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

In the matter of,	)	
	)	
Comprehensive Energy Efficiency	)	Docket No. 12-EBP-1
Program for Existing Buildings	)	
(AB 758 Program)	)	

Staff Workshop on

Comprehensive Energy Efficiency Program
For Existing Buildings (AB 758)
Scoping Report

California Energy Commission
Hearing Room A
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P R O C E E D I N G S

OCTOBER 9, 2012 9:06 A.M.

MR. ASHUCKIAN: Thank you for all coming to day two of our 758 workshop.

I see many of you, if not most of you are here for day two, although there are a few faces that are new, so I will do a little bit of repeating what I talked about yesterday in the introduction, mostly about how the day's going to operate.

So, just briefly, again, about activities to date, again we've done some ARRA programs that include financing and the Energy Upgrade California, met some targeted nonresidential programs. These have been, basically, the kind of pilot programs for AB 758 work.

The program's going to be set up in three phases. This is the first phase, which is the program development and action plan. And as we talked about yesterday, this workshop is helping to develop that plan.

The scoping report, which was published with this workshop, is kind of the comprehensive overview of the program or of the issues surrounding energy efficiency.

And as a result of these workshops and two additional -- at least two additional workshops that

will be held in either Northern, and/or Southern, or Central California we will have comments on the draft action plan.

From there we expect to go into phase two, which is the market development and developing the partnerships. It's kind of ramping up the infrastructure to get the energy efficiency going.

And then phase three would be widespread implementation followed, potentially, by some specific regulations that will help facilitate more widespread energy efficiency in existing buildings.

So, I just went through phase one. Sorry, I'm not keeping up with myself here.

Next steps, again written comments, after this workshop, are due two weeks from today, October 23rd. Again, we plan to have the draft action plan out by about the end of December. And the workshops will be held probably in January or early spring, with a planned adoption by the Energy Commission in early March -- or in March, I should say.

And, again, we are heavily coordinating our work with the PUC and the expectation would be that a lot of these programs would be implemented by the IOUs in their energy efficiency portfolios.

Today's workshop is going to be on -- basically,

focused on data collection and nonresidential programs, nonresidential buildings.

We'll have, actually, three presentations; an opening presentation by Martha, talking about the market characterization and a little bit about the potential energy efficiency reductions available from existing buildings.

Then we'll have two other panels about -- one on the DOE program and then, again, the two additional panels on nonresidential buildings, one on performance and one on tools and upgrades.

Again, we're using the blue cards today, again. We had a lot of cards yesterday, some of them, about 15 cards didn't get answered because of the participation.

What I'm going to ask folks today, if you have a comment that you think is a quick comment that is not going to require dialogue, if you could put a note on your card, you know, "quick comment" that way we'll try and maybe make it in so that people can make a comment, rather than devoting a lot of time for various questions.

If you have a question that's certainly encouraged as well, but I want to be able to just get a better gauge of how many -- we're trying to get through more folks. So, if you can make that notation on there.

Also, please, if you have a comment that you want for a specific panel, if you turn your card in early, please put down the panel number or even the question number that you are trying to -- you want to have questions about or comments on. That will, again, help organize the questions.

As I mentioned yesterday, and as everybody experienced here, for the new folks, we're doing what's called question mapping so that every panelist has been assigned one or two, or two or three questions out of the group, so that each panelist will not be answering every question.

We certainly encourage participants from answering any of the questions.

And in addition to that there are a group of questions at the end of the agenda that we have not assigned to any specific panel. Again, we encourage questions, and comments, and written comments on those, as well.

Housekeeping, restrooms are across the way. There's a snack bar on the second floor, it closes at -- just kidding.

Emergency exits, the main doors to the right and there's emergency doors to the left. The emergency doors to the left will sound the alarm if you use them

without a key card, so don't exit those doors without a key card. And once you exit those doors you can't get back in without a key card.

So, if there is a fire alarm, we congregate across the street at the Roosevelt Park, which is kiddie-corner from the building.

And again, with your blue cards, if you have comments please be sure to state your name and the company you're representing.

Are there any questions?

Okay, with that I think we'll start with Martha. Oh, yeah, sorry, sorry.

COMMISSIONER MC ALLISTER: I'll just chime in and say thank you all for coming again. Yesterday was a great set of discussions and there are some familiar faces who were here yesterday, as well. So, also appreciate the PUC sticking it out, so thanks Simon and crew for being here for the second day, as well.

So, hopefully -- I think we have a good foundation for a productive discussion today as well, to get through the rest of the topics. And looking forward to today, thanks again for coming.

MS. BROOK: Good morning, I'm Martha Brook. I'm an engineer here at the Energy Commission and I've been here too long. So, I think that -- well, in relative

terms, I've been here over 20 years which is I think, maybe, my testament to my lack of imagination, maybe, I'm not sure.

(Laughter)

MS. BROOK: So, anyway, what I'm going to do is talk about the charts that were in the scoping report and there's a little bit more information here than in the scoping report because I just dug in a little bit more the last few days because I just love this stuff, and any time I have an opportunity to dig into the data, that's what I try to do.

COMMISSIONER MC ALLISTER: That's actually why you're still here, Martha.

MS. BROOK: Yeah. So, anyway, the sources for the data that we've looked at briefly here for the scoping report, and to sort of understand more about commercial and residential buildings are the Energy Commission's Demand Forecast, which we produce -- it's a long-term forecast and we collect data in order to produce those forecasts.

And, principally, the survey data that we've looked at here is the 2009 Residential Appliance Saturation Survey, that's the RASS, and the 2003 Commercial End Use Survey, the CEUS survey.

So, this is just to get everybody on the same

page. Residential and commercial buildings are the majority of electricity consumption, coincident peak demand. So, just residential and commercial buildings are 70 percent of electricity consumption. About 80 percent of the peak demand is due to residential and commercial buildings and more than half of the gas consumption are also residential and commercial buildings, so, no big surprise.

We have a big contribution to the State's energy consumption are in these buildings that we're trying to address in our 758 Program.

So, we're going to spend about half the time looking at residential data and then the second half looking at commercial characterization data.

So, this also is no surprise to anyone, we have a lot of old houses in the State and this is, you know, one of the -- one of the focus points for this 758 legislation was to look at older homes and to figure out ways that we can bring those older homes forward in terms of the energy efficiency paradigm.

So, almost 60 percent of buildings were built before any State Building Codes, and then about 10 percent every decade after that.

And I should say that that last decade, that's forecasted data, so it's probably more optimistic in

terms of new construction than what we'll realize. So, we're probably, again, maybe that 11 percent drops to 9 or 8 percent in terms of the overall sector.

So, again, the focus for our work really needs to think about that diversity across construction performance that we would anticipate in these buildings, with really a target on that 60 percent of older buildings.

This is just a way to look at what's going on in the residential sector in terms of end use electricity use in this case.

And one of the things that I really take away from this chart is that we're expecting, you know, fairly static or no growth in the end use electricity consumption in houses, except for that "other" category which is basically, if you look at everything else that's already been itemized in the residential survey, it's really plug loads.

So, it doesn't even include televisions, and VCRs, and things that are in that entertainment category, it's all of the things that we do with our pocket devices, our consumer electronics that really is the sole reason that the whole sector is expected to grow in the future is new homes and that consumer electronic or "other" plug load category is expected to

continue to increase within existing homes.

So, this next slide is just a way of looking at kind of the vintages of homes and how space conditioning end use sort of varies across these performance levels or, you know, the decade categories or code categories of homes.

So, basically, if you look at the oldest houses, if you looked at what the space conditioning unit energy consumption, that is if you have heating and air conditioning in your home, it's expected to use over 2,000 kilowatt hours per year if it's in that decade of an older appliance and an older home.

Whereas if you look at the newest construction, that same air conditioning equipment and heating equipment is expected to use far less than that, you know, less than 1,000 kilowatt hours per year.

And the difference between that, it's not just equipment. Obviously, we've done a lot to improve the envelope of these buildings, which allows the air conditioner to work and meet loads much more effectively.

But the red columns in this chart show that even though older equipment is less efficient, it's not giving -- it's not producing more energy in the use of these older homes. And that is due, to the greatest

extent, to the fact that a lot of older homes don't have air conditioning equipment.

So, the unit energy consumption is really only relevant if that equipment is in your house and you're using it, right.

So, two things in older homes, they don't always have air conditioning equipment and often they probably are living with different comfort conditions because they can't always afford to use their air conditioning and heating equipment because their bills would be so high if they did use it, because they're so ineffective.

So, this chart just shows you that even though we expect older equipment to much less efficient, the usage of this equipment isn't more than in new buildings. In fact, the usage in new buildings is more because everybody has that equipment and, therefore, they're using it more often because it's available for them to use.

And I'm going to come back to this slide when we talk about the scenarios just a little bit.

So, the next thing that we looked at for the scoping report is, you know, the distribution in the residential sector of -- this is at the whole house level, how much electricity the house is expected to use versus at a statewide level how much electricity is

being used by this category of homes.

So, across the bottom of the chart you have bins of house unit energy consumption, so how much the house is expected to use. And then the height of each bar is statewide how much that category of home is using over the course of a year.

So, this is where you get that average, a lot of us typically say 7,000 kilowatt hours a year for a house in California. Well, this is where that number comes from because it's the highest bar in this distribution is that 7,000 kilowatt hours a year.

And so really the point that we're trying to make in this chart, really is that one, there's a wide spread. There's houses that don't -- there's a lot of energy that is being consumed by houses that are less than that average. And there's, you know, a significant tail, also, of high end users that we need to consider when we're thinking about program designs to implement energy efficiency.

So, the point here is that there's potentially different messaging and different program designs that we would want to consider when we're trying to reach each of these different classes of customers. Customers that use a lot of energy, you know, everything above 10,000 kilowatt hours a year.

So that whole right-hand tail of this distribution curve potentially has a different program design than an average user or a house that uses much less than average.

So, for example, SMUD and other utilities have already done this kind of peer group, showing customers what they use compared to their neighbors. So, it's sort of a shame game type of a program design where you get people kind of excited that they might be using more than their neighbors, and they begin to investigate why that might be.

So, certainly, high end users also could -- and I think some of the ARRA work where there's been whole house upgrades, that we heard about yesterday, have actually addressed this high end user where they're spending a lot of money for electricity because they're at that highest rate tier.

And, therefore, they see huge value to their own pocketbook in efficiency improvements because it drops them out of that high end tier into a more affordable rate level.

And the most typical consumers might react differently and need a different kind of a program design. As is, you know, lots and lots of buildings

that are using less than average and either because they're in mild climate zones or, again, they don't have the same level of services and haven't gotten used to the levels of services that are in bigger and newer homes. And maybe there's a different program design that's necessary for those types of consumers.

So, that was really the point of this slide is to begin to think about the distribution across the State in terms of consumption in homes and how much they contribute overall to the statewide electricity consumption.

So, this is the scenario chart that I wanted to spend a few minutes on. It has an additional trend that isn't in the scoping report scenario chart.

So, let me just walk through this and then when we get to the end I think we have plenty of time for questions.

So, the first blue dash line is the CEC demand forecast and it probably has a little bit more new construction starts than what the Energy Commission's standards anticipated, for example, in the 2013 update.

So, maybe that curve is a little bit more steep than we would expect.

But the next trend line, this red dash line is the zero net energy trend and this actually has made

it -- we did make an adjustment for a more shallower trend for new starts, so it actually matches better what our anticipated starts were for the 2013 standards, for example. So, that's a legitimate trend line.

And one thing I should back up and say is that the way that we organized this chart is that every horizontal grid line is equivalent to three power plants. There are three Rosenfelds, which is 3,000 gigawatt hours a year.

So, it's a real easy way to say what kind of an impact any of these scenarios might make is just to look at, for example, the zero net energy trend line is almost nine power plants, maybe eight power plants.

So, when anybody asks us why we're doing zero net energy that's what we can tell them, it's because we want to save, you know, potentially up to eight power plants in the future, in California.

So, what we did for the rest of the trends for existing buildings is just assumed that the zero net energy goal that we have in the State is achieved. And, therefore, as you can see, all the other trends sort of follow that same growth line.

And the reason that that ZNE trend line is still increasing over time are those miscellaneous loads, the consumer electronics in existing buildings that we

anticipate will grow over time.

So, we'll just keep attaching things to our bodies and they all need to be plugged in, right, at night. So, that's the forecast that -- that's the forecast that we've projected here. I think I skipped there.

So, the next line that I want to talk about is this green line. That's the 2013 through 2016 IOU economic potential that is guiding the 2013-14 portfolio planning effort.

And really the only -- you know, the estimates that were taken from that potential study stop at 2016 and then the trend just sort of picks up the zero net energy trend line.

So, just as a disclaimer, the economic potential didn't go out to 2040, it went out to 2016 and then we just extended that line out.

So, you can see that what the IOUs are trying to achieve, and at least the goal that the PUC thinks is achievable is in existing residential construction -- is north of two power plants, but maybe less than three.

So, the next two trends that I want to talk about are the two blue lines. That's this trend and the other blue trend. Those are both from the Long-Term Energy Efficiency Strategic Plan.

The dark blue line is 25 percent of homes decrease electricity by 70 percent by 2020. And the lighter blue line is that three-quarters of homes decrease electricity by 30 percent by 2020.

So, both are very aggressive goals and, you know, have significant power plant savings as depicted in this chart.

So, the intent here is just to say, well, if 758 did have a quantitative goal where should it be?

And so we tried to put everything on this chart that we know about, that people have talked about, that are in policy documents in the State, and then added a couple just for discussion purposes.

So, the two that we've added for discussion purposes are that purple line, which is quite similar to the blue lines in terms of -- in terms of impact. But it's basically saying that if we did something like a whole house upgrade program where the asset energy used, the permanent features, and not behavior-driven, but more permanent features of homes are improved by up to 40 percent by 2030 in the majority of homes, where would it end up in the -- in an efficiency scenario such as this?

And it's very significant, but also quite similar to these long-term strategic planning goals in

terms of impact. And they're all very, very aggressive. But maybe help us think about, you know, aspirational goals or just exactly how much we do want to accomplish with our 758 program.

Then the other yellow line I just added in, it's not in the scoping report. And I started thinking about these pre-code homes, and one of the directions from the 758 legislation is to focus on pre-code homes and bring them up to a relatively advanced level of energy efficiency.

So, what it says here, pre-code homes increase efficiency 10 percent by 2025.

And the way I got to that 10 percent is back on this chart. I said, okay, let's assume that these pre-'75 houses move to the next level of performance, about 1500 kWh per home, and so it's about over 60 percent improvement.

So, the oldest homes get to the middle of this chart and then the middle of the chart get all the way to the current level of home performance. So, that just is a way to say, okay, pre-code, well that's everything, right, because we keep changing our code every three years so -- but we're not going to assume for this exercise that these oldest homes get all the way up to current levels of performance, but they get halfway

there.

So, that's where we did the math and came up with -- sorry for that -- if you take that level in terms of space conditioning use, and do the math in terms of the contribution of space conditioning to the total electricity consumption of the home, and then you upgrade those code levels, you get to approximately 10 percent of the whole house electricity use for those pre-code homes. And that's what it looks like on the chart.

It's also assuming that some of the homes have already been upgraded, right, so it's not saying -- it's not making the assumption that nobody's ever touched any of these older homes that would be unrealistic.

So, anyway, a type of a scenario that would focus on pre-code homes in improving the efficiency in terms of envelope or space conditioning improvements would yield almost three power plants.

So, that is all I have for residential, I'm going to move on to commercial buildings.

So, this was the first chart I wanted to talk about for commercial buildings and I think this is really important for today's discussions, where we're going to talk about commercial building upgrades, and also planning for the action plan.

So, what this looks like is all these abbreviations on the bottom are building types, it's college, grocery stores, health -- you know, hospitals and healthcare buildings, lodging, large office, miscellaneous, refrigerated warehouse, restaurants, retail, schools, small offices and non-refrigerated warehouses.

And the red bars are the counts of buildings based on the CEUS survey, with the weights included in there, so it's not perfectly accurate but it's a good estimate.

And then the blue line is the statewide electricity consumption for these buildings.

So, right away you see that miscellaneous and retail are huge in terms of their overall contribution to the electricity consumption in the commercial sector, and all the other buildings really pale in comparison to those.

And I must say as one additional disclaimer, colleges are under-represented in this data sample that we analyzed because this is a non-confidential version of the CEUS data that we looked at and we had to strip out large colleges out of this -- out of this dataset for confidentiality reasons.

And so I didn't make adjustments for that in

this data analysis. So, colleges probably rise a little bit higher is basically what I'm saying, but I don't think it changes the -- what I hope to -- for the takeaway of this chart to be basically is that miscellaneous and retail are the largest contributions to the commercial sector's electricity consumption.

So, if we dive into that just a little bit more another really interesting thing about these building segments is that they're dominated by small buildings.

So, those same two building sectors, miscellaneous and retail, and we're just looking at the counts of buildings by size, and as you can see the smallest building sizes dominate and tail off quickly. So, they're all reasonably small and most of them are very small buildings.

And this is huge for program design purposes. I mean, you know, anything that addresses class A office buildings is not going to address these market segments.

So, this is really important, I think, for our planning purposes.

Just dive down another, just because I can't resist, so one more dive down, this is what those miscellaneous buildings are. I mean miscellaneous is not helpful, right. So, saying that there's a lot of miscellaneous buildings is not going to help us in

trying to figure out what we can do about it.

So, this is just the characteristics of basically what these buildings are. They're churches, or convenience stores, or fitness centers, they're gas stations, they're manufacturing facilities. They're all the little concrete tilt-up buildings we have across the State.

Police and fire stations, post office, public assembly facilities, service buildings, and then the miscellaneous of the miscellaneous, things we really just don't what the heck they are. But we know they're buildings, that's all we can say for sure is that they're a building.

(Laughter)

MS. BROOK: So, once again, lots of lots of small, weird buildings. And those are the ones that we're going to have to address if we're going to be successful with our goals.

Another like end use snippet for the commercial sector, we don't see the same growth in the miscellaneous. And, again, this is from the Forecast Office and I would challenge that maybe there ought to be more growth anticipated in that miscellaneous sector because if we've got all these things attached to our buildings and we forget -- or our bodies, not our

buildings, and we forget to plug them in at home what are we going to do? I've already got three things plugged into my office upstairs.

So, I expect there to be growth in that consumer electronics that get drug into the commercial sector. I don't think our forecast is capturing those.

So, when we go to the scenario chart you'll see it looks a lot different from residential because we don't have that growth in the miscellaneous sector.

But anyway, the things you would anticipate, indoor lighting dominates miscellaneous, also, it's very significant. And cooling and ventilation are trailing close behind.

And then the other thing that's really important for commercial buildings is -- again, because I'm a mechanical engineer, you know, cooling just has to be dominant on one chart that I show, and so this is a chart that I want to show.

Lighting is important always, but for coincident peak in the State cooling in commercial buildings is very, very important, so that's the point of this chart. And again, this isn't in the scoping report. I saw that cooling was neglected in the scoping report and so I had to toss this one in there.

Okay, so commercial scenario chart looks like

this. This does have one added -- one added trend from the scoping report.

But anyway the different -- the same thing here, the blue dotted line is the CEC forecast. The ZNE red dotted line is shown here, very impactful. In this case it's, again, a good eight power plants.

The difference in the ZNE trend is that it shows no growth over time and that's because the only growth in that forecast is due to new buildings. So, again, because there is no growth anticipated in the forecast for those miscellaneous loads once you've cut out the growth from the Zero Net Energy program, that's why the trends flattens out where you didn't see it flatten out in the residential sector.

So, again, the green line is the 2012 to 2016 economic potential as sponsored by the Public Utility Commission and is guiding the '13-'14 program planning that's going on.

The significance, you know, six power plants worth of potential there.

This bright blue line is the aspirational goal that was in the strategic plan that half of our existing buildings are going to get to zero net energy by 2030.

So, we've solved the -- we've saved polar bears if we get there. I mean we basically -- we're getting

back to the 1990 levels of greenhouse emissions and buildings that, you know, is trying to get achieved by the AB 32 goals. We would have achieved that and then some if we actually were able to achieve this zero net energy goal for existing buildings.

So, I think this -- having this on this chart is a nice sort of kind of bounding the levels of achievements we may be able to achieve.

And then this purple line, again, is if we did something with 758 -- again, this isn't blessed by any agency, this is just staff putting lines on a chart for discussion purposes. But if three-quarters of the buildings, commercial buildings, were to decrease their asset energy use, again those permanent features of buildings that would trade if the -- that would go along with the building if there was a change in ownership. If those were -- the efficiency of those assets were increased by 40 percent by 2030, it would be this purple line. And that, you know, taken off of the ZNE trend line is three, six, nine power plants.

And then the only other thing I added here, just for discussion purposes is -- well how -- you know, that purple line looks really, really aggressive and how would we achieve that?

And so what I did, as another scenario to

compare that to is, well, what if we took lighting? That's the most common measure that's incented in commercial buildings today, what if we continued to increase lighting by 30 percent in half the buildings in the State, what would that look like?

And it seems very aggressive but it doesn't -- it pales in comparison to these other kind of potential savings that we get from other scenarios.

So, it's significant. It's, you know, potentially two power plants, that's nothing to sneeze about so that's great.

But just looking at one major end use in buildings is -- doesn't produce the same significant levels of savings and maybe the things we want to think about for 758 as more aggressive, whole building approaches might.

So, that's the point of that scenario and I think we're ready to talk about this, now, if people are interested in that.

What's that? I guess so. So, Commissioner, did you want to talk at all about -- I know yesterday there were people that were -- actually, I was kind of confused yesterday, people were saying, well, if we want to meet our program goals we should do this. And I don't know that we set program goals, so that's what was

confusing to me yesterday.

And so that was actually one of the points of these scenarios is to look at where would we land on a 758 program? Do we want to put a mark in the sand in terms of what a quantitative goal is or do we want to just say we're happy if -- if we just save energy for consumers?

COMMISSIONER MC ALLISTER: Well, I guess so in the scoping report, back and forth, when we were really trying to figure out sort of what to put in there and what to focus on, you know, you came up with some initial drafts of these graphs and it was a really good fodder for conversation internally here.

And I think what we came away with is that there's kind of a -- there are a number of questions about how we parse not only these scenarios, you know, what scenarios we're going to take seriously, but also as we identify policy actions and then we try to dig into them and see what impact they might have, that will produce some scenarios.

Okay, we want to do -- okay, this is a big lift for a few savings. I mean we don't know all this, yet, we're trying to gather the information about our policy options.

So, it does -- so what emerged was this theme of

do we want sort of broad versus deep, right. Do we want really to go deep with some subset of buildings or do we want to be as broad as possible and kind of at the individual building level settle for maybe not as aggressive interventions.

I think that's an open question and I'm pragmatic about it. I want to do what kind of gets us furthest down the road.

There are a lot of paths -- I think it could be useful to establish a point B, you know, where how we -- okay, here's our overall goal in some very macro way, but there are going to be many, many pathways between where we are now and that second point.

And so I would invite kind of people with specialty knowledge or detailed knowledge about any given sector today and, you know, nonres, primarily, to offer ideas about where -- you know, what about the broad versus deep problem at the Commission, and I think the regulatory community we always talk about, okay, if we touch a building do we really want to sort of make sure we harvest everything because we may not get the change again?

Well, I think that may be true for many buildings, but it may not be true in other buildings. We may -- if we don't do something now, we may not do

anything ever. Right, so I think all these questions are good. And I hate to throw out more questions than answers here, but that's kind of my job.

So, you know, we want to do what makes the most sense and what we have buy in from the marketplace on. And so we want to develop some kind of consensus so there's not just policy in a vacuum, so that it's actually something that people can go out and do.

So, I think that kind of broad versus deep question is maybe a way we can grapple with some of these issues and give people some organizing principle to come to the table and tell us what they know.

MR. ASHUCKIAN: Yeah, we do have a couple comments here from the audience. Gina, could you come up and give your comment and then followed by Mike.

And then if anybody else has comments about this particular topic, just go ahead and come on up to the mic after the next speaker.

MS. GOODHILL ROSEN: So, a quick comment, hi. I think so, there's a green light. Can you hear me? It's a pretty small room so you can hear me.

So, there will be more detailed comments in written form. But, very briefly, I think there definitely does need to be quantitative comments. I don't think that we can really measure success unless we

know what we're aiming for. So, definitely, there should be actual goals that we have in place for this program.

There's a lot of great ideas, I think, that are up here. One thing that we really have in the comments, though, just in this last presentation that it was very briefly mentioned, the scoping report, is that at the end of the day the goal we pick needs to get us to our AB 32 targets.

I think that that needs to be the overarching point in choosing these targets is -- I mean, this isn't a suggestion in terms of AB 32, it's something we have to meet for our sector.

Global Green did some very, very rough calculations on just these scenarios, which I know are suggested, but even looking at these individual scenarios if we were to just choose one, we're really not anywhere close to meeting our goals.

So, I know these are incredibly aggressive but unfortunately, or unfortunately, the goals for AB 32 are incredibly aggressive, so I think that's something we need to look at.

With that said, some of the things that are up here seems like we're really looking at regulations. And so, as we mentioned yesterday, I think we need to

put regulations at least on the table before 2015, especially if we're looking at it in terms of meeting our AB 32 targets.

It seems like we would be doing a disservice to ourselves if we completely took it off the table and didn't even consider it until 2015.

So, we'll have more details in our written comments, but that's basically it.

MS. BROOK: So, Gina, could I just ask one question, not to get into the weeds too much, but when you say meet the AB 32 goals do you mean published numbers for electricity and gas reductions from the sector, the building sector, or do you mean 1990 levels of greenhouse gas?

MS. GOODHILL ROSEN: No, I mean the first one.

MS. BROOK: Okay, thanks.

MR. ASHUCKIAN: After Mike we have Conrad Asper.

MR. KESSEE: Mike Kessee at SMUD, an engineering question for you, Martha, how much PV does this represent?

MS. BROOK: How much PV?

MR. KESSEE: Yeah, do you know how much PV is represented in each scenario?

MS. BROOK: No, I don't. I could --

MR. KESSEE: Can you guess?

MS. BROOK: We could do the math but I can't do it in my head so --

MR. KESSEE: Is it more than the Governor's 12 gigawatts?

COMMISSIONER MC ALLISTER: Also, though, I mean this is energy -- this is electricity consumption, right, so this is -- I mean so this is behind the meter, whatever's behind the meter right, so it presumably has some distributed PV and potentially some other stuff in there. So it would be good to kind of maybe break that out at some level.

MS. BROOK: Well, no, this is metered, right, so this is what's measured, what's getting consumed in a building.

COMMISSIONER MC ALLISTER: Yeah, but this is net metered, right?

MS. BROOK: Yeah, it doesn't include -- it doesn't count PV generation, it's what's expected to be used.

COMMISSIONER MC ALLISTER: Okay, so this is net consumption.

MS. BROOK: Yeah.

COMMISSIONER MC ALLISTER: This is what we expect net consumption to be. So it actually, in theory, captures the distributed PV, right.

But at the same time -- so this is in kilowatt hours so this doesn't actually -- this isn't in carbon so --

MS. BROOK: No, it's not and it's again --

COMMISSIONER MC ALLISTER: To Gina's point, though, the RPS would actually make the carbon trend continue to go down.

MS. BROOK: Yeah, so one of the challenges that we have, as policy analysts, is data, right, and it's harder to do this type of analysis with the type of gas data that we have. So, we didn't combine it and put it into Btu terms from the carbon perspective it was -- because it was just easier to look at the electricity data.

MR. ASHUCKIAN: Actually, I was going to say we have Becky Menten on the line if we want to give her a chance.

COMMISSIONER MC ALLISTER: Hey Becky.

MS. BROOK: Hi Becky.

MS. MENTEN: Now can you hear me?

COMMISSIONER MC ALLISTER: Yes.

MS. MENTEN: Hello?

COMMISSIONER MC ALLISTER: Hello.

MS. BROOK: Hi Becky.

MS. MENTEN: Okay, great, hi guys.

COMMISSIONER MC ALLISTER: Hey Becky.

MS. MENTEN: So, I just wanted to take this change, basically I wanted to echo what Gina said which is that when we started to look at those projections and consider how they compared against the AB 32 goals, back to the question of broad versus deep we really couldn't find either of those on its own got us to where we were going.

So, I think it's not an either/or question, but it's really a both question. And from my perspective the takeaway is that you really just have to remember to design the programs to serve the different market sectors.

So, maybe some people, the earlier adopters, are the right folks to drive towards zero net energy and deeper, and maybe there's another program which reaches a broader amount of people less deep. So, I just wanted to share that perspective.

COMMISSIONER MC ALLISTER: Thanks a lot, Becky. Yeah, I mean I totally agree. I think, yeah, I feel like I'm in kind of a bind here because there are -- we can throw everything at the wall and expend a lot of resources, and we've got to really -- you know, at the same time much of what we do is going to be mediated through the PUC process, and go through the cost

effectiveness filters, and subject to some of the limitations of program design, the data availability and stuff like that. And so those are also real constraints and so I'm not -- I'm definitely not making excuses here, I mean we're going to try to do everything we possibly can.

And, you know, I think all of us are totally committed to that.

I agree, everything that works has to be on the table. And, you know, so the -- you know, there are so many stakeholders involved in this that I think, you know, I don't want to prejudge what I think is going to work and sort of put that on the table and drive the conservation towards that. I think we need to people to get there so we have buy-in, and so what we end up with is something that's actually implementable.

And it's my sincere hope that we can get much of the way there with things that we basically have consensus on. And then if we're forced, you know, to have the discussion, which I think will come, about what regulatory hammers we're going to use to force some of this additional savings into the marketplace, then we have to have that discussion, too.

And I think it's all very relevant, you know, in the near term to sort of start to put the pieces on the

table.

But we're the friend of this process, I very much appreciate what Gina and Global Green are pushing for and, you know, echoed by Becky. And yeah, I mean I think that's the reason we're all here so thanks.

MR. ASPER: Hi, Conrad Asper of CBPCA. It ultimately will be a question for you, Martha.

But I wanted to say it seems like the plug load situation and how that's increasing is going to be pretty significant. And that being the case it would seem that the operational ratings really do make a huge difference in trying to communicate to customers, you know, what's going on, buy a power strip, that kind of thing.

They may be simple fixes, but I think wouldn't it be a better -- a good use of resources to kind of go down and dirty on the asset ratings that the DOE maybe has put together with the home energy score, like I think you've been in conversations with them.

And, you know, put that aside and then really focus our energies, and I'm sure we'll hear from some of the folks today, on how we can have policies that will really promote the operational ratings and getting people to understand this.

MS. BROOK: Yeah, I mean my -- my opinion and I

think a lot of people share this opinion is that there's value in both and for different reasons, and for different opportunity points in a building lifecycle. And so I agree completely, I think there's a ton of value in looking at data and understanding people's operational characteristics, and especially for those consumer electronics.

MR. BAKER: Good morning everyone, Simon Baker, the Public Utility Commission Energy Division. If you could bring up the charts, that would be helpful for my comments. The targets charts.

MS. BROOK: Like the Res. 1 for example.

MR. BAKER: Yeah, that will work.

MS. BROOK: The next one, yeah.

MR. BAKER: Thank you. So, I just wanted to point out, so the green line there, the economic potential, so that comes from the Public Utility Commission's recent potential study. And I just want to point out the not-so-good news that economic potential is actually much larger than the utilities' goals.

MS. BROOK: Market, uh-hum.

MR. BAKER: Market potential I think is on the order of 40 percent or something of economic potential.

So, actually, what the utilities' goals are is much smaller than that.

MS. BROOK: Okay, good, I didn't know.

MR. BAKER: The economic potential represents what the economic potential is using current cost-effectiveness methodologies. And again, kind of back to the discussion of yesterday and, you know, this disconnect between current cost-effectiveness methodologies and what even the Public Utility Commission's own strategic plan goals suggest. I mean you've got a line there, you know, the ZNE new homes which hasn't been assessed for cost effectiveness. The Commission, itself, you know, acknowledged that in its strategic plan.

So, and to the point about, you know, these wedges being yet still smaller than the AB 32 goals I mean that's a very valid point. And I think we have to think about this kind of over time as kind of a feedback mechanism.

As the price of carbon starts feeding back into the assessments of economic potential, then you're going to start seeing that wedge of utility program economic potential potentially getting bigger and bigger.

But there's also, you know, the political pinch point, too, of how much the economy can take in terms of the cost of carbon.

So, you know, the AB 758 legislation and the

apparently broad authority that it gives the Energy Commission to adopt regulations, that seems like one of the sort of key components to solving this problem, you know, absent getting new legislation that provides some additional flexibility on cost effectiveness, or provides new funding sources.

You know, I'm just trying to think through this and I'd be interested to hear from the Energy Commission folks about the -- the breadth of the authority that seems to be granted in the AB 758 legislation to address this.

COMMISSIONER MC ALLISTER: Well, it does say cost effective as well, right? Not necessarily to the same definition that the PUC utilizes in the cost-effective methodologies, but 758 does require that it be cost effective in some way, right.

MS. BROOK: Uh-hum.

COMMISSIONER MC ALLISTER: So, we have to grapple with that. And, obviously, resources that are sort of outside of the IOU/PUC process potentially could have -- could be more flexible for us to fill gaps or, you know, do things to complement what's happening in the utility sphere.

So, I guess, so those are all great points. And so, yeah, I mean regulation is definitely on the table

for sure, no question about it. And that comes with all sorts of, you know, social, economic, political issues that we have to really think through and so we're going to be doing that, absolutely.

I guess I wanted to -- I wanted to dig in a little bit or just so people can understand it, maybe, Martha ask you or Simon on the PUC economic potential. The time horizons that we are seeing in these curves are actually, for the most part, pretty near term. The nearer term they are, the more based on actual data they are, right.

So, you see a dip based on sort of current technology, current cost-effective methodology, like I'm referring to the green curve here --

MS. BROOK: Uh-hum.

COMMISSIONER MC ALLISTER: -- in the near term up to 2018, 2020, and then you kind of have a linear after that because you don't know what technology's going to be out there. When you're designing actual programs you have to work on actual technology.

MS. BROOK: Exactly so --

COMMISSIONER MC ALLISTER: You know, if we're going to take a longer term view than that then we're forced to kind of do modeling at a much more high level and just make like assume technology in some abstract

way, and that isn't as useful for programs.

MS. BROOK: Right and that's basically what that green line is doing. After 2016 it's just basically saying that -- basically, there's this grand assumption that there's the same amount of economic potential every year after that and, basically, the same amount of technical potential in 2016 every year forward, and that's why it's basically a straight line.

COMMISSIONER MC ALLISTER: Yeah. Well, I mean to Gina's point so if we're -- so we have this big unknown of what technology's going to exist, what advancements in lighting, or HVAC, or building shell, or home area networks, or whatever. We don't know so it makes it really quite hard to model, to know what the potential is that we're -- you know, that pathway then becomes kind of an open field instead of a road, right.

MS. BROOK: Uh-hum.

COMMISSIONER MC ALLISTER: So, anyway, I think just so everybody appreciates kind of much unknown there is here and how important it is that we kind of keep engaged over the long term on these issues as things change.

MS. BROOK: Right. And the other thing I would mention, just from my perspective, is any time one of those scenarios says 75 percent of the homes, so three-

quarters of the homes are going to take an action, I would assert that there needs to be some mandatory component to that program for that to reach that level of adoption, basically. I mean that's just my assertion but I think that's a good way to think about if you're going to go to those levels and reach that type of an impact, you probably can't do it with just voluntary programs.

We've never historically experienced that type of adoption in voluntary programs before.

MR. ASHUCKIAN: Okay, this will be our last question.

MR. MC BRIDE: My name's Al McBride, I'm the Founder and Owner of Smart Light Systems and I make products to help energy consumption, especially fluorescent lights, especially for the retrofit market. So, I make products that are specifically designed for the retrofit market in buildings.

And I had a couple of comments. I think to achieve these goals on the lighting phase, I believe that's the green line --

MS. BROOK: On the commercial scenario it's on the --

MR. MC BRIDE: On the commercial, I'm in the commercial space.

MS. BROOK: Yeah.

MR. MC BRIDE: But that's very achievable. In fact, all the customers we install for we achieve greater than 50 percent energy savings on their lighting, okay, so that's very achievable.

The main problem is I've never been in an existing building that knew -- we do dimming of fluorescent lights coupled with motion occupancy sensors, and those two can give us easily over 50 percent.

But I have never been in a building, a customer that knew they could do that, that they could dim their fluorescent lights. So, I'm going to tell you that getting the knowledge out, I think you're going to talk about that later, perhaps, but getting that word out either -- and how do you do that and what are your levers?

One of them might -- obviously, the customers that I deal with really look at the rate structure, that's for sure. And the other thing they look at is if it's an economic investment for them with an ROI of less than two years, three at the max, the maximum.

So, unless you have low-cost products, which is what I provide, about $100 a fixture is what -- when we install our units, you're probably going to have a

problem of penetrating as fast as that green line shows in four years because it's -- I have not seen one building that had what I offer installed at all.

And I do agree that the potential is huge. We estimate there's 100 million fluorescent fixtures in commercial in California, alone, let alone across the country. So, I think this is a very achievable thing in the lighting space, it's just a matter of getting the word out that that exists and having low enough cost products.

COMMISSIONER MC ALLISTER: Great, thanks very much. And just a note, you know, we do have authority on the appliance standards in Title 20 to develop standards for lighting products. We're looking at some quality standards, now, for LEDs which, you know, are at the front end.

You know, we've seen, at least in the residential markets, in screw-in compact fluorescents and things like that, we've learned a lot from the penetration of those over the last 15 years.

And as the marketplace moved towards LEDs, the opportunities are huge for both quality and fluorescents, absolutely. That's the existing stock for the most part.

But there are a lot of technologies coming on

line that are just now, you know, sort of reaching market -- the important levels of market penetration and technology quality.

So, how we can manage the penetration and sort of reinforce it and help it grow is, I think, a key question.

MR. ASHUCKIAN: Okay, we have a presentation now with the Department of Energy.

MS. COLLOPY: We have Cody Taylor from the Department of Energy. We're just tossing the WebEx to you, Cody, and then you're going to need to share your desktop with us.

MS. BROOK: So, just for context, Cody was invited to talk about the Buildings Performance Database. That's part of our data panel that we're going to spend the rest of the morning talking about. And so Cody's going to introduce what the Department of Energy's been doing in this data space and how we might be able to take advantage of it.

MS. COLLOPY: And, Cody, we can see your desktop, but if you can just blow that up to one slide?

It looks like you may have a split desk top on, but if you can just put one slide showing that might make it larger. Great, thank you, Cody. And we can now see, if you want to go ahead and -- you can go ahead and

start.

MR. ASHUCKIAN: We don't seem to have your audio.

MR. TAYLOR: And can you hear me now?

MS. COLLOPY: Yes, we can. Thanks Cody.

MR. TAYLOR: Perfect, there we go. All right, thank you for this opportunity to join you virtually today from Washington, where I'm sure the weather is not as nice as it is in California, ever.

(Laughter)

MR. TAYLOR: I'm going to talk a little bit today about an effort that we've undertaken here at the Department of Energy, that we've called Buildings Performance Database.

And so a little bit of background to add onto what Martha said, my name is Cody Taylor. I work in the Building Technologies Program here at the Department. And I work primarily with commercial buildings, but this effort we're talking about pertains both to commercial and residential facilities.

So, I just want to put this in the context of a couple of other of our initiatives here. The Buildings Performance Database is noted there in the center, at the top, but it's really one of a couple things that we're doing here around energy efficiency data.

And the first of those is an effort to move the country toward some agreement on a data taxonomy, which you can see at left there. And this is something that we've noted has been a real challenge for people across the industry; it can really hamper information sharing and comparability to the programs.

For example, two similar energy efficiency programs run in neighboring states may be hard to compare to each to understand whether one approach is working better or worse than another, simply because the data may be recorded in ways that are incompatible or barely compatible, making it challenging to impossible to make that kind of useful comparison.

And so that taxonomy effort is one piece.

The DOE Buildings Performance Database that I'll be talking mostly about today is built on a taxonomy that we've developed internally, based on looking at a number of different databases out there, probably about 40 different data sources that we examined in trying to build a sort of rational, hierarchical taxonomy that I'll show you an overview of in a moment, of the kinds of data that are relevant for building energy performance.

The second thread for us is down at the bottom there, what we're calling the SEED platform, or Standard

Energy Efficiency Data platform. And that is something that is, again, built on that same taxonomy. But rather than being centrally held at the Department, it's something that we plan to make available as open source software for cities, and states, and other jurisdictions to use in managing energy data.

It's really a complement to the Portfolio Manager Tool, in particular, that is managed by the EPA for use with commercial buildings.

And our first -- our first use case there is definitely the jurisdiction that has our benchmarking and disclosure laws. In California, obviously, the State does, I believe it's through AB 1103, and then also the City of San Francisco does, and we've been working closely with them as a beta tester of the SEED platform.

So, really, the overall vision here at the Department is that as we move toward a place where there is some agreement on common data definitions and that we use those in our data tools internally, at the Department, and that others hopefully use the same definitions and the same terms for building energy performance data.

And, finally, we think the role of the solutions that we're developing at DOE is really just to be the

underlying foundation and to demonstrate some of the analytical power of building energy performance data. But that, really, the true innovation there is going to come from the marketplace and from third-party tools, not tools that we develop internally.

And so we want to make sure that we're enabling that in the long term. So, that's our overt thinking here.

Now, to delve into the Buildings Performance Database and what it is, and what we're doing, it is a decision-support tool that is intended to enable analysis of energy efficiency upgrades, primarily, although there are other kinds of relevant analyses that it can also assist with.

And it contains information about both the physical characteristics of the buildings, their operational characteristics, and the energy uses for those buildings. And that's, really, the key point here is it's the description of the buildings, as well as how much energy is used by a building.

And its purpose is to enable statistical analysis while maintaining privacy about information for individual buildings. So, think about it as a data lock at this point, where data that's contributed is anonymous after it goes in, but it creates this data

store that is valuable for many different parties to use for analysis. And you can think of the CBECS data, which is collected by the Energy Information Administration nationally as sort of an analog. That's a little bit different because it's intended to be a statistically relevant, a statistically descriptive sample, nationally, of buildings.

Whereas, the Buildings Performance Database is pulling from a variety of sources without that constraint that they be as strictly statistically representative.

But they both have that similar characteristic that as data goes into them, the privacy of the individual building is maintained.

So, as we bring in data, the final step is that we are working with National Labs to cleanse and validate data from different sources, translated into that standard taxonomy I mentioned, so that it can all be put in one place and trusted at the end.

But to give you a quick couple screen shots of what this looks like, that I'm describing, you're looking right now at our prototype tool for energy and financial analysis.

And so you can see on the left, first selecting a location, so imagine that you're considering right now

a retrofit to a particular type of building, so the -- in this example we're going to look at a single-family retrofit. So, you might first select a location for relevant comparator buildings, so if you wanted to say show me buildings in a particular climate zone that I'm going to consider retrofit in.

And then on the right side selecting particular characteristics, so this is selecting single-family homes. And a specific heating fuel, a specific age, or year of construction, specific heating system type. There are a number of criteria that you can use to down-select, which narrows the number of records or comparator buildings in the population that you're looking at, and you can see -- I'm not sure if it shows up on your end, the resolution of the projector there, but there's a little blue box in the upper right-hand corner of these screen shots that shows the number of records that's being included.

And as you down-select by using more specific filtering criteria that number will get smaller to reflect the number of buildings that meet your criteria.

So, as one continues to specify an analysis, the number of records will get smaller and smaller.

Now, the purpose here is to enable thinking, at the portfolio level, about the impact of various

retrofits. And knowing that actual results in the real world are noisy and reflect lots of differences in buildings that we cannot always, necessarily, predict the purpose here is to use large volumes of empirical data on building energy performance to supplement and inform decision making around energy efficiency retrofits, and perhaps offer some different evidence that we can access through only physical modeling of buildings.

So, if this model can give you one single point estimate of installing X widget is likely to save you five kilowatt hours, but it usually does not give you a very good sense of the performance risk distribution around that point estimate of energy savings.

And that’s what we’re trying to enable here. Again, with empirical data it’s allowing someone to look at the buildings that are out there, compare buildings that have a low efficiency version of a particular widget to buildings that have a high efficiency version of that widget, and look at the delta between those two populations to understand what -- what the difference is in real life, in real buildings, accounting for the fact that, again, the data’s messy because there are a lot of differences in the ways that we use our buildings and the peculiarities from one to the next.

So, bringing that back to the specific example here, you can see on the left side of these two screen shots there are a set of green buildings which are post-retrofit, and blue buildings which are pre-retrofit, so think of that pre-retrofit as the low efficiency widget and post-retrofit are green buildings as the high efficiency widget, and the -- that is further on the left of that scale of energy usage, which means lower energy usage. In this case we're looking just at natural gas because this is a natural gas furnace retrofit, again, that we are considering in the residential building.

And in red, at the bottom, you're essentially seeing the distribution of energy savings from those -- comparing those two datasets. So, 95 buildings in this case that have the low efficiency furnace and 23 buildings that have the high efficiency furnace and so you can see -- again, that's not a very large number of records, of course, but this gives you a sense of the mean savings is X Btus and here's the standard deviation in terms of what the spread can look like of the savings you might see.

On the right side you see just a sketch of cash flow analysis and the pink at the end there is the 90 percent confidence interval based on the data that is

being left. So, it's no longer, again, just a point estimate.

And this is just a second example on the commercial side. The primary thing I'll draw your attention to here is that the analysis from the ones, first, on the left, this is for differences in windows, so single-paned versus double-paned windows, a very simple difference in buildings.

First on the left, including both outbuildings with operable and inoperable windows, and then on the second time on the right showing only those buildings with inoperable windows, that is where the windows cannot be opened.

And so that gives you a smaller number of records and the main arrow, the spread of the data that you can see in terms of the calculated energy difference between the single-paned building and the double-paned building.

So, again, there are some other kinds of analysis that you might run if you were looking at data like this in the Buildings Performance Database.

So, I'm going to zoom back out after that example, up to talking a little bit about the data taxonomy that underlies this that we developed.

So, you can see the highest level sketch of it

here. And, really, we've tried to, as I mentioned earlier, create something that gives us a rational framework to fit in various descriptors for building energy usage.

We know there are other things out there and we will be working with stakeholders, beginning in the next couple months, and extending for a number of months after that to try to bring the energy efficiency industry together to discuss what makes sense to all of us in terms of a nationally appropriate data taxonomy that multiple parties can get behind and implant in their organization across -- across energy efficiency programs to ensure that we are speaking the same language and can equally translate our results to each other.

The detail level of this taxonomy is that it will prioritize the fields. There are about a hundred fields for those what we call priority one data that is the most important descriptors for buildings.

And then we have priority two and supplementary fields, obviously, of increasing importance, but still potentially meaningful in describing building energy systems and energy usage.

So, I want to also mention the relationship of the Buildings Performance Database to a couple of

other -- a couple of other initiatives out there.

So, one obvious one is Portfolio Manager, which many people are aware of in the commercial space. Again, it's maintained by the Environmental Protection Agency. And the data that goes into that is essentially operational characteristics of the building, a basic description and its monthly utility bills.

And so that allows you to assess a building, how a building compares to the CBECS population of buildings and so it gives you a comparison to a national sample. It doesn't necessarily give you a deep comparison in one particular location simply due to the limitations of the CBECS dataset that underlies it, but it can be an excellent and helpful benchmarking tool.

It doesn't, I should mention, go into the asset side of buildings really at all. And I know that there's been a little other discussion of asset ratings.

So, our last row here in this sample is a couple different asset ratings. And so the key data input there of course are the asset characteristics of the building.

And the type of analysis that allows is some understanding of the efficiency of energy systems in a building. Now, the Buildings Performance Database is meant to take both kinds of data here, both the

operational and asset data, as well as the energy usage data and allow -- allow large type analyses.

So, these may be analyses of similar types to those -- for example, a benchmarking analysis could be done similar to the kind of benchmarking in the Portfolio Manager. It might not, again, have strict connotation of being a nationally representative set of buildings, but in some cases the Buildings Performance Database may allow you to have a dataset where you don't have a comparator dataset really at all now.

So, I think for example some of the miscellaneous buildings that Martha was just mentioning earlier, for which we don't have large numbers collected in the CBECS survey to give you a good comparison.

But if a state was able to collect, say, a hundred fire stations' or police stations' energy characteristics then, suddenly, you start to have a decent comparator set which may be better than nothing in terms of giving you some basic benchmarking.

That's a kind of feature that the Buildings Performance Database can support.

So, we think there's value in this to a number of different entities. I'm not going to run through these in detail today. I believe the slides will be made available and I don't want to dwell on this too

much.

We think it is potentially available -- pardon me, potentially of value to financial institutions, those at the project investment level in particular, and who want to think about retrofit performance.

And to the extent that that may impact the financial performance level, alone, they may want to know what empirically is likely to be the performance of a particular retrofit before they're willing to make a loan that is primarily to execute that kind of retrofit.

And similarly, building owners and managers may wish to use something like the Buildings Performance Database to assess opportunities for energy efficiency investment, understand performance risk of various investments.

Government agencies have the same interest for their own buildings, so as they're property owners they, of course, want to assess returns that are likely from various investments.

Of course, it also may be something the government agencies wish to use in influencing local real estate markets. So, by making statistical information available that can, as was suggested earlier, increase the ability to benchmark certain building types, for example, that you might not have

otherwise to make.

So, we think this can be a tool that enables that by providing a repository, again, for anonymously holding the kind of data that can allow someone to look up the statistics on a particular building type.

And now for energy efficiency program administrators we also see some values there. One may, in helping to assess opportunities and target the program design, really.

In other words understanding -- if there's an empirical basis for saying, well, this retrofit type appears to be under-performing in this subset of a building type and over-performing in another subset of a building type, then that may be a basis for changing the way a program is targeting who it markets to or where it intends to spend most of its incentive dollars.

And there may also be a value of the kind of approach I'm describing in terms of this -- we're calling it actuarial analysis around here, in terms of supporting EM&V on the backside of programs. So that you might actually be able to, in the future, use this to enhance or -- enhance the EM&V that's being done or potentially lower the cost of executing the EM&V by bringing in other statistical information that is available in the state with respect to energy efficiency

programs, but may not be the approach undertaken right now in program evaluation.

So, I'm not -- I'm not trying to promise that we'll turn this on tomorrow and you'll drop $10 million off your EM&V bill for the State of California, but I think this is something that we should look forward to as a potential in the future and consider what the methods need to be -- what methods need to be developed to enable bringing this kind of data to bear to reduce costs and approve the usability of outputs of EM&V activities.

Currently, the data in the database, that you saw, is about 50,000 buildings from both public and private datasets. You can see some of the contributors here of various types.

I'll note that CEC is on this list and has assisted by making the CVEUS data, the California Virtual End Use Survey data available to include in here, so that gives us one good source. There are several others.

Obviously, many of these are regionally specific, although not all of them are. And some of them are specific to particular building types, although not all of them are.

We really think that inclusion of data in the

database is the biggest thing that differentiates whether it's useful and not useful. And so as we started this project, you know, we built the underlying infrastructure and we built a couple of prototype tools. You saw some screen shots of examples from that earlier. And we've been building up the dataset.

That will be ongoing, continuing to build that dataset is really a priority of ours and something that we are actively looking around to understand where appropriate datasets are that can flesh this -- because the richer and broader that dataset is, the more useful it can be for different kinds of analysis.

So, to give you some sense of what the data looks like that is going in there, here's just a quick snapshot of the types of data. So, in the basic building descriptions are things like the location, what type of building it is, whether that's a retail, or a hospital, or something else, what's the size of the building, the age of the building and the utility usage for at least one year.

And where we have some records in there that have annual data, some records that have monthly data, some records that have interval data. Obviously, the more granular the data is, the more types of analysis and more detail it can be put to in terms of its use for

output.

Now, on the right side you can see detailed building characteristics that we have going in there, as well. So there are -- that's all of the equipment information, lighting type, and efficiency controls present, various other descriptors about HVAC systems, water, shell. And then, finally, operational characteristics. Again, this is the type of information that is typically, at least on the commercial side, put into the Portfolio Manager Tool that can give you some sense of how those assets are actually used.

The last thing I'll mention on this is about our concern with privacy and security for the data. So, we are absolutely sensitive to the fact that this is data that most folks do not want to have out on the street in its raw form.

And so I want to be very clear that the data that goes into the Buildings Performance Database today is not something that, you know, that when we develop public access and a publicly available ACI it's not something where anyone has access to the raw data to be able to say, you know, the building at 123 Main Street is using this much energy in this month, or anything like that.

Yeah, so the identity of an individual building

is going to remain private once its data is in here.

However, we're trying to ensure that we can do that and also offer large-scale analysis.

So, the data's in there, it's anonymous. We've taken pains to scrub and cleanse to ensure its anonymity and to ensure anonymity structurally through the way the tools are accessed.

I didn't show this earlier, but if anyone tries to cut down to a -- or pardon me, filter down to something so specific that it gives too small a number of buildings that will simply return an error that says you've used too precise a filter, and you'll receive too few buildings and, therefore, we don't show a result.

So that prevents somebody from, for example, narrowing down to a single specific zip code and saying, you know, show me data for hospitals in that zip code and knowing there's only one. It prevents someone getting back data for a single hospital through that mechanism, or otherwise for a particular building.

So, I think in sum we've taken a lot of care there and feel good about the security measures that we have in place, and we think that's something that might help to ensure that folks feel confident in contributing data to this.

And so, finally, the overview of that

contribution is essentially just to let us know that you're interested, work with our National Lab to help identify and evaluate your datasets, and work with us on the privacy side to make sure you understand how our privacy protections work.

And then the National Lab will work with you and with us to cleanse and validate the data, and make sure that we in fact understand the terms and the definitions you're using, and then import it into our database where it can then be accessed.

So, I will stop there. I'm happy to take any questions or comments. It's something that we've been working on for a while and I think that it is relevant to some of the work that California's considering.

And we would certainly welcome collaboration on this. And we'd be happy to share whatever we can to make your efforts go easily and more smoothly.

And we would, of course, also be happy for any data that you're able to contribute that can make this resource more useful to anyone, especially those in California.

MS. BROOK: Great. Thank you, Cody, very much.

This is Martha, I just wanted to -- just if you could clarify how interested parties might be able to participate in your data taxonomy discussions that you

said were going to be initiated soon and ongoing for several months, I think that might be a great first step for us to think about. I mean just assuming that it will take longer to make decisions about whether there's future contributions or --

MR. TAYLOR: I can't hear anything, is everyone on mute?

MS. BROOK: Oh, well, you can't hear me so why should I tell you?

(Laughter)

MS. BROOK: Cody, we're trying to get it fixed so you can hear us.

MR. TAYLOR: There we go, now I can hear you, Martha.

MS. BROOK: Okay. So what I asked you, when you couldn't hear me, was if you could explain briefly how interested parties could participate in your data taxonomy discussions going forward.

Under the assumption that it might be easier for us to at least agree that we ought to organize our data in a common way before we're able and willing to share all data, it would be great for us to participate in your discussions.

MR. TAYLOR: Sure, so we're absolutely interested in folks who would like to participate in

that discussion. And as I mentioned, we haven't begun that, yet. I think the easiest way is basically just to reach out to me or to Elena, both of our contact information is here on this slide and we're the two primary contacts at DOE for both the Buildings Performance Database and the Taxonomy Development Initiative.

And I definitely want California involved in that. I should also note that it's not necessary to wait for total agreement on data taxonomy nationwide to begin contributing data into the BPD. And I fully expect that it will be a long process before we get everyone on the same page around taxonomy.

MS. BROOK: Okay, great. Thanks.

MR. ASHUCKIAN: So, we are just about out of -- basically out of time for this panel, for this presentation. And Andrew, Commissioner McAllister, if you have any questions or comments you want to make but --

COMMISSIONER MC ALLISTER: No, I just wanted to thank Cody and the Department for being with us today, and really helpful stuff. And I know the staff and you are in close contact on this.

And I've been in touch with some folks earlier about this, as well, and really think it's a great

resource that we can leverage and contribute to.

I'm sure there are lots of, you know, details about sort of, you know, California and the nation, and getting all that coordinated.

And also, you know, I think the issues of data, you know, setting it up such that there's a high level of comfort of providing data to inform a database is really, really important, and then making sure that it is searchable in ways that are useful at a fairly granular level, so that we know that we're using data that's relevant for the particular case.

And so I think probably those discussions are ongoing with staff and are extremely important for making it relevant, you know, across the country.

So, thanks again, really, for making time to be here with us.

MR. ASHUCKIAN: Now, there was a few questions from WebEx to Cody, and if those could be handled electronically, and then those questions or answers getting back as comments to us, that would be very helpful.

And so with that, I think we'll bring this --

MR. TAYLOR: I'm happy to do that.

MR. ASHUCKIAN: Great, thanks.

We'll bring this session to a close and let's

take a short break, and let's be planning on being back in your seats, ready for the first panel at 10:45.

(Off the record at 10:36 a.m.)

(Reconvene at 10:46 a.m.)

MR. ASHUCKIAN: Okay, this panel's going to be on data. And before we start, actually, I have an announcement from the PUC. The PUC is going to be hosting a workshop on -- it's actually a two-day workshop this Thursday and Friday on data privacy issues, and it will be in the Commission's Golden Gate Room from 9:30 to 3:00 p.m.

So, you can take a look at their website for more information on that.

So, with that I'll go ahead and turn it over to Martha.

MS. BROOK: Hi, thanks for coming back from the break.

And our first formal panel for today is on data and we've been kind of queuing up this panel for the last day. We kind of forecasted it yesterday and we have many people who came back today to talk about data, so we appreciate that very much.

I'm not going to spend any more time introducing the session. I think we all know what we want to talk about and we're going to let our panelists drive this

session.

So, just to reiterate the organization of the panel, each of these panelists will, in seven minutes, introduce themselves and put them -- explain to us why we've invited them here and also ask them to -- are we going to get the questions that we -- we have the -- okay, so Dave's going to get the questions up there and then they're all going to respond to one, two or more questions in that seven-minute period.

So, first up we have Mimi Frusha. And she just told me her last name and I already screwed it up, so I apologize for that.

Mimi co-founded Renewable Funding in 2008 with the mission to develop innovative finance and technology solutions designed to transform the clean energy industry.

Ms. Frusha is responsible for the implementation and execution of Renewable Funding's PACE finance and technology contracts, and programs for clients across the nation.

Since the launch of Energy Upgrade California Renewable Funding has been responsible for the development and maintenance of the UEC web portal, as well as the data collection reporting efforts for the Energy Commission, L.A. County, and the Better Buildings

Program Pilots.

Mimi.

MS. FRUSHA: Good morning all, thank you for having me here today and thank you to the Commission for putting on this workshop.

Just before I hit on my questions I thought it would be helpful to give a little bit more background on what we are doing on data for the Commission.

Renewable Funding, following the end of the statewide SEPT contracts was contracted by the Energy Commission, ultimately, to develop what we're calling the Energy Upgrade California Data Warehouse, or the EUC Data Warehouse, to support its EM&V efforts.

What's unique about this data warehouse is it's the first effort to aggregate data from multiple sources, IOUs, HERS providers and local governments into one comprehensive dataset, and it would include information about single-family, ratings assessments and projects.

The data, itself, will allow us to answer questions about incentives and financings, building characteristics, pre- and post-retrofit, as well as measures that were installed, project milestone, contractor characteristics and job statistics.

So, I think the data will provide some rich

information that we have yet been able to marry.

To date we've hit a number of milestones. We've negotiated a number NDAs, and confidentiality agreements, both with local governments, the Commission, as well as the IOUs.

We have received data from nine local governments, representing 15 different programs, and have received 2,000 records from PG&E. And to date we have a master project list of 10,000 projects, so when you look at what the Building Performance Database has of 50,000, we have a significant amount of residential energy efficiency data. Not all of those are projects completed, but include assessment and project information.

I think the effort that we have embarked upon ultimately can serve as a platform for other efforts that are going on across the State with AB 758, with the CPUC Energy Efficiency Portfolio, particularly related to financing, as well as the Energy Data Center that just opened.

That said, what we have done with Energy Upgrade California Data Warehouse to date is just a portion of what we need to be doing. I think there are a number of elements that are still missing and this is an opportunity to put it on the record and get all of our

political and regulatory will behind moving things forward.

A couple of things we have not gotten is we haven't gotten data from the remaining three IOUs.

We do not have public access protocols defined because it is a negotiation between the multiple stakeholders that are providing this data.

The future use of the warehouse has not been defined. I think there's opportunities to leverage it.

And lastly, ongoing collection of data has not been defined. And right now we have a snapshot of data for a certain amount of time, but we don't have ongoing data.

Some things that would be terrific to be able to collect is energy usage data, which this data does not contain. It is just retrofit and assessment data at this point in time.

So, with that background in mind I think we, as an industry, really could benefit from something like the CSI database. I think we see what that has done for the solar market and we need something similar in the energy efficiency industry.

So, the question is -- thank you, question 19, "What can be learned from the California Solar Initiative Online Database experience that can be

extended to energy efficiency upgrades?"

I think probably one of the most important things about the CSI database, that I see when I look at it, is how it came to fruition and the genesis of it. I think, actually, the decision by the Commission -- Public Utilities Commission in August of 2006 really set the stage for CSI and actually what CSI has been able to do, the CSI database has been able to do.

And then, ultimately, the decision mandated two things, that there was centralization and access. And those are two things right now, with energy efficiency data, we do not have centralization, although we have been undergoing that effort to do it.

And the second is we don't have really clear access. And I think what was laid out in that decision, in 2006, really enabled a powerful dataset for the industry that has allowed them transparency into the market. It has allowed key business decisions to be made, investments, private investments into the sector to be made and, ultimately, marketing strategies.

And I think the energy efficiency sector is really lacking in that respect, we don't have that comprehensive dataset that can be accessed easily and publicly.

EUC, at its genesis, did envision being like

CSI. I think we had wanted to have a centralized application process and bring all the data into one place. Ultimately, what happened was we were all running around trying to implement our programs and I would say the regulatory, the political, and maybe just the time were not -- the will and the time were not there.

And I think we are at an opportunity to do something much more like CSI.

So, with that in mind I'll move to some of the question 22, which is, "What actions exist to collect pertinent energy savings and market characterization data without collecting personal and business sensitive data?"

I will say with EUC, if we would have not gotten any PII, or personally identifiable information from the various sources there would have been no way to match all of this data and create one master list or a unique record when there were multiple records, or multiple sources of information for a project.

So, the reality is you need PII for whoever is that database administrator. But it's not about what you collect, but how you display it. And I think at the end of the day what's really important is that whoever is receiving that data, validating that data, QA'ing

that data is then how they make it publicly available is very clearly specified and defined.

And I think some of the things that Cody was saying about the Building Performance Database are perfect elements. So that you can't allow someone to drill down to a zip code such that they can find a property, one unique property. You have to put constraints and limitations on how that data is displayed.

And I think the perfect example, the IRS collects the most sensitive data about all of us, and they actually display tax stats, but we know they're not going to display our personal information.

And so I think we sit here and sometimes hem and haw and I think our utility partners are oftentimes constrained, or their lawyers are constrained about how they interpret the law, but the reality is we have to protect the individual, but we can still make data available publicly.

One of the thoughts, just as we think about collecting personal information and then displaying information that is anonymous or at an aggregate level is we really should think about at what geographic unit we display it in. Because one of the things that's really important is can we start to marry some of this

data about projects with valuable demographic data?

And so I think as you look at Census Bureau Data and think about how the Census Bureau can -- or aggregates that data and displays that data might be something that we might want to look at, using similar geographic units, as long as we're protecting the individual's information.

So, with those comments I think I'll just sum, is the EUC Data Warehouse we've learned a lot, we can inform a lot of the decisions that are going forward and we're happy to participate and offer our insights.

I think it's paramount and critical that we centralize and standardize our data but, and this is sort of the theme of yesterday, not putting undue burden on contractors and consumers.

I think as we talk about broad versus deep there's lots of different data that's collected and we have to be really thoughtful about how we're getting that data from contractors and aggregating that data, or consumers and aggregating that data.

Because at the end of the day, with Energy Upgrade California one of the challenges has been lots of detailed data that the quality of it has been challenging, and even the ability of the collect it has been challenging.

And then last I would say we should leverage our political and regulatory will of those in this room. I think the CPUC and the Energy Commission have an excellent opportunity here to really set the stage for how data is made available going forward.

And I think looking to the CSI ruling in 2006 is a perfect example.

So, thank you very much.

MS. BROOK: Great, thank you, Mimi.

Next we have David Jacot. And David is a professional engineer and the Director of Energy Efficiency for the Los Angeles Department of Water and Power. David has a bachelor's degree in mechanical engineering, yay, from the University of Oklahoma --

(Laughter)

MS. BROOK: -- and a master's degree in urban and regional planning from California Poly Tech University, Pomona, as well as over 15 years of experience designing high-performance building systems, modeling building energy performance, and managing energy efficiency programs.

David.

MR. JACOT: Great, thanks Martha. So, as a disclaimer, I'm with LADWP now, as the Director of Energy Efficiency, but I've only been with LADWP for

about four months. I was with Edison, Southern California Edison for ten years' prior.

So, the experience I'll be talking about here that I've gained to answer these questions, is largely from my Edison experience. The disclaimer is that, you know, the thoughts, and sentiments, and other things that I voice are not necessarily the position, the official position of either Edison or LADWP.

(Laughter)

MR. JACOT: This is just me, speaking from my experience.

So, my questions pertain to the barriers to accomplishing comprehensive data collection and safeguards that exist.

On the barrier side, the whole thing we're trying to accomplish here is an open and transparent market for energy efficiency, for energy performance. And that requires data and it requires visibility.

There's another force out there that kind of acts in opposition to open and transparent, you know, display and dissemination of data, and that's the concerns about privacy due to the identity theft crisis, frankly, that's gripping the country and the world.

So, that's a -- you know, there's laws, there's criminal liability around, you know, disclosure of data

on the customer side, when it's without permission or it's potentially damaging to the customer.

So, we have to keep in mind when we're trying to do benchmarking and we're trying to do AB 1103 implementation, et cetera, that there is -- you know, there's this driver that's pulling kind of in the opposite direction.

We have policy imperative to open things up and, you know, create that point of sale rating, and visibility and mine that for identifying energy efficiency opportunity, top quartile, bottom quartile of energy users, et cetera, on an energy intensity basis.

At the same time, though, there's -- you know, there's a whole industry on the flip side, that's not really, necessarily in this room, that's dedicated to protecting and locking down that information as much as possible. So, we really have to walk a tight line there.

And so customer confidentiality winds up being the big driver. Mimi talked about it as far as with the IOUs, and it was certainly my experience that the starting point is one -- given the stakes on the identity theft side, given the stakes, you know, what's at stake there, the starting point is one of less is more. You know, being very conservative about what

information is to be shared.

So, overcoming that, working with that and working with the holders of the data, the IOUs, POUs, or the State, CEC, CPUC, the holders of the data, the entities that have been entrusted to hold the data on behalf of the data owners, which is the individual customers, all have a stake in being very careful and conservative with how that data is used.

So, that's one barrier is just negotiating that very fine line.

Operationally, data systems are a big challenge. Mimi talked about that, too.

And when you look at -- when you look at the utilities, customer data is typically housed in mainframe type computer systems that have been around for decades, typically.

Edison's, I think is close to 40 years old, and DWP's I think is a tad older. But they all generally date back to when these records were first computerized in the first place, back in the sixties.

So, you know, the incompatibility of data platforms and then, obviously, security issues around the platforms in which the data is housed is another major -- it's operational, but it's a major challenge on sharing the data and overcoming the barrier of concern

about maintaining the confidentiality.

The third piece I'll talk about on barriers, and there's a lot of barriers, but this one I haven't heard discussed yet, either, and this is where my disclaimer at the start, about not necessarily representing Edison's official position, comes out.

But I'll generalize it to say, you know, on the part of the IOUs, and it has to do with the proprietary nature of customer data. And what that gets to is does a profit-making entity, such as an investor-owned utility, have an interest in using that data for itself for various enterprises outside the regulated sphere, that it does not want to, you know, yield to the competition. Well, it doesn't want to yield to the competition.

So, that's a concern, too, that you got to get -- what's the value proposition? What's the value proposition for these holders, these entities that hold this data to play ball? What's in it for them?

If they're looking at it as proprietary data they want to mine for an unregulated business on the side, to market with, they don't want to give it up. So, that's an issue.

And then beyond that, even if they don't have any plans, any strategic plans for that, they may want

to keep the option open or they may just be -- you know, just not have any motivation to go above and beyond a compliance level.

So, when it comes to sharing data you've really got to find a way to get these entities invested in it and see a value proposition. There's got to be a value proposition for these entities to play ball on this issue because, otherwise, it's the most conservative route is to be as safe as possible and not release anything.

And if it's approached purely as a compliance effort, in other words we just leverage a compliance mechanism, regulatory mechanisms on the entities that hold this data, guarantee you'll get absolute minimum level of whatever it takes just to be compliant, and it won't be a true model of cooperation.

So, those are the major barriers I see. And I've kind of covered some of the strategies for -- for the safeguards, but I'll just touch on a few.

Obviously, the customer confidentiality laws that are in place are designed to protect the data and define what the various -- you know, what constitutes confidential data, what is self-identifying -- or identifying data.

But a safeguard to work around that or work with

that is when you can get the owner of the data, the customer to authorize the release, so there's manual processes to get that, to sell them on that and get that.

Also, non-disclosure agreements between parties, I mean we talked about that and we certainly, you know, between the utilities, and other entities, city, local governments often -- often will engage in a non-disclosure agreement.

The idea is there that with the binding non-disclosure agreement in place between, say, a utility and the local government they can trade that identifying data back and forth as long as it stays protected within each other's systems without prior authorization from the owner, from the customer.

But that's fraught with risk as well, if you're looking at it from purely a risk mitigation stand point because you've got to trust, or you've got to know that the entity you're sharing through the non-disclosure agreement truly has a bullet-proof data system in place, that is not likely to be hacked, et cetera.

And, frankly, I don't know, I haven't seen, I haven't experienced what that non-disclosure agreement process looks like when it gets to the enforcement side; in other words, if somebody blows it.

If the local government, or the IOU, or whoever, if one of the parties to the non-disclosure agreement doesn't follow it I haven't seen what happens, but I have to imagine it's probably not pretty.

(Laughter)

On the systems side, you know, you can develop a data solution for everything, but you need time and money and we have quite an imperative to move quickly on a lot fronts with energy efficiency and with data here for a number of reasons. You know, the climate target's AB 32, job creation, et cetera, and it's just hard to get -- it's hard to make that happen expeditiously, in a quick period of time to build secure portals and get everybody on the same page from a data format stand point.

And, finally, the last point I'll leave with is on the issue of aggregation and redaction, and Mimi touched on this, too.

One of the things I experienced in trying to negotiate between -- when I was in Edison, walking the fine line on the privacy versus the transparency, using the market data for data mining and opportunity identification was, you know, I had to negotiate between the utility's own internal risk mitigation and the goals of what we were trying to accomplish from a policy stand

point.

And what I found, in my experience, was that those weren't necessarily 100 percent oppositional. They might be far apart, but what you usually had was you had somebody asking for something and then somebody saying no to that.

But what I found is that there's usually a middle ground. There's usually a point somewhere in the middle that is less than what the original ask was, but still accomplishes the broad goals that we were trying to get to, and that less than the full boat ask is something that's acceptable or can be acceptable to the entity that holds the data.

That's really the art is finding -- you know, there's the data you want, the data you think you need, and then the data you need to do what you're trying to do, and often those are different things.

And so by looking for that and teasing that out you can find that middle ground and make things happen.

Thank you.

MS. BROOK: Great, thank you, David.

All right, next is Steve Schmidt. Steve is the Founder of High Energy Audits, a Silicon Valley Software Company using Smart Meter data to pinpoint wasted energy in homes. The software has been used to remotely

analyze over 1,200 homes, including about 200 in an Energy Commission-funded program that saved over 500 megawatt hours of energy.

Steve has engineering and business degrees from Stanford and received the second highest score in his class on the HERS written test.

(Applause)

MS. BROOK: Steve.

MR. SCHMIDT: Thank you very much, Martha.

It's really an honor to be here. This is my first CEC Commission panel, so I hope I don't screw up too bad so that you'll invite me back, because I've learned so much over the past day, this is great.

So, I'm going to address question number 23 which is, basically, what's the promise of Smart Meter data?

And I want to say your timing is perfect. We're at the confluence of three big things that are happening at the same time, and it is the perfect time to come up with a new method to deal with energy efficiency in existing homes.

Those three things, I'll go over them quickly and then I'll go into more detail.

One, Smart Meters, they're out there. They're installed in California.

Two is access to the data and I'm going to talk about why I believe that is available now, we can get to it.

Three is software that can analyze the data and make raw data into something very useful.

So, number one, what are there, 10 million Smart Meters deployed in California? It's amazing most California homes right now have Smart Meters. And many of them not only have electric Smart Meters, they have gas Smart Meters. So, we are way ahead in that area, I don't think there's any debate about that.

Number two, Smart Meter data is available. Okay, if we tried to do this two or three years ago it's a completely different story, but this is happening very, very quickly.

We started collecting Smart Meter data from customers about two years ago, two and a half years ago and it was all PG&E's territory down in the Silicon Valley.

And the way we did it -- the way we do it with most of our programs, our 1,200 homeowners that have gone through our service is they opt in. So, they're giving us access to their data.

So, the security issues, the privacy issues, they're saying we're giving you access to this data.

We ran into a glitch about a year ago when PG&E changed the way they store their information and display their information to their customer, and it shut us down cold. At that point we only had like 300 people that were in the system, but we couldn't access any of their data.

The CPUC did a great job, it bubbled up to them within a couple of days. Commissioner Ferron and a bunch of the CPUC Commissioners said, you know, this is a critical issue; we've got to address this. They had discussions with the IOU and within a week we had the data back.

So, this has already bubbled up, it's very clear in law that if a homeowner says to a third party you can access my data, then the utility has to make that data available.

So, at the same time about a year ago, the White House began pushing the green button file format, which is wonderful. And all three California utilities, IOUs adopted the green button format so that any customer of the IOU can download their usage information, their Smart Meter data into a file.

Now, it's kind of a cumbersome process, that original one was cumbersome because you have to sign into your account and you download a file. It's a

snapshot of your energy use, it's not ongoing data. But you can do that today and then you can upload that file -- there's like 68 software in the companies in the U.S. right now, that analyze green button data, and they'll tell you lots of different things about it. This is where innovation really thrives. It can give you all sorts of analysis, whether you're ripe for an electric vehicle or whether your idle loads are too high in your house, there's just a whole bunch of analysis that can be done.

Just a week ago, last Monday, the White House announced Green Button Connect. And I was back there, I had been invited by PG&E. PG&E was there, San Diego Gas & Electric was there announcing Green Button Connect, which is a machine-to-machine interface, a much, much easier interface to Smart Meter data.

And we got it working. I'm proud to say that Energy Audits was the first company in the U.S. to have established this machine-to-machine connection with PG&E so that we get not one-time data, but ongoing data.

Now, a user, a customer has to approve that, they have to opt in. And before we could be accepted by PG&E we had to go through a very difficult third-party security audit, where they analyze how we store the data, what we store, what the interfaces look like, what

the security is like. We can do this, this is something that can be accomplished.

In testing, before we went back last Monday for the event in the White House, PG&E gave us access to about 1,700 accounts that were anonymized. This is no personal information.

And over a weekend we ran an analysis of those 1,700 accounts showing some aspect of their energy use.

This can be done, this is not a problem. So, that's the second bullet.

So the -- oh, I lost my cheat sheet here.

So, the second bullet was the data is available. But Smart Meter by itself, Smart Meter data by itself is just raw data, it's like an MRI machine produces a whole bunch of raw data and it's useless until the software that's been developed to analyze that stuff presents it in a format that a doctor can say, oh, there's a tumor on that liver, or whatever.

So, it's the software, the analysis software that has to make this data useful.

So, that's where Energy Audits and a bunch of other companies, Retroficiency's on the panel this afternoon, First Fuel is doing it, Noesis Energy, there's a bunch of companies doing this now and it's very useful.

What we do, in particular -- well, I want to say we do this analysis and, in our case, we do the equivalent of a household energy audits. And these audits are just dirt cheap. I mean you could put this service, ours or another one, onto the Energy Upgrade California website and offer it to every homeowner for -- I mean at that volume it's less than ten bucks a house. It is just so easy, software scales really, really well.

And what we do with the data, Martha showed a great diagram that showed the distribution of energy use across different houses, and you cut it up by low use, high use, et cetera.

MS. BROOK: Uh-hum.

MR. SCHMIDT: What we do is we actually break it down into a couple different categories, categories that make sense based on what you can learn from Smart Meter data.

So, I want to show an example. Hopefully, there's flyers outside and, Commissioner, I hope you got this as well.

This is the type of analysis we do for three different homes, and I'm showing two different diagrams for each home. One is just a pie chart that says here's how much money this homeowner is spending in different

categories.

The other one, the more complicated stack chart is showing how the energy use changes throughout the year.

And what you're seeing very, very quickly in these three homes is you'll see a home at the top that has a lot of red. That's the energy that's going towards heating that house. So, I don't know if I can see the number here, but 67 percent of their energy spent is going towards heating. This is a prime candidate for Energy Upgrade California.

Got to get to that house and do a HERS audit, get to that house and figure out where the problem is. You can't -- with Smart Meter data you can't figure out whether it's the ducts or the -- oh, no.

(Laughter)

MR. SCHMIDT: The second house down is more typical, a lot of different use. What you'll see in this house is that they have a pool pump and it's this yellow section that we call recurring loads. There's a big load that comes on for six hours a day. They have a pool, it's a pool pump.

Well, what do you do for that house? You make sure they're not running their pump too long or you give them a new, more efficient pump.

Lastly, the house at the bottom uses a lot of energy and only eight percent of it goes to heating and cooling. So, a contractor could go into that house and do $50,000 worth of retrofit work and their energy bills would not change.

So in that house it's behavioral issues and it's a whole bunch of plug loads, standby loads, appliance loads.

Let's see, I wanted to mention briefly that for EM&V Smart Meter data is absolutely wonderful because not only can you see what the house was doing before the measure, but you can follow it afterwards. So, we're tracking the energy use of all 1,200 homes that have gone through our service so far and we can tell whether their energy use is going up or going down.

And then, finally, Martha, you wanted me to mention something about the credibility of the analysis. Do you want me to jump on that or do you want to move on?

MS. BROOK: Well, let's talk about it if it comes up in the discussion, after everyone's had a chance to speak.

MR. SCHMIDT: Great, thank you very much.

MS. BROOK: Thank you, Steve, that was -- all of you so far I'm learning tons, this is wonderful. We

could be here all day and I'd be happy, but we have to keep going.

So, Fran Inman is next. Fran is a Senior Vice-President of Majestic Realty Company and is responsible for government relations. Majestic Realty is one of the nation's largest privately owned real estate firms.

Headquartered in Southern California, Majestic Realty owns more than 70 million square feet of commercial real estate across the United States.

Majestic's portfolio includes office parks, retail centers, specialty and hospitality properties, as well as master-planned business parks ranging in size up to 1,200.

Fran also serves as a member of the California Transportation Commission and is widely recognized for her efforts relating to the global supply chain.

Fran, thank you.

MS. INMAN: Well, thank you. First, I'll start with why am I here? About seven or eight years ago I was in the midst of debates around cleaning up the global supply chain and greening the global supply chain, and I flew back in to Ontario, from Sacramento, and I looked at these big flat roofs and I thought, you know, we're having all these fights over the definition of a port truck, meanwhile I have lots of sunshine and

these huge, under-utilized assets, big flat rooms.

So, at that point I hired your Chairman, Bob Weisenmiller, who was MRW at the time, who became my friend and energy mentor. So, to summarize, I'm here because of really having one of the greatest energy mentors I think anybody could have.

So, I want to start off and say that I am an energy language learner. I like to say I speak logistics as a second language because of my work on the global supply chain. So, I don't have all of your acronyms down, so this will be quite basic.

But as was mentioned, Majestic's privately held. I think that's important because of the fact we have a little different model than some of our competitors. Most of our competitors today are real estate investment trusts and they have different objectives, sometimes.

We're in for the long term, we build and hold, so we have accumulated 70 million square feet across the United States over the years, we're 65 years old.

So that really, we take a real long-term perspective and I think that's why we were fascinated to become students of renewable energy. And I have to admit that we're not there, yet, because of the fact -- not that we haven't tried, but just figuring out for our largest sector, which is warehouse distribution sector,

what really would work. And the California Solar Initiative, with net metering, did not apply for us. And then we've looked at, I think, every other option that has come across our desk. Today, I've taken a pass.

So, I want to say thank you for having me here today. I recently read an article from the Stanford Center for Social Innovation and it talked about why we don't get to the goal line quicker on some of our objectives, and it's because we don't have enough doers.

So, I'm encouraged to have IKEA on the panel later today, but I think we really do need to get more participation amongst my colleagues in the commercial real estate sector.

I was fascinated by your very colorful charts, Martha, and I, too, love data and information. I think the collage that was presented is so very important for all of us because clearly there is not a one-size-fits-all answer.

And I think we can go be penny-wise and pound-foolish when it comes to really improving efficiency for all of us if we don't really dig into the trenches, so to speak, understand -- I would use the phrase "please understand me" and I think that will be good for all of us to really learn about the various perspectives and

figure out where is that happy meeting ground where we can all succeed together.

So, as I'm listening this morning and I'm supposed to answer the question about major barriers, and I may drift a little bit. And I have to tell you that amongst the staff here we kind of had a little debate about where do I really belong, being a fish out of water, but here I am.

I also continuously wear my Transportation Commission hat. I proudly serve the State and focus, obviously, on modes of transportation, except the high-speed rail is a separate commission.

But my particular expertise and where I spend a lot of time relates to the global supply chain. So, with that I've been participating in the recent Export Initiatives, and also in the push for energy-efficient vehicles.

So, I'm sitting here thinking about the description of how we all live our lives, and now I have to plug in my iPhone every night so I can make sure that I have power, and I can talk to everybody I need to talk to the next day.

But thinking about the electric vehicles and how, if we move towards electrification of fleets what are those -- what's that going to do to the charts?

So, I think it really is important for all of us to have, really, these integrated discussions in terms of what will be the impact.

Ocean lining is another push to really green the supply chain, but that translates to plugging in a big ship. I've been told that plugging in one ship for the weekend represents 7,500 homes. So, as having the nation's largest ports in the San Pedro Bay area, and then the efforts of our Oakland Ports, it's -- we can't just look in isolation here, I think we really need to have these integrated discussions.

So, back to my question, the major barriers to accomplishing data; to me it really is important that we have relevant data that's meaningful and useful.

And when I looked at Cody's slides this morning, talking about the fact that the operational data was optional, to me, in our core competency, the warehouse distribution sector, we have basic -- from the landlord's perspective, we have two identical buildings in a business park. One can have dry storage and one will have manufacturing. Well, clearly, the manufacturer is going to use more power.

Is that a good thing? I, personally, think so. Without judging how efficient his processes are, I would love to have more manufacturing in the United States.

But that's going to take more power than the dry storage.

Also, from the landlord's perspective because we've had -- we've been in many of these debates around 1103, in terms of our sector and the warehouse distribution's built on a triple net lease, as opposed to offices are full service leases, which means that your landlord, you know, basically gets a power bill and deals it out on a pro rata basis.

But in the warehouse distribution sector, with the triple net lease, we are not party to those transactions between our tenants and the utilities, so it's a little bit difficult.

And then I think, really, it's the tenant that controls the decision on the tenant improvements. Basically what happens when we negotiate is there will be a TI allowance, if I can use some of our lingo from commercial real estate.

And then we'll debate back and forth what that's going to look like.

What we have found for most of our tenants is the lighting efficiencies. We have actually on the buildings that we build that are spec buildings, all of our new buildings that are over 160,000 square feet will qualify for the Section 179(d) tax credits.

So, I think with Title 24 in the State, basically for what we do today, the basic shell is probably about as efficient as we can get.

When it looks to energy use most of the discussions, and I think what the tenants are looking at, their all-in cost, can have to do with the transportation costs and the efficiency within transportation.

So, hopefully, for all of us we will drive towards efficiency that's meaningful. As we do that, and I think what we can all do together is get more folks to give more examples.

It's tough even in the logistics sector. Freight moves constantly and logistics theories change constantly as everybody is trying to drive absolutely every penny out of the supply chain. So, I think it is important at the end of the day a business in California is going to look at their all-in cost and one component is energy.

We happened to be headquartered in the City of Industry and very proudly market to our buildings there that our local electricity is very, very reasonable in the City of Industry and competes often very effectively against our buildings that are located in our investor-owned that's nearby.

But I think that conflicting objectives we're going to have to watch out for as a State and make sure that we make great decisions.

I think the options to collect pertinent energy savings, really, we need to be comparing apples to apples. And it's not as simple as rating a building when that tenant has moved out because the new tenant coming in, in all likelihood, will have a different operation and different transaction.

So, we heard a lot about education and I think that's important.

MS. BROOK: All right, thank you, Fran. And I was going to ask you a question but we ran out of time. So, hopefully, we'll get to that next.

MS. INMAN: I wasn't even looking.

MS. BROOK: So, I think that behind me they're basically moderating my session for me, so I guess I need the help.

So, next up is Cassie Bowe. Cassie is a public policy and market development analyst at SunPower Corporation, a large, vertically integrated solar company based in San Jose.

At SunPower Cassie analyzes the effects of State and Federal policy on SunPower's business strategy.

Prior to working at SunPower Cassie received her

BA in economics and government from Harvard University.

Cassie, thanks for joining us today.

MS. BOWE: Do I not get a cheer for an economics degree?

MS. BROOK: Not from me. I'm sure --

(Laughter)

MS. BROOK: I'm sure from lots of other people, but not from me.

MS. BOWE: I guess I'll have to go back to school.

So, as Martha said, I work in public policy for SunPower. We're a large, vertically integrated solar company. We employ over a thousand direct workers in California. We also work with 200 independent dealer partners who install our systems throughout the State.

So, I'll be answering questions 19 and 22, so just more broadly talking about the CSI online database for the solar industry, consumers, and then how that type of data can be valuable for businesses more broadly.

And I just want to clarify that the CSI online database is just for the IOUs, and it's just for solar systems that receive a CSI rebate. And I'll get to the importance of that later.

So, I think that one of the main ways that we

use the CSI online database is to analyze the effects of technology, financing, and other business offerings on our market share.

So, for example, when third-party financing for solar systems was becoming popular companies immediately could see how is that affecting my market share, how is my price competing, and I think that facilitated the adoption of third-party financing in California. So, I think that's an interesting example.

And when we don't have that kind of data we have to rely -- which is really most states we have to rely on third-party reports, which vary in their accuracy and their methodology.

So, what we'll end up doing a lot of times is using the lessons that we learned in California, the broad economic lessons and applying them to other markets, so I do think that makes California a more attractive place for companies to do business, given that we can see the effect of our decisions there.

And so I think that another value of the database is that it has served as the industry standard for data collection for other states. And we've seen New York, Oregon, Vermont, among others, develop databases that are clearly modeled after the CSI, and I think that's been really valuable for the industry.

So, it also helps consumers, this online database, particularly because having visibility into industry pricing makes us more competitive as companies, which lowers prices to consumers.

Additionally, it helps us reach consumers in market segments and regions that are under-served, which helps us access more customers.

And so I think the combination of those things are a big reason why CSI has been so successful, it's three to four years ahead of schedule. And so I think that the access to public data has helped us reach consumers more quickly and more cheaply than we would have otherwise.

And we've been able to do this, as Mimi said, without infringing on sensitive business and personal data.

I agree that it's not about the data you collect, but how you display it. It's displayed zip code, county and city level.

I also agree with Mimi that going forward if we could find a way to merge it with some sort of demographic data that would be really valuable to solar companies.

And then from the business side, the top level price data, it doesn't include any information about

financing costs, or deal structure, or profits, so it's not sensitive in that way.

So, I think that a CSI type database can be really valuable for energy efficiency, but I also want to point out that developing a clearer path towards proposed CSI data collection method for the solar industry is also important.

CCSE just announced that on an application basis, in San Diego Gas & Electric residential sector they're all finished with their CSI, so those customers won't be apply for rebates anymore and so we don't have a way to access their information.

So, that's a pretty urgent issue for us. I think that collecting that data remains valuable in a post-CSI world as we still try to meet the State's policy goals.

I do think that we'll have to address the questions, which energy efficiency will as well, which are what's the incentive for the business to do this?

And I think I counted 104 categories of data in CSI right now so, you know, maybe that will involve streamlining some of that data and figuring out what the minimum burden is.

But we are looking forward as a solar industry to working with the Energy Commission and the PUC to

develop that going forward. So, thank you.

MS. BROOK: Great, thank you, Cassie.

All right, Andrew, do you have any -- Commissioner McAllister, do you have any questions for the panel before we open it up?

COMMISSIONER MC ALLISTER: Yes, I do. This is -- I've been waiting for this panel for the last couple of weeks because I --

(Laughter)

COMMISSIONER MC ALLISTER: Not that I'm going to use up all the time or anything, I'm actually really interested in what folks have to say and questions people have here. But I was, you know, instrumental, I think, in getting the CSI database started in the first place, and I think was really pleased that we were able to have a fairly concise and relatively quick, in the grand scheme of things, discussion at the front end with the utilities, the other program administrators, and the PUC. This is when I had a different hat on and I was involved in the administration of the CSI.

And we were able to get to that end point and I think go feel-by-feel, and figure out, okay, is this okay to release? Is this okay to release? And everybody said okay and we did it, and now it's live. And I agree, it's been really instrumental in helping

the marketplace develop.

I guess, so I want to -- starting now and going forward I really want to dig into that. I want to make sure that we're focused on digging into the issues of what a sort of low to mid common denominator -- you know, not least common denominator, but some database that we can develop that -- and what the form for that is, who facilitates it, what the sort of pressure points to actually get the data submitted, you know, if we don't -- you know, if we can have a centralized sort of application, a reporting requirement, or if there's some other way to get relatively comprehensive, relatively good coverage across programs and utility service territories, and local governments, et cetera, what that might look like.

But also what the fields that are the ones that are not controversial, that wouldn't have to go through the full sort of legal kind of -- sort of discussion, you know, that we heard about.

That enables us to be a relatively accessible and flexible, kind of quickly implementable mechanism.

And so, you know, we're not talking, probably, about EM&V level data, at least in a publicly accessible database. But we -- you know, it could be as simply as any project funded in some way by ratepayers or other

public funds, on the energy efficiency front, and what it's basic characteristics were, zip code, you know, measures, cost or maybe we can get to something like incremental cost of the energy efficiency component of the project, who installed it, whether it got financing, you know, and it got two windows and an HVAC, and did a duct test.

You know, it doesn't have to be the whole range, you know, it doesn't have to be hundreds of fields, but I just think that something like that is useful.

And by the way, the marketplace also used that data to beat the PUC and the program administrators over the head for needing improvements on their program design. So, this is not all about just the regulatory community or the policy community, or the business community having access to data, this is about accountability all around.

And so I think it's really important to point out that this is a public resource and that it actually has -- if designed right, it has utility all around. I mean it could help the utilities achieve their energy efficiency goals. It can help their stakeholders, and partners, and local governments, and the business community do a better job and be on board with the utility programs.

I think there's just a lot of upside to having a resource like this. So that is one aspect, right.

And then we also have -- so, maybe that's a unique path and so I'm asking you to indulge me here as I put -- you know, one potential vision. So this is just -- this not done, right, I mean this is just ideas.

And then the other -- the other need is to have this more robust sort of EM&V-focused, you know, actuarial kind of data about actual impacts and having some statistically valid results of what the energy savings and other impacts of these initiatives actually are.

So, that is a much -- that is a different discussion, I think, and it's got more to do with the proprietary data and sort of, I think, the security issues and all those are really front and center.

So, I would really invite the investor-owned utilities, I know there's some SDG&E folks in the room and then certainly, probably, I think Edison and PG&E are also here.

So, if now or in your comments it would be great to hear sort of the -- the options there, as you see them for engaging with the marketplace in a way that's as flexible and sort of manageable as possible. Because I think that's really what we're talking about is what

public resources we can develop and manage to help people make a decision to the marketplace.

So, and I think that Steve's tool and other tools that are out there have a lot of potential to sort of skirt some of these legal issues and allow the customer to have control. But also, it will happen to engage the contractor and the participants to get better information and make better decisions.

So, that's really it, getting information, using the available information to make decisions I think should be our organizing principle here, and invite everybody's expertise to sort of figure out how that happens in practice. So, that's sort of -- I'd like just to sort of have that kind of -- you know, hopefully give people some direction to think about these issues and bring their expertise to the table.

MS. BROOK: I was waiting for a question mark, but I didn't hear it, so that's okay.

So, does anybody, quickly, on the --

COMMISSIONER MC ALLISTER: This low- to mid-common denominator data, like what does that look like? Like what data really needs to be in the public's -- how would you envision this database looking, you know, if we go there and we download an Excel spreadsheet what should it contain?

MS. BROOK: Thanks.

MR. SCHMIDT: I can talk from just the energy analysis perspective. We just need the interval data that's the hourly data and that's their energy use. And there's programs, like in Texas, there's Smart Meter Texas where all the utilities operating in Texas have to provide access to customer's energy use, real interval data through a common portal.

And I know Vermont's working on the same thing. Texas did it too early so they missed the standards. They're just a progressive state, it's really very impressive.

(Laughter)

MR. SCHMIDT: But I know Vermont is working on it and they're going to use standard formats for that and that will be a huge help.

COMMISSIONER MC ALLISTER: Well, actually, let me just qualify. So, I think -- so maybe we're talking about two different things. One is like an Excel spreadsheet that just has project information. So, you know, SunPower and other entities have used it to say, okay, where are the projects going in, how much do they cost, what geographies, what climate zones, they've mapped it into, you know, art view or whatever.

So, that's sort of one thing, just basic market

information.

And then, Steve, you're talking about the individual customer making the decisions at that level and using much more detailed information sort of behind the wall, right.

So, really, I think those are two different things and they're both incredibly useful, so I think we need both. But I'm really referring to sort of the former. You know, what project level market data, project data could the market use to help business develop, for example, help design programs?

MS. FRUSHA: I can jump in on the project data; or David if you were going to jump in.

I think a couple of -- at least one distinction with this project data that we have to complete is even though we are moving towards a more comprehensive energy efficiency retrofit sort of offering, we also have to think about how we capture some of this more flex path, or single measure versus comprehensive.

COMMISSIONER MC ALLISTER: Uh-hum.

MS. FRUSHA: So that, in and of itself, may inform what data we want to collect, because if you're collecting comprehensive, at least under the existing Energy Upgrade California program, we have energy profiles that we're pulling all the data from, so it's a

pretty extensive set of data.

But at the baseline what do we need? I mean we need things that are in the CSI database. We have incentive levels, project cost, zip code, city, some information on the measures installed. And I think the question is how granular do you start to get on there? And then I think, ultimately, we want some energy savings information broke out by both electric and gas.

But I think the onus really ends up on like who is collecting that information? If you're under Energy Upgrade California and doing a comprehensive project, you have to collect that data.

But if you're doing something different what does that -- if you're doing flex path, what does that data collection process look like?

So, I think at a baseline I mean we look at CSI, and then we have to really modify the project data to reflect what the energy efficiency data is, what's happening in the home.

So, building characteristics, as well, will be valuable, I mean everything from age of the home, square footage of the home. Potentially, if we have occupant information so we can have some asset and operational, obviously recognizing that that will change as the home transfers ownership.

But those are some of the elements. I mean right now we have sort of that short list from what we're doing with the warehouse and, ultimately, have had to really whittle down, I think there's like 800 unique fields within EnergyPro. You can confirm that over there, CalCERTS. And, basically, have brought it down to about probably 120, 150 fields, so not unlike what CSI is collecting right now.

COMMISSIONER MC ALLISTER: Thanks.

MR. JACOT: I just wanted to react to your comments on a little bit bigger picture. I think you're absolutely onto something and it sounds like you, personally, were involved and took advantage of a very unique opportunity and did so quite artfully, the fact that CSI was bottoms up, brand-new statewide. So, you had a blank slate for all the IOUs to get it right from the start, and it's a rare opportunity and it's a window of opportunity that closes quickly without leadership in that area, because otherwise what you have is everybody goes off and creates their own system.

And that's kind of where we're at with energy efficiency is, you know, much -- nothing's really from scratch, necessarily. So, there's legacy system -- legacy systems abound.

And so even though you're generally tracking the

same data it's different platforms, it's different field names, different column headings, et cetera. So, that reconciliation lines up being the work.

But you touched on -- I mean it's the same whether you're trying to fix that or do it right from the start, which is that you've got to get everybody together and beat through it operationally. You know, got to lock people in a room for six hours and go through every single field and say yes/no, yes/no, yes/no. That's what we do.

And that's how we were able to make some headway, too, on some data sharing.

And I used to sit down with a lawyer and say do you have a problem with this one? No. Do you have a problem with this one? Maybe. And beat through it that way, so that's what it takes.

MS. BROOK: Great.

COMMISSIONER MC ALLISTER: Thanks. And, you know, like for example energy savings, so whether that's the -- so, we model savings, presumably, as in EnergyPro, actual savings is a whole different ball game. You know, my tendency would be to just not even talk about savings, just project data, like what's being installed.

If I'm an investor and I want to go see what the

cash flow is going to be, all I need to know is the project flow, or at least that's kind of the main thing I'm interested in. I mean, and where they got financing and stuff like that.

So, just from a market facilitation point of view I guess I'm trying to ask the question is -- is the efficiency industry ripe for that same opportunity as we kind of saw at that stage of the solar industry?

And would a -- you know, maybe CBPCA or some of the contractors in the room could give a gut reaction on this, too. Is a resource like that, just know what the projects are out there, okay, there were 10,000 projects in the last two years, and they were in the following places and they had the following characteristics, would that be useful and, you know, if so how might we approach creating something like that.

MR. JACOT: I think it does require a different approach because you do have mature programs that have been in place for a long time, with a variety of administrators using different systems. But that brings us around to, you know, leveraging centralized reporting process we already have in place.

And I'm not terribly close to this one, but I know that the IOUs report -- at least on the IOU side, obviously, report to the CPUC at a measured level in

terms of the annual reporting. So, there's phenomenal data there that's being collected and aggregated at the CPUC, obviously under a non-disclosure agreement.

That's at the measure level so that goes beyond even the individual project. And, you know, I recall some crazy number, Edison's accomplishments for 2009 yielded a data file with 2 million rows, 2 million individual measures, and that's 2 million rows by 150 fields.

So, I think it bears taking a look at where those -- where that data probably already exists and the most excruciating level of detail you can imagine, and then working on that strategically to aggregate it and winnow it down to the purposes we're trying to accomplish.

MS. BROOK: Great.

MR. ASHUCKIAN: Yeah, we have about three or four questions. I'll just read one from Merrian Borgeson, from LBNL. It's basically the same, I think very similar to this question and so we would certainly encourage folks to comment on this, at this point written comments.

"What specific data fields should we make public that both protects customers and, too, is useful to the industry?"

So, I think that's basically what we just had a discussion about.

So, the first up would be Ted Reguly from SDG&E.

MR. REGULY: First, great comments, great. I've been involved with both the Smart Meter rollout and the Green Button rollout.

I think what we really need to do is have some balance here. I think everybody will agree that customer usage data is very valuable and can help us provide better distributed generation, energy efficiency, and demand response throughout the State to our customers.

And move it more into much more of a customer-centric point of view, instead of painting with a really bit, wide brush, we're going to be able to target market various EE measures to our customers in a much more cost-effective manner.

But it must be protected and used in a customer-friendly point of view. This data, if it does end up in the wrong hands, could infringe upon our customers. And I think we all want to be viewed as their trusted energy advisors. And all it's going to take is some abuse of this data and we could really hurt energy efficiency in the State more than pushing it forward.

So, what I'm saying is, and I like some of the

points, I think both Steve and David mentioned earlier, is there's a lot we can do with this data and we can do it on an aggregated or disassociated manner, and we really need to work on the use cases.

MS. BROOK: Uh-hum.

MR. REGULY: Everybody comes to me and says I want the data. And I say what for, or what data? Well, I want everything. And one of the things, we're a big proponent of privacy by design and one of the key tenets of privacy by design is you limit your exposure.

And for San Diego Gas & Electric we've had some very simple things. We had one where we were having an employee event at an amusement park and we gave the event coordinator all our employees' names, telephone numbers, and addresses three years ago, Didn't think anything about it.

Their system got hacked and we lost that data. So, really, data minimization needs to be part of our tenet in going forward.

And so that's why I'm a big proponent of coming up with like three or four primary use cases around energy efficiency and look at, for those use cases will aggregated data work, or do we need customer specific? And then what does that data need to be combined with?

There are some great things right now that you

can do with weather data, and the energy data, and you put it together. And if you can know from the communicating thermostat inside the home what the temperature is, and how much that heater or air conditioner -- you really don't even need to go to the building and that is very customer-centric.

But if we take it back from another point of view, and we don't get customer consent to get that data, they could see it as being very invasive and big brother and I don't think any of us want to do that.

MS. BROOK: Thank you.

COMMISSIONER MC ALLISTER: So, thank you, Ted, I agree. So, I think the -- I kind of laid out, broadly, two use cases. One was individual project, but not linked to the customer. And the other was -- you know, is more EM&V and much more involved as far as the level of data, and intrusiveness and, presumably, we'd have to have them behind some screen that's pretty -- very tight.

MR. REGULY: Very tight and very -- and we need to limit that access to that data somehow.

COMMISSIONER MC ALLISTER: Yeah. So, I guess I'm curious, have you thought about mechanisms, you know, bonding, or insurance, or something like that so that when you -- if you were to enter into, you know,

let's say share -- you know, have a significant data sharing agreement with some third party out in the marketplace and maybe it's something other than the local -- well, even with a local government. But just, you know, maybe it's a third party that is going to do some major analysis, you know, whatever, I won't speculate what exactly.

But I guess what's sort of your enforcement mechanisms or your sort of -- how would you ideally guarantee compliance, like if that partner that got hacked, like how are they accountable for having opened themselves up to getting hacked?

MR. REGULY: So for us, if they're under contract with us that is the best way to protect us in contractual arrangements.

NDAs, let us say with an NDA what happens if someone violates the NDA, you have legal action.

I also think and this is something that we're working on with Department of Energy is having a collaborative method between the utilities and third parties for best practices in this area, and then also coming up with a trusted, sort of like at your financial institutions or whatever, the e-Trust, where we'll have requirements for people that get, or entities that get this data, they have to meet certain minimum

requirements. And then if they don't behave, they get kicked out.

This is something that we're also addressing with Scott Anders, at USD, to try to come up with all the reporting requirements that the various State agencies have and what can we do with the data to meet their requirements and still protect customer privacy.

MR. ASHUCKIAN: Great, good. Thank you, Ted.

COMMISSIONER MC ALLISTER: Thanks Ted.

MR. ASHUCKIAN: Next, we have George Nesbitt, with CalHERS. And we're going to break at noon for lunch.

MR. NESBITT: Thank you. As a HERS rater and a building performance contractor, as I think you know I firmly believe in asset ratings, but I absolutely have for a decade plus been a believer in operational ratings.

The reason is when you look at information in different ways you get different answers. Ratings won't necessarily pull up what this does. It tells -- but it's absolutely valid and important.

But if you don't look at this, yes, you will go to house three and try to sell them all the air ceiling insulation and HVAC, because I've been to this house, I know the people that will do that, and you will not

touch their bill.

Unfortunately, the rest of the industry has dragged their feet, has ignored base load, they don't look at the utility bills and they do try to do that.

So, the asset rating naysayers like to say, well, you compare it and it doesn't match and, therefore, it's totally invalid.

Well, Mike Blasnik has taken thousands of data points and on average it's accurate. So, having large amounts of data, the more data we have, the more actually accurate and valuable that data is.

You look at my house in an operational rating, I am below the low energy user according to PG&E in my inefficient, old house. So, you're going to tell people some really wrong things looking at my house, operationally.

Nationally, RESNET built a registry. Every HERS provider -- you've got at least ten HERS providers in Nevada, alone. They did not have to build a registry. We currently have the same core calculation in INGEN for the Energy Code. In 2013 that's going to become public domain and that's very important.

So, absolutely, you know, having data, the more common things are -- you know, and not everyone having to recreate the wheel. So thanks.

MS. BROOK: Thanks George.

Okay, I think we're breaking now?

MR. ASHUCKIAN: We have one last comment from Conrad. I don't know if you got your question answered regarding data?

MR. ASPER: I just wanted to find out a little bit more. I am excited about the prospects of the operational data ideas that we're talking about here. And as -- you know, it is going to be contractors doing upgrades to reach our State goals.

I just wanted to just briefly ask Steve what, from that approach of operational data, how can that -- what tools or what things can we provide the contractors to support them in doing upgrades?

MR. SCHMIDT: Oh, that's great, thank you. And for both the comments I would come back with the same response.

So, the very short story is that when I got my HERS rating you go through a final test where you actually go to a house. And so ten of us went to this house in San Jose and it was a fairly small house, like 1,400 square foot. And we analyzed the duct system, we did the blower door test, we did the duct blaster test, we checked the furnace, we checked the air conditioner, and all ten of us walked through and came to the same

conclusions that they needed their ducts cleaned and they needed, probably, a new furnace because it was really old, and the air conditioner needed some extra Freon.

But no one else walked around the house and found that there were two huge media centers, big TVs, a different box in each one that had a VCR, had a Blu-Ray device, had a game console, two different ones, glowing lights all over the place, and he had a continuous recirc pump in the garage, on the water heater in the garage.

So, for 20 bucks for a timer this guy could lower his energy use, both natural gas and electricity on his recirc pump, and for another 20 bucks or 40 bucks for two Smart Strips, he'd dump his electric bill.

The reason he was a high energy house was not because of the seal ducts, it was because of other stuff.

So, informing contractors before they go in, in our Mountain View project people go through this and then they're directed to different programs based on their energy profile.

So, we were working with Ecology Action when we found a home that had more than 50 percent of their energy was going to heating and cooling.

We would give this information to the contractor. The homeowners would approve it, but we would send them a profile. So, when they're walking into the house they're already informed, they know where the energy is going.

COMMISSIONER MC ALLISTER: Steve, are you doing that with the weather normalization? I mean like Ted referred to taking different data streams and kind of adding them up.

MR. SCHMIDT: Absolutely.

COMMISSIONER MC ALLISTER: And I assume that you're doing that in the background?

MR. SCHMIDT: Absolutely. So, we're analyzing what part of their energy use, both natural gas and electricity corresponds to temperature variations. We're analyzing their base loads so you can see a lot about standby power, and household electronics that way.

We're analyzing recurring loads that happen at the same time every day, that's like a pool pump or low voltage lighting outside, stuff like that.

There's a lot of data you can mine from the Smart Meter data and you can inform a contractor and kind of split it into different loads.

So, the contractors, some of the ones that are working with us are like, this is a desktop audit,

before I actually go to a house to talk to them about what they need I can very quickly, the contractors can understand where the issues are and be much more prepared.

And some homes they might say, well, you know, I don't even want to visit that house because I know there's not a lot of waste there.

But other homes they say, well, we've got to do both the heating and cooling and we've got to try and figure out where all that base load stuff is going, what's with the plug loads. So, that was very useful.

MS. BROOK: Good. Okay, thank you.

Well, thank you for all you panelists, I think it was a wonderful session. And we're going to break for lunch and come back and talk about commercial building.

(Applause)

(Off the record at 12:02 p.m.)

(Resume at 1:09 p.m.)

MR. BURR: Okay, are we all set, can everybody hear me?

MR. ASHUCKIAN: Okay, everybody can hear you and your slides are up.

MR. BURR: Okay. Well, sorry about that everyone, I hope I gave everybody some extra time after

lunch.

So, I'm Andrew Burr. I'm the Director of Building Energy Policy at the Institute for Market Transformation.

We're a nonprofit in Washington D.C. We've done a lot of work in the past few years on energy benchmarking disclosure policies.

A few quick notes, our foundation's funded to assist cities in implementing these types of policies, so we have staff actually on loan sitting in the New York City Mayor's Office and helping them implement the Greener Greater Buildings Plan, and in the District of Columbia helping them implement their benchmarking ordinance.

We're also part of a new network called the Global Buildings Performance Network that's funded by Climate Works Foundation, that's trying to bring together building energy efficiency best practices from around the world.

So, we're the U.S. hub. The central hub is in Paris. There's a European hub in Brussels, and a Chinese hub and then a hub in India.

So, I should be much more of an expert on European certification programs than I am, but I'll do the best I can.

I'll try and move pretty quickly, just one introductory slide on motivation of policymakers. I think California was ahead of its time, at least in the United States, when it adopted AB 1103 and then 758.

We have a lot of policymakers out there right now that are looking at what's working in other markets to drive demand and competition. In the building sector, of course, we're talking about energy efficiency.

They're coming to the conclusion that if there's no information in the marketplace then there will be very little action.

The questions at the bottom of the screen are what I hear policy makers asking, how can we make real estate markets work more effectively to drive demand for energy efficiency without the use of public subsidies?

How can we reduce costs for business and create jobs?

And last, how can we reduce emissions from existing buildings?

So, moving on, I'll start kind of around the world and then I'll move into Europe. So, some of you may be familiar with this time line. We think of rating and disclosure policies as a new thing in the United States, but if you look around the world there's quite a

lot that's been happening over the past decade and longer.

So, the big event was in 2002 when the European Union adopted the Energy Performance of Buildings Directive. This is what all the certification requirements there are part of.

Since then Norway and Turkey, which are not part of the EU, but maybe someday, have adopted similar requirements to bring themselves into alignment with the rest of the Union.

China adopted a mandatory rating program for government buildings that's also a prerequisite for their Green Building Program, and that was in 2008.

Brazil adopted a voluntary program that is supposed to become mandatory this year for commercial buildings.

The European Union adopted an Energy Performance of Buildings Directive recast in 2010, trying to fix some of the things that weren't quite working from the original and I'll talk a little bit about that.

And then also in 2010 Australia adopted a mandatory rating policy for commercial buildings that's based on their neighbor's rating system, which is quite similar to our Energy Star system.

So, moving on to the EPBD, again, some of you

may be familiar with this. It was adopted about ten years ago. It was a really comprehensive package of different policies, rating and disclosure was part of it. In Europe they call that certification.

This certification covers new and existing homes, nonresidential buildings, and government buildings as laid out in the Directive. All of these certification requirements are triggered by the sale or a lease of a building, similar to in California.

The document gave member states the ability to choose whether they wanted to implement an asset or an operational rating.

And so what's happened there is asset ratings are being used almost universally for homes and for smaller commercial structures, whereas operational ratings are being used for more complex and larger commercial buildings, and government buildings.

The other part of the EPBD was that it basically set energy code requirements across all the member states, many of which did not have them before. It also required the mandatory inspection of boilers and other mechanical systems in nonresidential structures.

So, in 2010 the European Parliament adopted what they call the EPBD recast, which fixed some of the things that weren't quite working in the original

legislation.

It also strengthened the certification requirements, so it put in place mandatory enforcement measures because many of the member states were not enforcing the certification of buildings, and it made disclosure at the time of listing mandatory, which was the intent of the original EPBD, but didn't -- wasn't quite implemented in that way.

The other thing the recast did is requires all new buildings in Europe to reach what they're calling nearly net zero by I think it's 2021 or 2020, which is basically a mandate to begin integrating renewables in all new construction.

So, a couple of graphics, Ireland is recognized as one of the better certification programs in all the member states. This is a graphic I pulled from an IEA report which is just showing what the distribution of certificates are there, according to their rating system. So, this totals 142,000 certificates from about mid-2010. Most of these are homes. It only includes about 4,800 nonresidential buildings.

This next slide is from our partners in Europe, the Building Performance Institute of Europe. What it's showing is sort of the adoption -- the implementation curve for certification schemes across the EU.

So, if you look at the sort of greenish shading, that's member states that have adopted at least part of the certification requirements.

The gray shading right underneath that are member states that have adopted the full slate of requirements for certification.

And then the blue bars below are when the initial implementation rolled out in different member states.

So, this thing passed in 2002, it got -- implementation got pushed by a few years and most of these programs came online between 2006 and 2010.

This graphic illustrates some of the problems they've been having in Europe and it is really a cautionary tale, I think, for U.S. policies. Again, this is pulled from BPIE research in Europe, and it's showing basically how the industry and the public are perceiving the integrity of certification programs in a few member states.

So, ideally, this graphic would have a lot of four stars on it, which means very good. But, unfortunately, we're seeing a lot of one and two stars, and I'll talk about some of the issues on this slide that they've encountered.

So, first, just some statistics about where

Europe is as a whole, 11 member states have now established national certification registers. So, 11 member states are now tracking all of the certifications that occur in their countries, which was not required as part of the EPBD.

A few more are under development. Ten member states are not, at this point, tracking at all what's going on with the certificates in the market.

Nineteen member states have penalties, now, for noncompliance with certification, ten do not. Again, that was -- enforcement was not a requirement and, unfortunately, it was sort of poor in the initial rollout.

And then there's been some new research, recently, on certification costs for nonresidential buildings at a half to three Euro per square meter there.

So, for smaller structures it's not going to be too much, but it does get costly there, particularly because of the asset rating requirement in many member states.

A few challenges, nine member states are still not in compliance with the original EPBD certification requirements. We've heard that in a few member states they've begun rolling back some of these regulations.

Unfortunately, it's been sort of a bad time, as many of you know, in Europe to be trying to roll this program out.

There have been some complaints in member states about the quality of certification and that's where you really start to lose the integrity and the public's fear about these programs. So, there have been some issues with quality of the certifications and the quality of the assessors that are doing the work.

The asset ratings, because it's a very technical procedure it's been very difficult for stakeholders, building owners and people in the market to understand exactly what's going on behind the scenes.

Again, that's a bit of advice that I think we can use here in the U.S.

There's been poor perception, the last slide showed about the effectiveness of some of these certificates.

One of the larger problems has been that there's been very little standardization and comparability between certification schemes in the different member states.

So, each member state, basically, has its own certification protocols and methodologies to rate a building.

So, if you go between the UK, and Austria, and Hungary, an A in any one of those places is different than what an A would be in somewhere else.

The last one is that initial compliance again, unfortunately, was pretty poor in most of these countries.

What we find in Europe sometimes is that they have a lot of political will, but it becomes very difficult to actually implement these programs. The directive comes from the European Union, but then has to be translated into national legislation by each member state, which is bureaucratic and can be problematic.

So, we'll move on to the United States. This map is showing where policy adoptions have occurred, where there's policy interest currently, and where there's been state interest.

So, in general, we're seeing the most interest right now from cities. There have been a number of state efforts, aside from California and the State of Washington very few of these policy proposals have passed.

So, there was legislation in Oregon, and New Mexico, in Maryland, Connecticut, Vermont and none of them passed.

However, Philadelphia did pass a policy earlier

this year. Minneapolis is developing a policy. Chicago is also very interested.

And Mayor Menino in Boston, early this year announced his intent to adopt a benchmarking policy for nonresidential and multi-family.

So, this slide is showing basically what you had on the map. It's also showing how the different programs break down by what types of buildings are covered and what the disclosure mechanism is.

So, you're seeing, if you look sort of toward the left at the top of the screen, a lot of variation right now on where states and cities are setting threshold size minimums for buildings. California should say 5,000 feet, and congratulations on getting the rules adopted.

Most cities are going with a larger threshold now, 50,000 feet, with the rational that they want to focus on larger buildings first, where the stakeholders are more in tune to energy efficiency, where they have more budget to actually implement measures.

On the right side of this screen you see the disclosure mechanisms. As I think most of you know, there are two sort of protocols for disclosure. One is that a disclosure is triggered by a transaction, that's what's in California.

What we've been moving more toward is a public disclosure, where the city posts data that's publicly available on a website. This is what San Francisco has.

In almost all of these jurisdictions disclosure is also accompanied by a reporting requirement to the local government, which is a terrific thing.

IMT did some research earlier this year on the impact of these policies, how many buildings and how much square feet they're covering now, nationally.

We're estimating about 60,000 buildings and 4 billion square feet.

The California number on here probably needs to be updated. We did take a look at historical transaction volume from CoStar to try and come up with this number.

As you'll see in the building area pie graph at the top of the chart, New York City accounts for most of the floor area that's being covered.

And because I'm working a lot with New York right now, I'll just spend a minute describing this program. It's very indicative of sort of the evolution of benchmarking and disclosure policies, as we see them.

What New York did was package benchmarking and disclosure with an integrated suite of policies. So, in addition to that they are now requiring, in ten-year

intervals, mandatory audits and mandatory retro-commissioning.

By 2025 they're requiring lighting upgrades to the City Building Code, and they're requiring sub-metering in all large buildings, of all large tenant spaces. So a tenant spaces 10,000 feet and above.

And in addition there's now a requirement on the owner where tenant spaces are sub-metered for the owner to pass energy information back to the tenant.

And a couple notes about New York City. Again, it's one of the programs that's farthest along. They had their initial reporting deadline in August of 2011. They extended it to the end of the year and came out with a 75 percent compliance rate, which is just terrific considering the volume of submittals that they had; more than 10,000 buildings.

A couple keys here to their success that we do not see in all the jurisdictions that we're working with. The City launched a major outreach and training, benchmarking training effort for stakeholders. They have live informational sessions. They hosted benchmarking training sessions that were broken down by building sector, so there was one for hospitality, one for hospitals, one for office, and so on.

They set up a benchmarking help center that

stakeholders could call into with questions about how to comply, which we think was tremendously important to achieving such high compliance.

And they went to their State PUC and they got ConEd to provide aggregate whole building data to all of the building owners that had to comply.

So, ConEd is providing whole building data, now, to any owner in New York City without obtaining consent, as long as there are -- I think it's five meters aggregated together by rate class.

The one other interesting thing New York found was the participation by the consultant and energy efficiency services sector. So, New York is estimating that I think it's about 80 percent of submittals were actually done by consultants. So, New York City building owners kicked a lot of this work out to the energy services sector, which has resulted in a lot of very good things for the job market there that I'll talk about in just a second.

New York City also, just a few months ago, completed a citywide aggregate analysis of benchmarking results for the first year there.

One of the most interesting findings from this report was that energy intensity is actually greater in newer buildings than in older buildings. This is true

both for office and multi-family. And multi-family accounts for three out of every four buildings that had to comply there.

They also found Energy Star scores for office buildings tended to be higher, again, in older buildings than in newer buildings.

A quick word, IMT's done some research this year on the job impact of benchmarking. We released one study earlier this year that looked nationally if there was a rating and disclosure policy. We put together an industry panel that included pension fund investors, large commercial managers and owners, and the conclusion was that these policies could create almost 60,000 net new jobs by 2020.

At the same time, we went into New York City and said, well, what's actually going on in the ground in one of these markets? So, we interviewed about 15 energy services firms and what we found was that a lot of them are doubling their staff and they just have a tremendous amount of new business. Really, for the first time, a lot of owners are looking at how their buildings are performing and then asking critical questions like how can I improve.

The primary issues and one of the surprising things we found is, as we talked to these guys, these

vendors, they said the primary issue for them was not financing, it was demand. So, in other words, they weren't going to owners who were saying, well, we'd like to do something but we just can't finance it, it was an issue of owners not understanding what the opportunities are and the benchmarking has really opened up a whole new energy efficiency market there.

So, my last slide, just a couple challenges that we see across the country. Policy harmonization between jurisdictions will become increasingly important.

I hear, increasingly, from BOMA and the Real Estate Roundtable, the big real estate trade groups, that this is very close to the top of their priority. The only thing they hate more in some cases than these requirements is having to comply with 10 or 15 different requirements in 10 or 15 different places.

And we think that standardizing this stuff will actually help them comply, so that's a good thing.

Again, energy consumption data and the owners' access to that from utilities is probably the biggest challenge that's still out there. In all of these jurisdictions they need to do their homework and legwork in approaching utilities and regulators to try and figure this out before a policy's adopted.

We're also working with the Administration and

the Department of Energy to look for national or Federal solutions.

Quality assurance, no jurisdiction so far as really established a rigorous QA protocol for the data that's coming. And the danger here is that, again, with Europe as a cautionary tale, you get a news article somewhere that quotes a bunch of building owners that are saying, well, we don't really trust this data, it's something we have to do, but it doesn't really mean anything.

And I think if that happens, then we've lost a lot and it's difficult to get credibility back.

The proliferation of rating tools and the integration of these tools will be tremendously important. Portfolio manager, of course, can be improved. There are lots of other operational ratings out there.

Lots going on with asset ratings, obviously in California, in Massachusetts, at the Department of Energy they're rolling out an asset rating tool.

They're also rolling out, at DOE, some IT solutions that can make data collection easier for jurisdictions.

And the last thing is we've seen about half of jurisdictions that have policies include multi-family,

the other half do not. It's a tricky sector. There are some things that I think have to happen to make benchmarking really effective there, but it's something that we have to begin to think about addressing because it's a huge part of the real estate industry in the U.S.

So, with that I'll hand it back over to CEC and thank you all very much for the opportunity to present.

MR. ASHUCKIAN: We have a few minutes for questions or comments.

COMMISSIONER MC ALLISTER: I'd like to ask Andrew one question. So, Andrew, are you still there?

MR. BURR: Yep.

COMMISSIONER MC ALLISTER: Oh, great. So, last panel we talked about data and kind of the issues, a bit of a minefield of issues of how to get the right data to the right place, with kind of, you know, negotiating all the different constraints.

And I'm wondering, you said the data for your tool in New York came from ConEd. And I'm wondering if you could describe the relationship or the discussions that sort of led up to that?

MR. BURR: Well, you're talking about the owner being able to access consumption data from utilities?

COMMISSIONER MC ALLISTER: Let's see, I'm not remember what slide exactly, but you mentioned the data

came from ConEd and I was assuming -- well, maybe you could just describe exactly what that data was?

MR. BURR: Sure. So, as I think a lot of people understand, benchmarking requires the owner to have historical energy consumption data for their buildings.

Owners of multi-tenant facilities do not have a legal right to acquire that information without consent from tenants. For owners with a lot of tenants in their buildings this is obviously a huge hurdle for them to be able to benchmark.

So, we're seeing a lot of jurisdictions working with utilities and regulators to try and figure out a way for utilities to get owners this data in a way that protects privacy, but in a way that allows the owner to benchmark.

So, a lot of the utilities are now aggregating monthly consumption, they're wrapping up all the meters in a building and providing a single number to the owner, stripping it of identifying information from individual tenants.

And in an increasing number of places we're seeing that sort of pass muster with the utilities and with the commissions. Does that make sense?

COMMISSIONER MC ALLISTER: Yeah, great, thanks a lot. I was a little off base in my remembering what you

were actually saying there. But yeah, that's useful, thanks very much.

MS. BROOK: I have a question, Andrew, this is Martha Brook.

MR. BURR: Hi, Martha.

MS. BROOK: Your summary of U.S. disclosure programs, it seems like the focus is in large commercial buildings. Is that also true in Europe or are they implementing either operational or asset ratings in small commercial buildings?

MR. BURR: Oh, it covers small commercial in Europe. I can't remember the threshold, but it's a large part of what's covered there.

MS. BROOK: And are those operational ratings, asset ratings or both?

MR. BURR: It typically, according to the IEA, it's typically asset ratings for small commercial and residential. And you only get into operational ratings in Europe typically with the very large commercial buildings and with government buildings.

MS. BROOK: All right. Okay, thank you very much.

MR. ASHUCKIAN: Yeah, we have time for more questions if anybody else has questions.

If not, let's move on to panel two.

MS. BROOK: Thank you, Andrew.

MR. ASHUCKIAN: Thank you, Andrew.

MR. BURR: Sure, thank you.

MR. ASHUCKIAN: So, do we have all our panelists up? I think we're missing -- oh, we've got one on WebEx. Okay, sorry.

MS. BROOK: Okay, so here we are back from lunch, back from that presentation from Andrew Burr, and we're going to talk about tools for commercial buildings. And they vary, you know, the topic of tools is varied and covers a lot of ground. So, you know, the panelists that are going to talk to us cover that scope, I think, pretty well, all the way from benchmarking tools like we just heard about from Andrew to, you know, sub-metering disaggregation tools to identify, you know, performance based on whole building analysis, monitoring and sub-metering tools to identify opportunities for improvement, so, a large range here.

And again, just as this morning, we asked our panelists to introduce themselves and address a couple of the questions from the panel in a seven-minute time frame.

And our first panelist is Alecia Ward, and I'm going to introduce each of you, first, and then ask you to speak.

Alecia is the Director of Government Relations and Business Development at the Weidt Group, a 35-year-old energy and software consulting firm.

She's an expert on energy efficiency, sustainability and climate, and she has knowledge and insight into the process of designing, deploying, managing and evaluating energy efficiency, demand side management, demand response from renewable energy programs.

She has served at the pleasure of two members of Congress and one President, and has coordinated extensively with Federal agencies and state and local governments.

Alecia maintains active relationships with more than 40 state agencies, departments, bureaus, boards and commissions, including the Energy Commission and the California Public Utilities Commission.

MS. WARD: Thanks Martha. Thank you for the opportunity to be a part of this panel. And, more importantly, a part of this two-day workshop because I think you're sort of addressing really challenging questions.

And I approach this from a policy perspective; the Weidt Group approaches it from a tools and software, and energy consulting perspective.

And I think, as Mr. Schmidt said this morning on the residential side, that it really is a perfect storm right now.

So, in order to accomplish the goals of both AB 758, and AB 32, and 1103, and the State of California, and the CEC, and the CPUC, and the Better Buildings Initiative and all of the other initiatives that are out there that are really reaching towards that Architecture 2030 Net Zero glide path I think there are some really interesting questions around the issue of tools, and building performance, how to track it and measure it, provide an infrastructure for it, data warehouse for it, and then use that data in order to inform better, more effective policies, programs and implementation of those two things.

So, the Weidt Group, a little bit about us is that we have pretty extensive expertise in both designing and deploying whole building demand side management programs.

We run Energy Design Assistance, which is a commercial new construction program that gets about a 30 percent savings beyond baseline code, with about a 70 percent market penetration, and have consistently done that through about seven different baseline code changes.

That's great, but it's also one of the more expensive programs in a portfolio to be able to deploy energy modeling on a per-building basis. It's labor intensive and it has a lot of work-arounds. When you do an energy model you've got to work around, and so you get a variety of different methodologies for how different people work around those issues.

As a result of our experience in that industry, we decided that we would begin to take all of the protocols that we've been doing on an ad hoc basis for the delivery of these kind of programs and embed them into software tools and protocols so that you could effectively take that quality, and consistency, and methodology for energy modeling and make it available to the masses, without making it as expensive.

So, I've been asked to address two questions. One is question number 24, "How can energy performance tools be used successfully in the multitude of nonresidential business cases?"

And then, "What's the proper role of public and ratepayer funding?"

And I will tangentially sort of talk about the appropriateness of requiring performance ratings.

So, let's step back for a second, though. the purpose of identifying performance tools is to figure

out how to track the performance of that building.

But before we get to the larger portfolio of all the buildings in order to be measured, in order to reach the goals of AB 32 and AB 758 let's talk about individual building. What do you want to do in an individual building?

You want to design in as much efficiency as possible, as you can, on the front end of that in the pre-design and the design phase. You want to ensure that that efficiency gets fully realized in the construction documents, in the design documents, and then it gets actually constructed and implemented in the building.

You want to shore that up by demonstrating that it is code compliant and, as possible, as an asset rating that meets with the minimum requirements of the State.

You want to dump all that detailed information that you have about a new building into a benchmarking system, so that what you've garnered in the process of creating that depth of information for that building, all those intensive inputs that went into the energy models and simulations, that is not lost.

Currently, that information just gets lost out in the universe. We need to find a way to capture it

and pull it through the entire lifecycle of that building and then calibrate back to it for benchmarking, for retro-commissioning, for deep retrofit opportunities throughout the entire lifecycle of that building.

That's what I think is really important from a policy perspective and what our organization tries to make tools that will allow us to do.

So, the only way I can talk about the benefits of these tools is to sort of describe for you the kind of tools that we've built.

So, while traditional design intervention programs accomplish these pretty dramatic savings, energy modeling and the design intervention is labor intensive and costly.

Everyone models, but not very many people want to build models, and most of them just want to know what the answer is that a model would give them in order to make better design decisions or better operational and performance decisions.

So, consistent, accurate results require judgments, and good assumptions, and rigorous organization, and deep expertise in building science, and that's difficult to capture.

So, building energy performance tools have this potential to capture all those things that are currently

varied in the marketplace in terms of their abilities, in terms of the resources that are out there, and in terms of things that currently sit on laptops and CPUS that could otherwise sit on broader platforms, like Online Access, that would make them more accessible, readily available, capable of being data warehoused.

So, that's sort of the filter. So, what are the trends?

The trends in the industry around modeling, and around tools, specifically, is that you want flexible modeling systems. You want to intelligently ask the user to provide some minimum amount of data that can result in a good model.

You want to accurately and securely embed and then consistently apply key protocols for evaluation parameters.

You want to provide context-sensitive inputs where the user doesn't have, necessarily, access to the information and derivation should be consistent and repeatable over time.

You want to provide a consistent process that derives and runs models, and a few hundred parametric variations at a time and you want to enable everything through a web interface.

The question is how can we build a reality like

that given the regulatory constraints that we all have, and the historical legacy of the kinds of programs and the way we've done this in the past?

I think the way that we begin to answer that question is to talk about a couple of tools. One is a tool called Net Energy Optimizer. So, whereas we do energy design assistance, which is very similar to the Savings By Design Program in California, we basically said, that's great, but it only works for people who can afford a $15,000 energy model and have a really big building, or project that's in a relatively large urban area.

So, how do you make that accessible?

We've created a tool called Net Energy Optimizer. It's an assisted self-service, with an integrated design simulation tool that's done over the internet, and it's intentionally targeted for buildings that are as small as 5,000 square feet.

And it potentially has some applicability in the 1,000 to 5,000 square feet.

Because I noticed on your presentation this morning that that's where really the bulk of that, in the commercial marketplace, that challenge exists.

The beauty of this tool is that it dramatically reduces the price point because it brings energy

modeling to a community of people who previously wouldn't have been able to afford that in terms of either making deep retrofit decisions or new construction decisions.

So, finding a way to codify it, create it, standardize it and make it accessible to people is what we really struggle with and what we hope this process that you've begun will move towards.

Second tool, it's called SB2030. It stands for Sustainable Buildings 2030. It's a design tool calculator that we built for the State of Minnesota, who made a commitment to the goals of Architecture 2030.

However, a design community team doesn't really know what a 60 percent emission reduction is off of baseline design, so they need a tool to help them do that.

So, the calculator leverages about 30 years of data mining experience from real building simulations. It intelligently estimates some of these building parameters around the materials, the internal organization of space types, building shapes and orientation.

And the users are asked for a minimum amount of data. So, if you don't know very much when you're starting to use this building, you use all the defaults

that are embedded in the system.

As you know more, you come back to the system and you enter more details on the specific data.

As you enter more it saves those simulations and then allows you to operationalize the performance of the building once you have consumption data on the back end.

This tool of the State of Minnesota is effectively the first operational asset rating -- operational rating that holds asset constant, basically, and it has a label and is currently being disclosed for all public facilities in Minnesota.

MS. BROOK: You've been blinged, by the way.

MS. WARD: How long does that mean?

MS. BROOK: That means that you're out of time and you should wrap up.

MS. WARD: Okay, I'm going to wrap up. So, there's another tool for co-compliance. So, instead of taking dead art, which is the code that we've got and putting it into, you know, code books and doing look-up tables, why wouldn't we have online, real access available for people to be able to do capacity building among the A&E community and then code officials being able to effectively reduce the amount of on-site checklists that they have to have.

The role of public funding in all of this I

think falls very similarly to emerging technologies, measurement and verification, and other things.

We intentionally set aside a percentage of the portfolio to be able to invest so that we can build the pipeline to continue to drive more savings through the system.

That similar methodology should be applied to sort of the enabling infrastructure and the backbone of these kinds of software tools that will standardize, replicate, and then consistently provide some process out in the marketplace that people can reliably resort to.

Because as we look at codes, beyond codes, performance-based codes, outcome-based codes, asset ratings, operational ratings, DSM programs and their intervention moments there's a huge sort of set of policy things that are getting snaggled all together that we have to parse out.

And common platforms, like software that's enabling this, should be able to help us do that.

MS. BROOK: Great. Thank you, Alecia, very good.

All right, our next panelist is Denny Mann. Denny is the President of Service at Marina Mechanical and has been part of their organization for more than 30

years. I'm not going to speak about what I talked about earlier in terms of my lack of imagination being with the Energy Commission for over 20 years. I'm sure you have more imagination than I do, Denny.

He has 32 years of experience in HVAC control, service and maintenance. In addition to his technical training and background, Denny has a deep understanding of total environmental asset management, the team approach to system maintenance.

He views systems as an asset and uses preventative maintenance to maximize asset life, efficiency and performance.

Recently, Denny's been working with the Western HVAC Performance Alliance, Southern California Edison, PG&E, and PECI on operationalizing the ASHRE ACCA Standard 180 for Quality Maintenance.

Denny.

MR. MANN: Thank you. So, I've been asked to respond to questions 24 and 26.

As a mechanical contractor, we're in San Leandro, and our focus with our business has been to grow the business through maintenance contracts.

And one of the things that's been in this industry that's affecting the efficiency part of it is just the economics of the times. One of the first

things folks always cut is the maintenance. And the other thought is, well, we can go and change filters ourselves and, you know, blow out condensate line, and really don't have an understanding of the impact of proper maintenance on the equipment.

And, you know, so this QM program, we're talking about something that ASHRAE and ACCA got together and said we can build these wonderful buildings, and these phenomenally efficient air conditioning units and all that, but once it's up on the roof, if it's not maintained a year down the road, two years down the road, all those wonderful things that were done on the front end have gone by the wayside.

And so we've spent a lot of time trying to work on, you know, the educational piece to the customer.

Our customers are technically under a hundred thousand foot. Again, we like to sell maintenance contracts and typically over a hundred thousand foot they'll typically have some type of facility folks on staff, so that's kind of not our target.

But the challenge in the under a hundred thousand foot is typically property managers, owners aren't necessarily involved in peer groups and that type of thing, BOMAs and that, where they get that education piece so they have a better understanding of the value

of keeping the equipment running efficiently.

So, that's where we kind of come in and try and change the relationship from a contractor to a solutions provider, an educator on the energy component.

Fortunately, in our industry there's been a lot of changes over the last five years when it comes to tools that you can implement that are more cost effective, that allow us to go in and look at a building 24/7 for a week, so we can see what's happening on the weekends, evenings when there's not a service technician around.

And there's a phenomenal opportunity there just on what we'll call low-cost/no-cost opportunities, time of day schedules. You know, why is the unit coming on at 3:00 in the morning? Well, I didn't want it to be cold when the clients came in, or the customers came in, the tenants came in.

Well, actually, in reality it only took an hour and a half to come to temperature. So, you know, those types of things.

In the smaller commercial buildings probably the number one issue with efficiency is economizers that are non-operational. And I would venture to bet that somewhere in the neighborhood of 60 to 70 percent of economizers are non-operational.

And in the San Francisco Bay Area that's just a shame, there's such a wonderful opportunity for free cooling, if you will, by having functional economizers.

And one of the issues that we've dealt with over the years is different types of tune-up programs that have come through, whether it's an Air Care Program, a Check Me Program, these types of programs. One issue has been it's a once in three-year deal. So, you go in and you do your tune-up and that building's not eligible again for three more years.

Well, if that equipment's not being maintained during that three years, it's no wonder that we haven't seen the results that everybody's looked for by doing these tune-ups.

And again, one of the tools for the legislative side is this QM Program, the 180 Program that requires once you do the tune-up on the equipment, on the front end, you then -- the customer has to agree to a three-year maintenance contract on that equipment to make sure it's maintained at that level.

As far as going into requiring all buildings to get rated, I think that's phenomenally important. One of the things that we do when we're talking to a new customer is go in and offer to do the Energy Star rating on their building, if it hasn't been done, and probably

90 percent of the time it hasn't.

Because it gives us an opportunity to go in and let's say the building comes back at a 60, and you can talk to them about taking that building, say, from a 60 to a 65, a 60 to 70, or maybe try and get to the Energy Star at 75. And in dollar and cents say this is what it would look like if you made that leap from here to here.

And a lot of the times you can make that five-, ten-point leap, again, with kind of those low-cost/no-cost, and with those savings be able to do a quality maintenance on the building so that you can make sure that the building stays running efficiently.

Kind of the next level is this ongoing monitoring. I think that's really important because, again, you know, from the economizer stand point, whether we're looking at demand control ventilation -- every building, basically, that we've done studies on has been over ventilated. I mean and not just a little over ventilated, a lot over ventilated.

So, if you're trying to condition 100-degree outside air in the middle of the summer, rather than 75-degree coming back from the building, that's a huge energy spend that's very easily avoidable with relatively easy demand control ventilation.

So, that's a big thing going on.

Variable speed fans, for years the small, call it 25-ton and under package equipment's typically just been a constant speed. So, whether there's a call for heating or a call for cooling, or you're just in a ventilation mode that fan's running at a hundred percent.

So, that's one of the technologies that's come out. More folks have come up with ways to put VFDs on the motors, integrate the VFD with the outside air so that as you slow the fan down, if you didn't do anything with the outside air dampers, your ventilation rates go down because you've slowed the fan down.

So, now they'll integrate that and go, okay, if I slow the fan down to save some energy, then I need to open up the dampers a little bit more to bring in the required amount of outside air. Demand control ventilation tied into the same component.

And then from a technology stand point, the biggest user in air conditioners has always been the compressor. So, ideally, you have it off for the greatest amount that you can through economizer modes.

But even in the compressor arena there's been huge strides as far as, again, for years, constant volume. A compressor was either on or it was off. If you had a ten-horse compressor and you had a two-ton

load, you're running a ten-horsepower compressor.

So, now, they're doing variable speed compressors that make a huge difference.

One quick story, we did a test in the City of Walnut Creek, had a 40-ton unit, four 10-ton compressors on the unit. So, if you had a 2-ton load you brought on ten tons worth of compressor.

If you had a 12-ton load you brought on 20 tons because you've got 10-ton increments.

And what we did is we took one digital scroll compressor, so variable flow through the compressor, replaced one of the compressors with that one, and that one will stage at 1-ton increments.

So, now, you can go with 1-ton increments, from 1 to 40, rather than 10-ton increments.

And so it's those type of technologies that are really driving the -- I'll call it going into existing buildings with existing equipment, and having ways that you can raise, if you will -- or lower the energy span on that equipment.

MS. BROOK: Great, very good. Thank you, Denny.

Our next panelist is Karl Brown. Karl is the Deputy Director of the California Institute for Energy and the Environment and the Director for CIEEs Energy Use and Buildings Program.

He also directs the State Partnership for Energy Efficiency Demonstrations, the SPEED program sponsored by the California Energy Commission, Research and Development Division.

For his contributions to UC, energy efficiency planning and implementation, Karl has been honored as the 2003 Energy Engineer of the Year by the Association of Energy Engineers Bay Area Chapter, and as 2010 University of California's Sustainability Champion.

He helped found and continues to advise the UC California State University Investor-Owned Utility Energy Efficiency Partnership Program.

Karl.

MR. BROWN: Thank you, Martha.

Today I'm going to address question 24 and I'm going to talk about --

MS. BROOK: There's a little panel in front.

MR. BROWN: I got it. Today I'm going to address question 24, I'm going to talk about metering as an energy performance tool in itself.

Question 25, I'm going to present an example of a successful program focused on metering.

And question 27, I'm going to present some context for that question giving the current landscape for monitoring.

So, I'll start with a very simple statement, metering saves energy.

Now, energy metering often works as a critical tool in energy management strategies, including commissioning and retrofit components. But energy metering is also sometimes effective as a stand-alone tool in reducing energy use by alerting building operators, owners and even occupants to energy waste.

Energy waste problems that, once identified, are better understood through monitoring are trivial to fix.

I'll give a couple of examples. The first one is from the University of California, at Berkeley campus, which has recently started an incentive program for departments to save energy in their buildings. And a key part of that program is the provision of energy dashboards in dozens of the larger buildings.

And so you can now read in the Berkeley Campus Newsletter about measures that have been identified by students and faculty in the buildings to save large quantities of energy.

As an example, a large fan was left on as a part of a renovation and not put back under automatic control. That was flagged by someone using one of these dashboards and then remediated by the maintenance department.

The second example comes from the most common type of heating ventilation and air conditioning system in use today, VAV reheat systems.

One way in which VAV reheat systems can commonly fail is with a stuck open chilled water valve. Now, this is sort of a silent failure because the reheat kicks in and keeps the spaces comfortable. But this is in no way a graceful failure because this is wasting an enormous amount of energy.

So, this is a problem when building owners and operators know about it, they are going to go fix it. But the issue is knowing about it and metering is the key step for that.

The third example is from a California campus where an energy management strategy was being employed involving taking chilled water from a district chilled water system and the strategy was to try to minimize the use of chilled water in that building. Sounds promising.

Meter revealed that reducing the use of chilled water in the building caused the fan systems in the building, which are capable of using a lot more energy to overreact and be on full power all the time, over ventilating.

And once metering revealed that this strategy

was not the optimal strategy, the campus went back to using more chilled water, less fan power, and that was $60,000 a year, I think.

So, moving on to the next question, an example where energy performance metering has been successfully deployed and utilized at scale since 2004, in the monitoring-based commissioning element of the University of California, California State University Investor-Owned Utility Energy Efficiency Partnership.

This has -- the successful deployment of monitoring in this program I think led to third-party programs which are now being deployed. And those third-party programs were as proposed by private sector consultants that served -- had experience serving the campuses of the UC, CSU, IOU partnership.

Full documentation of that program can be found in a paper that my colleagues Andrew Meiman, Mike Anderson and I recently published in the proceedings of the ACEEE Summer Study in Buildings for 2012.

Last, I will say that electricity metering is becoming ubiquitous. In addition to Smart Meters, you now find electricity metering coming in switch gear, invariable frequency drives, and so the metering is coming with the buildings. It’s the software tools that are the issue.

And so software tools to enable effective use of energy metering data by building operators, owners and occupants continue to emerge and are already being employed by many.

However, effective us in small and medium buildings will depend on mass market development and access.

So, with regards to mass market development I think there's a lot of room for public interest research and other assistance to this industry, which is by no means mature in that it really needs help in learning where to collaborate and where to compete.

MS. BROOK: Perfect. You ended right at the bling, I'm very impressed.

Lin, we're going to hold off with you for just a second, we're going to introduce Mike first, and let him speak. Even though he's not in the room, he still has a presence on my agenda here.

So, Mike -- is Mike queued up?

Okay, Mike Kaplan is Vice-President of Marketing at Retroficiency, Incorporated. Mike drives marketing efforts for this company. It's software analytics of Retroficiency enables energy service providers and utilities to cost-effectively prioritize high potential buildings and evaluate thousands of energy efficiency

measures in minutes.

Prior to Retroficiency, Mike was a strategy consultant for CSMG, where he led dozens of market opportunity assessments, business case development, and investment, due diligence engagements for clients in the telecommunications, wireless, and digital media markets.

Mike holds a BA from the University of Rochester and an MBA from Massachusetts Institute of Technology's Sloan School of Management.

Mike, are you online?

MR. KAPLAN: Thank you, Martha, and thank you everyone for letting us to join, albeit remotely from Boston today. We're excited to participate in this phase of the workshop.

So, I'm going to be addressing primarily questions 24, around how energy performance tools can be implemented for success, and I'll briefly touch on question 25.

So, in terms of successfully implementing energy performing tools, I think the first thing that is important to understand is that there are, as the other panelists have touched on and alluded to, several classes of energy performance tools. And each one really varies in terms of cost, how scalable it is, the type of data you might analyze, and the insights they

deliver.

You know, broadly speaking classes of these solutions, as we see them, could include energy dashboards that can provide real time or near real time views of energy consumption and basic metrics, interval analytic solutions where we provide -- Retroficiency provides a solution that remotely assesses the building's efficiency potential.

To on the other end of the spectrum, you know, extensive hardware-based solutions that continually monitor a building's systems.

So, I think it's important to really think about deploying these tools, you know, in terms of getting the right level of energy analysis at the right time, such as the cost and effort required to deliver these solutions that would really be dramatically lower than the benefit that you're obviously achieving.

There are, as we see it, multiple phases of driving efficiency. The first is really identifying the buildings that you're going to target across a very large building stock.

The second is really engaging those most important buildings and those owners to secure and trust in program participation.

And then, finally, you know, really evaluating

the building to determine the best measures to actually implement.

So, early on in that identification process, you know, when you're looking at thousands of buildings or tens of thousands of buildings, the goal should really be to focus efforts on those buildings with the greatest potential.

We've analyzed a number of utility portfolios and pretty consistently found that the top 35 percent of buildings in those portfolios have about 75 percent of the total savings opportunities.

So, it becomes very important to know which buildings have that potential and which ones have less potential.

Energy performance tools at that phase, whatever you might implement, needs to be done quickly and inexpensively.

And we think it's really important here to try and leverage data, to the extent that's possible, from meters that are already installed.

In particular, you know, interval data where we focus, combined with advanced analytics, you know, can really determine the true potential savings of a building and the opportunities that exist without ever even going on site.

And it's really, again, effective for identifying the best buildings and engaging with those buildings owners with the unique operational opportunities or retrofit opportunities that exist in the building.

Now, specifically, on the small- and medium-sized building segment, you know, I think there are a few considerations.

So, while it's important for all buildings, the need to really deliver actionable insights to small- and mid-sized businesses, buildings and business is really critical. Because these buildings and building owners often don't have the expertise to properly interpret energy data and make corrective actions on their own.

The insights must be provided when you're looking at a very large number of buildings in either, ideally, a web-based or other digital formats at scale.

It's also important, you know, when you're touching this amount of buildings to actually go into a building, given the number of buildings and the aggregate consumption for each, it's really important to evaluate as many energy conservation measures as possible when you're sending somebody, particularly on site.

So, we strongly advocate for whole building

approaches to energy efficiency to achieve those deep savings as possible.

Traditionally, in the small- to mid-sized business there's been a lot of single-measure, prescriptive programs such as lighting, because it has traditionally been very costly to comprehensively evaluate which UCMs were optimal.

So, emerging sort of audit platforms that combine data analytics with rapid building modeling can really evaluate thousands of measures in minutes to determine what that optimal package of measures is in a very comprehensive, standardized, and cost-effective manner.

So, briefly, on question 25, I will just say that energy performance tools really should be subject to any of the same cost-effectiveness, you know, requirements as any other efficiency program dollars, such as, you know, an incentive, or funding for energy audits, as well as being part of market transformational initiatives.

And then, secondly, the first priority should really be to leverage data from existing infrastructure that has already been paid for by the ratepayer, you know, such as Smart Meter, Smart Grid deployments.

That concludes my comments and thank you, happy

to take any questions.

MS. BROOK: Okay, Mike, thank you very much. Hopefully, you can stick around a little longer, we're going to open it up for questions after our last panelist has his seven-minute session.

So, Lin Ortega is our next panelist. He's the Utilities Engineer and Program Manager for the County of Santa Clara's Facilities and Fleet Department.

Lin's current focus and management responsibilities related to existing buildings include responsibility for developing and managing about a $60 million annual utilities budget.

This responsibility includes the planning and implementation of costs and energy usage reduction measures in the areas of energy efficiency, renewable energy, water conservation, and utility purchasing strategies.

Lin.

MR. ORTEGA: Okay, thank you.

I've been asked to address three questions, 27, 24, and 25 in that order.

Before I provide my responses, though, I did want to give a little bit of background information on the County of Santa Clara, because I think it will help put my responses in perspective.

So, first of all, the County has over 10 million square feet of space. Types of space range from office, to prison facilities, garages, hospitals, clinics, and just about anything in between.

So, in terms of vintage, we have building probably from the 1800's up to fairly new buildings. So, I think it's safe to say that we have a fairly good salad of buildings, so to speak.

In terms of the program on the energy efficiency side and the renewable energy, we've done quite a few energy efficiency projects. We also have done quite a bit of renewable power.

We've managed to secure over $12 million in CSI incentives on projects that we've completed, solar projects that is. So far we've received almost two and a half million dollars in CSI incentives.

In terms of energy efficiency, I think PG&E has given us over a million dollars in incentives over the last six or seven years, I would say.

In addition to that, some of these projects we financed and over the last three years we've been able to secure $27 million in bonds, mostly qualified energy conservation bonds.

I provide this information because in terms of measuring the results of the projects that we've

completed, it is critical to us to be able to validate our investments.

So, with that said, I'm going to start with question 27.

The question reads, "Is it appropriate to require monitoring equipment in certain types and/or sizes of nonresidential buildings to improve the persistence of public and ratepayer funded efficiency improvements?"

My answer has to be yes. Measuring the results of implemented efficiency projects, it needs to be an integral part of the efficiency project, itself.

The data that comes from it helps validate the reasons why the measures were implemented in the first place.

And in addition to that and perhaps even more importantly it helps to sustain the results of the projects. If we cannot track it and measure it after the implementation of the efficiency measures, some of these tend to degrade or fail over a short period of time.

If we are financing, and in our case, as I said earlier, we are financing many of these projects, it could be -- it could be a really big problem paying for efficiency measures that are not producing.

So, it is a critical piece of energy efficiency or it should be, in my opinion.

With the prevalence of Wi-Fi and landline networks in and around facilities and the availability of affordable measuring technology and software, it is becoming more feasible now, in my opinion, to include this feature as part of the efficiency projects, particularly larger efficiency projects.

But with that said, in some of these projects the added cost of including measuring technology could very well put the ROI of the projects out of reach.

So, I'll touch a little bit more on this in one of the following questions.

So, I'll move on to question 24, "How can energy performance tools be used successfully in the multitude of nonresidential business markets in the State? Can these tools be cost-effectively deployed in small and medium buildings?"

As I said, measuring technology is becoming more and more affordable and readily available and so are the communications protocols, Wi-Fi 33, land-based.

In addition to those communications protocols there's also industrial protocols, like ZigBee, these make it possible to deploy monitoring and control technology in facilities more readily and easily and

with that make it more affordable.

However, in existing facilities there is the challenge of where do we put these measuring devices or control devices, for that matter.

For older facilities, and we have plenty of them in the county, the buildings were designed and constructed and really with construction efficiency in mind. What is the best way to construct the building at the lowest cost, not necessarily with the building's post-construction operating efficiencies in mind.

So, that is a challenge that remains and that is often the biggest cost factor in deploying measuring technology, especially in existing facilities.

Ideally, all of these features would be included in new construction or in the design of new construction. Perhaps this is something that should be included, and it may already be in the works in the construction codes and the design codes that exist.

So, I will move on to question number 25, "What is the proper role of public and ratepayer-funded programs to increase the access to and penetration of energy performance tools for nonresidential buildings?"

Until now, energy efficiency programs really have focused on incentivizing the implementation of the measures, themselves.

And in our experience, in the County, these -- if the calculated incentives -- or the incentives are really calculated based on tests, sample tests. So, this is what is used to really pay for the incentives. It doesn't really represent the actual results.

As far as I know, there are no incentives, really, that -- for the deployment of performance measuring devices.

So, as far as the energy efficiency measures, in order to sustain those, really, they must include some form of measuring technology to be part of those measures,

Like the California Solar Initiative Program, public and ratepayer-funded incentive programs really must develop a way to incentivize the deployment of performance measuring technology.

I realize this is easier said than done, but one of the ways that perhaps might work is some sort of a tiered incentive approach where higher incentives could be provided to efficiency projects that include the deployment of measuring technology.

Or perhaps to efficiency projects implemented in facilities that already have this technology deployed.

So, while the performance measuring tools may be installed to measure the results of a specific project

or set of projects, the technology can be used for other purposes, such as cost allocation, trouble shooting, and peak demand management.

So, the benefits of measuring usage, I think it's been stated time and time again here, in this forum, but there are greater benefits than just measuring the results of a specific energy efficiency project.

From my perspective, it helps in developing budgets. It helps in managing peak demand. It's also a way for our operations folks to troubleshoot buildings.

And it's interesting, but being able to look at real-time power on a second-by-second basis can really tell the story as to what is wrong in a facility.

So, I think from my perspective, from a public sector's perspective, being able to measure the power consumption of a facility is very important, not only for validating energy efficiency, but also for the reasons that I mentioned.

I think because of that this is something that really should be pursued and should be in the form of incentives, perhaps, or perhaps subsidies, be looked at more and perhaps find a way to deploy it somehow.

MS. BROOK: Great. Thank you, Lin.

All right, Commissioner McAllister, do you have

questions for the panel?

COMMISSIONER MC ALLISTER: I do, actually, unless you want to kick it back to you, Martha, because I think you probably have better questions than I would have. But in particular because, you know, you're day-to-day working in some of these -- in the nonres tool kind of strategy and implementation, and so I think to the extent that you and your staff, you know, colleagues can -- you're probably in a better position to shape this and sort of dig in than I am.

But I do have a couple of questions. One, you know, the last speaker actually started to get into this but, you know, energy efficiency at the facility level, energy efficiency is part of a variety, kind of an ecosystem of activities. You've got the facility manager, an owner, whatever they're doing, and that involves rate analysis, right, involves -- and the whole economics of what the bill is going to produce each more, and that's probably more real than the actual energy, per se, to the customer or the consumer.

And we know that, particularly in Southern California, and really throughout the State, demand response is something that we really have to get our heads around and it is very much related to energy efficiency.

And so I guess I'm curious as to how your experiences, if any of you have really dug into the automation side of -- you know, metering is one step but you can do lots of things with electronics, and metering is one of them, and automation is another, and there's a fairly robust, you know, set of technologies out there to help do that.

So, I'm wondering sort of in your approaches if you've gotten into not only the metering to inspire performance, but also the actual control and automation of that because it seems like it could come efficiently all together if one were to take an integrated look at the building.

MR. ORTEGA: Yeah, I'll touch briefly on that. We do have experience participating in auto DR. That program we started about three years ago, under PG&E's auto DR program. And we retrofitted several of our facilities, those that required technology improvements to participate in it.

We already had sub-meters deployed through all our facilities. About ten years ago we started investing in sub-meter technology through all our facilities.

It's mostly to address accounts that have multiple buildings tied to them. So, we didn't -- even

with that investment and we invested over a million dollars in sub-metering technology, but even with that we didn't -- we still don't have the granularity that we need.

Going back to your question on auto DR, one of the key ingredients, really, to be able to do that and participate in those programs is, in fact, being able to measure technology or measure the energy on a real-time basis.

We were fortunate that we had sub-meters in most of our buildings. We actually rolled in 16 of our largest facilities into that auto DR program. Not only could we measure the energy consumption of each one of those buildings, but we also tied the meters -- I guess also tied them to PG&E's -- I forget the name of the technology that we were using at that time, but we also tied our meters to -- and our control ENS systems to respond to the signals of PG&E.

But even with PG&E's signals not being there, in order words when they didn't call for a peak demand period, we can still utilize those to manage our peak demand, regardless of whether or not there's an event called for under auto DR.

So, yes, it is very useful for that. I didn't get into the details, but that was one of the main

reasons I mentioned auto DR.

COMMISSIONER MC ALLISTER: That's really good stuff and I mean I think you could actually extend it to DG. And, you know, at the individual customer level it's not too far off that you could actually have arbicharge going on, or some kind of -- you know, if you had storage on site and things like that. We're moving towards all that very quickly.

And I think, you know, leveraging these various -- 758 has a particular focus, but it's not a big stretch to sort of envision it helping to lay the ground for -- or actually being the forum for a broader discussion on, you know, what kinds of equipment would go in buildings, right.

So, anyway, I kind of want to see if anybody has comments on how that might look or your own experience along those lines. So, thanks for that, Lin.

MS. BROOK: So, Karl or Denny would you want to speak to automation in your -- in the building projects that you've been involved in? I mean very different buildings, right, campus buildings for Karl, and I would characterize maybe small and medium commercial buildings for you, Denny. I mean there's probably a big range of automation technologies that you're seeing in these buildings, either incented or just through your business

practices.

And that, I think, maybe would complement what Lin was saying about the Santa Clara buildings.

MR. MANN: Yeah, for myself, I would probably say, you know, 90 percent of the buildings that we do that are under the 100,000-foot do not have any type of BMS system in there. Which is why I think some type of monitoring or ongoing monitoring is even important in those buildings as far as not having a BMS system where they can look at any trends or that type of data.

Again, as the costs for those types of systems, now there's these new systems that are coming in, that aren't really a full blown BMS system that still give you a lot of the same benefits that you can get from those systems.

And as that price point comes down, I think we're going to get those into buildings with less square footage.

MS. BROOK: Oh, great. Okay.

COMMISSIONER MC ALLISTER: Go ahead. Sorry, go ahead.

MR. BROWN: In terms of automation, I want to defer to my colleagues at the Demand Response Research Center at Berkeley Lab.

MS. BROOK: Okay, that's fine.

MR. BROWN: I will say that --

MS. BROOK: That's where we got Lin, by the way. That was our recommendation.

MR. BROWN: With demand response I do notice that we find a lot of things that can be permanently implemented as energy efficiency measures, and then you go on to find more demand response.

MS. BROOK: Right.

MR. BROWN: And those measures are often on peak, so there's a lot of savings to be had on peak.

MS. BROOK: Uh-hum, good.

COMMISSIONER MC ALLISTER: The other question I had was really, specifically for Denny, probably.

Now, are you finding that your expertise in maintenance and the use of data to streamline maintenance and improve the quality gives you a cost advantage or kind of a price advantage in the marketplace, in some way, or allows you to be more competitive when you're, say, responding to an RP or looking for new customers?

MR. MANN: Yeah, I think for us what it's been is a differentiator from other contractors that aren't providing that level, if you will, of engaging the customer in how their building's using energy.

That whole education piece I think is critical

to helping them make the best business decisions they can.

So, we really look at it as a differentiator and it really does help us working through projects that maybe typically they wouldn't do because they're just looking at that front-end cost, rather than looking at the bigger picture of what it's costing them not to do the project.

And so we try and work on kind of changing their mindset, if you will, on getting past that front-end cost and looking at the bigger picture.

COMMISSIONER MC ALLISTER: Great, thanks. So, I'm going to turn it over to Martha.

MS. BROOK: I think how you described your kind of evolution in your business from a contractor to a service provider was a perfect kind of capsulation of the change in business practice, which was awesome, it was great.

COMMISSIONER MC ALLISTER: Yeah, that's good stuff. So, I will turn it over to Martha and anyone else who wants to comment.

MS. BROOK: Great, thanks. Do we have any comments?

MR. ASHUCKIAN: Yeah, we have a -- well, we have one question here and actually had one from the web,

that it's specifically on a different question, but I think actually may be appropriate for this panel.

It's, "are there special strategies for reducing energy use in the retail sector?"

And I just wonder if anybody might be able to address that?

MS. BROOK: Anybody? Anybody?

MR. MANN: Retail customers, I'll use what was Long's Drug Stores, it's now the CVS's on there. Typically, those fell under this whole -- when I was talking before about cutting back on maintenance. And, you know, unfortunately, that's one of the areas in retail where they've really been hit real hard. And so, again, maintenance goes back to that.

CVS, for what it's worth, doesn't do preventative maintenance on their equipment. Their business model is run to fail. You know, a lot of the CVS stores, traditionally, were kind of -- their footprints were all the same.

Well, then they brought in the Long's Drugstores, which are 30-, 40-year-old buildings and now they're having issues with it.

With that said, the pharmacies are the most critical part for them. So, you know, the one thing they do invest in is keeping the pharmacies, you know,

with the temperature within the guidelines of that.

But retail has been really hard hit and CVS isn't the only one that uses a run-to-fail policy, but that is their policy on 6,000 locations.

MS. BROOK: Wow. Wow, okay. Do you have any?

MS. WARD: I might just answer that from a pretty high level perspective, which is, you know, one of the tools is this B3 benchmarking tool, and given Andrew's talk about the role of benchmarking and how it plays, what's critically important is as these tools get put in place, and as rating, labeling, and disclosure, and then programs begin to sort of pick up those low-hanging fruit opportunities at retail establishments or any other space use that's not currently captured in the current dataset of comparison tools.

So, like CBECS is an excellent resource, but it has a sampling problem which doesn't represent 70 percent of the buildings in the marketplace.

MS. BROOK: Uh-hum.

MS. WARD: CEUS, you guys did a much better job over-sampling in the California market.

CBSA, the northwest version of over-sampling in that area.

But there's still a pretty large percent of the buildings that don't have a reference case. And in that

case simulations are really the one way to begin to build together this space use.

We do a lot of work on convenience stores, retail spaces, grocery stores and other things. And I thing that as you begin to narrow down from our population of buildings, either at the sort of owner level of those retail chains, or at the State level as you're beginning to make priority choices of limited budgets, that's important to get the reference cases right.

And, that retail is a particularly difficult and challenging one because that retail encompasses so many possible other drill-downs of silo to activities on a space usage basis that are going on in that facility.

MS. BROOK: Uh-hum.

MS. WARD: So, you know, we'd like to have that conversation and help sort of drill down on what are consistent and replicable opportunities to classify like-to-like buildings in order to be able to better target the DSM programs and to better target the benchmarking so that those sorts of segments of buildings don't get treated badly when the disclosure requirements come out.

MS. BROOK: Right, right, good. Good point.

Do we have another question, Dave?

MR. ASHUCKIAN: Yeah, I just wanted for the record that that was the question from Tracy Von Lone, from Glumac.

And George Nesbitt has a question for this panel, CalHERS.

MR. NESBITT: Thank you. Nonresidential buildings, it's funny we talk about motels and hotels -- motels -- I'm sorry, high-rise multi-family, which are residential occupancies.

You know, and then in the codes portions of the residential portion fall under residential codes, portions of it actually fall under nonresidential codes.

And I've done some modeling of multi-family, and I've taken the same building and run it as a low-rise, and as a high-rise, in a non-air conditioning climate. As a low-rise, it's a heating-dominated building. You call it a high-rise, the same inputs, it becomes a cooling-dominated building. And these are buildings that have no air conditioning.

So, we're calling high-rise multi-family nonresidential buildings, we're calling them cooling-dominated buildings, we're doing cooling-dominated measures to get -- to reach code or get savings, yet they have no air conditioning, and we're actually increasing heating energy.

MS. BROOK: Are you complaining about our compliance software, is that what you're doing? I'm not sure.

MR. NESBITT: You know, this is tools for nonresidential buildings so, you know.

MS. BROOK: Okay.

MR. NESBITT: You know, other things are -- air leakage doesn't matter in nonresidential buildings according to our energy modeling and we don't have things like quality insulation. Yet, every nonresidential building I've ever stepped foot onto, they install insulation as poorly as we do in residential.

As I said yesterday, you know, I'm fighting with a mechanical engineer, he doesn't know what a room-by-room load calculation is or an ACCA Manual D. I'm redoing his working. A, proving his work was not a real design, and trying to guide him to show him how to do it.

So, in nonres we have as many issues with quality and things not -- A, not being designed right.

MS. BROOK: Uh-hum.

MR. NESBITT: B, not being installed right. And then we don't have the commissioning, or retro-commissioning. And, you know, when we look at the data,

you know, we know that you have a brand-new building and some of them perform really well, and a lot of them don't. And, you know, it's design, installation, and commissioning.

So, we know how to build, we know how to retrofit more energy efficiently. We know the answer, it's how to do it.

So, I'm just, you know, hitting on issues and I like to be consistent and repeat it, and finally, hopefully, it sinks in and maybe we do something about it.

MS. BROOK: Okay. It's going to take a few more times, but not today.

MR. NESBITT: Yeah.

(Laughter)

MS. BROOK: Often. Early and often, right.

MR. NESBITT: It's preventive maintenance.

MS. BROOK: Okay, Karl wants to respond and he's got 58 seconds to do so.

MR. BROWN: Modeling has its strengths and weaknesses, and to support its weaknesses is one of the best reasons to do a lot more metering and monitoring.

But what that really is is feedback.

MS. BROOK: Uh-hum.

MR. BROWN: Feedback from actual operation of

buildings back into the design and modeling and construction. And, you know, all those feedback loops are broken, we need to fix them.

MS. BROOK: Okay, very good. Thank you.

MR. NESBITT: You know, we've heard, oh, we have to have -- you often hear we have to, you know, do modeling and tune it to utility bills, which actually requires utility bills.

But the experience, like in NYSERDA, is most contractors never bother tuning the model. So, on the program side they figured out, you know, how to kind of estimate it.

And I've done, you know, my seven Banpf audits last year we had to use TREAT, we had to tune the model. So, you know, I'm working with my dysfunctional team and I get a model back, well, it's tuned. Well, yes, the utility bill answer in the model, total answer is right. But where those pies are split are totally off.

So, we can tune the model to the wrong answer.

MS. BROOK: Sure.

MR. NESBITT: You got to then actually tune it right to the -- you know, so everything actually is falling right in all the right places. And then it's, hopefully, the computer is actually making all the right calculations, that it actually happens.

MS. BROOK: Right.

MR. NESBITT: But this is also a lot more work.

MS. BROOK: George, you've been blinged.

MR. NESBITT: I've been blinged, I did hear it, yes.

MS. BROOK: Officially blinged. And Alecia's going to follow up, though, just to close out.

MR. NESBITT: Yeah.

MS. BROOK: Thanks.

MS. WARD: So, two things. One is in the marketplace, you know, it would be great if we could just sub-meter everything because then we'd have a lot of information and we could make really good choices about it. And in the one percent of the market that has sub-metering, that's a wonderful tool.

In the other portion of the market where we have, you know, Smart Meters, where it's not sub-metering, but it gives us a lot more 15-minute interval data that we can make choices about, that's great, too.

In the 70 percent of the rest of the market where we don't have those two things available to us, we are required to use the limited technology of simulations in order to depict reality.

And then what is important about that is to be able to have a feedback loop that consistently helps us

actualize our predicted reality in the simulation with the actual reality that's happening.

And I'd say all of these tools that we've each described, sub-metering and real-time feedback loops, and simulation-based benchmarking and all sorts of things help to make better choices.

But each of them, individually, is like a Polaroid snapshot of a building. And what we want to do is piece all those Polaroid's together so we have a bit of a video, a moving target for how that building is performing and then how each of the different tools we have in our toolbox, whether it's DSM programs, or whether it's benchmarking at a policy level, or whether it's something else can be deployed and pursued of capturing the most efficiency that we can, with the greatest savings in that process.

So, you know, I get the indictment, but all of these are imperfect tools.

MR. NESBITT: No indictment was served.

MS. WARD: And we just sort of need to find our best path of imperfection towards a good solution that hurts as few people in the marketplace as can, captures as much savings as possible, and then moves us all sort of forward on the path.

MS. BROOK: Great, thank you.

MR. NESBITT: I mean we hear lots of cries about how bad the modeling is but, yeah, I mean my dad 30 years ago, Carl Nesbitt, my dad, and I've found -- you know, we haven't gone back and tuned our models based on actual data and we have to do it, it's important.

MS. WARD: And a good deal of research and sensitivity analysis will help to inform those things. As we say, okay, if you take parametric models and you plug them into DOE II versus Energy Plus, versus Apache, versus whatever that what we learn in the process of figuring out how the engines, themselves, treat the inputs is a really valuable piece of how we can control for variables when it comes to the policy, and the rating, and the labeling, and the disclosure on the back ends.

MS. BROOK: Uh-hum, right.

MR. NESBITT: Even with the same engine in Micropas and EnergyPro we still have some differences, and I can talk about that.

MS. WARD: We're going to keep working on it.

MS. BROOK: All right, thanks. I think that's it for this panel.

COMMISSIONER MC ALLISTER: Okay, actually, can I -- I want to -- this sort of got me thinking about something else that -- I think it's quick, but I want to

make sure that it's at least beginning on the record.

So, you know, there's been a lot of talk about how we have to get -- you know, we have to have a broad blanket, try to get all the market sectors that we possibly can if we have any hope of meeting the State's goals for energy carbon, what have you.

So, I'm thinking about the hard to reach part of the commercial sector and, you know, there are lots of different definitions of that but, basically, sort of small commercial. You know, you mentioned the retail that is, you know, hard to slice and dice properly, and you could say that about a lot of different sectors. You know, you got fast food, you've got a lot of different unique types of businesses.

So, how might -- this is a big question and we're not going to answer it here, but how might we make sure that the contractor community or the services community that is going into those facilities has the appropriate expertise to get to the level that we want?

We just talked about all these, you know, different models, and it's fairly technical, quite technical and it requires specialization in the workforce, okay.

So, what contractor is going to sort of ally themselves with, you know, Carl's, Jr., Jack in the Box

or, you know, whatever particular retail chain to say, okay, I'm going to do all their buildings and here's what this looks like, and it's going to be cost effective?

I guess, you know, we need to -- to some extent that ecosystem sort of exists, but we've got to move it sort of to the small commercial and down market.

And what can we do in this proceeding to sort of help establish a foundation for that workforce development? We'll talk about that, probably, in the next panel, but sort of make this most accessible to the most number of businesses.

I see Martha nodding. I'm probably not articulating this question exactly.

MS. BROOK: I'm not nodding because I have the answer.

COMMISSIONER MC ALLISTER: Yeah. Darn, you know, I was hoping you could just tell me the answer to that.

And I think the workforce aspect is probably for the next panel. But as far as making these tools effective and efficient to implement, sort of accessible to the kind of contractors that are necessarily going to have to go get these buildings, you know, we're not talking about multi-nationally ESCos, probably, we're

talking about, you know, relatively local, relatively small businesses.

So, I guess what's the sweet spot there?

MS. BROOK: Karl?

MR. BROWN: Well, I mentioned feedback and broken feedback loops. What we find is that it's a matter of communication gaps and lack of ability for the different actors in the building, the delivery process in the building service process to effectively communicate.

So, if this market is not being fully reached, it's a communication issue between the service providers and their clients.

And I think there is a potential role for creating a language standards to create a better basis for communication.

MS. BROOK: Okay, good. Denny.

MR. MANN: I would just say, traditionally, contractors are very poor at marketing.

MS. BROOK: Uh-hum.

MR. MANN: And so as I've gone through like this QM program, we've gone back to PG&E and Southern California Edison, you know, whatever you can do to help get that word out so it's not, quote/unquote, the contractor trying to educate the customer when they've

never heard of it before.

You know, the more we can get Energy Star out there, the more that we can get information -- you know, a lot of times in these smaller buildings there's a mindset that the energy cost is the energy cost, there's not an awful lot I can do about it.

And you can sit down and say but, you know, 35 percent of your energy cost is going to the air conditioning and we're the guys that do the air conditioning, let us help you do that.

MS. BROOK: Uh-hum.

MR. MANN: But up until now they're really only hearing it from us. You know, they haven't really felt the pain of time-of-day billing, or peak day pricing, those types of things.

But I think the more we can get the message out there that then the contractors are following up, you know, they just need to hear it from more than just one.

MS. BROOK: Right.

MR. MANN: So, that's the whole education, increase the awareness. That's why I started by saying I think going to these buildings and getting the ratings on the buildings is critical because, again, it opens it up.

We talk to building owners in San Francisco, you

know, when 1103 was coming and say, we'll come out and do a benchmarking for you. Oh, no, you know, I don't really -- the next thing you know San Francisco passes it and they're calling us and saying can you do the benchmarking. We've been trying to tell you that.

MS. BROOK: Yeah.

MR. MANN: So, it's that education piece.

MS. BROOK: Right, and I think that a rating program could, if nothing else, serve that role very, very effectively of just being that educational and outreach piece.

Alecia?

MS. WARD: So, I think it's an excellent question and I think that the way tools like this can empower is it would be quite a jobs program if everybody was going out and doing an audit on every single building in the entire service territory and in the State of California. I don't think that's feasible.

I think the things that these tools can do is to funnel down.

For example, in the Minnesota benchmarking tool we have 8,000 buildings in this tool. We know that 1,400 are located in X's service territory. Of those, we know that 400 exceed their benchmark by more than a certain percentage.

So, the next time they have to hit a performance goal they can go out to that population of buildings and do all the audits.

What that means is that if you've got a dashboard and a simulation that's doing a benchmarking, you've got a lot more information to share with the person on the ground who's going to go out and be the feet on the ground walking into that building.

And if you use the low-signature disaggregation models that are out there to sort of say and here are the top five things your guy probably needs to look for when he walks through the door, that should make the most effective use of a ratepayer dollar if you can combine Smart technology with good feet on the ground, in the targeted market that you're trying reach.

And all of that depends on properly segmenting those markets out and getting good comparison buildings, and then empowering people to have, you know, capacity building and the right level of education as they walk into that building.

MR. MANN: Another thing that we've done is Da Vita Dialysis Clinics. We went out and we did benchmarking on 40 of their facilities. And so that they had a budget of X number of dollars, they could do capital items with upgrades and stuff like that.

Well, here's your 40 buildings, here's the ones with the lowest scores, here's the ones with the highest scores, let's take those dollars that you have available in next year's budget and funnel those to the buildings that you're going to get the biggest bang for your buck for.

COMMISSIONER MC ALLISTER: That was a dialysis clinic, you said?

MR. MANN: Yeah.

COMMISSIONER MC ALLISTER: Okay, so that's like a perfect small business. That's a great case study, we should look at that.

MS. BROOK: Yeah.

MR. MANN: Actually, and they're very proactive, they have this whole Village Green that they run and they're very conscientious as far as the community and the environment.

MS. BROOK: Yeah, fantastic.

MR. ASHUCKIAN: We have one more comment here from the audience.

MR. HARGROVE: Hello, my name is Matthew Hargrove; I'm with the California Business Properties Association. We represent the International Council of Shopping Centers, as well as building owners and managers, and several other commercial groups in the

State of California.

We've been working really hard with the Energy Commission on 1103 implementation. And I wanted to address the issue with retail.

We found 1103 was difficult for many reasons not mentioned here today. It's not because those -- most of the retail groups don't want to become more energy efficient, but there's some very real issues in that sector that need to be addressed.

I mean we could point to Wal-Mart, who's really one of the most energy efficient companies in the nation, who's sharing all their information.

But, really, with a lot of the buildings that we have, and we had to benchmark under 1103, the issue really comes down to we have tenants in those buildings and many of those tenants have master meters.

And even though we own the building, or we own the ground, it's very difficult for us to come in and force information out of our tenants, or force retailers, who want to make sure they have a certain type of lighting in order to sell their product in a way that we can influence that.

So, I think we absolutely agree with this whole proceeding today. I mean we know that the tough nut to crack here is existing buildings. That's where a huge

amount of the energy savings are going to come from.

We've been saying all along, under AB 32 that's where we're going to get the greenhouse gas savings.

But it's very difficult, as Fran said earlier, to come at this with a one-size-fits-all approach.

And I think sometimes in the past when we've done that, it's actually taken us longer to get around to the solution because we've been trying to apply something that works in class A office to an industrial building, or to a multi-tenanted retail facility.

So, we look forward to bringing in more practitioners who are doing this. We have a lot of folks who are not actually here in the room today because they're out at their properties doing energy efficiency.

We have folks who work for companies who do this on a daily basis because it's a bottom line issue for them. They're very innovative and they're out in front on this stuff.

So, we look forward to continuing to work with the Energy Commission.

We supported 758 in the Legislature and we have a stake in making sure that this thing works, so we really appreciate this, the time that everyone's taken today.

But I wanted to make sure I addressed the retail issue because that's been a particularly tough thing, as Martha can tell you.

In fact, all of our buildings, class A office, any time you have a building with a tenant in it, you have some difficulty implementing some of this stuff.

So, thank you very much.

MS. BROOK: Thank you, Matthew.

Okay, I think we're going to take a break.

MR. ASHUCKIAN: Okay. I just want to make, again, one more announcement that all the presentations and the handouts that have been throughout these last two days will be on our website by Friday.

And with that, let's take a ten-minute break and be ready to go at three o'clock.

MS. BROOK: Thank you.

(Off the record at 2:50 p.m.)

(Reconvene at 3:02 p.m.)

MR. REGNIER: First off, I want to thank everybody for their patience. This has been an action-packed couple of days. I'm glad everybody could stick it out to the very end.

Like Dave said, this is the nonresidential building upgrade program's panel.

I'd like to first introduce our panelists. Our

first panelist is Carol Zabin. She's got a PhD from the University of California, Berkeley, and is the Chair for the Green Jobs Council, California Workforce Investment Board.

Carol is a labor economist who's research has addressed job quality, workforce development, low-wage labor markets, and other economic development issues.

Carol was lead author for the comprehensive California Workforce Training and Education Needs Assessment for Energy Efficiency, a study commissioned by the California Public Utilities Commission.

Carol also serves as Co-Chair on the Donald Vial Center on Employment and the Green Economy.

She is on the Executive Committee of the California Workforce Board and Chairs it's Green Collar Jobs Council.

She regularly provides technical assistance to labor unions, low-income advocacy groups, training institutions, and government agencies.

Before joining the Labor Center she was on the faculty of Tulane University and UCLA.

MS. ZABIN: Thank you and thank you for inviting me to speak on this panel.

Is this working good?

MR. REGNIER: Yeah, yeah.

MS. ZABIN: Okay. So, I think I am supposed to address question 30 and a little bit of 31. And, really, my expertise is on the workforce side and not so much on the driving demand side, although the two certainly are related.

I was really pleased with the scoping plan and I'm saying that to Commissioner McAllister because last time I spoke at a hearing I was a bit more critical. So, I'm happy to say that I -- although I could quibble with pieces of it, in terms of the identification of the key market needs I thought was right on.

And I want to address each of the market needs identified really briefly, in a minute. Let me just list them first, and the needs that the scoping report identified are the need for stackable credentials, which is just lingo for making sure that people have training paths where you get credit for your previous training and can build on it.

The alignment of training programs, so they fit together, the importance of defining quality standards, the role of the CEC in promoting the value of skills, standards and certifications.

And then, finally, filling skills gaps of, really, the incumbent or the current workforce.

Before I go into a little bit on each of these,

I just have a couple overarching recommendations that actually affect each of these areas.

And the first is that I think we're moving towards this and there was mention in the scoping plan, but I think there's a tremendous opportunity in the Brown Administration and going forward to really pull in the Labor and Workforce Development Agency. And, really, that we should have all the planning and investment in the workforce area by the CEC, and the CPUC's, and the IOU's really should be done in concert with the Labor Agency, and through some sort of interagency advisory committee that includes the Workforce Board, the Division of Apprenticeship Standards, the Department of Industrial Relations, the Employment Training Panel, as well as our education institutions.

So, that's point number one and I think all these specific issues can be moved forward by that interagency collaboration.

And I do hope that the Green Collar Jobs Council, which is a committee of the State Workforce Investment Board, and that I'll be chairing, can play a role in that.

The second point I want to make is I think for the commercial sector the key, really heretofore

untapped strategic opportunity for the State in terms of workforce education and training is the State Certified Apprenticeship System.

Our study that was mentioned a minute ago, looking at workforce needs in this sector really showed that about two-thirds of the workforce is in the construction trade. Another six is sort of in the professional designers, specifiers, architects and engineers.

But that importance of the trades really means that that's a key area for focus. And other forums have sort of gone through the litany of why apprenticeship, as a structure, is so valuable.

But just to super repeat it really quickly, you know, it is about a hundred million of private money. You know, most programs are five years, so it really is the college for construction industry trade's work. It's demand driven. Employers drive the curriculum so it's valuable to them.

It's, of course, an earn-while-you-learn model, so it's better than college in the sense that you exit without a huge debt, which is now occurring.

So, I think however the CEC can have an influence, either through funding from EPIC, through your bully pulpit role or participation in any

interagency agreements, through your involvement in the CPUC proceedings, through your support for Federal grant opportunities looking at apprenticeship and including apprenticeship is really going to be key.

So, just to very briefly go through the specific areas, alignment and stackable credentials are really an important thing to do. The CEC doesn't, I don't believe, have that much leverage or ability to help that.

There's great things happening in the State, trying to get community colleges and apprenticeship working together. AB 554 that passed last year actually forces the WIB to work and align better with apprenticeship.

I think the key area, however, that the CEC can play a role in, which I have also said in other forums, is in developing and adopting standards.

And you already have some experience in this with standards certifications for raters, in acceptance testing. You can work with -- you can really build off the work of the DOE, which is also involved in creating skill set certifications.

And you can help promote standards, not just through participating in the CPUC proceedings, where this will all be debated once again, but also in the

non-ratepayer pots of money. We're going to be seeing -- you know, we may be seeing $500 million per for five years, if Prop. 39 passes. There are revenues from the cap and trade auction that will -- some of which will go into energy efficiency.

And in a little bit more agile and perhaps more flexible forums, pushing standards, if only to experiment with their value and test and evaluate their value will be possible.

I'm going to stop there.

MR. REGNIER: Thank you.

Our next panelist, Bill McNamara, has more than 25 years' of experience as an executive and senior manager in all aspects of business operations, planning and business development, and product development for technology companies.

For the last ten years Bill has worked within the energy efficiency industry designing and implementing commercial retail grocery, and large commercial commissioning programs, developing and patenting energy management systems technology for industrial sector, compressed air and refrigeration systems, and developing systems for ocean wave electrical generation systems.

As Director for Energy Efficiency Programs in

California for PECI, Bill worked closely with the California Conservation Corps to architect, design, and successfully implement the CEC's ARRA-funded Energy Smart Jobs Program to substantially save energy and reduce costs for traditionally hard to reach commercial retail facilities located throughout the State, and create energy industry jobs and viable work experience for CCC Corps members located throughout the State.

Working with the CCC, Bill is now designing the next generation Energy and Workforce Development Program which is focused on commercial retail, large commercial, and residential buildings.

MR. MC NAMARA: Thank you. First, I wanted to say thank you for this workshop on AB 758, and also for our participation. In my opinion, this is one of the best that I've seen.

COMMISSIONER MC ALLISTER: If you can get closer to the mic, I think it will help.

MR. MC NAMARA: As I said, in my opinion this is one of the best that I've had a chance to attend.

The questions that I'm addressing today have to do with -- in question number 29, question number 30, and it has to do with the fact that there are many types of diversity, much of which have already been identified over the last two days here, in the commercial building

sector.

So, what kinds of strategies and approaches might be used to effectively gain more energy efficiency across those -- across those areas of diversity amongst commercial, or shall I say, nonresidential buildings?

So, in the first case there is a very strong need for contextualization for the building owners and ratepayers for whatever the program opportunities might be that are opportunistically presented to them.

That has to do, in many cases, with the ability to communicate to them from a marketing perspective, as well as to apply to them an understanding of what the benefits they might actually expect to get from these programs look like.

In addition to that, they also have a need to know what other programs might be available.

So, the actual outreach to these individuals, although they are in different parts or different sectors of the nonresidential building part of the energy efficiency perspective, they actually have a commonality in terms of their need to understand what the programs are that are available, how they can make use of them and, in many cases, one of the greatest obstacles, which has been addressed before, is the fact that they may not in fact have the finances capable of

addressing what we would like them to do, which is a whole building perspective.

So, the whole building perspective, itself, is an interesting aspect that does need to be contextualized further for building owners in the sense that even if we were able -- and even if they were able to financially afford and willing to implement all the measures that might be recommended for their building, in fact it's an iterative process. It's a continuum of change.

So, setting the expectation for those building owners of the fact that they're going to be iteratively addressed over time, for reasons that are both economic, they might be program availability, incentivization and other factors is simply a fact.

And in many cases, as was addressed earlier today in Martha's presentation, the vast majority of the commercial buildings are small- to medium-sized buildings. And so addressing these particular buildings requires a combination of being able to outreach to them effectively, as well as to communicate all of the opportunities and benefits that are possible.

This is a -- you know, it sounds like a fairly straight forward thing to do, perhaps, from an information packaging stand point, but getting people to

listen to this and respond in ways that you want them to is a whole different art.

So, commonalities in terms of actual opportunities across these buildings are fairly straight forward. For example, virtually all the buildings have HVAC of some type.

All of them, as has been illustrated earlier, those HVAC systems are running very ineffectively in many cases, or it's certainly very inefficiently.

There's a need for commissioning in buildings, there's a need for a number of particular strategies, energy strategies that lead to the whole building approach, including things like control systems.

So, from those perspectives, which leads me to question number 30, in my experience and the things that I've been doing for the last several years, the ARRA, recent ARRA program, the Energy Smart Jobs Program is a very good case study for a very large-scale pilot that was implemented across the commercial retail sector, specifically targeting small businesses.

And the small businesses were distributed throughout the State, which has the further complication of being located in multiple utility districts, that had multiple utility programs, some having finance offers, some not.

Those particular programs, what we did was we constructed a business model wherein we would go and we actually hired, as a subcontractor, the California Conservation Corps.

We sent Corps members out under -- trained them, a combination of university, community colleges, manufacturers, other business partners, energy efficiency companies, and we put together an approach to these buildings wherein the intention was to contextualize and bring the building owners into an understanding of what it is that might be possible within their building.

At the same time we automated, using a hand-held iPhone-based device, using software that we developed at PECI, specifically to do energy surveys that were done locally at the individual facilities.

The surveys, themselves, were actually instructional in two ways. They would teach the surveyor how to do the surveys. Now, they'd already been trained, but the reality was it was push/pull application so that technology could change, so that when they moved from utility district to another the messaging could change with it.

In addition to that the information, once it was gleaned from there, could be uploaded to individuals who

were professionals, and all from an energy efficiency stand point, for evaluation purposes.

They were also trained to observe other energy efficiency opportunities in those facilities that were beyond the six measures, which were targeted at commercial refrigeration, commercial refrigeration lighting, and control systems for compressors and economizers, those sorts of things.

The results of that were that over 6,000 stores, retail stores disbursed across the State, were actually surveyed. And from that 6,200, actually, from that number more than 5,000 of them converted to do all of the measures that were recommended.

So, it's a very, very high conversion rate, most of which was due to the fact, A, that they understood really what the things were that we wanted to do; B, that they actually did produce the results.

And also, we used the peer groups, such as associations, like the Korean Grocers Association, and things like that to establish case studies, communicate those case studies out to individual groups, and get the information out in a much more effective manner than just they received something in their utility bill, or perhaps there's a public announcement on radio or other forums.

So, one of the key elements from a workforce development stand point is the fact that in many cases the work that's done by the professionals in the energy efficiency industry are not actually things that they perhaps should be doing. Meaning that you may have a very over-qualified individual doing important work that's appropriate for that, but some of that work may in fact be suitable and, therefore, represent workforce development opportunity for someone new coming into the marketplace.

So, we actually stratified the workforce and then identified those tasks to competency levels and training levels, and distributed those works so that we could bring more people into the workforce and also allow a much more cost-effective model to be applied and, therefore, make the energy efficiency dollars go further.

MR. REGNIER: Thank you, Bill.

Our third panelist is Jenna Olsen. Jenna Olsen is the Director of Core Products, Customer Energy Solutions at PG&E, where she directs a portfolio of offerings that help customers manage their energy usage.

Her team manages emerging technologies, rebates, incentives and program offerings for residential, small and medium, and large commercial and industry customers.

She also manages the technology platforms that help customers understand their energy use and build plans to reduce their use.

Prior to this role Jenna served as Chief of State to the Vice-President for Customer Energy Solutions, and also managed third-party and government partnership sales channels and energy efficiency at PG&E.

Before coming to PG&E, Jenna worked with a sustainability consulting firm advising multi-national corporations on integrating sustainability into their businesses.

She also served as Executive Director of the Tuolumne River Trust, a San Francisco nonprofit where she now volunteers.

She has a joint master's in public policy and natural resources from the University of Michigan, and also graduated with high distinction from the University of Virginia.

MS. OLSEN: All right, thank you. Thanks for having me here to comment on the AB 758 scoping.

I'm going to address questions 28 and 32, but want to give a couple of overarching comments about whole building, first.

And first want to talk about -- it sounds like

whole building kind of means different things to different people. In some cases maybe it just means doing multiple measures targeting different end uses. Other cases maybe it means deep retrofits, getting more than maybe 50 percent energy savings, or maybe it's equivalent to the residential whole house building program where there's some kind of a loading order and a focus on the building shell.

So, wanted to let you know PG&E has proposed in our '13-'14 filing with the CPUC to do a whole building demonstration project. And we've been building our thoughts around this. We still have lots of conversations to have with the energy division around this, so thoughts here are going to be high level and preliminary.

But wanted to share with you where we're heading on these thoughts and most of that has been informed by a workshop that was held in May by the California Commissioning Collaborative that dove into a lot of these issues.

So, what are some of the features of whole building? And it starts, probably, with performance-based. It should be based on some kind of measure of the actual performance of the building.

Also, this should capture the equipment, as well

as the operational, as well as the behavioral savings that can be achieved in that building.

Thirdly, it would use interval data to establish the baseline as well as to measure the savings that have been achieved.

So that, then, necessarily takes us to the fourth which is that's the M&V protocol that's used? And there are some protocols, IPMVP Option C, which fits pretty well but may need some modifications, which we can talk about during Q&A, potentially.

So, what is the actual program? So, it starts with a base lining of the energy usage. PG&E's territory, we're mostly fully deployed with Smart Meters, so we have 12 months' of data for pretty much every building we have in our territory, so you can do the baseline. Need to make some adjustments to it, obviously.

And then you apply the treatment, or the intervention, or the program, whatever terminology you want to use.

And so we're thinking about a wide range here of things that could be done, starting from maybe more traditional to potentially being more expansive, starting out with multiple retrofit measures, then looking at advanced controls. Obviously, retro-

commissioning fits very well in here.

Then you can layer on some of the energy information services that were talked about in the previous panel, where you have energy dashboards, continuous loops of feedback from the interval meter data.

That can then enhance and streamline the audit and retro-commissioning screening processes.

You may then want to even go towards enabling continuous treatment where, instead of just having a single intervention, a single program at a single day, where that's happening over time.

So, whether that's providing just this feedback, could that, itself, be the intervention in the program? Do you need to have some kind of coach, particularly, maybe for the smaller companies, the smaller businesses that don't have facility engineers on staff?

Or is it repeated tuning and maintaining commissioning?

Again, you'd have the M&V based on the building performance using the meter data, and then an incentive that could be paid one time. If you're getting into continuous, maybe it's an incentive paid over time.

So, there's obviously some challenges that would need to be worked through. What are the base lining

capabilities of some of these software tools? Again, I mentioned the EM&V protocols.

And then the idea of doing continual base lining, if you're going to have continual treatment, so that you don't have to stop working with the customer to help them improve their facility so that you can establish the baseline, so that you can do the measurement you'd want to be able to have some kind of continual base lining there.

One issue that I think is probably particularly relevant for AB 758 and the CEC that this whole concept brings into -- brings into the fore is the idea of the code as the baseline.

So, we all know that oftentimes there are situations where there's equipment that is still operational, maybe it's kind of a repair-indefinite situation, and it's far below code. And the utility's allowed to offer an incentive based on that increment above code.

And so, really being able to motivate the customer to make that change can be difficult in that situation.

And if we're looking at measuring the savings based on meter data, which helps us streamline the process, if you have to then go in and measure where are

things related to code, that starts to get away from some of the efficiencies of this whole building approach.

So, we think there's an opportunity and the CPUC has kind of opened the door to this with dual baseline policy, that maybe we could get together with the CEC, the CPUC and look at is there some way to be able to offer the incentive to the customer to make that full change from way below code to to-code, or a little bit above code, and then do some kind of accounting on the back end so that there's not double counting. You would attribute those savings of getting to the code to the Codes and Standards Program that increment above to the voluntary program. That would be largely not visible to the customer because they don't really care about that, anyway.

So, all right, so getting quickly to answers to the questions, "How can whole building upgrade programs be encouraged in the commercial sector?"

I think exploration of these approaches that we're considering would help to bring the approach down market, as well as work with larger customers and, again, addressing the issue with code in a mutually agreeable fashion between the CPUC and the CEC.

"Should specific equipment, advanced upgrades be

considered whole building?”

So, again, I think ideally the whole building program would not be focused on equipment but, rather, on the building performance.

If you wanted it to be focused on equipment, you could probably still make that work. In that case advanced controls probably would work since, usually, they’re going to be controlling multiple pieces of equipment in the building.

And, “What criteria should be considered for a program to be whole building?”

So, again, it should be performance-based on maybe energy use intensity or a benchmark. It wouldn’t distinguish between equipment operational and behavioral savings, it would use the interval data. May want to define some kind of comprehensive nature of the program and may eventually evolve that program into a continuous treatment rather than a single intervention with the customer.

And the last question 32, all continuous commissioning. As you can tell, the way we’re thinking about whole building really just starts to merge continuous commissioning into that overall concept. So, yes, continuous commissioning can play a critical role and we have some ideas about how that can work in the

SNB sector as well. Thank you.

MR. REGNIER: Thank you, Jenna.

So last, but definitely not least, we have Derrick Rebello. Derrick Rebello is the President of QuEST. Mr. Rebello has over 15 years' of experience in the implementation and evaluation of energy efficiency programs.

At QuEST Mr. Rebello managed a program portfolio of more than $40 million in energy efficiency programs across small commercial, large commercial, and industrial spanning sectors -- excuse me -- and industrial, spanning sector as diverse as high tech, wastewater treatment and healthcare.

In addition, QuEST manages a very successful local government partnership, the East Bay Energy Watch.

Mr. Rebello has a PhD in economics from the University of Washington.

MR. REBELLO: Thank you for giving me a chance to speak here today.

I think questions 29, 31, and 32 are mapped to me, 29 and 31 will probably start to blend together.

When I think about question 29 I think about it more from a sort of comprehensive stand point. So, if we're working with small, medium businesses, even large, how can we sort of capture as much energy savings once

we walk into the building, you know, looking at 20 percent or something in that neighborhood.

And a lot of this is, I think, driven by some of our local government partnerships. Talking with cities who have climate action plans, who are trying to hit these goals, they're struggling to figure out where is that savings going to come from because no matter what they do to their buildings, it's still really a drop in the bucket.

So, thinking about it within that context of trying to go deeper, I think the answer really is split between two -- splitting commercial between small and medium, and then large, because I think are different.

Thinking about small and medium business, these business owners, they are the purchasing agent, they're the accountant, they're the sales manager, they are the facilities manager and they're also the energy manager.

They don't have time to go a website, pull down an application, figure out what they should do. And so in that case your best bet, if we're going to make some strides, is through a direct install model where somebody is walking through the door, they're doing an audit, making some changes in real time, and then following on with that customer and continuing to coach them.

And this is really a sort of a door-to-door type of a campaign.

We've seen pretty good success with that model because, really, I think the hassle costs and the information costs are probably the bigger barriers relative to, say, finance for example.

Thinking about the larger customers, you know, I've been working with them for over 15 years and I've brought amazing projects to them financially and they said, ah, you know, let me think about it. I mean stuff that would pay back in three months, some stuff that was actually free.

And these are large hospital chains, I mean people who have been on the record of saying we support sustainability, et cetera, et cetera.

So, you know, they need some specific solutions. They need expertise. I mean what works in a data center doesn't necessarily work in healthcare.

You also have to have some credibility before you walk in the door.

All that being said, even when you package up these financially fantastic projects, I think the organizational aspect of this is becoming, at least in my mind, the bigger barrier.

Finance isn't really an issue with on-bill

finance these days, where you can get $250,000 at zero interest, so long as we can identify a number of projects that should just fly, but it doesn't.

And so we've sort of taking a step back and are walking customers through almost an organizational interview to coach them along to see whether they actually have the -- not the resources to do a project but, really, the organizational ability. Because, again, I think those barriers are much larger.

Moving on to question 31, again, I think the issues with the small sector are information and time. And so your direct install model is going to help solve a number of those problems.

With regards to the split incentive, we haven't seen that as being much of an issue, particularly in the small and medium side. Most customers will pay for financially attractive projects out of their own pocket. So, I'm thinking in the neighborhood of, you know, nothing more than $2,000.

Many times their leases are such that they do not have to get approval in order to move forward on these items.

And then we also asked about community organizations. QuEST ran a program with the City of Oakland, called Oakland Shines, which was an ARRA-funded

program. And for that program we brought in a number of neighborhood associations, we worked with them very closely, we went to their events. I mean that was sort of one of the key items there was going to where the business owners are, and they're at their monthly meetings, they're at their monthly breakfasts, those sorts of things.

So, going there, partnering with them, identifying the individual within that organization or association who is really the key mover or shaking I think is very important, and getting a project done with that individual because they then become sort of a figurehead for doing more within the organization.

And then I guess, sort of lastly, as you're doing these campaigns, thinking -- we had a very successful campaign in Chinatown, in Oakland, and the clear message there was you've got to do that in language and in culture. There's no way we would have been as successful as we were if we did not have Cantonese speakers as part of the program. It would never have worked.

And the last question, continuous commissioning; I think the answer is yes. With the advances in software tools and the plethora of Smart Meter data that we have, continuous commissioning, now the time is

right.

I think, though, that we need to sort of change a bit of the rules in terms of how the savings are settled. So, thinking about it within the utility program context the way that retro-commissioning programs operate now there are a series of engineering calculations that happen. You're talking about $10,000 to $20,000 to pull it off on the low side.

That's obviously not going to fly for the small and medium business sector.

So, in that case we need an alternative method to settle on what the savings are so they can receive some sort of an incentive, or at least the utilities can claim credit for the savings.

And so we look to demand response in the way that a baseline is developed with demand response, and then after demand events happen there is a true up on what the savings are.

We've developed a couple of approaches that allow that to happen using just the Smart Meter data. So, I think that has a chance to provide a low-cost settlement vehicle for claiming the savings.

MR. REGNIER: Great, thank you.

I don't know if we've got any questions at this point or any comments by Commissioner McAllister?

COMMISSIONER MC ALLISTER: I think so. We actually have quite a bit of time, this is our final panel and I think we've got like an hour left on it, so we actually have time. Maybe if we -- I think we definitely ought to sort of squeeze the excellent folks here on the panel for all they can offer, but also open it up. And maybe if there's any more encompassing questions or issues that we need to get back to, that we didn't have time to cover maybe yesterday or today, and there's still people in the audience, we can potentially do that.

Let's see, I guess I had a couple of things, so just a couple of clarifications, really.

So, Jenna, I guess and the PUC, this is also relevant for the PUC, so the above-code issue, and sort of dual baseline and all that, I guess -- I'm sure there's lots of discussion going on at the PUC and we certainly need to be aware of that and, you know, probably more engaged than we are in that; but very critical that we be on the same page or at least in the same discussion with the PUC.

I guess I'm wondering about the tradeoff between -- you know, from a customer's perspective, absolutely. If they're way behind code today and, you know, we can only offer incentives that go above code, I

mean there needs -- if the option, if the alternatives are do nothing or get up to code, we clearly want some way to encourage people to get up to code, and so it would be nice to offer incentive at least for that piece, as well.

Anyway, I guess it seems like that, the whole free-rider issue kind of rears its head there because, you know, would they have done it anyway to bring it up to code? Maybe there was a trigger that was just basically compliance with the law.

So, we get back to that whole issue of, you know, should we provide incentives for compliance and, you know, open question.

But I guess what's sort of your feeling about -- or how's PG&E kind of approaching this issue? is there a position on that as far as what the -- yeah, what the tradeoffs there?

MS. OLSEN: I don't think we have a solid position on it. We think that it's, you know, as you just laid out, it's a real issue that we do see out in the field is stopping some customers from taking action. And that there's some room there for us to have a good conversation and come up with a policy that would work for customers and work for the programs, as well.

COMMISSIONER MC ALLISTER: Maybe what we need to

do is, either in this forum, or in the appropriate moment over at the PUC, is to sort of make sure we're communicating well with them and figuring out how we can align, yeah. Hopefully, we can align.

You know, Simon maybe wants to -- can make a comment here, too.

Oh, yeah, go ahead. Go ahead.

MS. RUDMAN: This is Monica Rudman from the Energy Commission.

COMMISSIONER MC ALLISTER: Oh, great.

MS. RUDMAN: And we're dealing with this issue of our evaluation of the ARRA programs. So, for our eco loans and our block grant programs, which are really small local governments, we're finding that the local governments' equipment is so outdated and they just can't update it, that it really has been an issue for us that the incentive -- I don't know why I'm nervous -- the incentive that we paid under the ARRA programs included replacement of equipment that was no longer up to code.

And through the process of the ARRA evaluation we developed the dual baseline approach and we will be presenting information on the savings based on early replacement, and then replacement as if there was a replacement up to code. So, it is kind of an issue that

we're finding.

COMMISSIONER MC ALLISTER: Thanks, Monica, appreciate that.

And maybe, Bill, do you have something to say about this as well?

Maybe let's let Simon go and then --

MR. PENNINGTON: Yes, Bill Pennington at the Energy Commission. I'm a little curious about the potential solution here.

What I was hearing is that in terms of attribution the Codes and Standards programs could gain the attribution at the utility for the getting to code portion, and then exceeding the code that attribution could go to the program that's causing the upgrade.

One thing that -- I think that sounds great. You know, I'm just, whoa, that's a good idea.

But I'm wondering what would be the funding source within the Codes and Standards program to pay for that increment up to code, given that that's not how they're allocated funding now?

They're allocated funding for developing the code and advocating for the code, rather than building by building incentives.

MS. OLSEN: There's no incentive budget within the Codes and Standards program right now. Right, that

is true, they're all things we'd need to work out.

MR. PENNINGTON: So you'd need to build that, then.

COMMISSIONER MC ALLISTER: Simon.

MR. BAKER: Simon Baker, the PUC Energy Division. So, at the risk of getting too far afield from my core expertise and I can definitely bring the evaluation folks, particularly Carmen Best would be an appropriate person to talk to about this.

But so the utilities do get credit right now for Codes and Standards savings to the extent that they advocate for new measures that are eventually adopted into code.

So, if any one of the measures that would, say, be contemplated in PG&E's whole building design program, if that were adopted into code then those savings would have been quantified and some attributed savings associated with that would be counted towards the utility's portfolio, if not in this cycle, in future cycles. And there's kind of a weird accounting that happens with Codes and Standards savings.

But kind of at the highest level they're already -- those savings already are being accounted for, which is why in the evaluation process it becomes really important to determine, you know, what savings

are occurring due to code improvements versus above-code improvements.

The other thing I would say is that the Commission, in the May Guidance Decision, recognized that there are, you know, sectors that have had challenges with code compliance and there may be -- a case could be made by the utilities, if they wanted to come forward in their budget applications to say, hey, you know what, we think that this particular area, and the classic example that's given is residential HVAC, is a problem area, and maybe some additional incentive dollars should be applied in this area, pilots developed, what have you, to try and just get equipment installed to code and done properly.

So, perhaps Jenna can speak to the extent to which the utilities did propose that in their applications. I know that there was some support from parties, such as TURN, for doing things like that. But this is definitely an issue, Commissioner, that I think we should continue to follow up on in our interagency dialogues.

COMMISSIONER MC ALLISTER: Yeah, for sure. I guess the question or the problem is that if we sort of relegate it -- I like the example you just gave and the sort of potential solution because the problem is if we

pass the code and then just sort of say, okay, we're done with the incentive portion except for what we sort of include in the forecast with the basic that we -- you know, sort of with some presumptions about what's going to happen going forward, then that removes any incentive to then go really get retrofits, you know, proactively.

Because it's sort of like it doesn't impact the attribution bottom line for utilities.

So, if we could build a program like that where it's, okay, there's an explicit goal associated with going out there and ramping up, whether it's two-code kind of upgrades, or whether it's with some increment above code, then I think that would send the kind of market -- that would send the signal to the marketplace that we want to be sending.

So, yeah, I guess the question is how ugly does it get in the implementation?

But, yeah, Jenna, did you want to --

MS. OLSEN: So, I'll just clarify, yes, Simon, exactly how you described it is the way that the utilities already do get credit for the work that is done on the codes, to the extent that the utility is involved in impacting that code.

So, I think what I didn't say explicitly enough was that then, if we also claimed savings at the

individual project level that could potentially be called a double counting, right, because it was already counted for in the codes component of the savings.

So, that's where you would need some kind of back end accounting to say, oh, that amount of the savings was actually already counted for when we looked at the savings attributed to the specific code. So, that was the thought there.

MR. PENNINGTON: So, I have a thought about how this might work. If the savings that was determined for the project was based on a performance basis, comparing the baseline to where the improvement went, and that was the whole savings that was associated with it, you could pay that much, but there's no way to pay more than that at this point.

And then cost for accomplishing that would be a mix of the low cost of the Codes and Standards program and the higher cost per savings of the upgrade program.

It seems like the benefits you could get out of that could be accomplished at a lower cost than if you assumed the whole cost was driven by the upgrade project. And you might see this pencil as a totality.

MR. BAKER: That's an intriguing idea, we'd have to give that some thought.

I was just going to close the loop on kind of

the savings attribution. So, my understanding is that the way that the attribution for utilities getting credit for Codes and Standards savings is through a modeling methodology that assumes a certain compliance rate, right. So, part of the rationale for the Commission welcoming proposals to provide incremental incentives for measures to just come up to code in areas where you have low compliance rates is that you're not actually -- you're perhaps not actually seeing those savings which your Codes and Standards attribution methodology says that you're getting. And it's basically accounting for that difference. That was the rationale behind that.

MR. PENNINGTON: I agree.

COMMISSIONER MC ALLISTER: I just have one other question about sort of local government capacity development. It seems like we're always -- I mean we, rightfully, I think, are focused on sort of the service providers, contractors and kind of the marketplace as sort of classically defined.

But, let's see, one of the panelists, let's see was it Derrick, you mentioned the local government? Okay, right, you were working with all the East Bay folks.

I guess one of the -- so, one, is my

preconception of where local governments are right now correct, which is they've been gutted, they have low funding, they don't have a lot of construction activity, their permit fees are down, their staffs are pretty meager relative to where they were a few years ago and, you know it's hard for them to really focus on much of anything consistently right now, other than just sort of keeping things running.

And yet they have -- they're on the hook for regional, local carbon reductions, they have all these programs to try to implement. I mean I know a bunch of local jurisdictions that I've worked with, they have aggressive goals. They tend to focus on their own buildings. They don't really -- they kind of do marketing and outreach to the citizenry and the business population, but they don't really do it very well. They're kind of at wits end about what to do.

So, how can -- so this -- I guess it's sort of about the workforce and a sort of other support kind of questions.

You know, how can the workforce, how can the folks that work for the local government be better prepared to do this stuff?

And then, also, how can they engage with the contractor and service provider community to sort of do

things more effectively and get their local economy kind of focused on this?

MR. REBELLO: So, most of my experience is with the East Bay, so Contra Costa, Alameda County. And short of Berkeley and Oakland, no one has the resources to really put towards both, you know, their own buildings as well as sort of -- you know, forget about that, you know, trying to get out into the community and affect change there.

And so I think that's where the role of local government partnerships sort of step in where you can bring technical expertise to them, allow them to contribute as best they can.

But I can tell you, I mean budgets are as bad as you've described, such that we actually have to pay people to come to meetings so they can participate. And they need a budget number in order to participate.

So, I think continuing along that mechanism right now, I don't -- I'm not -- you know, I'm not representing any local government people here.

But I don't know that there's a lot more capacity for them to do much more, other than to support and pitch in, provide testimony, provide quotes from the mayor and sort of push that envelope. But short of, you know, boots on the ground, I think really Oakland's the

only one that's been able to sort of step up in that way.

MS. OLSEN: I'll also just add, and Derrick, you can correct me if this seems wrong to you. And this, again, from a couple of years ago when I managed the Government Partnership Programs, actually, they put more into the community work than into their own buildings. And I think because that whole process of long lead time budget cycles, and that was a bit of a barrier.

So, I think, and I'm sure even more difficult now, and as you've commented that budgets, that local governments being what they are right now.

MR. REBELLO: Yeah, and I guess another quick example, I've approached a number of cities in the East Bay and said, look, you know, through the on-bill finance program you can get a million dollars of no-interest loans. Let's use that to sort of plow through your list of projects, you know, help make a big dent in your climate action plan, at least on the municipal side. And so, you know, a million dollars you can cross of, you know, a pretty major barrier right there instantly.

And the uptake has been really, really slow. And so I think it goes back to, as I was saying earlier, the organizational issues. Does it matter to the city

manager? Does it matter to the facilities? Does the person above the facilities really care all that much?

And so right now we're working through, you know, really a structured process, sort of a Six Sigma type process, to get the organization primed to do the project, but not investing any money in audits or things like that because, otherwise, they're just going to sit there.

COMMISSIONER MC ALLISTER: So, I guess what are the factors that influence whether a local government -- I mean I can imagine Berkeley, you know, I know Oakland, you know, they're going to be on the progressive end of the spectrum.

But you also have, you know, Western Riverside, or Chula Vista, or places like that that are -- you know, they're doing things independently and proactively in their own way, which doesn't look like Berkeley, it's got some other model.

I guess I'm trying to sort of think what -- so, practically speaking, you know, within this proceeding, getting the right sort of people involved at the local government level, whether it's that contractor community in that particular place, you know, the right officials, the right utility representatives, nonprofits, whatever it is, looking for models that we can sort of call out

in this implementation.

MR. REBELLO: Yeah. Right, so with the East Bay, I mean you've got your Berkeley's who are at one end of the continuum and then, I don't know, pick some other community that's on the other end.

What we have seen in the last -- I think we've been doing this for about a decade now. We've seen in the last couple of years the Climate Action Plan seems to work in that cities are now more interested in the Local Government Partnership, what sort of resources can we bring to their community.

We do door-to-door campaigns where we bring in -- get approval from council or from the mayor, bring in PG&E, bring in the local contractors and it's a door-to-door process. Now, again, this is targeting that small and medium business sector.

So, you know, I think that that works pretty well through the Local Government Partnership now, so that's one model.

COMMISSIONER MC ALLISTER: Great, thanks. So, Monica.

MS. RUDMAN: Monica Rudman, the Energy Commission. What we've found with the ARRA programs, we have some preliminary feedback, and the one-time infusion of funds created this urgency and I think that

really motivated people to implement projects immediately.

And in my experience with working with local governments, I think you need to have a champion on site. So, anything that can be done to find one person that's going to take that project and get it going is really more important than almost anything.

MR. REBELLO: I guess I have a counter to that which is you need a champion, yes, but in many times that champion just does not have enough to kind of get those projects moving forward.

And we've had that with a number of cities, and projects that have been sitting for two years, and these projects have paybacks in less than six months. I mean there's no reason for that so --

MS. OLSEN: Yeah, I would just echo one of the ARRA implementers we met with recently talked about success they had with their municipal program, and also mentioned that same issue of the limited availability of funds was enough to get the government to, you know, move off the dime. Whereas if the funds are available this year, they'll also be available next year, then there's maybe not as much reason to do the project because you can always do it next year.

MR. REBELLO: We've heard a similar thing where

cities have said, you know, how do we get you to move, and they said, well, tell us the money's going away.

MR. REGNIER: That's one way.

So, we've got a couple members of the public that wanted to speak.

MR. SCHMIDT: Yeah, Steve Schmidt from High Energy Audits. I wanted to come back to the performance-based incentives, which I think is a great idea. So, I'm a PG&E customer and I know you rolled out something related to natural gas use, I can't remember the name. But they monitored our natural gas use from one year to the next over the three winter months, and we got a payment for reducing our use.

I know from Smart Meter data analysis we can identify the base load of a house, what we call the idle load, where every building is using energy whether people are gone or not, and we measure in watts, and there's a huge variation.

And on top of that, it's very easy to reduce. So, we've seen lots of houses go from 900 watts down to 500 watts, or 300 watts down to 200 watts.

And I'm wondering if, first, how successful was the natural gas program because it worked for us?

And, secondly, could you do something related to a Smart Meter analysis, like idle load or something?

MS. OLSEN: Yeah, so I think the natural gas program you're talking about is the Winter Gas Savings Program, which is actually not an energy efficiency program it's its own proceeding.

So, yeah, we have -- I don't actually work on that program so I don't have the details at my fingertips. But, yes, it has been successful. We have some, you know, anecdotal data that for some customers, knowing that program's there, they aim for it.

For other customers it's kind of, wow, it's a surprise they did less than last year, they didn't necessarily do anything specific to make that happen.

But, yes, we do have on our "my energy website," for both residential and small and medium business customers dashboards to look at your energy usage, day, month, year. Fill out some profiling information and get recommendations for actions you can take to reduce your usage. You can set a plan and then track your progress against that plan.

MR. COHEN: Hi, David Cohen from the Energy Coalition. So, we're currently managing the Southern California Regional Energy Center, which is for L.A. County and Huntington Beach, funded through grants through Southern California Edison, and L.A. County's using some of their Department of Energy Funds, their

ECBG grant.

And I feel like we've really hit a golden nugget in the public agency sector, so we found some deficiencies in the Local Government Partnership Programs with the utility companies in that we found that it was a very reactive program design.

Where we though if we actually acted as energy managers for the entire region of the Los Angeles County territory, especially working with the COGs down there, and we helped -- besides setting up a financing program, using private equity lenders, with a master lease model that we're actually basing all of the loan interest off of the Treasury Bill rate and the credit of the actual city, we are actually getting interest rates between two and a half to four and a half percent, depending on the credit rating of the city.

And it's basically a no-nonsense load product that -- but the Southern California Regional Energy Center is working to try to come up with cash flow, a cash flow positive energy efficiency projects and then selling the business case to the city.

We're doing that in two ways. The first way is through aggregated procurement. For example, we found a lot of cities wanted to do VFD replacements on their pool pumps. So what we did is, on behalf of all the

cities, created an RFQ, put it out to the market, and then basically got tiered prices from vendors, also dealing directly with the manufacturers saying, if we bring you 100 customers how much will you charge us, with installation, for this product.

Then what we do is we put pro formas together based on all of the different short list of vendors and we go around to all of the different cities that have expressed interest, and now we have 20 cities right now that are in the process, in some form or another, of actually implemented full pump VFD retrofits through their Local Government Partnership implementers.

We're just bringing the deal, helping them sell it. We've got templates that are helping cities with staff comments, specifications that they can put into their own procurement documents, if they want to actually get into contract.

Because we are bringing cash flow positive energy efficiency, we qualify under Government Code 4217, which allows them to sole source our procurement opportunities for them.

We're also doing whole building demonstration projects on three properties right now, which we call the SoCal REC audit, which is to take an ASHRE Level 2 audit and then add demand response, as well as renewable

energy and carbon offset gap analysis to the energy efficiency to actually come up with potential income sources, in addition to energy efficiency improvements that could all be incentivized through the IOUs.

Final thing that we're working on is a streetlight retrofit that the RFQ is just about to close out on the market. And then we're going to be, again, putting together a short list and we've got pro formas where you can -- I'll finish in a second. Where you actually have a cash flow positive where you could retrofit your city-owned LS2s, LS3s with zero -- finance it through our master lease agreements and you have zero impact on your general fund.

We're actually taking some extra money to try to put together an insurance plan so that it kind of acts as guaranteed savings. So, if the savings aren't realized, they can actually put a claim against an additional loan loss reserve fund that we have.

So, I think it's really taken off and we're getting tons of interest. We're doing presentations right and left on this in Southern California, so we'll let you know how it goes.

COMMISSIONER MC ALLISTER: Great, thanks very much, really interesting stuff.

And I was going to ask about COGs, but I think I

won't, actually, at this point because I think that's a good example.

I know ABAG has been working with many of the Bay Area governments, but kind of in a different capacity. And you know, SANDAG is kind of a unique beast down in San Diego.

So, I think there's some unique models around the State.

I did want to actually, you know, an acknowledgement that Carol needs to leave at some point here pretty soon, is that right, yeah --

MR. MC NAMARA: We've got about 15 minutes.

COMMISSIONER MC ALLISTER: Yeah, okay. But I kind of wanted to talk -- so, let's see, we've talked a little bit about, you know, examples and case studies, and sort of the program area.

Also, George, I'm going to ask you to hang out for just a few minutes.

MR. NESBITT: I'll be patient.

COMMISSIONER MC ALLISTER: So, I'm kind of interested in the workforce, so the folks actually going out there and doing the work. Right now, you know, it's sort of no-man's land out there. And you have contractors and you have lots of excellent contractors. There's a lot of sort of diversity in the marketplace

and lots of different business models out there, some of which, you know, are sort of more sustainable for the individual employees than others, right.

I guess I'm interested in sort of if you could point out or describe kind of a model that you would say, hey, this company, and this apprenticeship program, or this training program is really kind of the way it ought to be done, or at least headed in the right direction, you know, sort of real-world examples of kind of, okay, here's the sort of right level of training at the right moment for this particular market need.

And maybe give -- fill out that sort of -- you know, our sense of that model a little bit, if you can?

MS. ZABIN: Well, I would give an example of Marina Mechanical. Denny was here.

COMMISSIONER MC ALLISTER: Yeah.

MS. ZABIN: And you probably know Jim Hussey, the President of that firm.

And their website is interesting because, you know, they're what we would call a quality HVAC, innovative, definitely into continual learning, and emerging technologies, and educating the customer, and kind of the things that we would like to hold up as a good example.

And Jim was a -- he was actually not associated

with the State Certified Apprenticeship Program, and he describes, and it's even on the front page of his website, that he was chasing skilled labor and there just wasn't very much of it outside of that apprenticeship system.

And we're talking highly-skilled, five-year apprenticeship in sheet metal and in plumbing pipe -- and pipe fitters.

So, for that quality commercial market or public market there really is a system, and it is called the State Certified Apprenticeship system. And it works because the employers jointly get together in some association, in his case SMACNA and the Mechanical Contractors Association, and they all put in money.

And they don't have to chase each other's workers because it is a multi-employer consortium.

So, structurally, it functions, and it also functions from the worker's point of view because as they get trained, they get paid better. And so they make a career commitment, and so you see people working 30, 40 years in the industry from when they were very unskilled, just high school grads to, you know, whatever.

So, there may be variation in the individual quality. I don't think we can hold up everybody who

belongs to that system, there's always going to be variation. But I think the point is that there's a structure that functions and it is a structure that is really good at meeting code, because the employers are in the compliant component of the construction industry.

There's a bit part that isn't compliant, right. They're not so great and you can see why, at going beyond code because they have to deal with the market as it is.

So if, in your position, trying to push the market, it's worth public investment to build off that already very functional system and make sure that it's, you know, pulling in and incorporating the emerging technologies and, you know, going beyond code.

But that is the quality segment from a training and skills point of view.

Now, it might not be the quality segment from a marketing point of view, that's kind of the beauty of CalCTP, it builds on that and then it says, okay, we're going to train contractors in marketing because that particular set of contractors, you know, they have been more concentrated in the quality segments, in the public sector where they just -- you know, and in subcontractors to general.

So, they don't have to, you know, bid and sell

energy efficiency.

But from the workforce skills perspective, it's not so much pinpointing, you know, a particular employer, it's pinpointing the system that they belong to.

COMMISSIONER MC ALLISTER: So, that system attracted Denny. So, he wasn't aware of it and then he became aware of it, and then he started contributing to it?

MS. ZABIN: Right, and they joined it, they joined it, yeah.

COMMISSIONER MC ALLISTER: Okay, right.

MR. NESBITT: They went union?

MS. ZABIN: They did go union. Now, you don't have to go union. You can, you know, go through the State certification process as a non-union employer; it's not an exclusive system.

COMMISSIONER MC ALLISTER: Right.

MS. ZABIN: It is a demand-driven system, though, and you'll get turned down if your market -- if the investment has already happened, you know, it's like you don't want to create a new CSU or a new UC if the demand isn't there. And somebody's regulating that, and it's the same with the State certified system.

Unless you can prove that there's demand that

the current programs aren't meeting, you won't get certified.

COMMISSIONER MC ALLISTER: Okay, thanks, that helps a lot.

And I'd kind of invite Bill to kind of give us a similar kind of description of the ecosystem in which the sort of -- the context into which, you know, the workers that you're talking about kind of enter into and what that looks like sort of functionally speaking.

And really, the goal here is to try -- so, within the AB 758 proceeding to try to -- we know that it's in the legislation, but we also know that it's just in the water in Sacramento, right here, that jobs are, you know, the number one issue and we need to make sure that we're doing it justice, I think, in this proceeding. And highlighting the benefits, and where we can design the designing initiatives that we propose such that they do actually -- it has the intended economic and workforce impacts in the State.

So, I think it's really key to have sort of your views on this.

MR. MC NAMARA: Well, one of the design parameters of the ARRA program, according to the RFP that was let, and according to ARRA in general, was to get as much in addition to the creation of jobs, the

alignment with DOE, save energy, and at the same time create matriculated economic benefit across a wide part of the State.

So, when we looked at the design and I first contacted the California Conservation Corps, we were saying, okay, so we've got these young people, typically between the ages and 25, looking to get into the job market. They have typically very high unemployment rates for that particular age group spread across the State, and not really clear paths in many regards as to how they would get into the energy efficiency industry.

So, what we did is we aligned that set of resources, thinking of them as resources, as entry level individuals into the job market on energy efficiency, and took a look at all the work that was done in energy programs, typically.

And then, specifically, this particular program was focused on commercial retail, small facilities like convenience stores, and small grocery stores, gas stations, that sort of thing spread across the State.

Focused on, again, commercial refrigeration, lighting, within LED lighting within refrigeration, control systems for compressors, those sorts of things.

And so we put together a premise, which was that the Corps members could be trained in a relatively short

period of time to go out, under a structured environment, using technology-driven survey equipment to gain the kinds of information that would be the first steps of a stratification approach to a census, an energy census for these particular buildings.

We called them surveyors. The intention was to drive the opportunity index up, meaning get to a place where we could let people know very effectively, on a very personal basis, by having Corps members' outreach program first, Corps members showing up, contractors, these leading or following in that process, and at the same time training the contractors in the same environmental condition as the Corps members, with the same types of people, on the same types of measures.

And the result of that was we found that they actually dovetailed together really well, meaning the Corps members established a great rapport. They were multi-lingual, they could speak the same sorts of language. They were from the same sorts of areas that the stores typically were located in.

And they response from the communities was very, very positive. There were some people, of course, who didn't want to be bothered, but their number one concerns by far were things that had to do with cash flow. You know, the fact that they are an incredibly

under-served community relative to -- as business owners, relative to the larger businesses.

So, many of them were unaware of what energy efficiency programs there could be out there for them. And, certainly, nobody had met with them personally to do the math. You know, to basically show them how it might work.

Or they were daunted by the process of applying for financing for energy efficiency.

So, they needed some -- I hate to use the word hand-holding, but they needed some very personal addressment of these issues.

And so the Corps members, as new members entering the workforce, were able to do direct installs of economizers, and certain lighting things. They were able to do the marketing side of it and establish, you know, really good personal relationships with the store owners and ratepayers. And then also do the post-install checks.

So, as I mentioned before, there’s a compression that’s occurring in the workforce. First of all, a lot of the workforce is transferring out. They may be retiring, they may be doing other things. The technologically driven demands for education levels and experience are increasing. A lot of the programs are

more complex.

There are a number of factors that are creating cost and efficiencies in programs. I know this having run many of these programs in the State of California and elsewhere.

That in many cases the cost of individuals that are actually billed to programs are not necessarily the costs that could be build.

And I don't mean any falsification, I mean simply that an individual that may be at a certain compensation level, a certain skill level may be doing, you know, 80 percent of their work at that level and 20 percent at some level that could be done by some other person, which represents a workforce development opportunity for stratification of work.

And so those approaches have been very successful. The program was developed as a pilot program under the ARRA auspices, the intentionality being that there would be something that follows which, by the way, there is, which you'll be seeing fairly soon. I should say coming to a theater near you.

But there is a lot of latitude in the workforce for decompression of cost-based, cost-driven opportunities and stratification into work that's more fit to finish in terms of who can do what sorts of work

and, arguably, more effectively in some cases than some of the more traditional experienced professionals.

COMMISSIONER MC ALLISTER: Great, thanks. Thanks very much, I appreciate that.

So George.

MR. NESBITT: George Nesbitt, thanks. I'm going to start on the workforce, you had a question, and then maybe I can come back to whole house a little later.

COMMISSIONER MC ALLISTER: Three minutes, man.

MR. NESBITT: I just --

MR. ASHUCKIAN: I want to thank Carol for her time.

COMMISSIONER MC ALLISTER: Thanks Carol.

MR. NESBITT: I just realized that after 26 years in the trade I am about the average age of a carpenter in the industry. Scary thought.

I started non-union, no training, got a job. You essentially work, learn on the job, learn as you go. I mean I was a heavy reader I'd, you know, take lectures, I'd read books, magazines, a self-learner. Moved up, actually went to work for myself quite early.

You know, absolutely we need to get into the union apprenticeship programs and teach stuff right there.

Unfortunately, unions are a small part of the labor force and have been declining. The bulk of the industry is non-union, non-trained, which is one of the big problems. And there's certainly a big cost difference between union labor force and non-union.

But we need to get into the universities, you know, we need to get into the design professionals, we need to get into all the schools, into the junior colleges.

I'm on the Board of Passive House California, and the lawyers are denying the junior college students the benefit of a real Passive House Project retrofit over liability. They've only done like eight projects in 20 years.

And, yet, I know from my involvement, you know, with the junior colleges, I know in the environmental, the HVAC program, you know, that the instructors don't necessarily know the ACCA standards and the various things. They're not necessarily teaching what we know is best or, actually, even what's code because much of that is in the code. It's, you know, minimum industry practice and/or manufacturer's recommendation.

And so workforce training's absolutely vital. You know, one of the jokes we've had in the HERS rating industry is, well, with ARRA there was a lot of money,

there was a lot of people trained and there were no jobs for them. So, you know, we can train people but there's got to be jobs for them.

COMMISSIONER MC ALLISTER: Well, that's kind of why I'm asking, actually, exactly that question, really is when Carol describes this program and they get people trained, where do those people go? What is the commitment, what is the nexus between the industry and those trainers?

And similarly with Bill, like when you put together a program you're producing a certain level of, you know, employee worker that's got a certain level of experience what -- you know, how do we ensure that that fits in with the needs of the marketplace?

And, hopefully, that can be a growing marketplace. If we're successful in this program then that will be a growing marketplace, and we'll have lots of slots for different levels of folks to fit in, and then have some professional development associated with that.

So, that's really kind of the whole reason that we wanted to have this discussion is so that we can talk about programs, talk about workforce and see how they fit together, and whether there are gaps we can fill with the 758 proceeding.

So, I ended up taking up a little bit of your time but --

MR. NESBITT: No, that's quite all right. If I understand right, in the apprenticeship programs you have to -- it's a job and an apprenticeship. So, if you're not employed, you're not an apprentice. So, in that sense as long as your job is viable, it's okay.

But, you know, when we get to junior colleges, when we get to Rising Sun, we get to a lot of these workforce development, especially with the younger, the unemployed, the people that have had issues there isn't necessarily jobs.

And, you know, then we're struggling with trying to grow this market and there isn't necessarily -- those jobs aren't necessarily there yet to move them into it. But, you know, it's the chicken and the egg.

MR. MC NAMARA: Well, I couldn't agree more in the sense that -- with both comments, in the sense that training someone to do something and upon the end of that process there not being any jobs available is a rather counterproductive thing.

It creates a number of issues for the people who give the training and also the people who receive it.

So, one of the things that we've been focused on is to, whether it's in a formal, California State

approved apprenticeship program, or something that is not that but it is similar to, is to make sure that the people that are being trained actually receive a wage. Meaning they do a day's work and they receive a day's wages for that work.

And that the training process, itself, is not just theoretically, meaning it contains all the theory that's necessary, but it's a practical, hands-on type of thing, pretty much the working definition of apprenticeship from the old days.

And so apprenticeship programs need to have an avenue, they need to have a purpose, they need to have a value proposition that's associated with that, that's communicable, understandable and acceptable, and has some kind of utility by whoever the recipients would be for that.

So, apprenticeship programs in the past often were tied directly to unions, for example, where they would have a union organization focused on sheet metal, or piping, or whatever that was, and people would be brought in under the union auspices, trained by union auspices, and perhaps also by third parties, and then deployed. You know, hired in and actually having work.

But they weren't necessarily all employed at the time of their training.

So, it's much like the problem that small businesses have in terms of not being able to finance energy efficiency measures, many of them, from a cash flow stand point. You can sit there and show them that the thing pencils out in two months, a return on investment, but they'll look at you and say, well, I don't have that money to offset what's not covered by incentives, if there are incentives. So, therefore, I'm not going to do this thing.

There are ways to overcome that from a value stand point.

But on the human side of the equation, when you're training people and then deploying them into opportunities, there has to be some sense of measured success, and hope, and opportunity for them in order for them really to perform at their full potential.

One of the great things that the California Conservation Corps does is it brings opportunity to many young people, who aren't actually employees of the State, but they're participants in a program. And as such they do a day's work, they get a day's pay.

And they learn something. They continue their education in general, meaning if they don't have high school diplomas or whatever level of education, they're actually required to continue that education as a member

of the Conservation Corps.

When they work on specific projects, like this, they actually are employed on that work. I mean they are deployed -- trained, deployed and have a future. They build resume potential, meaning they actually have something to put in their resume. They actually gain financially during that period of time.

They gain credentials, in many cases stackable credentials, so that they become a much more marketable entity.

And perhaps most important, in the process of working on one of these programs, they're exposed to literally hundreds of potential employers, often.

Now, the employment that they get may not actually be tied directly to the result or the thing that they're trained to do. But, nevertheless, that training was valuable to them and they may very well move on.

Many of the people from the Energy Smart Jobs Program went on to work for contractors directly. Some went other places, as well.

But the key is to create a value proposition that's strong enough so that it's not false in the beginning. Meaning, they're not just getting training for something that in theory should work. Rather, they

should be getting training and then deployed into actual work associated with that so they have the credentials, they have the practical experience, work experience, and then they have something that's marketable, that can be acknowledge by potential employers as a marketable set of skills.

Sorry for the length of that.

MR. REGNIER: No, not at all. I just appreciate the response.

I had hoped to speak a bit to a subject that all three of you guys can speak to with a bunch of authority, but addresses attention between the comments we had with Derrick and with Bill.

One of the things that you were discussing, Bill, is the need to set expectations properly such that if we're not able to get to all efficiency measures in the first set of programs, that the expectation is well founded that we can have access to that marketplace later to continue the work.

One of the things that Derrick said and that I've heard very much over the last couple of days in the residential and light commercial sector, is that the cost of the retrofit is not nearly as much a factor as the cost of the hassle associated with the program, with the retrofit.

In terms -- I'd like to hear, specifically, the ideas that you have on how to address that tension. There's no way of having a multi-touch program that doesn't have some hassle associated with it, but it would seem that there's a very specific set of elements or perhaps skills that are going to be necessary to thread that needle.

We've had some -- unfortunately, we didn't have Mark here to speak to that, but he's also spoken quite a bit to the sales aspect of it.

You know, you've got an enviable conversion rate and enviable smart jobs, and I would assume that some of the elements that you've had there would be elements that were required, but I'd love to hear you guys' opinions on it.

MR. REBELLO: So, again, thinking about the small and medium business sector, which I think is the target --

MR. REGNIER: Uh-hum.

MR. REBELLO: -- and trying to be comprehensive. As I said earlier, the direct install model is the one that seems to work best. I mean people don't have time to thumb through a website, fill out applications.

Within that there are really two types of direct install programs. There's sort of a general contractor

model where somebody goes in and they do the audit, and they look very comprehensively, and then they've got a pool of contractors that they'll bring in, if it's refrigeration, in addition to HVAC, or electrical, et cetera.

The other is more of a contractor-driven model, where the contractors are trained and then sort of armed with rebates, and they'll go out and sell the jobs.

Our experience is you don't get the comprehensiveness that one would like under that contractor-driven model.

And the main reason is a lighting contractor is going to do the lighting job and until the return to them of selling an HVAC project is equal to selling another lighting project, they're not going to do it.

So, as much as we would hope and we thought we could train them, it doesn't work.

And so looking at more of an auditor going in, taking a more holistic approach -- and what we're doing with one of the Local Government Partnerships is we're taking that holistic approach, we're selling what we can, what the customer has an appetite for, and then we're holding the rest of it sort of back in reserve.

And the goal is to continue to follow up with them and say, hey, look, the lighting project seemed to

go pretty well, you're saving some energy, what about doing that refrigeration project we talked to you, or maybe at this point there's a new program that we can tap them into.

But collecting that data and continuing to follow up with I think is pretty critical.

MR. MC NAMARA: So, I would argue that setting the customer expectation is the most important thing to do and it doesn't matter really the topic, but in this particular case energy efficiency.

So, in showing up at a store location, for example, to use commercial retail as an example, in many cases, as I mentioned, some of the smaller facilities had not actually been directly approached by energy efficiency programs other than, perhaps, they've received something in the mail or perhaps a telephone call.

But to have somebody actually show up in person to see them, that wasn't directly selling them something, but rather there to explore the opportunities of that particular facility and then tell them what that might mean to them, and how that could be beneficial, and help them understand how to navigate the process with the utilities, or whatever other factors were involved is a powerfully strong statement to that

particular store owner that they're important.

You know, first of all they matter, and they really do. Look at the numbers this morning, how many small businesses are there in the commercial, in the nonresidential side, right? There are -- that's the largest number.

And some of the energy density in those small facilities is actually amongst the highest of building per square feet. Refrigeration being a great example, which is one of the reason why the ESJ program focused on commercial refrigeration.

But setting that expectation requires delivering more than just telling them about the opportunity, but the commitment to follow up, the ability to help steer them to recommended contractors, if that's the particular program aspect.

But more importantly to tie together whatever may be available so they can actually connect the dots as to how to leverage not only the thing that they're doing, but this concept of whole building as a continuum of engagement and a continuum of energy efficiency improvements. Not, you know, hit and run type activities wherein people show up only to harvest the most available type of thing at the highest profit level, if it's a for-profit organization.

Those are the kinds of things that build, that set expectations really positively and build positive relationships between the customer and not necessarily with the particular utility, or the particular program, but with the idea of having energy savings as a beneficial thing to them and an important aspect of the way they think about doing business.

Because at the end of the day they're in business to do business and so the value proposition has to be made contextually real enough, and set the expectation that it doesn't have a start and an end.

Because even if we did a whole building, if I went there and did a real formal audit, and came back with all the recommendations that they could do in that building three months from now a new technology comes out, or another kind of incentivization where we didn't consider some aspect of the building envelope comes out, or they have a failure of equipment, or they have -- there are many, many possibilities.

We don't want them, we would be ill-advised in our engagement with customers to actually make a condition where they thought there was a stop point to it. And that's what a lot of programs do, they show up as a singularity, the person participates in it, and then later on they're surprised that there's something

else.

This is not a brilliant approach to energy efficiency, in my opinion.

MS. OLSEN: I'd just like to add on I wholeheartedly echo everything Bill just said.

Just to talk a little bit about it, our approach is to really look at where the customer is, use the information we have about the customer from segmentation and all the information we know, try to understand where that customer is along their journey. Had they been engaged before, is this their first engagement, what are they ready for, and understand their needs, present it in their needs and as a step along that journey that will continue.

Also, we're looking more closely than I think we have in the past at designing what the customer experience is, what the entire process for the customer is in participating in the program, applying for or receiving the incentive or the rebate.

And, particularly, looking very closely at SMB, trying to understand are there segments where we don't have enough opportunities for them to participate, and designing some products that are simple, easy, you know, don't have the big hassle factor.

Then wanted to just also comment on the direct

install models, that we've looked pretty closely at those and are looking at making them -- have redesigned direct install for the majority of the programs that are going to be in the next cycles, so that they are more comprehensive, working on making sure that when they get to that customer site that they're doing more than just lighting, that there are opportunities to coordinate, collaborate with other contractors who might have different skill sets.

COMMISSIONER MC ALLISTER: Thanks a lot. I guess, do we have some blue cards over there?

MR. ASHUCKIAN: Yeah, we have a couple more, actually. We have two questions from the web, Tracy Von Lone, from Glumac, has a question regarding how Smart Meters -- how Smart Metering will help overcome the barrier to achieving upgrades in small, noncommercial buildings. I mean, I'm sorry, small, nonresidential buildings.

And then we have Cheri Davis from SMUD, who has a question as well.

And then the last question from Tracy on, actually, one of our "bonus questions" at the end of the agenda, and that is, "How penalties for building owners for noncompliance on regulations, particularly AB 1103 would be handled?"

MS. OLSEN: So, I can address at a high level the question about Smart Meter. I think, kind of as I tried to lay out in my seven minutes on whole building, that if you can use the Smart Meter on the -- for the kind of the pre-measurement and the savings verification you can get around some of the intensive sub-metering, engineering, et cetera, which adds a lot of costs, which then means it's lengthy, it's complicated, and maybe not worth it to do that project for a smaller business, where the savings opportunity isn't as large.

So, that's one of the big benefits.

MR. REGNIER: Sounds like we've got consensus.

COMMISSIONER MC ALLISTER: Cheri?

MS. DAVIS: Hi, I'm Cheri Davis from SMUD. And I wasn't sure if this was going to be an appropriate topic, but since we were talking about hassle factor and SMB, I thought I would just bring this into the discussion.

So, first, just a little bit of history. SMUD's programs for SMB historically have been very widget-based and contractor-driven.

And I'd like to echo the comments you made earlier, Derrick, that contractor-driven really doesn't -- doesn't get you what you want. It doesn't get comprehensiveness and, basically, the contractor

does what's best for the contractor, not what's best for the customer.

And so with the help of ARRA funds this -- well, I guess this was about two years ago, now, we started a program called Complete Energy Solutions, which is a more comprehensive approach. I wouldn't call it whole building because we're not addressing things like insulation, but it is addressing lighting, HVAC, refrigeration, controls all at the same time.

And we have a program administrator that's going out and conducting the audits, and they're making the recommendations, and the contractor does the installation.

Starting next year I think we'll move towards a more direct install approach to the same program.

But one of the biggest problems we have in this program and the biggest break point we've had is on the permitting side.

For this program we decided to basically police permitting. In other words, the program administrator is required to get a copy of the permit.

And we did this for a variety of reasons, it's something we haven't done in the past. And surprise, surprise, this caused a lot of problems.

And in our other programs, in our contractor-

driven programs we've always told the contractor you have to comply with the law, you have to get all necessary permits.

Well, the fact that they were complaining so loudly when we started policing it tells us they weren't getting those permits.

(Laughter)

MS. DAVIS: And so that was a little bit of -- that was kind of dismaying.

But then in reality, when we watched the program deal with this issue, it's a huge problem because the contractor, for a small job, large job, it doesn't matter, they have to go to the city or county, they have to wait in line, they have to provide a to-scale drawing of their project, they have to pay the fee, they have to set up an appointment, they have to wait at the job site and all of this for something like an occupancy sensor wall switch?

I mean this -- it really -- I don't really even know how to do a direct install program when you have those kinds of barriers.

And we've tried to streamline the process a little bit with Sacramento City and Sacramento County, but there's only so far we've been to go.

We've tried a lot of, you know, what if we did

this, and what if we did that, and what if our program administrator acted as the -- acted as, basically, the inspector, what if we trained them? Well, no, there's labor issues.

And so we haven't been able to overcome that barrier. And for true whole building retrofits maybe this is not such a big deal because these are going to be really big projects. But for a program such as ours, which I think is still good, maybe not best, but good, you know, I think it's a big barrier that needs to be addressed.

And I don't know if it's something that the Energy Commission could address, or I don't know, maybe you have some comments along those -- how to solve that problem or what you've experienced, or any recommendations?

MS. OLSEN: I think I have to unfortunately say this is not an area that I am very well versed in. So, I've heard the same concerns and I think it's a rich area for discussion.

MR. REBELLO: Well said, yeah.

MR. MC NAMARA: So, I would add only that in some -- this is a perennial problem, so contractors, I think, it would be fair to say not all contractors, as has been said, actually pull permits before work is

done.

Most programs actually have language in their agreements that say it's up to the contractor to make sure that they have the appropriate documents before they do the work.

But unlike in the case of SMUD, that you mentioned, the programs don't actually police that condition, nor have the utilities in general.

So, how to get past some of that in the most positive sense, legitimate sense, so in some cases direct install programs can do things that are not actually alterations to the physical wiring or the building.

For example, an economizer, which is of the type for, say, an internal refrigeration device is something that plugs in the wall and you then plug this small refrigeration thing into it.

And so there are things that can be done on a direct install basis, legitimately, without violating any permit process.

But beyond those things, direct install programs, if they really are going to be compliant, will need to have ways to address the permit issue, and very few entities have stepped up to the plate to want to actually police that, and "police" being in quotes.

MR. REGNIER: Just as a follow on, to what extent do you find that difficulty shaping the design of your programs?

It sounds as though you've got some measures that are outside of the boundary of that which must pull a permit. So, either one, if you'd like to go first.

MR. MC NAMARA: So, having designed many energy efficiency programs in large commercial from whole -- you know, large building commissioning, to industrial, to residential commercial, I can say that without exception all of them have that language I refer to, but none of them have the -- either authority or the intentionality of determining that condition.

In fact, the most that I've seen done has been to extend to subcontracted relationships, for example a program may very well have a contractor participation model, and for the contractor to sign up they have to sign up to a certain level of agreement, so it's almost a pass through.

So, we say that work done under the program will be under, you know, all applicable local laws and statutes.

The transference to the subcontractor includes the same language and that's about as far as it goes, meaning it's a very well-understood condition, I think

by virtually any program that isn't done directly, perhaps, by an energy efficiency company and, therefore, under the same sets of standards and liabilities, that that pass-through condition is the norm.

MR. ASHUCKIAN: Okay, we have one more request, Sean Layerle, from TRC Solutions.

MR. LAYERLE: Good afternoon, my name is Sean Layerle, with TRC Solutions. We're an environmental engineering firm and we have business throughout the United States.

I'd like to thank the Commission and the day's panelists for a very insightful forum.

I have a question for Jenna, but I'd also love to hear perspectives from the other panelists and, perhaps, from the Commission as well.

We've worked with a lot of energy efficiency programs throughout the United States. And with regards to pay-for-performance type programs a lot of states, and a lot of utilities in other states have programs that actually require a significant portion of cost sharing, not just for the implementation of measures, but also for the study work that actually goes towards identifying measures or the technology. Monitoring technology, for example, that seeks to identify measures.

They might also require an up-front commitment for a budget towards implementation of measures, so there's a lot more skin in the game for customers before any of the program work begins.

Whereas in California it seems that the worst case scenario for a customer, in participating in an energy efficiency program, is the status quo, and so there might be a little bit less incentive for customers to move forward with implementation of a project.

Whereas in other states they know up front that the worst case scenario might be that they're out $30,000, or $10,000 or what have you.

MS. OLSEN: So, if we're talking about programs with large customers, we do have certain program models where maybe the customer will get an audit for free. But then if they don't follow through then they would have to -- they sign an agreement saying that they would pay for the cost of that audit.

And then there are, even in some of the direct install programs with the smaller customers, there is a co-pay involved so that there is some skin in the game.

MR. MC NAMARA: And it's my experience, as well, across many different market sectors that the vast majority of the programs require, and the utilities in particular, through their determination of the amount of

incentivization, the percentage possible, make sure that there is some customer skin in the game.

There are exceptions to that, but many programs do require that.

The timing of that, I think to your point, is fairly crucial. So, if the customers are required to make payment before work begins, or before the rebate processing occurs, or if they can't bundle that all together in some fashion that they think is reasonable, then the uptake of the program is diminished, speaking here in California, but I also run programs in other states, too.

So, it is to a large extent based on the way -- "the way things are." I mean in certain states, in certain environments the kinds of programs that available and the ways in which people participate in them may be slightly different, especially relative to the percentage of incentivization, the timing of incentivization and the way the rebate processes actually flow.

MR. ASHUCKIAN: Okay, with that I think we're going to have some closing remarks from the Commissioner.

COMMISSIONER MC ALLISTER: No more blue cards, no more questions?

MR. ASHUCKIAN: There's no more blue cards.

COMMISSIONER MC ALLISTER: Okay, great.

MR. ASHUCKIAN: There was the question regarding 1103.

MR. REGNIER: Yeah, it's one of the bonus questions. It's a very quick answer. The question was what enforcement is the Energy Commission planning on putting in place to enforce the regulations that are implementing AB 1003, which is Nonresidential Building Energy Use Disclosure.

And the brief answer is that by virtue of having the disclosure be a required part of a business transaction, that brings into play just a lot of the established contract law and fraud statutes, willful misrepresentation and that sort of thing.

If anybody would like, I don't have in front of me all of the code sections or the specifics, but the short answer is a lot of it's going to take care of itself just because the disclosure's going to be a mandated part of a transaction.

And in order to be legally binding, all of the mandated parts of a transaction must be present.

COMMISSIONER MC ALLISTER: Actually, one question on that. So, I guess, is there any sort of infrastructure support, anything like that, that the

Energy Commission would be appropriate to bring to that, to sort of ensure that the disclosure happens in the most effective way possible?

MR. REGNIER: We certainly have the legal capacity to do so.

The statutes that regulate commercial transactions, fraud, willful misrepresentation and the like, are pretty well established law and have pretty mature venues for being carried forward.

COMMISSIONER MC ALLISTER: Well, I guess I'm thinking like does -- and I'm not -- I haven't read 1103 and haven't look a lot at -- I should, but I haven't looked a lot at what the materials are that have been developed already, and how that implementation process is going.

However, if there were, for example, a standard format or something like that, that we could pitch in and develop, potentially as part of this proceeding, that would enable sort of that mechanism, the disclosure requirement to be -- to be taken full advantage of, let's say, from an energy efficiency point of view, or just from sort of a consumer point of view, then we could consider that at least.

MR. REGNIER: Certainly. And one of the positive elements of how the statute was put together is

it's very specific. And due to that specificity we've come up with a number of very well defined and very well-articulated elements as to what consists -- or what a disclosure consists of. And those are articulated very clearly and unambiguously in the regulations implementing.

COMMISSIONER MC ALLISTER: Great. Thank you. Good answer.

MR. REGNIER: I've read it a few times.

COMMISSIONER MC ALLISTER: Yeah, I bet you have. Thanks Justin, I appreciate it.

So, we're pushing five o'clock and I don't want to make a lot of closing comments, except to just really thank everyone for coming.

First, I want to thank staff, actually, because I have found this two days to be incredibly positive and energizing. And, really, it makes me excited to sort of roll up my sleeves and help keep this ball moving forward.

I think we've got great staff on this. We're going to look at bringing the right amount of resources to the right -- to each of these topics.

And, you know, the right expertise to make sure that we're engaging the different sectors of the marketplace and the stakeholder groups.

You know, one thing we're going to have to think about is on the sort of working groups or the support groups that we form for -- to carry implementation forward, you know, we're not going to just sort of sit back here behind the curtain and twiddle knobs and come up with a solution, right.

It really has to be a collective effort, so primarily with the PUC and other State agencies at that level to make sure that we're on the same page and working towards the same ends.

But also with the broader stakeholders on each of these topics, nonresidential, residential, if that's the right way to parse -- it may not be, we may want to talk about, you know, have a data group and have a tools group, et cetera, et cetera.

So, you know, always the tradeoff is trying to do it efficiently, with the right level of formality, because the more formal we get the more kind of administratively burdensome it gets but it also -- that may have some validity in some sense, so -- or some usefulness.

So, you know, informal can also work where we sort of -- ad hoc, you know, when we need that expertise and we're at a critical point we call the group in, or we have a WebEx or something like that.

So, we're still sort of really beginning to figure out sort of what that looks like going forward. And any suggestions that folks might have for that would be more than welcome.

But again, I think at the beginning I said I think this is incredibly important and could have a huge impact on our State for generations, and I think that that is very true.

And so it's a big lift and it's really a good thing we're doing here in the room.

So, specifically, I want to just call out Christine. Probably many of you have talked to her. She's going to step back into the room to get out of the way.

No, she deserves a lot of kudos here, as do the rest of the staff on the case here, Bill, Martha, I see Craig there, I see different folks, different staff is here. Justin and, let's see, Devi who ran a panel.

I'm going to leave a bunch of people out so I guess I won't try to -- Adrian there, yeah, behind the laptop there.

So, anyway, we got a good -- and Dave Ashuckian, who's sort of the fearless leader of that team.

So, I think, you know, we're on the same page and really working towards the same goal, and so I'm

really encouraged by that.

And together, with the PUC as well, I want to thank the PUC. I see Bruce over there.

Really, really I'm encouraged in a lot of different ways. I think there's a lot of goodwill and collaboration in the room and we want to keep it that way.

Let's see, so there are a lot of individual topics I could bring up, I'm not going to do that. I think we're all well tapped out after two days of pretty intense conversation.

I find my limit on this sort of thing, being over-stimulated for two days is about all I can take.

And I think we got a lot of good foundation and --

(Interruption by WebEx Operator)

COMMISSIONER MC ALLISTER: No, please, don't reconnect, don't connect.

MR. ASHUCKIAN: We didn't want people to miss the very end.

COMMISSIONER MC ALLISTER: Well, yeah, okay, great.

But, you know, there are a lot of individual topics that really will require heavy lifting, and a lot of digging and, you know, construction of new tools that

are going to enable us to get the result efficiently and effectively, and learn from what we're doing.

So, we've talked about a lot of those things today and I'm sure in comments and in the, you know, the working groups that we may choose to convene going forward, the draft action plan, and then the events or the workshops that we'll hold around the State, which I think will be very interesting.

I mean, we definitely are not going to do them all just here in Sacramento, we're going to try to get around the State, so we have to plan that out and figure out what's doable and what's worthwhile.

And then the final action plan is really going to be a document that directs policy in the State in very important ways. And so we'll want to structure it to be as relevant as possible and as impactful as possible.

So, we're going to need all your help, and all the folks who have been listening in and attending over the last couple of days, and beyond, to make that happen.

And, definitely, the CPUC and staff are going to be co-partners in that.

So, with that, I think I want to -- Dave?

MR. ASHUCKIAN: Well, I just wanted to just

remind folks that written comments are due on the 23rd.

COMMISSIONER MC ALLISTER: Okay.

MR. ASHUCKIAN: There is information in the notice about the docket, how you submit to the docket. And we encourage you to be specific. You know, tell us exactly what you think we should be implementing and encourage you, again, to provide written comments.

If you want to direct those comments to specific questions that are in the agenda, that's great as well.

COMMISSIONER MC ALLISTER: I would also point out that, so apart from the questions that were attached to individual panels, there are several questions -- let's see, seven questions it looks like at the end, that are just additional questions.

And, you know, issues like non-energy benefits, like financing, some of the issues that really the primary discussions are happening over at the PUC, and they're the ones that are really digging into these, we didn't want to overlap too much, but we wanted to make sure that we were sort of cross-pollinating.

So, folks with the appropriate expertise and sort of willingness to dig into those issues are more than welcome.

And those questions were not -- we didn't dig into those these two days but, still, they're very

important and they're front and center going forward.

So, read through those and make sure that you comment, if you have the desire.

So, with that, I'm going to adjourn the proceedings here. And again, thanks everybody for coming, it's been a really good couple of days.

And thanks, panel, yes.

(Applause)

(Thereupon, the Workshop was adjourned at 4:55 p.m.)

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