilities Commission, in the Energy Efficiency Group, actually.

And I realize this question arose in my mind during the last panel, where on-bill financing was mentioned a couple of times by, I know, Bob, and maybe some of the other panelists and I was wondering if -- I realize, now, I should have asked it at the last panel, but I was wondering if any of the current panelist can speak to how you'd see on-bill financing or on-bill repayment I guess is the better term, working with, you know, prepaid leases or other financing arrangements and how -- how it might work with new homes? I think that

would be, perhaps, a different situation than existing homes.

Something the CPUC is looking into a lot now, currently, with an efficiency focus rather than PV.

MR. SPRAGUE: You know, for the way SunRun works with new homes, we don't -- we don't do a billing arrangement, we have a prepaid lease product, so it's got to be paid up front.

And the reason that made sense to us -- you know, let me just give you a little context. About a year ago we looked at -- we were in this market, we were selling a low up-front product, and we had to run credit on the customer, and the customer wasn't there until maybe after the home was built, so you couldn't install the system until you got the customer, and it looked pretty much a lot like a retrofit product.

And we got no advantages of scale and so we changed it to require a prepayment up front, which allows you to sort of do it prior to home close.

And so because of that design change there's no -- we're not billing, right, it's prepaid. So, from my perspective it doesn't help me out.

Yeah, I can see for maybe someone else's business model that might be useful.

I do think consumers like to move into the home

with everything working, the system interconnected, no bill. You know, a new home with clean energy, it's very appealing in not having this ongoing payment stream. You know, you have one, you have your mortgage payment and you get used to that.

MR. BRUST: This has come up several times, as well, and I would just say that I think that it's an interesting concept but, once again, new construction and residential retrofit are completely different.

And so to do an on-bill finance in a production home community and to be educating the consumer about the choice they have for on-bill financing with the local utility, and all that comes with those arrangements is no easy task to bear, and so I would think that that would have to be really well thought out for that to work.

And I'd just comment on this last topic here, one thing I wanted to mention is that we've maybe leased a thousand homes through the New Solar Homes Partnership. I think we were the first to launch a lease in 2009.

And so we've quite a bit of experience with the program and one thing that we've always -- it's always been a monthly lease, not a prepaid lease.

And when we talk about alignment of, you know,

the incentive structures with the different financing programs, the one thing that I would -- I think we should think about is making sure that someone has skin in the game.

And so if you can use an incentive to fully prepay the lease and so, basically, the builder doesn't have an out-of-pocket cost, they're getting solar at essentially no cost, I -- you know, there was reasons we didn't go down that road and particularly for some of those reasons.

And so I just think that that's an alignment issue that we have to think about because when a consumer does get a rebate today, and they finance it, they have an out-of-pocket cost for that. They're making a cognitive decision to put extra money down and finance money, and purchase that, and so they're more apt to educate themselves around the decisions that they're making.

So, I wanted to throw that out for consideration.

COMMISSIONER PETERMAN: Thank you.

MR. NESBITT: George Nesbitt. Had I been an Enron accountant, rather than bankrupting the company I would have delivered it and manipulation would have been incompetence or not understanding.

Obviously, leases and PPAs are allowing people to have systems on their homes with no up-front cost or very little cost, and that's certainly expanded the market.

I may have to consider it on my house, not having much cash, either.

So, I'm reroofing my house with no budget, it is winter.

What I'm struggling to understand is assuming I can buy a system versus leasing, or a PPA, which costs me less in the long run?

And I'm also having a hard time looking at this NSHP examples where the lease systems look like they're 25 percent less expensive than the purchase system.

And I must remind you that if I purchase a system, and I have to pay out of pocket, whether it's cash or finance that costs me money, too. You know, there's lost opportunity or whatever interest I would earn investing it somewhere else.

So, why would a lease be less expensive and what happens at the end of 20 years.

MR. HARLAND: I'll clarify that the lease totals on that slide you're looking at, that's the total payments made on the system, so that's paying for the lease. The other slide that's up there, now, that's

purchasing the system.

So, once you have -- once you've paid for your lease and you've made all those payments, then you have options at the end with those leases to usually renew them, remove the system and upgrade the system, possibly, where the purchase that's yours.

MR. NESBITT: Right.

MR. HARLAND: So, that's the difference.

MR. NESBITT: Right and if it breaks down I got to fix it, buy a new inverter. But it's a little surprising, I would have expected a lease or a PPA would have cost me more money than if I bought a system.

COMMISSIONER PETERMAN: Kind of like a car, your car lease.

MR. NESBITT: Yeah.

COMMISSIONER PETERMAN: So, maybe someone who's going to be put it in that context about why it would be different, maybe --

MR. NESBITT: Maybe my financial brain is stuck in the dark ages and I don't understand this fuzzy math.

COMMISSIONER PETERMAN: I'm sure you're not the only one.

MR. WEINGARTEN: No, no, I mean it's not really fuzzy math or anything like that. It's simply -- I mean, the car leasing example I think is the best

example.

You're only leasing the asset for the period of time that -- I mean you're only paying for what you're using.

And when you're buying it, you're buying the entire life of it.

Obviously, at the end of the lease, at the end of the 20 years you can extend your term. If they don't extend the term or if the option has been granted to even -- and some companies offer the option, some don't, to buy it at the end of the term and if you don't avail yourself of that option, then the company will go ahead and remove it and then you can have a new lease.

Just like a car, if you continue to lease over time it becomes more expensive. So, it's just a financial choice more than anything else.

MR. NESBITT: Right, it's pay now or pay later, you know.

MR. HARLAND: Yeah.

MR. NESBITT: Yeah.

MR. LUU: I would jump in. This is Albert. Obviously, in my personal life I've never financed anything. I hate the concept of finance and, yet, I worked in a circuit finance department where they're raising capital for these no-money-down products.

And I guess the way a customer looks at them is they're really looking at two different things. Where, with a cash product it's really they've got questions when you're putting some money down today, and you're going to have to really -- it's an ROI analysis of how quickly do you get your money back. And then for different people, they have different return hurdles.

But over the long run the cash number, you have a better return if you're looking at like a 32-year horizon.

The finance option is -- the nice piece about the finance option, especially on a product like this is that it takes care of all the ONM, maintenance, production guarantee.

With a cash product, typically the warranty on those is ten years. There's a lot of discussion on the market that inverters typically fail between 10 and 15 years, so that's something the homeowner would be responsible for.

In the finance product it's essentially an infinite return because you never come out of pocket for any up-front costs, so it's just more of a reducing your electricity bill. Think of it as instead of buying SMUD or PG&E, you're buying power from a solar provider who is able to beat the retail rates that are being provided

by the utilities.

COMMISSIONER PETERMAN: I just have a clarifying question for someone. How much are inverters going for right now, for the 3- to 5-kilowatt system?

MR. LUU: Inverters are typically somewhere in the close to 30-cents-a-watt range. So, 3 kilowatts, 3 times 30 cents, time 1,000 is your inverter cost.

COMMISSIONER PETERMAN: I'm waiting for you to do the math. I have an MBA but now that I'm a Commissioner I don't do math, so what does that work out to be?

MR. LUU: It's about $900.

COMMISSIONER PETERMAN: Thank you.

MR. HODGSON: Good afternoon, Commissioner, I have a comment that I'll try to phrase in a question.

COMMISSIONER PETERMAN: Yeah, or you can just comment as well.

MR. HODGSON: On question number one the panelists got off into talking a little bit about energy-efficient mortgages. And having worked on these for a long period of time, one of the things that the Federal Housing Finance Agency requires under their new guidelines or their guidelines they're developing is they want a uniform national platform.

To do that, the platform that we rate homes in,

in the nation, are based on the resident guidelines, which are based on the International Energy Conservation Code.

California, I understand, has Title 24, some familiarity with that. It's slightly different than the IECC.

And for California to be able to play on this platform which, hopefully, we have a product sometime in the spring of next year, is we're going to have to either have a crosswalk or conform to those guidelines.

So, my question possibly to the dais or the panelists is how do we get California engaged in that discussion so that homebuilders and, potentially, homeowners will be able to participate in Freddie and Fannie mortgages, if they exist next year, on a national scale

COMMISSIONER PETERMAN: Well, I guess I'll just note, since you brought it up to us here, we've been officially put on notice that this is going on and I think this is the start, having dialogues like these and making us aware of what these trends are, and these opportunities for engagement are.

And if any of the other panelists have --

MR. BRUST: The SAVE Act, coming back to it again, is basically a national program that uses the

same system to measure, which is based on the resident and everything so --

MR. HODGSON: Right.

COMMISSIONER PETERMAN: I think we -- staff would probably getting more information about it, though.

MR. HODGSON: We keep staff informed and we'd love to have them engage.

COMMISSIONER PETERMAN: Okay, terrific. Thank you.

MR. HARLAND: Are there any comments or questions coming in through the WebEx, online?

None, so does anybody else have any questions or comments?

Are you guys good? Okay, so, yeah, Ethan, go for it.

MR. SPRAGUE: You know, we didn't really get into the program mechanics, but there were some good suggestions from the previous panel about the task force and allowing builders to sign leases, and generally making the process more streamlined.

When we looked at this, when we considered new home builders, they're just trying to control their costs, and they're trying to make a product and solar in their homes is a feature, it's not the main thing

they're doing.

And so if the price of their home, or the amount of the rebate, or the cost to the customer is going to change or is in some uncertainty, it makes it hard for them to commit to that, and it dampens the momentum that solar has in the market.

So, just as a general point, the simpler you can make it -- you know, just talking about the financing, solar is provided in a large part by a series of systems that all have to work together to make something really simple to a consumer who just says, you know, make it easy for me.

And to the extent those systems that are trying to support it create more bureaucracy, or overlap, or confusion then they actually do some harm in that and they confuse the market.

So, just a high level, conceptual point that, you know, try and make it as streamlined and efficient as possible, while still protecting the public.

COMMISSIONER PETERMAN: Thank you. Yeah, that's a good comment to end on.

Eli, thank you so much, as a moderator you're terrific and I'll let you wrap up.

Okay, so next up we're going to have an energy efficiency conversation. Because we are a little bit

behind on time, let's do about three, four minutes to try and wrap that -- to try and get that started.

So, if I can have the energy efficiency presenter come up? And thanks to the panelists, I appreciate it, and to those on WebEx.

MS. BERGER: Thank you.

(Off the record at 2:20 p.m.)

(Resume at 2:37 p.m.)

MR. HOELLWARTH: Okay, my name is Craig Hoellwarth. I'm the Supervisor of High Performance Buildings in the High Performance Buildings and Standards Development Office at the Commission.

I have a few items here that I just want to touch on for the people on the panel and the audience to consider as we start the discussion on energy efficiency as it relates to the New Solar Home Partnership Program.

The program really comes under the umbrella of AB 32 and in that regard there's a goal to have new residential construction reach zero net energy by the year 2020.

In terms of the New Solar Home Partnership, it's a type of standard which means that it has -- it requires the design of these homes that participate in the program to exceed minimum standards by at least 15 percent, and at a tier two level 30 percent.

And it does that like a reach standard to encourage the use of new technologies, of new energy efficiency strategies that aren't in common use and, in general, will cost more out in the marketplace.

And by encouraging the use of these strategies we hope to bring down their general costs so that they become more cost-effective and can be adopted in future energy standards.

As we repeat this process, we approach that goal of requiring zero net energy in our new construction. And it's in that light that we can talk about the New Solar Home Partnership as being one of those programs to help get us there.

A second thought is that a few years ago the Commission adopted a loading order, or the State has a loading order that says that we should use all cost-effective energy efficiency strategies first, before we use other resources, and that includes photovoltaics or non-renewable resources.

So, first comes energy efficiency, then comes the renewables, and that is the way the program is set up. And in some respects that is what complicates, perhaps, the nature of the program as we heard from conversations that went back and forth earlier this morning.

A third thing is that we do have past experience. Now, with the program out in actual practice, we're now in our fourth -- we have approved our fourth Guidebook. And in that Guidebook, when we approached that from an energy efficiency point of view we tried to identify the various barriers that are presented by having to exceed the standards in order to receive a photovoltaic incentive for that cost.

And we've learned a lot in that process and we think that we have streamlined the program from an energy efficiency point of view, but there's more to do.

Obviously, we've heard some things this morning that we should continue to work on.

So, I want to encourage you to make sure we bring those things up and we challenge ourselves to address them.

The fourth thing is that we have a new standard that's been adopted, the 2013 standards, and they're going to be more stringent, of course, than the previous code and that's going to present a challenge for the NSHP program because it's going to be that much more difficult to meet these minimum requirements.

And we need to discuss what sort of impacts we think this new standard might have on the support for the real -- to increase the impact that the program has

on the residential marketplace.

And the fifth item, we've done some analysis of the utility programs coming up, in their new version, and looked at the costs of strategies to meet the minimum requirements.

And to address those, we have our Senior Engineer from our Energy Efficiency Office, Martha Brook, to present that data.

MS. BROOK: Thank you. Can you guys see the slides? I mean I know you can see them with your eyes, but can you actually read them from where you're sitting?

UNIDENTIFIED SPEAKER: We got handouts.

MS. BROOK: Okay, you got handouts great, perfect.

Okay, so what we did was we looked at what we expect for the 2013 standards.

I can't see you guys, I'm super short, I guess.

And what we expect for the 2013 standards, which will be implemented in January of 2014 and because that's a more aggressive standard we wanted to do an exercise where you look at the costs of getting to the 15 percent and 30 percent better than that more aggressive standard across various climate zones in the State.

So, what the cost would be versus what you would get as an energy efficiency incentive and a solar incentive to meet that same level of energy that you're saving.

And so that's what we did for these six climate zones. And they're basically three pretty moderate climate zones, Oakland, San Jose and Riverside, and then more extreme climate zones. Fresno's a really good example of the hot, inland valley climate zone, and then we have a very hot Palm Springs, and a pretty much heating dominated, cold Blue Canyon, which is basically climate zone 16 which goes all the way across the Sierras and down, even into the eastern part of Los Angeles.

So, in this first slide we're looking at Tier I, 15 percent better than the 2013 standards. And the dark blue is the cost that we expect to achieve that level of energy efficiency. And the dark green is the cost that it would take for a solar system to meet that same level of energy savings that you're getting with the energy efficiency.

And then on each side of those cost bars is the lighter-colored blue incentive payment you would get for the new construction programs that the investor-owned utilities offer for their new construction programs.

And on the light green, on the far right is the expected incentives, both the Federal Tax Credit and New Solar Home Partnership Program that you would receive for a solar electric installation incentive.

So, that's Tier I. Basically, quite a bit of difference between energy efficiency costs and solar electric costs for the same amount of energy savings in these homes.

So this just demonstrates what we think is really important is do all the energy efficiency you can first, and then use your solar electric system to offset the loads that you can't meet with the energy efficiency of your building, and there's plenty of those.

So, you know, probably over 50 percent of the energy use that's in these new residential homes are things that we add to the house after it's been constructed. So, major appliances and plug loads make up the dominant share of energy use in the residential construction in the State.

So, Tier II is very similar, but more extreme. So, this is now 30 percent better than the 2013 standards, which is very energy efficient. And you can see that the costs, you can still achieve this level of energy efficiency with, you know, about between $1,000 and $3,500 of energy efficiency.

And your incentives for that energy efficiency offset that cost to a pretty good degree.

And then, again, the green is the cost and the incentive you would get with a solar system to meet that same level of savings in your home.

And if there's any questions about that, should I take them now or --

COMMISSIONER PETERMAN: Actually, I have a quick question, a clarifying question just because I'm not as well-versed in the energy efficiency side.

The energy efficiency incentives, can you just speak to what the source of that incentives are, is that customer rebates, as well as the CAP Program or --

MS. BROOK: So, that is the investor-owned utilities' New Construction Program, California New Homes Program. And these are basically the current incentives. So, we expect that these incentives will actually, probably be a little bit higher in the future than they are now, but we thought for this comparison we should use the current incentives, both for the efficiency side and the solar side to our best information.

MR. BRUST: Factoring the gross cost or the net cost?

MS. BROOK: So, that's the cost based on the

current six -- it's the cost we used were $6.86 per watt for a PV system.

COMMISSIONER PETERMAN: So, it's not net cost, to your point. I think it's a pre-subsidy cost.

MS. BROOK: But see, the subsidies are the light green and so if you look at the difference between those you can tell that the difference is still much larger than the difference between the two blue bars.

So, it's gross cost on both sides and then incentives separately calculated.

COMMISSIONER PETERMAN: And just a clarifying question, as well, because I mean I think the number that would be useful to see on this is what the total kilowatt hours that's captured is?

MS. BROOK: Uh-huh, yeah, we have that and it varies significantly across those climate zones.

COMMISSIONER PETERMAN: I see.

MS. BROOK: But we can provide that to you and your decision-makers, you know, as soon as you need them.

COMMISSIONER PETERMAN: Thank you. Sorry, Matt, I think you might have had a follow-up question and I just wanted to get that one.

MR. BRUST: I just think the pricing and modeling assumptions in here are extremely important and

when you're trying to offset a system side that may be very small, the price of the PV system per watt changes dramatically. The production of a system is dramatically changed based on the inputs that you use. So, I'd just --

MS. BROOK: So, what we did for the production is actually used our CECPV calculator to calculate the KWH per KW that's expected in every climate zone, so that's how we transferred from KW to KWH to meet that efficiency savings.

COMMISSIONER PETERMAN: Come on up.

MS. FOGAL: I think, based on our conversation last week, I would guess that these efficiency incentives are modeled without the kickers. There are about six kickers that have been offered for the last three years, so that --

MS. BROOK: So, this actually includes the KW reduction kicker for both Tier I and Tier II, and it includes the NSHP additional kicker for Tier II. So, it's the current incentives.

But probably not, like you said, all of the different six variations of incentives that are offered.

COMMISSIONER PETERMAN: Yeah, Mike?

MR. HODGEN: It's 30 percent of this particular slide of the regular --

MS. BROOK: It's the same, exactly the same savings, yeah.

COMMISSIONER PETERMAN: I guess I would ask and add more that this shows the equivalent savings. I would be interesting if you all had modeled what the optimal mix is.

MS. BROOK: Well, I'm sorry, I don't understand the question.

COMMISSIONER PETERMAN: Well, kind of getting a little bit to Matt's point around the assumptions around the system size that's assumed and also economies of scale in terms of when you would -- one might employ -- ignoring policy for a second, there are times when you want to use energy efficiency and times you want to use PV. And so just kind of following up on that you wouldn't normally -- you wouldn't have these two as equivalencies, but I assume you might start with the energy efficiency first and then --

MS. BROOK: Right, but if the question on the table is why do we have to do efficiency before we do solar, then we're trying to illustrate why, because you can use -- I mean the solar that you install is going to go to other parts of the home's energy consumption, right, so why not do -- why not do efficiency which is much cheaper, so what you can do efficiency with and

then focus the solar -- you know, reduce the size of your solar and really just meet what you can't meet with efficiency, which is plug loads and appliances, with your PV system.

So, I guess what you're saying is the lower you can get the size of your PV system, the more cost-effective it's going to be for the consumer who has, you know, so --

MR. BRUST: Did you look at when we take the EE measures apart and then I would argue that at $6.80 a watt is -- you know, that's two years ago.

But at what point does that PV price cross the line and become -- fall within the stack of energy efficiency cost-effectiveness?

Because when you've got probably other measures carrying other measures in this analysis because it's a composition of seven, or eight, or nine different things, some more cost-effective than others. Where does it come in the loading order, where does it fall in there at different price points?

MS. BROOK: So, you mean where does each efficiency measure fall in the loading order or do you mean what -- at what cost point for per-watt of the PV system is it the same as efficiency. We could definitely do that.

MR. BRUST: Yeah, do you look at the cost-effectiveness at each measure and then at different cost points where does PV then start to fit into that stack?

MS. BROOK: Yeah, we could definitely, with the data that we used for this, I mean immediately tell you what the cost point is for solar that meets the efficiency costs. If that's what you're asking, that's readily available.

MR. BRUST: But I think it's also going to the measures, as well. I mean this is like a whole building concept right here. Your measures to get to 30 percent is multiple energy-efficiency measures --

MS. BROOK: Right.

MR. BRUST: -- that measure the different cost-effectiveness of each.

Understanding it's a whole building approach but --

MS. BROOK: Right.

MR. BRUST: -- at some point -- I would think that at some point the --

COMMISSIONER PETERMAN: Marginal one, uh-hum.

MR. BRUST: Yeah, because costs have come down so much more dramatically than what is modeling here, you're going to -- I believe you're going to start finding that it's more cost-effective than some energy-

efficiency measures that would be in --

MS. BROOK: Well, obviously, we picked -- we didn't pick the most outrageous energy-efficiency measures, we picked the most cost-effective ones that met this -- that met this demand reduction.

We're trying to make the best choices for the consumers, right, so we're trying to say these are very -- you know, these are going to be in future codes, so these are very, you know, buildable, constructible measures. And then we've just basically added up the cost of those to meet this blue bar here.

COMMISSIONER PETERMAN: So, let me -- Matt, you probably have a follow up, so you can do that, but speak into the mic so people on WebEx can hear. And then Commissioner McAllister has a question. I think we've got a clarifying question from Dan and then let's move to the panel. And we're wrapping up because I think this dialogue will continue in a couple minutes with Martha sitting down.

MR. BRUST: My last question I would ask is where does TDV or the time dependency fall into this? Is this just an energy analysis or because we know certain energy-efficiency measures with today's utility rate schedules and things like that provide different financial benefit? So, is that figured in any of this

work?

MS. BROOK: So, this is the -- the percent better is a TDV metric, so it's percent better of time dependent valuation of energy.

But the incentives that were calculated for the efficiency are based on KWH and therm savings. And that there's also that one of the kickers is a KW reduction.

So, the incentives have KW, KWH and therm components to it that were all included here.

COMMISSIONER MC ALLISTER: So, yeah, I'm glad to finally make it over here. I've been away to a program today, so I really wanted to be in there as much as I could, so thanks for inviting me.

So, I guess I'm a little surprised by this graph because I think -- well, so there's clearly a lot of variation from climate zone to climate zone in the amount of energy that represents the 30 percent better than the 2013 standard.

MS. BROOK: That's right.

COMMISSIONER MC ALLISTER: And I guess I'm a little surprised that, say, that amount of energy is less in Riverside than it is in Fresno or, you know, Oakland/San Jose.

So, I guess I'd like to sort of hear the characterization of the typical house, the prototypical

new home, I guess, in each of these in terms of square footage, and energy consumption, and stuff that gives rise to a relatively low amount of energy representing compliance with Tier II in Riverside, for example.

MS. BROOK: So, it's all the same prototype, it's a 2,100 square foot house.

And the -- it's basically the measures that get to 30 percent are, you know, in mostly water heating and space heating for Oakland and San Jose, which have pretty minor, relatively speaking, cooling loads.

And then in Riverside, what works really well in Riverside is a -- for Tier II is an insulated roof deck, which helps on both the heating and the cooling loads significantly.

And so that's why a 30-percent-better-than-2013 has a pretty minor energy usage overall because you're really bringing down the loads of that building significantly by really making significant improvements in the envelope.

And then when you move into Fresno and Palm Springs you have to do -- well, Palm Springs, it's all cooling. So, you're doing an insulated roof deck to bring down the cooling loads. You're maximizing the envelope and then also additional, higher efficiency on the cooling equipment for Palm Springs.

COMMISSIONER MC ALLISTER: So, the way I'm looking at this graph, I'm really -- I guess I'm looking at it -- based on the conversation up to now I'm looking at the PV, the dark green bar is essentially a proxy for energy.

MS. BROOK: Well, no, that's -- the cost of energy is really the blue bar and energy, itself, isn't on this slide.

COMMISSIONER MC ALLISTER: No, that's what I mean. But if you use the same price for the PV -- well, I guess you're modeling it according to the climate zones so it's going to vary a little bit.

MS. BROOK: Well, and the reason that Blue Canyon just leaps up there on the green line is that it's a heating-dominated climate and I mean it --

COMMISSIONER MC ALLISTER: Absolutely.

MS. BROOK: So, you have just this huge amount of heating that, you know, that it takes a lot of electricity to provide heat to homes. And so that's really why that jumps up there like that.

COMMISSIONER MC ALLISTER: Yeah, okay. Yeah, I was just a little -- so, based on this it's basically Riverside has lower consumption overall for the prototypical new home than any --

MS. BROOK: But so these are just -- you know,

we could have picked -- like it's like San Diego, climate zone 7, would come in under Riverside, so there's -- this isn't like the whole --

COMMISSIONER MC ALLISTER: No, for sure, but it's the climate with the lowest energy consumption --

MS. BROOK: We tried to pick representative ones where there's a lot of activity in this construction market, and where there's been activity in the New Solar Home Partnership Program.

MR. PENNINGTON: So, Bill Pennington, I wanted to comment on your question. One thing that may not be intuitive about this chart is that in more severe climates these measures are more powerful in saving energy, and so the cost stays the same in this chart because you're using basically the same measures, but they're more powerful.

MS. BROOK: Yeah, sorry, that's right, right.

MR. PENNINGTON: And so the equivalent to produce that energy through a PV system is bigger.

MS. BROOK: And we can definitely, if it helps you for your record and your work going forward, we can provide the energy that lies behind all these costs, and that sounds like it would be very helpful to you.

COMMISSIONER MC ALLISTER: So, it looks like there's one kilowatt hour number, like say the annual

consumption of the prototypical new home, for example, that you could just put one number over each city and that would be helpful to have as reference.

MS. BROOK: Okay, thank you.

COMMISSIONER PETERMAN: Dan, did you have a question about the presentation?

MR. CHIA: This slide.

COMMISSIONER PETERMAN: Okay, go ahead.

MR. CHIA: Just a quick question and I'll say at the outset that we need it all. but is there any data that actually compares the durability or longevity of savings between the two resources?

MS. BROOK: Not that I know of so --

MR. CHIA: Dan Chia, with SolarCity, C-h-i-a.

MS. BROOK: Yeah, most of the measures that we're using here to get to this level are envelope measures so they're -- you know, we consider them very durable. We use a 30-year life for the measures when we do our cost-effectiveness analysis.

COMMISSIONER PETERMAN: I've not heard that question before so that's an interesting question, and something that as we continue together and thinking about these EE goals will be important to do.

Mr. Tutt?

MR. TUTT: Tim Tutt, with SMUD. I think there's

no doubt from the figures, as modeled, that engaging in energy efficiency is less expensive per kilowatt hour at present. Matt, no doubt, has indicated solar costs are coming down and that equation may change in the future.

All things being equivalent, you might want to do as much energy efficiency as you can.

But the question I think that is missing -- two questions I think are missing. If you -- depending on your program structure you can actually complicate things enough that people don't do either energy efficiency or solar, so you might be losing some savings. And you have increased transaction cost and that cost is not included in those charts, so I just wanted to mention that.

COMMISSIONER PETERMAN: Thank you.

All right, let's move on to the panel, please. Thank you, Martha.

MR. NASIM: Good afternoon everyone, my name's Farakh Nasim. I work in the High Performance Buildings Office here at the CEC. I'm going to be the moderator for this Energy Efficiency Panel.

I'll go ahead and introduce the four panelists, three of whom have done at least one other panel today.

So, Jacob Atalla with KB Homes, Bob Raymer with CBIA, Mike Hodgson with ConSol, who is our new panelist,

and Matt Brust with SunPower.

If we could have each of you just briefly reintroduce yourself, and state a little bit about your background and any work you've done in efficiency throughout your careers. And we'll start with Jacob.

MR. ATALLA: Thank you. Jacob Atalla, Senior Director of Sustainability with KB Homes -- KB Home, I should say. I'm an architect by education. And we have been focused on energy efficiency since the early 2000s, started building Energy Star labeled homes at that time.

And we currently have over 74,000 Energy Star certified homes.

Energy efficiency is important to us because it lowers the total cost of ownership for our customers and that's very important, became more important in the last few years.

And we also have taken a step into building zero net energy homes in a quantity of nine homes so far, across the country, to basically understand these homes and how we can start transforming our product line for the future towards 2020 and beyond that. I'll leave it at that.

MR. RAYMER: Thank you. I'm Bob Raymer, Senior Engineer and Technical Director of the California Building Industry Association. I have been representing

CBIA at the local, state and national level for the past 31 years. I have been involved with the updates to the energy regs since, of course, 1981.

One of the huge issues that we've been looking at with recent updates of the standards, and then the next two updates of the standards, will be doing our best to help the transition from one set of regulations to another. That involved a lot of field work, education and training, but it also requires us to take a hard look at what changes are being made to the standards, what changes in common design practice are occurring and the up-front costs.

We automatically assume that these features are going to be cost-effective, but we're also looking at the up-front cost and to the extent of which that can somehow be moderated. Thank you.

MR. HODGSON: Good afternoon, Commissioners, I apologize for not introducing myself last time. I'm Mike Hodgson from ConSol, and I'll turn my microphone on.

COMMISSIONER PETERMAN: Just so everyone else can hear you. Say that one more time.

MR. HODGSON: Okay, I'm Mike Hodgson from ConSol. My background is we -- ConSol makes buildings more efficient. We do a lot of program management, as

well as representation of trade associations.

Most relevant to this discussion today is we're managing a few utility programs in the southwest that make buildings very much more efficient, near zero. We've built a few hundred homes in the last two years that are somewhere between a HERS score of zero to 12 in the production environment.

So, we're trying to promote efficiency, as well as renewables in a combined package that can be delivered and sold to the consumer.

MR. BRUST: And once again I'm Matt Brust. I'm the National Sales Director with the New Home Division at SunPower. We work with the U.S. Top 25 National Homebuilders and also large regional homebuilders to incorporate both solar and energy efficiency, really, into their homes as a turnkey system offering.

I've been here for six years in this division, and prior to that I spent 12 years as a consultant to the utility industry, mainly working in DSM or demand-side management in energy efficiency programs. And, actually, the last three years I was there I was the program, the statewide program manager for the Energy Star New Homes Program where I spent quite a bit of time interviewing, and talking, and understanding the Energy Star Program and how that worked with homebuilders.

Then, to take my career to the next step which was to actually begin working with homebuilders in sales.

And, you know, as I mentioned earlier, we're at this 10,000 mark now, so over the past five or six years we've reached 10,000 new homes. Every one of these homes has included energy efficiency to 15.

And I think if you went back into the databases and actually looked you would find that the New Solar Home Partnership and the strategy of selling energy efficiency with solar as a package to the homebuilder, which is ultimately sold to the consumer, has turned out to be very successful and that probably more of your Tier II homes come with solar than Tier II homes that do not.

And I think that, you know, we took on a big education process of working with the homebuilders, and learned a whole lot from the days of talking to them as an evaluator to working with them, you know, in their offices and actually doing deals and building systems. So, that's my background.

MR. NASIM: Okay, so we're a little bit behind schedule so I'll go ahead and get started with the first question for the panel.

How does solar, combined with energy efficiency,

help California achieve its zero net energy goals.

MR. RAYMER: I'll be jumping in on question two, so I really don't have much to add, other than they both work. I mean you need both for zero ZNE.

MR. NASIM: Yeah, I mean I guess maybe a follow-up question is are there -- what kind of a balance do we need to meet? Is there a balance or is that something that --

MR. RAYMER: I think there is, but I think the challenge that we have to meet in a very short order is getting industry, and I mean the subcontractors, whether it's the roofers or the solar installers, the electricians, we have tens of thousands of workers who, as I mentioned during this morning's session, are just now coming back to the construction industry, as well as the plan checkers, and inspectors.

We need to get them all familiar with solar before 2020.

So, to the extent that we can get solar going in, and I realize we have a loading order, but there's also a huge benefit to gaining familiarity with an issue before it becomes an absolute mandate.

And so to that I think -- I don't want to say you'd think outside the box, but we need to be accepting the fact that that chart, that Martha was showing,

indeed shows that there may be more cost efficiencies to doing efficiency first, and solar second. But there's also a huge benefit to industry in general and doing the right by 2020 to learn how to do it now and in the next few years. So, that's kind of a balance situation there.

MR. HODGSON: I would agree, Bob, I think solar is essential to getting net zero, if that's the direction that we're trying to go.

The chart definitely demonstrated energy efficiency is more cost effective than solar at this time. But I think a really interesting dissection of that chart is where is the crossover, which I think is one of the questions Matt was trying to address. You know, is it at $4.00 a watt that solar is now more cost-effective than its efficiency?

Where is energy efficiency at peak load more cost-effective, or where's solar more cost-effective than energy efficiency?

I think the --

COMMISSIONER PETERMAN: Mike, I'm going to ask you to pull your mic just a little bit closer.

MR. HODGSON: Sure.

I think we all can agree that we have a long ways to go on the envelope, still. There are advanced

building constructions where we're building homes probably 50 to 60 percent more efficient than current code. To do that it's fairly expensive, it's not cost-effective to the production home builder.

But as Bob mentioned, if we don't learn how to do that now, and if we don't learn how to do it and integrate solar, in six years where we're trying to get to net zero, we really need that educational process.

The construction industries are not quick learners, we know that. They're a trade association, it takes a long time to change and so we need to expose them to things.

But we have mentioned solar and I apologize, I was not participating this morning but, you know, there's a lot of different solars that we can look at. There's solar hot water, there's solar PV, there's space cooling that we can do, there's space heating.

And some of the integrated systems I think should also be looked at because those are some of the most interesting technologies personally I've seen that help us get down to near zero.

COMMISSIONER PETERMAN: So, I appreciate the observation, too, or acknowledgement there's different types of form of PV. Because, you know, we were talking in the previous chart about providing everything by

electricity and that may not always be the most efficient renewable to balance, so I appreciate you mentioning it.

MR. ATALLA: Commissioner, I think I want to make -- put out a caveat here that the nine homes we built are across the country. Therefore, a lot of the numbers that I'm going to mention are related to -- when I say HERS, it is the National HERS Index Score, not the HERS California, HERS II. So, forgive me for that.

But to the point of the initial presentation, energy efficiency has a role in building zero net energy homes. And, granted, but also to Mike and Matt's point, where is the crossover?

Currently, as prices of solar drop we got to continue to have a dynamic conversation about where is the crossover?

In the meantime, for us as a builder, KB Home, putting a standard for our divisions across the country to build net zero homes, we are looking at HERS score of roughly about 45, between 50 and 45. That's where we look at in reducing, where we put energy efficiency up to that point before we add solar.

And in most cases the solar then is roughly about five, six kilowatts, in most cases.

We've had it where in some extreme climates it

goes -- like Colorado, it goes to nine kilowatts for just that -- from 45 down to zero.

But in California I think we're blessed with a better climate than that and I think we can be in the five to six kilowatts.

So, there is room, with the reduce before you produce kind of mantra there is room for both of them to live together.

Where is that point? Is it a HERS 45? Below that? That's a dynamic conversation based on market numbers.

And we are -- you know, for that matter we're not just encouraging our solar partners and trade partners, as well, but also the insulation people and the windows people to continue to bring the price down.

And whoever, you know, brings the better price down, whether it's energy efficiency or solar we'll take -- you know, will go into that dynamic equation.

COMMISSIONER MC ALLISTER: Can I ask a question, actually, on that point? Now, I'm interested as a builder, are you making different technology choices, particularly for your mechanical systems, when you start to really go aggressive on -- you know, towards the zero net energy?

So, I guess one example of that would be would

you go with, you know, some kind of heat pump technology or, you know, an electric technology over a gas technology if you're -- I imagine it might depend on how you're defining zero net energy.

But I guess if you could shed some light on sort of the decision-making process as you design a building with an eye towards ZNE that would be great.

MR. ATALLA: Yes, definitely, we are making part of the energy efficiency measures to take the house -- all our homes are built to the Energy Star guidelines, so they all get Energy Star certification. And roughly, we then for any net zero energy home what we do is take it from that level down to about 45.

So, in national numbers for us that translates from about an average HERS score of 68 down -- we need to take it down to 45. And we're doing that with -- starting with the envelope, more efficient envelope.

Second, we go to the mechanicals, definitely do better mechanicals. So, if Energy Star requires 14 SEER air conditioning we go to anywhere from 16 to 19 SEER for air conditioning.

And we are working with other technologies to help with that.

And in terms of the mechanical improvements, we also put in solar to the point that solar is more than

PV. Part of our reduced measures is the solar thermal, so reducing the load of the water heating in the house through solar is part of how we get to 45 before we start putting PV on the system -- on the home.

COMMISSIONER MC ALLISTER: Okay.

MR. BRUST: So, a quick comment and then I actually have to excuse myself for another meeting, so I apologize.

But from a slightly different perspective and having spent a lot of time in the sales offices where the consumers walk through and look at the different floor plans, and models, and make the buying decisions to actually purchase a home, the combination of energy efficiency and solar has been, I think, really, really important because it's a story that we teach the sales people to tell.

KB Home does an incredible job of telling the story with their marketing, and the EPG labeling of the home, and explaining the bill. And in doing so, you have to explain all of the things that you've done differently for that home to make it perform better.

And then what you find is at community scale people start moving into these homes and they're actually performing -- the performance is exceeding their expectations. And so now they're talking to their

friends and their neighbors. And the reason I think that's a really important point to make because to really get to net zero I think it's going to take more than just policy. It's going to take some sort of demand in the market to say we want these, we're willing to pay for them and buy them.

MR. ATALLA: And so by marketing these things together is having -- building momentum for that sort of thing.

COMMISSIONER MC ALLISTER: I think that's a great point. So, the point you just made, actually, you could say the same thing or something very similar about existing home that's in some ways, something very similar about existing homes.

And that's, in some ways, even more of a conundrum as far as how we, you know, develop the marketplace for those things and what people will be looking for and then how to express it to their friends and neighbors to build the marketplace. So, I think that's a great point, actually.

COMMISSIONER PETERMAN: You know, since you've served on three panels, you're free to go.

MR. BRUST: We do what we've got to do.

COMMISSIONER PETERMAN: Thank you very much, we appreciate it. And that goes for -- just I'll say a

heads-up in case people start to leave, you know, we've gotten great participation from the solar industry, builders and the whole lot today, and we really appreciate it.

We know this is not your primary job, but you really help keep us informed and looking forward to continuing to work with you all going forward.

MR. NASIM: So, we've kind of moved on into question two which was, basically, what energy efficiency measures should be considered before installing solar on a new home?

And Jacob did mention the way KB Home makes that determination, envelope the mechanical and solar thermal, even.

But I wanted to ask the other panelists if they're -- would you agree that's a way that works or there's something else that we should consider before putting in PV?

MR. HODGSON: I think the thought process that Jacob just explained is very similar to what we do with our production builders who we're trying to push in an incentive program to go substantially beyond code.

In general, in the southwest, you know, we build very similarly from Riverside over to Arizona. There is a very good wall system, already, we have one-coat

stucco, with foam on the walls. And that's not necessarily for energy efficiency, but very nicely it works with energy efficiency.

So, our R-21 to 22, 23 wall system is already there. The question is whether you're going to go 2-by-4 or 2-by-6 framing, and that's really a cost issue.

The thing that we have, the biggest problem with convincing builders is we put our mechanical systems in the attic for some reason. I actually know the reason why we do that. But realize when we're in the southwest and we have our mechanical systems in the attic it tends to be a little warm up there.

So, we have to figure out how to get them to reduce attic temperature. We've been doing that with some of the spray foam technologies, with some of the cocoon technologies.

We're wondering about the longevity of some of those things, but they're very interesting.

But that's really the hurdle that we see is how to get that attic to be semi-conditioned or conditioned and reduce the temperature in the southwest from 150 degrees down to 80s or 90s.

After that, then it's the mechanical system. You can go up in efficiency very quickly. What's difficult for the production building is to understand

that they should right size correctly, and that they will not be sued over having a smaller box than the neighbor which, unfortunately, the market. It's more outside of California right now, than happening in California and I don't know why, but it is a fairly active issue.

MR. RAYMER: We have more lawyers.

MR. HODGSON: Well, but Las Vegas is the cleaner king of lawsuits right now on construction defect and one of the major issues is comfort, which has nothing to do with actual comfort, it has to do with the size of your mechanical system.

Other than that, it's -- you know, then you get to the window systems and DOE has a high-performance window, technologies that they have guidelines for, which are more stringent than Energy Star. Those are coming into the market, now, and we're beginning to spec those on a production basis and so that's very useful.

After all of that, I agree with Jacob, we get somewhere in the high 40s as a home on a RESNET HERS score, and from that we end up with about 5 KW solar. You know, depending on if we have the roof space.

The concern I have going forward is as the market picks up lot prices are going to appreciate and we have a lot of product out there, a lot of volume of

lots, but that's going to, I think, be done in the, hopefully, short term, three to five years.

And then we're going to get smaller and we're going to go vertical. And as we start to go vertical, from two stories to three stories, my surface area to get that 5 KW diminishes, my shading ratios become much more difficult. And I think that's going to be an interesting issue that we're going to have to deal with, which we don't have any solutions for right now because we really don't have that mix, except in an urban environment where it's pretty much impossible to put 3 KW on your roof, regardless of 4 or 5.

MR. RAYMER: Okay, I'll jump into this and I'm going to try to fly through it. I could probably spend a couple of hours where we would like to see things go for 2016 to 2019 but --

COMMISSIONER PETERMAN: You can always file written comments, as well.

MR. RAYMER: I will just -- later. Okay, kind of kicking things off right here, the direction that we would like to see the Energy Commission head for the 2016 to 2019 energy efficiency update is plug load appliance efficiency and plug load.

Obviously, there are things we can do to the envelope, a lot more things we can do for the envelop in

the HVAC systems.

But as the Heschong-Mahone report, *A Road Map to ZNE*, that was released last week, the draft report I might add, indicated that for each new increment of energy efficiency, because we've already kind of picked the low-hanging fruit, it is getting a little bit more costly to get that next increment.

And considering the fact that about 55 percent of the energy used in a home today, a new home, is related to appliance efficiency/plug load, to the extent that we can use the Energy Efficiency Standards to set up strategies for dealing with appliance efficiency and plug load that would be very helpful.

Reducing the overall energy use of the home gets the PV system size down, which gets the cost down, and ultimately helps us get to our goal for 2020.

I realize that's a lot easier said than down and that we obviously don't want to run afoul of Federal stipulations of what minimum compliance efficiencies are, but there are a host of things you could do in the efficiency regulations that could provide compliance credit for doing this, that and the other.

And that would certainly be one of the things we'd like to investigate over the next three years, how can we somehow provide compliance credit for a variety

of plug load strategies, systems, technologies, et cetera, and appliance efficiency that doesn't run afoul of Federal requirements, but gets industry familiar with these technologies, gets the subcontractors familiar with this technology so that by the time we get to 2020 it's understood.

This is a strategy the CEC's been using for decades, simply putting something in compliance credit and eventually going for it as a mandate down the road. It's a good way of working it in, making the transition as smooth as possible.

Another area we'd like to see the CEC investigate, which you've already done for the 2013 standards, and that is energy efficiency credit for solar.

With the 2013 standards there will be some limited amount of credit for, I believe, the air conditioning load relative to climate zones 10 through 15.

To the extent that we could apply this down the road on a statewide basis, once again I realize energy efficiency is at this point, as Martha's graph shows, more cost-effective than the solar, the point is we've got to get thousands and thousands of people familiar with this technology and how to install it, how to

basically plan, check, inspect it.

And this is certainly one of those ways that we can incentivize it without necessarily having a direct exchange of money from the State to either the solar company or the builder so, once again, incorporating that into the Energy Efficiency Regs is good.

In terms of the constraints that are out there and there are quite a few that are going to make things difficult, we have physical and technical barriers. Rooftop space for PV panels, as a rule of thumb we need approximately 100 square feet for each KW PV panel.

The problem that we're seeing, as Mike alluded to, over the last three to four years we've seen a rather significant design change of residential construction where we used to have single-family dwellings located on relatively large lots, that's changed drastically.

We've made a significant move towards high-density single-family homes, where we're now seeing the one-story, ranch style home on an individual lot becoming definitely the minority of the designs.

I might point out that that was the design used by the Heschong-Mahone Group in looking at the cost-effectiveness of solar, recently.

They looked at a 2,100 square foot home, it was

single family, had lots of rooftop space for solar.

When you go to two stories, and especially for the three story, you've drastically reduced the overall amount of square footage on the roof and so we've got to be very careful with the next point, with the roof penetrations and the obstacles.

In the Central Valley we're going to be moving towards the whole-house fans, but we're also putting about double the amount of penetrations for venting into the roofs. We've got to basically teach industry to get them on the north side of the roof, okay, and that will be something that probably over the next couple of years we sort of calmly feed to the designers who, in turn, put that into the product, but they need to move very quickly in doing this.

We've also got to be cognizant of fire safety clear space. The Energy Commission has been working with the Office of State Fire Marshal to address these issues but we once again keep running into local programs, where the local fire department, who can pretty much blackball a project after it's built, you know, before you can final occupancy. You don't like to see the fire chief come out and say, oh, that's a problem.

We need to get the fire chiefs throughout the

State onboard with the goal of getting to zero net energy; coming in after the fact and effectively holding up a product from going forward to the homebuyer can be very difficult.

And as I've already mentioned, we need to do ongoing education and training. This is an issue that I've discussed at great lengths with Commissioner McAllister.

But it goes without saying, as industry starts rebuilding from the economic downturn we need to get a lot of people educated real quick, and they need to keep coming on. As the industry expands, new people will be coming on, so one size doesn't fit all. We're going to have to do this on an annual basis probably well into the next decade.

Lastly, before I hit on some liability issues, our new and unfamiliar design techniques, as I started off with, we can indeed fix and do better things, more efficient things with the building envelope, putting insulation in the roof deck, moving to 2-by-6 or 2-by-8 construction, switching to 24-inch-on-center with the studs as opposed to 16-inch-on-center.

The problem here is you can't do that overnight. Once again, just like training on ZNE, putting solar into the roof, industry needs time. And while these

things can be done, they're relatively expensive. And particularly with the roof deck issue, industry is largely unfamiliar with that. Yes, it does work, but we need to establish sort of a historical database.

And once again, allowing that as a design credit early on so that industry can slowly move into that and, hopefully, by 2016, 2019 we can be a lot more familiar, do a good job with it, and we anticipate that sort of moving towards a mandatory feature.

We just need time, as Mike indicated, of getting there.

COMMISSIONER PETERMAN: But Bob, before you go into the limits, first, I'll let you catch your breath because that was a lot. It was a lot for my brain to hear, so it must have been a lot for you to say.

MR. RAYMER: That's just the high points.

(Laughter)

COMMISSIONER PETERMAN: And I look forward to the written.

I do have a clarifying question, actually, that might be more appropriate for one of the solar contractors. And that's you commented on the change, you know, from the flat roofs to the pitch roofs, and multi-story, are we seeing an increase in the power density in modules in this point?

Because I know there are some modules that have better power density, but I'm just wondering to what extent you all see that as a constraint on system actual size? Or in the future I'd be interested in that response. It's just a probably better one for Matt because SunPower has some of the higher density.

MR. ATALLA: Commissioner, maybe I can address it on behalf of Matt, if you will, to some extent.

The SunPower product has increased in efficiency in the last couple of years and we're, this year, switching to the higher efficiency model.

Secondly, another innovation that they brought to us to somewhat address some of these issues in terms of roof space is an inverter that has -- that allows for two orientations. This is not the micro-inverter, this is a traditional inverter, but allows for two orientations.

So, we're already seeing these smaller homes in Irvine, for example, and so we're deploying it in Irvine because we do need -- we have a lot more complex product there with a lot of roof variations and we do need two orientations, so we're applying it there.

COMMISSIONER PETERMAN: Very neat. Well, thank you, I'm glad you responded.

MR. RAYMER: Okay, lastly on liability issues

two points. The definition of zero net energy, as with energy efficiency in general now moving towards zero net energy we're going to be -- we need to be careful how we define this for the public and, more importantly, the disclaimer that the builders are going to have to be working up into contracts.

If the consumer is somehow under the impression that they're not going to see an energy bill anymore because they live in a zero energy home, they're probably going to be -- well, I'd say maybe a third to a half the consumers are going to be very unhappy.

They're not going to sue the PUC, they're not going to sue the Energy Commission, they're going to sue the homebuilder.

And so we need to find a way that very clearly and succinctly gets the point across these are the assumptions used by the State, without necessarily lining them out, and if the home is used according to the assumptions used by the State this should be effectively what your bill is going to look like, but there is going to be a bill.

And so to that extent we need to do what we can ahead of time to beware that just as we've seen with certain energy efficiency provisions there will be litigation if things don't know the way the homeowner,

maybe unintentionally thinks they're supposed to go.

And that gets to occupant comfort, which is my last point.

COMMISSIONER MC ALLISTER: So, let me just --

MR. RAYMER: Sure.

COMMISSIONER MC ALLISTER: I just want to make a quick point there. So, Commissioner Peterman and I are actually collaborating on the 2013 IEPR, as well, and I would strongly encourage you to participate in the workshop that we will hold about zero net energy and very likely front and center there will be discussion of what is the proper definition of zero net energy.

I think that's a benchmark that has to be out there, which is long overdue and it's been incredibly difficult to define and sort of satisfactorily. You know, we want to do it in a way that doesn't sort of encourage gaming in fuel switching, that it's sort of just clear all around and that you can use, and give some comfort -- some predictability with respect to what you're actually building towards.

MR. RAYMER: Yeah, I'm very worried that as we go forward and the complexity, if the standards continues on the same trajectory that we've seen trying to explain to a homeowner what TDV is, they're eyes are going to glaze over. You're going to lose them. Just

like I lose the people I work with at CBI and try to explain to them what I do for a living, even though I've worked there for 30 years and their eyes glaze over and just go do it, Bob, please don't tell us about it.

The same goes with the builder or the purchasing -- or the sales staff. They've got to try to figure out how to articulate to the homebuyer, all homebuyers what this really means.

And I've been on a task force at the PUC dealing with the definitional issue of ZNE for about two years. We're getting close, but it's still pretty complex. And even if we go for the low end, which we seem to be kind of headed for there, it's still a very difficult thing to articulate.

And with that, you know, with that kind of difficulty will give rise to confusion, people will get bills and they'll wonder why am I getting a bill? I need to get a lawyer, you know, this is just not the right thing.

And lastly, in terms of occupant comfort, Mike alluded to it earlier, particularly as we head towards really defined, well-engineered HVAC systems if you base the performance of that system on incorrect assumptions, if you're shooting for the worst 95 days -- or I'm sorry, a temperature, a dry temperature, if you will,

that's good for perhaps 95 percent of the time, then there's five percent of those hottest days that your system isn't going to meet the comfort needs of a good number of the occupants, in essence, the 10 or 15 hottest days of the year.

And it's over those 10 to 15 percent of the days of the year that they're going to sue over. If they're not comfortable in the house, we've got to figure out how to, number one, install a very good system and make sure that the homebuyer that moves in there fully understands that during the hottest times of the year you may not be as happy as you are during the remainder of the year.

That needs to be clarified up front because there's a lot of litigation out there over this very same issue, a whole lot in Las Vegas.

COMMISSIONER PETERMAN: So, let me note, this is a great discussion that could go on all afternoon. We're already behind time and, as Commissioner McAllister noted, we'll be exploring the issue of zero net energy in more depth in the 2013 IEPR. So, there will be a number of opportunities to get into the details.

So, I'm going to ask that as you continue moderating go through questions three and four, and if

everyone can, you know, focus on their priority answers and really honing in on the New Solar Homes Partnership Program at this time so staff has some sense of what to do in terms of upcoming Guidebook revisions, and then we'll explore many of these topics more going forward.

And then, also, I want to leave a couple of minutes for some audience questions, as well.

MR. NASIM: So, moving on to question three, many cities and counties have varying energy efficiency policies and programs. How can State agencies take these into consideration to streamline their program requirements, such as for the NSHP program?

One item I'm thinking of are local ordinances that are approved here by the CEC, where jurisdictions require homes built in their cities or, you know, counties and what have you, they must be 15 percent beyond Title 24.

So, is there a way that we can align our programs with their requirement to streamline our process?

MR. RAYMER: Well, I think what's currently happening with local jurisdictions, and by far the most common above-code adoption that I've seen over the past, say, four to five years, the local jurisdiction will adopt part 6 and they'll adopt part 11, the California

Green Code. And rather than going to Tier I or Tier II in the California Green Code, they'll simply adopt the minimum green provisions but require a 15 percent increase in part 6, the energy efficiency standards.

And where I've seen modifications to that, they may also require, depending where they are in the State, some water conservation measures above and beyond what is minimum requirement in CALGreen.

So, that's been going on. Quite frankly, the Energy Commission's been doing a good job, along with some of the utility subcontractors, in developing economic analysis that is needed in adopting these.

We've seen there's probably five dozen or so jurisdictions that have gone above-code. Not all of them have filed with the Energy Commission, but somehow they seem to require it.

And we're not of the minds that -- you know, we're not going to argue over that. If a jurisdiction wants to do it, that's fine. We prefer they file the paperwork with the State so we know ahead of time, but so far it's been working quite well.

I'd have to say the Energy Commission's done a good job of helping the locals out with this and vice-versa.

MR. HODGSON: My comment on that is local

jurisdictions do what local jurisdictions want to do and it's local politics, so we just have to adapt, serving the building industry to whatever the local politics are.

However, the Commission definitely can assist making that a smoother path by encouraging them to adopt either Tier I or Tier II because then we know what those standards are, they're uniform and they're not unique, now.

To say that is one thing, to actually implement it is another.

It also would behoove, in personal opinion, the Energy Commission to actually work with the local jurisdictions to more effectively enforce their own standards. And we know there is a lack of compliance in the market and it sets a competitive disadvantage for those who are playing by the roles to those who are not.

So, if there's some relationship where if a city or a county applies to go to Tier I is there some assessment on how well they're enforcing the existing standard? Currently, there is not. But I would say that would be an interesting hurdle that you could set for those folks who say they want to go beyond code, is there some documentation that they can provide to you, or some assessment that the Energy Commission can give

that local jurisdiction so that we know we're actually getting those savings and encouraging them to do a better when they go above-code.

COMMISSIONER PETERMAN: Moving on to the last question.

MR. NASIM: Okay, the last question, how can the energy efficiency intended programs in the NSHP be streamlined and maximized? How can these programs be coordinated to help California achieve its ZNE goals?

MR. RAYMER: I think I've already mentioned energy efficiency credit for solar is certainly a good start. I think the important thing is to try to prompt industry to move forward on both of these issues, not just look solely at energy efficiency and then at the last move look at solar.

Like I said, we've got to get tens of thousands of individuals familiar with above-code. We've got to get these same individuals familiar with solar installation and we've got to do it now.

MR. ATALLA: I would add that the NSHP program has, as Bob mentioned earlier, is helping train the trades to build with solar, which is going to be a necessary component down the line for zero homes.

So, continuing right now with the program with a stable policies and streamlined Guidebook is essential

for us to get the knowledge up enough so that we can build zero homes efficiently in the future, market transformation.

MR. RAYMER: Bringing the task force back into action, in whatever vehicle you want to use for that in 2013, I think is going to be a big help.

And early on, effectively troubleshooting things, asking people give us the problems that are going on out there so the group can kind of work it out early on and, you know, roll up the sleeves and come up with some policy. That's the way to do it. Thank you.

COMMISSIONER PETERMAN: Great, thank you.

MR. HODGSON: I have just one quick comment to add to what I think Jacob was saying is having a stable base of incentives for a known amount of time is very important to the production builder who's planning a subdivision that may be being built for two to four years.

The other -- the criticism I've heard, and I don't participate in New Solar Homes Partnership, I mean we don't really do too much of that work.

But the criticism I've heard, of the builders who are participating in it, is the turnaround time is painfully long.

And so having a clean Guidebook that's

streamlined, and some performance guidelines for those participants who are a part of the cog that make that system work would be very helpful.

COMMISSIONER PETERMAN: No, those are all great comments. And I would say I'm sure in every workshop people would like more regulatory certainty and I'm sure we would, as well. So, I appreciate the request.

We'll take time for any audience comments and just to mix it up a little bit, see if anyone on the phone, first, wants to put in a question or a comment on this topic?

Then anyone in the room?

MR. NESBITT: George Nesbitt.

COMMISSIONER PETERMAN: And we need specific questions, George, because we're running about a half-an-hour past.

MR. NESBITT: Okay.

COMMISSIONER PETERMAN: Thanks.

MR. NESBITT: Just real quick, we need energy efficiency as well as renewable, and Mike kind of hit on it. Currently, PV is the only thing we can get credit for on the renewable side. Solar hot water works on the energy efficiency side.

So, we're going to need wind power and other type of systems to be able to take credit for the

renewable.

I think staff actually has articulated that for number two that focusing on the building enclosure first is important. It's the thing that lasts the longest, it's the thing that costs the most to go back and fix.

Mechanical systems don't last as long, they should be replaceable.

I agree with Bob, we do need to tackle appliances and plug loads, but those also have the shortest product life, so those -- those get replaced much more frequently.

I think one of the work-arounds that local jurisdictions are using is requiring green -- you know, green point rating or something which requires your 15 percent above code, without going through the process.

But the problem is without any kind of verification there is no teeth.

And I just want to make a point that as we raise the code higher and higher it becomes harder to get to 15 or 30 percent. So, we went from 35 down to 30 for Tier II.

I don't know, do we have any Tier II high-rise, multi-family? Okay, I don't think you can get there currently.

2013, you know, Tier I just might not even be

reachable.

So, we have to remember that as we crank up the code we've got to reduce tier thresholds and we've got to make sure we can actually get to them because CTAC requires it, and affordable housing developers.

So, we may have requirements that people can't meet and money, you know, even given an unlimited amount of money. We have no ability to get credit in high-rise, multi-family for practically anything, except duct testing which disappears in 2013.

So, I'll leave it at that.

COMMISSIONER PETERMAN: And thank you. Those are good observations and it's a question I've had as we move towards meeting our energy efficiency goals how to think about the balance of the percentage requirement reductions. So, thank you for teeing that up.

MR. NESBITT: Actually, two other quick things. Barriers; the Air Resources Board, they have prevented California from following the rest of the country in having a prescriptive air leakage requirement.

Another barrier is, you know, Bob brought up net zero -- I prefer net zero energy. Zero net energy puts the emphasis on zero. But four years ago, in this room, we debated and the Energy Commission approved, not the current Commissioners, a definition of net zero energy

for California, in Title 20, the HERS rating system.

Unfortunately, CPUC and others have not recognized it or that the Energy Commission has the authority to regulate building and building energy.

So, we need everyone to, whether they like the definition or not, to get in line. We can always change it later, but we're tearing it apart.

COMMISSIONER PETERMAN: Thank you.

Please.

MS. FOGEL: Yeah, Kathy Fogel, CPUC. I'll just leave that definition issue behind for now.

But I was wondering for Bob, you've mentioned training a lot today and I know you've discussed it with the Commissioners a lot, as well, could you be any more specific about how you see this training being provided? What types of partners you anticipate would be needed? And what the role of what the private sector should be versus the public sector?

MR. RAYMER: We've had some -- I'm going to use a test case that we had in the late 90s, early 2000s, and that was with the BECT Program, originally funded by DOE through the Energy Commission. In years after that, IOUs, such as Edison and SoCal Gas picked up where DOE had left off.

This was a program that was designed initially

for production builders, in particular the site superintendents. They wanted the Federal and State governmental entities, yourself and DOE, wanted to have a maximum penetration into the market.

And fact of the matter is it was ConSol that served as the contractor to the Energy Commission on this. And the plan that they had used was to get a small, basically get-in-the-face, not do it over the internet, but to get basically into a small classroom, not one with 50 to 100 people, but do these up-front, small groups of 8 to 15 people, usually from one or two companies, get them into the room.

And then after the update on the standards is done, usually in the morning, the afternoon was spent out at one or more sites kind of going over the problems that were encountered.

And then there was a follow up about six months down the road, with the same builders, to find out how things are going, have they improved on the things that they weren't doing well?

And we saw compliance in the late 1990s and early 2000s skyrocket. It was a very successful program. I believe the CEC got two awards from DOE for the success of that program and it was used as a model in some other states.

That type of up-front education has worked fantastic and we would suggest that it continues. It works very well with the building officials.

You seem to lose focus when you get classrooms of 50 to 100 people. I realize it's a real easy way to do things, but small is good.

COMMISSIONER MC ALLISTER: So, let me just ask one a little bit more in-depth. So, were these mixed classes, did they have building officials and builders?

MR. RAYMER: The ones that I attended on a regular basis did have building officials. And I would like to point out that the CAUBO Training Institute has great access to basically the statewide set of building officials and plan checkers, and the designers.

And so there's a lot of crossover here. I'm just giving one example, but that same model can be used with just about any group. So, this is something that we can discuss at great length later on, but there's a lot of models over there.

It's just the Energy Commission's had so much thrown at it over the last few years, ARRA, et cetera, et cetera, that maybe it's time to kind of revisit some of the things that worked about a decade ago and maybe revisit it.

COMMISSIONER MC ALLISTER: Well, I think we've

been in this situation where we've kind of been -- you know, we've had certain things, basically just like you said, we've had a lot of things thrown at us.

But I think we have to recognize, now, that 2020's not too far off and we only have two more Code cycles. The things that Code will have to ask builders to do, and the inspectors, and there's a spot for new construction, for sure, but also there's a big existing building component here, are going to be outside the box. And, you know, and so I think this education is really essential, this kind of education and sort of getting everybody on the same page is really essential.

And so any of you who have sort of ideas from your perspective about how that could happen to make it operational in practice --

MR. RAYMER: I think the CEC partnership with the Contractors Licensing Board and the local building departments could really help out with existing housing stock and commercial stock. That's a huge problem.

COMMISSIONER PETERMAN: Moving on, any other audience comments or questions?

And, Mike, would you like to have the last word?

MR. HODGSON: No, I was just going to give --

COMMISSIONER PETERMAN: Okay.

MR. HODGSON: -- Commissioner McAllister an

example. 2013 is a fairly rigorous code and there was a lot of pushback on the code from the building industry for a variety of reasons.

But one of the examples that -- we're going through the residential manual, now, and try and help staff edit as much as possible, but I still don't figure -- I do not understand in being -- coming from a company that has a lot of mechanical engineers in it, how we're going to double the size of our returns in a two-story home, with five-foot side yards, and put in 600 square inches of return on the second floor, and get that by my building client, as well as their marketing department.

I know Jacob has to take the abuse. As soon as he designs something, he has to defend it. And it's not to the public, he has to defend it internally.

And we don't -- we haven't figure that out, as an industry, and I don't think the Commission understands the constraints they put on industry when they make up these rules that really don't have a practical solution, yet.

And those are the issues that we have to really get a better dialogue going because there's a lot of them out there. And we push back on some of them, especially with the roof deck insulation. This is, you

know, just an example of how --

COMMISSIONER PETERMAN: Mike, you're getting a little further along into a topic than I want to at this point.

MR. HODGSON: Okay.

COMMISSIONER PETERMAN: So, I think your point is duly noted.

Commissioner McAllister, would you like the last word on that and then we'll take a five-minute break and do the next session.

COMMISSIONER MC ALLISTER: So, just as a general point I would say, you know, if we can get -- if we identify these issues early on and talk about them, there actually is, I think, expertise inside the Commission, in the development of the Code that can help resolve those issues kind of before they happen.

But in any case, you know, we've got to get everybody in the room at some point and hash it out because, you know, this is where we have to go. And I think we are all on the same page with that but, you know, everybody's got a different perspective.

So, I think that this kind of dialogue, and certainly within the IEPR and 758 proceedings needs to continue and be as pragmatic as possible. So, thanks.

COMMISSIONER PETERMAN: And I would say

generally, too, again the reason we're sitting here together is even though much of this dialogue will happen under energy efficiency workshops and proceedings, it has implications for the New Solar Home Partnerships and we want to make sure that the Partnership Program stays current with the advances that you're doing on the energy efficiency side.

Well, thanks, that was a great panel, got a lot of information. Looking forward to, you know, Bob, particularly you submitting some of your notes, or I can read the transcript as well, because lots of good suggestions there.

So, let's take a five-minute break and then we'll have our final panel. Thank you.

(Off the record at 3:55 p.m.)

(Resume at 4:02 p.m.)

COMMISSIONER PETERMAN: Thank you, we're going to get started as I know there are some folks who flew in, and have trains, and I want to make sure that we give the attention to this last panel, as well.

What's been interesting is I think we've touched upon topics related to consumer protection and warranties in the panels leading up to this, and this is a good one to wrap up on about -- you know, particularly about marketing and outreach, and how do we get to our

goals?

MS. HUTCHISON: All right, thank you. My name is Elizabeth Hutchison, I work in the Renewable Energy Office. I will be talking about topic four, Outreach and Marketing, Warranties, Consumer Advocacy and Protection.

I will try and make this as short and sweet as possible so that we can leave as much time as we can for our panel discussion.

Just an overview, I will be talking about past outreach and marketing efforts, current outreach and marketing efforts, current PV system warranty requirements for solar incentive programs, and then we'll go ahead and turn it to our panel discussion.

Our past outreach and marketing efforts for NSHP was a three-year public awareness campaign for both builders and consumers.

The goal here was to encourage builders to incorporate high levels of energy efficiency as standard features, and encourage homebuyers to seek these types of homes to purchase.

We had a Consumer Go-Solar California Sweepstakes in 2008 and 2009. Participants were entered into the sweepstakes by taking an online quiz about energy efficiency.

Grant prizes included a hybrid car and green home makeover.

We did research reports assessing consumers' awareness and attitudes towards solar and energy efficiency.

Stakeholder partnerships contributed more than $1.9 million in added value to the campaign.

We had several outreach to municipal affordable housing and builders. We provided toolkits for going solar.

We also had an NSHP Advisory Committee from 2006 to 2009. This Committee helped created NSHP and made sure that it addressed current market conditions.

Over time the Committee eventually dissolved.

We also had "Buying of a PV Solar Electric System." This discussed the basic technical, economic, and regulatory information that you should know before buying a PV system.

Currently, the Energy Commission offers several tools and resources for consumers when they are looking into going solar. We had several calculators, the CEC PV calculator estimates estimated performance and supports the NSHP PV application.

The Solar Advantage Value Estimator, known as the SAVE tool, estimates the present value of a solar PV

system.

The Clean Power Estimator estimates customer payback and return on investment in solar systems.

I've just highlighted a few, but there are many more available on the Go-Solar California website.

Informational materials that we have available are the NSHP Guidebook, which has all the program eligibility requirements, NSHP Reservation and Payment Claim Checklist. These are intended to assist program applicants with so many NSHP applications.

We also pass out brochures, which contain a brief overview and information about NSHP.

The Energy Commission, along with the program administrators, which includes PG&E, SDG&E, and SCE, hold several public workshops during the year to help educate applicants on the requirements of NSHP.

To show the current warranty requirements we chose six different well-known solar incentive programs, four in California and two on the East Coast, which include New York and New Jersey.

The California programs have fairly similar requirements, all consisting of requiring a minimum ten-year warranty that protects against defects in materials and workmanship, and degradation in electrical output of more than 10 to 20 percent from the originally rated

electrical output.

The New York and New Jersey incentive programs only require a minimum five-year warranty and it does not protect against defects in materials and workmanship.

As you can see, between the California programs and the other two programs there are some inconsistencies in the length of warranty that is required.

We want to ensure that the requirements that we have established in our incentive programs are good enough to protect our customers.

So, with that I would like to introduce our panelists.

We have Jacob Atalla from KB Homes.]

We have a change, we have Scott Weber on the line for the Contractors State License Board.

We have Eric Weingarten from Solar City.

And Lew Milford from Energy States Alliance.

If you would like to introduce yourselves and give a little background on how you are related to warranties and marketing and outreach?

Go ahead, Jacob, we'll start with you.

MR. ATALLA: Thank you. So, in regards to these items, I think my biggest exposure to it and activity on

it is really working with our legal department trying to make sure that the claims that we make are acceptable, and can be backed up. To that extent, every time we can bring an EPA, or DOE or, CEC calculator, or a brochure forward it helps us because it gives us a certain amount of credibility and backstop, if you will. So, I think that's an important part of it.

And then the second part is, of course, trying to work with our sales team to leverage the value and bring out the value that we put in the homes we build with solar on them. I'll leave it at that.

MS. HUTCHISON: Go ahead, Eric.

MR. WEINGARTEN: In my role as Assistant Counsel for Revenue I'm the lead -- sorry, let me move it a little closer.

Is that better? yeah.

I have the lead responsibility, from a legal perspective, to ensure that all our contracts are compliant with all the respective consumer protection statutes, State and Federal.

And then I also, in my role, negotiate as lead negotiator from the legal department, all our procurement contracts to make sure all of the warranties are what our investors require, the fund investors, and then what we would require, just generally, from a

business stand point.

And then I also have lead responsibility for making sure that all of our marketing materials and brochures are compliant with consumer protection requirements and then, also, socializing all of that with our sales team throughout over 600 personnel.

MR. MILFORD: My connection to this would be, obviously, what the other states are doing through the Energy States Alliance.

And what this has prompted us to do is to actually send out a survey to about 20 of the other states, asking for more detailed information along these lines.

So, I don't have much to say about this at the moment, but I hope we can get some more information about these kinds of issues from those other State programs and share it with you, and anything else that comes out of this that you might want from other State programs, we'd be happy to try to get that.

MS. HUTCHISON: Scott Weber, from CSLB, do we have you on the line?

MR. WEBER: Yes, I'm on the line. I'm with Melanie Bidwell from our Public Affairs Office, as well.

As you know, the Contractors License Board is a consumer protection agency. We receive about 16,000

consumer complaints each year which we investigate.

And some of those complaints, if you want to talk specifically, do deal with warranty issues.

We have a section of code when a contractor or manufacturer breaches a warranty, so we do get involved in warranty investigations.

And we license 310,000 contractors, so we have quite a big base.

MS. HUTCHISON: Great, thank you. We're going to start with question number one.

NSHP has a goal of installing somewhere around 50 percent of new housing by the end of the program. What level and types of outreach, marketing and technical support are needed to achieve that goal?

Anybody?

MR. ATALLA: I think it had been mentioned in earlier sessions that giving the homeowners -- homebuyers enough education to let them see the value of the system and the ROI for the system are important factors.

To that extent, the program has done a lot with the tools that you've reviewed. I think we need to leverage them better and get our builder sales teams more at east in conversing about solar. So, more training toward sales teams is something that is --

something that we see that could add value and could take us to the 50 percent you're looking for.

COMMISSIONER PETERMAN: I just have a follow-up question on that. I was just wondering, on houses where you've not put solar, so how much is their education generally about electricity consumption in a house or the energy efficiency?

Because I would imagine that getting homebuyers comfortable with solar also requires them to get comfortable with understanding electricity basics.

MR. ATALLA: Sure. To that extent, Commissioner, I mentioned earlier in the day that we have designed an Energy Performance Guide, which is a sticker that goes on the model home, just like there's a sticker on the window of new cars.

And early one we decided that the conversation with the consumer cannot be about kilowatts. They don't understand how to measure kilowatts, so we talk with them all about dollars. Okay, the EPG has a very small thing at the bottom for the percent better than Title 24, in terms of energy.

We don't put anything about kilowatts, here's how many kilowatts you're going to save. We put a big number that says your utility bills for gas and electric are going to be -- per the models, the energy models

that we've run are going to run about this much. And here's how much you're saving versus a resale home. Again, to differentiate from the resale market, and that's what we work with.

MS. HUTCHISON: Anyone else want to comment?

MR. WEINGARTEN: You know, the only that I would -- at least just in terms of what I see on the warranty side, with the requirements there they make sense, but a lot of folks don't know what entails a full, you know -- I guess looking at the degradation in power output what does that mean? Well, that's a guarantee.

What do those percentages mean? How do they work? What should the customer be looking for in a materials and workmanship warranty, you know, that kind of background and insight.

And I think it also helps, you know, the companies out there that are trying to make sure that their products are compliant with that and making clear, okay, what's required by a defects and workmanship warranty requirement and, you know, the degradation, what does that really mean?

You know, the more guidance that can be provided there, both for the customer and also the companies that are participating, the better.

COMMISSIONER PETERMAN: Yeah, I think that's a good point.

And I would have a general question of, which I don't know what these warranties is, how often they have to be exercised, utilized, you know, as soon as you buy a product?

Anyway, I had this shredder one time from an unknown company, and the unnamed company I had to return it to every week, and the warranty wasn't worth it.

Then there's other ones where it works for the whole duration.

MR. WEINGARTEN: Yeah, I mean the warranties -- I mean these numbers, they're perfectly fine. I mean these warranties, there's been some discussion earlier about warranties on inverters. Inverters are going to be 10 years, panels 25.

Degradation in power output, you know, these percentages are perfectly fine and they're very attainable, and they're not a problem, and these are very consistent.

You can take a look at the numbers here in California and they're relatively consistent, and Arizona has numbers that are similar to this, too.

Yeah, the states that are well deep into this, they have these numbers.

And in terms of your question about -- was it about how many times -- calling up the company, literally, like it's broken, how do I get this fixed?

In our contracts, you know, in contracts that I think across the industry we see, that are pretty typical, there's procedures, return merchandize authorization procedures.

But the key for the customer here, I guess, is that, you know, the company that you're contracting with is going to take care of that.

And that's sort of the customer protection issue is that it should be clear what they're getting and that that ten-year warranty is simply you call the company and they fix it, and that's the intent of it.

I think that that's what all the solar leasing players and PPA providers do.

MR. ATALLA: I think it is the intention that for a warranty that Mr. or Mrs. Consumer call the warranty provider and they'll take care of it.

But in the new home world, the new home construction world the first entity they will call is the builder, themselves.

So, the selection of the solid partner to be there and, you know, support the program is very important in this matter, also keeping it -- keeping the

warranty and the installation simple and clean.

Roof installations I think were mentioned a while back, in terms of the importance of roof installation along with solar, so that becomes something that we look at very carefully, how it is the roofer and electrician -- the roofer, and electrician, and solar company, we try to keep them all on the same -- all in the same company or working together so that there is no more finger pointing.

MR. MILFORD: If I could just raise one point, and I don't want to get my friend upset here, next to me, but I wonder about the question about how well-capitalized the leasing companies are? I mean they're becoming important players, new players in an industry with potentially thousands, let's hope, tens of thousands or more customers going forward, I think guaranteeing, whether it's the manufacturer's warranty or other guarantees, you know, a new relationship, basically, 10 or 15 years.

And these start to look like, you know, car leases, basically, that's sort of the model. And maybe a couple of years ago we would have been worried about GM being there to backstop car leases.

And so I guess it's just a question and I know that, obviously, they're thinking about this, but

whether there's a role for the State in thinking about that and questions, you know, to be asked and some satisfaction about that not being an issue going forward?

COMMISSIONER PETERMAN: I think that's a reasonable point and question to ask as we're trying to scale up the market.

And I don't know if our panelists from the Licensing Board have any comments on Lew's point, there?

MR. WEBER: Well, capitalization as far as requirements for a contractor's license is very low. The code reads $2,500, currently, so that is way out of the realm of what Lew's talking about, just to get a license.

COMMISSIONER PETERMAN: And just kind of following up on that question because I know you have the solely licensed, versus general contractor and electricians. Do you have a different capitalization requirement across?

And considering there are sometimes newer industries have you thought about a higher capitalization requirement for the more specialized and newer industries?

MR. WEBER: I think our capitalization is very low and it's consistent across all classifications. We

have 46 classifications, so it is consistent.

Have we thought about these newer industries, it probably should be raised overall, but these new industries should probably be looked at as well.

COMMISSIONER PETERMAN: Thank you. Anything additional you also want to add about the discussion?

MR. WEINGARTEN: Well, just on the capitalization requirement. And one thing, I mean there's a certain -- certain players and constituents in the industry are represented here, but there are other folks, smaller players. And when you set up capitalization requirements like that, that inherently creates a barrier to entry.

And we just need to be careful. You know, we're a bigger company, obviously, but there are folks in the market that are competitive and should be allowed to compete in this market.

And when you set up capitalization requirements, you need to take a look at that.

I mean, also, there's a lot of -- I mean you have cash players in this market selling systems, and when you take a look at capitalization of inverter manufacturers or, you know, PV manufacturers, themselves, I mean it's just something that there are different players in that field and you're looking at

different warranty providers.

And the role that companies, leasing or PPA companies play in providing a warranty is different from the role that the PV manufacturer or the inverter manufacturer plays.

And it's a more limited role that the leasing company provides. It's an aggregate, it's almost like an O&M kind of company that will facilitate the claim.

But if there's a problem with a customer system, more often than not it is a problem with the actual componentry, which is really just the manufacturer, itself.

COMMISSIONER PETERMAN: Elizabeth, please.

MS. HUTCHISON: I guess that concludes question number two.

COMMISSIONER PETERMAN: I didn't think we were done with two, yet. I didn't think we got there, yet, I thought we just streamed into it.

MS. HUTCHISON: Okay. A big concern we have is companies going out of business and, therefore, likely won't honor their warranties. Are there any ideas on how to deal with this situation and protect the consumers?

MR. WEINGARTEN: Yeah, just a thought here. You know, consolidation is inevitable in any industry that

reaches a certain level of maturity of technology and margins grow slimmer.

Inherently, I mean, obviously, there are lot of pluses and minuses to that from a market stand point. But from a customer stand point consolidation, there are a lot of systems that are going to be out there that are still generating money. There are a lot of manufacturers that will be purchased, and aggregated and allocated -- or aggregated together.

The key, certainly from a leasing stand point or from a PPA stand point is somebody's still making money on those systems and because of that there will be an interest in maintaining the warranties. But it's a good question and I don't know how you deal with that with just the manufacturers, themselves.

And if there's a manufacturer that's bankrupt and then they can't make good on their warranty, I mean that's a good question. I mean it's a risk in any industry, but particularly this one.

COMMISSIONER PETERMAN: Well, I was curious just to hear the response from the State Licensing Board in terms of the points that Eric is raising about how we go about that in other industries, in terms of bankrupt industries, and making sure those warranties are kept.

MR. WEBER: You know, probably the largest

number of bankruptcies and largest cases we've seen have been in the pool industry that we can refer to. Some of them you might have seen in the news.

Basically, when we have a situation like that we really can't do too much, other than if someone files bankruptcy prevent licensure for the future.

But we have, in the past, tried to pull the industry together and help consumers as far as getting either work completed, fixed, repaired at a cheap rate. So, we have been involved in pulling the industry together.

But we really are somewhat limited when an actual bankruptcy's filed.

MS. BIDWELL: In a lot of cases they will have to go to civil court to become financially whole.

MR. MILFORD: Good point. It may or may not be relevant, but in just looking at some notes, you know, let's say if a warranty can't be satisfied or, you know, there's some other failure, I'm looking at a Connecticut program, it's a leasing program, this is not new homes. And I should know more about how this works exactly, I think this was really for inverters, where a fund was established. Basically, the State dedicating some portion of the SRECs to a fund that would be set up in the event that there was an inverter failure so, you

know, there was some pot of money at least available to consumers to tap into to pick up the cost of an inverter failure.

And I'm not sure if that was individuals, you know, that is whether it was a pot for an individual or a generic one. I can get you more information about that, but at least it's something to consider as a backstop, perhaps.

COMMISSIONER PETERMAN: You know, that's interesting, I think we would like more information on that because, indeed, one of the differences with the pool industry, number one, is that people appreciate the value of a pool in the Sacramento area.

And when we have these still maturing industries anything that stops the market can be problematic. I mean we faced that situation with the ERP program when we had to suspend it, and there was concerns about performance.

So, even though I think there was recourse within the court system, we'd like to think if there are things that we can do in advance to provide more assurance. So, I think that's a good point and something we can continue to consider.

MR. WEINGARTEN: Yeah, I mean just one item. With the proliferation of third-party ownership it

creates, again, a backstop, if you will, because those third-party owners, they're probably just as concerned, if not more concerned, than the customer in making sure that those systems are operating.

So, that's an added feature that you may not have had in industries that you might be looking at, like the pool industry.

I mean once you sell a pool that's it. I mean there may be an O&M relationship there but, again, it's probably not generating enough revenue that somebody really, really cares.

Here, there's real revenue generating off that asset that's a 30-year asset, so there's somebody that has an interest in swapping out the inverter and replacing panels that are broken.

COMMISSIONER MC ALLISTER: Is there a contractual mechanism for that, like a -- so the PV provider goes out of business --

MR. WEINGARTEN: Yeah, so in the fund structures --

COMMISSIONER MC ALLISTER: -- how would that then transfer to some new owner, how would that owner -- or how would that new provider step in and take over that system?

MR. WEINGARTEN: In third-party ownership, in

most of the models that are out there you have an investor, they invest in a fund that has lots of assets, hundreds of thousands of system. They own equity, they own those systems for the period of that lease for 20 years.

So they, in turn, sign a maintenance contract with a SolarCity, or a SunRun, or whomever and that company, that leasing provider, if you will, operates the asset for the 20 years of service.

If that provider fails to provide quality service or they can't replace the inverter or something's broken, the only way that that investor gets paid their money -- now, granted, we've talked about prepaid leases here, but these prepaid leases get lumped in with a lot of other assets that aren't prepaid.

So, the only way that that third-party investor earns their return is by making sure that that asset continues to perform.

So, if the service provider fails for whatever reason, goes out of business, bankrupts, doesn't do a good job, they will get replaced. And there is a contract between the fund and the owner of the fund, and that operator to make sure that happens. Yeah, they have the ability to just default, remove and then replace.

COMMISSIONER MC ALLISTER: Great, thanks.

MR. ATALLA: Commissioner, I'm not sure that this example will address the specific question, but I'd like to just submit it for example.

COMMISSIONER PETERMAN: Oh, please.

MR. ATALLA: A couple of years ago there was an inverter that a certain manufacturer model of inverter that caught fires, and there was a recall from that manufacturer. Of course, as a builder we -- when we contract for systems, we don't really contract specifically for a specific inverter, our provider can put in whichever model they choose.

But it was something that we had to be responsible for to some extent, and we called our service provider and asked them to run through each home they installed, which models, and to see where they need to replace inverters.

So, the requirement, perhaps, is a good robust recordkeeping of models and components by the service providers is a good mechanism here for future cases of this sort.

COMMISSIONER PETERMAN: That makes sense. And, you know, what you were talking about also made me think about the fact that we have a list of eligible equipment, modules and inverters to participate in one

of the incentive programs, and so there is some monitoring of part of that.

But as we move towards the industry being self-sustaining, we need to think about what are the implications in the 2017, 2018 if those will stop, and what role the State may have in still maintaining something like that, even if it's not tied directly to an incentive program, so something for us to think in the longer term about, as well.

MR. SAXTON: Yeah, I was wondering maybe, Eric, if you could just talk briefly about the extent to which a company like yours does technology evaluation and reserves for warranties and maintenance?

I tend to think those are things that smaller players would be very challenged to do.

MR. WEINGARTEN: I can't speak to the smaller players, but certainly the technology evaluation is ongoing for any of the players in the leasing and the PPA industry.

The investors demand certain equipment, there's certain equipment that is authorized to be used within the individual funds. All that equipment has performance requirements that's built into the financing documentation.

So, yes, there is testing. Over the years

various different players have decided certain modules are no longer good enough because either they're no longer efficient enough, or they perform well, or they have defects issues. I'm very aware of the issue that you mentioned, Jacob, and the industry moved away from that inverter.

So, yes, to answer your question, it's done. And the investors require it and, even if we didn't, and we do, but the investors would.

MR. SAXTON: Maybe could we generalize that these so-called bankable modules are 15 to 20 percent of the universe of available modules? I guess I just want to get to it's a -- a company, like yours is, that field of allowable equipment is rather narrow compared to the universe of equipment available; do you think that's a reasonable statement?

MR. WEINGARTEN: Yeah, I couldn't tell you the number or the percentage. And if you wanted the percentage we could probably provide that for you in further discussion.

But I think it is accurate to say that the universe of what's acceptable from a bankability perspective is smaller.

It's really less on performance. It's somewhat related to performance in history. It's more

bankability in terms of is that company going to be around? What's their capitalization level? You know, we were talking about capitalization levels -- it's funny, we're talking about capitalization levels here but we have those -- everybody in this industry has, you know, those capitalization conversations with investors and they care about that.

COMMISSIONER PETERMAN: You know, I think that's a good distinction to make, as well, because with the equipment I mean there are standardized tests, internationally standardized tests.

And in some like other emerging renewables there's not. So, looking still for continual certified testified for small wind, for example.

And so I think in the PV market there's more certainty around equipment performance, but then to get to the next question of bankability in terms of the actual manufacturing company, themselves, which is another level to look at.

MR. WEINGARTEN: Yeah, I think from a technical perspective the industry is relatively mature in terms of how the equipment works, and how efficient it is, and the safety standards.

Where it's not as mature is in the consolidation and in terms of the balance sheets of the companies and

that's where you're headed to next.

MS. HUTCHISON: All right, anything else on warranties? Okay, then we'll move on to question three.

Okay, what information is needed to help consumers decide if solar is appropriate for their home? A, what information is provided to a customer when they are considering installing solar?

And, B, what information do we need to help consumers decide on the appropriate financing level for them?

COMMISSIONER PETERMAN: Anyone who has bought, has a solar PV system on their home would like to comment on what they did not hear? You don't have to identify who your system was from, but feel free to come to the table, as well, and be a panelist.

MR. ATALLA: So, I'll go back to the EPG, the Energy Performance Guide. We use it not just to showcase the energy efficiency of the home and how much it will save versus a resale, but we use -- so, we put that sticker for the base home, which is an Energy Star home. And then if we are trying to sell solar for that home, if solar is an option, we then develop the same EPG, do the energy modeling so that we can -- and we plug in at the 1.8, the 2.2, the 3.X systems, and we extract out of the system what would be the utility

bill, the lower utility bill if these systems are in.

So, it's all about the dollars conversation and we show them that lower EPGs, if they go with the systems, at the different sizes of systems.

In our case that's the initial level of conversation then we go into other things such as the Federal Tax Credit, the property tax reduction they can get, and so on, and so other benefits as well.

And that's -- some of that is canned in a presentation, a digital presentation.

MR. WEINGARTEN: I think there's two scenarios, there's the information that's provided to the customers that are buying homes versus what the retrofit customer gets.

The retrofit customer will get, I think, three different options. They'll get an option that shows what it would cost under a cash scenario, a full prepay and then a partial prepay, a custom kind of scenario, and they can take a look at lease and PPA.

But I think the key thing here, and this is just in terms of, you know, where we go to protect customers is just clarity. I mean that's something -- I mean that's my job, that's one of the things I do every day is I get questions from people about how do we market this product, how do we do this, how do we do that,

questions from sales people, and the key is just clarity.

And I think the more that it's specific clarity to us about what we need to provide to customers, you know, what do you have to tell them? And I know that the Commission has provided that guidance and staff has provided that guidance so, well, how does the lease benefit you? How does that incentive benefit you? How is the price being reduced by that incentive?

That is helpful guidance in making it clear to us, in the industry, what we need to say and making that standard apply the same to everybody.

and I think the more guidance that we can get in terms of how we need to provide information to the customer, and standardize that, it makes it easier for us to do that and it makes it seamless for us, then we don't need to ask questions and we're not resistant to being clear. I mean we're happy to be clear to customers.

COMMISSIONER PETERMAN: And I'll just -- you know, one of the things in terms of information that I'm interested in exploring is I've heard anecdotally from some consumers, or PV customers that they felt they -- were given misinformation about the cost savings, but in particular the compensation they would receive from

their utility. And some of those rules are changing in real time at the PUC, and it does really vary across utility on your marginal rate, et cetera.

But I've heard less questions about the product and more about kind of the financial story that's being sold.

So, that's just one thing I'll mention and I'm curious if you've heard similar things.

And I'll ask the Contractors State License Board, have you gotten complaints -- you know, in addition to equipment do you get complaints about the -- yeah, the expected overall cost? And I think this will come up with energy efficiency, as well. And it's particularly challenging in new homes where you don't have the energy usage history to tie to, as well.

MR. WEBER: Yeah, I can state from the Contractors Board perspective, most of the complaints we do receive is the retrofit market, as you stated.

And as you also stated, there's some misrepresentation or at least alleged misrepresentation on behalf of homeowners on the dollar amount of rebates they're going to receive.

And we also receive complaints, and I can't remember the gentleman's name that was speaking about this, but output versus dollars. They get -- it might

be a verbal statement that they're going to receive X amount of kilowatts. Well, those sophisticated enough, when they don't receive that, we do get complaints on that issue.

Also, we've gotten complaints on systems being under-sized. After they do further research, they realize that their system was not the proper size for the area.

So, those are some of the complaints we receive. But I have to tell you we do not receive a large volume of complaints from the solar industry.

COMMISSIONER PETERMAN: That's good news.

MR. WEBER: Yeah.

COMMISSIONER PETERMAN: Yeah, that's a definitely a good point to bring home. And I think we're here today just to make sure that continues to be the case.

COMMISSIONER MC ALLISTER: So, can I make a comment?

COMMISSIONER PETERMAN: Please, go ahead, Andrew.

COMMISSIONER MC ALLISTER: So, I'm sorry, what's the gentleman's name on the CSLB?

COMMISSIONER PETERMAN: Actually, I do not know. He's on my paper as "Jane," but I don't think that's it.

MR. WEBER: It's Scott.

COMMISSIONER MC ALLISTER: Scott, yeah. This is Andrew McAllister.

So, I think, you know, we talked about energy efficiency and solar in a previous panel, but I think to the extent that the -- and I was going to bring this up in the previous panel, about warranties, but I think it really is -- so, there's a balance between sort of -- we need to figure out how best to enforce, you know -- not just a compliance with program code, but just if we're going to offer rebates, we're going to encourage contractors to get out there. We need to place some incentives for a contractor to actually behave out there in the marketplace.

And I really feel like, you know, in my previous incarnation, working on the CSI, which was the retrofit solar program, I know we had worked with the CSLB a lot to share information and sort of help the tracking of the complaint process, and even just checking to see if the licenses were up to date and in good standing.

And I think that, just in and of itself, the contractors knowing we were checked really helped a lot to keep them at least with some sense that they had to behave themselves out there in the world.

It didn't always work. Of course, there were

bad actors out there that we had to then deal with.

But I think in -- I'm interested in exploring this further and any comments you have on what your action -- what your enforcement abilities or pathways actually are to then get misbehaving contractors in line, it would be really helpful to hear in somewhat more detail.

And I'm interest not only for the solar side of things, but also for the HVAC contractors, which I would imagine -- and just the building industry more broadly, which I imagine you'd probably get a larger flow just given the quantity of projects out there.

MR. WEBER: Well, you've brought up HVAC. I can speak to the HVAC, we've been very aggressive in the HVAC industry. A large problem with HVAC permits -- or HVAC installs, you're probably aware, is a failure to pull building permits.

And because of that, the systems aren't as efficient as they could be.

The Contractors Board has participated in four building permit stings where we call out contractors that have given us probably cause to believe they're not obtaining building permits, and it's an undercover operation and we ask questions about obtaining building permits.

And you also asked what kind of actions do we take? We have issued administrative citations, they range from $200 to $5,000, and they're disclosable on a contractor's license for five years. So, that is a deterrent for a contractor to not do the right thing.

We do and have since 2010 put a priority on building permits and that would include, you know, solar permits.

We don't get a lot of complaints for a failure to pull solar permits.

We also have the ability to take a license if a contractor's not heeding. We do use progressive discipline. We will try to warn the contractor in the first instance, generally, to go to an administrative citation in the next instance. And if the contractor's failing to heed our warnings, they could ultimately have their license taken away. So, those are some of the actions we could take against a contractor.

But again, we deal with progressive discipline.

COMMISSIONER PETERMAN: Let me ask an intro -- thank you, that was really helpful.

COMMISSIONER MC ALLISTER: Thank you, that was great.

COMMISSIONER PETERMAN: Even before you get to your measures, you know, the progressive discipline, I'm

curious what you've heard from those who have complaints about PV projects, how they were able to identify they had a problem to begin with?

And so you noted, for example, that you've gotten a complaint that the systems are under-sized, or the incentives are not what they should be.

MR. WEBER: Uh-hum.

COMMISSIONER PETERMAN: And do you know if customers know this because they went and got a second opinion or they asked, they did internet research, you know, how do we get them even to make us aware that there is a problem?

MR. WEBER: Right, most of the times in those types of complaints they talk to somebody and they did internet research after the fact, you know, after it was installed, maybe buyer's remorse, I don't know, but they should have done it up front, but they end up doing it afterwards.

And a lot of times they're just talking to somebody else that had an experience and they realize that, you know, maybe they didn't get the right system in, they didn't get the proper rebates.

And we do get complaints, like I stated earlier where -- and I don't know if this is going on as much now, because like I said the solar industry's been

pretty good, but we have had a lot of complaints that there's been verbal promises by sales people that haven't come to fruition, so that was an issue at one time. I don't see as many of those anymore.

MS. BIDWELL: And I'm just going to add in there that if we do end up opening up a case, they'll be able to use subject matter experts or industry experts to go out and make that determination of what may be deficient in a system.

COMMISSIONER PETERMAN: I was just curious about the following statistic, if you happen to know it, and how many active solar licenses are there right now in California?

MR. WEBER: Oh, that's a great question and I do not have that information available, I'm sorry. I could follow up with you, though.

COMMISSIONER PETERMAN: Yeah, that would be great, just follow up with our staff. I'm just trying to get a sense of how those numbers are changing over time. Thank you.

Elizabeth.

MS. HUTCHISON: Are there any comments from the audience, on the WebEx or --

MR. NESBITT: George Nesbitt, a couple of things. As I've said, I certified the first new single-

family net zero energy home in California last year, and the Energy Commission and our two Commissioners signed a nice proclamation and sent it to staff for the big grant opening.

But I haven't seen it used in any other marketing. I haven't seen it in the Go-Solar newsletter.

You know, Heschong Mahone Group for the multi-family efficiency rebate, you know, sends out and highlights a project every month. You know, you'd think if we want to drive consumer demand for net zero energy homes, we'd take one and we'd use it.

So, then on warranties, I have had customers who, in years past, had some early panel failures and I think in some cases the installer had gone out of business. And so while the manufacturer may have covered the product, there might have been nothing there for labor for switching it out.

I'm actually a licensed general contractor, and the License Board does have a bonding. And the pool contractors actually have to have a bond. Although, you know, I guess in theory that money is there for things that go wrong, but it's 12 and a half thousand dollars.

So, if you do really have someone with a lot of problems, that won't cover it.

And so in that sense perhaps having, you know, within the program some fund that when there are early failures that if, for some reason, a manufacturer goes out, an installer goes out, you know, that someone isn't totally left hanging.

COMMISSIONER MC ALLISTER: Can I just get in there, the solar industry, itself, has actually -- that possibility keeps coming up and it's really, you know, to the discussion we had before where, you know, you've got a backstop if you have a PPA or a leasing model. It doesn't really exist out there in the case market.

It's really -- I think one of the options there, I think, is possibly to get -- for the solar industry to sort of band together, at least the most responsible members of it, for the sake of the brand of their industry.

And then I guess it would be interesting to hear from any of the companies in the audience whether or not that they that that's a realistic to try to do and, you know, pitch in and sort of get a fund that can take these systems and make them whole, just as the right thing to do for the industry.

MR. NESBITT: Yeah, it can create a lot of goodwill. I think in San Diego there were a lot of unhappy customers because it used to be required to go

to time of use, and a lot of customers didn't buy, or couldn't afford, or didn't have room for a system that was big enough to give them positive production during peak, and they ended up with higher bills. And they were undoubtedly sold the PV system on lowering their bills.

COMMISSIONER MC ALLISTER: That was actually the end of an empire because that was Edison territory, yeah.

MR. NESBITT: Oh, okay. And then sort of a last thing, although we've sort of touched on it, you know, HERS verification. Part of warranty and consumer protection is, you know, the HERS verification.

I, literally, have not had a project where there has not been some issue. Usually, often, mostly with shading, although I had one multi-family project where they had no shading and I did the shading as best as I could and it cost $15,000 off the rebate.

Now, I don't know if the contractor ate it or if the affordable housing developer ate it. I know I don't think I've gotten any calls, referrals through that installer really since.

And I gave them options, you know. They says, well, we get blamed -- there's rules for shading, right.

So, verification, I mean I've done monitoring

verification of utility rebate programs.

I think we know and we have the HERS for a lot of things that -- making sure that things are done right and well is very important and I think perhaps what we could go to is an installer-based sampling at some point, perhaps, rather than job-by-job, so that -- you know, but like I say most jobs end up, especially with shading, because that gets to be complicated, especially on new construction, predicting what it's going to be like on that roof when it's built, and all the things or shading from structures or trees is almost impossible.

So, it's a really important part of the whole process. And actually, I think also, potentially a place that we can use to streamline some of the process, especially when there are the changes when we do verification and so that we don't have rebates sitting for weeks and months after -- you know, I've done my job, but I can't finish because of the paperwork trail.

COMMISSIONER PETERMAN: Thank you.

Any other comments from the audience or on the line?

Well, Elizabeth, let me turn it back to you and see if you have any final comments or if the panelists have any final comments before we wrap up.

MS. HUTCHISON: Okay, I just have one last

slide.

COMMISSIONER PETERMAN: Well, while this slide is being pulled up, because I think it's our concluding slide, then let me say thank you very much to all the panelists today. And many of you did multiple duty, on multiple panels, so we appreciate that.

I've been wanting to have a workshop like this for a while, and I'm really glad we had it. It's been incredibly informative to me and I imagine, as well, to staff. I'm excited that we have a transcript because too much information to write down.

Indeed, I think we're touching upon issues, you know, as Lew has noted, that other states are wrestling with as well, or other states haven't even gotten to, yet, because their markets are not growing the way California's is.

And, ultimately, the Commission is focused on making this program as successful as it can be and developing some guidelines and best practices that will be useful once solar is no longer being incentivized through public programs.

And I think a lot of the discussion we've had today, in terms of how this PV coordinates with energy efficiency, coordinates with local and state policies, as well as how we think long term about consumer

protection are important areas for us to address in this Guidebook and this program going forward.

I think, also, we've benefitted from having a diversity of panelists and I appreciate that this input is important to the program, and so we will look to some type of task group or a stakeholder regular meeting, where we can engage the various stakeholders.

So, continue to stay involved with us, we appreciate your comments and the hard work you're doing to make this program successful.

And, finally, let me say a sincere thank you to the staff, the Renewables and Energy Efficiency Division staff for putting together a great agenda and providing very comprehensive background material.

A lot of the information in these slides is new to me and I look forward to taking a close look so, thank you.

Any final comments, Commissioner McAllister?

COMMISSIONER PETERMAN: And thank you, Commissioner McAllister, for joining with me and I'm looking forward to working with you on zero net energy issues, or net zero energy issues, if you will. Thank you.

MS. HUTCHISON: Thank you, Commissioners.

If you'd like to submit written comments, you

can do so by e-mailing or mailing to docket energy.ca.gov, and recording that in at energy.ca.gov, and if you could do so by 4:00 p.m. on December 19th, 2012.

Thank you all for attending, have a good evening.

(Thereupon, the Workshop was adjourned at 4:55 p.m.)

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