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CALIFORNIA ENERGY COMMISSION

STAFF WORKSHOP

In the Matter of:	)	Docket No. 19-IEPR-06
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	)	STAFF WORKSHOP RE:
2019 Integrated Energy Policy	)	2019 California Energy
Report	)	Efficiency Action Plan
	)	
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CALIFORNIA ENERGY COMMISSION (CEC)

STAFF WORKSHIOP

CALIFORNIA PUBLIC UTILITIES COMMISSION

505 Van Ness Avenue

San Francisco, CA 94102

TUESDAY, APRIL 09, 2019

10:00 A.M.

Reported by:
Susan Palmer

APPEARANCES

COMMISSIONERS (AND THEIR ADVISORS) PRESENT:

Commissioner McAllister
Commissioner Liane M. Randolph
Martha Brook, Advisor to Commissioner McAllister

CALIFORNIA PUBLIC UTILITIES COMMISSIONERS AND STAFF PRESENT:

Michael Kenney
Eugene Lee

PRESENTERS AND PANELISTS:

Abby Young, Bay Area Air Quality Management District
Nick Dirr, Association for Energy Affordability
Stephanie Wang, California Housing Partnership Corporation
Isaac Sevier, Energy Efficiency for All
Anne Arquit Niederberger, Enervee
Carmen Best, OpenEE
Joanne O'Neill, CLEAResult
Ahmad Ganji, Ph.D., San Francisco State University, Industrial Assessment Center
Anna Smidebush, Pacific Gas & Electric
Christian Lenci, California Large Energy Consumers Association
Dan Bush, Representative of the Joint Parties Working Group, Public Advocates Office
Arthur Haubenstock, Ex Dir, California Efficiency and Demand Management Council
Daniel Johnson, CPUC

QUESTIONERS:

Jeanne Clinton, self
Jennifer West, StopWaste and Bay REN
Rob Nicely, Passive House California
Nate Kinsey, CEDMC
David McCoard, self
Elsia Galawish, Executive Director, Western HVAC Performance Alliance Inc.

APPEARANCES (cont'd)

ALSO PRESENT:

Just Strachan, Ygrene Energy Fund
Scott Harding, IIP
Janet Wolworth, Sierra Club
Heather Bird, CEC
Joanna Perez-Arten, CPUC
Serj Berelson, Google/Nest
Nils B. Strindberg, CPUC
Nancy Kops
Dan Suyeyasv, Code Cycle
Charlie Buck, Oracle
Olaive Nordlie, EBMUD
Jen Kalafat, CHPC
Sprindhi Sanmpath, CHPC
Ben Cooper, StopWaste
Athena Besa, SDG&E
Lisa Schmidt, HEA
Dan Buch, Public Advocates Office
Rajan Mutia, CPUC
Lisa Paolo*, CPUC

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P R O C E E D I N G S

APRIL 9, 2019 10:00 A.M.

COMMISSIONER RANDOLPH: Okay, everyone. I think we're going to go ahead and take our seats and get started.

MR. KENNEY: Good morning everybody. I'm Michael Kenney, with the California Energy Commission. We're going to start with a brief emergency announcement, if you guys can play that.

[Safety Announcement]

MR. KENNEY: All right. So thank you all for coming today to our first 2019 California Energy Efficiency Workshop. This is the first workshop in a series of workshops we'll be doing across the state. We'll be heading to Redding next week, going down to Fresno the following week, and then ending in Los Angeles and San Diego. All of this to collect information for this new action plan we are working on to be published later this year.

So today's agenda looks something like this. We're going to have three panels sandwiched between presentations. So we'll be getting a brief presentation as well to give you guys more information about our action plan.

So what are we looking to do here today? We want to engage with all the stakeholders here in the room and those on the phone to understand the successes, the challenges, what has been your best practices, and what kind of

recommendations can you share with us that we can incorporate into our action plan process. We really want to document the information coming from our panelists and the information that gets put in to our docket on multifamily energy efficiency, industrial and agricultural energy efficiency, building decarbonization, the link between what air districts are doing and what energy efficiency programs they may be running, the intersection between greenhouse gas emission reduction and energy efficiency.

And to understand the roles of all the actors running programs, so whether it's regional energy networks, community choice aggregators, investors in utilities, public in utilities, what are all the different challenges, successes that they can share.

So each notice lists a series of questions we're hoping to receive input on from stakeholders. These workshop notices are available on our Integrated Energy Policy Report webpage so we would request that you respond to those questions you are comfortable responding to. And at the end of each panel and presentation there will be time for questions. So if you do have comments or questions that you'd like to make, we'll reserve time at the end for those.

And following these workshops if there are specific comments you'd like to make into the docket, a link is available as well. So any comments we'd like to receive by

May 15 at 5:00 p.m. That's same deadline for all of our workshops so that way it's just open and people can comment and we look forward to hearing from you.

So with that, I would now like to introduce our -- I apologize, I'd like to pass over to the dais and allow for opening comments from Commissioner McAllister and Commissioner Randolph.

COMMISSIONER MCALLISTER: All right. Thank you very much, Michael.

Welcome everybody. First of all, I wanted to say thank you to the CPUC for hosting. We love it when we do things together. It just makes everything, I think better and just improves the quality of the conversation and just having the shared space to true up ideas and to, you know, hear from the same stakeholders in the same place. It really cultivates the spirit of cooperation, collaboration but also makes sure we're all looking at the same information and able to interpret it and talk about it in real time. So that's always really helpful.

This effort is a critical effort, it's a key effort for California's reaching its climate goals. We're having these meetings, as Michael said, across the state. And it's not every activity or every report or every plan that for which we have staff, you know, trucking across the state to listen to people in their own environment and in their own

context. So we really wanted to do that for this effort because this is critical. This -- how are we going to double energy efficiency, how are we going to get to our existing buildings, and how are we going to begin to decarbonize our buildings are all questions and all topics of this California Energy Efficiency Action Plan.

And so it's a year-long effort, it's a big lift for the Commission, we have some really great staff on it, Michael among them but you'll hear from some of them in the coming -- today and in the coming days and months. You'll be working with them if you choose to participate which I hope you do.

Energy efficiency is evolving. I mean, frankly it needs to grow up and become a resource like that can really mimic supply that can be timed based, we're going to hear a little bit about that today, that can really be predictable and that can contribute to certainty in our path forward for how we're going to use less energy and use decarbonized energy in the best -- in the most cost effective and optimal way.

So, you know, energy efficiency, you've been doing it in California as all of you know you're all in this industry, you know, 45 years. But energy efficiency it's a new era, we really have to play in the sandbox with a lot of other resources and there are many, many other resources now sort

of competing for everyone's capital and attention.

However, energy efficiency is still key, it's still really number one. Definitely number one on the loading order but it makes all of our other problems smaller. It makes all of our investments in different kinds of supply smaller. It helps rate payers across the board reduce their bills. It reduces the investment we have to make in our energy systems. And it frees up capital for our broader economy which just makes everybody's life better. It makes all of Californians' life better.

So we really need to crack this nut, you know, we -- we've had AB 758 report for a number of years now. We did the first draft and we did an update, Nancy Skinner's Bill from six, seven years ago now, to focus on our existing buildings. So the existing Building Energy Efficiency Action Plan is -- was sort of the nugget that we're now building on to embrace SB 350 doubling, and to embrace AB 3232 decarbonization of our buildings. Make sense to sort of fold those efforts together.

But in the years since the existing Building Action Plan was produced, I think we've made -- we have made a lot of progress and I certainly don't want to minimize that. But we have not figured out how to get to our existing buildings and improve their performance at scale and get the kind of capital that we need to those buildings.

Certainly the 30 or 40 percent across the state of low-income customers are a big challenge. You know, they don't have the capital, most of them are living paycheck to paycheck, many of them are renters, most of them. And so how to get to those buildings as part of this doubling effort, we have to figure out a way.

So I believe that there are ways in the marketplace to -- there are solutions in the marketplace. I also believe in order to scale those; we're going to have to work with our policymakers. We're going to have to work with the legislature, we're going to work across the agencies with ARB and the PUC and within the Energy Commission to really get on the same page so we're firing on all cylinders and we're channeling the kind of capital that's needed. We're mobilizing it from the private sector and we're using state resources where we can. We're working with local governments to leverage their authority. It's really all hands on deck.

And so this document, this plan, this action plan is the vessel for those ideas. You know, this is where we -- we adopt this plan at the Energy Commission. So we will develop it and towards the end of the year we will adopt it at the Energy Commission, it will become policy, it will become the plan for California.

And then we can point to it, we can say, hey that's the plan. Legislature, work on some, you know, we'll work

with you on some bills to try to free up some resources and help the marketplace embrace some of the ideas in the plan. They have to be good ideas, they have to be workable, but they also have to be bold.

So we really -- I exhort you to put on your best thinking cap, you know, pull the best one -- out of -- on the rack there and put it on and participate. Because the knowledge, you know, it's not going to be generated inherently inside, you know, a state building. It really needs to come from people out there with their fingers on the pulse on the marketplace, technology, stakeholders, real world problems that are out there that need to get solved.

There are some great solutions emerging, we'll hear about some of them today at small scale and not necessarily even in California. Some great work going on in the East Coast, there's great work going on in Chicago, in the Midwest, how to finance activity in existing buildings. And we need to do that in California. We need to figure out how to adapt those activities to California's reality in our context.

So that's enough words, I've gone on too long already. But I am really passionate about this and I have an open door at the Energy Commission in Sacramento. If you have a burning idea, you know, I want to hear it, and so does the staff at the Energy Commission, so do our counterparts at

the CPUC. So just, you know, keep banging on the door because it will open and we'll figure out how to make stuff happen.

So that's what we're here for and, you know, California really can't expect anything less from us. So with that, I'll pass to my colleague, Commissioner Randolph.

COMMISSIONER RANDOLPH: Thank you. I just kind of wanted to take a moment to thank the CEC for embarking on this project and I'm really excited that we were able to host the first workshop and be able to kind of start setting the stage for this action plan.

I -- first of all, I of course have to give a shout out to my predecessor Commissioner Peterman, who put a lot of great effort into this and set forth a lot of major changes in how we're implementing EE programs, including the rolling portfolio framework, and third-party administrator changes, and lots of work that our staff is currently implementing.

And some of you may know, I'm also the commissioner on the Integrated Resources Plan proceeding and that is why I wanted to take on this task because as Commission McAllister mentioned, looking at location based and time based analysis and trying to, you know, really treat energy efficiency as a resource in that integrating planning process is one of our first next steps in the integrated resources planning process. So I'm excited to be able to work on both of these

issues and work on that intersection and try to make that as effective as possible.

So thanks again for coming to San Francisco and I look forward to our discussion today.

MR. KENNEY: Thank you. So good switch to the next presentation.

So now we're going to head into a little background or a little background about our prior reporting and how this new action plan puts a lot together. It was nice setting the stage there for Commissioner McAllister to bring up all these different mandates that we've had and directions we've been given and all the overlap that occurs within them.

So in 2015 we put out the original energy -- the Existing Buildings Energy Efficiency Action Plan subsequently updated in 2016 and that was driven by in large by AB758 in -- all the way back in 2009. And that guided us to focus on residential, commercial, public buildings and to put out this roadmap for achieving more energy efficiency and not a set number, no targets just we need to push the dial, we need to transform the market. What are strategies that are going to allow us to do that?

And then in 2015, we were directed under Senate Bill 350 to actually hit a specific target and hit that target by 2030 to double our energy efficiency. And so 2017 we adopted the report that then set those targets and looked at, to the

best of our knowledge, what is out there in the market and what do we forecast in terms of energy efficiency savings. And now broadening the picture to both look at agriculture, industry, new construction, conservation voltage reduction, things well beyond our scope of existing buildings that we had in our prior plans.

And then, now more recently AB 3232, just last year, is having us assess how we can decarbonize buildings, also on a similar track by 2030. And so we have these three strong policy drivers that are now being wrapped into a singular plan.

Not to exclude at all the Low-Income Barrier Study and the Clean Energy and Low-Income and Multifamily Buildings Plan which was produced last year.

So kind of taking all the energy efficiency components of those as well as the energy efficiency components of our policy drivers and to put them into a singular report that we can point to as our main report going forward.

So this year we'll be updating the targets that were mandated under Senate Bill 350, trying to establish new targets for agriculture, industry, and conservation voltage reduction which we had limited information on in our first assessment. And to try to come up with strong policy recommendations that we can have going forward. And then to

look at this being revised biannually with intermediate kind of updates within our Integrated Energy Policy Report.

So that's -- this plan, then, is going to take, hopefully -- its similar structures to the way we looked at our Existing Building Action Plan in that we have our vision and we have what that vision is ideally is resulting in, in this case we want to double energy efficiency by 2030. We want to break down the barriers that are preventing more energy efficiency from impacting low-income and disadvantaged communities. We need to figure out ways to decarbonize buildings, and we need to do this in a pretty short timeline.

And then we can't forget our guiding principles that need to be with us along the way. So these things that need to be market centered and reliable, quantifiable savings is one that at point that keeps coming up again and again. We need to verify the savings that we're claiming. Things need to be scalable. Whatever the programs may be, whoever may be running them, they need to be able to impact more people than just, you know, a city or town.

There needs to be policy coordination. And this is kind of a perfect example of that, we need to work with our brothers and sisters in the California state agencies, with our local governments, and people outside of California to understand what is working and what is not.

We need to keep in mind things that are cost

effective, and we also need to bear in mind nonenergy benefits that not everything is going to save kilowatt hours or therms but it may have impacts that we can't see, you know, behind the meter.

And with that, we'll kind of focus these all into our three goals of doubling energy efficiency by 2030, and expanding energy efficiency in low-income disadvantaged communities, and to decarbonize buildings. So within that have strategies, discuss programs, what policies are in effect, what policies do we recommend, and where do we see ourselves in the years to come.

And so this report we expect to draft out in the late summer and hopefully adopting in the fall. So keep your eyes out on that if your -- already got notice of this workshop, you'll be getting notices as those reports go out as well.

And so with that, I'll take any questions you may have. If you have a question, if you could come up to the microphone so that way the folks who have called in can also hear you.

And if there are no questions, are there any questions on the phone? No? Okay.

So then with that we can proceed to the next phase of our workshop. So I will be inviting up Abby Young with the Bay Area Air Quality Management District.

So Abby is the manager of the Bay Area Air Quality

Management District's Climate Protection Program. During her 12 years with the Air District, Abby developed and has overseen over $7 million in local climate protection grant programs, coordinated regional climate leadership summits, and developed technical guidance and assistance programs for local governments, developing and implementing Climate Action Plans.

Prior to working at the District, Abby spent 11 years as the director of the U.S. Cities for Climate Protection campaign at ICLEI-Local Governments for Sustainability, overseeing the development of training programs, software and research to assist local governments in achieving their climate protection goals.

So please welcome Abby Young.

MS. YOUNG: Thank you, Michael. Good morning. I appreciate the invitation to be able to present here to you today. This is a very exciting topic for the Air District. You're probably a little surprised to see somebody from an air district speaking at a Building Energy Efficiency Workshop and, you know, what's the link?

Well, the Air District, there are 35 local air districts in California. The Bay Area Air District comprises the nine, most of the nine county Bay Area region. And we are -- we've been around since 1955 and we were established first and foremost as a public health agency.

So I'm going to be speaking on this topic of energy efficiency in buildings from a climate protection kind of lens. So the climate crisis is inherently connected to the issues of public health and air quality. And the Bay Area Air District kind of realized this a number of years ago as we were looking at projections of different global warming scenario projections.

And we were modeling what those impacts might have on heat in the Bay Area and extreme heat occurrences. And we really couldn't ignore the fact that if climate change continues unchecked, we're going to see a dramatic increase in extreme heat days which then, you know, are a direct contributor to the formulation of ground level smog -- ground level ozone or smog.

So we were really seeing the connection between what was happening with climate change and public health issues and air quality issues and that they're all very intertwined.

And then of course, more recently, the issues of extreme exposure to the particulate matter due to wildfires. And so we really can't avoid the fact that climate change and local air quality and health issues are very connected. So this is something that is becoming increasingly important to air districts across California.

So just a few words about our agency. We regulate stationary sources of -- actually, let me ask is anybody from

an air district here in the room? No? Okay.

So we regulate stationary sources of air pollution. That's what the 35 local air districts do in California and then the California Air Resources Board regulates the mobile sources, that's kind of the distinction.

And we're governed by a 24-member board of locally elected officials from the nine county Bay Area. We do serve most of the nine counties of the Bay Area, the southern portions of Sonoma and Solano Counties, and the complete rest of the other seven counties.

And so that's 101 cities, that's a really complex region. And most of those -- the vast majority of those cities are small. So while, you know, sometimes the discourse is dominated by some of the larger cities, San Francisco, San Jose, Oakland, Berkeley, really the challenges are trying to meet the needs and work with the communities that are in some cases very small indeed.

We have seven million people, five million vehicles and those are expected to grow quite a lot in the next 20 years. So when it comes to trying to reduce emissions, we have some very big challenges.

So let's look a little bit at the greenhouse gas picture in the Bay Area. And we continually work on updating our greenhouse gas inventory but we haven't released another one public -- ready for public consumption since this one a

couple years ago. So this is 2015 data. So some of this may have changed a bit.

But really what we see is, of course, transportation that's nothing new. We also see a big chunk is what we call stationary sources. And that sector is dominated by heavy industry in the Bay Area. We have five refineries in the Bay Area, a lot of power plants, we have a cement manufacturing plant. So that's kind of what dominates that slice. But also in there are a lot smaller sources that the Air District regulates like gas stations, dry cleaners, coffee roasters. So there's a lot that goes into that section.

Now, today we're talking about buildings and you see the slice that says buildings are ten percent of our greenhouse gases and it's a little misleading. The way the Air District presents and conducts and presents its greenhouse gas inventory is a little bit different from what you might see from the city of San Francisco or another city. We focus on these big sections of sources and we have a regional perspective so it's a little bit different.

That building's ten percent slice represents natural gas use only in buildings. So that green slice, energy, is really the electric power sector. And we look at the emissions from the power plants in the Bay Area. So a good portion of that green slice would also be attributed to the operation of buildings in the Bay Area. So it's about a

quarter of our emissions. So the main story there is buildings, industry, and transportation.

Now this is -- one of our board members calls this the scary slide. And it is terrifying indeed. So this is a slide that shows previous trends, that's the dark shaded emissions in the Bay Area up to 2015. And then moving forward, the lighter shade is what we're estimating and modeling the trends taking into account major state level policies. And again, this was done prior to cap and trade reauthorizations so we were basing it on the previous cap and trade system.

But really finetuning is not the issue here, the main issue is that we have a tremendous gap. This also, by the way, includes an estimation of the impact of all the local Climate Action Plans in the Bay Area if they were fully implemented.

So you can see the little dotted line where we want to be in 2050 and where -- even with all the stuff we're already planning to do, where we're going to go, where we're going to be. So this is -- this is why it's the scary slide.

So I am speaking through a climate protection lens today but I just want to also talk a little bit about air quality and public health the nongreenhouse gas portion of what we do, which is really most of what we do.

So this is the Bay Area. Those purple shaded

communities are areas that are what we call disproportionately heavily impacted by air pollutants. And we're talking about kind of local -- air pollutants that have local health impacts. So ozone, ground level ozone, and particulate matter. So those purple regions are impacted -- how do I say this? Either or. Some of them are impacted only by summertime ozone or wintertime particulate matter and some are impacted by both and this slide doesn't differentiate.

But you can see that there are -- even though on a day like today it feels like we don't have any air pollution issues in the Bay Area, we really do and what the Air District is more focusing on now is how do we ensure that everyone in the Bay Area regardless of how much money they have or where they live is breathing healthy clean air all of the time. So that and our climate protection goals are really what we're focusing on more and more.

So about two years ago -- and so transitioning from that slide, those dual goals of local health and climate protection are what has kind of transformed the way that the air district looks at regional air quality planning. Traditionally air districts do regional air quality planning on a kind of a pollutant by pollutant basis.

So historically we would have a regional ozone plan, or we would have a regional particulate matter plan. And we

would look at what are all the things we can do to reduce ozone and ozone precursors or what are all the things we can do to reduce particulate matter? The problem with that approach is that some things that we might do to reduce one pollutant could increase other pollutants. So for example, some things that we might do to reduce ozone precursors might compromise efficiency. And if we compromise efficiency, we're probably increasing greenhouse gas emissions.

So what we wanted to do was take a multipollutant approach where we look at the interactions of different pollutants with the different kinds of actions that we might take so that we could see those tradeoffs.

So two years ago we adopted Spare the Air Cool the Climate which is a multipollutant clean air plan. And we tried to model it off of the state's Climate Protection Scoping Plan. So we looked at the same nine sectors and organized the plan according to the same nine sectors that the state organized the scoping plan across.

And that plan includes -- actually, you know what? I'm going to go back. There's one thing I was going to mention.

In taking that approach, we came up with 85 different measure -- broad measures that address those different sectors. A lot of them are regulatory, some of them are funding. But a lot of them are other types of measures that

I'll get in to.

Those 85 different measures break down to nearly 300 discrete implementation actions so we really had this long exercise of trying to think of every single thing we could, I think that the kitchen sink is actually in there under, I think it's under water, so I think that's the approach we need to take.

So when we think about achieving the climate protection goal and implementing these measures and how we came up with these measures, we were looking through several key objectives.

Number one, we want to reduce what the Air District calls super greenhouse gases, super GHGs. These are also called short-lived climate pollutants. They're the pollutants that have a really high global warming pollution value and that are shorter lived so that if you reduce them now, you can have a bigger immediate impact on global warming.

So we want to focus on those up front while at the same time trying to get at reducing fossil fuel combustion. So those are the two big objectives. Now we want to reduce fossil fuel combustion by increasing efficiency, or simply reducing demand for fossil fuels and by decarbonizing the energy system or increasing the amount of renewables in our electricity.

And the Air District has a variety of tools at our disposal. And so we try to use every single one of these tools throughout plan. We regulate and adopt rules, we issue permits with requirements, we support local government work, we form partnerships with industry and community organizations, we issue grants and incentives, and we conduct our own internal research and scientific studies.

So as we look at buildings, and again that blue wedge is probably understating the emissions from buildings, this is just for CO2 by the way, so the previous pie chart was for all greenhouse gasses, this is just CO2. You know, buildings are a big part of what we're trying to do.

And the Clean Air Plan had three -- has three broad measures for how we are addressing emissions from the building sector. The first measure addresses, we call it green buildings, that's really getting at energy efficiency through a lot of different approaches. The second measure, decarbonizing buildings, that's really getting at fuel switching and trying to increase renewable energy. Market-base solutions, that's where we try to think about how can we use potential funding to stimulate market solutions. And I will get more into that as I talk about our grant program. And then urban heat islands, how can we really get at sort of the dual issue or reducing energy use and addressing heat.

And I think the important -- the reason that we've --

the Air District feels is so important to focus on the existing building sector is that it's, it's an enormous legacy that we're challenged with. Twenty -- or two-thirds of all buildings that will be around in 2050 have already been built, 70 percent of the homes in California were built prior to Title 24 energy efficiency requirements. It's that legacy that we've somehow got to address. And this is a huge gap, and so we feel that that is a place that the Air District can add value.

So cap and trade reauthorization really limited what air districts can do with their regulatory authority with regard to controlling CO2. So when we think about our climate protection approach, we start thinking okay, well, what can we do outside of our regulatory authority? And working with local governments to support local reductions in greenhouse gas emissions has really become the cornerstone of our Climate Protection Program.

And there are a variety of tools that we use to support the work of local governments. Certainly financial assistance, we have a lot of grant money that's mostly focused on vehicles. So we have a lot of funding for EV charging infrastructure and vehicles, we have pass-through money from the state and the feds to reduce, you know, clean up heavy duty vehicles to give to different counties to do trip reduction. We also offer a lot of technical assistance,

well, I'll get into in the next slide.

We have partnerships and collaborations directly with public agencies, with business groups, with community organizations. We have a very robust community engagement program, and we do a lot of information sharing and convening. We feel that our role as a regional government well suits us for convening and bringing together folks that can share important information.

So I wanted to look at tools and approaches and technical assistance a little bit deeper. Local governments need a lot of assistance. They -- we often work with planners in local governments that don't have a lot of technical training to do things like greenhouse gas inventories or cost effectiveness analysis or simply, as I mentioned a lot of these smaller jurisdictions just don't have the staff period. So a lot of what we try to do is support the work that they might otherwise not be able to afford to do.

We provide quantification tools for greenhouse gas inventories, methodologies for quantifying reductions, trainings on how to do greenhouse gas inventories, guidance on how to develop solid Climate Action Plans. We offer policy support, best practices, model ordinances, cost effectiveness assessments. We also try to do support through CEQA, and don't worry I'm not going to talk about CEQA, just

that the Air District does develop significance thresholds including for greenhouse gases and we're in the process of updating those right now. We also provide a lot of guidance through CEQA consults and commenting on how to strengthen local Climate Action Plans and projects.

So applying these to the building sector, we're thinking of what we're doing, the work we're doing with local governments in three parts.

First is a climate protection grant program which I'm going to speak to next. We also do a lot of policy support. And finally we're in the process of trying to ramp up what we're doing with local governments on buildings by developing a strategic building decarbonization approach.

So I'm going to talk a little bit about our climate grant program. A year ago we issued $4.5 million in competitive grants and these were from the Air District's general fund. So we didn't have a prescriptive, you know, approach that we had to follow. We didn't even have a prescriptive focus on what we had to -- to fund. So staff engaged in a process of talking with different public agencies and nonprofit groups and some business folks and tried to figure out well, what should we do with this money?

And we decided -- one big question was do we go deep or do we go broad? And we decided, well, we're going to do both. So we wanted to go deep on buildings and broad on

innovation. So we created two buckets of project types for this funding. One was to focus on reducing emissions in existing buildings, and I'll give you a number of examples of that, and the other was to focus on innovative strategies across any sector.

We took this approach a number of years ago when we did a similar one-time grant program. And by offering funding to help incubate and pilot test new innovative ideas, we provided startup funding for Marin Clean Energy which was the first community choice energy program in California, and for Berkeley First which launched this notion of property assessed clean energy financing and now of course PACE programs have gone nationwide. So we really see a value in trying to stimulate innovation.

But I'm going to focus on the buildings. So a couple of projects that we are funding, and again we gave out $4.5 million in 17 grants ranging from about $125,000 to $400,000 all to public agencies. So we provided to -- money to cities, counties, a housing authority, a community college district, waste -- Stop Waste Management was here, the Waste Management Authority, and to community choice energy programs.

So one example of one of our projects went to the San Mateo Housing Endowment and Regional Trust. We provided funding for them to run a competitive design project where

they are soliciting designs for green zero carbon auxiliary -- it's the word, auxiliary dwelling units, ADUs. So these are basically to allow people to turn, you know, their garage or their in-law unit in to a rentable extra dwelling unit. This, you know, helps address the housing crisis, helps address aging -- the aging and place challenge. We feel this was a growing interest to local governments.

So what this will result in is ready to go off the shelf designs for a variety of different types of zero carbon ADUs. So it takes the cost of developing the architectural renderings and design off the table for the homeowner. So -- and we're hoping that all these projects will be scalable and replicable across the Bay Area.

We also funded about four or five grants to look at incentivizing heat pump water heaters. So while this is more of a fuel switching from natural gas to electricity, it's also in -- it's sort of where renewable energy meets energy efficiency because the efficiency increases quite a bit when you switch from traditional water heating to electric heat pumps.

And what we've got is a number of different projects working in coordination to regionalize an incentive program and address different stops along the supply chain. So this is a very exciting program.

We're also working with a -- gave a grant to the city

of Brisbane to develop a model ordinance that requires energy audits, benchmarking, and retro commissioning of commercial -- of existing commercial buildings. And so that's something very exciting that we're interested to see how it turns out.

We're also funded the city of San Francisco to expand its Tune It Up Program where they provide incentives to corner markets and family run small restaurants to upgrade the energy efficiency of their equipment, and our funding is allowing them to include the refrigeration equipment in that program. And the refrigeration equipment is really important because fluorinated gases are an extremely high global warming potential gas and it's the fastest growing greenhouse gas in the Bay Area.

We're working with Marin County to try to address embodied carbon in building new buildings. They are developing local specifications and a model ordinance for using low carbon concrete in all new building practices. So this is getting at efficiency of -- in the building process.

And then finally, we're working with the city of Palo Alto Municipal Utility to do an appliance replacement and recycling. Recycling is the important part. Recycling of the fluorinated gases and refrigerants program. This will hopefully stimulate energy efficiency by stimulating the replacement of old inefficient appliances.

So there's a variety of approaches that can be taken by local governments, and funding is a big piece of getting this going, but it's not the only piece. A lot of what can simulate the market are policy drivers and so one thing that we do is we try to dis -- to work with local governments to figure out what kinds of policy drivers might work for them and what assistance do they need to get them developed and put in place.

So one thing we did last year in coordination with the CEC and also with the Bay Area Regional Energy Network, BayREN, and with the Bay Area Regional Collaboratives, kind of coalition of the regional agencies was to develop a model toolkit for requiring solar PV on new construction. And this was a couple years ago so it was before the new Title 24, you know, update had come into place.

So this is sort of start to finish turnkey approach that takes all the work and time out of the hands of the local planners so -- that they can just take this and all the materials, the cost effectiveness analysis, the CEQA document, everything, and take it to their -- to their council.

This was sort of a test run and we think that we could do this kind of soup-to-nuts policy development for local governments on a variety of topics.

So we're now trying to think well, what can we do

with maybe EVs or EV charging or applying this to all electric, you know, construction. So, TBD on what the next toolkit is going to be.

We also work with local governments a lot on climate -- local Climate Action Plans. We help them think about target setting. We help them think about what kinds of measures to include. We help them think about how to quantify the impacts of different measures.

So, here in the Bay Area there are about 75 local Climate Action Plans that have been adopted. And that's the most of any region in the country. So we want to help make sure those are as strong as possible and as likely to achieve their goals as possible. So we worked very closely with local governments on those.

And then we've also created of those 75 local Climate Action Plans, a database of all the measures that are included in those climate action plans. Over 3,000 measures and we've cataloged them according to sector, to type, to subsector, to estimated emission reductions, we've taken them at face value, we haven't gone back and said, well, are you implementing any of these? But it is a catalog of what is included in all these 75 local Climate Action Plans.

And when we look at those -- oh, it's coming up in a couple of slides, we'll have to wait on the details on that.

So the final tool in those -- that three-part kind of

bucket of tools funding, policy support, and then a building decarbonization strategy. We're really in the middle of this right now. We're trying to figure out where do we go next? How do we expand and accelerate the action of local governments in meeting the SB350 and other local goals for their building sectors? And what is the appropriate role for the Air District? There are things we do well and things that we don't. So what can we do and how can we add value?

So we're serving local governments, industry experts, community organizations, and we're trying to figure out where we fit in. And we're trying to think about this in terms of how do we get a big GHG reduction? How do we fill a gap? We don't want to duplicate anything. How do we work equity in to what it is that we're doing? How do we address those emissions impacted communities? How do we impact underserved communities? What's the likelihood of success? You know, are we pulling -- are we trying to bite off something that will actually result in some high -- good emissions? Will it be something that could be scalable? What are the -- particularly air quality co-benefits? We always want to make sure that we're integrating again the public health and air quality piece into our climate work. And then ultimately is, you know, our -- is what we're doing cost affective?

So when we think about all these things, we get the feedback from all these local government and other folks,

we're really honing in on incentives, it was mentioned by one of the commissioners the money and the incentives and the investment is key. The Air District doesn't have a lot of money. So when we do have money, we really need to focus it like we do with our grant program; focus it on incentives, focus it on filling a gap, focus it on things that will be scalable.

We also, what's floating to the top is more of these policy resources, more of these guidance documents and helping local governments with the policy levers that they hold.

And then finally, in the next couple of years we want to reflect on this grant program, see what was the most successful, and has the biggest opportunity for scaling across the region.

So this is the database I wanted to dig in to. So this pie chart shows -- it is a little hard to read, the breakdown across different sectors of, you know, what do these local Climate Action Plans contain in them?

So the circled sectored of these 3,000 measures, that gray slice, those -- that's the portion that address buildings. Okay. So it's a pretty big piece. And when we look at these measures, what are some of the things that emerge? What seem to be common approaches that local governments are taking to address energy in buildings?

We do see a lot of audit and efficiency, you know, upgrade campaigns and outreach. These tend to be softer voluntary measures. So, you know, the effectiveness is proportional to a soft voluntary outreach kind of measure.

Technical assistance to homeowners, that's great but that's often dependent on uptake and how do you get the uptake? Green building ordinances and reach codes, that's a place where in the Bay Area we're -- most of the local governments are on-board with reach codes. It's mostly an issue of the staffing resources to get it done.

Improved enforcement with permitting and inspection; that seems to be an ongoing issue of, you know, we've got it on the books but we don't have the resources to go out and inspect and enforce.

And then we try to look at well, are there any particularly innovative approaches that we've noticed in doing this cataloging process? And we just, I just, you know, picked a couple to show you.

So, in Piedmont, they're requiring -- they haven't -- they're working on it, they haven't put it in place yet. But requiring an energy audit or upgrade at the point of sale. So point of sale, these are -- these are policies that local governments have been -- have used. The city of Berkeley and the city of San Francisco did them a long time ago in the '90's where this is how you get at the low -- the existing

building stock. How do you get that turned over? And putting energy efficiency upgrade requirements at point of sale was viewed as really one of the only ways you could do it. But those have become politically undoable. Even in Berkeley, they had to roll it back.

So without -- that doesn't seem to be a political option anymore so what else can we do? This is a big challenge. And then, you know, Danville, absolutely more and more local governments are trying to think about how to we engage -- how do we find the points of engagement that affect building energy efficiency? It's with designers and architects but it's also with vendors, suppliers, contractors. So how do we -- how do we insert ourselves at those different points?

So in order to expand and accelerate this work, what is it that local governments need? So these are just a few things that are not really shockers to anyone but this is what we're hearing are key challenges from local government staff. Always funding and financing, of course. But they also are struggling with this equity issue. How do we address multifamily buildings? How do we address low-income households? This is an ongoing struggle.

Getting information to energy decision makers -- and decision makers would be the homeowners, the landlords, the building owners. How do we get information to them so that

they're ready to make, what we would call the right kind of decision at the point of time that they have to make the decision? So Saturday morning when your hot water heater goes out and you're calling somebody anybody to help you, are you really thinking maybe we should do a heat pump. You're probably just going to take whatever they give you. So how can we have that information already on board before that decision point occurs?

And getting clarity on legal authority; this was a surprise. There's a lot of confusion as to what local governments can and can't do. So, in terms of, you know, how far can the reach codes go? What about fuel switching? Should they focus on codes or can they -- can they do something to limit the purchase and use of certain appliances? So answering some fundamental legal questions might be helpful to local government staff as well.

So as we move forward, we're continuing to survey the needs of local governments. We're envisioning we're going to be having a series of convenings on some of these key topics this year, and of course we want to leverage the resources of the local governments themselves of regional energy actors like BayREN of the Community Choice Energy programs.

So, you know, our takeaway from this process is that there's a role for everyone and that absolutely everything has to be on the table. So we'll keep you informed as our

process moves forward. Any questions?

COMMISSIONER MCALLISTER: I have some questions, actually.

Thank you so much for that, that was great. So I had a question -- I have a number of questions and I know we're a -- we have a whole panel to do before lunch so I want to give them their full time.

But did -- so with your scary slide, I agree it's totally scary, and, you know, I really just, I think, lately we've seen a lot of news -- this is sort of confirmation of that -- we've seen a lot of news that, you know, we're not meeting our, you know, our carbon emissions continue to go up, you know, and transportations kind of not going in the right direction. We're not getting -- just each of those wedges needs to get smaller and faster and it's just not happening fast enough.

So, have you, let's see, I guess have you done scenarios on the transportation stuff like looking at electrification, you know, how much the red goes over to the green? I guess actually, it was more the pie chart that you had but, you know, there's a big 40 percent plus red transportation, and then there were buildings that were -- that are to, you know, a couple wedges for 24 percent.

Like, have you done scenarios to see okay, what happens at different penetration rates for electrification

transportation? And how much of that, you know, that red migrates over to the building sector and the electricity sector, and scenarios that might actually push decarbonization a little bit faster?

MS. YOUNG: Now, that's a great question. So with regard to transportation, the Metropolitan Transportation Commission, MTC, is as part of their development of the next regional transportation plan and the sustainable community strategy, they have embarked on what they're calling a Horizons Project where they're defining different future horizon scenarios that look at things like, you know, robust economy, they look at -- it's actually very interesting, they look at things like immigration, things like natural disasters and trying to impact various parts of the transportation sector.

So they are doing that scenario building and they, I believe they've published a few perspective papers as part of that Horizons Project that look at things like, under this scenario we would have more electrification of the transportation sector, under this scenario we would have more infield development. So they've been leading the work on the transportation sector.

With regard to scenario building sort of within these different economic sectors, the Air District hasn't done that but that's something that we're trying -- we're planning to

get into this year. So that we can look at things like, you know, through all the, you know, by the end of this year, I think every community in the Bay Area will be covered by a Community Choice Energy Program. And they all are on certain pace to have 100 percent renewable energy within a few years. What does that do in terms of how quickly we should be electrifying buildings? Those are the kind of things -- so we haven't, but we will be starting to do that.

COMMISSIONER MCALLISTER: That's great. I want to just invite, you know, you -- so I think it's critical that we invite, and Michael mentioned this, but that we really get into the weeds with the COGS and the, you know, the Metropolitan, you know, the planning -- the transportation planning entities as well, and across the state, because there's a lot of detailed knowledge there that we need and we really ought to be working together much more annually on that. So obviously that applies to the Bay Area AQMP.

One thing you brought up which I wanted to just get a little bit more detail on is on the HFC front, on the refrigerant front. So if we're going to be promoting heat pumps all over this, you know --

MS. YOUNG: No we're --

COMMISSIONER MCALLISTER: -- we're going to have to orders of magnitude more heat pumps.

You know, what's your view of the system that we have

currently in place and where it needs to go for ensuring that those refrigerants actually get collected? Right now, I mean, I think we all suspect and basically know that there's a lot of venting going on kind of on the down low. But you know, how can we put a system in place that's like car batteries, where they just like basically get recycled and they just, it happens? What's your view of how big of a barrier that is?

MS. YOUNG: Well, I'm going to be honest with you. We haven't -- we know this is an issue we have to study more and I don't really have an answer for you. But there are -- there has been some work on looking at low GWP refrigerate use and heat pumps, looking at CO2 based refrigerant systems and heat pumps that's interesting.

But certain -- we're trying to learn from this one grant that we're doing with the large appliance recycling of -- recycling of the H -- of the F gases, the HFCs to see if we can apply that to other -- to other types of -- not appliances -- to other types of equipment. So that's one thing that we're specifically looking at in that grant. So not a great answer for you.

COMMISSIONER MCALLISTER: Well I just think we, you know, highlights that I think there's a system that needs to be put in place that really is going to have a big climate impact one way or the other, you know, if it does or doesn't

exists.

So anyway corollary to our electrification, you know, push, have you done -- so it's great that you've got all these -- you're rolling out the climate plans and like really seeing what the local governments are doing. And I think, I'm not going to get into it right now, but I think local governments -- we all know local governments have key jurisdiction here and they have to have the tools that they need. They don't really have those tools and they need a ton of money, right? So I mean, that's, you know, we all -- we know that and we got to try to figure out how to make that happen, you know, while keeping them accountable.

But how -- so let's -- so we've got these climate plans. And, you know, we understand basically the building stock and the vintage of the building stock, have you sort of done numbers to see, okay, in the Bay Area, how much money would we need -- would need to come from somewhere, whether it's the homeowner, you know, the property owner, the states, the capital markets, you know, where ever. How much money is needed to do the existing building retrofits that either embodied in the climate plans or just, you know, doing the numbers to get to the climate goal?

MS. YOUNG: We have absolutely not done that but I believe others have. I know that BKI did a study a couple of years ago I think including Contra Costa in Alameda County

where they were looking at just that. I'm not sure if Stop Waste has done anything like that but possible.

So I think others may have we -- the Air District probably would not -- that probably would not be what we would do but we would try to potentially support others.

COMMISSIONER MCALLISTER: Yeah, it's a touchy public number.

MS. YOUNG: Yeah.

COMMISSIONER MCALLISTER: I mean, I'm sure somebody in this room probably has a, you know, an estimate -- a ball park estimate.

But I think, you know, we need to start being real with this, you know, we really need to start putting the numbers out there to see if we have the political will. I mean, I think that's, you know, when we start talking about hundreds of billions of dollars of retrofitting and rebuilding a lot of our building stock and retrofitting it, that money's got to come from somewhere. And if we don't have the political will to do it, it would be really nice to know that. And if we do, it would be really nice to mobilize it.

So, you know, I think we're, you know, people think we make policy, we don't actually. We implement policy that the legislature makes and for the most part the governor, you know, we push things in a direction, we have a lot of tools

and levers.

But I think the really key question is how much political role is going to back this effort up, you know, and I think in general in California we have a really great political role relative to other jurisdictions but this is a big lift, nobody's ever done this before. So anyway, I'll get off my hobby horse as my colleagues would say.

COMMISSIONER RANDOLPH: Yeah, I think that's a great point and, you know, we had a workshop, a building decarbonization workshop yesterday, and are proceeding implementing SB 1477. And I don't know if you've signed up on the service list for that proceeding but I encourage you to do that and just kind of keep an eye on that. I know you're really busy but I mean, some of these ideas are really ones that can be built on in that proceeding so, that's a great presentation. Thank you.

MS. YOUNG: And one thing, too. I think just with this political will question, one thing to -- for us to watch is what's happening in Sonoma County as the rebuild after the wild fire. So a lot of incentive money, part -- you know, mostly through PG&E but also the air dis -- through the Air District has been focused on rebuilding as carbon free as possible.

And so it will be very interesting to see what the uptake is on those incentives and how deep the uptake is in

terms of how much -- how carbon free, how far do the homeowners go? And that may give us some insight into what the market will take.

COMMISSIONER RANDOLPH: I think that's a great point but I think it also gets to the marketing component of this, right? Which is the making this -- the kind of new paradigm attractive to homeowners who sort of think of things in, you know, think of a perfect stove as being one way and not the other way and how do you sort of create that kind of buzz that, hey, you know, these carbon-free appliances are just as good or better.

COMMISSIONER MCALLISTER: I totally agree. You know, hopefully a lot -- we can create a world where a lot of the solution is voluntary. You know, we live in a democracy, we have a big economy, there's, you know, people making choices every day. And so hopefully that just, you know, happens as a natural evolution. But I think, you know, we have 40 percent of the states that's low-income. It's just -- it's not going to happen without a serious amount of money.

So and we can -- we cannot leave those folks behind, right, we have to -- they have to be an integral part of the solution. So big challenges, obviously. I really appreciate your coming and that was a great presentation, and let's give Abby a round of applause.

MS. YOUNG: Thank you.

COMMISSIONER MCALLISTER: I wanted to actually, is Arthur Haubenstock -- okay, there he is. So I wanted to just give -- I'm going to take executive privilege here and carve out a few minutes -- a couple minutes really for Arthur, executive director of the California Efficiency and Demand Management Council. And we are lucky to have an entity like that in California, mobilizing stakeholders who are knowledgeable on these issues and able to provide a voice for what's needed out there in the marketplace. So Arthur.

MR. HAUBENSTOCK: Thank you very much, Commissioner McAllister, and thank you Commissioner Randolph. It is such a pleasure to be here today and to be participating in this workshop and to see the agencies working together, not only the CEC and the PUC but also reaching out to the Air Resources Board and the regional districts as well.

This is such an important issue and the efficiency plan that you are working on is exactly the prescription that we really need to achieve California and -- the both of the Commissions' goals.

We are looking at a tremendous road ahead as was talked about in the scary slide by the BAQMD, the pathways model, and the deep decarbonization study that was done for the California Energy Commission identifies tremendous growth in the electric sector. And even with the maximum use of efficiency and flexible load, we see that there may be as

much as 50 percent increase in demand. That means we need to figure out what the barriers are, we need to address those barriers, and we need to start growing our efficiency and demand management sectors in order to achieve California's Energy Commission's goals.

We're very excited to be working with both Commissions and with all stakeholders to try to usher in that new future. I recognize that yes, there are some real financing challenges, but yes, there are some real marketing opportunities, and yes, there are tremendous opportunities as Commissioner Randolph was pointing out to use efficiency and demand management to -- as a tool to solve the grid needs in ways that have not been done before.

So this is an exciting time, a challenging time, and we very much appreciate the time to talk with you here today. Thanks so much.

COMMISSIONER MCALLISTER: Thanks a lot, Arthur, I really appreciate it.

So I'll pass it back to Commission staff and we'll get going with the first panel.

MR. LEE: Good morning. My name is Eugene Lee, supervisor of the Benchmarking and Equity Unit in the Efficiency Division at the California Energy Commission.

And today, I am pleased to be moderating Panel 1. And this panel is titled, Capturing Deeper Savings from

Multifamily Buildings.

As background, as we know, the energy trail to retrofit multifamily buildings has been long and a very steep one. And it's been traveled in the past by many smart and committed professionals, many in this room. And yet it remains as the Commissioner has described, the toughest nut to crack in the energy sector. Why? A couple of points. According to the U.S. Census Bureau, nearly 60 percent of the multifamily buildings in California were built before 1979.

And we know that according to the federal poverty guidelines, 33 percent of California's households are classified as low-income. And within that, 47 percent of low-income Californians live in multifamily housing according to the Commission's Barrier Study. Forty percent of low-income multifamily customers in the Southern California Edison service territory experience an energy burden in the summer. And this is also particular interesting that 54 percent of the low-income households use a primary language other than English, according to our Barrier Study.

As the Commission affirmed in its adoption of the Clean Energy in Multifamily Buildings Climate Action Plan in November last year, solving this rubric involves addressing the buildings and the behavior, specifically lenders, owners, and tenants, many who are low-income as I described.

And part of the solution is the calculus of making

new connections, speaking in "and" statements in our strategies and creating programmatic marriages. Although, it is more convenient to work in singularity and isolation, it requires basically to being averse to the status quo. It is a call to align programs, and their design and learn successful practitioners and scale these models very importantly as it is accepting the challenge that clean energy is a right in a just society for all California residents irrespective of income.

Mohammed Ali once said, "It isn't the mountains ahead to climb that wear you out, it's the pebble in your shoe." And with that backdrop, joining me to identify and remove these pebbles are some of the brightest in our industry.

And they are to my right, Nick Dirr, Director of Programs at the Association for Energy Affordability, AEA. And during his 11 years at AEA, he has conducted the energy audits, analysis, and research on multifamily buildings. And he has developed retrofit specifications, trained industry stakeholders, and designed, managed, and implemented multifamily energy programs.

He facilitates collaboration among the stakeholders involved in comprehensive multifamily retrofits, acting as a single point of contact for owners, utilities, governments, property managers, operators, and engineers and architects and contractors. That's incredible, Nick.

He oversees AEA's implementation of the statewide LIWP and SOMAH programs and the BayREN multifamily program and the MC multifamily programs as well as AEA's TCAC, that's the Tax Credit Allocation Committee, Title 24 and GreenPoint Rated services.

To his right, I'm also joined by Isaac Sevier for the -- and he's the California Coalition Manager at Energy Efficiency for All. And he works with multiple advocacy organizations across California and in the U.S. and coalition to create and expand clean energy and climate change initiatives which address social inequality.

He possesses a multidisciplinary perspective with experience as a policy advocate at NRDC, senior analyst at a wealth management firm and engineer at Chevron prior to joining EEFA.

Originally from Oklahoma, Isaac holds a bachelor's from University of Tulsa in Petroleum Engineering and a master's from Stanford in Civil and Environmental Engineering. He is based here in San Francisco, very close.

Last, Stephanie Wang is the policy director for the California Housing Partnership, a nonprofit organization with a mission of helping to preserve and create multifamily affordable housing for low-income Californians. Stephanie leads a team of policy and program experts who develop and implement clean energy programs for multifamily affordable

homes. And she serves on the Coalition Steering Committees for the Energy Efficiency for All California, and Sustainable Communities for All. And prior to joining to the California Housing Partnership, Steph lead the California policy and strategy initiatives for the Center for Sustainable Energy.

Welcome, panelists.

We have an array of questions to talk about this morning. And the first question and I'll pose this to Nick. Are -- what best practices can you share for capturing energy efficiency in multifamily buildings? And are these common area upgrades and -- or are you able to capture deeper upgrades in individual buildings?

MR. DIRR: From the program design stage, there's really kind of three key ingredients into the formula where we found that it works pretty well, so one is flexible program design. So we really need to meet the properties where they're at and find ways to help them upgrade their property and become more energy efficient and help the residents in that property become more energy efficient. And a lot of times they might not fit a very prescriptive program design, and so we need to evolve a program or solution around them.

And with that involves technical assistance. So strong technical assistance for the property to help identify what solutions we could provide to the property and help them

understand again what their needs are but also help identify what needs they didn't know that they had or what opportunities they didn't know that they had.

And then the third key ingredient is long-term confidence of programmatic and funding availability. So a lot of these building owners and tenants and contractors need to have a lot of confidence that the program is going to exist for a multiyear period so that they can build their business models around that, they're retrofit planning around that, their financing planning around that, and really kind of build up that momentum.

I think by default there is always going to be some preference for common area upgrades just because of the opportunity for reduction in operating cost for the property owner. But only 60 percent of multifamily buildings have central mechanical equipment, you know, 40 percent of multifamily buildings are essentially all apartment-based heating, hot water, and air conditioning. And so, you know, the common area upgrades there is really just limited to sight lighting. So, you know, maybe 30 or 40 percent of the building stock, the only opportunities are in unit upgrades in multifamily.

So again, it's helping the property to do that upgrades, it is more expensive to do in unit work. I mean, it's not too dissimilar from single family with the added

challenge that you're not working with the homeowner as you are in single family. So it is expense and so the funding needs to be there and subsidies need to be there to help encourage properties to do that.

But if we can work with them at intervention point in time when they're planning on doing an upgrade, or even on market rate type buildings or individual buildings that aren't home -- owned by an individual owner, you know, a lot of these buildings, the comment was made before were built pre 1978 so there's a lot of deferred maintenance and needs in those properties. And so it's encouraging them now is the time to make upgrades within your units and improve the quality life for the tenants and here's some financing or subsidies that might be available to help you go above just the minimum.

MR. LEE: Isaac, did you want to comment on this?

MR. SEVIER: Yeah, I can. I mean, thanks, Eugene, for the really kind intro and Nick for explaining some of the really kind of like down in the weeds details here.

I want to add because I think that Nick is being a little --

Sorry. Thanks. Is this better? Yeah. So I just have to lean straight into the microphone for you guys.

I just wanted to add that I think Nick is being a little bit humble about some of the success that we've seen.

So the question is about best practices, right? And the program that he administers, LWIP, has been able to achieve 45 percent energy savings in multifamily buildings. That's half, right, that's close enough, I'll round up to half, right? And in contrasting last year in utility programs that are trying to bring the same type of energy efficiency to low-income customers who live in multifamily historically have an energy savings rate of 4½ percent.

So I think it's important to know and not because, you know, the -- there's something wrong with kind of what has been done in the past, because as Eugene says, a lot of very bright, very professional people have trod this path. But I want to point out that if we're getting real about doubling energy efficiency savings, the disparity between the success of a program model that's being used by LWIP and being used with the BayREN program, the MCE program, and many others, is tenfold.

So by going to kind of like a really flexible approach, we're not just going to see a doubling, we're going to see a doubling, and then another doubling, and then another doubling, all with what we already know about program design. And I think that's really important, right?

I think it's -- I think it's important, too, to focus not just on the common areas because that is where building owners want to see a reduction in their operating costs, but

to address the whole building while we're there. I mean, the literature will tell you that addressing the whole building is the smartest way to approach building upgrades. And a favorite Stanford professor of mine describes it as picking up a lot of pennies in the world of energy efficiency, right? No one's going to stop to pick up one penny or two pennies, but you might pick up a whole dollar if you can do it.

So I think it would be incredible unfair to move ahead with a common area of focus and not try to bring some of the benefits of energy efficiency to the spaces where people are actually living. Thanks.

MS. WANG: Thank you, Eugene. I want to -- here we go.

I'd like to add a shout out for a Low-Income Weatherization Program Multifamily Impact Report that the AEA team and the California Housing Partnership team just completed in March. It's available online in multiple locations, including chpc.net, go to the resources page.

And you can see not only some of the statistics that Isaac mentioned but also an average of 30 percent tenant bill savings. Also information about how it promotes climate resilience, promotes decarbonization of buildings, also integration of energy efficiency, solar thermal, solar PV. And the variety of solutions as you were mentioning that whole like, don't just pick up a couple of pennies, pick up

the -- we'll pick up the dollar approach and how that relates to preserving affordable housing and getting owners of affordable housing excited about doing these types of projects. So and among other things also, the farm worker program, et cetera.

So, you know, I'd encourage you to look at that to get more information.

MR. LEE: Steph, since this is a good segue. From your perspective, what changes could be made to capture more EE in multifamily dwellings? Do you consider them kind of a hybrid of we've got policy and resource, other kind of sweet solutions?

MS. WANG: So I've been thinking a lot as I've been doing spring cleaning, about I'll admit Marie Kondo, I don't know how many of you have like read the book or watched the show, but you pick up the things in your home as your home is very, you know, it's clutter like mine, I've got a six-year-old, so we've got way too many toys and books, and other things we've just gathered over the years and you pick it up and go, does this spark joy? Yes, or no? And if it doesn't, maybe it used to, right? Maybe a long time ago you built that Lego set together or that Ikea furniture whatever, and at that time you went ah, I need this or made that, you know, piece of, you know, that mug and back then it really meant something to me, it used to have value.

But she teaches you about how you have to be able to let go of even the things that used to spark joy and don't anymore. And I thought a lot -- I think a lot about our energy efficiency and clean energy programs in that context too.

We built these, right? If you've been working in this field, as I look around, I'm like yeah, I know all of you. We've been here a long time and you know what 10, 15 years ago, a whole lot of these programs we were proud of them. We went, this is the best we've ever done, these are amazing, good job all of us, we're killing it compared to the rest of the country in energy efficiency, high fives all around.

But you know what? Some of those programs don't spark joy anymore. And in the words of my six-year-old who's also a big fan of Elsa in Frozen, you got to let it go. So this is, yes, okay, so my entire -- is this is going to go on the transcript? And I just imagining the entire record is going to be I've been practicing talking to legislators more who are not, by the way, not interested in me talking deep in the weeds, so I'm practicing.

But basically, what I'm getting at, is we've got a ton -- a huge portfolio of energy efficiency programs and solar programs and now we're going to have decarbonization, electrification programs. And we have a tendency -- I

remember being in the Integrated Distributed Energy Resources process that was previously the IDESM. So, you know, I do know some acronyms too, I've been with you.

And back then we'd go well, what if we just pile them together and we will break down the silos by having like, one-stop shops and integration behind the scenes. And don't worry, we'll take care of it in the application -- behind the scenes application process for all of you. It will fine.

But I also know a lot about trying to combine programs now and we will, yes, we will keep trying to do it because I'm not expecting you to let them all go at the same time. It will take time to let go of that favorite sweater. I still have sweaters that I haven't worn for five years and I just can't, right? And it's going to take us some time.

But we were just talking about programs that work, love it, right? Programs that we've got impact reports, we're like, yeah, we're doing it. And these -- and low-income multifamily property owners love them. I mean, when you hear about like okay, we've got 300 properties on the wait list and we're not advertising. Not really anymore because we don't have enough consistent funding and we don't want to be getting folks hopes up. And the program's not available across the whole state, only in certain -- in certain communities, right?

We would have even more demand if we had the funding

available and we could ramp up, we could keep doing the outreach the way we know works.

But what we don't have -- and it's -- the problem isn't even that's there's no money. We've got huge portfolios of investments in energy efficiency, in clean energy. We're going to have more funding coming out. We also have -- even programs for low-income, but we continue to invest in the same programs that used to be the cutting edge and now we're learning we've got better working programs with better results for this moment and in designs that we can continue to evolve, right?

And I'm just saying I think it's time. I don't know if it's going to be enough to keep saying behind the scenes, we're going to one-stop shop it, we're going to make a single application for -- so you can apply for eight programs at the same time with different application requirements. Not sure that's going to work. And so that's -- that's my overall big picture point of it all.

COMMISSIONER MCALLISTER: Can I ask a question, Eugene?

So just super high level, you felt like you were talking at a high level. I'm going to go really high level. Okay. So what do we -- so we're -- we talk a lot about these, you know, the mortgage assistant buildings and the recent application process and sort of jumping in to that as

sort of an easy win, you know, not that it's easy, but it's at least conceptually.

But the vast majority of multifamily out there is just sort of low-end market rate, right? It's just sort of, you know, it's got a private owner, and it's just kind of, you know, average housing that's for, you know, low-income people live in.

So, is -- what can the Commission or what can the agencies do to get at -- to sort of get that sector's attention? Is it, you know, is there a big convening to be done? Are there owners to be identifiable? Is there, you know, some pitch we should be making to the legislature to like mandate something?

I mean, you know, so how do we mobilize that sector and really sort of get some sort of get some scale and then do something bold?

MS. WANG: So I'll admit freely, my expertise is not in, you know, unregulated -- we -- those of us who work in affordable housing think of those unregulated, low-income multifamily properties as market rates. Some people refer to it as naturally occurring affordable, though they don't have any requirement to stay affordable is an issue. And so I feel in some extent it's really hard to separate out for me the question of, how do we get their attention and how do we get them to participate without also thinking about, you

know, some of the other issues we run up against when we're trying to serve that market sector.

So I think, you know, there -- on the one hand, there are huge opportunities to use similar approaches that would -- that we would use for deed restricted regulated affordable housing, you know, offer significant subsidies and really, you know, really make it extremely appealing.

On the other hand, as we may talk about further in this panel, in another point, there's still major barriers to -- that as we work with our environmental justice and other equity organization partners on figuring out how do we actually ensure that our state investments do not accelerate displacement in communities.

And so it's -- I have a hard time answering that one in the moment with the current, you know, with the current toolset we have. But I think many of us are working together at this time through Energy Efficiency for All trying to, you know, build the toolset, work with our agency partners, always appreciating folks like Eugene and tapping their long years of experience in all of this work, too, and try to figure out like what tools might we have worked and used in the past, not necessarily for energy efficiency, but for other sustainability programs that may also have had concerns about displacement.

So I can't -- so unfortunately, I don't have a quick

answer for you on that. Perhaps others on this panel might have.

MR. SEVIER: Yeah, just in my free time I solved it, Commissioner. And I've just been waiting for this chance to tell you.

So I do think that the point is right, that the naturally occurring market is a hard nut to crack. And I really appreciated some of what Abby was talking about through some of those innovative approaches like requiring building upgrades at point of sale.

I also want to point out that kind of reiterating what Stephanie was saying here that we're seeing new approaches deliver serious energy savings without centering energy at the core of the message, right? So why with this greenhouse gas reduction program achieving 45 percent savings -- and I'm going to say it a lot, so you're going to hear it a lot. They're also -- the Association for Energy Affordability and NRDC are working on a pilot with the South Coast Air Quality Management District to electrify multifamily residences as a part of a nitrogen oxide reduction program, right?

So there are other pathways into motivating building owners to make these kinds of upgrades, and I think the important piece for the Energy Commission to really look at is what does it mean to provide sustained long-term funding

for programs like these? Because building owners aren't waking up today or tomorrow going like, gosh, I really think I should upgrade my building for the health and safety of my residents tomorrow.

Because in the multifamily market, a large part of the residence are low-income. That is a captured market, right? Low-income people don't have somewhere else to live. If they need to move out, it's going to be into a worse building or, you know, a building further away from where their kids are already in school, from where they already work, or it's going to be out onto the streets. And that's just the reality.

And so by having long-term funding available and starting to spread the awareness that these funds are available for building owners to participate in, you're really making sure that when the time does come and that building owner is finally like, gosh, if I don't upgrade my building, it's just going to fall apart, right? Or I'm going to face serious violations of whatever code are in place at the time, state code, local code.

Without having that assurance and that long-term kind of like knowledge up here that they can tap into those resources whenever they decide, I don't think we're going to see the type of progress that we need. And we see this every year just based on the way that we as advocates are fighting

for the low-income weatherization program in the legislature.

So five years ago when this program was first authorized, it was authorized for around $75 million and then that quickly has dropped off to where they get around $10 million every year.

And so even though the state has said that it has these like very serious commitments to spending assets -- access for low-income, we're just not seeing it reflected. So I think that the Commission could also do some work with just educating its sister agencies, the legislature about the really serious need that exists, and how that is directly connected to some of these negotiations that go on.

MR. LEE: Nick.

MR. DIRR: And just very briefly, I think it's probably a carrot and a stick approach, unfortunately. I mean, obviously they need subsidies and financing because they may have -- lack access to capital reserves to do that upgrade in regards to the naturally occurring affordable housing or private ownership model. But we do need to nudge them along a little bit as well to --

MR. SEVIER: Agree.

MR. DIRR: -- show the real need to it.

And one last note on -- you know, one of the reasons LWIP program has been successful is because it's greenhouse gas based and so we can design a program around the market.

And we weren't -- we didn't have too many limitations around things such as the total resource cost test or other types of things. There's a lot of funding available to the rate payer programs that can be addressed to that sector of the market, but it sort of conflicts with the state energy goals and the climate goals of doing deep comprehensive energy retrofits when the policy sort of mandates just the opposite, just very low-income for house measures.

So I think, you know, in your question there on the policy changes, if there could be some legislative changes around even rate payer programs are identified as being successful or not, you know, there may be better metrics in the TRC or perhaps other benefits need to go into the TRC to determine if that's a good investment of funds.

MR. SEVIER: Let it go. Right? Let it go.

MS. WANG: Let it go.

MR. LEE: Moving on. In this environment, we regularly talked about nonenergy benefits. And I recall a great comment during last year in our workshop at the Commission [indiscernible]. The statement was being that benefits are benefits. And there really is unnecessary to bifurcate energy benefits from nonenergy benefits.

But using that term about nonenergy benefits, I'm curious, how have those been incorporated in the program process and that all kept using examples of it?

MR. DIRR: Tangentially. So, you know, when we're proposing upgrades to our property owner, we're explaining to them, you know, these are the reasons you could do it for energy efficiency or reasons in cost savings, reasons there's better quality of life for your residents, there's reduced maintenance costs, there's improved durability during, you know, heat waves, better resiliency.

And so those other nonenergy benefits could kind of help persuade someone to see the real value in it, especially if economics are not there alone. But because all of the programs, at least the CPUC and CEC funded programs are directly tied to, you know, units of energy, units of carbon, then any investment in those properties has to equate to a certain result in those metrics. And so, you know, we speak to those benefits but they kind of occur organically, we're not really able I think, you know, we're not really able to identify some of the other nonenergy benefits or even tangential benefits. For example, electrification is a good example that maybe do an electrical panel upgrade. You know, the panel has, you know, been recalled, you know. And so that -- there's a whole bunch of reasons why that panel could be upgrade that opens the door to electrification and a whole bunch of other safety benefits, but it's hard to package that in giving the currently funding programs that we have.

MR. LEE: Isaac.

MR. SEVIER: I think what I have to add, so what Nick said is that the benefits of investing in multifamily buildings is going to require breaking out of our box. Like, it's going to require some deeper collaboration with folks like the Department of Housing, Community Development, like the Department of Public Health. The Bay Area Regional Health and Equity's initiative has developed a tremendous policy framework that really links our public health, long-term outcomes to where we live, where we work, and our bill environment right? And so I think when we talk about putting energy efficiency into multifamily, right? We're talking about providing safe spaces for families and people to go during wildfire smoke events. We're talking about helping weather severe heatwaves in the summer and the central valley better.

And in order to do -- and, you know, I think question comes down to like are we measuring the right thing to be able to say that we're providing those benefits, right? One of those ways that we could talk about this is by measuring energy burden, right? By asking energy burden is the amount of income that goes to paying your energy bills, right? And for low-income people that's usually two to three or even four times higher than their nonlow-income counterparts. Right?

But we don't ask those questions. As energy people,

we're using to counting kilowatts and therms, right? It would require us to go have a conversation with like in a economist or public health expert to really understand what are the benefits that we're achieving that aren't kilowatts and therms and I think that we have to do that.

MR. LEE: Ducking a little deeper about the steep energy upgrades, you've been successful, Nick, but I know that you face challenges with them. And could you illustrate what kind of challenges that you still face right now?

MR. DIRR: Sure. So the deeper and more comprehensive the project it is, obviously it's more costly and then the project timelines are quite long as well. So again, this kind of goes back into the need for having long-term availability of funds that people can plan this into their upgrade.

And the earlier they know that there's funding available to help them go beyond business as usual, then they can, you know, they can plan that in and make it happen and have that commitment.

You know, we work at projects that are doing comprehensive upgrade, but they're so far along in the program design that it sort of change a lot of the details to make it a very deep and comprehensive project that's just too late for them to do that. So that long-term funding commitment is important. Obviously, it's expensive. So, you

know, whatever subsidies are available.

It's a good idea but I think we all agree that like we can't have rebates and subsidies forever, like if we're really going to accomplish the scale that we need to do, we need to figure out some sort of other market mechanisms that will enable that to happen.

And it's just we need to find a way, I don't know the answer, but we just need to find a way to get the market to value a lot of this stuff better. Whether that's building owners or financing entities or contractors developing business models around this. It's just a real -- even working with contractors, you know, you're used to doing certain things a certain way. And the truth is -- is right now in the economy of California, the construction market, they -- they have a lot of work as it is. And so finding ways to make it valuable and profitable for them to build their business around the Energy Efficiency Comprehensive arena, then we can scale it with or without additional subsidies.

MR. LEE: Steph.

MS. WANG: Yeah, and I can actually add on nonsubsidy approaches. So -- so my organization The California Housing Partnership did -- did a test of an auto bill repayment approach maybe a couple of years ago and we've been actively involved in, you know, helping agencies design what these

sorts of financing approaches for energy efficiency. And we found some challenges. The big ones tend to be, one of the biggest ones is that just like all of our programs tend to be restricted to particular measures, our targeted financing programs turns out are also really restricted to particular measures, to particular eligibility requirements. And so whether we're looking at a utility on bill finance program that's -- that can only apply to you if you're doing particular energy efficiency measures and you qualified for the energy savings assistance program requirements or you're looking at the statewide on bill rate repayment program through KATFO, they're getting to prepared to launch for low-income multifamily that can only address energy efficiency, but you can't include -- I don't think you can include water solar, solar thermal, anything else. I could be wrong about the exact list, things that you can include. But the feedback we got from a potentially participating affordable housing owner is that generally you're not going to be able to use financing or just a small component of their project, they need a large -- their gap is generally like they're going to bother with all the program requirements and do a different type financing because they have a significant financial gap and they need to be able to fund all the different greenhouse gas emissions reducing measures they are doing at the same time. Ideally there are water conservation

measures as well.

And then -- so that's piece of it. And the second finding we had was that there's -- that right now a lot of programs are in a place of uncertainty or risk around whether there's bill savings are going to be high enough for to cover their cost of repayment, the risk currently lies with the participating property owner.

And when you're talking about affordable housing or probably even low-income multifamily housing, you're going to have to ask them to be sure, I don't think they have in common not a huge amount of interest taking a lot of financial risk when they don't – in affordable housing you have really tight operating expense margins oftentimes by design to meet tax credit requirements. I don't know, I just like to have other folks weigh on the -- on the market rate affordable housing – low income housing side, whether they're seeing tons of interest and taking lots of risks on this, but I would be surprised.

I think that, you know, there has been discussions about auto shipping mechanisms, something that my organization would be really interested exploring the Association for Energy Affordability as we're moving forwrd on -- and Energy Commission EPIC project coming up and trying to figure out, you know, how do we -- are there other actors who can take on some of that risk. Are there other ways to

make sure we're covering -- covering some gaps around not requiring that every property owner has staff become experts on managing, maintaining, overseeing, monitoring all the new energy efficiency and clean energy measures.

MR. LEE: Okay. So when you face unanticipated costs when you're retrofitting, how do you actually bridge that kind of funding? Because inevitably on this housing stuff we're speaking of, you know, lead, abatement, and mold, and asbestos mitigation. You've probably faced some of this, Nick?

MR. DIRR: Yeah, it's not -- there's not really good solutions, to be perfectly honest. A lot of times it means either the project doesn't happen or there's a dramatic reduction in scope so that they can use whatever funds they have to address that.

You know, there are some federal programs that, you know, like the LIHEAP and weatherization assistance program that provides funds for that but, you know that's very specific to a particular building sector.

You know, Marin has an interesting model. They've upped the green and healthy homes initiative chapter in Marin County and they've paired that with their MCE program so GHHI Marin does provide funding for those types of issues. Anything health and safety or code related. And it's pretty substantial funding, but again, it's very limited to a low-

income building sector and just to Marin County currently.

You know, and one idea I had even in just working with other agencies in the state is that, you know, it would seem like there's some funding out there from the healthcare industry. I mean, we all I think agree that like addressing the root cause and the source of the issue is being addressing the symptoms and so I would think somewhere out there there's a huge bucket of funds that could be used to address root cause type things instead of addressing it in the emergency room.

MR. LEE: And it goes to your point about this collaboration with Department of Public Health.

MR. SEVIER: Yeah, if I can add -- just add a comment and take a step back with you all for a second. So I don't have answers about how to finance this. I don't have the perfect answer yet on how to pay for it, give me time.

But I want to point out that part of the quandary here in plain language is how do you make people -- or where does the cost get passed down to, right? So we talk about building owners not wanting to take on the risk and I think the other side of that coin is well, we'll pass on the risk to our tenants and we'll make sure that they're -- they're part of the solution in repaying the cost of this building upgrade.

And here in California where we already have really

high housing costs and a large number of folks who are living in multifamily housing are predominantly low income, that's a risk that I can't advocate for, right? I can't advocate for potentially displacing people out of their homes because those costs have been passed through to them.

So I think that, you know, for all of us in the room, and I challenge to anyone who's listening to this to really think about how do we creatively outside of what we already know about on bill financing, about kind of green bank lending. How do we address a problem like this?

I was talking to a colleague of mine at the Rocky Mountain Institute over lunch the other day about this and we both are just stumped, right? There is not on the menu today and financing options a way to both provide clean energy upgrades and avoid a risk to tenants. And so we really have to think about our housing stock as a part of our societal infrastructure and think about other models that we've used to finance upgrades to our build infrastructure.

MR. LEE: Thank you. [Indiscernible] to a different topic about our workforce and to what extent do you actually utilize a well-trained local workforce in your EE efforts.

MR. DIRR: Depends on the program. So a number of the programs and we're talking about energy efficiency at the moment. But a number of the solar programs have very explicit workforce development requirements, local workforce

development requirements which works well because it's scalable and replicable so it's worthwhile for a contractor or a workforce development agency to invest. Getting people placed in those jobs because there's repeatable large scale projects they can work on.

It's a bit trickier than a multifamily efficiency sector because just the way that the current market is -- is happing is that, you know a project, you may have one in this county and another in Fresno County, and another in Stockton. It kind of jumps around, it happens every 9 or 10 months so it's hard to invest a lot and building that workforce if there's only one project for them perhaps to work on.

So, you know, we do work with contractors, local contractors you do a good job on those projects and they understand the nuances of going better than business as usually. And so, you know, BayREN's a perfect example as a program that's been going on in the Bay Area for six years now and repeatedly 5,000 units a year. And so entire contractors have built their business plans around that. And so in that sense it makes sense for them to invest in workforce development.

We're also working with the property managers to help them understand how to use this equipment, especially high efficiency heat pump type of equipment but all types of advanced equipment. And so I think that's really helpful as

well. We have done a few contractor trainings, but usually they've been voluntary. And the challenge with voluntary trainings is the people that come didn't need the training. You know, they were already interested in it and they already knew what to do and they just wanted to learn more.

And so we had a really hard time finding folks that really need the training, they either haven't drank the Kool-Aid or they just haven't seen it as a profitable benefit for them and so they haven't invested the time and resources which are significant to have someone come and get off the job and learn stuff.

MR. LEE: Going on that subject, do you see that there's a state role in -- for state departments, the Climate Action Plan laid out 49 strategies and then identified multiple state departments to implement the strategies. In your experience a role of, you know, maybe it's the Energy Commission, but maybe a little broader than that at the state level that you see state agencies that would -- can help.

MS. WANG: I'll take that, Nick you may have more to add. I've heard time and again from workforce organizations that when the state or local governments try to just create workforce job training programs standalone, they don't -- there's no connection to actual jobs.

MR. SEVIER: Uh-huh.

MS. WANG: And so we really have to make sure that

you're pairing workforce job training programs with programs that are creating the market so that there is a job to get to and not just, you know, such a short term, that by the time you finally get through the program and there's no job you're done, you just went through a training exercise, but rather a longer term funding real market development so that you're -- you're getting trained for a career.

MR. LEE: And that really is a different focus as you put it. Thinking career focus.

MR. DIRR: Uh-huh.

MR. LEE: What's the long game here. Right? Okay. So what advice would you give to building owners that are not currently going beyond just the minimum right now?

MS. WANG: I think I'm going take this as if you're talking about a state code minimum for example. So a lot of times I would say the affordable housing owners I interact with the most tend to be a bit more savvy, right? So on sustainability meeting climate goals some of them may even, you know, maybe be a sustainability lead and -- but we're not really trying to design it for them, they already have somebody there. But I would say amongst at least affordable housers, even those who don't have sustainability leads, there's a recognition that if they are given flexibility, that they can find a less expensive solution and even, you know, looking at -- but sometimes get talking to them and

they cannot understand that code minimums aren't necessarily written to be like, oh, this is expensive.

MR. DIRR: Uh-huh.

MS. WANG: Lowest cost solution or high spent value solution but rather a starting point and, you know, we work with a lot -- and we and others in the building work a lot with the Energy Commission and really appreciate the work it they in designing code to -- to be flexible recognizing that what's less expensive or higher net value is different from location to location. Nobody was designing code minimum for the perspective that this is your cheapest option.

And so going so beyond a minimum often is going to be a better deal. And so often I have these conversations with folks in affordable housing industry. Not just the folks who are trying to figure out what to do now with one project, but going back to the political will, how do they feel with how green code is going at the state level and locally.

And I advise local governments when they're creating code requirements and they don't want to scare off the development of affordable housing, don't tell them a one reach code option. Yes, they're better off going with all five options that you came up with, don't subtract any of them. Give out all five because, you know, then your developers will look at them and go, I think I can do one of those five rather than oh, my God, you gave me only one

option and it's going to be crazy for this particular parcel right? So that's been my experience.

MR. LEE: Isaac.

MR. SEVIER: I'm going to add, Eugene, here that I think another tactic could be to really educate Californians who need this in their homes about the benefits that could have them. You know, there's a lot of tenant organizing that goes on around this state, a lot of renter advocacy groups that are out there.

And while we're talking about the whole market rate, so in the derestricted market I think there's good actors, nonprofit groups that are trying to create the kind of land stop on affordable and durable housing. But out there in the naturally occurring market, what's going to drive demand to kind of go back to Commissioner McAllister's point is political will. People don't know how to ask for something that they don't know about, right? And so I think about a lot of political will in terms of really educating my neighbors about what's available to them, what they could be having, the buildings that they could be living in if they were putting more pressure on their landlords.

And I think that it's a little more nebulous, right, especially for us energy folks who really like to focus on the technical parts, the things that we can count, right? But, you know, meeting on climate goals is going require

being really creative and really strategic in ways we haven't been before based on the slide that Abby showed us. We're -- we're not going to make it guys. So let's stop kind of like hammering on just the things that we've done and really start asking ourselves how do we bring more people into this climate tent? How do we make sure that people are demanding that we go there to meet our 2100 goals?

MR. DIRR: I'll be brief on this. The AB 802 disclosure of homebuilding energy use for multifamily buildings with 50,000 square feet or more will be interesting because now to get to your point, there might be more of a sort of a bottom up request to say oh jeez, my building is not very efficient.

And even, you know, the -- I think it's going to be disclosed in sort of an either ENERGY STAR score or EUI which may not really help folks really understand how good or bad their building is so you really need to take that AB 802 data and also convert it into how carbon intensive or not carbon intensive my building is and then, you know, the communities and residents that live within this building can say, oh jeez, my building is using a lot carbon. Provide that pressure to the property owner to upgrade it.

MR. LEE: Yeah, a selfless pitch. You know, this year multifamily buildings owners are now required to report to the Energy Commission, specifically my benchmarking

program I'm supervising. And so now we're going to be collecting both commercial building and multifamily building energy use. So we're really excited in this year. Thank you very much for brining that up.

I think what you're really describing is engaging the tenants and oftentimes that does involve these community-based organizations. And do you have any experience on how you actually integrated tenants and encouraging them to participate? How did -- how is their role can be being better?

MR. DIRR: It is a challenge. I think, you know, especially because a lot of the major upgrades are going to require the property owner's involvement. But there are things that residents can do within the units without property owner involvement. So you know, in the BayREN program, we're developing a pilot with -- partnering with Home Connect who kind of has the gamification approach of having users, actual individual residents, see what their energy usages is on the electricity side and reduce usage it at high times a day.

But again, I think coming back to the AB 802 really is a good pathway for -- you know, we need to value efficiency and low carbon buildings in the market. Whether that's at time of rental or just for folks living within their buildings to provide pressure and provide them with the

tools and the documents to take to the property owner and say, hey, these are different things that we could do, here's some funding available and really work with local community based organizations, I can help empower them to do that. Because it is a pretty intimidating thing, I don't like talking to my landlord.

So we need community based organizations that can sort of advocate on their behalf or tenant's right, education, vary organizations.

MR. SEVIER: Yeah. I mean, Nick, I love fighting with my landlord so if you need someone to fight your landlord, I mean, I'm game.

So let's -- I have a funny story about that but you can ask me later when I'm not on a microphone.

So one -- one thing I want to give a shout out to here is the great process that the CPUC used in the San Joaquin Valley proceeding where they really built up a stakeholder based design approach to developing those 11, I think pilots for how to electrify propane and wood use in areas of the central valley that are too far away from natural gas pipelines and to reasonably connect them and provide that heating service.

So I would encourage following that kind of an example wherever that we can. I think community members know what they need. They know what a solution should look like.

They may not have the fancy education to tell you all the jargon, but they certainly know what will work for them.

Energy efficiency for all the summer will be hosting an equitable electrification workshop that really follows that same model where we're asking community-based organizations to come and help us design a strategy. What would it look like for the state of California to not only double its energy efficiency goals but expand access to disadvantaged communities and enable really deep fuel switching across our state.

And we think that that kind of a model is the best way to really democratize some of the process.

MR. LEE: Thank you. I want to turn the time now to any kind of questions that we might have.

COMMISSIONIER MCALLISTER: Eugene, are we going to open up, oh yeah. I would like to hear from the audience we have monopolized everything.

MR. NICELY: Okay. My name is Robert Nicely and I'm a general building contractor, work in the Monterey Bay Area. I'm also the copresident of Passive House California, I actually drove up here today to address you on behalf of Passive House California about some of this stuff and I will just in sec. But some of the stuff you have been talking about makes me want to -- these are one of those microphones we have to be really close -- makes me want to talk about a

couple of things from the point of view of being a building contractor.

You guys all talking about sort of -- I apologize, I'm hearing a bunch of stuff about top down strategies about how to basically create cultural change which is what I think we're talking about, culture change in the marketplace to get -- yeah, get people to value the things that were not in the consciousness in the recent past so we're talking about how do we get people to -- how do we create demand or create value in the marketplace for energy efficiency strategies.

And I'll just say I've been doing this, I've been working for the trades for about 35 years and for the last 15 years, I've been trying to do just that. And something I want to tell you guys is that an interesting thing that happens is when you start to work in your own business when you start and try and make energy efficiency part of the offering that you're providing, something interesting happens and that's that the trades people start to learn to have that department, their craft or their wisdom if you will.

So something that happens is that if there's some force that is causing them to have to relearn their trade, in this case it's mainly me as a boss telling them you have to do this. But starting with this, I'd say 2013 codes cycle was also -- to a lesser extent that there is quote unquote, green code which acknowledges as a trade person we're

starting to think a little more about that aspect about what we do.

But basically we're talking about a cultural shift. And the point is -- is that once you -- if you have -- I've certified some passive houses and I've had some fairly high profile projects where the clients wanted to have a very advanced building. And when you have -- people start doing that kind of work, it's not like they're going to go back to not doing that kind of work afterwards.

In other words, if you make a point of insulating all the little places as you go along or air sealing all the little places you go along rather than, you know, building it however you're building it and then have the insulator come when you're done building it. You think about those things and that sort of starts to suffuse into the culture and the tradespeople and that's one of those sort of little guerilla ways that this is going to happen is that when the when people are working the trades start to incorporate into this -- this into their craft, that's one of the ways this is going to suffuse out in the culture as well.

So one other things before I get into the passive house thing, I want to say is that when you're talking about incremental upfront cost that is added to a project, a multifamily in this case, you have to bear in mind and Isaac, you talked about The Rocky Mountain Institute when I was

trying to get my mind around this, I read some books that they put out and one of the concepts was that if you don't do marginal change but if you order a magnitude change you can also realize benefits that drive down cost. So there is -- while there is an upfront cost, there's also the fact you have a more durable building that will take less money to maintain, you can have small mechanical systems so whatever the lifetime cycle of the mechanical system, it'll cost less to replace it.

Obviously, the energy cost is going to be less so you can track lifetime possibility and find that there are actual savings that sometime quickly outweigh the incremental upfront cost.

Passive House -- thing that I came to say was that Passive House California submitted to -- I brought my notes so I'd say exactly right thing -- to the CEC's codes and standard Commission and a reach code study and I came here specifically to say I hope you consider employing Passive House because it is a metric that creates -- first of all the things that you have to do from a tradesperson standpoint are just obvious things that you would do to make a better building.

There's just no reason not to do that. I'm not talking about fancy, expensive things, we're just talking about making a good separation between inside and outside we

didn't used to have to do.

So really from my point of view, there are sort of sophisticated elegant parts to Passive House. But from my point of view the reason I adopted it is because the simple obvious thing that we needed to do going into the future to make buildings work right. And since we in the trades need sort of a -- an authority to tell us how to do things. In other words, you know, the building code is sort of the go and no go line. If we incorporate something like Passive House as an alternative pathway, then you're saying that these, you know, sort of simple, intuitive practices are now what we as the authority, saying that you need to do to come up to the minimum standards. If you're doing your job, that makes it a lot easier for us to go out and have that reach out into our cultural because there's the authority, building code saying this is what you have to do.

And I guess the last thing I'll say is that to achieve the climate goals that we need to achieve, we need -- we need unprecedented action, we can't do incremental, 10 and 20 percent. We need the kind of gains that we get by employing a protocol like this where people in Passive House, talk about a 75 percent or more improvement and building efficiency. And that's really the kind of change we need to get to the goals. And it's right here in front of us. It's a tested easy to implement metric that is available.

So thanks a lot for your time.

COMMISSIONER MCALLISTER: Thanks for being here. How many -- how many speakers do we have? I [indiscernible].

I did want to just say, give my regards to [indiscernible] and I have talked to staff about this and, you know, it's a pretty big lift, actually to sort of find an equivalence on each and every single case in Passive House will absolutely guaranteed to exceed code. I think that's probably the case. But we have to actually do the work to show that. We were going to try to create that alternative pathway.

Anyway, I think it's a great idea. We should look at it and talk with staff about that.

MS. CLINTON: Hi, I'm Jeanne Clinton. Some of you may know I retired a couple of years ago. I was the efficiency advisor here in the governor's office.

I want to encourage the Energy Commission's processes go forward in the 2019 EIPR process. There are three upcoming meetings where you're going to take up multifamily I think in Fresno, Los Angeles, San Diego. And I really want to encourage you to try to try to structure those panels in a way that says what are the greatest success stories that we have A) in California and what lessons can we learn from those in terms of scaling.

And then B) what are some of the best success stories

elsewhere. Particularly New York City, Chicago [indiscernible] energy. And I'm really intrigued -- I don't happen to them, I know personally what's been happening in New York but I knew they took an approach of benchmarking multifamily buildings. And then I think requiring that the bottom [indiscernible] title needed to do some level of investment in improvement.

So in California we have a benchmark in the reporting process, but we're not yet utilizing that as a stick to mobilize action. And then I would just say since we do have people point to BayREN and the low income weatherization organization program has examples of maybe better models. And I would put out BayREN is not necessarily focused on affordable housing, it's multifamily work in general.

I would really like to encourage future workshops to try to focus on what are those success stories and lessons learned? And how do we scale that as opposed to having one off?

MR. MCCOARD: Dan McCoard --

COMMISSIONER MCALLISTER: Let's let -- let's let the lady here on your left. So she's up. You'll be next so stay right there.

MS. WEST: Thank you. I work at StopWaste and I also work on East Bay Energy Watch as well as BayREN programs. And I know Jennifer from BayRen had hoped to be here today

and could not. And I'm somewhat standing in, at least taking notes as well.

I wanted to make sure that in the preparation of these policy documents that you identified that more funds are needed, especially for local governments to implement. And there are lots of limitations and barriers around TRC, which has been brought up today, Total Resource Cost, but also the three-prong test. And I'd love to have the panel to talk briefly if they can about, you know, how -- what's the potential for change there? How can we break down some of those barriers, release funding that might be designated right now only from an energy efficiency, but look at the bigger picture and how could this document help to set that policy in process.

MR. MCCOARD: I'm David McCoard and I live in El Cerrito I'm in a multifamily apartment, 16 units. And we do have all electric kitchens, but the heating and water and space heating for the whole building and they're run by gas. And I would really appreciate the source of information and figures that I could give to my owner to get him to put in electric heating for water and space, we use radiators.

And as far as new construction that you've got a crisis in housing from moderate and low income residence and lots of new housing projects are going up in the planning and permitting.

In El Cerrito there are three or four big apartment projects going down and with a proportion of affordable units.

And if we -- make those all electric design, you have cut the cost of running gas lines to the buildings. And that will reduce costs of residence in two ways. So it will cost less to buy or rent a unit and utility bills will be less from space and water heating, cooling and cooking.

And the Department of Energy, their talk has a webpage on electric heat pumps. And they're saying that because they removed heat rather than generated heat, heat pumps can provide equivalent space and conditioning as little as one-quarter of the cost operating conventional heating or cooling appliances.

So California residents will thank you for instituting strong policies and guidance to make new housing all electric and to retrofit existing housing. Thanks.

COMMISSIONER MCALLISTER: Thanks for being here. One more question, we're going to -- we're right at that -- a little bit past the agenda that we had in mind. And we'll break for lunch for an hour or so. Okay.

MR. KINSEY: Thank you, Commissioner, I'll be quick. Nate Kinsey, California Efficiency and Demand Council. I heard a lot about barriers, to doing deep energy retrofits, I heard about moving down specific measures, I heard about AB

802. I didn't hear about NMEC and how meter based energy savings could be a benefit for the multi-family. So I'm curious to know really on that past question what are the barriers to implement some NMEC and how that that can kind of help achieve this achieve this market transportation, market-based approach we need this moving forward.

MR. KENNEY: All right so.

MS. BROOK: So in case you don't want to answer or you don't feel like you have time, we are going to talk about NMEC in the next panel so [indiscernible].

MR. KENNEY: All right. So with that, we will break for lunch. So we'll break for an hour and we'll pick up with the next panel.

So we thank you to our --

COMMISSIONER MCALLISTER: So let's just give a time.

MR. KENNEY: 1:20. So 1:20.

COMMISSIONER MCALLISTER: 1:20 [indiscernible].

(Off the record at 12:18 p.m.)

(On the record at 1:20 p.m.)

MR. KENNEY: Okay. So we are going to get going here with our next panel on Innovative Approaches to Energy Efficiency. So I will be calling up Martha Brook who will be moderating that panel.

MS. BROOK: Good afternoon. Did everybody have a good lunch? I had a portobello mushroom sandwich right

across the patio.

I'm Martha Brook. I'm a mechanical engineer by trade, a technical advisor right now by profession -- advisor to Commissioner Andrew McAllister at the Energy Commission.

And I'm pleased to moderate this panel of -- on the topic of innovation. So since Eugene this morning had a really great intro, I thought I should actually spend a little bit of time, which I did, during his panel to prepare for mine.

And so I looked up a couple of things about innovation. And so just to kick things off with the two quotes that I found that I think are really build off of the morning panel in terms of, you know, you can't keep doing the same old things kind of theme.

The first thing I found from an unknown source was: The Stone Age didn't end because they ran out of stones. And the second one is from John Steinbeck and his quote is: Ideas are like rabbits, you get a couple and you learn how to handle them and pretty soon you have a dozen.

So the topic of this panel is Innovative Approaches to Scaling Energy Efficiency. And I'm pleased to have actually remarkably in the order of my notes, Carmen Best and Anne Neiderberger, and -- I've got it right here. And I know her first name is Joanne O'Neill.

So first Carmen. Carmen Best is director of Policy

in Emerging Markets at Open Energy Efficiency or OpenEE. In this role, she supports her team to navigate policy issues relevant to the growth of meter-based energy efficiency markets across the country.

Carmen started her career in energy efficiency evaluation and brings a wealth of knowledge and perspective from the evaluation industry coupled with a solid understanding of the regulatory landscape for energy efficiency.

Prior to joining OpenEE, as many of you know, Carmen led the Energy Efficiency Commercial Programs and Evaluation team here at the California Public Utility Commission, and served as a senior analysis during her ten years here. She was heavily involved in the initial guidelines from the CPUC following passage of AB 802 and SB 350. And she's continued to track the evolution of these meter-based savings protocols and market developments that have followed.

Throughout Carmen's career, she has worked on bridging the gap between forecasting, implementation, and evaluation. She shared her lessons learned across a continent and the world.

In her new role, she's bringing the gap -- bridging the gaps remaining to be able to use near term M&V to improve the ability for energy efficiency to contribute as a grid resource. Thanks for coming here, Carmen.

MS. BEST: Thanks.

MS. BROOK: Second, we have Anne Neiderberger, who's Dr. Neiderberger, and she's a VP Market Development at Enervee. With responsibility for thought leadership and collaboration with utilities, governments, and retail market actors to drive innovation and expand markets for energy efficient consumer products.

She's a tireless advocate for making markets work better for consumers and bringing energy efficiency solutions to those who need them most, both in the U.S. and abroad.

With roots as a climate scientist, a decade of experience leading Swiss climate policy and a successful international consulting practice and is adept at bringing public and private sector actors together to move markets. Thanks for being here, Anne.

And finally, Joanne O'Neill. Joanne has over 12 years of experience in the demand side management and utility industries. During this time, Joanne has developed, launched, and implemented numerous energy efficiency programs across residential, commercial, and industrial customer segments.

She has a long history of working with key market actors including manufacturers, retailers, and contractors to successfully deliver these programs.

In her role as the director of California Programs,

Joanne leads a team to deliver a set of diverse, innovative, and cost-effective offerings across Northern and Southern California. Thanks, Joanne.

Okay. So I think you guys can confirm that we have not practiced. So. But I think you do know the direction that our questions are going to lead. Basically, the first set of questions I'm going to ask together and then -- because I think they're going to naturally blend in to each other. And then we'll just start and see where the conversation goes.

So basically the questions are, what nontraditional approaches to capturing energy efficiency savings is your organization undertaking? What are the major challenges you have faced in these approaches? And what successes can you share?

Want to start, Carmen?

MS. BEST: Sure. Make sure this is working. Great.

Thanks, Martha. I think that the -- well, starting with the simple thing, what are -- what nontraditional approaches are we using? Open Energy Efficiency actually is in a role of not providing specific services to customers, but rather we're a software platform that enables market transactions related to energy savings.

So one of the key ways that we do that is by providing a standardized method and a transparent,

repeatable, calculations to drive energy efficiency savings in a consistent way. And then that is utilized for settlement payments in pay for performance programs. So that's kind of the most typical way that our platform is being used. It's also being used for targeting and other ancillary services as well. But that's the main role that we have had is being the transactional platform for pay for performance.

And the meter challenges, I think that's still are existing in that space are one, that it's still relatively new approach, so there's still some lessons to be learned for how to get the data to flow properly, making sure that it's available to all the different actors in the market. Making sure that people can reorient their program designs to the meter-based types of outcomes.

So I came from evaluation, meter-based efficiency was kind of the world that I lived in with ex-post evaluations. But having that information accessible and available as you're deploying your program design gives you a little bit of a different flavor of where you're going to be putting your emphasis and even what sorts of interventions you're going to be doing. So I think that's one of the big opportunities but also a challenge that has been faced as these have been getting going.

Another challenge has been making sure that the data

is accessible to folks who are actually providing the services, so they can use that for the real time interventions and changes that they're looking at.

Some of the successes that I think are most relevant are that, first, folks are really interested in sticking their necks out and trying to make some kind of bold decisions and bold paradigm shifts for how they're deploying programs. There's entirely new models that have come forward as a part of this process that we wouldn't have been able to see at all under a deemed savings framework. So I think that's really exciting.

And also that it is having the intended effect of creating a bridge of communication up and down the value chain. So the gentlemen you were talking about being a contractor in the field, people that are delivering these savings can actually see how the savings are coming out for their customers. They haven't really had access to that in the past. Their value and incentives coming from aggregators can be aligned with the value that they're delivering. The aggregators can align their value with what the utility is trying to procure, and then the utility can align their incentives with what the regulators are asking them to do.

So and it's all being able to -- it is all able to be done on a common understanding of performance which had I had that as a regulator here at the Commission, I would have been

quite happy. We didn't really have that. There would be different silos at which you would check in and have different results. And then a lot of the interactions were reconciling the outcomes. And frequently the folks on the end of the -- at the beginning of the process wouldn't get that feedback.

So I think this is a fundamental shift that can really enable the alignment of performance and really drive to bigger investments in energy efficiency with better accountability than we've had in the past.

MS. BROOK: Great. Anne.

DR. NEIDERBERGER: Excellent. So Enervee is -- I think we're talking about innovation here, I just wanted to mention that Enervee was actually founded by people who knew nothing about energy efficiency. They were digital marketing executives. And I think this is a big reason why we're having the success that we're having is because everything we do is designed from the ground up to be of value to consumers in a market base setting.

And so if our offering is not compelling, then nobody will use it. And so I think that's a really important thing here that you keep the needs of the customers in mind, you're obviously going to have much better success.

So what we do is we make it simple and compelling for people to make better one-time energy-related buying

decisions. So our focus is not on smart meter data and changing behavior in the home once you've got your products in the home or the house is built. Our focus is on making sure that every single purchase that's made is the most efficient purchase that meets the individual consumer's needs.

And so the main innovations with respect to our offering is that instead of relying on rebates, you know, mass market incentives which had been the main stay for residential energy efficiency programs for a long time, we actually tackle underlying market barriers and we also apply behavioral insights to make sure that consumers can take advantage of all the data and insights that we have about the market. So that's a shift.

And then the other thing, too, is our focus on the one-time buying behavior because, you know, if you make a wrong decision, like if you -- if you're going to spend $1200 for a water heater, you have a choice of buying a conventional water heater or a heat pump model. If you make the wrong choice, you could be spending 3,000 extra dollars over the lifetime of the water heater which is more than double the cost of the water heater to begin with. So focusing on that is a super important piece.

We also then, I think the other approach that's different than a lot of approaches is that this establishes

an ongoing relationship with people. Because people are continuously making these purchases, they're out there in the market, they're going to buy something anyway, we have to inject our offerings into that normal shopping process.

And when we do that, the whole concept of incremental cost pretty much falls away because we're not forcing this consumer to buy any particular model. We're just giving them information to shop within their requirements.

And then the other thing that I think is innovative is that we've developed the technology to bring a market-based retail product approach also to the low-income segment. This is something I'm very excited about we can talk hopefully more about later.

Another reason why this is so important is because people always forget, Andrew doesn't, but a lot of people forget the plug load in appliances is responsible for 30 percent of total energy bills in a home nationwide and 45 percent of electricity bills. So by not addressing that, we're not addressing the main driver of residential load growth. So we need to do that.

The barriers. Well, beyond just normal, you know, market entry barriers of having a completely novel solution to the utility sector and really, we didn't have proven results, we had theory, we had behavioral research that indicated that what we were doing was going to work, but we

frankly didn't have the results yet, that's anything new that you try is like that.

What we also found now and this is still ongoing today, there's a big disconnect between state strategies and the regulatory framework, the rules. The rules of the game have not been updated to reflect the state's strategies that we're being asked to respond to and which we are responding to. And there's a lot of examples I could give of that, we can talk about those as we go along.

The other problem is the silos, which have been mentioned. You know, customer if you're, think about yourself as a normal person, if you want help from your utility on, you know, making better energy buying decisions, you want to know about EVs and solar, and energy efficiency, and how they interrelate to each other, but the program budgets and the -- everything in siloed.

So when we started in California, we were starting under the AB 793 banner and that's that was put into the energy efficiency bucket so adding the vehicle category then becomes a challenge in California. We've done it in New York, but we haven't done it yet in California.

So, yeah, just in general it's proven for us as a company to be harder to innovate here than in some other places because of the silos and the mismatch between strategy. And then -- but on the flip side despite all that

that, we actually did go from launching an emerging technology trial with Pacific Gas and Electric in 2015 to having these marketplaces -- these online utility marketplaces being included in the 2016 update to the Energy Efficiency Action Plan.

And then in 2017, the CPUC actually mandated all IOUs in California to have these online marketplaces by the end of 2017. And we've also got LADWP. So we're actually 90 percent of the California market.

And what we've now demonstrated, in the real world, in practice, is that we can really eliminate this market in transparency barrier and close that gap between what's cost effective for a customer and what the market potential is. Because a transparent market -- when the consumers can see efficiency, then they choice more efficient products. And that's I think a huge advance that we've achieved.

MS. BROOK: Great. I'll have some follow-up questions. Very interesting. Let's hear form Joanne first.

MS. O'NEILL: Great. Thank you. And to start off, Anne and I were talking before the panel about how wonderful it is that it's a panel full of women to talk about innovations. So thank you Martha for hosting the panel --

MS. BROOK: Oh, yeah. Right.

MS. O'NEILL: -- and Commissioner for enabling it.

MS. BROOK: And you can thank Michael for organizing

it.

MS. O'NEILL: Yeah. Thank you Michael, definitely.

So, CLEAResult is a program implementer we do work obviously in California but across the U.S. and Canada so we try to bring some insights from across the footprint that we have. You know, I think when we're talking about nontraditional approaches to energy efficiency savings, I think it's worth making a distinction that, you know, there is a customer or marketing -- or marketing engagement approaches, so your incentives, your technical assistants, engineering, partnerships, program logic, et cetera. And then there's the platform of methodologies that allow you to measure and claim those savings.

And, you know, I think that there are innovations that can be had in both. One of the areas that we are doing a lot of work in currently is in NMEC, Normalize Metered Energy Consumption. And that kind of presents itself in a few different market approaches. So we have retro commissioning that we run with San Diego Gas and Electric. We were part of the PG&E whole building demonstration. And we run strategic energy management programs both in California and across North America. And, you know, we see those as very unique, distinct, and innovative ways to address that market, leveraging the NMEC platform which allows that.

What I think is also interesting and Carmen, you kind of touched on this is, you know, where can we make sure that there's that feedback loop between those market engagement approaches and the platforms that we leverage and how do we make sure that cycle occurs? And so, one of the things that we're excited to be engaging in and it was just launched recently in -- we implement on behalf of BAYREN, the Home Plus Program. And in that program, we're partnering with OpenEE and using the customer data as a feedback tool to further engagement with that customer to further energy efficiency identification opportunities.

And so not just as a way to measure savings but as a way to really integrate into the thought process of the program and those marketing engagements which I think is really exciting.

In terms of major challenges. So I, you know, I'm trying to keep this positive. You know, I think that a lot of us in the industry and, you know, with kind of the evolution of AB 802 and others saw MX, metered energy savings, those kind of the saving grace to solve a lot of our problems.

I think that we have to be weary of labeling it that too earlier and -- because there's a few areas of challenges. So I think customer demand, how do we make sure that the -- or driving demand of customers to leverage NMEC and meter

rate savings. How does that live in a world where there's still upfront incentives and how do you rationalize that for a customer? And how do you find a customer that is both kind of innovative and willing to move quickly but also willing to wait for you because it takes a while to get those calcs ready and those are rare customers.

You know, I think the other challenge is project identification. So how do you find a -- I'm mostly talking about kind of a site NMEC, I know Carmen will probably talk a little bit more about population -- but how do you find the building that is right for the NMEC approach and then the customer that is right?

And so, you know, one of the things that we see as a challenge especially in early days is that if we -- there's a lot of risk in pursuing NMEC from an implementer perspective and a customer perspective too. And so we want to make sure they are likely to be successful and that means, you know, based on their energy usages, based on the consistency of their energy usage, based off of, you know, do they have other DERs are they going to pursue them, was there ownership configuration, all those are components in that decision making process.

And then finally, I think the policy and measurement. So one of the things -- and I think I'm kind of skipping ahead to one of my other answers, but one of the things I

challenge us is to change our mindset from a policy perspective and -- because if we keep focusing on attribution at the measure level, we're never going to be successful when it comes to the scale and the kind of hope that we're looking for from meter-based energy savings.

And, you know, we also need to be faster. So, you know, lot of collective industry, we need to be fast to try things. We need to be fast to acknowledge things that don't work. And we need to be fast when it comes to actually reviewing calculations and models and determining one of the pin points for us is non-routine events and how do you adjust for those? And if you get enough smart people in a room, they'll never agree.

And so, you know, we -- I don't advocate for taking smart people out of the room but I do advocate for making decisions and making them as fast as reasonable.

All that said, I think that we have a lot of early successes from the programs that we have been implementing and I think those are on a couple different fronts. So our San Diego Retro Conditioning program, we're just getting back some of the first project with a full year of measurement.

And one of the projects we're actually pretty much kneeling on the dot, we're within one percent of the calculations on the predicted energy savings which is kind of amazing but it can be done, right. And I think that that's a

testament to the fact that it can be done and we, you know, customers can accept this and work within these frameworks and be successful.

On the flip side which, you know, some may say is a -- is not a measurement of success I see it as a measurement of success. One of the projects that we're monitoring the gas saving just kind of went completely off the rails and the gas usage when up. But I think that's a testament because that allows us early to identify that that's happening, one.

And with the ability to reconnect with the customer and engage on why that's happening is it, you know, is it a change their production? Do, you know, are they still a good candidate here? Was there something missed in the model, et cetera? And without that ongoing feedback, we couldn't have had that conversation or had the impetus for that conversation.

So, you know, I think that those are good examples of success from customer perspective. Also, internally one of the things we've done is building out and developing internal processes for NMEC and SEM. And so we've developed a kind of data analytics center of excellence within our organization that has highly trained data and statistical analysts that can do the modeling, vigorous QA/QC processes and really kind of a centralized learning and best practices wing so that we

aren't, you know, just learning from the customer that we're working in California, we're learning from the one we're working with in Alberta or in the Northwest, or in New York, and that we're also learning from the M&V reports that come out from the various entities and re -- you know, reinvesting that in to our processes so that we can continue to be better and hopefully provide valuable feedback to California and others in terms of what's been successful elsewhere so.

MS. BROOK: Great. Thank you. We're going to go through the last two questions that you've prepared for and then I have a few follow-up questions and then we'll hear from the rest of the group here.

So you've touched on this a little bit, but if you could all just spend a couple minutes talking about the future and what innovative approaches you'd like to see or you expect to see and, you know, with the sort of painting a picture of what you'd like the next five to ten years to look like in the energy efficiency landscape.

Do you want to start, Carmen?

MS. BEST: Sure. I realized after I open my new innovative tablet that my notes were all erased. So technology isn't all good all the time.

So I think the question about what the future looks like. I want to start with a caveat, it depends. Because it's going to depend on a lot of people in this room and the

innovation that they're able to bring to bear. It's going to depend on regulatory decisions that are in the works and that are, you know, some farther along than others.

And it's also going to depend on, as Commissioner McAllister said, political will. I think knowing what we're aiming for is really important rather than just having kind of this aspirational goal of 50 percent increase in energy efficiency by whom, from what, with what dollars is really important to get into that nitty-gritty to know what we're aiming at.

I think the other key component to that is having a consistent valuation structure that is supporting the -- those big picture objectives.

I would like to see a world in which we can be evaluating the whole swath of energy efficiency and other DERs kind of on a consistent basis, so we can be making rational choices about lease carbon alternatives and the marginal costs thereof.

I don't think that cost-effectiveness tests right now are going to fit that mold. I think we need to think bigger and go to the bigger picture of resource evaluation structure more like they've done in New York with the valuation of DERs, just called the VDER, someone said it sounded like Star Wars.

So I think for the future if we take on those big

ticket items and really look -- take a step back from this crazy quilt of policies and rules and guidance that we've created over the years, I think the next five to ten years of energy efficiency and other activities could be really uncertain. And people could sit on their hands and be worried about how we're going to do this going forward or we take some of the elements and successes that have been coming forward and keep pushing forward and see how they're playing out as well in these different valuation structures.

I think some -- a couple -- in the shorter term, some concrete things that are coming forward with, you know, the market transformation that we're going to hear later this afternoon. I think the question of program administrators is on the table that's a fairly rare occurrence, you know, maybe once every 10 to 20 years that one comes back up on the table.

And I think that when we do discuss and deliberate around accountability and what types of things different entities should be accountable for, it opens up an opportunity to reinvent some of these structures that we've been living with. So if market transformation, codes and standards, kind of that whole upstream swath of how we're delivering to the state can kind of live in one space and the resource acquisition and the resource valuation and kind of the nitty-gritty nuts and bolts could live in another space.

I think that would open up some opportunities for them not to have to kind of balance one another out, but rather have their own space to deliver their unique value to the state, and then come back together with more of a top down modeling structure of what we've been accomplishing back to a carbon goal or an intensity goal, or something else -- some other unifying force.

And then for that little bucket on the side of -- not the little bucket, I don't want it to be little, I want it to be very large. The whole reason why OpenEE has taken on pay for performance and meter-based efficiency goes back to the ability for it to be financed as a supply -- more like a supply side resource, so more like a PPA. And allowing finance structures to come to bear in that -- in that -- in that space.

And what you need to be able to do in -- to enable that is have a consistent and repeatable view of your risk profile and where those savings are going to be delivered. Not for every asset, not every site but in aggregate. And that's why we focus on aggregate methods, that's why we focus on, you know, the big picture delivery of that. It looks more like an actuarial model for delivery non-efficiency rather than a precision model.

So if you think about buying car insurance, it's more along those lines. I don't know who's going to be getting in

an accident but in a collective, I can guess that two or three of us will. So that is the type of thing that we should be looking at with energy efficiency and where the savings are going to happen and where changes are going to not be savings. I think that was the answer to that question.

MS. BROOK: It was. That was an excellent --

MS. BEST: I'll stop for now.

MS. BROOK: -- it was an excellent answer to that question. Anne.

DR. NEIDERBERGER: Sure. I think one of the big things is, I feel like we have the stated ambition, a high level of stated ambition, but we need to start really focusing on innovation, driving innovation instead of just the next kilowatt hour saved. Because we need speed and we need scale.

I'm a -- as she said, I was a climate scientist by training so I'm acutely aware of the fact that, you know, that we need to -- time matters. And so really, we need to focus on innovation so that's why I was really happy to be a part of this panel. And the couple things that I thought, you know, could and should happen in the next, you know, five years or so, hopefully much faster.

The one that Carmen raised is my first point, which is that we need to be able to have an integrated approach to

DER evaluation because that's also what the customer wants, like I said before, it's a customer centric approach to have comprehensive offering.

Another thing we need is to first finally fundamentally tackle long-standing market barriers because using incentives on top of an inefficient market is not -- is not the way to go. It's going to be much more expensive than if you actually tackle the barriers first and then it frees up money to do very targeted incentives where they can have the most impact.

And that's actually been recognized by the CPUC which gave guidance on incentives that said, you know, don't treat all customer segments the same, address their specific needs. And also, don't just offer incentives on any standard product that's better than code but, you know, target your incentives at incrementally efficient -- the most efficient products, if you will. So some of that thought is starting to creep in to some of the decisions. So, yeah, so tackle market barriers head on.

And then another one is we need better solutions for the low- and moderate-income segment because forever we've basically done two things. We've done through tariffs bill subsidies, which actually does not encourage people to save energy.

And we've -- we've done direct install programs that

are 100 percent paid by all ratepayers. And we believe that there's big potential for market-based, retail product approaches. But a key part of that, though, is making sure that the benefit of avoiding the need to pay bill subsidies year after year after year is taken into account in any cost-effectiveness framework that's developed. As soon as you do that, as soon as you account for the avoided cost of bill subsidies, that can pay for special incentives on only the most efficient products for low-income customers.

And then another thing is that there should be more emphasis, like Carmen said, on market transformation, moving markets and also I would say on REACH standards or REACH performance specifications for, not just building code but in my area on the product side, you know, we now have the ability, like with our Enervee score, to actually create a dynamic super-efficient benchmark. And this dynamic super-efficient benchmark can be used to simulate manufactures and retailers to focus on innovation as well.

And then I have a wish list of things that we would like to have done in our own space. But do you want, I can do that later, but I.

MS. BROOK: So there's only one question left and that's how can we help? We're from the government we want to help. So, if you -- okay.

MS. O'NEILL: Great. So, you know, what do I see the

future looking like? You know, I think in the short-term, the next, call it one to five years, I see, clear as all, I see other implementers trying different approaches, trying to identify what the most effective solutions are and try to figure out what acceptable risk is in those solutions.

And, you know, I think during that time and maybe cover your ears, Regulators, I think that the cost to deliver those is going to be higher. It's going to be harder to deliver those as we're testing new models and kind of stumbling a little through that process it's going to be harder to engage customers. But I think five years plus that is, you know, with the ifs, and I'll get to them that Carmen mentioned, you know, I think we could really see the scaling of the models that are deemed effective, I think we can see lowering of administrative cost. I think we can see increased penetration and adoption from customers and increase cost-effectiveness.

But all that can only happen if we get the regulatory framework right and we give the market the room to innovate and room to fail. Because the -- without that, that room to innovate, we're not going to be able to make those kind of jump, step, leaps into where we need to be in, it's going to end up being more of the same which I -- to your point about the need. We need to do this sooner rather than later. So, you know, I think that that's -- that's where I see.

MS. BROOK: Good. Great. Yeah. I'll just put a little tidbit in here. When I was reading through the innovation quotes this morning, more than half of them basically were on the -- you have to be willing to fail and fail fast and often so absolutely that's part of the whole ability to innovate.

So the final structured question is, how can Energy Commission and other state agencies help advance more innovative approaches and realize the future that you just described very briefly to us?

Go in the same order?

MS. BEST: I get to go again? So I'll just re -- I think I'll reiterate. I think the key ones are to have a consistent valuation framework. And, Martha, you and I know well it is challenging to coordinate across agencies, one of the hardest things to do. But I think it's really important given that we have these shared objectives.

I think focusing on creating market structures rather than program designs is another important thing. I think program design should be left to folks like CLEAResult and Anne, Enervee and those guys to really bring those forward when we've set a cleaner focus on the outcomes and what we want to achieve tied with the valuation structures that, I think in California is appropriate to tie them to carbon output.

And then back to what Joanne was saying, the third-party models, I think, show a lot of promise, just like the RESP for P program has. They -- that opportunity came out of the legislation and the high opportunity programs and projects. And I think there were about eight other opportunities that came out as well through that process. And I think for the most part they've been able to just kind of do their own thing once they've got their advice letters approved. And there have been a lot of learnings that have come out of it, including offering kickers for time valued energy efficiency which should be part of the valuation structure.

So I think giving that room for the experimentation and allowing for those opportunities will create a more resilient system for the future that is more focused on market structures and outcomes rather than having to reinvent strategic plans or goals or specific program designs year after year.

MS. BROOK: Good. Great.

DR. NEIDERBERGER: So from our perspective, there's -- I mean, this is really a little bit from a selfish perspective of what we would need as a company to really take advantage of this -- it's really an unprecedented opportunity because we have -- we have shown that this market-based approached without incentives works.

And so now what we need to do is scale it. That means we need to invest more money in marketing and that will increase the cost-effectiveness, the more we market, the more traffic we drive, the lower the cost per therm, kilowatt, and kilowatt hours saved will be. But we again we've got some things on the books like that utilities are supposed to aim to keep marking spent to six percent because that was written at a time when programs were rebate programs, right. So you want to maximize the rebate payments.

But we're talking about a model here with no rebates. And so, we need to drive people to the site or it won't work. There are a number of things like that.

Also to reach more people, we would love -- our platform was designed from the ground up to be multilingual, that's really not that difficult for us. We've launched in France, for example, we have a Spanish version. We need funding to be able to offer our platform in different languages but it's not a technical -- it's not a huge lift, we just need some money for that. And there's no incentive really right -- we don't have the money to just do that but we would gladly and happily do that.

And another thing is, we want to pilot the use of our platform, specifically for low-income customers. We've invested in the technology to do that, it's available, the first tests are going to probably happen again, not in

California. But we can inject specific discounts tied just to superefficient products for people who are on CARE or FAIRA TERRAFFs, so we do that all in real time. We can qualify them. And then we can inject this special incentive into an online retail transaction. This all exists.

We want to pilot this in California, you know, we want to pilot this but the, like I said, these platforms are funded from energy efficiency funds and if we do that, it hurts our cost effectiveness. That's the barrier.

Again, the -- including the avoided cost of bill subsidies in the TRC as a single NEB add-on would solve that problem. And, yeah, I think that's my main wish list. Thanks.

MS. BROOK: All good. Yeah. Thank you.

MS. O'NEILL: Great. And I really appreciate being asked what the Commission can do to help, you know, I think we've talked about a few different things but my team wouldn't give -- wouldn't let me go back to the office if I didn't mention this again. But, you know, really adjusting our policy framework and mindset away from how we've been running energy efficiency for the last four decades, and not requiring measure level attribution, being quicker to approve new calculation methods, and the review process used for those.

And, you know, kind of going to more the macro level

we talked about being faster. I think as an industry, we need to be able to move faster to take advantage of these various innovative opportunities.

And then lastly one thing that constantly hurts the environmentalist in me is that right now and, you know, in the short term there's an incentive conflict between, you know, the wanting to do what's right for the climate and the customer when it comes to allowing and encouraging customers to do self-generation, and then the policy implications of a customer who is doing NMEC or even a custom project having self-generation and therefore, not being able to take advantage of incentives or being able to claim savings.

And I think that that conflict is going to continue to be a huge burden as we look to, you know, achieving our climate goals in the State of California, is if we can't align the financial incentives for the market that we are asking to take on the reigns of a lot of this then we're not going to be able to meet those goals. So being able to encourage customers and not disincentivize, you know, market actors to do both energy efficiency and then generation I think is going to be key.

MS. BROOK: Great. Great. That was really great information that I took so many notes on so many different pages, I'm going to have a hard time -- I wanted to suggest maybe one more way that we could help.

When I heard that -- I heard data access, and I heard risk assessment, and so to me the government should -- could certainly help in providing much more information about control groups and what does the -- what does the, you know, granular time sensitive data -- energy used data look like for any population or subsectors or anything so that you can help decide whether, you know, how much efficiency savings ought to be, you know, achievable in certain market segments.

The Energy Commission's going to be getting customer level data from utilities and we're going to keep it confidential but there's no reason why we couldn't provide information to all the market actors to do a much better job of understanding risks around portfolios of energy savings. So, I suggest you ask us to do that. Or not. If it's not a good idea, we have better things and other ways to spend money so we don't have to do that.

I thought the -- an interesting thing that came up a couple times were the silos between efficiency and electric transportation, or efficiency and self-gen and I think that coordination and some of it is just us talking to ourselves, right. Because, you know, we do have a really strong and growing transportation electrification program at the Energy Commission and us as well as many other people are funding charging infrastructure across the state.

And I heard at a heat pump symposium that getting the

electric panel upgrade to get paid for by the electric vehicle charging programs is sometimes the only way that they can get the upgrade to happen because the heat pump -- the efficiency programs don't have the bandwidth in terms of funding to pay for upgrades or really just changes the whole cost-effectiveness calculation.

So those types of couplings and coordination just seem like again to scale not only efficiency but carbon reductions in the state -- it seems like those are the kind of coordinations that we're going to have to think about.

So any way I wanted to open it up to first the Commissioners to see if they had any questions, and then to the audience.

COMMISSIONER MCALLISTER: So, I guess, really, I mean, we, you know, I think we're pretty -- this is a fairly a familiar group here and I'm pretty aware of what our panelists do already and don't want to ask questions that I don't really need to ask.

But I just really want to highlight maybe provide a little context, you know, we are in California, you know, I guess I'm not willing to say we invented the Internet but we certainly invented big data. And, you know, we have an innovation economy. And we have, I mean, this -- what's going on in -- out there in the skill that's being applied to the sector is really unprecedented.

And we just need to leverage it as best we can. We need to figure out how we can promote it and promote that innovation and, you know, not get in the way of it, first of all but also, you know, promote it in the right directions. And I think we're doing a lot at the Commission to do that but we can absolutely do more and better.

And help the marketplace do more and better, you know, so we're trying to sort of take back the mantel of being the repository for a lot of data that's going to be the basis of much good analytics about the marketplace and the contexts of our policy work, right at the Energy Commission.

And we're on the side -- we're on the utility really side of the firewall on that, right. We're trying to develop policy for the state of California, working with the Public Utility Commission and all the POUs, the Public Owned Utilities, the DWP and SMUD.

But the market there's a -- the flipside of that is that the marketplace needs data. And that's different data, it's more real time data, it's more customer focused data, to help the customer make decisions. You know, we've talked about, gosh, wouldn't it be great if we could -- in the morning, you know, we talked about really we need to get as far as we can with people voluntarily making these choices.

And we're, you know, we have 40 million people that have 14 million structures or however many it is. There are

a lot of decisions that need to be made out there and, you know, if I propose mandating, you know, something big and bold well that will be the last thing I do at the Energy Commission.

You know, political will is something that we need to be very careful with how we invest in, right. And so, anyway I -- I guess the upshot is tell us what beautiful things better access to more data will enable you to do so we can try and make it happen. And it's a big lift, you know, it's not -- there's a lot of sensitivities and rightly so about privacy and about, you know, sort of the vulnerabilities of cyber security and all of that.

But those are dealable and certainly there are other sectors where I think that's even more important or at least more the downsizer, you know, even bigger, right, then just consumption data. But I think there's lots of creativity out there that we would never think of inside the Energy Commission that this building, you know, it's just not going to happen in a state agency. There's incredible innovation going on out there and we can assess it for the good of California.

So how do we do that and please tell us and we will make it, you know, as front and center as we can so that we can work on it making it happen in a formal setting. So. I'm just going to -- again, it's sort of -- this process is for,

you know, it's as much for you, the stakeholders and the public, then it is -- as it is for us. Because we don't know what to do unless you tell us.

So let's, if anybody has questions in the audience.

MS. BROOK: Anybody have any question from the audience?

MS. PAOLO. Hi. Thank you. My name is Lisa Paolo; I work here at the Commission. And I -- it was really great to hear all the comments about the silos being barriers and, you know, years of regulatory framework that have developed and grown up within these silos making it really challenging.

I was an Integrated Demand Side Management Program lead for many years in Energy Efficiency and they're trying to get the IOUs to break these silos was really challenging because of all the things you mentioned.

The Commission did establish certain regulations and guidance that would -- or hopefully to open the doors to breaking silos. For example, one of the Commission guidance was Energy Efficiency funds could be used to promote soft generation and other kinds of technologies within an Energy Efficiency program as long as those funds were not used for capital costs and incentives, but to promote marketing and other types of program activities.

So after years of doing this, and still no major improvements in this area, we now have this 3P effort where

the Commission is kind of taking a back seat, maybe that's not the right word, but hands off and also directing the utilities to take a hands-off approach on program design. And also heard the distinction between program design and market transformation.

So there's concerns still, though, that we may not see the level of innovation that we're hoping to see -- innovation is a major reason why we have this 3P effort to give it to the third-parties and let them come up with hopefully integrated strategies. We'll see how that plays out and hopefully a lot of lessons learned.

But the point I want to make is over the years -- I also worked on CSI for a while and even despite the Commission trying to propose guidance to eliminate these barriers, the market itself is slow to respond. So, I think it's important not to forget that the market viewpoint is also responsible for some of this, you know, these silos, you know, as long as they're getting their incentives for the solar sector for example, they're fine, they don't need to integrate.

So I just want to make sure -- it's kind of a leveraging between regulatory guidance and market response. And just because the regulatory guidance is there, doesn't mean the market is going to respond. So how do we bridge that divide? What is the, you know, magic formula for this?

So hopefully we'll learn a lot with the 3Ps but we don't see the level of innovation we're hoping to see that breaks down these barriers. Hopefully we'll learn something from it. I don't know what the answer is but it's important to keep that in mind. We'll see what happens.

This is more of a comment, I guess. If anyone has feedback on that, I'd love to hear it.

MS. O'NEILL: Could I jump in.

MS. BROOK: Go ahead.

MS. O'NEILL: Real quick. I appreciate the comments and, you know, I think it's been an ongoing challenge and I appreciate the Commission's willingness to try to breakdown silos where it can. I think to your example about a customer who engages in CSI or has engaged in CSI, and the California Solar Initiative, for those following along and then I think we still have the missed opportunities.

So right now, a lot of -- solar is -- for example, is easier to understand, it's a little sexier, they have a lot more marketing dollars that they are putting towards it. And so, maybe that you choose solar first, that doesn't mean that there's not efficiency opportunities there that would benefit that customer and, you know, the state as a whole by reaching that consumption. Where I think we have a challenge is that customer then like for an industrial customer for example, you have to subtract out that generation from kind of the

eligible energy usage. And that really hand stings our ability to find viable projects and meet those ROI requirements for our customer.

And so, you know, while I think it would be ideal obviously if they do energy efficiency first, I think we have to acknowledge that customers have their own business reason and emotional reasons for doing things and we also need to meet them where they are in their journey and make sure that the policy allows for that to happen instead of trying to force them in to kind of our confines.

DR. NEIDERBERGER: Yeah. So interesting coming -- I didn't realize that Energy Efficiency funds could be used for renewable and EV outreach. But on the other hand, it hurts the TRC then. If you spend money on a nonresource activity, that's not going to lead to more energy savings, so there's still that.

And also, you know, we're in the middle of this third-party RFA/RFP process and, you know, you see the way the RFAs are written. Some are the way the RFAs are written some of them are explicitly saying, we only are going to cover HVAC, for example. So they explicitly say you can't cover these other things, you can't offer an integrated proposal anyway. So we need definitely to work harder on this integration issue.

MS. BEST: Yeah. And I think I'll just to play on

both of those comments but add one more. I think that all your work on IDSM was helpful to grease the skids for the really breakthrough which I think came in the IDER proceeding and having that being taken up by the Commission was a really important thing. It's a multipronged beast in many ways but I think it -- the intent -- intent-wise it is doing the right thing to try to integrate and think how things fit together.

Completely agree with you with respect to how the market can respond. I think what we're mostly referring to is kind of the systematic kind of structures that are -- sometimes they're even implied or they're historic and people may not know the new rules for these different little buckets. But also I think in the IDER procurement processes as well, you see just different vendors EE and others they don't quite know how to talk to each other yet. And how they create value propositions that can come in and be competitive.

So you're right, it's going to take a little bit of time to respond but it's also important that -- oh, I spawned another question, that they have the opportunity to do that too.

MS. PAOLO: No, I just wanted to follow up. The whole -- I agree, this whole attribution issue was a major challenging when we were trying to promote IDSM, way back, like almost a decade ago because how do you attribute savings

to solar and energy efficiency.

So, the whole hope with NMEC is, you know, that will also -- right now the Commission has allowed, you know, some activity kind of measured activity and that, you know, basically, throwing up the whole thing open to program -- you know, incorporating in program design. But hopefully we'll start seeing that more and more kind of help break these silos.

And so there's another point but I forgot what that was. But so anyways, I appreciate it. I just wanted to follow up and this will be really interesting to see where this goes

MS. O'NEILL: Yeah. On that real quick, I do want to just going back to -- sorry you can -- could you take a -- you know, while NMEC is kind of new to California I want to make sure that people are aware, like especially for strategic energy management programs, we've been doing those for over a decade across North America using NMEC.

Carmen mentioned, you know, NMEC was a methodology for EXPOS. So, you know, I think, it's new and innovative but again, it's that difference between the customer engagement the marketing approach versus the platform methodology and so where the innovation happens.

MS. BROOK: In the interest of time, this will be the last question.

MS. CLINTON: This is Jeanne Clinton, I spoke earlier. As I've been listening, I've heard some ideas about how to make incremental progress, how to fix this or fix that or needing to get out of silos. And I want to encourage the Energy Commission in its IEPR process to consider more of -- not more but adding a visioning process to this year, that would sort of look at how do we leap ahead to not having to worry about silos and not having to worry about incremental theses and whatever. But what would a new paradigm look like and how could -- what would it take to get there?

And I think we've already seen the solar industry go through this amazing transformation and getting to PPAs and being able to measure stuff, and offset the capital allocations here and there and all that sort of thing. But we don't have such a robust market yet with all these actors on the efficiency side.

So I would like to -- specifically as examples encourage the Energy Commission or together with the PUC to -- and CARB to go through something like a visioning process, an ex-prize competition, or working with CAlSEPH for instance they're doing a lot of things on entrepreneur business models. That sort of says, what would a robust, active, flourishing, behind the meter market look like that's efficiency, and load management, and clean energy, and EV storage, what would that look like? Do we need new measuring

technology? Do we need new ways of valuation? Or do we need a clearinghouse for what actors can be in the marketplace so they're not all trampling on one another, or do we want to have that occur?

And so I think we need a visioning effort to get us out of the incremental progress because we don't have time for incrementalism, in my opinion. And I would just cite one example that I think was a good initial start and didn't have the get-go to succeed. And I'm not going to remember all the details but it was about four years go Southern California Edison was going through an all source procurement process. Efficiency was in in the first round and ultimately I think either no efficiency or only one industrial efficiency solicitation got selected. Because most of it was not perceived as incremental to what was already in all the planning documents that were presumed to -- going to happen with the existing programs.

So there was no room for innovation. And I -- that was my simple takeaway and I think the reality was well, if it wasn't incremental, it was liked feared you'd be paying twice for the same resource which is a legitimate concern.

But I think there are ways to carve out market opportunities for innovation in a way to let things flourish and then you can back off some of the old-style programs as you see new solutions. And I think that kind of thinking

somehow should be integrated into the IEPR processes if at all possible.

COMMISSIONER MCALLISTER: I just want to respond briefly to that. I really appreciate that comment. So we're a big state, we have a big economy and, you know, I think, a lot of the focus and, you know, rightly so, has been on the sort of the portfolio, the Energy Efficiency portfolio, right. It's a, you know, not only at the PUC but also at the POUs, and POUs have a little bit more flexibility and they're more lightly regulated but, you know, they use the same -- or similar standard practice manual and, you know, kind of similar rules apply.

So in order to do I think -- I think and maybe this is a little just speculative and I'd love your comments on what people think. But if you just back up and you say okay, where -- across our economy, where is the capital going to come to do what needs to be done? Where's the, you know, and it's got to be sort of capital that can be used in liberal ways, you know, and creative and innovative ways.

And, you know, it may not be that a state agency with all the rules whether it's ARB, Cap and Trade maybe has a little fewer rules, you know, the Energy Commission, we have mandates but they're specific programs, and the Public Utilities Commission has a mandate to really protect ratepayer dollars above all.

So maybe there are other sources that we should be looking at and maybe there's a bigger vision we should take to the legislature. Maybe there's something that's a -- just gives -- that has fewer strings attached or at least fewer constraints that could be at the scale that's needed.

This is in no way a criticism of any of our agencies, it's just sort of recognition of all the, you know, plates we're trying to keep spinning on the -- and all the kind of constraints we have on our processes and our expenditures.

So that vision -- if we had that visioning process, you know, let's sort of try to really step out of our traditional ways of thinking. Because we've, you know, we've produced a lot of success over 40 years. You know, we've spent tens of billions of dollars on efficiency. We've gotten huge results and our economy shows it.

But if we're going to do -- if we're really going to ramp up and get to doubling and reduce are, you know, decarbonization our buildings and everything that we've -- I tend to agree with you we need a different way of thinking -- of doing things that allow experimentation in a way that's much more fundamental. And that it has the tools in place to recognize success and really replicate that quickly. Anyway, just a thought but thanks for being provocative.

UNKNOWN SPEAKER: Do you want to give a hand at the -- are we done? I'm sorry, I don't know if we have time.

MS. BIRD: Well so we were planning to break at 2:15, but we were running 5 minutes behind, so we're kind of running into the next, I mean, it -- unless we want to go beyond --

COMMISSIONER MCALLISTER: Is it related to this panel?

MS. BIRD: -- the 4:00.

COMMISSIONER MCALLISTER: Is your question related to this panel?

MS. GALAWISH: Well, it's kind of a comment, I think as I heard people talking about the pay for performance and the NMEC. And I don't know how many of you called. But --

MS. BROOK: Can you speak into the microphone, please.

MS. GALAWISH: We had a standard performance. Standard --

COMMISSIONER MCALLISTER: Just pick it up and hold it in front of you.

MS. GALAWISH: We had standard performance programs. I forgot how long ago, and with those programs they did pre and post metering before the program was implemented, they were metered, and after implementation they were also metered. So when I hear people talking about those tools innovative, it's just doing what we used to do before.

So I would like to see some more innovation because

those are -- or looking at what was done in the past and see what failed, what didn't. But NMEC is just a continuation of what stopped several years ago. So just a comment.

MS. BROOK: All right. Thank you.

COMMISSIONER MCALLISTER: Thanks for that.

Heather, do you want to give people the lowdown on our break?

MS. BIRD: Yeah. So we're hoping to make up a little bit of time on the break, we planned for 15 minutes, so if you can get back in 10, that would be great. Thank you.

So, yeah.

(APPLAUSE)

MS. BIRD: So, like 10:37, thank you.

(Off the record at 2:26 p.m.)

(On the record at 2:36 p.m.)

MR. KENNEY: All right. So if everybody could take a seat, I'm going to be calling up our next panel.

COMMISSIONER MCALLISTER: Everybody want to take your seats again; we're going to get started.

Who's the -- hey, Michael, who's the panel? You want to convene the panel or you want to convene the panel? Get everybody seated and we'll get started.

MR. KENNEY: All right. So our third and final panel for the day is Opportunities and Challenges to Capturing Industrial Energy Efficiency. Moderator Kevin Uy will be

introducing our panelists.

MR. UY: Hi, everyone. We'll get started with the workshop again. I'll just do a brief introduction to myself and then the panelists and we'll dive right in to the questions, hopefully we can make up a little bit of time.

But my name is Kevin Uy, and I'm the program lead for the Food Production Investment Program which is a cap and trade funded program administered by the Energy Commission. It gives grants to California food processors to implement advanced technologies at their plants. The project have to reduce energy consumption and greenhouse gas emissions and of course must be located at a California food processing plant.

We've done a couple rounds of funding totaling $43 million dollars when you add up the awarded and the pending grants, and more funding is going to come later this year. But that's just one of the many funding programs that the Energy Commission implements. We have research for industrial energy efficiency which is the topic here today.

So we'll shift our focus over to industry, there's been a lot of talk about buildings but, you know, we shouldn't forget about the industrial sector it's a significant portion of both California's energy sector but also its economy.

A few quick facts I'll riff off. It's the second largest consumer of natural gas behind electricity

generation, third largest electricity consumer behind the commercial and residential sectors, and the industrial sector is also the second largest GHG contributor just behind transportation. And it's the fourth largest contributor to California's GDP as well. So again something that we shouldn't forget about, it's going to play a key role in achieving the SB 350 goals.

And with that I'm going to go ahead and introduce our three panelists. Thank you very much for joining us today. So first off, we have Anna Smidebush, I hope I'm not butchering your name too bad. But Anna is a senior program manager for the Industrial and Agricultural Energy Efficiency programs at PG&E. The program she manages are tailored for energy consumer segments such as food processing and manufacturing, and other participant's energy audits, technical assistance, and financial incentives to reduce market barriers energy efficiency.

Prior to PG&E, Anna's background was in market research at the Energy and Efficiency Institute at the University of California Davis, managing studies on diffusion of emerging technology, impacts of codes and standards on manufacturers, and whole building retrofits for multitenant commercial buildings.

So thanks for joining us Anna.

Next, we have Dr. Ahmad Ganji from San Francisco

State University Industrial Assessment Center. Dr. Ganji received his masters and PhDs from University of California Berkeley. He is a registered professional engineer in California and a professor of mechanical engineering at San Francisco State University where he's been teaching and has supervised energy-related projects since 1987.

He's directed the DOE sponsored Industrial Assessment Center since 1992, which preforms comprehensive energy assessments for over 500 industrial facilities since its inception, including various large food processing plants. Recently he directed a California Air Resources Board funded project that reviewed a sample of 9 out of 60 audits of the largest industrial facilities in California. The audits were in response to ARB's ruling for emission reductions mandated by AB 32. So thank you for joining us, Dr. Ganji.

And finally, we have Christian Lenci from Praxair but also representing the California Large Energy Consumers Association. So Christian is a director of energy and USIG integration at Praxair, Inc. and subject matter expert in industrial gases and most electric -- the most electricity intensive manufacturing process.

In his 33 years at Praxair, Christian has worked in 15 different roles across all aspects of the business including four years as facility manager at Praxair's largest liquid hydrogen facility in Niagara Falls, New York, 12

leading Praxair's west region productivity organization which completed nearly 200 custom retrofit energy efficiency projects totaling $40 million in capital expenses and $10 million in utility incentives.

And eight years managing the region's controls group that designed, implemented, and measured in real time automated energy management strategies at every production facility.

Currently, Christian's responsible for electricity and natural gas procurement for the western U.S. and Canada, responsible for procuring and managing a $100 million annual spend. In 2017, he was elected chairman of the California Large Energy -- sorry, California Large Electricity Consumers Association or CLECA, an organization representing California -- sorry, representing the 15 largest demand response customers in the state.

Christian's a graduate of University California Berkeley with a bachelors in mechanical engineering and he resides in Concord, California.

All right. So we have a whole bunch of questions here, which you guys have seen but we'll get through as many as we can but we'll try and make sure that we, you know, stop at 40, 45 minutes to make sure that people in the audience have a chance for questions.

So I'll dive right in to the first question. Please

go ahead and use it as a means to introduce yourself as well, since it is a pretty general question. But the first question is, what are your organizations' energy efficiency goals and what challenges are you facing in achieving these goals? So why don't we start with Dr. Ganji.

DR. GANJI: Good afternoon. Thank you for inviting me here.

I'm from San Francisco State University, I manage the IEC program. We go to various size of manufacturing facilities and we do energy assessments. We do about 20 energy assessments per year including some large -- large processes -- mostly food processing facilities in California that's for the most part that's what's left.

And I just want to add that there's a rich market for energy efficiency in the industrial sector. We have audited plants that have potential for 40 percent energy efficiency in their facilities. I think, that's all for now.

MS. SMIDEBUSH: So I'm -- being from Pacific Gas and Electric, I probably don't have to tell most of you that we have energy efficiency goals that are mandated by the state and that those goals have to be measurable clearly attributable to our programs intervention and they also have to be cost-effective.

In terms of the challenges in achieving those goals in the industrial sector, I think it's best viewed through

two lenses, one of them is the challenges that are facing the customers themselves, industrial customers have, you know, a very high costs, they have very complex decision making structures, timelines for, you know, clarifying budgets for the following year. Any investment they make is probably going to be a very large one if it's a crucial piece of equipment.

And so, you know, we have to make sure that the programs that are tailored for that space are able to adequately meet those needs and dovetail with their concerns rather than conflict with them.

And then the second lens to look at in terms of challenges that PG&E faces is not just the needs of the customer but from us as a utility, what boxes do we need to tick with our regulator, with our stakeholders, to make sure that we are achieving those goals in a way that serves the customer but also, you know, meets all of our regulatory requirements.

MR. LENCI: My name is Christian Lenci and just thank you for the opportunity of being able to be here today. I, as you heard, I've been doing this for quite a while and very honored to be able to be here and participate.

So, Praxair has a very robust energy efficiency program. We started it back in the 1980's before I actually got started. We have a group of about 20 people in the

United States that are dedicated to nothing but electric -- about energy efficiency. Our overall goal is six percent of our cost stack -- six to eight percent of our cost stack per year reduction.

We capture productivity in terms of a 12-month benefits clock. It's measured using lead statistical analysis to be able to validate the capital expenditures that we make. And so as a result of that, the activities basically have to be ongoing because you only count the first 12 months of benefits and yet you're being asked to, you know, reduce cost stack basically, it's inflation and a few other things that you're having to try to negate every year. So, it's a -- it's very challenging.

In our industry, industrial gases we separate out oxygen, nitrogen, argon, some rare gas and such out of the air. The air, even in California, is still free today which is a good thing.

So our largest expense is electricity. And the reason why we are, in some respects, the tip of the spear when it comes to energy efficiency is it and this is not a misprint upwards of 80 percent of our production cost is electricity. Every truck that we ship to our customers has over 23,000 kilowatt hours of electricity in it. Our storage tanks which are warehouses essentially, are also big batteries of over 1000 megawatt hours of electricity each.

So we live in a different realm and as a result of that, you know, energy efficiency in this work is really, really important to make sure we're making the right capital investments and we're doing it in the right geographies.

MR. UY: Great. Thank you very much. So the second question and you'll notice the theme with a lot of these questions is basically how can we help industry? How can we better reach industry? But this one specifically is, would outreach and education help achieve more energy efficiency from the industrial sector? If yes, how could such a program be structured? Would it be best done at the state level or at a local agency?

Maybe you could take it again, Christian, since you were just talking about how your organization does energy efficiency projects.

MR. LENCI: Yeah, sure, thank you. So now we kind of moved a little bit into the -- a little bit more in the weeds. So we have current energy efficiency projects with Praxair occurring in Washington, California, Utah, Colorado, and New Mexico. My world is essentially Albuquerque, Denver, and Winnipeg West. Though nearly 40 percent of our sales are in California, only ten percent of my energy efficiency projects are here. And the reason why that happens is because of the challenge of getting an energy efficiency project, primarily what's called the custom retrofit program

validated and approved in the state of California. And it's not -- it's tragic.

So I have experienced working in Washington with Puget Sound Energy and several meetings up there with Rocky Mountain Power and their swath of IOU-led geographies throughout several states as well as in, as I said in Colorado and New Mexico, very familiar with all of those energy efficiency programs. My peers handle those for the other sections of the country.

And the challenge is, in California, at least under the current environment is that we have, for lack of a better term, an extreme amount of red tape and bureaucracy that in the end, causes us and many other industrial customers in the state to essentially give up on energy efficiency in California and spend our limited dollars elsewhere.

We do our work on a return on capital. Some folks, as Anna mentioned have got a -- they'll have a CapEx budget in that year, that if they don't spend it that year, they lose it, and it goes off in some general fund somewhere else.

One of the biggest challenges with energy efficiency for industrials in California today is the amount of time it takes to get it approved and then the amount of time it usually takes to go get it executed.

Most of our projects are 8- to 12-month execution times and -- but I've have instances where it took me almost

two years to get an energy efficiency project approved in California. And even then, the industry standard practice issues as we'll talk about in a little bit, caused us to not implement the largest energy saving option for this particular plant, I'm talking about in Pittsburg.

So there's a lot of -- a lot of challenges to try and make this work and it's really not as much of an outreach or educational issue, I think most of my peers understand energy efficiency, it's really wanted to be able to execute within the state and be able to work through the issues and get it done in a timely fashion.

MS. SMIDEBUSH: Only two years? Sorry, a little joke for anyone who's participated in custom retrofit program.

So I'll echo the challenges that industrial customers face when trying to participate in custom fit -- retrofit programs. And it dovetails into the question of how do you do education and outreach for these customers or for that industry to promote energy efficiency?

And you really need to have programs that are tailored to the needs of the customers. You can -- if you take a general approach to outreach and education, you might not actually be applicable to any given site in particular.

And so really we found more success in say in our recent -- recently deployed Strategic Energy Management Program which is a program model which goes to the site level

and tries to change the culture and behavioral practices within that site from bottom to top. So that you can -- you don't just teach the decision makers who maybe already know about energy efficiency but struggle to, you know, get projects through the existing processes, you empower the whole organization to pursue those things as a unit.

And, I think in terms of education outreach that would be administered by a different entity, which is I think the question, is more -- would be the most beneficial if it was tailored to specific end uses perhaps for industry professionals. You know, because of the incredibly diverse ways that different industries, different sites use particular technologies, it's not necessarily enough to know a little bit about industrial energy efficiency, you need to know about a lot about something in particular. Say compressed air might be used very differently in two different types of processing or manufacturing.

Or, you know, you could have two sites owned by the same company sitting next to each other with the same end product and the contents of those facilities in terms of the age and model of the equipment, the layout, the energy usage could be entirely different. So I guess my -- the point that I want to make overall is any approach to this customer segment needs to be deep rather than broad. And that -- that is -- it's hard to cast a wide net if you need to -- if

you're trying to go for that deep engagement, that's kind of the challenge that we have in that industry as a whole.

DR. GANJI: I would bring a little bit of different perspective to the question. We deal with, of course, the smaller manufacturing facilities but still at large scale but nothing like Praxair plants, essentially.

These are -- a good number of these plants are really are not aware -- do not have the awareness about the energy efficiency or what they could do at their plants. And our audits actually result in 60 percent implementation rates without really paying much attention to the incentives that are paid by the -- by the utilities. We work in territories of different utilities, both IOUs and also municipal utilities.

I believe that industry focused education for energy efficiency will be effective and anything -- any education should be local so that people can travel or the facility people or the operational people can travel easily to the place, should be within driving distance. And of course, it should be done by people who are well familiar with the industry and there are those type of people that can be -- that can be located and it should be included -- it should be at the plants, at selected plants, actually, so that people can see the effect of energy efficiency, actually, real cases.

COMMISSIONER MCALLISTER: Kevin, can I ask a question to the panel?

MR. UY: Yes, go ahead.

COMMISSIONER MCALLISTER: I wanted to just build on that a little bit.

So I guess I'm wondering about the, I know, it's hard to generalize, but I guess I'm going to ask you to do it anyway.

Wondering sort of what the opportunities are in industrial sector? I myself had a career doing industrial load management and did some rate design and things like that in other countries not in California, but so, you know, there were various types of projects, there was a lot of kind of incrementalism, you know, as Jeanne said sort of around the edges. But then there also big process changes that potentially we can do. You know, we're always talking about electrification and, you know, large heat pumps like in aggregate, you know, coordinating heating and cooling in a way that leverages both and all this kind of thing.

The heat pumps are coming in to the market. I was just over in Denmark in, you know, in and around Copenhagen, they're just doing a lot of really interesting stuff on industrial agricultural and, you know, large scale energy efficiency in that sector and we're going to try to work with them, you know, bring some of them over and do a little MOU

with them.

So what -- are there transformative opportunities, and this is more for Christian, but are there transformative opportunities where, you know, with a pretty significant capital investment can really sort of change processes in a way that kind of is a game changer in terms of the, you know, emissions profile of a given industrial process?

MR. LENCI: Yeah, there definitely are. I think the areas outside of and the future question was I think it's batteries, LEDs and electrification for some transportation. The ones that we deal with, Commissioner, are primarily related to compressors. It seems like the main compressors and pumps, it seems the rise of big data and the ability of getting massive competing power has created almost a whole revolution of rebuilding compressors.

And the compressors I'm talking about are ones that would consume electricity for a small city. I have one, for example, a turbine project that we've submitted with PG&E. It went 20 months it got refused, we never did the actual measure because it was denied, it was 1.1 million kilowatt hours a year which is equivalent to -- what was that number, 1,157 homes would have electricity annually or a city of 2700 people and this is one project. Oh, and did I mention that the 1.1 million-kilowatt hours savings was all in the summer.

So it didn't happen, it was an industry standard

practice issue where I -- we were asked to go to our competitors, there's only seven of us that make these special turbines that technology is enabling us to figure out how to make more efficient. And I was instructed by the Energy Commission to go to my competitors and find out what their standard was so we could compare to find out if our technology was better.

And I'll just tell you if I did that, I would get fired. The only two companies that do this in the world, General Electric and Atlas Copco are both our competitors and our suppliers and going to them and asking them about the efficiency curves of their turbo machine equipment, it would -- the conversation wouldn't get you very far.

So in the end because I was unable to supply industry standard practice data, the project was denied, that was three years ago. The turbine's still running just the way it was it was, the technology still exists, but we're unable to execute.

COMMISSIONER MCALLISTER: So for example that project or, you know, your process, I mean, like you said, you're electric intensive, I image you're running 24/7?

MR. LENCI: Oh, yeah.

COMMISSIONER MCALLISTER: Yeah. So are they -- and CLECA, you know, I think we've talked with them over the years about, you know, demand response and sort of the pluses

and minuses of participating in their response, I guess, did these sorts of investments like if you were to make that investment, would you also be able to provide sort of a enhance grid responsiveness. Is there any way, I mean, I imagine you're focused on -- you have a pretty flat load shape, you know, you've got 24/7 but could you respond say in the summertime if we had a capacity crisis, could you drop load and do that in a way that didn't affect your business to negatively?

MR. LENCI: Absolutely. And, so Praxair and many other CLECA members are members of and participants within DIP as well as PG&E has got this really cool innovative pilot going on right now called the Economic BIT program which through Franklin Frickes and Crew, we are members of actually now for the second year. And where we're trying to understand in a CAISO market system how we can use that demand responsiveness and then actually adjust our load based on what the actual needs are in a day ahead real time market.

So, yeah, we're doing that as we speak.

COMMISSIONER MCALLISTER: This is great, thanks.

If anybody else wanted to comment on this?

DR. GANJI: If I may. Actually, from our experience in the past over 25 years, a majority of energy efficiency comes in supporting equipment for these plants. In a food processor, like a tomato processor, which we produce 90

something percent of the tomato for the country, the major user of energy is from the broiler system and a steam system. And the energy efficiency is related to those systems and a good number of these plants, a majority of these plants have large amount of refrigeration equipment and energy efficiency's related to those, how to control it, how to better utilize the present equipment, of course, if there are increase equipment with better efficiency. Compressed air is a major issue.

All of these support equipment consume most of the energy at least in a majority of the plants that we have audited. There are -- there're exceptions, I mean, what Praxair system and you -- and refineries are exceptions, but the majority of the industry are -- it is with the support equipment.

MR. LENCI: I guess I'd say that we're kind of like that other than our support equipment is our process. We compress air and that's about a third of our -- a quarter of our energy expense and then we -- after we separate it then we liquefy it.

DR. GANJI: Yeah.

MR. LENCI: And that liquefaction is three quarters of it and essentially that liquefactioning is just a big HVAC unit with a really, really big compressor.

DR. GANJI: Yeah.

MS. SMIDEBUSH: I think, I'll just add on one thing that echoes pieces of what both Ahmad and Christian have said which is that, you know, Christian mention that his company, you know, Praxair has energy, energy mangers that got, you know, very clear visibility into the opportunities that they have at a particular site. Whereas, in Ahmad's experience as an implementer, you go in to a smaller shop and they have no idea. They can point to the meter, maybe, but you know, there's no visibility on what systems are actually using.

And so I would say that one of the biggest opportunities aside from, you know, to specific technologies is the metadata about how those are functioning. So energy information -- or energy management information systems where, you know, the energy manager doesn't even need to be on site, they've got a screen, they can screen share it with any consultant who wants to help them identify opportunities and get real time information about how all their equipment is functioning.

MR. UY: And I'll just respond very briefly to the Commissioner's question and say that, you know, at least, in our experience with the food production and investment program, there is still a lot of low hanging fruit, so to speak, 20-, 30-year old pieces of equipment that need replacing that doing that alone by replacing it with, you know, modern standard equipment will save, you know, millions

of therms and millions of kilowatt hours.

And so there's a large opportunity in the near term to reduce greenhouse gas emissions just based solely on replacing old equipment. But as far as transformative technologies go, I would say that a lot of R&D still definitely still needs to be done. You know, there's opportunities with solar thermal, you can electrify some low temperature heating loads but higher temperature processes like oil and gas refining, and chemical manufacturing, and, you know, smelting metals and things like that, really technology needs to be developed if we're ever going, you know, make significant GHG emission reductions in those applications.

Okay. Well, the next question, I think, is definitely for you Anna. And it's how do local utilities support industrial customers in achieving their energy efficiency goals?

MS. SMIDEBUSH: So I think it was, do they? My response is, gee, I hope so. We have -- we have a big portion of our energy efficiency portfolio is geared towards industrial customers. As I mentioned, a big piece of that is the customized retrofit programs which, you know, take a more in-depth look at what changes are being made, offer technical assistance, and identifying those opportunities, pre and post calculations around the installation of that equipment and at

the end, you know, upon verification where customers use an incentive for that.

We do also have some component of the more off the shelve plug and play deemed kind of measures although, because of all of these very broad unique -- or these unique end uses at sites, you know, there's not as much opportunity for those standardized approach like, you know, you can assume that many plants will have pipes that need insulting, or tanks that need insulating, or lighting that needs to be swapped out. But after those opportunities are taken up, you really are looking at those more in-depth approaches.

And that's were strategic energy management which has -- uses an NMEC platform but has the delivery model of this very in-depth cultural change ground up approach I mentioned earlier. And for programs -- or for customers that don't quite fall into any of those, there's financing options, the on-bill financing that we offer for customers to acquire loans to help finance their energy efficiency projects.

And thanks to a lot of advocacy from trade organizations and large customers we've been pushing for the increase of loan caps for the OBF program so that they can be more applicable. I think previously loans were capped at around 100,000 per site and now we're looking at 250 to start with, with exceptions made for up to 4 million per site.

Which is far more impactful for these large customers who need to be making big investments all at once.

So that's kind of the quick rundown of the variety of things that are available to customers. But really when it comes down to whether or not they're effective, it's in the implementers who go out into the field and administer those things and also, for the portion of the portfolio that remains in-house, and how they utilize the network we have with customers to make sure that we're communicating with them, listening, and meeting their needs.

MR. UY: And how would customers learn more about those energy efficiency programs? Is there a web page or--?

MS. SMIDEBUSH: I'm so glad you asked. So most large industrial customers will have a PG&E sales representative already assigned to them. If you don't, you can request them just by calling into, you know, the regular customer service line and saying, hey I'm a customer, I would like to learn about energy efficiency options. And someone will be able to get you more information about that.

But for -- generally speaking for the large industrial customers, somebody's already on the phone with them on a regular basis. And they're usually the conduit for marketing a lot of our third-party programs and they work closely hand in hand.

MR. UY: Sounds like you want to weigh in, Christian?

MR. LENCI: If you don't mind, yeah. I guess, I'd like to say first, that being the customer at the other end of the pike here that I think PG&E and especially SCE have been really good partners in the drive to improve industrial energy efficiency.

As Anna mentioned, through some which we're participating with in the pilot down with SCE in Southern California with the financing, with the in particular as we said all these unique facilities are custom retrofit programs. They do a nice job trying to tee up an opportunity, the challenge has been is getting the projects across the finish line.

And I got some data from SCE last week and, I mean, let me just share it with you. So 17 percent of the industrial load on megawatt hour basis is consumed by industrial customers for Southern California Edison. They are currently meeting their overall energy efficiency goals but they're being met by increasing share of residential EE programs.

In 2016, the nonresidential component of energy efficiency for Southern Californian Edison was 60 percent of the total megawatt savings. In 2017, it was 45 percent. In 2018, it was 29 percent. The energy efficiency programs in -- for industrials contributed 13 percent of the overall results in 2016. In 2017, it was 4 percent. In 2018, it's

less than 2 percent. They estimate that less than -- and this kind of gets to Dr. Ganji's comments, less than 0.1 percent of industrial customers in their service territory participated in energy efficiency program last year.

So and this is the data. I would submit that the challenge we have with regards to getting projects approved and it's happened in my company and it's happened in our members' companies within CLECA, they're just taking their limited amount of effort and limited amount of money and going to states with more productive, more assured, more quantifiable, and executable energy efficiency programs. I know we have.

And I know several of our member companies that have actually said they're not going to do EE projects because they've been approved then changed or they had a really bad experience and said, we're not going to do this anymore.

So I don't know what the issue is but I know it needs to change. I'm a native Californian, my son was born here, I have three daughters I want them all to live in California, hopefully they'll be engineers in STEM and work in engineering, and work in industrial companies perhaps. And we've got to make sure that we are helping these companies be sustainable, helping them to become more energy efficiency, and using our dollars whether it's through the CPUC or through the CEC to be able to enhance our competitiveness so

that they can compete on an increasingly worldly stage.

MS. SMIDEBUSH: And I'll echo that as well. For PG&E, the penetration rate for -- or the participation rate for industrial customers in energy efficiency programs has been around two percent. And they're similarly the contribution to energy savings goals has been diminishing year over year. And we also have heard as the ear on the other end of the telephone a lot of the frustration from large customers and small customers. Anyone who's got the constraints that an industrial customer has, trying to participate in our programs and that it is not -- it is not easy.

You know, and I want to go back to something I think Joanne said in an earlier panel about needing to be fast. And I'm not sure that people these days look at utilities and think gosh, aren't they fast. And that when -- as we approach this new world of third-party programs, we're mandated to be 60 percent of our energy efficiency portfolio to be operated by third-parties by the end of 2022 and that, you know, we're currently in solicitations to start bringing in those new contracts.

We hope that the market will bring us some of these innovative solutions that will help get these hard to reach customers these -- the strength of potential of the industrial sector and help them access the funding that they

can.

MR. UY: Thank you. I'd like to just jump all the way to the last question and, it's basically what can we do to help? So can the Energy Commission support the industrial sector in addressing the barriers you faced in achieving energy efficiency? What other government agencies may be able to address these challenges? So, what do think the state can do to help?

MR. LENCI: Well, I think certainly the CPUC has attempted through Track 2 and such of trying to figure out how to restructure their energy efficiency programs. It's taking a long time. Unfortunately to get through Track 2 and I'm still not sure we've got any actionable activities there and that's really unfortunate.

The flip side is, is what the CEC has done in particular with the food processer side, is innovative, it's new, it's simplified, and it's created results. And those results benefit not just the food processers but in the end, right. It's the cheapest and most sustainable kilowatt hour, it was kilowatt hour that was never used.

So what does EC and the food processers working together are doing I think is a real benefit, not just to them but to all of us. And if we could figure out a way of doing something like that for the industrial community, I think we can get similar if not even better results.

MS. SMIDEBUSH: I can echo as well. So I was on board at PG&E during the time that the food production investment program was being launched and that we had, you know, some program participants in our industrial programs and food processing very excited about it. And I think that, you know, FPIP was a very, you know, fantastic opportunity.

But when we tried to layer together say, participation in FPIP and participation in our custom retrofit program say, for a customer whose financial barriers are substantial and they might be looking for multiple opportunities to offset those costs that we run into issues with the timelines required for each opportunity, the eligibility requirements, the things that participants are required to do or provide, and that it's really -- it's an opportunity for increased collaboration between different state agencies who might be offering these programs to collaborate early and often and make sure that we're not that program launch day when we get to the question, are utilities actually allowed to provide a letter of commitment about funding for an incentive project? What does that look like? Does it meet the grant requirements for what a commitment letter should be? Things like that. And that the earlier we can have those conversations, the better the results will be, the more people will be able to participate and overcome those market barriers which is the point of both programs

broadly overall.

MR. UY: Go ahead, Dr. Ganji.

DR. GANJI: Okay. I will be a little bit more straight on the question.

One will be that the role of CPUC that is, of course, the guardians of the funding of the ratepayer, but at the same time, I believe if it plays the role of guidance, more direction to these programs, more active participation in directing of these programs and advance basically, interfering advance in these things so that approve it and the kind of due diligence on these programs, it will help quite a bit if they listen to the customers that have gone through the difficulties of this program it will help quite a bit to guide in addition to be guardian of the -- the other will be to work with regulatory agencies to ease the path to implementation of energy efficiency programs -- of energy efficiency projects.

This is especially true for the case of gas technology. That if people do not implement the projects because they are afraid, they may -- just the kind of phobia that they will violate some air regulations. While if the people on the air side of the agencies work with them and guide them through their regulatory and contribute towards the ease of this phobia, it will help a great deal.

MR. UY: Thank you for all that excellent feedback.

Sounds like I need to talk to a few of you after or probably all of you.

With that, I was going to see if there were any questions from the audience at this time. And if so, just please go ahead and ask.

MS. BROOK: This is Martha Brook, oh, yeah, it's working. Hi, I was -- I'm sitting here thinking sure, the meter-based savings approaches it seems like they'd be a slam dunk for the industrial sector. Would you agree with that? And should we be moving in that direction instead of all the calculated custom stuff that becomes a black hole that everybody -- nobody survives?

MR. LENCI: Hear, hear. The -- what we do in our world and for the large industrials as compared to the smaller ones, big data has taken over. So and for us, we're collecting in the western United States over 80,000 data points per minute and putting them in the cloud. So of course, all that data includes all the energy data from all the electrical compressors, and all the inner cooler temperatures and pressures, and all the technology that we were talking about early that's out there.

We -- we're measuring all of that in real time and -- and so when we do our energy efficiency calculations for our own eternal CapEx to go get the money, that's what we do. We go do a baseline. We do, you know, statistical analysis, you

know, for the normal or non-normal data, understand what we believe the actual kW kilowatt hours are in baseline.

Then we figure out what we believe the number will be in the future. And in my group, once we end up hopefully getting the energy incentives to go make it work since we've been plucking off that tree for 30 years, that when we finish and implement the project, we just go back to the same dataset, grab the new set of data, compare the two. And my bosses find out whether or not I did my job right. It's just that simple.

And the cool part about the technology and the data and the access to data today, is it -- it's just so much more simple than it used to be. It's still difficult, for the smaller industrials that may not have the PLCs the DCSs and the data collection systems, but for all the medium and large size customers and even large commercial folks, data's easy now. And as a result, the quantification of it is so much more simple than trying to figure out how to move the goal posts that sometimes we deal with today.

MS. SMIDEBUSH: So I think my response contains a big asterisk which is that by CPUC decision, we are not currently allowed to pursue NMEC methodology in the industrial sector with the exception of the Strategic Energy Management Program. And to that end, I say that I do think Strategic Energy Management is a huge part of the future of programs

addressing the industrial space.

In our business plan, we're looking at how we are going to scale this in the future and, you know, we greatly anticipate success of the two programs that launched last year. And that it's also something that in terms of Strategic Energy Management, we are behind the rest of the country. You know, there have been I know various folks in the audience have mentioned throughout the day that this is already happening elsewhere and that we need to catch up.

And in terms of using NMEC for the channels which we currently can, yes, I absolutely think that's where we should be focusing a lot of attention.

MR. UY: Go ahead.

MS. PAOLO: Hi. Okay. Lisa Paolo, I'm in energy efficiency, I'm currently the lead for Industrial Energy Efficiency Programs so this has been a great informative discussion for me.

I hear Christian what he's saying, that a lot of the complexity and calculating savings for measures within the industrial sector, getting those approved, have contributed to lots of delays, I do agree that that's part of the program. I think there's other problems, though, in this sector. Why we are seeing the decline in participation from the industrial sector related to just the complexity, in general, for these customers to identify an Energy Management

Plan, site specific, the engagement that those customers need to have to even participate in a program. So, I don't think that just that, that complexity of how to calculate the measured savings is the only reason we're seeing this lack of participation.

I'm glad that SEM has been brought up. The Commission for again, over a decade starting with the continuous energy efficiency -- energy improvement, CEI, has been trying to analyze this type of program approach to see if it makes sense in the industrial sector. And that's why we see the SEM program today because the commission did recently for this cycle approve that approach after years of workshops and talking to experts in the field. So it'll be interesting to see what we learn from this initial effort.

One thing I wanted to ask, though, I actually do have a question. Is part of the current SEM program structure is this idea of a cohort approach because again another complexity for the energy efficiency -- or the industrial sector is the cost involved -- the program cost involved to actually go to those customer sites, work with the customers, do on site energy audits, try to identify, you know, what makes sense for that customer. So, that's another barrier in this sector.

So the current SEM program is trying to pilot this cohort approach where you get similar industrial customers in

similar industries to come together and through a series of educational workshops that utilities promote and lead the customer identified under the Action Plan. Part of this requirement, you know, objective is also pointing persistency with this amount of investment, public funds is going into this sector to promote energy efficiency, the idea is to see persistency. One way of doing that is to have on site energy champions that remain after the utility engagement is completed.

So I guess my question is, I've heard a lot about the various end uses might be good to go from that approach but it's onsite specific strategy. Does the cohort approach make sense for the long term? We're already hearing that there might be challenges in terms of location of the different customers, like one might be located in Northern California versus Southern California. It's hard to have a cohort approach where you have to come together in workshops when there's this regional difference. So that will be one of the lessons learned we probably will learn about.

But aside from that, do you guys have any input or insight on how this cohort approach could work or how it might not work? Just curiosity.

MS. SMIDEBUSH: Thank you for the description and the question. So, a quick point to clarify, one of our there's two SEM implementers currently and one of them is taking the

cohort approach and the other is taking a site individual approach. So, at the end of the engagement of both of these programs we should hopefully be able to have some lessons learned from both and be able to make a better value judgement about cohorts using that.

I definitely agree and have heard the same that sometimes picking the right geographic location for in person workshops is a challenge especially if you want to get lots of engagements from a particular site, they might have, you know, or if you're trying to get someone at that meeting whose time is very highly prioritized on other things that's definitely a challenge.

And I think that as we look towards scaling that's something that we'll have to overcome but the benefits of having a cohort as we've, you know, a theme of our discussion has been a lack of information is a challenge. And that when you put a lot of actors in the same room who may, if they are not direct competitors be able to share best practices, or have a little friendly competition that networking as a cohort is important too. There's a combined networking competition isn't always, but that, that's something that would be an advantage moving forward but I'm very open to hearing perspectives of actual participants about how they feel about it.

MR. LENCI: So, Praxair started in the one of the

original BPA pilots back in 2008 up in the Pacific Northwest and was member of some for two or three generations worth as it kind of moved through BPA in to the utilities and then elsewhere around the country. As I mention we're currently spent with Southern California Edison's program which I think is more of this cohort approach. So, it there's -- I echo Anna's comment, she right on I think the best practice sharing of understanding of what's happing in energy intensive yet unrelated industries is really valuable.

I have -- we have bunch of kids, I would say, folks over 15 or 20 years' experience that are operating our facility down in Ontario, California, it's a liquid hydrogen plant and they're -- they have gotten an awful lot out of the STEM because they see their energy issues and challenges and the talk to others in unrelated industries but also energy intensive. And there's this comradery of challenges that at some point everyone roles up their sleeves and tries to help each other. And I think that works really, really well.

Unfortunately, and was fine, my first question when I heard about some here in California was are any of my competitors included? And the answer was, no. And that was the right answer and we were able to sign up. Since there's only like four or five of us, I just can't and won't reveal what sort of technologies and thoughts and practices and energy management strategies we may be doing in our company.

I'd love to hear what they're doing. But I'm not going to tell them what we're doing.

And so, I think if you end up having similar industries or the same industries in the same room, I think it actually has a retroactive negative effect, you know, you actually go backwards. You kind of don't get that sort of critical mass of communication that you're looking for.

So, I think, there's a balance there but I think that there's a way that it can be done and I certainly applaud what PG&E's trying to do in terms of testing the waters to figure out which way may be more effective here.

DR. GANJI: If I may, I went through the SEM program and it had that effect of creating a silo of being very, very prescriptive, and limited the implementer on how to approach it. Any program that is that limited if they abide by all the limitation that was prescribed in the manuals for that program, would have difficulty unless they kind of bypass some of the limitations that they have and the utility or CPUC agrees you do that.

MS. SMIDEBUSH: Are you talking about the SEM design guide.

DR. GANJI: Yes. It was very prescriptive and I hope the future programs it can be adjusted or any other program let the implementer have his own method and innovations with the end result be properly met.

(Unidentified speaker didn't go to mic)

MS. SMIDEBUSH: I think; the general theme is that we'll be evolving that model over time based on the lessons learned.

MR. UY: All right. We'll take this last question.

MR. SCALA: Thanks. So, Pete Scala with Energy Division. I just wanted to -- I was confused by some of the responses that you had to Martha's question and I wanted to revisit that for a get some clarity on some things. Can you hear me? Is this working? Okay. Is that working, yeah. Okay.

So, I guess, one -- so, when I think -- when I hear about normalized meter approaches I think about whole building and or whole floor depending -- and -- so, the two things that I think about are, first; regardless of whether or -- well, I guess, these investors projects by in large view typically ultimate use sort of metered verification process it's just not whole, right. It's tied to that particular subset of a large industrial facility. It has many different, you know, electric and energy uses going on simultaneously. So, the whole approach isn't always that effective there's too much noise too many other things going on unrelated.

And so, I think it's pretty -- and I also, think my understanding is the reason that the estimates are needed is

to get an incentive number because you got a chicken and egg problem you need to estimate how much savings a projects going to deliver to get a number out there for what the incentive is likely to be and then you evaluate off of it and, you know, you have sort of a plus delta off of that.

So, I'm trying to understand your response is in the context of my understanding of how these work in industrial settings because I think they generally do, you know, A) you do need some sort of estimate to move a project forward and then, B) you might not use whole building but you by in large do some sort of meter-based evaluation or pay for performance type element to a lot of these projects anyway. They're not usually just completely deemed with no meter-based component to them. Is that -- am I wrong about that? Because the way that those answers came across kind of like that's not how this is going.

MS. SMIDEBUSH: That's -- you make a very good point. There's definitely baselining that is done using usage data in the custom process that currently exists, you need to do that before and after the project. It's based on what's actually happening, you know, it has to be measured. I think when we talk about -- or when I talk about strategic energy managements usage of the NMEC platform it's I think somebody was talking early about measure attribution and that for SEM in particular the way that it is different is that you're

capturing behavior changes, you know, operational changes things that might have a more difficult time being quantified in a manner of a particular -- or the tradition custom process. That's how I would distinguish those two.

MR. LENCI: Now, I think you're right on but I want to expand the perspective a little bit to it -- in at least in our world as industrial customer. What the real challenge is which is in part the efficiency incentive but in reality, it's the actual capex of -- so, we've got a project we're executing right now in Utah with RNP. We're replacing a large air compressor, you know, 8,000 horsepower unit so again, we're huge. And with completely new technology, motor's going to stay, stand's going to stay, all new tech, and all the piping, and all the wheels, everything all the baring, everything, it all gets ripped out and new stuff comes in from the new technology that's now out there today.

It's a, you know, to be able to do that it's just this one machine and kind of the surrounding components around it so you're not looking at the whole plant you're just looking at this one particular large compressor. And you get the baseline data and, you know, calculate out again, you know, using reams and reams of, you know, 8760s, right hourly data for a year, for maybe a few years. Figuring out what your baseline looks like what it does in terms of weather and seasons and such. And not only are you doing

that to go get your energy incentive configured which may I add California's the only state where I don't sign a contract before I sign a contract at the end which I don't get and really have never got.

We sign a contract for so be guarantee the money and we know the monies there, and then after that contract is signed then I go to my management to go get the money. And in reality, you know, the incentives $1.2 million here. The capex is 4 and whether or not I get a million 1 or it's 900,000 or something, you know, it's not good but it varies but if I can't deliver on the 4 million capex, I don't have a job anymore.

So, the real perspective, right, I guess, [indiscernible] the bigger picture is using the data and in reality, it's in partnership with the utilities of being able to develop a system where I'm sharing the same data set. We're working off the same data. Not only for the energy incentive, but also for my capital investment approval.

And we can't do that very well in California, it's very difficult to do because the measuring systems is so difficult, but in Utah, in Washington, in Colorado, in New Mexico that's the ways it's done. It's a partnership between utilities and the industrial customer so we can both go essentially go get the money to help get that ROI to make the project happen. Thank you.

MR. UY: All right. I want to thank the -- oh, go ahead.

MR. JOHNSON: Hey, Kevin, really quick. I was just going to say; we have one person on the line. Do you have time to take that question?

MR. UY: Heather, I think we have to move on.

MR. JOHNSON: Okay. All right. Just, yeah, just, Rick if you can hear this, just write it in and we'll get you from there. Thank you.

MR. UY: All right. So, I think that concludes the panel, but I do want to thank the panel members very much for participating.

(Applause)

MR. KENNEY: All right. So, we were now going to move on to our final presentation for the day. This is on Energy Efficiency Market Transformation and we'll be having presenters here from the California Public Utilities Commission and the Public Advocates Office.

MR. KANE: Hi, everybody. I'm Hal Kane from Energy Division on the energy efficiency team. This is Christie Torok from the Energy Efficiency Branch and Dan Bush from the Public Advocates Office. We're going to tell you as you just heard about the latest round of market transformation work here at the CPUC and in the state.

I'm going to frame it for you and then Christie and

Dan are going to go in to detail on two initiatives.

As you may know, it's getting harder in California to capture cost effective energy efficiency. If you look at this slide here, this is 2013 to 2015 and it's -- you can see it on the right this this, SDG&E very clearly the drop-in cost-effectiveness of the portfolio, this whole portfolio. You can see, you know, also on SoCalGas very clearly, not quite as clearly on PG&E and SEC but it's still there.

So, we need new approaches to getting new energy efficiency and we have several but of those is market transformation and here's a time -- oh, went backward, here's a timeline of where we are, it's scoped in to our energy efficiency proceeding stemming from SB 350.

And late last year, we developed a staff proposal credit to Christie Torok and many people for that and she's going to tell you the details of it in a few minutes.

The staff proposal when out through a ruling for file comments to develop a record. We held two workshops where there was a lot of enthusiasm and a lot of interest.

And so, at the end of the second workshop, we invited the parties of the proceeding to have a working group. It was hosted by the California Energy Efficiency Coordinating Committee; acronym is the CAEECC.

And Dan Bush is going to tell you about the details of that report from the parties which came in just about

three or four weeks ago.

And the next step I think that a ruling is probably imminent which we'll send that out for comments from the parties to further develop the record and potentially work towards a proposed decision to launch a market transformation framework.

The definition of market transformation is long there; you see it on the screen I won't try to read it for you. And one thing that's hard about it is that a lot of different people use the term very differently.

What we did, I'm going to tell you the starting point for what we did and then you can tract this. As you listen to Christie and Dan you can see how this evolved through the staff proposal and evolved through the joint party's report.

But that starting place was, if a California program administrator believe that it has a way to capture a lot more energy savings in a cost-effective way, but it can't do that under the rules -- the current rules, then it can come to the commission with a special proposal. In which it lays out a special for example, a special cost-effectiveness schedule may be the reason why it wouldn't work under the ordinary rules is that it wouldn't be cost-effective at the beginning because the market transformation program is often not cost-effective near the beginning but it might be very cost-effective near the end.

So, we looked at a life cycle, cost-effectiveness instead of a year on year cost-effectiveness or it could develop its own custom schedule and it would have to live up to that schedule but not up to year to year cost-effectiveness.

Initially there were a lot and there still are a lot of protections for ratepayer funds so, there are offramps for a proposal that looked like it might go somewhere but ultimately is not -- has not met its own detailed metric and timelines and so forth. So, and again, you can watch how that initial thought evolved through the staff proposal and the joint report from the parties.

I have a favorite example of sort of market transformation initiatives and I just want to lay it out there for you. A market transformation proposal can be anything but say your hot water heater breaks, at home and you call the plumber and the plumber comes and he says, don't worry he has three or four hot water heaters in the truck.

And you say, great, but, you know, I really want one that's highly efficient; and he says, well, actually none of those are highly efficient; and you say, you know, I'm also interested in maybe going all electric; and he says, well, you know don't have in the truck; and you say, you know, I'm even interested in one that's a grid connected hot water heater that could be used for demand response and energy

storage; and he just kind of looks at you're crazy; but then he says, no, don't worry I can get any of those for you but it's going to be three weeks and you and your family are going to take cold showers for three weeks.

And you think to yourself, you know, what do I do? And a lot of people are probably just going to go with what's in the truck there. So, this a strategic sort of -- of intervention point that a market transformation program could target. They could be working with the plumbers or the electricians who might do electric water pump may be given incentives to them or just education.

But again, a market transformation program can be potentially anything and very broad, hence the ability for unique proposals to come through that framework as Christie and Dan are going to describe in a minute.

And I'll just say also, I want to make one distention that this is energy efficiency market transformation as part of our energy efficiency proceeding. We will also have a building electrification proceeding as per SB 1477 the legislation and that also will have a market transformation program. But that program is not what we're talking about today, right now we're talking about the energy efficiency program. So, I'll let Christie describe the staff proposal.

MS. TOROK: Thank you, Hal. I'm going to talk a little bit about the staff proposal which was published in

August of 2018. You know, working from our definition that was adopted in 2009 we started and given SB 350's mandate to authorize these -- this program framework to support the doubling of energy efficiency goals.

We started discussions with stakeholders about what really -- what would a market transformation program look like, what are its key features, how does this definition translate in to an operational on the ground program. And we heard a lot of different things from different stakeholders and different sort of different uses of the word -- all of which were generally consistent with that definition but some of them weren't different from what we already have in our portfolios, what we already fund and/or weren't necessarily applicable in every situation.

So, we wanted to find something -- pieces of this that would draw out what was the new opportunity and what could be operationalized in a manageable way that would provide opportunities that we haven't had before.

And I'm really excited about it because I think it allows for different strategies that we've honed in on independently to be woven together in to a single longer-term effort with some real measurable goals and that -- that's the vision for it.

So, what does it look like? These key characteristics that we pulled from -- in our goal of honing

in on something both flexible and different was that these would be long-term initiative the things that are not revolving, like maybe a retrofit program in doing a continuous number of retrofits, maybe your measured changed but that could be done in a short time scale or a long time scale or -- and it's not an ongoing effort, like maybe a work force in education in training where you're kind of constantly doing -- dealing with one market barrier or one activity. So, we want to pull together long -- over a long period of time a market that would benefit from addressing multiple barriers simultaneously.

So, if a market really has -- is mostly facing one barrier like a first cost barrier or an information barrier, we have programs in place that really are -- do that very well. We have incentive programs, and we have emerging technology programs, and we have information programs, and workforce education programs. But when we have an opportunity where it -- that would really benefit from addressing multiple of those and maybe changing how we address it over time that is what we are looking for.

And where there is leverage points where we can touch small -- a relatively small number of transactions or market actors and create a big kind of a leverage, big [indiscernible] in the market. So, that's an attractive characteristic that we would look for in an ideal opportunity

for market transformation.

So, the endings are things that are not cost-effective initially mostly because we have avenues to pursue cost-effective measures currently. So, these are things generally things generally that aren't cost-effective right now. So, but that we have a reasonable vetted case that over a life cycle a program over the full program effort it will become highly cost-effective.

And we say highly cost-effective because inherent any longer term forecast it the somewhat higher risk level. So, we want to set our thresholds for life cycle savings cost-effectiveness to be fairly, you know, promising and high to compensate for some of that risk.

Another key characteristic is for there to be clear goals. And here the goals can be there -- they should be -- there should be a data supported case for what -- how the goal translates directly in to energy efficiency savings.

But it does not necessarily restricted to counting individual installations, and documenting them, and verifying them the way that we do generally in our resources programs. It is more -- we could perhaps set a goal on market shares, or saturations, or practices of certain key services providers and -- but the goals need to be measurable, you know, smart goals, achievable, and have targets associated with them, and a schedule so that we can track our progress

towards something that we've all agreed is worth pursuing.

And a lot of -- another big piece of this that's not on the slide is actually that we set these goals up front and these schedules up front and these like savings methodology we agree on that ahead of time so that as we move through it, we know what the savings are and we know where we're going and we can adjust along the way. But setting that initial goal putting our kind of line -- or our line in the sand or our stake down and trying to move towards something is a big piece of how the vision of how this is supposed to work.

And what this does I think together is give us an opportunity to pursue savings that aren't currently possible to pursue. Because these kinds of long-term plans with multiple strategies that aren't, you know, once you introduce workforce education and training, and marketing and education, and outreach, and you have a resource component, and you have different -- you can get lost in attribution.

And so, here we don't -- we don't have -- we can stitch all those things together use the most effective way possible to reach these stated goals and share collectively in those energy savings.

And we also, we can start to pursue more mar -- we can start to claim market size savings. I mean, we've seen a lot of successful efforts in California over many years that's still produce effects today. And some of which we

capture and much of which we don't because we're very rigorous in how we verify our -- every kilowatt hour that counts towards goals and that's a good thing.

But when we're shooting for something that's achievable that takes a little bit longer than we can pursue these types of market size savings.

So, then how does this actually work? So, how do propose to operationalize this? So, I'm just going to walk through the process it's sometimes referred to a stage-gate process I think my stage numbering is a little off compared to what Dan is going to talk -- so don't focus to much on that.

But in the first stage there's, you know, first there's just a bunch of ideas and somehow a market transformation administrator, this is the administrator of the program, will select from those ideas a short list of things to pursue and they can -- they'll apply some election criteria to that end.

And then once that's done then you -- they enter in to this market transformation initiative development stage. Where you're really taking what was a promising idea based on all available information and filling in all of the details. You're defining -- you're looking at that market to try to size it, you define it, create -- model your baseline -- your forecast baseline, propose -- think about off boarding

criteria for the initiative, what should the -- what should that look like, study how the market actors in that market interact, and come up with a program theory and logic model, test some strategies.

And then you come up with -- at the end of all that and in order to do that there's an advice filing that says, we're going to develop these three ideas and this is how much money we're going to spend on that. And so, the public knows at that point what's being developed.

And then after that the -- when after the development plan efforts have complete -- so one idea might drop off. So, maybe you had three ideas move forward, maybe not all of them look really good because when you got really in to the data, and started to test things it just didn't look as promising, and that's okay. So, there's no -- it's not necessary to move forward with each one.

But the one's that result in a plan that is something that the administrator wants to move forward with then it's submitted as what we called in the staff proposal, an accord.

I think, in the stakeholder proposal it's called a plan, but a little confusing because we got a plan and then a plan but anyway. So, we'll just call it an accord for right now.

But this accord is really the governing document for this effort and it outlines what the, you know, what the

performance metrics are, where you expect to be at what time, how are you reporting out on progress, you can setup an initiative review committee to kind of provide some input or help communicate with stakeholders and provide recommendations at key points in the process.

You have you're forecast baseline and that's really important because that determines savings as well as a way of taking measurements in the market over time that produce both progress and savings estimates.

And that's really the heart of the proposal. Let's see, there's implement -- once it's -- and the accord is submitted as an advice letter again, so it's open public comment. And then it -- if or when it's approved it goes into its implementation phase where it's starting to -- it's using its funding to do the activities that were outlined in the accord and report out and there should be a report out on a regular schedule, there may be some strategy refinement, there would be certain parts of the accord outline that would be flexible and not trigger any red flags if it needed to change and that maybe other parts that were more like no, these are really important and if we don't make these then there's definitely a problem or -- so there's different aspects of it. And then this is the implementation and what are some of the key issues that came up.

So, -- that we had two workshops on this and then we

had -- and then the joint stakeholders came together and met for three months. And they put together a really impressive consensus document which took a lot of the ideas in the staff proposal and refined them, and added to them, modified some so, it will be really good to hear from Dan in a minute.

But with the keys that kind of came out of those discussions not all the recommendations were consensus. One of the ones that is -- that was kind of an outstanding issue is who's the best selection for program administrator? Is it the existing program administrators that we have? Or, should it be a third -- an independent third-party contracted by IOUs? And if that's the case, you know, we -- there are related questions about how long should an initial contract be? And how should this third-party be held accountable? How do we create the stability for market transformation and having the benefits of an independent third-party administrator?

And then, I think another main key issue to resolve is, is our what if scenarios? So, when things don't go exactly as planned? If our -- if the key milestones aren't meet, you know, what is that -- what does that process look like? And how modifiable is the accord once it's filed and what's the process for proposing or approving changes?

And we, you know, we want to -- we expect that there will be adjustment that need to be made along the way. And

how much latitude should be provided to the administrator to make those in program adjustments in real time versus having a -- another public vetting? Because some changes may over step that boundary where it starts to become questionable about whether you should move forward or not all.

And -- but -- so we want to find that balance and -- without creating an overly burdensome process -- nobody likes that.

Another key issue is, what is the right cost-effective threshold? Is it, you know, we -- in the staff proposal we had proposed 1.5 TRC as a starting point and there were different values being discussed in the joint stakeholder groups and there was actually not consensus on what this value should be so this remains an outstanding issue.

And the last kind of it's partly a technical issue and partly kind of a policy issue. Is how should we include codes and standard saving in our market transformation planning?

We could -- so there are a couple options on the table, we could try to forecast cost -- codes and standards savings as part of the accord -- in, you know, going in to the accord you can forecast your savings and include a forecasted codes and standards savings.

There is a question about whether there are any

logistical or logic problems and combining pre-codes and standards and post -- and codes and standards savings. Since they have sort of fundamentally different approach to the allocation of savings.

And the other question, I think it's reasonable to ask is it -- can we really forecast codes and standards savings when we're planning a long-term effort that's beginning before a measure's even cost-effective? That's a long-time horizon.

So, the other option on the table is to forecast cost and benefits using all the available data and then backing out what you would need to get from codes and standards, and assessing whether that value is reasonable to expect and -- instead forecasting what it would be just kind of, you know, is it 90 -- is it an achievable number and, because in some cases it would be an easily achievable number and in some cases it might be a really difficult, really big -- really high big lift. And if it's in between then, you know, it's a judgement call but that might be just as good as for -- trying forecast exactly what it would be. So, I don't know, that remains a question.

And if we did the later approach then the idea would be that once the measure became adopted in to code we would -- we could then do a retrospect evaluation similar to what we do now to assess what the savings are and then credit it

appropriately to the market transformation program.

So, that was my piece and I'll hand it over to.

MR. BUSH: Okay. So, I'm Dan Bush, I'm Supervisor in the Public Advocates Office for the customer's program teams. We cover the whole demand side including energy efficiency.

I'm going to talk a little be in my role as a member of the market transformation working group, give a really brief overview. My task here is to just to give you a sense of what's in the report, encourage you to go look at it and for those who are parties or wish to be to get involved in the stakeholder party comments that are coming up, and to be brief because it's the end of the day. So, without further ado, I'll try and march forward.

So, and not surprisingly the market transformation working group that was convened by the California Energy Efficiency Coordinating Committee drew heavily on the staff report that sort of the market transformation working group came in to being after the two workshops that Christie was describing and organizing.

And so, you know, we took the staff proposal as a starting point for further elaboration and I think what you'll see is pretty consistent with spirit if not the letter in most respects.

It was a pretty intensive process with a bunch of all day in person meetings, subcommittee meetings over time for

drafting et cetera. And the group worked really hard to achieve consensus on as many issues as possible and with the exception of two issues which Christie already mentioned -- the -- it is a consensus document.

So, the -- I want to highlight -- the document lays out what I think are pretty helpful some principles for market transformation initiatives. These are the three that the parties agreed were the sort of must haves in all situations. It -- a market transformation initiative needs to drive incremental savings, achieving EE equity in GHG reduction goals, it has to be cost-effective under whatever the framework is for cost-effectiveness and it needs to use a stage-gate process for developing and deployment of the initiatives and I'll show you a diagram in a second, it's a little busy but it will give you a sense of what we're talking about.

I'm not going to read all these but these are some other principles that if applicable the MTI's should -- and I want to highlight a couple which is coordination with rolling portfolio programs that was one that was significant concern in the staff report and remains one for a number of parties, and obviously to support innovation.

And, you know, from our perspective -- now putting my Public Advocates Office hat on just for a second, metrics to measure progress are key. They're because you're not using a

traditional savings measurement framework, you're making some modifications, the metrics to assess progress are really important. If you don't have good metrics up from for how you're going to figure out whether you're actually impacting the market, you're likely some years down the road to find yourself asking the question, well, what did we achieve? Did we achieve what we set out to do?

So, a handful of areas of consensus, this is the bulk of report the first one that I sort of highlighted already is the stage-gate process with some defined regulatory check-ins and here's the picture, I know you can't read the text. But the key -- and these actually line up well with what Christie described the different terminology I think Christie has a preferred terminology the working group developed its own preferred terminology I assume that the decision makers will come up with some combination and some new terms for a third terminology and that's what we'll all end up using.

But basically, you have three phases concept development phase, that's the idea phase that Christie was describing, the best ideas go in to a -- an advice letter before the commission for review and approval -- potential approval and funding. Second you have a program development phase, that's the sort of building out the potential initiative, another advice letter to the commission for the

commission to ratify, bless, and fund a full-scale market deployment of an initiative.

And then finally, you've transitioned or sunsetting either when you've achieved your goals, or you've realized that this thing not working, or needs a fundamental rebuild, and maybe needs to go back in to the earlier steps.

And often but not always codes and standards will be part of that transition, you move something in to code and you're starting to realize the savings from something that might not have been possible at the beginning.

Okay. So, institutional stuff the working group proposes the creation of a market transformation advisory board. Which would be various, you know, some stakeholders with a particular expertise and knowledge about market transformation and as necessary some independent review committees' theses are sort of more specialized experts to help advise the program administrator. Parties also agreed on a budge approval process, including a not to exceed multiyear budget, annual budget advice letters for continuing funding, and stage-gate funding approval in those advice letters, these are all the consensus recommendations.

A few more parties also agreed to adjustments to the commissions current cost-effectiveness framework for energy efficiency, these -- mostly within the EE context so around codes and standards counting, time frame for counting savings

and how to do attribution or net to gross, as well as a process for identifying, mitigating, and resolving disputes about the overlap between market transformation initiatives and the existing the resource acquisition portfolio in -- of the utility programs.

So, Christie already went over the areas of non-consensus so I won't belabor them, they're basically, who should administer the programs and what's the minimum cost-effectiveness threshold? If you'd like at some, you know, during question and answer I'd be happy to elaborate on the Public Advocates Office's position on those things but I'm trying to be, and I'd be happy to try to fairly represent other parties or they can come forward if they're in the room or on the phone about what they thought about those issues.

And then the next steps, Christie already laid it out the market transformation working group report was submitted via motion in the energy efficiency rule making, there was a request for a ruling to enter the report in to the record and then do some additional record development. There are a handful of issues that I think are probably germane that aren't addressed in the report.

So, 1) is how much funding? That's not actually in the report, it's in the staff proposal but not in the working group report so that's certainly one that the commission would want to develop a record on. There are probably a

handful of others that we or other parties will want to raise about some additional pieces, how things fit together, you know, overlap with other initiatives et cetera. And then we anticipate and, I think, that everyone does that proposed decision would follow that additional record development.

And that's all I've got, and be happy to answer questions, that was sort of what I had planned on. Thank you.

MS. BIRD: Great. Thank you very much. So, do we have any questions from commissioners? Okay. Any questions from the audience, come on up to the microphone.

MS. PAOLO: This is great. Thank you so much. I did have two questions. One of them is related to the Phase 1 gate, I guess, and selection of ideas. What is the process that is being proposed for identifying the ideas that will be put in to the advice letter and then go out for public comments? So, that's one of my questions.

And then the other question is related to the innovation panel that we had earlier assuming that market transformation and promotes innovation which I'm not that's the case and sort of how you guys are thinking about it.

But one of the things they brought up is that one of the challenges for innovation was the requirement -- well, for in cost-effectiveness requirement as well as this incremental energy efficiency savings requirement. And one

of the these and I'm sorry I don't remember who said this I'd have to look through my notes. But one of the things they suggested instead was having a different metric like greenhouse gas reductions and I noticed in this slide here, I don't remember if it said, energy incremental energy efficiency and greenhouse gas reductions or if it was either or. That was -- just two questions -- clarifying questions.

MS. TOROK: Want to take the first one?

MR. BUSH: Sure. So, I think there are a couple of different processes for trying to get the ideas in that First Phase. One that a number of parties advanced and that -- and again, these were consensus recommendations. So, one avenue is through a kind of a solicitation so putting out an open call for ideas and inviting -- particularly for turnkey market transformation initiatives, or things that have already been tried other places, or are well developed and bringing in third-parties who may have specific initiatives that they want to advance. And running it something like a solicitation so a competitive process.

And the second is more active development by the market transformation administrator. So, scanning the market, looking for areas of potential promise, technologies that maybe are available in other place but aren't in California yet that may have some promise, and then starting to take those -- the most promising ideas from that scanning

and beginning to develop a plan so.

(Unidentified speaker not on mic)

MR. BUSH: No. Actually, the proposal from the market transformation working group is that there would be both. So, for certain -- a certain kinds of things so you would do -- run a solicitation from more turnkey approaches as well as the administrator would actively be scanning and starting to develop and do some of the work to develop initiatives in-house. And there -- so -- that consensus that both avenues were necessary came out of the working group discussion.

MR. KANE: So, there was consensus for the working group but it's still open for discussion in the proceeding so as parties file comment they could do that. Just quickly you question about energy savings versus GHG savings, this is part of the energy efficiency proceeding again, so this more likely to go to the energy savings.

But there will be the building electrification market transformation work and I think it's interesting to know we'll have to think a lot about whether maybe that one goes to GHG savings.

MS. BIRD: Okay. Any more questions? Any question on the phone?

MR. KANE: Anne.

DR. NEIDERBERGER: Based on what you just said, this

is Anne Neiderberger by the way from Enervee. So, what if you did want to do market transformation across DER types? Is that not going to something that's possible? Or.

MR. BUSH: Yeah. That's a good question, it's a hard question. I mean, again, this is with the energy efficiency proceedings. So, we have not really explored that as much as maybe we should. The goal here would be energy savings; I don't know what do you guys think?

MS. TOROK: I think where market transformation approach might be better suited to encompass other demand side resources. Is that you can create a prototype of the effect and it -- in an intended outcome vision for where you're going and why it's going to save energy and it has these other benefits.

And we don't -- you can get away from, I mean, the reason that we don't do a lot of energy efficiency where we have distributed generations, you know, it's a ratepayer thing but it's also a measurement thing. It's difficult to verify. But if you have a different approach if you want to get every solar customer to have a super-efficient home and not and not -- and you have a plan to do that or you have a plan to do that or you have a plan market them with the solar and then do the energy efficiency together in some really attractive bundle. And you can make a case for that then we can think about that but it's true that these are intended to

further our SB 350 goals of doubling energy efficiency savings. So that is and this is fundamentally in support of that goal.

MR. KANE: One thing that -- all of them are? Or that.

DR. NEIDERBERGER: Yeah. So I -- I mean, we are just very practically we are trying to help customers make those integrated decisions, that's kind of how we're set up, we're set up to do that. And when a customer's thinking about an PV they're also thinking about solar and about heat pumps for their heating and cooling. That's exactly where we're trying to go.

But if we can only value one piece of it then it's just hard to implement, you know. And again, it gets back to what does the consumer need and what is the frame we're going to value?

MR. BUSH: So that sounds more like when you talked about three different electrification potential issues. So it sounds more like over the longer term that that might be a -- in scope for building decarbonization.

I think the issue here is that the statutory mandates -- is my read is that the statutory mandates are such that using energy efficiency dollars for some of the like electric vehicles are not really in the compliant with statute as I --at least as I read it. There are certainly

other funds and the leveraging is something that is difficult in this building and that, you know, that was ample discussion about silos. I think that over the long run probably building decarbonization efforts that are agnostic to wear the contribution comes from and have a different metric than energy savings which is really an efficiency metric not a solar or a EV metric that might be more fruitful.

I -- this framework might be a stepping stone there but at this time it doesn't, I mean, it's still efficiency. The metrics are still, you know, in statute and commission decisions around savings and all cost-effective energy efficiency.

MR. KANE: As we --

COMMISSIONER RANDOLPH: Yeah. I'll just kind of close out by saying that, you know, we tend to do things sort of one proceeding at a time here. And, I think that there are some opportunities that, you know, as you mentioned like if we can create a framework here and then, you know, kind of replicate in building decarb and then start to look at other proceedings where we can sort of deploy the framework and tweak it as needed. I think that's a good opportunity.

MS. BIRD: That sounds like a good place to end right now. Maybe we can -- some folks can continue the conversation after or we docket some of this feedback. Thank

you.

Michael's going to close out for us.

Thank you all for your presentations. Thank you. Thanks.

(Applause)

MR. KENNEY: So thank you all for sticking around. We wanted to leave a few minutes here at the end to do just some last closing comments and I'd like to open that first up to the commissioners if they have any last closing comments for the workshop today?

COMMISSIONER McALLISTER: Yeah. I just want to thank everybody -- all the presenters and all of you for sticking it out, you know, there's a -- the brave -- few of the brave, few of the proud, the brave. But, you know, this is a huge lift for the state and, you know, I think there's a -- if you count the people in this room an you divide -- or you what would you do, you'd take the population of California and divide by the number of people in this room, there's a big responsibility on every single one of your shoulders to get this right down the, you know, for the long run.

And so, I'm heartened at the conversation. I really want to thank the PUC again for hosting today. And we have four more all over the state and I think we're going to get a real diverse set of audiences and we're trying to, you know, mix up the agendas a little bit to talk about different

topics as appropriate in each place.

But the docket is really where we need to see everything anybody can come up with to submit in to this process. So you know, being present at a meeting is great and that creates part of the docket too. But really the -- I would encourage everyone to also write down what they're thinking and present it in the most [indiscernible] way they can so we can figure out how to put it all together in to a report that has an impact.

And the process is just getting underway. It's going to take, you know, six months or so to get it to the finish line and hopefully a lot of you can participate along the way.

So thanks a lot. Anything from my colleague? No. Back to you Michael. Thank you. Thanks to staff actually. Thanks Michael and all your -- and Heather and just all the staff for putting this together. My advisors Martha and Brian, the efficiency staff has been great all along the way. So more to come. Thanks a lot guys.

MR. KENNEY: Thank you. So if there's any final comments from the audience if you can be brief, you're welcome to come up to the microphone for a final comment otherwise, we will -- it looks like we have one. Okay.

MR. VU: Nakin Vu from California Efficiency Demand Management Council. I just wanted to thank the Commissioners

for taking off this process. I know it's an in-depth process and staff as you guys travel around. California Energy Efficiency Demand Management represents over 80 members and working throughout the demand management industry in California, we look forward to continuing the support in development of the action plan as you guys move forward. Thank you.

MS. BIRD: Thank you.

COMMISSIONER MCALLISTER: Hey, Michael. Could you remind us the next, you know, the four upcoming and places and dates?

MR. KENNEY: Sure. So after today we will be heading on Monday, April 15th up to Redding, we'll be at the Redding Electric Utility for our next workshop; following that April 25th we'll be in Fresno at the San Joaquin Valley Air Pollution Control District, and then on April 30th in Los Angeles, we'll be hosted by the L.A. County and SoCalREN but we'll be actually at the downtown Courtyard Marriott for the workshop; and then on May 1st we'll be in San Diego and the City of San Diego is hosting us at their Public Utilities Department.

So we have a lot more miles to cover on this journey. So if you're able to call in and listen we would appreciate that. If you'd like to come in person, that' even better. The topics some may be similar but the voices will be very

different. So we hope that you stay tuned in and follow the process as we continue. And I'll just close by saying our docket is open and will be open until May 15th at 5:00 pm.

So please drop in your comments these will help inform the whole action plan process with our hopes of getting a draft out for all of you to see in the summer. So thank you again for attending we hope you got a lot out of this. I know we sure did. And a big thank you to the commissioners for sticking around and providing a lot of input, and to the panelist who, as well, helped us get a lot of information. So thank you.

(Applause)

(Thereupon, the Hearing was adjourned at 4:21 p.m.

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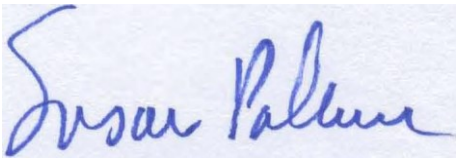

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