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JOINT AGENCY STAFF WORKSHOP

on

BUILDING DECARBONIZATION

In the matter of:	)	Docket No. 19-IEPR-06
	)	
2019 Integrated Energy Policy Report	)	RE: Building Decarbonization Joint Agency Staff Workshop
	)	

Held at the

California Public Utilities Commission

Auditorium

505 Van Ness Avenue

San Francisco, California 94102

Tuesday, July 30, 2019

10:00 A.M.

Reported by:

Susan Palmer, CET-124, CER-124

APPEARANCES

From the California Public Utilities Commission:

Rory Cox

Alison LaBonte

Nick Zanjani

Abhilasha Wadhwa

Julie Fitch, Administrative Law Judge

Hal Kane

Colin Rizzo

Shannon O'Rourke

From the California Energy Commission:

Martha Brook, Meeting Facilitator

Tiffany Mateo

Nick Janusch

Reem Rayef

Robert Ridgley

Presenters:

Nic Dunfee, TRC

Rachel Kyukendall, Sonoma Clean Power

Conrad Asper, PG&E

Christine Harada, i(x) Investments

APPEARANCES, continued

Commenters/Attendees:

Susan Bea, CPUC
Kevin Best, Real Energy LLC
Scott Blunk, Sacramento Municipal Utilities District
Merrian Borgeson, National Resources Defense Council
Carrie Brown, Resource Refocus LLC
Dan Buch, CPUC, Public Advocates Office
Alan Caldwell, SoCalGas
Sasha Cole, CPUC, Public Advocates Office
Michael Colvin, Environmental Defense Fund
Charley Cormany, Efficiency First California
Ralph DiNola, New Buildings Institute
Greg Gahagan, UMA Solar
Jennifer Ganata, Communities for Better Environment
Deanna Haines, SoCalGas
Darren Hanway, SoCalGas
Arthur Haubenstock, California Efficiency
and Demand Management Council
Brad Heavner, California Solar and Storage Association
Tom Hintz, SeaHold LLC
Eric Hofmann, Utility Workers Local 132
Martin Lith, Elane Power
Jim Lutz, Lawrence Berkeley National Laboratory
Bruce Maddox, Arden Energy Partners, Inc.
Beckie Menten, Center for Sustainable Energy
George Nesbitt, HERS rater
Ayat Osman, CPUC, Public Advocates Office
Ole Pilgaard, Heliodyne Solar Hot Water
John Sarter, Clean Coalition
Bruce Severance, Mitsubishi Electric
Ariel Strauss, Small Business Utility Advocates
Jon Switalski, Californians for Balanced Energy Solutions
Jennifer West, StopWaste and Bay REN
Kevin Wood, Southern California Edison
Jessica Yarnall Loarie, Sierra Club

I N D E X

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P R O C E E D I N G S

JULY 30, 2019 10:05 a.m.

MR. COX: Welcome to the workshop for Building Decarbonization proceeding. And before we get started we have some emergency instructions for you and we will start the video. Oh, I'm supposed to start the video.

(Safety video played.)

MR. COX: Great. So just to get things started, I guess one of the things is some of our staff will not be up here today but they have been very, very instrumental toward making things happening in this proceeding and the staff proposal and everything and whatnot. And I'm just going to go around.

Well, there's ALJ Julie Fitch, who is right there; Nick Zanjani, from the Energy Division, is a couple of rows in front of her. We have Shannon O'Rourke way in the back. She is a supervisor from the Customer-Owned Generation Section. Hal is in the room somewhere -- oh, you are right there. Colin. Dale, Jay. And Colin Rizzo is in the back there. And, let's see, Abhi, where did Abhi go? Is Abhi -- oh, she's right in front of me.

Abhi, and I forgot how to pronounce your last name.

MS. WADHWA: Don't worry about it.

(Laughter.)

MR. COX: Okay, don't worry about. This is Abhi. So she's an analyst on the Building Decarboniztion Team now.

And I'm looking around to make sure that I didn't forget anyone who might be here, and I don't think I did. But these are all the folks that I've been working with and it's just been this agency who have been a wonderful team to work with on all this building decarbonization topic, and just wanted to give them a shout-out and, you know, make sure you talk to them during the break and whatnot.

And before we get started, my name is Rory Cox. I don't know, I want to make sure that I make myself --

[AUDIENCE MEMBER]: Whew-who.

MR. COX: -- what do you think.

(Laughter.)

MR. COX: And I'm an analyst with the Energy Division.

So I just want to say that within -- the spirit of this workshop is really that we will be asking you questions as we go along. This is not the, you know, we're just going to present stuff at you and expect you to come back at us. It's going to be we're going to ask questions of you.

You had -- we mailed a ruling that went out with the staff proposal a couple weeks ago and that ruling had a lot of questions already. Now we have come up with more questions on top of those questions. So there is -- this is -- being that this is a brand new program for us in a brand new topic area for us, you know there is a lot that we are -- we want to know all the pieces of this and all the things that can go right and the

things that can go wrong and what not, and we want to do this right. So that's -- the spirit of this is, you know, we're going to ask you questions and ask you to answer.

And also this is the first time I've ever experienced this but we're doing a live simulcast at the CEC in a conference room there, webinar. And they have a webinar there. So what's going to happen is after you -- when we take comments and questions, we'll go over there to the -- to command central over there and they will ask if there are questions in the other room and we'll get them through the WebEx and we're going to see how that works.

So, with that, I'm going to bring up Martha from the CEC, and she can introduce herself.

(Applause.)

MS. BROOK: Okay. My name is Martha Brook. I am currently advising Commissioner Andrew McAllister, who oversees Energy Efficiency, Load Management, and now most recently Energy and Natural Gas Planning Work at the Energy Commission. I'm proud to be here and excited. I have loved seeing all of the California Building Decarb List Serve Members just like in person. It's amazing. Like, wow, I just thought you existed in my email, and here you are. No, it's really good energy in here and I really -- I think we're going to have a great day.

We -- so this is the first time for me even though I've been an Energy Commission employee for a long time, but

I've participated in a joint staff workshop -- staff proposal and now workshop with the PUC and on such a great topic. So it's been a great experience.

And I wanted to also introduce Tiffany Mateo.

Stand up, Tiffany.

She was probably the, I'd say, lead author on BUILD.

And, Nick, I'm sorry I'm not going to pronounce your last name -- Janusch. And I already butchered it, I'm sorry.

He's been mostly helping us on the evaluation components, but he's also playing a lead role on our building decarb work at the Energy Commission going forward.

And Reem Rayef is an intern with us for the summer from U.C. Berkeley. And she won't be in school forever, so she might be needing a job and she's awesome, so please introduce yourself to Reem at lunch. She's going to be running WebEx for us, but she's also been playing a critical role in reviewing and editing the Joint Staff Proposal.

So I'm here to facilitate. So I'm looking down at an agenda. Did you want me to go through and introduce the agenda first? And then -- or just jump into the proceeding?

MR. COX: Oh, yeah. Let me do the proceeding schedule first.

MS. BROOK: Okay. So it'd be great if I knew how to run this, which I don't. Is this like going to roll up or down or... There we go. I'm just going to not do it in live time,

so I'm going to make sure I have everything in front of me. That's it? Good. I guessed right.

So you're all here today because we actually did get a staff proposal out to you for your review earlier in July. And, as you know because you read the proceeding proposal, that we have broken this proceeding into four phases. The first one is this pilot phase where we have $50 million a year for four years to spend wisely and really focus on ways to scale building decarbonization in the state. So that's what we're going to talk about today.

We also have a Phase 2 which is Fire Rebuild, which hopefully gets launched later this year. And Phase 3 is integrating building decarbonization into codes and standards in earlier 2020 and in some ways piloted by Building Initiative for Low-Emissions Development (BUILD), which we'll talk about. And then Phase 4, early next year, really thinking within a broader framework of all of the different elements of building decarbonization that are happening in various proceedings at the Public Utility Commission and how to integrate that into a larger long-term policy framework for the whole state of California.

So super exciting. This is just like the coolest proceeding ever. It's got -- it's just got such a -- it's a very thoughtful, I think, approach to -- to new work for both of our agencies, but super important and critical and timely work

for -- to reach, you know, California's climate goals.

So we will hear a little bit about Fire Rebuild today, which will sort of get you thinking about Phase 2.

And let's see what's next queued up. Is this where I jump right in to the next part of the agenda?

MR. COX: Yes.

MS. BROOK: Okay. So just because I'm looking at an agenda, we're going to have lessons from a post fire construction program next from Nic Dunfee at TRC. That's going to be our Fire Rebuild part of our agenda today. And then after that we're going to talk about the concept of a prize, innovated prize type of a program that might become an element hopefully in our [Technology and Equipment for Clean Heating] Program. And so we're going to do those both before lunch. And then after lunch we're going to go through the main components of our Staff Proposal and get some feedback from you and ask you questions, as Rory has mentioned, and really get you queued up to provide excellent comments into our docket.

So with that, I'm going to invite Nic to come up.

* MR. DUNFEE: Hello, everyone. I'm Nic Dunfee. I'm with TRC, and we are the third-party implementer, current third-party implementer of the California Advanced Homes Program for PG&E. And that extended over to the Advanced Energy Rebuild Program when they got permission to expand that program to assist the affected homes in Northern California.

So the Advanced Energy Rebuild, it's really -- it's a collaboration. It's multiple programs that are running as different programs in the background, but the forward facing, it's one program to participants. So it's a collaboration between Sonoma Clean Power, Pacific Gas & Electric, the Bay Area Air Quality Management District. MCE is actually joined in with some funding through BAAQMD as well, so they're actually taking part in this now.

The program was recently awarded a Bay Area Metro Award. And these awards were focused on collaboration. And we're very proud to have received this award for the program.

So a little bit about the program design. So this started with an advice letter approved by the Commission that allowed the CAHP program to expand their incentives and double them for folks that were rebuilding from the fire. And that goes with the property or with the property owner. So a property owner rebuilding within PG&E territory is eligible for this or someone rebuilding on an affected property, this is also available.

We wanted to simplify the program because now we're dealing with homeowners as opposed to production builders, and I'm going to get into some of those caveats a little bit later on. But for that reason, we decided to simplify the program and we set up a two-tiered system where basically there is a set incentive that's available for split-commodity homes that are

receiving natural gas and electric service. And there's another tier of incentives that's available for homes that are going all electric.

We came up with a mechanism that's allowing us to deliver 50 percent of the reserved incentives upfront for these homeowners, which is something we don't do in a typical production build program. And we did that because we really want to help these homeowners get back on their feet, be able to start building, and to be able to keep their contractor paid and keep them onsite because there is a real lack of labor in the North Bay right now.

And, like I said, we wanted to really make sure this was one public facing program. So while we're pulling multiple funding sources to the participant, to the builders, to the homeowners, this just looks like one cohesive program upfront, but really in the background we're pulling funding from three sources, reporting things in different ways to different folks in the background.

So there are two different pathways. There is a flexible performance path and there is a menu-based path. And you can look at this like code compliance. This is your performance path and your prescriptive path. And with that, we have the advanced energy home, which as your split-commodity home. Those homes are eligible for up to 7500 in incentives. All-electric homes are eligible for up to 12,500. And either

one of those options can add on a solar option. But to be eligible for the solar option, it's not just solar, this has to be solar with battery storage in order for them to receive the 5,000 bonus. So that means a split-commodity home could receive a total of up to 12,500 and an all-electric home can receive a total of up to $17,500 in incentives for the rebuild.

So a little bit about the pathways. The flexible performance path is pretty straightforward. We want you to be 20 percent above 2016 Title 24. And for the split-commodity, we also require that all end uses be wired for electric. Even if they're putting in natural gas, we want to require that prewire in order that future homeowners have the option to easily switch fuel source and also so that future programs know these homes are going to be much more affordable to retrofit over to all-electric as opposed to homes that have not been prewired.

The only other additional requirement is an electric-vehicle charging station, which Sonoma Clean Power actually provides that equipment for free. It's already in Cal Green for the prewire for the conduit, so this should be no additional cost to any of the homeowners to meet this additional requirement.

So you're 20-percent above code, you're prewire all-electric, you install your EV charger, you're eligible for the 7,500.

Now say you don't hit your 20-percent above code, you

can also take a prescriptive path. I'm not going to go through the details of this, but we're basically looking for advanced measures. And these also include not only efficiency measures but some water efficiency measures and just some best practices that we wanted to see adopted within these homes.

So the all-electric is very similar: 20-percent above code and all-electric with an EV charging station. And you're eligible for the 12,500; or we also have a menu-based path for the all-electric as well, which requires things like induction cooking, requires heat pump water heaters, and has a little bit more stringent requirement to get to that $12,500 amount. If you wanted more information on these, on the prescriptive path, we can discuss offline, but I just don't want to take the time to go through all the requirements during the presentation.

I am going to talk about one -- about a couple requirements we have. If you go through the prescriptive method, we give -- we require a high-performance attic and we also require ducts and conditioned space.

We do make an exception for fully-sealed attics. Even though code does not consider these ducts and the fully-sealed attic to be in condition space, we accept them for the program. And we do that for the reason that with a fully-sealed attic, it's a fire-prevention measure. Many fires start not from the outside of the home but from embers being pulled into the soffits, into the openings, and coming into the attic space or

into the crawl space and they start the fire from inside the home. So we have allowed the fully-sealed attic to hit both requirements of a high-performance attic and the ducts and conditioned space simply for the fire resiliency aspect of it within the program.

Another very unique feature of this program that came at the insistence of Sonoma County is we actually are incentivizing [accessory dwelling units] on these properties. That's to help the housing issue. It's to get additional housing. We know all these homes aren't going to be rebuilt. The more that we can get rebuilt with an ADU on the property, the more housing we have in the area, and it's just going to help the housing issues in general.

And for those additional dwelling units, we give out 50 percent of the full incentive for the second dwelling unit on the property. So the first dwelling unit that's built on the property is eligible for the 7,500 or the 12,500, and the second one is eligible for 50 percent of that incentive.

We promoted some educational opportunities around the program, especially when the program first launched. The [California Association of Building Energy Consultants] came up and gave a [Certified Energy Analyst] exam. The program does require a Certified Energy Analyst to complete the documentation, just like the CAHP program. We find that there is much -- we have much less QA/QC time and it's much better

quality that the homeowners are receiving from those CEAs. So we offered an exam in Santa Rosa that was actually subsidized for local residents to take the exam and become certified by Sonoma Clean Power.

And then Sonoma Clean Power also incorporated an induction cooktop lending program that's been very successful, where they allow customers to rent out an induction cooktop for free to take home and try out. And they have gotten some very, very positive feedback from the results of the lending program.

So like every hero, AER deserves an origin story. In October 2017, both PG&E and SCP were working to develop programs. And this really started before the fires were even out. We started having these conversations about what we were going to do for these affected homeowners.

In November-December of 2017, PG&E and Sonoma Clean Power decided to combine efforts so that we weren't implementing competing programs. We wanted to make sure that we weren't competing for customers, we weren't confusing customers, so we wanted to join forces and make sure that we were, you know, going out with one comprehensive program, which honestly was a bit trying in the beginning. PG&E being resource-funded doesn't really have the ability to promote all electric and Sonoma Clean Power coming into this didn't want to incentivize homes that were not all electric. So there was a lot of back-and-forth to finally land on these pathways that we came up with. The

electric prewire I feel was a big part of making that -- making that happen.

In January-February of 2018, Sonoma Clean Power attended additional funding from BAAQMD for heat pump technology and carbon-reducing technologies that we're able to incorporate in the program. And in May of 2018 we actually launched the program and went public, which honestly for anybody that's dealt with program design and implementation, to be able to not only get a program off the ground this fast but to get a program off this fast pulling in all these different entities was quite a feat and it's pretty impressive, and getting advice letters approved from the PUC in order to do all this. So pulling all these entities together and really, really putting all our efforts into this, it was quite a task to get this up and running as quickly as we did.

So just the roles of the different entities. PG&E is supporting with resource funding through a [California Public Utilities Commission] advice letter that allowed them to double incentives that we're currently offering for the Residential New Construction Programs. And they're responsible for the majority of the program implementation costs through that -- through the mechanism of the existing California Advanced Homes Program.

Sonoma Clean Power is using internal funding that they set aside for the GHG reduction. And their role as far as implementation was more on the outreach and marketing side.

Since they're the local CCA, they have the boots on the grounds, they had the contacts with the local individuals. So we relied heavily on SCP for the marketing and outreach to get the word out about the program.

BAAQMD on the background is providing funding for GHG-reducing technologies. So that's for heat pump water heaters, heat pump space heaters, and the solar and battery storage options. They're providing additional funding through Sonoma Clean Power.

And TRC, as the third party, we're responsible for the program implementation, design, consulting, and the actual processing, the infrastructure of the program. And then we were also responsible for stakeholder education as far as educating the industry, the energy consultants, the builders, the HERS raters in the area.

And really without pulling all three of these together, all four of these entities together, the program wouldn't be as successful as it is today.

So just a little bit of difference in the rebuild programs from what a typical new construction program looks like. And the big difference, it all boils down to the fact that we are dealing with custom homes and individual homeowners and not production builders. So this is kind of the -- there is a lot of additional administrative thought that goes into these homes. So just for example with the traditional program, the

developer owns all the land. With the AER program, all these homes are already owned by individual homeowners. So that means that every home is one application, it's one plan, it's one QA/QC. And because we're doing the upfront incentives, now we process two incentives for every single home that comes through.

A typical program under the CAHP, when we do -- under the CAHP program when we deal with the production builder, you get one application for an entire development. That could be 250 homes. Those 250 homes could have just five plans to review because those five plans are being used across the whole -- whole program. So you get into a lot more of these one-offs. Every single custom home is a plan review, it's an application, it's two incentive processing. So there's a lot of administrative differences between this and a typical rebuild -- typical new construction program, but it leads to some real advantages as well because now we're dealing with a homeowner and not a production builder.

A production builder is building a home to the bottom line. They want to build a home with the highest profit margin possible. And when they're looking at programs, they want to look at do the incentives offset the cost of the -- incremental cost of the measures you're asking us to implement. We're now building with a homeowner, we actually have the ability to educate these homeowners on the lifecycle cost, the true lifecycle cost of these measures. What are the true benefits to

the homeowner and the occupants of the home, things that the production builder just does not honestly care about in the first place. They're dealing with, you know, what they can sell the home for and the bottom line.

And this gave us the opportunity to really educate these homeowners through the program. And we hope that this results in some sort of spillover when they make their next housing choices, when they build their next home, that they're actually pushing their builders to implement these measures without a program and that they're actually looking for some of these measures when they go to purchase their next home.

So now I'm going to run through some of the numbers. And these numbers are through the end of May. These align with the advice letter report that was given to the CPUC earlier this year. These numbers are -- like I said, these are through the end of May. The numbers are quite a bit higher now currently.

So we have a total of 105 total applications. That's 104 single-family homes. We have seven ADUs and 96 multi-family units. We have one multi-family building that's come through the program. Of those, 33 of those applications have been all-electric. And we're capturing about six percent of all permits being pulled in Sonoma and Mendocino currently.

So these are the enrollment statistics. We had enrolled 65 single-family projects, one multi-family. It's 161 dwelling units. Twenty-eight of those projects are all

electric, 12 of those projects are taking the PV and battery bonus. So, just to be clear, the 12 are people that are installing PV and battery. Some folks are installing just PV. So out of those 28 all electric, 27 of those have actually installed PV and battery systems, 12 -- or PV systems. Only 12 have installed the battery to go along with it to get the bonus. So the solar number is actually higher than this appears. Thirty-one of those projects are using heat pump water heating and 40 of those projects are using heat pump space heating.

So we're looking at total enrolled kWh savings, and these are efficiency savings. These are not taking into account solar. These are how the CAHP program needs to report to the PUC, these numbers are much higher when we take into account the solar. So our total enrolled is a little over 9,000 kWh. That's 60 kWh per dwelling unit.

When we look at solar, this number actually goes up to about 4300 kWh per unit on average. And the homes that are adopting solar, we're about 16,000 kWh per home on those homes.

Total enrolled therms, we're at about 62,000 therms. That's 387 therms per dwelling unit.

We're at 2.1 tons per dwelling unit of CO2, for a total of 340 tons of CO2 removed annually.

We reserve just under a million dollars in incentives.

And our average percent above Title 24 is about 24 percent above Title 24 for all enrolled homes.

The average incentives for a single-family home have averaged 9,615. And you could see the breakout of the incentive dollars per -- for each entity involved. Again I will reiterate that a lot of the costs are shared administratively, heavier towards PG&E, whereas SCP has more of the incentives dollars, so it really kind of equals out when you look at it at a higher level.

And then the multi-family average is 920 from PG&E, 2830 from SCP, for a total of 3750 per unit average on our multi-family dwellings.

So as a program implementer, this is something that we never see from production builders. This is unsolicited feedback that we have received from homeowners. This was not us reaching out. This is homeowners that when they receive their incentive check, turn around and send us an email thanking us for educating them about the efficiency in their home, for providing them the funding that they needed to have a more -- an improved home with better indoor air quality.

And, as a program implementer, it just really, really blew me away to see these coming through, because you don't see these, you never have a production builder send you a thank-you, to thank you for the incentives for their housing development.

So this is unsolicited feedback we received. Recently, the CPUC approved an advice letter that allowed the program to expand into the Paradise area for the fires that took

place in 2018. And, as part of that, we did a survey for participants and nonparticipants both in the Sonoma-Mendocino areas through Sonoma Clean Power, just to get some feedback. And we got some really -- we got a good education out of the feedback.

And the fact that these homeowners are going through a process that's not like a typical rebuild. It's not like a typical new production. They have to wait for the water to be cleared. They have to wait for the site to be cleared to be built on. And a lot of them viewed the program as an additional step that the money just wasn't worth taking the time to enroll. So something that we were working on in the expansion is we're working on educating the homeowners of how this program fits into their process and actually step by step how it works.

And we don't require any additional paperwork beyond an application from what they already need to produce for compliance. So we're working in the rebuild in the Paradise area to really work hand in hand with these folks to try to work them through the process and show them how the program aligns with the process they're already going through and that it's really not much additional work. It's really just an application and making sure that you get the right people involved at the right times.

And one other thing that we're working on in the rebuild for the Paradise area is we are currently working with

manufactured homes developers. There were about 35 manufactured home communities that were destroyed. And given the income level in the Paradise area, we are hoping to be able to extend these incentives into some manufactured homes area arena so that we can get some help out to these folks that might not be building a typical Title 24.

Yeah. Yeah, I'll take questions.

MR. COLVIN: Hey. Good morning. Michael Colvin from Environmental Defense Fund. Thanks for a great presentation. Just a couple of really quick clarification questions.

The advanced dwelling unit that you talk about with that extra 50 percent, were there metering requirements or anything else specific to that additional unit, that it may be separately metered? How did that work?

And then for the electric vehicle requirements that Sonoma Clean Power did, was there any -- a use rate requirement or anything else to incent PV charging that would sort of going to promote decarbonization and not just electric vehicle deployment? Were there any requirements there?

Thanks much.

MR. DUNFEE: Okay. So I will cover the first half of that. For the ADUs, we just require that they be permitted as an ADU, that the residence on the permit be permitted as an accessory dwelling unit is the only requirement we have there.

And I will let Rachel take the question.

MS. KUYKENDALL: Yeah. For the electric vehicle charging stations, we have a sister program called GridSavvy, which is our Demand Response Program, which is a layer onto everything. So we're actually sending remote signals to either ramp up or down those residential charging stations depending on grid being -- so not required to be TOU, but we do a lot of that with our program.

MS. RAYEM: We have a question from the WebEx: Is there a similar program for Thomas and/or Woolsey Fire rebuilding in the Southern California Edison service area?

MR. DUNFEE: So I know that there is an advice letter currently under consideration at the CPUC to allow that program to expand down there. That's still under consideration.

MR. ASPER: Can I ask...

MS. BROOK: This is Martha Brook. I have a question. So what percentage of those permits is the program targeting? So you got six percent. Does the budget and the inspiration of the program, did you -- were you targeting a certain percent of the population there?

MR. DUNFEE: So we were targeting -- we weren't really targeting a percentage. We were targeting a number of homes. And we are -- we have definitely picked up a head of steam over the last few months. Those numbers are now -- we're up over 200 dwelling units now. The last couple months we've had a lot more activity. And we're -- honestly, we're just seeing the permit

activity tick up in the region over the last three or four months. It's taken that long for folks to get their property approved to start rebuilding. We were targeting around 400 homes and depending on current advice letter approval, I think that we will come close to hitting -- we'll come close to hitting those numbers.

MR. STRAUSS: Ariel Strauss with Small Business Utility Advocates.

I notice that one of your numbers at 28 out of the 100 houses went all electric. What were some of the barriers you experienced to increasing that number and why did some of those homeowners choose to -- so many of them choose to stay with both systems?

MR. DUNFEE: Honestly, the majority of the time, and this is true in other programs I'm involved with, that decision comes down to two end uses: Induction cooking and their fireplace. And most of the time it's the induction cooking, folks don't want to give up cooking with natural gas. But honestly in the Sonoma area and Santa Rosa area, we get a lot of feedback for fireplaces a lot more. And it's more in the higher-end homes, but we definitely got a lot of pushback for folks that wanted to install natural gas strictly for fireplaces and cooking. And, like I say, that's pretty much across the board, the pushback, in most of the electrification programs in operation right now. A lot of the builder feedback is they

don't feel that they're able to sell a home that doesn't have natural gas cooking. They don't think the market's ready to purchase those.

MR. ASPER: Conrad Asper of PG&E, I want to also comment. I think, as Nick had pointed out before, these people have been through a lot as well and they kind of just want back what they had, so I think that's a lot of a motivating factor as well.

One might look at this as an opportunity for electrification. And I think we have to be very careful with the sensitivities around these fire victims that have gone through so much. So I say a word of caution there as far as trying to push electrification. However, I think offering that and making sure that they know the opportunities and options and the costs associated with both are pretty important. So we did try to provide as much education as we could for those.

MR. DUNFEE: And we developed webinars specifically for homeowners internally at TRC that I actually removed all engineers from having anything to do with the development of it so that we could actually speak to homeowners and try not to speak over their head when we talk about these measures. And we actually had some of our administrative staff put it together with interviewing us so that we were delivering a message that was palatable to a homeowner as opposed to our typical outreach we do to builders, and the industry is familiar.

MS. RAYEM: I have one from the WebEx: Do you have any idea about some program results on loaned-out electric induction units?

MS. KUYKENDALL: Yeah. So this is Rachel from Sonoma Clean Power. We've had that program now up running for about a year. And certainly if this person wants to connect with me again, we do a very detailed survey after the fact when we lend them out.

So we've lent out about a hundred. We ask some qualifying questions about what cooktop they are using currently. Most are gas. Once they cook on induction, results are really favorable. So we're trending about a score of, I think, nine out of ten of people saying they would like to make the switch to induction and about a third of folks who are rebuilding who do make that decision as a result of that program. But it's a really easy program for us to implement and really favorable responses once they figure out what induction is.

MR. HOFMANN: Good morning. Eric Hofmann, president of the Utility Workers Union of America, Local 132.

I have sort of a two-part question. The first is: Do you any of you know off the top of your head what the greenhouse gas emissions that were emitted from the Paradise, Thomas, and Woolsey Fires? So that's question one.

MR. DUNFEE: Not off the top of my head, no.

MR. HOFMANN: The reports that I got from [the California Air Resources Board] were they were significant, to say the least. And, just to point out, that all of those fires, at least from what we know, were caused by down power lines. So I want people to consider when we go to a one-stop shop for a fuel source, which we already know that we're going to be shutting down in high-wind concentration areas, that we're going to be losing our one source of energy. So when the winds come up, instead of using gas, we're going to shut the power off, we're no longer going to have the ability to heat water, we're no longer going to have the ability to use our fireplace, we're not going to have the ability to cook because we shut off the power.

So I want everyone to understand that when we do that, I get it, there's a lot of -- there's a lot of academic elites in this room, I could appreciate that, a lot of smart people. But there's also a lot of people that we're not thinking about in areas I represent, in Compton, and East L.A., South Central Los Angeles, this is just -- it's nuts. But, anyway, so my question is are we prepared to move to that situation where we're ready to roll with one source of energy?

Thank you.

(Panel confers.)

MR. COX: I do have a question. Yes, so we had -- we kind of have a unique situation with, you know, PG&E, Sonoma

Clean Power and BAAQMD. And it seems like every community in California is now in a unique situation with multiple parties providing energy and energy services, and whatnot. And you know the idea of this proceeding is how can -- hopefully we didn't just capture lightning in a bottle once and we'll never be able to do it again.

You know we want this kind of collaboration to happen again, what was offered there. And I guess what -- and we're looking for -- you know we're really looking for like what is the advice you can give to us to move this and replicate something like this in future fire zones. The idea is that we can roll this out without any -- you know, without having to do an advice letter, it's just ready to go, yeah.

MR. DUNFEE: So the first thing that I would say is the use of a third-party implementer, and this is kind of me tooting our own horn right now, but the use of a third-party implementer made getting this program up and off the ground as quickly as it did accessible. Without a third-party implementer to deal with each entity individually it’s more difficult, so it's an individual contract with each entity as opposed to them trying to deal with one another, they're able to funnel funds through the third-party entity. We actually set up through Sonoma Clean Power. Sonoma Clean Power was able to set up an escrow account with us so we have funds sitting there ready as soon as a project is approved. We have a check in the

homeowner's hands within two weeks. Without a third-party implementer, that doesn't happen. And then we just backfill PG&E for their portion of that.

So I really feel that, you know, as a third-party implementer that without our intervention in this I don't think it would run as smoothly and I definitely don't think that we would have been able to get up and off the ground nearly as quickly as we did.

MS. KUYKENDALL: Yeah. Echoing that I'd say what we've kind of discovered being so far in this process is that PG&E and SCP really complement each other really well and we have, I think, unique strengths. So I will say PG&E was phenomenal in just having this infrastructure in place. And, honestly, we couldn't have done this without them, and being able to just really easily and nimbly start cutting checks to customers, and that was important to us.

I will say they were really flexible in being able to alter the program and make it something that was unique and suitable for average customers. And that was pretty critical as well. And I think where SCP really helps is being able to be there physically on the ground meeting with customers. If I wasn't here, I'd probably have eight meetings with Advanced Energy Rebuild customers today. So it's a lot of effort just being there on the ground, and I think that's really critical when you look at these programs, not just having the big utility

but having that partner who can really speak to people who are rebuilding.

MR. ASPER: And I would agree with Rachel on that. You know when you were talking about the roles, you had said that they were kind of the marketing support and stuff like that, but I can't emphasize enough how -- I mean it's actually an individual, as Rachel said, I mean the hand-holding that goes on is pretty significant. So having that -- and what we've done up in the Paradise area for PG&E's program up there is we have partnered with our Energy Watch partner NORTECH who has a group that's -- you know, people that are on the ground there. And so we're able to -- we'll see how that rolls out over time, because we're still early in the process there. But I think, yes, definitely having that connection and marketing on the ground is important.

MS. MENTEN: Hello. This is Beckie Menten, Center for Sustainable Energy.

One of the things I think is so awesome about what you all have in the Sonoma program is the infrastructure that Sonoma's bringing to the table, Sonoma Clean Power with the Grid Savvy program as well. Given the fire shutoffs, given the comments about need for additional resiliency, I'm curious if there has been exploration or consideration of bringing additional funds to the table either from PG&E, Sonoma, or elsewhere to explore storage incentive, to explore having

behind-the-meter storage added on to the load-management program as well, and if that's a model that can be considered in making this program or this pilot a statewide thing?

MS. KUYKENDALL: Yes. So Grid Savvy, which is our demand response program, we definitely do see it as a layer onto everything. What's really sort of unique about these all-electric homes is we're starting to get data on them. And they can either be really good grid resources or they can look like little mini duck curves. So it's really important for us to start integrating with these things. And we're finding a variety of impacts in terms of load just depending on which manufacturer, say a battery storage vendor is, so we're knee deep in studying that and looking forward to expanding the program to other various DERs.

MR. ASPER: And I'm not a hundred percent sure on, you know, the relationship between our grid interaction and battery storage group and their integrating with the customer. I think if you have the customer --

MS. KUYKENDALL: We are.

MR. ASPER: Yeah. Okay, good. Yeah, so I mean she knows more about it than I do, so.

MS. BEA: Hi. Susan Bea (phonetic) from PUC. So I'm going to slightly push back on your tooting your own horn, but we appreciate you did great work so it's not really pushback. But just from the perspective of the seat we sit in, could you

give us some idea of how much it costs per dwelling unit to have a third-party implementer be, you know, a central force? Like how much money is it extra for having a third-party implementer; is there some calculation like that?

MR. DUNFEE: I have never run numbers like that to know what it would consist of for the IOU to operate internally to compare that to.

MS. BEA: No. My question is not what it would cost IOU to operate internally. My question is for this project, hiring a third-party implementer meant how much extra dollars per dwelling unit?

MR. DUNFEE: I can't tell you how much extra it would cost without knowing what it would have cost for the IOU to do it initially. You're asking for an incremental cost and I don't know what that initial cost is. And I've never done the math on the other side per dwelling unit. I've never looked at it in that method so I don't have an answer to that currently.

MR. LUTZ: Looking at a fractional, not incremental, what fraction went to TRC and what fraction went to SCP? You know, how much per -- when you tally up the total project dollars and divide by the number of units?

MR. DUNFEE: Well, I don't have those numbers in front of me to do them --

MR. LUTZ: But that's what she's asked for.

MR. DUNFEE: Yeah, yeah. Right. Thank you.

MR. NESBITT: George Nesbitt, HERS rater, as well as many other things.

Start with a question about electrification. I think for a lot of people decarbonization and electrification are a foregone conclusion, although I don't necessarily think it's the only path. I think historically a lot of people may have went electric only because they didn't have natural gas service available to them. You also have people who then also went off grid because the cost of bringing in the grid was too high, so it was cheaper to invest in solar batteries. And I would say predominantly with some form of gas backup, maybe a nice dirty diesel.

So my first question I guess is the houses -- I'm going to repeat the question that was asked earlier but I'm going to ask it differently. Why did those 28 homes choose to go all electric? Is it because they were in a more rural part of the burn area, where they don't have natural gas service, or are they where they have natural gas service, they chose to go electric? You know, that's...

MS. KUYKENDALL: Yes. So it actually is really hard for either of us to gage propane use, but we did look at this. I would say it's split between folks who were rural. We do have a big portion of our customers who are rural who were offsetting propane and going all electric. We do have a portion of those folks who were all electric before who are rebuilding all

electric. And then we have a whole slew of folks who are more urban homes who are electrifying for the first time. So we can certainly -- I know we have crunched those numbers before internally and be happy to follow up with folks on a more dedicated push on what that looks like. But I'd say it's a mix, honestly, of different drivers.

MR. NESBITT: Yeah. I mean because electric and especially with heat pump is probably going to be cheaper than propane and has been for ages.

Another question is so you required houses that are installing gas to prewire for electric. Can you expand a little bit on what you're requiring them to actually do? I mean one of the -- one of the hazards with prewiring anything is are you actually prewiring it correctly. So the Energy Code I think went to some prewiring stuff for like water heaters, but if it's only a 110 volt circuit that will not support a heat pump, so.

MR. DUNFEE: So, yeah, we have a list of requirements. We're requiring -- I don't know what the exact -- what they are exactly off the top of my head, but we are requiring wire to the box, the box to be wired, there to be a breaker in the box, everything be prewired, ready for somebody to come in, take a unit and plug it in and go.

MR. NESBITT: I mean ideally it would support the capacity and the voltage of what you might expect to go in?

MS. KUYKENDALL: I can't say it does, and if you

wanted to dig into the requirements they're on the program website. But we do require 220 to 240 upgrade appliances.

MR. NESBITT: So that brings up issues. You ever hear of this thing called the HERS rating system, California Energy Commission, Title 20? Some of us in this room helped develop it over a decade ago. So when we rate a home and if it's wired for electric, so let's say you have a dryer, a clothes dryer, but let's say it's gas. But let's say there is a large plug there for an electric dryer. As a HERS rater, the Energy Commission said we have to rate the home as if it was an electric dryer. So that gets into sort of the energy design rating. So it's a gas home, but you're having to put electric.

Honestly, for code compliance, code compliance is different between an electric home and a gas home. So it's compliant as a gas home, but it could become an electric home. And I can probably guarantee that a lot of the electrification -- - the solar industry has been pushing electrification. I've seen customers that had high bills putting in solar, and they still had a thousand dollar a month bill because the solar people told them to plug more crap in, right, electric resistance heating.

So, you know, a lot of electrification, even if it's a heat pump water heater only one night and not the whole house is probably being done completely outside of Title 24, Part 6 Energy Code compliance.

MS. BROOK: Okay. So me facilitating, I don't want you to go anywhere. You still can ask some questions. Let's try and keep to our eleven o'clock budget. So if we could get through our next three speakers, that would be awesome.

MR. BUCH: Dan Buch, Public Advocate's Office. Just a quick question.

I recall the PG&E's advice letter originally for this program was premised around a particular opportunity that we had a code change coming up, but folks were rebuilding, they weren't required to meet the 2019 code yet. And so the idea was to -- we had this opportunity to incentivize some additional savings that weren't otherwise required.

With the 2019 code change coming in very quickly, can you sort of explain a little more? Like what is the opportunity at this point? Is that opportunity still there? Are you going to try and push further? What are the incremental sort of effects of the program now that your 2019 code within a few months is going to be mandatory; could you speak to that a little more?

(Smartphone tune.)

MR. ASPER: So the program is designed to move people to the 2019 code before the 2019 code goes into effect. That is still going on. People getting permits now will be under that 2016 Title 24 Code requirements, and so there is code, you know, relevance and push as far as energy savings for those homes. We

have filed an advice letter for extension, but that's something that's in the works right now so I don't really feel right to talk about that at this point.

MR. [AUDIENCE MEMBER]: So I wasn't there, so go back. So what you just said where the advice letter doesn't get filed -- the advice letter --

MS. BROOK: Use a mic.

MR. [AUDIENCE MEMBER]: So what you just said doesn't square with the advice letter PG&E filed two weeks ago, which would extend this into 2020 and would effectively incentivize people to build at code.

MR. ASPER: Again, there is an advice letter underway. I don't know if a public forum here is the right place to talk about that. You could certainly file comments on that, and I'm confident that we will. Thank you.

MR. BLUNK: Hi. Scott Blunk with SMUD. And we also are doing quite a bit of electrification.

And, just to put it on the record, relative to gas cooking we gave away 400 portable units and did survey results after people were able to use them for a long extended period of time. Ninety-one percent agreed they preferred it over gas or at least felt it was an equivalent and they would have no problem switching.

New construction, we have 1400 homes in the queue to be built in the next two years in SMUD territory under our

program. That's building to code all electric. Not only is it saving energy it's saving carbon.

The first couple, 2- to 300 homes are constructed. Sales have kept pace with expectations of whether gas was there or not. In our existing homes we have done over 800 heat pump water heaters in the last year, converted those customers from gas. And over 400 space heaters we've heard zero customer complaints on any of those measures. And I also feel that -- or know, you know, heat pump water heaters are a resiliency measure compared to on-demand gas water heating.

We talk about if the electricity goes out, like, what, we will just power our whole home with gas. Gas requires safety features to keep things from going wrong and those safety features are controlled by electricity. So I just want to put that on the record too.

Thank you for your work. A great program. Keep it up.

MS. BROWN: Carrie Brown, Resource Refocus.

MS. BROOK: Carrie, can you speak into the mic in front of you.

MS. BROWN: Yeah.

Nic, I was wondering if you know why you had more heat pump heaters than water heaters? Was that a customer decision or some site limitation?

MR. DUNFEE: Yeah. Those are customer decisions from

all I can gather.

MS. KUYKENDALL: Yeah. I would say locally just heat pumps for space heating have hit the market already, so it tends to be something that we get a lot of projects already coming to us with that heat pump for space heating. The water heater tends to be by default a natural gas tankless unless we really engage with them to switch that out, so.

MR. DUNFEE: And those numbers flush out across the state. In general, the state's at about five-percent penetration in heat pump space heating, about one-percent heat pump water heating.

MS. BEA: Is that like a lack of product available, not enough?

MR. DUNFEE: Not if you ask the manufacturers. Yeah, I think it's just education. It's just people becoming aware of the technology. I think education is really key in all of this, educating the public so they're aware of these technologies.

MS. BROOK: Thank you, thank you, thank you.

So I'm going to keep pushing us along.

Nic, that was great.

Thank you, all. That was very, very helpful.

(Applause.)

MS. BROOK: And I know I cut two questions off. I really encourage you to come back. I do think there is going to be relevancy to BUILD, at a minimum, this afternoon, so I hope

you do ask your questions, or if we have time after the next session, which is now. And we have Christine and Alison that are going to talk to us about prize concept for innovation.

Thanks.

MS. LABONTE: Good morning. Thank you. I'm Alison LaBonte. I'm with the CPUC as a supervisor in the Residential Energy Efficiency and Portfolio Approval.

And I wanted to take some time before I introduce our speaker just to refresh folks on the context for this idea of what the space is for a prize that's being considered in the staff proposal. Just quickly, AB 3232 has a goal of 40-percent GHG reduction from buildings' direct emissions; 75 percent of that is in residential buildings, and of that 80 percent is space and water heating.

So the SB 1477, which this proceeding was opened to address in the first phase rolling out, CPUC in consultation with the CEC, BUILD, and TECH pilots are intended to demonstrate ways and approaches to achieving those significant reductions. In particular, the TECH pilot -- and "TECH" stands for Technology and Equipment for Clean Heating -- is in the existing home space. Thirty million of the staff proposal is projected to go towards that, in particular midstream -- upstream and midstream efforts as well as two million towards prize, administration, and prize purse funds.

So it's my pleasure to be able to introduce Christine

Harada. Christine is president of IX Investments, a company that invests in the critical areas of human need, for example, renewable energy, affordable housing, gender equality, technology and waste reduction in food and agriculture.

Ms. Harada has over 20 years of success in leading government and management consulting organizations. She has an extensive experience in business strategy and translating that into operational excellence. Recently she was partner with Ridge Lane, LP, and is a fellow at the Los Angeles Clean Tech incubator.

Before we're turning to the private sector, Christine served as the federal chief sustainability officer for the Obama Administration. In this role she provided oversight for all sustainability-related initiatives across the federal government.

In energy fleet and accusations, making game-changing improvements that added to our nation's clean energy future. Prior to the White House role, Christine was acting chief of staff at the U.S. General Services Administration.

Christine holds multiple postgraduate degrees, ranging from finance and international studies to aeronautics and astronautics.

At IXPRIZE, Christine was a Bold Innovator. That's actually a title for a role at the IXPRIZE. And in this role, Christine designed an x price to combat air pollution, so we're

really fortunate to have Christine here.

Thank you for traveling here today from -- to present to us, your thoughts on the use of a prize and approaching some of the ambitious goals we're after.

MS. HARADA: Fantastic. Thank you so much for having me.

Beyond what -- just to build a little bit more on what Alison was just saying about the prize concept, I think this is a fantastic opportunity for us here in the state of California to help push innovations forward. Not that California is short at all on the innovation front, but I think this is anything and everything that we can do to help address the climate risk that we're having at hand, in my opinion, is all good.

Just a quick show of hands. How many of you are familiar with the prize concept or have experiences with prizes at all?

(Hands raise.)

MS. HARADA: Okay, this is handful -- oh, a lot more. Fantastic. That's good. Okay. So there is a great -- I have a couple of slides here that I'd like to talk through for those of us who may not be as familiar. Please obviously chime in as you all have questions, et cetera.

I think we do have some time set aside for after my four or five slides, to talk through some of your ideas and thoughts and questions around prices and how we might be able to

best leverage that.

So, board. Green button. I have multiple engineering degrees, but I struggle with the pointer. This is just awful.

You're my antenna. Okay, great.

So there are a couple of things I want to make sure that I explore with you today. So what role do prizes actually play and what are some of the attributes of what might be defined in terms of a prize and what are some of examples of where we've actually used prizes in the government. And, last, how can we best leverage this for the CPUC and CEC's TECH program.

So the role of prizes, there are a couple of great examples in history that you all may be already aware of, and I have them here in the images. So in 1714 was probably the first recorded history of a prize actually being used when the British government, Parliament actually set out a prize for the person who could solve the longitudinal issue by developing the first marine chronometer. It was a huge prize purse at the time. And we successfully developed that -- or, rather, they successfully developed that in the 1714 timeframe. And that design did not change fundamentally speaking for hundreds of years.

And a second more recent example of that was the Charles Lindbergh flight from -- the transatlantic flight right from New York to Paris in 1927 for the first solo flight. And there are some really interesting things around how that changed

people's mindset around how we can approach solving these particular issues. And there's a lot of great history around how Charles Lindbergh redesigned his aircraft so that he could be able to do it. He had to plan out, you know, where he's going to go -- or how or if he's going to sleep -- he didn't. You know, how he is going to make sure that he's surviving by eating and drinking and of course making sure that he's able to make the flight itself. Tremendous advances also in guidance as well.

And so, you know, in more recent years we've seen organizations like XPRIZE kind of reinvigorate the concept of prizes with the Ansari XPRIZE in 2007 that was awarded, but that took 10 years to award for the first private space plan, which now of course has launched SpaceX, Virgin Galactic, and many other places. And you may see a number of aerospace-oriented examples in my stories. That's because I'm an aerospace engineer. I can't take me out of it.

Anyway, you know they help us -- I think what's really cool about prizes is they help us reach beyond the usual suspects. And I think many of us in this room here are probably the usual suspects when it comes to energy and policy, and walking that kind of -- all that great stuff. But I think that there is a tremendous amount of creative genius in this nation that we can harness and leverage against all these types of different issues, and so these are the kinds of things that we

are seeking or I think that this program can really help to encourage.

These slides will be made available online later today. I do have a couple of sources in super tiny font at the bottom, so if you guys like you can feel free to check them out.

So let's talk a little bit about the attributes, right. So a great grand challenge that was defined or a great example of one in the federal government is President Kennedy's let's go to the moon, the Moonshot Initiative, when he first announced it in 1962 and we landed on the moon 2500 days later. It's a fairly significant accomplishment. And so what are some of the attributes of prizes.

So they can, number one, have a major impact hopefully in addressing climate change and greenhouse gas reductions.

Number two, they are ambitious but achievable. Let's see, wait a minute. Can we really do that, and then you can start to see some of the people's wheels turning in their head. That's what a prize should do, I guess to a subscriber, if you will, on an emotional level. It should be -- which then ties into compelling and intrinsically motivating. And it needs to have a very Goldilocksy level of specificity and focus. It can't just be like 'We're going to solve climate change,' because there's so many ways you can approach that problem.

So in John F. Kennedy's case it was we're going to land a man on the moon and we're going to return him safely to

Earth. Right, so there's the three key things. With the space -- with the -- I'm sorry -- XPRIZE, it was the first private space plane, i.e., less than 10 percent of any kind of state funding to go a hundred kilometers above the ground and return people safely to Earth. That was the goal.

So the prizes can also obviously even help catalyze innovations. Right, again that launched an entire industry. It also spurred a number of regulatory changes with the FAA around commercial space transport. And of course now we've got an office that helps to address that. helps spur the formation of multidisciplinary teams. A lot of the folks who participated in that competition did not come from the traditional aerospace industry. They were not the Lockheed, Boeing, Northrop Grumman guys. They were the people who were the tinkers in the garage out in the Palm Desert trying to figure out how can I make this thing go up.

And it helps to inspire the next generation of scientists. And I don't know if you guys are familiar at all with a lot of any of their work, but if you like please check them out on their website. There's some fantastic examples across a whole slew of different areas, to include ocean exploration, oil spill cleanup. Back in the day they also did like a hundred-mile-per-gallon car. Obviously in the more recent days, the work that I did last year around developing a prize to combat air pollution and address the public health

effects of that, et cetera.

So what are some examples of prizes in government? We have -- you know in the Obama Administration that was a big effort that we undertook beginning around the 2010-2011 timeframe that we want to really push forward on challenges. Take that idea and have a much more open government, a more participatory government so that we can collect the best of everybody.

There is a concept called Joy's Law which I find super fun. And Joy's Law says no matter who are, most of the smartest people work for someone else. And so, that being the case, you're usually going to be better off if you make it easier for people outside the boundaries of your organization to, A, know what problems to try and solve; and, B, how can they get involved. And so within the federal government we have -- we still have challenge.gov. And if you go to the website today you will see a number of challenges that are still out there.

Some other examples include a $50,000 prize that was sponsored by the Federal Trade Commission in 2012 that led to a technology to block robocalls. None of us, I think, enjoy receiving robocalls. And so now the winner is now in business as a private company and they have I think -- they have blocked 236 million calls from 530,000 robocallers as of June.

NASA has used these prizes to develop a number of new technologies. For example, more flexible astronaut gloves;

space elevators; unmanned aerial vehicles that are capable of exploring other planets; and Via, the HeroX offshoot, if you will, of the HeroX Prize Foundation. They developed the system for managing space poop. It's a very important problem. If we need to go to Mars, it's great that we can store food. We've got to do something with the other side of it, so how do we help manage that.

Right, so again super fun stuff. And it invites the imagination. I'm sure you guys are all thinking about how would I manage that.

Department of Energy, where Alison used to work, they had a Sunshot Catalyst program that put up over a million dollars in prizes to incubate cutting edge solar tech companies that work for discoveries, you know, spun out of its National Laboratories. They're trying to figure out how we can commercialize. A lot of the great stuff that the nerds in the National Labs helped to develop.

So these are just but some of the examples. There are some more nonscientifically-oriented agencies, a la GSA, my old agency, where we have a number of -- we formulated more in the form of a hackathon because we are focused on improving the customer experience. We have all this data about the federal government. So given that, how can you as a citizen help us with making better sense of it, making better use of it so that we can run our programs more efficiently, more effectively, et

cetera. And those are still going on today, so that can be applied, specifically in GSA's case around how do we help manage the federal real property portfolio.

The federal government has well over 343,000 buildings on the continental United States and outside the nation as well. So that being the case, I mean can you imagine how much we spend, how much greenhouse gas emissions that we have from that extensive property portfolio. So how do we develop the appropriate data collection/data analysis kind of mechanisms to be able to better manage that.

Okay. So I thought it might be helpful to talk through a little bit about just some questions. You know, so for example when really are prizes appropriate. There is a great deal of debate, a very healthy set of discussions if you will within the Obama Administration around is it a grant competition or should it be a prize competition. And, you know, for the most part a lot of the prize competitions ended up focusing more on the technology, the innovation that was going to be developed more so than what we see normally around the grant competitions.

And some things to watch out for. You know on the agency parts, the toughest part of a prize and when you're designing it is thinking through what the specific criteria should be, what does a prize need to achieve. And you need to really shift your mindset in thinking that through, because a

lot of us tend to think of, oh, we can make this marginal change here, we can make this marginal change here, and this other incremental change here and we have a better product. That's all fine and good, and I'm not going to say that we shouldn't be doing continuous improvement for product development or services development, et cetera, but the whole point of a prize is to completely incentivize and to recruit a whole different set of brains and perspectives at solving this particular problem.

So you know as it comes to the TECH program that's going to be implemented, we need to make sure that we're thinking very thoroughly about the problem statement or the victory conditions, if you will.

Sometimes what we experience in the federal government, sometimes we did it to size the prize purse big enough given the amount of challenges that we have. And also the -- you know sometimes they just hadn't really thought about what they would do after the competition, in the post award phase.

And so what we wanted to do with both the federal government as well as my experience at foundations like the XPRIZE is we want to make sure that not only is this just a one-time, fun thing, but then how do we make sure that we're further building out and supporting an industry or a capability behind that. So a lot of the efforts that followed on from my work at XPRIZE included, you know, recruiting investors, who were the

types of people that might want to come and help us build out this company. From an agency perspective, I think also this kind of ties into a lot of their procurement rules and officials as well in thinking through how do we help bolster and support these entrepreneurs, great thinkers in helping to address some of these issues without getting too buried under the acquisition regulations.

When I was at GSA I was also the chief acquisitions officer and I had the FAR, the Federal Acquisition Regulations, in my shop, and so I had some dangerous familiarity with what are the potential conditions that might work for prizes and what are some of the other conditions that we really need to look out for with respect to making sure that we're not just stifling that innovation.

So with that, maybe I will take a pause and see if we have questions or other discussions from the audience.

MS. RAYEM: We have a question from the WebEx from Alice Sung (phonetic): What is the difference between a prize program and a grant.

MS. HARADA: So that's an excellent question. That's something that needs to be figured out. So -- in a more nuanced way, rather than just like a black-and-white answer. So the grant programs tended to be much more -- in our experience tended to be a lot more earlier stage with respect to R and D type grants. We didn't find that they worked very well with

things like EPA grants for local neighborhood community type activities. And the prizes were something that we wanted to use when we were actually going to leapfrog the commercialization of a particular technology.

Yes.

MR. LUTZ: I really don't want to do this and I'm very disappointed with Martha for letting the prize concept go into this space. Water heating heap pumps have been -- they are perfectly adequate and have been commercially available for years. Space heating heat pumps that are perfectly adequate for California have been available for decades. It's just that in this space California is a parochial backwater. There is no need for technology improvements that manufacturers can't apply and find themselves very quickly. What they need is a market, they don't need a prize. And so I hate to be the wet sponge or something, but this is completely wrong. The $2 million for the prize should be added to the $5 million on the Quick Start and TECH Program.

MS. BROOK: You want to tell us who you are, Jim?

MR. LUTZ: What?

MS. BROOK: Can you tell us who you are? Sorry.

MR. LUTZ: Oh, Jim Lutz. I've doing hot water research for decades. Part of my first introduction to this was the Super-Efficient CASE Water Heating Appliance Initiative in the 2010-12 era. We were trying to get the gas utilities to

come up with a very efficient water heater. They said, sure, fine. Give us market, we'll build it. We don't have any problem building the product, we just need the market.

SoCalGas was real into it, but between the combination of the IOU and the utilities' requirements and the PUC requirements, they just never funded the program to get it started, so --

MS. LABONTE: Thank you, Jim.

MR. LUTZ: I'm, but --

MS. LABONTE: I'd like to respond --

MR. LUTZ: Yeah.

MS. LABONTE: -- or have the chance to respond and then bring in some other questions, ideas, concerns as well. That's part of the what are the concerns here.

So, Christine, I can respond?

MS. HARADA: Sure. Absolutely, please.

MS. LABONTE: So I wanted to say that a lot of the examples we have provided are in one part of the spectrum of the problems that a prize approach could be applied to. And that one part that we heard a lot of examples about was about the technology innovation. It doesn't necessarily have to be a prize -- that the problem that is determined to be the most appropriate for a prize to fit or be applied to is technology advancement. It could be that we're talking how do you deploy, scale that technology and enter it into the market space.

So I just wanted to help folks with the picture of there is a full spectrum of possible problems to which a prize can be applied.

MS. HARADA: And -- absolutely -- and I think also, you know, one of the things that I would encourage -- it's great feedback, by the way -- the tough -- in my experience usually people want to do the right thing, right, when it comes to greenhouse gas reductions or like implementing much more efficient heater systems, et cetera. The biggest issues comes down to how do we finance for it. And enhancing the financing mechanisms really helps your market. And so as a former engineer that has long been a frustration of mine when I was younger, around like: I don't understand, it's a far superior technology, why would anybody use anything different. But the bottom line is where distributors don't know about it, the installers aren't familiar with the technologies. The bankers, the financiers are really not into the technology because it's not the same round cookie that they have been selling for the past ten years. I sold chocolate chip, oatmeal raisin, and, you know, chocolate macadamia nut cookies. This is all I've done. You're telling me that this is a brownie. How am I supposed to sell a brownie. Right.

So a lot of this is also going to require not just, you know, other developments, whether it be in the requirements of technologies, et cetera, but thinking through our networks of

people who are willing and open to be able to try that out.

MS. LABONTE: So also if folks -- part of the intent with this time is for you to share what your concerns or what questions you have as far as the use of a prize in the building decarb space.

MS. MENTEN: Great. A good segue, and thank you. Beckie Menten, Center for Sustainable Energy.

I entered this room with the same skepticism, what we need is not further innovation, we need to remove barriers and throw money at the problem. But I've been sort of intrigued by some of the suggestions you have, but you're right, like off in the room talking over this stuff for the last five years, there might be something we're missing.

I'm a recovering bureaucrat. Government is not always great at administrating an innovation type program. I would be interested to hear from you what sort of guiding principles or perspective you might recommend agencies consider if we were to embark on some sort of innovative prize context. Like how are we going to get out of our own way and create the opportunity to have the true outside-of-this-room solutions to enter into the market.

MS. HARADA: So I have a very strong-formed hypothesis bordering on a belief that a lot of us can indeed come together to solve problems, a diversity of perspectives ends up resulting in a far better set of solutions.

And I think that, you know, my personal opinion, my comments, for what it's worth, would be it would be helpful if the agency could help foster networking events, right. Everybody and anybody who is interested in solving this problem, let's get it down -- let's boil it down in the plain English level and we invite not just the technologist, not just the policy people, we invite the financiers, and we invite college kids or whatever the case might be, because a lot of this comes down to who do I know that might think slightly differently from me so that they can apply their perspective to solving the problem. And then like, oh, my goodness, gracious, now we have actually something for real. Then thinking about how we take that up to the market, et cetera.

And so we see a lot of this in my space right now as well as in impacting investing or, you know, ESG, a great hot buzzword right now. A lot of the financiers in the United States seem to still struggle with the idea largely because they're trying to figure out 'How do I incorporate ESG into my investment allocation, decisions, and how do I think about it.' It's largely because they just don't know who to go talk to. How do I think about the environment as I'm making these investments in -- whether it be like a mutual fund, or whatever. There are some easy things, right? Like, you know, let's not invest in oil, let's not invest in guns. Okay, that's great. So that's easy. That's step one. I would call that the null

hypothesis. What can we do more beyond that.

And so one of the things that I think would be super value added from this prize perspective is we have a great, huge state, and to the extent that we can help cultivate and pull together people from different backgrounds. People who grew up in the Central Valley have a very different perspective on energy, energy savings, and where the energy sources are compared to those of us who grew up in L.A. It's also very different from San Francisco. And so to the extent that we can help garner more of those diverse perspectives together, in my personal opinion, I think the better the prize competition will be.

You're at least laying the groundwork for getting people to think in that slightly different kind of way to be able to help push forward.

MR. HAUBENSTOCK: Arthur Haubenstock. You mentioned commercialization, and I'm just wondering what in your mind has to be behind the prize to take a great idea through the valley of death and actually into full market deployment?

MS. HARADA: So I think that's a great question. And it really does kind of depend on the team as well as the emphasis of the prize. So, for example, in my prior experience it's been a lot of technologists. Engineers necessarily aren't the best marketers, we aren't the best financiers. And so help recognizing that there is that need to be able to help

complement the space to be able to help through the commercialization.

It would be also great if we could work together with some of the early financiers, whether it be Angel Investors or other VC type funds to say, hey, let's take a bet on these kinds of companies to help further with this commercialization. And that's an area where either the state can help through a publicity campaign or whatever the case might be, investor day, insert other appropriate example here, I think that would be a great way to help accelerate it.

MR. MADDOX: Good morning. Bruce Maddox with Arden Energy. Thank you for this presentation.

I'm always intrigued by the idea of bringing in thinkers who are not the usual suspects. As I imagine how this might work, I kind of immediately zero in on possibly an alternate filtering criterion, so I'm imagining that the prize would come at the end of the process after the innovators that have developed their solution demonstrated it. I'm also assuming that there are some also-rans who invest a lot of time and effort into this that don't win a prize. So that to me suggests that a prize kind of filters for entities who kind of have the wherewithal, the discretionary resources to kind of make a bet that they might win.

Is there anything about a prize design that might expand the talent pool to people who are not necessarily in that

camp?

MS. HARADA: Yes, absolutely. And actually most prize teams, teams that participate in prizes, they're very scrappy. They're not well resourced and they are just super passionate about the idea. And that certainly helps carry them through all the development stages, all the milestone pains, et cetera.

And, interestingly enough, it's been my experience, I don't know if there's data on this, but it's certainly been my experience that it is precisely because of those scrappy, under-resourced teams that they're able to think really creatively about the problem and the role that the prize generator -- or, you know, the organization can really help in playing is by attracting the investors or tracking other forms of capital to be able to help support them launch post prize effort.

MS. LABONTE: Before the next question I just wanted to insert I wanted to hear what you see as the common -- or what has been the frequent downside or pitfalls that agencies have run into. And since the Obama Administration launched the challenges.gov website there has been 870 prizes run by a hundred different agencies. Clearly from those we must see, you know, common -- where these prize ideas fail or weren't successful.

MS. HARADA: Yeah. The biggest contributor to that is not defining the criteria well enough and thinking through what are the fundamental requirements that we really need this thing

to accomplish. And, having done work in procurement, it's very similar for those who have actually worked in government procurement, it's this very similar thing as well. Like we think we want -- I want an iPhone, I need 600 iPhones for my people. And some procurements things, you know, are for securing common goods and things like that. That's reasonably easy to do.

But there's a lot of situations where if you are indeed trying to push forward an agenda around combatting climate change, reducing greenhouse gas emissions, that are really getting down to the first principle requirement. This thing -- you know maybe it's not just 600 iPhones, I need a way to be able to communicate with my workforce in an emergency situation, when the towers are down, and we can go out and coordinate a response. Well, then maybe your iPhone really isn't the best thing, right. So then what are some other communication methods, whether it be the tools or the contracts that we need to obtain with telecons or satellite providers -- I'm making this up -- you know, might be.

I think that, you know, we will see tremendous benefits as well. So, for example, you know you only end up paying for the results. If nobody accomplishes the prize, then nobody wins the money, which is also kind of a bummer because you really want people to win the prize money.

You can also help to leverage that investment. That

can exceed the value of the prize purse, again to help with commercializing the technology and obviously also like changing people's views about what is and isn't possible. I mean, seriously, 20 years ago who would have ever thought that a private space plane would have been possible.

MS. LABONTE: Thanks.

The next question, please.

MR. SEVERANCE: Bruce Severance, Mitsubishi Electric.

I wanted to say I was intrigued by the idea of using a prize to broaden perspectives and solving some of the problems that we're faced with. And I can see some relevance to the TECH program.

Six weeks ago Mitsubishi Electric Corporation in Japan issued a release of an environmental vision initiative that included competition as one of the things that would broaden discussions and bring in other innovators into that conversation. I think this is very consistent with top staff, and Japan is thinking along those lines.

To me one of the key issues with heat pump integration is the grid harmonization piece. If we are going to do time-of--use metering and really get utility rates aligned with carbon content on the grid, a lot of the older homes that we may want to electrify are leaky, don't necessarily have good shell performance, and so preheating those homes becomes an issue. And ways to load shift with HVAC seems to be limited in the time

span that it can cover. So in my mind one of the key pieces of resolving this is important because if we don't have time-of-use metering that aligns with space heating -- water heating is much easier to do where this is concerned, obviously it's kind of a no-brainer, but time-of-use metering relative to space heating is critical to get the return on investments to work out so that it can compete in this fuel-switching scenario. So there is some conflict between those things and there's a need for innovation.

And the first thing I thought of was, well, that's something. Grid harmonization is kind of the elephant in the room. I don't see a lot of people talking about that in the space heating arena. There's been a lot of brainstorming in our office about that and to me it seems like there is a lot of opportunity for innovation and maybe competition in that category, so I just wanted to make that comment.

MS. LABONTE: Thank you.

MR. SEVERANCE: You know I guess the question to go with that would be, you know, do you see -- what are some of the categories or what is your idea of what the criteria of a prize that applies to the TECH program specifically would be? You know, how would that be formulated? What kinds of problems would you want to address?

MS. LABONTE: Yeah. I just -- this is Alison -- I want to say that we are in the mode right now of hearing in what

the ideas -- I think Christine is right, that the first and fundamental problem to -- key to prize design is, one, picking the right problem. You have to have a problem that's going to have enough market space that draws the number of participants and the diversity of thought. So you've got to make it a clear that there is a market space associated with this problem when you put a prize out there to solve it.

And then, you know, it needs to be a problem that can be broken down into a fairly simple construct so that it's not a huge burden to new entrants to come to the table and help solve through that problem. If you have an extremely complex problem that can't be broken down, simply you're going to -- you're going to have that low participant space. And for the effort to put the prize out there, you may not have the benefit to cost as compared if you had done a traditional grant or procurement route. When you have an extremely complex problem and maybe only a couple solvers that would come to the table.

So I'm -- you know, those are some of the parameters that I think Christine and I have mentioned as far as a problem space that's appropriate for a prize and in this particular space where we're interested in commenters coming in to state where they see a good problem fit to prizes.

MR. SEVERANCE: Broadening the criteria may make it easier for people to do what you're saying. And I think like one -- one aspect of the solution to the problem I just created

would be something like offshore wind as opposed to utility site storage, you know, where it's going to be a source of power that's going to complement the grid with the renewable source that really greens the grid and eliminates the diurnal and seasonal variations in the carbon content that we see. So to me like looking at ways to solve those diurnal and seasonal variations in carbon content also solves this problem. And it really should be a broad perspective in how we can integrate these technologies and have minimal impact on grid management at the same time.

MS. LABONTE: Thank you.

MR. SEVERANCE: Yeah.

MS. LABONTE: The next question or comment.

MS. HAINES: Yeah. I was supposed to ask a question and I -- for the previous one, but I do have a question for you. I do think it's important that there is diversity of thought in this proceeding. I think that -- you know, by the way, my name is Deanna Haines. I'm with SoCalGas.

I think that it -- you know, this TECH prize concept may actually add some diversity of thought that isn't here. We're very much on an electrification is the single-bullet solution for everything. And we obviously need to have options, especially in the fire areas where resiliency is so important and battery storage is only going to get you a few hours and you're going to need days upon days of some type of isolated

power supply. It would be great if we could do a prize around that.

I also think that it's important that, you know, this integrated-system thinking comes into play. We are thinking too silent. I'm an engineer, so I get what you're saying. I think we're thinking too silent and there could be some solutions that we had never even thought about, if we could get diversity of thought into this process. So I really like the concept behind what you're proposing.

On the previous presenter, and I apologize that you're up here and I'm asking a question, but we ran out of time, I'd like to know what the income levels were of the homes that were electrified. You know, what kind of income levels those folks were at. And I think that's important to understand, you know, who's taking advantage of the incentives. And if you have --

MS. BROOK: I don't have the answer, so we can -- we can get the -- we can try to find those folks at lunch, but the most important thing I think is that you asked the question and we can ask PG&E and Sonoma to put the answers in the docket. That would be --

MS. HAINES: That'd be great. And then, and I'm sure you probably don't know the answer to this, though, if you had the dual-fuel homes, not have to jump through the hoops of adding electrical conduit and wiring, and instead do some other energy efficiency -- higher energy-efficiency appliances,

obviously higher energy-efficiency anything, because we know that energy efficiency is our number one defense and number one reduction tool that we have, would we get more -- you know, people taking advantage of the incentives and maybe make up for getting higher greenhouse gas reduction by just having more people take advantage of the incentives for higher efficiency. That's another one.

MS. LABONTE: And last two questions from the folks in the room and then, depending on time, we may get on the webinar.

MR. COLVIN: Hi. Michael Colvin again from the Environmental Defense Fund. First of all, fantastic presentation and it's really thought provoking, so thank you so much.

I think my comment back to Alison and Martha, and I'd love to hear your thoughts as well, Christine, is what is the goal of issuing a prize here that we couldn't have already accomplished, say, through an EPIC grant or through some of the other traditional research that we have, especially in the confines of the TECH program where we already have a lot of the technology sort of figured out and we've already done a lot of the demonstrations?

Now I agree with you in your presentation that, you know, a prize could bring new interesting things together, and -- but I'm not exactly sure what it is that we're trying to solve that couldn't be already done, you know, that -- you know,

what's the breakthrough that's already there when we already have a lot of the technology sort of ready to be deployed. And so that's sort of the first major thing that I would get sort of as feedback.

The second is what are we trying to get done on the time scale that we're thinking about? And as we're -- the assumption that we're going into with all of this, I guess is the question, is we're trying to figure out how do we decarbonize our homes and decarbonize our buildings as quickly as we can. It seems like the most cost-effective way to do that from the Energy Commission's research is to electrify. There are a lot of assets in the ground that would be abandoned if that were to happen at a mass, mass scale. And so if we're thinking about within the confines of this program of, well, if electrification is the best way to do this, we need to think about that sort of extra cost of all those gas assets that are in the ground. And if we're thinking about the scope of a prize and trying to think that part of the ultimate goal is to be carbonized, maybe part of the conversation of the prize should be going, well, are there other ways other than electrification that could get us to the same place.

I'm not advocating that necessarily, but I am sort of wanting to say, look, if the prize is an idea that you guys really want to go after, I'm not sure it's the most appropriate, but if it is something, then I think the ultimate criterion

should be how do we decarbonize our buildings at the least societal cost especially thinking about the already-made investments that are in the ground. And so if you can think about, well, are there breakthroughs in either you have cleaner gas fuel substitutes in hydrogen, you know, technology deployments, or in other ways of thinking about those assets that might be another factor you will want to consider.

So thank you so much for your time.

MS. HARADA: Let me just offer up a quick comment or just a response to that, if I may. Not that I have any specific ideas, but just a different way of thinking or a way to think about it.

We're all very deeply ensconced in this topic in this room. And I'm reminded of times when I try to tell my mom, my mom is not the most technically sophisticated person. I don't know about your guys' mothers, but mine is not. So as I think about how would I describe what do we want to do in this to my mother, it would be: Hey, mom, I'm going to take our 1950's era home and like make it -- make our total energy bill $10 a month and we have all the light and all the heat that we need.

Right, at a fundamental level that is what we're trying to solve for at, oh, by the way, zero emissions -- or maybe negative emissions, right, if we can like figure out a way to suck the carbon dioxide out of the air and process it into something more useful for us. So now it just opens up all sorts

of different things. It could be heating and venting. It could be electrification. It could be like harvesting with gas. It could be other chemicals. It could be, you know, inspiring other green roof type things. I'm totally making this up, but now you've got maybe teenagers thinking crazy thoughts, like, oh, that's kind of George Jetson. How about this, wouldn't it be neat if we could figure out a robot that might be able to do that. I'm making this up, but that's kind how I would think about crafting the requirements of the prize, is explaining it to somebody, like the to my mother test.

MS. LABONTE: Another thing to maybe look at is some of the Sunshot examples. So regarding the timing, they had a race to seven-day solar. And I mean that was designed around we've got to get scale, we've got to think differently as far as rolling this out in significant deployment levels.

The counterpoint as far as ideas for achieving these aggressive decarbonization goals, stepping back and outside of the domain of the BUILD and TECH, that's -- you can even look at Sunshot, one of the earlier catalyst ideas that -- examples that Christine mentioned, that was basically an ideation prize. What are the entities out there, entrepreneurs that want to propose a business -- or a business around solving that bigger-picture problem, and then bring ideas in that way.

I think that it's really important to think about what you may not be considering when you design a prize, if you don't

have the appropriate expertise onboard you may not actually get a solution that's relevant to the overall market. So if you don't design that criteria correctly, you could bring in a solution that kind of flops when you're asking customers and markets to pick up that idea. So that's a caution or a pitfall to watch out for.

But say you're successful as far as how is this different than a CEC EPIC grant, if -- you mention we have to get a lot rolled out in significant scale, the difference I think with a prize is an opportunity to amplify. There's other corollary benefits to a prize such as building public awareness, building a momentum around the problem and the desire and the value proposition of should the problem be possible and achievable to solve. Now you've got a cadre from your, you know, upstream suppliers all the way down to the adopters, the homeowners in the market that are sort of following along with the excitement of a competition that they may -- they may end up realizing through some of these corollary benefits, some differences or added value beyond what you would see in an EPIC grant.

Last question.

MS. OSMAN: My name is Ayat Osman, with the Public Advocates Office.

I guess my question is what is the question that we're trying to solve with prize or grant? Is it we're trying to

create the market for these technologies that -- for space and water heating? Or is that we want to electrify the home? And then we're talking about the cost-effectiveness in retrofit, which doesn't make sense from the cost perspective.

As some of my colleagues said, these technologies have a market -- sorry. They are not emerging technologies, they are proven technologies. So we don't need per se to demonstrate or show that these technologies create the savings in greenhouse gases and emissions and energy usage. But we need to prove that these technologies provide the comfort level that the technologies that customers used to have. And in that sense, to me, this program deals more with customer acceptance and the lack of course of workforce for installing and maintaining the systems; and also getting to the correct type of heat pumps where we want ones with low-fluorinated carbon -- gases, and those are not available in the U.S. right now. You can find them in Japan and maybe some European countries.

So there are lots of hurdles or barriers to get us to where we would like to be in terms of reducing greenhouse gases, but the question is how to use the limited funds that we have in a cost-effective way. Thanks.

MS. LABONTE: Yeah. So I will say this staff proposal has a TECH program budget of 30 million to implement should the staff proposal carry forward. It basically suggests an implementer responds to an RFP with their construct of what is

the other 28 million to do, what would a prize do at two million.

The important point is that prizes aren't appropriate for every problem, so an implementer can look at all the different barrier spaces. And someone that's, you know, forward thinking may bring in what is their focus group, what are the key barriers here, what's going to have the biggest impact when solving each of those barriers, then make that fit or optimization to some of the key aspects that are appropriate for a prize. You need to have a strong market opportunity or clear market failure associated with it. You would bring its simple -- you could break it into a simple enough problem that you could bring new innovators in to solve that problem. So we're not actually -- we're intentionally -- or the staff -- I guided or suggested don't say what the problem is right now that's most appropriate fit because it requires a significant amount of focused thinking around what are the barriers out there, and then deciding which one is the best fit for a prize, and the 28 million does the other area.

MS. HARADA: Yeah. Just to build on that point a little bit more, the thinking through the prize concept and how we're going to be different is it takes a lot of work. It is not just a, hey, we're going to do this and magically it will come to us. It does require a significant amount of research of what is and isn't doable, what is an ambitious but achievable

kind of thing, and so thinking that through does take a fair amount of effort and intellect and of course obviously engagement as well.

But if I can go back to one of my -- that, my favorite example, the NASA space poop prize concept, I'm sure space poop has never been mentioned at this proceeding and will never be again, but the United States, we have been going to space since the 1960s, right? So we've been doing this now for well over 50 years. We kind have a solution for that. It works, it's probably evolved a little bit over time, but what the challenge did was it help inspire a couple of things.

Number one, it helped inspire an entire new generation of citizens around the NASA missions, right. So NASA had been struggling for years and we still kind of are, do we go back to the moon, do we go to Mars; what's the purpose for existing, is it climate change, science, earth sciences, blah-blah-blah, and it helps with citizen engagement around NASA's core mission.

Citizen engagement eventually translates into budget for NASA, right? Because your constituents, for those of you who worked on the Hill, the constituents are like, what are we doing with this, how come we're not going to Mars, we've got this really cool challenge and we just did this. So that turns into popular support for those kinds of programs. And in an agency where many will and have argued we don't need to be doing that, we've got all these other problems we're going to be

solving for like justice reform, immigration reform, whatever the case might be, why do we need to be sending a man to Mars, of all places. We've already sent Rovers, why do we need to send a human being, right? So it helps to not only excite the population, it also helps provide additional funding and a rationale and a reason for them to continue to push forward on that mission.

It's not that NASA has any shortage of potential missions that they could take on. You've seen Juno go into Jupiter. Cassini keeps on going into outer space. You know we want to talk about geo sciences and looking at climate change effects and things of that nature. And so what are the things that we can really excite the populace with in a way that might be slightly less politically, you know, controversial/doable to help advance their agency.

MS. BROOK: Thank you so much.

We're going to return from lunch at 12:55 and we're looking forward to seeing you. Thanks.

(Applause. Luncheon recess taken from 11:56 a.m. to 1:01 p.m.)

MS. BROOK: Rory has some announcements, then we'll get going.

MR. COX: Hey, folks, so I just have one quick announcement which is that the presentations from today will be put up on our website and the URL is: PUC.gov/buildingdecarb.

So did everyone hear that? Athena.

So, again, all the presentations from today will be on the website: CPUC.ca.gov/buildingcarb. They're not all there yet but they will be by the end of the day tomorrow, so -- so that's where you can find them.

MS. BROOK: Hey, Rory.

All right. Thank you for coming back after lunch. So basically we're going to spend the next few hours going through the Joint Staff Proposal on 1477. And we have broken this into sections on the Pilot Guidelines and then the TECH program and the BUILD program. And we're going to allow for questions and comments and discussion at each of those stages, so. And I'm going to try and help keep us on schedule.

So I'm going to talk about the Pilot Guideline parameters of both BUILD and TECH as presented in the Staff Proposal.

As you know, we have 50 million a year for four years, or 200 million total in our 1477 program. And the money is coming from the cap-and-trade revenues from gas corporations in the state as collected and overseen by the California Air Resources Board.

The administrators of the program must comply with the cap-and-trade regulation in terms of annual reporting to the Air Resources Board on the use of the funds and expected GHG emissions reductions.

So this is the Joint Staff Proposal Annual Program Budget where 40 percent would go to BUILD for new residential construction and 60 percent would go to TECH for clean heating technologies in existing residential buildings. So 20 million a year for BUILD and 30 million a year for TECH.

And then there is an obligation in 1477 that 30 percent of BUILD gets allocated to low-income residences. And so we do have six million recommended as a dedicated funding for low-income program costs in BUILD. And we're proposing ten-percent administrative costs for BUILD.

For TECH we have 30 million a year recommended; 23 million for program costs. That would include program administration. A suggestion for five million for cook start grants and the two million prize program we heard about the potential for this morning. And then both programs will be evaluated together under a two-million-a-year evaluation effort.

Clean heating technologies is a focus of SB 1477. Electric space and water heat pumps, solar hot water with electric backup, heat pump dryers, and induction cooktops. We probably could consider other things, but we would need to know about them and understand how they fit into the scope of clean heating technologies.

The guiding principles that we are recommending for the 1477 program: Equity in terms of not just the dedicated 30 percent for BUILD but for both programs, really trying to find

equitable solutions for all aspects of the residential market. You really want to pilot a path to carbon neutrality. We now have a governor executive order on the books that really gives California the ambitious goal of reaching carbon neutrality in the state economy wide. So everything that we can do to pilot how we would do this in residential buildings in this program would, we think, be consistent with that.

Really looking and encouraging regulatory simplicity and streamlining processes wherever possible. We want to be transparent about our objectives and the strategies that we use to meet those objectives. We really believe in our gut that it's going to take, you know, a really significant market transformation effort to -- just as we heard this morning -- to get consumers that live in homes and multi-family dwellings to see the benefits of electric equipment where they may have traditionally used natural gas and other solutions that are low carbon, have low-carbon outcomes. And that's not just consumers. It's all the way -- every aspect of the market and value chain and supply chain in terms of getting equipment and technology solutions into the state and into buildings and used by people.

So this is -- we are considering this a pilot program, so lessons learned will be a key deliverable and a key way to make sure that we're making the right recommendations after the program period to scale residential building decarbonization.

And you know the data reporting is critical to that in terms of tracking and reporting the progress from these programs.

And then you know a serious look at cost-effectiveness in terms of can the program scale in terms of not just the costs of the program but the costs to the consumers adopting these technologies. So that's a key principle in our program proposal.

So the requirements of the legislation are that we -- we track the costs per metric ton of avoided greenhouse gas emissions and that we estimate and track the annual and lifetime utility bill savings from the participants. We want to keep track of the number of low-emission systems installed. That's a direct requirement of the BUILD program. And then understand and track the changes in market share for the eligible technologies in the TECH program.

Our cap-and-trade funding requirements are that the total avoided emissions -- wait a second. Oh, so just we're going to track the total avoided emissions from each year's expenses and track the total expenditures and itemize the administrative and outreach expenses.

So we have -- we're trying to improve energy and housing affordability, which, you know, is I think always a broader goal that we have on our efficiency programs but in this case it's really important that -- to get market transformation to happen and to get the scale of a building decarb program to

happen that we see improvements in affordability in terms of fuel substitution in the state going from -- you know, there's positive outcomes for consumers that are participating in the program.

We're -- we have requirements in our program design, our proposed program design that no incentive payments are made if the estimated bill savings will increase. And so that's a real constraint that we're going to have to track and discuss with you and others as we go forward.

And then we're, you know, proposing to track the full lifetime cost to end-users, the first cost of the equipment and installation and ongoing maintenance that are costs as well as the ongoing bill savings over time.

And then other, in terms of the benefits of market transformation, the other benefits that would come with building decarbonization efforts that aren't directly related to emission reduction.

So the target market is, as described in 1477, it's both new construction and retrofit of residential buildings. The markets that we are -- must address, you know, are broader than just the built environment but also all of the contracting and the appliance and equipment manufacturing and distribution that's required to deliver and install and successfully operate the equipment that we'll be incenting.

So the TECH target audiences are definitely including

upstream and midstream market actors. And we have a discussion on supply chain thinking and methodology as critical to a successful TECH program.

So we are targeting for the BUILD program, and you will hear about more of this in a bit, that we focus on all-electric construction and for retrofits installing heat pump heating and air conditioning where the cooling load is high.

So you might think even though it's described as clean heating technologies, there are also emission and efficiency benefits of high-performance heat pump technologies that are replacing traditional air conditioners. So we do expect to count and track those benefits that come from cooling in the state.

And we definitely are not limiting the fuel substitution to -- from natural gas to electricity but in areas of the state where other fuel is used, like propane or oil for space and water heating, we certainly see the emission-reduction potential and probably cost-effective potential of replacing that with high efficiency electric equipment.

And then of course more traditional fuel substitution. Gas furnaces getting replaced with -- and water heaters getting replaced with high-efficiency electric technologies is an obvious focus.

We would love to see proposals in the TECH program that really focus on the benefits of low-income retrofits and

not just the direct GHG benefits but all the co-benefits that would come with focusing on low-income retrofits that are low carbon. And we want your help figuring out if it's possible to incent the TECH program in ways that cover any incremental installations costs from that fuel substitution. And we want your best ideas about how to do that.

We're targeting evaluation budget of four percent of the total program costs. That turns out to be two million a year. Part of our streamlining of the processes, we would like to pick one evaluator for both the BUILD and the TECH program. Expected to be a competitive solicitation. The PUC will also, as recommended by stakeholders, form a project coordination group that helps -- helps us track and discuss ongoing issues with the programs. The evaluation is based on the metrics for program impact and process. So I think basically we're saying an impact evaluation and a process evaluation. Got it. And then stakeholder review workshops are also planned as part of the evaluation effort.

Coordination and scalability. So we want to leverage, combine, and interact with other energy programs. And as -- especially when we start talking about the specific BUILD and TECH programs, it's going to be obvious that we need co-funding and leveraging of other -- of other funding mechanisms to the greatest extent possible. So it's not just for simplicity and streamlining of program delivery. It's really to get the right

amount of money applied. So this is an example of the Sonoma and PG&E partnership with Bay Area Air Quality Management District, and that co-funding, that has enabled very substantial incentives for the fire rebuild program. We would really love to see that same type of partnership, to really make BUILD and TECH successful.

I think that -- hopefully in the Staff Proposal it was clear that we really are hoping that BUILD and TECH inform our long-term building decarbonization policy framework. We think the most powerful part of the proceeding is going to be that larger building decarbonization policy framework, and so anything that we can do in both planning the design of the programs and in evaluating the programs that will inform that bigger policy framework, I think will be to the state's advantage, and we hope you help us do that.

I think part of that is demonstrating that the program designs as launched and implemented can scale. And as you will see very quickly, if you haven't already from the proposal, we have almost zero -- we do not have enough money to do this, right. So we really have to be thoughtful about designing a building decarbonization set of programs that are really designed to scale more than they're designed to achieve great things on their own because we don't have a lot of money. I mean 50 million a year to do what we want to do is really limiting. And so not just the combining and the co-funding but

on purpose thinking about this as pilot that we'll need to scale with significantly more money in the future is critical to what we want your help doing.

And then hopefully we get some really good efforts that target the expanse of market transformation that we'll need to be successful.

So process wise, we want you to submit comments on the proposal and anything you hear today by August 13th. And you know the name of the proceeding. It's here. You will get these slides later.

And do they have to do both dockets or is it eenie meenie minney mo? Or is it always yours and sometimes ours? I don't know.

MR. COX: I think it's always yours.

MS. BROOK: That's what I thought, so go do it at the PUC. And if you want to wave hello to us at the Energy Commission docket, you can do that too.

Okay, that sounds good to me.

All right. Do we have any questions on that? Let's start with Reem -- come on up, Bruce -- but Reem's going to take one from the --

MS. RAYEM: From the WebEx: In looking at the cost per metric ton of CO2, are you going to be looking at one year or a lifetime? And if a lifetime, what scale? And are you assuming the state's goals for renewables on the grid?

MR. COX: Okay. So we're proposing a lifetime of savings and that's probably not an actual lifetime but it's probably like a 30-year assumed life. And maybe it will be 15 years, depending on if it's a TECH technology that's going to get replaced or we might also assume that it will be replaced with the same type and then we would extend it to 30. And BUILD will use 30 -- that's what we do in the builder standards.

We'll probably do the same thing we do in the building standards in terms of taking a net present value of those 30 years. So this year's savings will be valued a little bit more than the last year of that 30-year time serious, but we'll look at 30 years. I think when you do the math it turns out that that's where -- that's why I'm not trying to complain because I'm super excited by this program, but that's why I'm worried that we don't have a lot of money, because we won't be paying a lot in terms of the price of carbon for the 30 years of emissions reductions we will achieve under this program, unless we have almost zero participation.

So we are counting all of them -- we are definitely counting the changes to the grid, so just like we do in the building standards we look at how the electricity emissions changes over time and we'll probably also do a net present value of calculation for those emissions, so it will look like one year's of emissions but it will be based on how we expect the grid to change over the next 30 years.

I don't think that's on. The first one after lunch, I guess I turned it off.

MR. MADDOX: Here's the button. Thank you. Bruce Maddox with Arden Energy. Two quick questions, I think.

The first one is whether the intended beneficiaries of this program are limited to IOU customers or whether it's intended for kind of all California households.

And the second question, you're looking at the metrics particularly around things like utility bill impacts. It implies to me that there is some tracking of actual installations in the customer's home, which kind of implies a downstream program. Would those metrics only apply to like the downstream portion of a program or is the idea that any upstream interventions would have some kind of chain of custody tracking so that everything gets tracked down to the installed house?

MS. BROOK: I think that's -- the second, let's do the second one first. You'll have to remind me what the first one is -- no, I'm kidding.

You should tell us about the burdens or opportunities that your question -- in your comments, right. So -- so I don't know how we would do that chain of custody. It seems super complicated to me. But if -- but you know the intent. The intent is to understand that every activity that we have is going to actually benefit the consumer in the bill, so it might just be that we say, you know, we're pretty confident that if

you have a 4x efficiency on the upstream side of that piece of equipment you're going to get bill savings at the end, or we might also -- you guys will propose us because of TECH will be a third-party proposal that you figure it out, this component you can actually track, the other ones you might have to make assumptions about.

MR. MADDOX: Okay.

MS. BROOK: Now the first one I did actually forget, so you have to...

MR. MADDOX: So the first one is whether the intended beneficiaries are all California or --

MS. BROOK: Oh, yeah, yeah. So statewide.

MR. MADDOX: Statewide?

MS. BROOK: And we think that we're allowed to do that because of the way the cap-and-trade dollars work where it's about emission reductions, it's not about a locational emission reduction.

MR. MADDOX: Great. Thank you.

MR. SEVERANCE: So Bruce Mass (phonetic) and I started a brainstorm several months back about nine months ago and, you know, the question I have is if we told you that we think we have a model that would pay for itself, require no state funds, and fully electrify certain segments of the market and specifically targeted low-income family first, you'd probably really like that, right?

MS. BROOK: Um-hum.

MR. SEVERANCE: So we think we have that.

MS. BROOK: Okay.

MR. SEVERANCE: And it's an inclusive finance model. There's been pilots in the east that Holmes Hummel designed and they're achieving 40- to 90-percent acceptance rates in the rental and LMI markets in very low-income areas. And the whole model is based on the notion of qualifying a property as having a high return on investment relative to the cost of improvements and using a residential ESCO like model where that residential ESCO would assume the risk of making those improvements and pay itself back based on the energy savings. So there's no money down, there's no loan qualification, the renter doesn't have to pay anything. The landlord says yes because his property is being improved for free based on the energy savings return. The renter is guaranteed an immediate 10- to 20-percent reduction in their utility bill. And the balance of the energy savings are used to either pay back the on bill tariff -- on bill or through a separate entity, but it would have to be tied to a utility service in some way.

So if we were to use that model, and the whole conversation started with how do we get from 10,000 houses a year with energy upgrade and go big, because we really have to do 500,000 homes a year to do ten million in the next 20, and it's going to take a few years to scale up and get the boots on

the ground all of that.

MS. BROOK: Um-hum, um-hum.

MR. SEVERANCE: So the bottom line is this model could actually achieve that for the first ten years. We could actually get up to 500,000 homes a year and have all of the TECH funds that are on the table used for wrap-around services to do -- make those homes energy ready, --

MS. BROOK: Okay. Um-hum.

MR. SEVERANCE: -- run circuits, and things like that. Anything that has a return on investment can be handled through the inclusive finance model.

MS. BROOK: Okay. Are you asking me a question or are you pitching your proposal?

MR. SEVERANCE: Well, I'm -- I'm pitching a proposal. I'm using the microphone to grandstand a little bit, --

MS. BROOK: Okay, okay.

MR. SEVERANCE: -- so forgive me for that.

MS. BROOK: Okay.

MR. SEVERANCE: But do you see dovetails between that model and this program? Do you see this program as the TECH program as lending itself to being a demonstration ground for --

MS. BROOK: Yeah.

MR. SEVERANCE: -- inclusive finance --

MS. BROOK: Absolutely.

MR. SEVERANCE: And -- and the funds flexible enough

to pay for, you know, circuit upgrades, for example, --

MS. BROOK: Yes.

MR. SEVERANCE: -- to make the homes energy ready? If the specific unit can't be fully electrified through the model, it could at least be made energy ready. Because this model requires ROI on whatever the ESCO invests, otherwise their risk factor goes up. So if that flexibility could be built into it, I think this is a way to --

MS. BROOK: Okay.

MR. SEVERANCE: -- leverage the dollars that you have that you're saying, you know, --

MS. BROOK: Yeah.

MR. SEVERANCE: -- you literally have enough to do 2500 houses if you were to fully subsidize those.

MS. BROOK: Um-hum, um-hum.

MR. SEVERANCE: So if we can do, you know, 500,000 houses --

MS. BROOK: Right, right. Yeah.

MR. SEVERANCE: -- and leverage the dollars, I -- you know, and there's flexibility in the program to accommodate that, --

MS. BROOK: Okay.

MR. SEVERANCE: -- it would be exciting.

MS. BROOK: So I would encourage you to look at our proposal and provide comments into the docket where you think

that that flexibility needs to be clarified. Okay.

MR. SEVERANCE: Thank you.

MS. BROOK: Okay. Thanks.

MR. SWITALSKI: Hello. Good afternoon. Jon Switalski, Californians for Balanced Energy Solutions.

In previous workshops and venues we've been somewhat critical of the process and nature in terms of equity, access, and considerable issues of affordability, and so I just want to focus my questions on that specific topic as it relates to this program --

MS. BROOK: Okay.

MR. SWITALSKI: -- and your presentation.

You mentioned that one of the guiding principles is equity. And equity can mean very different things to different people.

MS. BROOK: Right.

MR. SWITALSKI: So I'm just as a baseline curious as to how you are defining equity as one of the base principles.

MS. BROOK: Yeah. Hopefully we made it a little bit clearer in the paper, but just my quick response is that we mostly mean that the disadvantaged and the people that don't have the wherewithal to invest decarbonization have the ability to do that and maybe are given more access to program funds than those of us that have the ability to pay for it ourselves. Does that make sense?

MR. SWITALSKI: It makes sense to me. I mean the State actually outlines specifically disadvantaged communities.

MS. BROOK: Yeah, yeah.

MR. SWITALSKI: And so I think focusing on those communities is critical. And you mentioned later in that, in your presentation that the incentivizing of low-income families. What we know that there -- today is that there are no barriers to electrification. If you have the resources and the wherewithal, you can retrofit your home or demand that your new home is fully electric. So are you willing to commit that this program will not incentivize renters or homeowners or families that can already pay for that? I mean will 100 percent of the 50 million --

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

MR. SWITALSKI: -- dollars go into communities that --

MS. BROOK: I don't -- I don't think it's a hundred percent and I think that -- we'd love your feedback on this, right, but my gut says that you could -- I wouldn't hate that solution, but it could be that there are other benefits more broadly accrued, scalable benefits by targeting a bigger part of the market. You know, like if you're going to have some upstream component where you're getting the products into California that we want in residential buildings, it's hard to say no but that can only go into a low-income apartment or house.

So really -- it's really unclear to me, I'm not going to be the third-party administrator proposing the design for TECH, but there -- I could see proposals that totally focus a hundred percent on low income and I could see other proposals that spin it a different way and say that they're -- we're going to make sure there's equitable solutions for those of you that participate and need that help, but we're not limiting our program to low income, for example. So I don't know which way it will go, but I don't think that -- right now in our principles we are not specifically mandating one of those proposals or the other.

MR. SWITALSKI: Okay. Thank you for the clarification. I would encourage that. I mean we have millions and millions of people in California, especially those who live in deserts --

MS. BROOK: Yeah.

MR. SWITALSKI: -- and very warm areas that are energy poor.

MS. BROOK: Yeah, um-hum.

MR. SWITALSKI: They pay more than ten percent of their --

MS. BROOK: Right.

MR. SWITALSKI: -- net income on utility bills. And you speak of scalability and I think we'll get to that down the line, but that poses a significant set of larger issues as it

relates to affordability --

MS. BROOK: Right, right, right.

MR. SWITALSKI: -- in equity workforce displacement.

MS. BROOK: Yeah.

MR. SWITALSKI: How are we holding families and individuals harmless and so are we creating more socio-economic issues when we're trying to bring every citizen, every person into the effort of reducing greenhouse --

MS. BROOK: Okay.

MR. SWITALSKI: -- gas emissions, and so we'll have that scalability debate as this continues.

MS. BROOK: Yeah, that's a good point.

MR. SWITALSKI: I'd just encourage that --

MS. BROOK: Okay.

MR. SWITALSKI: -- we place equity and the issues of affordability at the forefront when we're making these --

MS. BROOK: Okay.

MR. SWITALSKI: -- impactful decisions, --

MS. BROOK: All right. Thanks.

MR. SWITALSKI: -- so thank you.

MS. OSMAN: Hi. I am Ayat Osman from the Public Advocate's Office. I have a few questions.

The first one is how will you address the time lag between the Senate Bill requirement which requires to start it to be July 2019 and ending with the fiscal year ending June '23?

So we are already past July 2019 and I'm assuming there's some extra time to get the programs in place and implemented.

MS. BROOK: Yeah.

MS. OSMAN: So how we're going --

MS. BROOK: So I'm -- so nobody has told us that we can't stop -- we have to stop spending money by that -- the 2023 deadline. It's basically we look at it as four years of money. And we'd love to get started absolutely as soon as possible. But we also want to be very thoughtful. And, one, the money wasn't available to do anything, include fund the process enhancements that the PUC needed to launch the program. So we have the funding now. And we don't think that we have, you know, a deadline in terms of when we spend the money. It's just that the money will not be allocated into the program. You know, it is only four years of money. Does that make sense?

And maybe there might be a deadline, but it might be created once we enter into contracts with a future administrator. That might be where the deadline comes in in terms of how long they have to spend the money.

MS. OSMAN: Can you speak about the incentives designed in the Staff Proposal for the BUILD program?

MS. BROOK: Can we wait until we are talking about BUILD?

MS. OSMAN: We're going to talk about --

MS. BROOK: Right now we're just talking about the

principles of the program.

MS. OSMAN: Okay. Okay. So we can ask --

MS. BROOK: Yeah, come back --

MS. OSMAN: -- that question later.

MS. BROOK: Thank you.

MR. PILGAARD: Ole Pilgaard from Heliodyne Solar Hot Water.

In the proposal there is -- you mentioned an upstream, midstream incentive structure.

MS. BROOK: Um-hum.

MR. PILGAARD: I assume that's opposed to having -- spending money on administrating rebates for, you know, the homeowners and so on. Can you elaborate a little more about what you mean by upstream and midstream?

MS. BROOK: Oh, yeah. No, what we -- what you just described we would consider downstream. So in this vernacular of program influence, midstream would be like the equipment distribution level and upstream would be the equipment manufacturer level.

So, in other words, before you can get the equipment installed in a home, somebody has to design it, sell it in California. You know, a contractor has to find it and be able to purchase it from a distributor. So it would likely be very strategic incentives at those levels to get the right products into the right places in California so that a contractor can buy

it and install it in a home. So those -- that's what we need by upstream and midstream, is the whole supply chain of the technologies that we want installed.

MR. PILGAARD: So it would be kind of --

MS. BROOK: So --

MR. PILGAARD: -- an incentive per system manufactured?

MS. BROOK: Um-hum. So you're a manufacturer?

MR. PILGAARD: Yeah.

MS. BROOK: So somebody could propose that you get x amount of money to provide x number of products, you know, in five different key distributions locations in the state. That could be a proposal for an upstream incentive.

MR. PILGAARD: Okay.

MS. BROOK: I hope I got that all right.

MS. RAYEM: A question from the WebEx real quick: Is it possible for some of the evaluation metric to change or for new ones to be added, or are those fixed by the CPUC?

MS. BROOK: So that's a good question. I think there's a limited number of those that were fixed by the legislation. Those are the only mandatory things that won't change, and I think we had those on one slide, but anything additional to that that is in the Staff Proposal as we think this is what should be evaluated, we could change that in the final proposal. And also, you know, if we find that we missed

something and it's still the contract for the evaluation hasn't been let yet, we could obviously add it then and we could also hopefully get the right set of requirements into our fee before we pick the evaluator. So I hope that clarifies the question.

MR. HOFMANN: Eric Hofmann, Utility Workers.

Can you -- in speaking to -- we were talking about the principles, --

MS. BROOK: Um-hum.

MR. HOFMANN: -- could you please describe to me what the principles would be and offer a suggestion of what I might take back to the 5,000 members that I represent that are sick with worry over the longevity of their job. A good-paying, union job that provides them a home, that they can provide for their families, there's a pension, a sold retirement, medical.

MS. BROOK: Um-hum.

MR. HOFMANN: And what do you suggest I go back to my members and tell them in terms of building decarbonization, moving to a process where we stop putting in natural gas, which ultimately eliminates the utility's ability to generate new revenue, which then eliminates -- by definition, eliminates us, what do you suggest I go back and tell them?

And if the suggestion is to transition into green energy jobs, I'm reluctant to take that advice based on the fact that two weeks ago Monday we had an incident where a solar panel contractor, licensed, didn't call 811, ruptured a gas line, and

my friend was killed in the line of duty. So I'm reluctant to jump into an industry where they don't respect California Government Code 4216(a), if that is the solution. So, please, if you could provide me with anything to take back to my members I'd appreciate it.

MS. BROOK: Okay. I probably can't do that right now, but I guess that just for 1477, just what we're talking about today, we don't see that we are eliminating the gas infrastructure in the state of California and so we don't -- we might be trying to limit the expansion of it, but there are certainly existing gas infrastructure that will be here for a long, long time. I really do think it's the broader building decarbonization policy framework that's going to address the larger issues of what is the future of the natural gas system in California, how do we use renewable gas, how do we use the infrastructure that your members and your friends work on diligently and provide great livings that they earn and expect and provide for their families, those are all huge issues that the State of California has to really come to terms with and find solutions for, and I'm not in a position to be able to do that right now.

MR. BLUNK: Hi. Scott Blunk from SMUD.

In your presentation you talked about combining this program with other energy programs. I want to ask people to think more broadly because -- and include combine it with other

like health programs, especially for low income; safety; school attendance programs. There's a lot of other co-benefits to electrifying. When we know that 12 percent of childhood asthma cases are brought on by cooking with gas, so that alone is going to reduce -- or improve health, reduce school absentee in such a program. So we can think beyond energy, beyond what we're used to more broadly. So thanks.

MS. BROOK: Yeah. Thank you.

MS. MENTEN: Hi. Beckie Menten, Center for Sustainable Energy.

So in the aspect of how these programs can inform the larger framework, I think thinking about how we conduct evaluation does become really important. California has often had an energy really reactive evaluation framework which informs future programs, but something that's a little more rapid cycle and allows for more adaptive management might be helpful in terms of making sure these funds can be used as efficiently as possible.

MS. BROOK: Okay.

MS. MENTEN: So considering instead of having the evaluation hiring be something that happens after the fact, potentially running those concurrently allowing metric development and identification to be informed by evaluation consultants in figuring out pathways for recycling lessons learned on a more real-time basis I think would be useful here.

MS. BROOK: Um-hum. That's great. So there could actually even be requirements of both the evaluation contract and the implementer contract that there is collaboration and data sharing, okay. Awesome. Thanks.

MR. STRAUSS: Good afternoon. My name is Ariel Strauss on behalf of SBUA. Thank you.

I actually have a follow-up question about evaluation. I see that the evaluation figure is not part of $50 million; does that money come from somewhere else?

MS. BROOK: So did we do the math wrong or...

MR. STRAUSS: Perhaps. I mean I see 20 million for BUILD and 30 million for TECH and then --

MS. BROOK: So Rory says we did the math wrong, so --

MR. STRAUSS: Okay, okay.

MS. BROOK: -- we'll figure it out.

MR. STRAUSS: So have to rejigger it.

MS. BROOK: So we only have 50 million a year. That's about it.

MR. STRAUSS: That's what I thought. Thank you.

MS. BROOK: And the evaluation is part of that.

MR. COX: That was -- I'll address that real quickly. It was actually one of your staff.

(Laughter.)

MR. COX: It was one of your staff who pointed it out to me yesterday, --

MS. BROOK: Oh, oh.

MR. COX: -- that, yes, yes, we counted the 50 million wrong. And so -- so we have to adjust for that. And, yeah, 50 million is all we got. That includes evaluation. And so I guess that's a good question, and it's in one of my questions, is $2 million the right amount because for the more -- you know, the more we spend on evaluation the less we'll have for program dollars.

You know four percent is -- we use the Energy Efficiency Standard number, but it doesn't have to be four percent for this. It could be -- it could be lower if we find that appropriate. So that's a good -- you know, for folks who are interested in weighing in on that, we'd love to hear your comments on -- but, yes, we acknowledge we made the math error.

MR. STRAUSS: Okay. So at this point there is no proposal for how to -- how it will be realigned to still pay for that?

MR. COX: No, but again we're open to suggestions.

MR. STRAUSS: Thank you.

MR. COX: And we're also open to a lower -- to a higher budget if someone thinks it needs to be higher. We're open to -- we're open to suggestions on the evaluation protocol.

And we do have something in the proposal that says if the implementer will provide real-time data so we can have real-time course corrections and we can know what's going on. So

there is that element built into the Staff Proposal on the -- of the implementer contract --

MR. STRAUSS: Thank you.

MR. COX: -- in addition to the longer-term evaluation.

MS. BROOK: Yeah. So I think that just burns up the other -- I just want -- a general comment is that we also presented the budget there, right, in the split between BUILD and TECH, so we would love to hear comments about if you think it should all go to TECH except for the -- we have some obligation to do BUILD, right. So it doesn't have to be 40-60, it could be something else, so we'd love to hear your comments on that.

MR. HANWAY: Good afternoon. Darren Hanway with SoCalGas. I manage all of our Energy Efficiency Programs, which are the largest in the nation, so we save more natural gas than any other utility.

When I was looking at SB 1477 and kind of comparing that with the proposal, it seems to me that SB 1477 is an emissions-reduction bill and the proposals seem to have a narrow interpretation solely focused on electric technologies or electrification technologies. And I think that's a tremendous missed opportunity. There is a plethora of high-efficient gas technologies that would qualify as reducing emissions over our current code, whether it's ultra high-efficient furnaces with

low NOX or it's a gas heat pump water heater, fuel cell technologies, and many, many more. And it seems to me that we're kind of missing the bigger picture if we're narrowing the program to only focus on a very subset of the market. So I would encourage you to reconsider that as part of your Staff Proposal.

The other thing I noted, and if I did the math right from the wildfire rebuild program this morning is that it was roughly $3,000 per ton of CO2. Our current Energy Efficiency programs at least at SoCalGas were less than $200. So there is a tremendous disparity in terms of cost-effectiveness, and glad to see that was one of your guiding principles, but I would encourage you to look at that further because if we're spending $3,000 for CO2 a ton when we could be spending less than $200, it seems to me that the money is not going to go where it is needed the most.

MS. BROOK: Okay. Thank you.

MR. HANWAY: Thank you.

MS. BROOK: So the only thing -- that was a great comment. The only thing that I remember when we were discussing the justification -- or what we would recommend in the Staff Proposal and what we wouldn't in terms of efficiency from both the gas-efficiency side and the electric-efficiency side is that since we have such a small amount of money in the 1477 program, I would propose that your gas-efficiency program should be run

at your gas-efficiency programs and equivalent things for electric efficiency, there's already, you know, a billion dollars a year split between the IOUs for efficiency programs, and so we wanted to try to focus the building decarb work on things that wouldn't happen in either of those places that we could focus the funding on.

MS. WOOD: Hi. Kevin Wood with Southern California Edison.

There have been a number of comments this morning around cost efficiency for customers, bill neutrality, positive bill paybacks. And I just wanted to make sure that everybody and you noted in your staff proposal reads the study that was done, commissioned by SMUD, LADWP, and ourselves around customer cost-effectiveness. And there's pretty clear evidence, particularly in retrofits, that customer bills go down. It's a great story. We retrofit space and water heating, and in pretty much all of the cases customer bills go down.

It plays well with the financing piece. All this stuff works really well together. Even on the new build side there is a lot of positive costs, customer cost benefits. If we increase the efficiency of those appliances that get installed for new construction, we can prove that even more.

And you guys did point out very well that if we do this regionally and focus on areas of high-cooling need, so much the better.

MS. BROOK: Right. Thank you.

MR. CORMANY: Hello. My name is Charley Cormany. I'm with Efficiency First California and we're also a third-party program implementer for the SMUD program.

And I wanted to put a caution in here about having utility bills not go up and I'll give you two scenarios. I have experience as a contractor doing retrofits. If you take a baseline of a person who's not heating their home because they can't afford to and you retrofit and put in a new technology, they start to use it and they're comfortable, their utility bill goes up. So that's another -- that's a scenario.

MS. BROOK: Um-hum.

MR. CORMANY: There's also another situation with heat pumps. If you go into a heat only situation, like all of San Francisco, and you retrofit with heat pumps, now they have air conditioning by default where they've never had it before. So there is potential for those utility bills to go up.

MS. BROOK: Um-hum.

MR. CORMANY: So one of the red flags that jumped out to me is that utilities -- your incentive won't be paid if the utility bills go up, I think there needs to be some considerations for that to the structure --

MS. BROOK: Yeah. So maybe we should clarify that, that for the same services, right?

MR. CORMANY: Yeah, or some form of a baseline,

because if you're --

MS. BROOK: If you're adding services, right.

MR. CORMANY: -- if you do a heat pump by default, you have air conditioning where you probably didn't before.

MS. BROOK: Right, right. Exactly. So that -- I would consider that a higher level of service, right? So --

MR. CORMANY: But there should be some definitions of where -- because I would --

MS. BROOK: Yes.

MR. CORMANY: -- hate for people to lose out on incentives in that situation --

MS. BROOK: No, absolutely. That's a very good point, yeah. Thanks.

Okay, so as facilitator I'm going to move us along. And I don't have my agenda, but aren't you doing TECH next? Okay, great.

MR. COX: And I brought the whole Staff Proposal in case I need to refer to it, you know, if somebody has another thing about 'what's in the Staff Proposal' comes up.

Anyway, so I wanted to start my presentation with just a little anecdote before I get into the meat of the proposal. It's about my sister's house. Now my sister has a house that's about a hundred years old or so in Portland, Oregon. And a few years ago she got a heat pump water heater installed through a partnership of -- with [Northwest Energy Efficiency Alliance],

Portland General Electric -- or is it Portland Gas -- PGE, and Rotor-Rooter. And she paid about $700 for this heat pump water heater and she loves it. It gives them all the hot water they need and it has the extra bonus of it's ducted and it goes into a vent in the floor in the kitchen and it provides air conditioning while it's heating water. That's the function of this heat pump. And she says it's great and the electricity bill is lower and she just, you know, is very happy with the program and very happy with the product itself. And it's been there for years and she's -- she's good with that.

So, you know, this has all been done before, and I think that little -- that sort of story is a good example of what we mean when we talk about market transformation, how to do this with existing customers. It's make it -- they cost about the same, make it easy, bring in, you know, contractors like plumbers. She said this plumber that did it was very knowledgeable and knew everything about the heat pump, knew how to wire it and everything. Obviously, you know, Rotor-Rooter did some training. So that's sort of an example of how this can work in the real world.

And, having said that, I'll go through what the sort of high level of what is in the Staff Proposal for the TECH program, which is Technology and Equipment for Clean Heating -- Clean Heating, yeah.

So here the problem, just in case you haven't seen

these sorts of things before, it was mentioned in a previous presentation, but we actually have about 85 percent of direct building emissions coming from heating and from water heating and space heating. And that's why the bill -- you know that was why it was intentional in the bill that it just be about space and water heating. That's what SB 1477 says. It doesn't say anything about -- for the TECH program, it does not say anything about cooking or hot tubs or dryers.

And 70 percent of the direct emissions in the -- are coming from the existing residential sector. This is what the problem we have to solve right now is. So it's not as big of an issue in the commercial sector. This is where we need to transform the market, is existing residences. And if we don't do this, there is no way we're going to hit that 40 percent by the 2030 goal. So just to sort of outline what the -- what the big challenge for TECH is.

Hello. Is it that one? Is it the green one, if you point it that way maybe -- ah. Okay. So just some legislative background. This is what the -- this is the language that's straight from the bill, meaning that the program is intended to advance the state's market for low-emission space and water heating equipment for new and existing residential buildings, and directs the CPUC to identify and target equipment technologies that are in the early stage of market development and would assist the State in achieving the State's GHG emission

goals.

And it should accomplish this through upstream market development, consumer education, contractor and vendor training, and the provision of upstream and midstream incentives to install low-emission space and water heating equipment. So that's just to sort of level set with all the -- with what the legislation says, in case you've either read it a long time ago and forgot or you never read it.

And this is getting into the Staff Proposal. So the CPUC proposes that we will work with Southern California Edison, who will hold the contract for the implementer for the TECH program and run a solicitation for the third-party implementer program. We have a governing structure which kind of puts us at the -- the CPUC at the center of it.

Before I was doing this I was -- I had been managing a marketing program called Energy Upgrade California, and this is roughly based on what we've done with Energy Upgrade California, as I think it's worked pretty well. And so we will be the managers of the work, but of course we'll have lots of, you know, ways for input and the sort of -- the collective expertise of the folks who are in this room or otherwise pretty knowledgeable about how to do this.

And in terms of what we're looking for from an implementer, these are some of the things that we're looking at to address the market barriers. Lack -- these are market

barriers that exist now: Lack of coordination with other programs. You know one of the things that we had to do, one of the reasons we had to sort of patch together -- I mean it worked out great, but one of the reasons we had to do the PG&E, Sonoma Clean Power, Bay Area Air Quality Management District. You know we had to sort of patch together a lot of things. And that's sort of an example of coordination with other programs, but it doesn't always work out so well. And we want to be coordinating with other programs. We want to be coordinating with energy-efficiency programs and customer-owned generation. And, you know, everything should be stackable -- is a term I've heard.

Untrained workforce. If you go to try to put -- I think this is slowly changing, but if you called up a plumber right now and asked them to put in a heat pump water heater, they'd probably, you know, think like why do you want one of those, you know, is the question I hear anecdotally that a lot of contractors, unless they're very specialized, but a lot of the market does not -- a lot of the contracting market does not -- not trained how to do this. It's not much of -- it's not very common in California.

Lack of coordination at local permitting offices. We've heard -- we've heard some permitting offices tell the residents that things are not even legal. And so there needs to be some coordination there.

Lack of consumer demand. Partly because of all the

other reasons, the first few reasons: The consumers just aren't asking for these things yet. Again I think that's changing. I've seen them in Home Depot now, so that's progress. But then there's lack of awareness among -- among contractors. And there are many more market barriers, so these are the things that we need to get through.

Let's -- oops, what did I do? Oh. That's the pointer. I'm sorry.

So we are looking -- when we will go out to an RFP we will -- we are to do a competitive bid. And we'll -- we'll be looking for an implementer which should be able to implement a holistic market transformation effort which includes all of the below. The customers and the builders and the contractors have been policy makers. If there is awareness, that awareness was raised on this issue, that customers receive a good value, that builders and contractors receive good value over the incumbent technologies. And that supply chains and delivery agents are able to meet a rising demand with quality products.

The supply chain is really important in this. And when I say the supply chain, everything from the manufacturers to the end-users. It is sort of -- it is a chain and if there is any link in the chain that is weak or not great, then that chain isn't such a good chain.

So the chain includes the manufacturers, promoting heat pump products and increasing the market share of heat point

products.

The representatives who are the ones that promote the products and they act as an ally, a midstream ally.

The distributors. These are the companies that offer sales and market support, elevate inventories and lines of credit. Contractor, who are the trusted advisors and trade allies. And then at the end we've got the end users who need to find the value in the indoor comfort, health and safety, and bill savings.

So the strategic initiatives that we have sort of outlined in the TECH program are upstream, so really working for -- while in incentives in partnerships with supply-side market actors. The manufacturers, the midstream, the workforce development, the education and supply chain side management. So we sort of see two very inter-connected initiatives there.

The third initiative is a grants program. That was brought up by one of the speakers earlier and I believe it was 5- or $6 million. And the idea of this is to really kind of put out a competitive grant program that will -- that will just say, you know, we want innovative ideas -- and these are going to be pretty localized. And we want innovative ideas in your -- in your town, your county, your whatever, jurisdiction for how to get these into people's homes quickly.

While we kind of figured out the larger program dimensions. So the ideas to sort of have, you know, sort of

like innovation grants to do this. You know, kind of like the [Electric Program Investment Charge] program.

And the last piece is the prize program, which we were heard a lot about this morning.

And so this is the budget and somehow this one actually adds up to $30 million, but again this is roughly the way it breaks down. So $22 million for the main stream program, $5 million for the Quickstart programs, and $2 million for the prize. I mean it was roughly a million for evaluation.

So some of the questions. Those are my slides and I've teed up a few questions, but I'm going to put these out there and if people want to try to come up and try to answer them, they are welcome to, or they can make comments of other things or other aspects of the -- of the TECH proposal.

Should a prize be used to augment the TECH program. If a prize approach is used, what should be the attributes of the prize. How should any level of incentive or award be set? Should it be the state agencies or should it be the Program Implementer? And to what extent should the agencies try to leap frog to the advanced technologies, like grid connected water heaters, various taking aa -- I'm just going to leave those questions up there and invite folks like Ralph to come down and...

MR. DINOLA: Hi. Thanks, Rory. Ralph DiNola with New Buildings Institute.

So we've been working with the Building Decarbonization Coalition on the heat pump water heater campaign. And we've done a lot of analysis based upon some workshops that happened last September. So we recognize that there are 12 and a half million water heaters in California, 90 percent are using gas.

And it seems to me through all the work that we've done with this group so far what is really needed, if there's going to be a prize is maybe a competition around a marketing campaign, a public awareness campaign. We need to do something to raise public awareness. And because people generally don't really care where hot water comes from, but we can tie this to so many of the issues they recognize are in their homes. You know, public health issues, indoor health, asthma, and other -- other research that has been uncovered and then of course the connection to environment and climate, et cetera.

So we would encourage that if there is a prize that at least a portion of that funding goes towards a competition for a statewide campaign that maybe actually could be rolled out into a national campaign. And I think if California leads, everyone looks to California, this is a great opportunity with some funding to actually launch this kind of a national campaign.

And then we have a framework, we have a programmatic framework that recommends incentive level and what the program structure could look like, so we'd be happy to share that.

MR. COX: Okay.
MR. DINOLA: Thank you.
MR. COX: And on the first point, on the prize, --
MR. DINOLA: Yeah.
MR. COX: -- let me just ask a question of you. How will we know when we have a winner for the marketing campaign?
MR. DINOLA: Well, I'm curious because the --
MR. COX: Yeah, I'm not a means --
MR. DINOLA: Well, I --
MR. COX: -- for coming here.
MR. DINOLA: So the -- you know the presentation this morning, it was very compelling to hear about the fire rebuilding program. And I'm saddened by a six-percent adoption rate. And so I think the question -- like market transformation should deliver this transformation, we should be halfway through this transition to electric water heating by 2030. So we have metrics for success and we can -- we can look at those milestones along the way, but I think it's critical that we have a significant adoption rate. And I think without a compelling connection to say like this is actually -- Owen Howlett has a great presentation on social movements that I'd recommend you look at, and he can present. And he's basically suggesting that this is not about technology adoption, this is a movement and we have to actually connect this to these broader climate and --
MR. COX: Right.

MR. DINOLA: -- environmental goals.

MR. COX: Okay.

MR. DINOLA: Yeah. Thanks.

MR. COX: Thanks.

MS. BORGESON: Hi. I'm Merrian Borgeson with the [Natural Resources Defense Council].

I just want to thank both Martha and Rory and the staff from both agencies for this really solid proposal. It's awesome --

MR. COX: Thanks.

MS. BORGESON: -- to see you guys sort of taking in all the feedback you've gotten and really coming out with something that's super constructive. We'll have little tweaks to it. You know, there are going to be lots of little suggestions. I think the one main --

MR. COX: That's why we call it a draft proposal.

MS. BORGESON: Yes, total agree --

MR. COX: In case you're wondering, we --

MS. BORGESON: This is how a process should work.

MR. COX: Yes.

MS. BORGESON: It's great.

Just one little tweak. So I spend a lot of time working on 1477. One piece of the TECH program in terms of the legislative language was that special consideration should be given to "technologies that improve the health, and safety of,

and energy affordability for low-income households," and I think that the TECH program portion of the proposal could emphasize that more. I think we need to think about specific ways that low-income households, may be certain technologies that may be present more often in low-income or renter households may be able to be targeted.

In terms of the second question, I don't think we should be giving super directive instruction to the third-party implementers, that we have to really make sure what our priorities are. And because that's in the legislative language and is like, I think, a priority for everyone in this room and for the state, we should think about ways that certain technologies that tend to benefit those populations more, like really old gas wall furnaces, for example, that have health issues plus other issues, can be integrated in each piece of these. So we're going to think about how that can be done.

MR. COX: Right.

MS. BORGESON: I'd be curious to know any of your thoughts about that. We'll try to provide some constructive recommendations. But I think that's going to be a key piece of making TECH successful.

MR. COX: Yeah. I think I -- we would welcome that certainly, yeah. Thanks.

MS. RAYEF: I have a few questions from the WebEx.

MR. COX: Okay.

MS. RAYEM: Part of the upstream landscape includes architects and other design professionals who are in many cases trusted advisors in establishing home design parameters. Architects are active in projects that range from single-family to multi-family and mixed-use homes. Where do design professionals fit into the TECH program landscape?

MR. COX: I think they would be more for the BUILD program landscape. Did we put -- was that in the TECH chapter?

MS. BROOK: This is Martha. So I would agree that mostly it sounds like new construction, but that if there is like a major retrofit that the design community would get involved in, that's where I'd see the connection to TECH.

MR. COX: Yeah.

MS. BROOK: So what -- I would not be surprised, especially based on what Bruce and others have said today in terms of connecting the envelope improvements with better outcomes for space heating and health and grid flexibility, that there is a design element on that on the TECH side as well as BUILD.

MR. COX: Yeah.

MS. RAYEM: The second question is: Does this Staff Proposal have an official definition of market transformation?

MR. COX: I don't think we went there. I don't remember if it -- I don't remember if we actually tried to define market transformation. I think we said market

transformation framework, but I don't know if -- I think we just used the term and then we just have all the specific parameters that we're looking for. I don't know if we tried to get into -- because there is kind of a big debate about that, but I think we just sort of put in this staff proposal in the pages that follow, you know, what we're looking for.

Should we maybe kind of go back and forth, yeah.

MR. SARTER: I'm John Sarter with the Clean Coalition.

And I'm really glad to see the question come up about utilizing grid-connected water heaters and appliance. And I really think if we don't take this approach, and this is a huge opportunity as we decarbonize and electrify, to create technologies and integrate them into homes that are grid interactive, they support the grid, they can help balance the grid because there are going to be more loads on the grids as we move forward potentially, including electric vehicles, right.

One thing I haven't seen mentioned is energy-storage systems and how those might want to play into the TECH arm of this as well. And I think it's important again as we electrify to help create resilience to include energy storage as an element. If you can't incentivize it, at least points within the prize system to help provide that for moving towards microgrids for critical facilities and even community microgrids to help enhance resilience.

MR. COX: I know one of the things we're concerned in

a different proceeding, the [Self-Generation Incentive Program] proceeding, is the grid-connected water heater -- grid-connected water heaters as an energy resource.

MR. SARTER: Right.

MR. COX: So it's not like you need the water heater plus energy storage, the water heater is energy storage.

MR. SARTER: Yes, right.

MR. COX: And so that's what we're considering in a different proceeding.

MR. SARTER: I see.

MR. COX: Yeah, because the hot water is your --

MR. SARTER: Right.

MR. COX: Yeah.

MR. SARTER: Yeah. Okay, so it is sort of considered but not specifically mentioned in this?

MR. COX: Yeah. Again, it's kind of being -- it could be a different incentive stream if that proceeding decides that that's appropriate, so.

MR. SARTER: Okay. Thanks.

MR. COX: So it is being considered elsewhere. But, yeah, I mean we're aware of that, that it is a grid -- it could be a really good, good resource. Yeah.

MR. SARTER: Thanks.

MR. COX: Thanks.

MR. HEAVNER: Good afternoon. Brad Heavner with the

California Solar and Storage Association.

I'd mostly like to encourage you to focus on a concrete outcome. We need units installed, right? I think that the prize program is intriguing, interesting, it's a good shot. I have to admit I'm skeptical.

And we all recognize that there is not enough money to do the market transformation that we ultimately need. And it's good that the Legislature directed you to create a program with upstream and midstream incentives. The Legislature didn't want to start with just yet another customer rebate program, so that's where we start.

MR. COX: Yes.

MR. HEAVNER: But let's design a framework and it's not out of the question that we all go back to the Legislature and say: We've got something exciting, it does take more money, but we think we can achieve market transformation. And that's up to us as part of the follow-up.

On the marketing, again I'm skeptical. We've seen in some of the other programs where the Commission-run program has done general customer -- marketplace marketing programs that have been duds, really. I mean you think about something like the "Got Milk" campaign that a lot of people I to point to, there's a ton of money that went into that. And that is influencing a decision that a consumer makes every week. You know, when the water heater is leaking, you're not in the head

space in the same way.

MS. BROOK: You're not thinking about that fuzzy bear that you see on -- no?

(Laughter.)

MR. HEAVNER: Again, worth exploring, but deeply skeptical. So we can move the -- you know we can move the incentives upstream, but still base it on concrete outcomes. We don't need nuclear fusion to -- you know, we know basically where the technology is. There can be some technology refinement which is really useful, but ultimately we need units installed.

MR. COX: Well, let me just sort of suggest something here. And I know Alison said that we don't want to suggest anything, I'm going to suggest something anyway. What if the prize was for number of units installed? What if, you know, some -- you're an HVAC or you're a plumber and you have a prize that you will get x, $500,000 if you install 10,000 units -- you know, the first one to install 10,000 units, then you are -- then you have an outcome. That's the outcome --

MR. HEAVNER: Yup, might be a better bit -- and I don't want to discourage -- probably -- I think creative thinking is absolutely necessary --

MR. COX: Yeah.

MR. HEAVNER: -- in terms of financing mechanism. We all need to do some creative thinking there. So we should do

this whole exercise. The report is great, but ultimately don't think it's only that because we've only got $50 million a year, so we can --

MR. COX: That's right.

MR. HEAVNER: -- never get to the other kind of program.

MR. COX: Right.

MR. LUTZ: Jim Lutz again. To follow up on that, what we really need in this space is something on the scale of the California Solar Initiative where it's two or three billion dollars over ten years and a really long span that ramps down as you succeed.

MR. COX: Um-hum.

MR. LUTZ: I don't think this is the venue where we can promote that, but that's --

MR. COX: Well, where we can say what's needed. We can say it, but we don't have the -- the money won't appear.

MS. BROOK: But if --

MR. COX: If you can go back --

MS. BROOK: I would just say that if you're -- we agree that's the kind of scale we need, then we should be -- we are encouraging program proposals that pilot that, like --

MR. COX: Yeah.

MS. BROOK: -- so that we could just take that and whatever comes out of 1477 TECH and it becomes CSI for water

heaters with the legislative move.

MR. COX: Yeah. And the fourth phase of this proceeding is supposed to be a longer-term policy framework. This is kind of the training wheels or the -- you know, --

MR. LUTZ: Okay.

MR. COX: -- what we've figured out, where we can get some lessons learned to put into that long-term policy framework.

MR. LUTZ: Yeah. Another more specific question, if you can go back two or three slides to the org chart one? That one, that one.

MR. COX: Yup.

MR. LUTZ: Yeah. Just based on the success of the Advanced Energy Rebuild program, I think instead of the third-party implementer going directly to the subcontractors, it should be like sideways to the local [Community Choice Aggregator], city, county organization, whoever has a local energy office, sustainability office, and then go down to the subcontractors, --

MR. COX: Okay. So --

MR. LUTZ: -- so that --

MR. COX: -- you're proposing an extra box for local government partner of some sort?

MR. LUTZ: Yeah. Because they obviously have, as everybody was saying, the boots on the ground and how that --

MR. COX: Right.

MR. LUTZ: -- will work it hopefully, that a third-party statewide implementer won't have.

MR. COX: Right.

MR. LUTZ: A third-party statewide implementer can keep track of how many water heaters come into California from the manufacturers, can coordinate the education program that is the same statewide, that sort of stuff. But the actual implementation, actually getting things into people's houses could be -- coordinated very tightly at the local level.

MR. COX: Right. Okay. Thanks.

MS. RAYEF: I have a question from Tom Conlon on the WebEx: I don't believe your initial list of technologies included storage, presumably because of cost and equity issues. But could very low-cost storage-ready technologies make it on your short list?

MR. COX: The technologies are limited by the Legislature and it was based in water heating. So for the TECH program, that's it. Again, you could consider water heating storage, some do. If it's grid-enabled, it can be -- it could be considered storage. But in terms of the storage, maybe the questioner is thinking of which is, you know, a battery, no, it is out of scope of the law.

MS. BROOK: Maybe a storage technology resulted in a reduced emission for space or water heating; is that too

indirect?

MR. COX: I suppose it -- I guess I'd have -- I'd have to look at the -- I suppose that -- if anything that reduces emissions from space and water heating.

MS. BROOK: Yeah. I mean I think that was probably the intent of the question, that would be my guess --

MR. COX: Yeah.

MS. BROOK: -- is that -- you know, we know the grid doesn't have the same emission intensity 24/7 and so if you can use storage to heat your hot water, at times of low carbon then there is potential play there.

MR. COX: I guess that could be -- yeah, I mean I guess if it -- if it -- that's a good --

MS. BROOK: I think that -- the outcome that this discussion right now gives me as a staff member of the proposal is let's make sure the next version allows for that kind of flexibility when it's appropriate, like so that we don't close the door --

MR. COX: Right.

MS. BROOK: -- inappropriately but not keep it so open-ended that we haven't focused in the right way.

MR. COX: Right, that's very true.

MR. SWITALSKI: Thanks. John Switalski, Californians for Balanced Energy Solutions.

Once again, I wanted to just push back on the

marketing campaign suggestion. I want to really caution you as stewards of public dollars and representatives of agencies that we're using -- potentially using public dollars to run a marketing campaign to raise awareness for manufactured items, for heat pumps.

MR. COX: Um-hum.

MR. SWITALSKI: So we're therefore advertising for these manufacturers who also are getting highly subsidized, consumers are being subsidized to purchase these products. And so really the question is, is that the highest and best use of public dollars within this program, given all the issues of trying to scale, as a previously-stated goal, issues of affordability and equity.

I think you need to ask the coalition and the manufacturers to come to the table and be a partner with you. And if they want a marketing campaign, then we should be paying for that out of private dollars and not out of these funds and out of public dollars, taxpayer-funded dollars. So I think that's kind of important that we keep that high level of the best and highest use of that public money. Thank you.

MR. COX: Thank you.

MR. CORMANY: Hello. It's Charley Cormany again with Efficiency First California.

I'm going to speak now as a program implementer to point number 2. One of the advantages, we have run the

[Sacramento Municipal Utility District] program, we're a third-party implementer, and we're constantly making adjustments and refinements to the program. And within that it includes changing amounts of rebates and incentives for various components based on what we're seeing in volume and uptick and what our goals are. I can't imagine how restrictive it would be to put that, to have to go through a state agency or process. So, hands down, I think the program implementer should be responsible for incentive levels.

MR. COX: Okay. Thanks.

MS. WEST: Hello.

MR. COX: Hi.

MS. WEST: This is Jennifer West. I work at StopWaste but I also work on a program funded by the Air District for two years under a [Bay Area Regional Energy Network] umbrella on the nine county, a midstream incentive program for heat pump water heaters. We're about six months into that and we're still setting up our program design, but it's very exciting to see the possibilities here of something statewide, similar to what we have been working on.

First, I just want to echo Merrian's comments about low-income households within the TECH program and how important I think that is.

And, secondly and more broadly, to comment on something that didn't come up which is in the Staff Proposal a

geographic focus on -- I think it's based on the E3 study -- for heating and air conditioning loads. And I just want to point out the difference between space heating and water heating, and that clearly a statewide incentive program that targets water heating I hope would not be restricted to climate zones given that everyone is using water heating and that about two-thirds of our population live in coastal communities, so I just wanted to make sure that that restriction is not being applied unduly to the water heating program.

MR. COX: I just have a question on that. One of the compelling reasons to go to hotter zones is the panel size. So if you -- you know, the -- if a house already has an air conditioner, you don't need a panel upgrade, supposedly, because the panel has the capacity to handle the extra load. Whereas if you are in the Bay Area where people don't have air conditioning, on the inner Bay Area anyway, then it's a panel upgrade, it might be another thousand dollars. Should we provide an incentive for that panel upgrade too when we can -- it's kind of like you can do two incentives in Fresno or one in --

MS. WEST: Right.

MR. COX: -- and one in the Bay Area. What is the right --

MS. WEST: Right. That's a concern. I don't actually have a good answer for you on that, --

MR. COX: Okay.

MS. WEST: -- although I know that it's a real barrier for folks here because we're running into that --

MR. COX: Yeah.

MS. WEST: -- with our -- in concern with our program.

MR. COX: Yeah.

MS. WEST: I will say that in terms of the market transformation I don't think you want to exclude coastal communities because that's not going to be -- I mean the market here at least in the Bay Area is much larger than the market just over the hill, so just a concern that you would -- for a distributor to look at the larger market, if you're applying incentives in just one geographic area it's going to restrict, I think, what happens.

MR. COX: Um-hum. Right. Okay.

MS. WEST: Thank you.

MR. COX: Thanks.

MR. SEVERANCE: Pardon me for skipping around, but I'm mostly going to offer a couple of comments and one is that, you know, cost-effectiveness I think is key. And one of the criticisms of Energy Upgrade California was that they had fairly high administrative costs with that program. And I think a lot of marketing dollars were spent trying to force-fit the glass slipper.

And inclusive finance I think would avoid a lot of

those costs because it's a program that would sell itself. And there's some discussion of partnering with Zero Home that could actually target by address which homes fit that model the best. So you could eliminate a lot of the marketing dollars.

And I agree with the previous comments that it's questionable using public funds to market for private industry. I would question that myself, although I think it's important to create awareness around SB 350's goals in general because I think the general public is not aware of decarbonization or that initiative, you know, as a whole.

So that segues into, you know, Mitsubishi supports incentivizing things like development of low-GWP refrigerants. The prize could be done, something in that category, kind of a moon shot to not do this as an incremental change over the next 15 years but like let's get everybody moving towards [global warming potential] refrigerants more quickly.

Another idea that came up over lunch was to incentivize with the prize money product development that would readily retrofit into multi-family residences. They would integrate hot water and space heating, and have some synergies where that's concerned with minimal impact as in drywall and modification of the residence that would make it uninhabitable for any period of time, so an upgrade crew could come in and in hours be done and back out again.

I had one other comment and that was in regard to

comments by -- I think your name is -- Eric, with the Gas Utilities Union. I don't think gas appliances work without electricity and in most cases these days, except for the old 50-percent efficient gas water heaters that we really do need to get rid of. So I don't know that we're gaining any resiliency by holding onto gas. I appreciate the need to kind of maintain job security for that market, but I think that there are still going to be those jobs. There's still going to be a gas infrastructure.

Also the area burned, according to the National Climate Assessment on page 163, it indicates that the area burned between 1984 and 2015 in fires nationwide is approximately double would it would have been if climate change hadn't occurred. So the spark that causes the utility, you know, power line dropping in a high wind and causing that fire has greatly increased the scale and the scope of this property damage that we're seeing. And that is directly related to fossil fuel consumption and not to the utility. So 20 years ago the typical damage was 300,- to 500 million a year, and now we're seeing 17 billion in this peak year recently. So I think we need to look at the actual root causes when we make -- when we draw those comparisons. Thank you.

MR. COX: Thanks.

Are we caught up with the webinar, with the WebEx? Okay.

MR. NESBITT: George Nesbitt, HERS rater.

To kind of restate something you said earlier, we can't build new buildings to reach our goals because there's a lot more existing buildings. So I'd say back to the question earlier with Martha as far as funding, more funding needs to go towards, focused towards existing buildings.

The thing is we actually suffer from many of the same problems, existing and new buildings. Technology is not really the answer. Okay, the tankless water heater is more efficient in theory. But when you have endless hot water, you can use more hot water. Put in a high-efficiency gas furnace into ducts that are not in conditioned space, not or poorly insulated, leaky, and as some have said you're wasting energy more efficiently. So we -- I mean many of us know and do, we know how to build buildings that perform well and will need less energy.

So if we're focused on technology and just getting heat pumps or efficient water heaters or decarbonization of specific appliances, especially in existing homes that are uninsulated, not airtight, have excessive solar gains, so on and so forth, it's an uphill battle. And then so the common thread between new and existing is just the fact we don't design right. And even if we did, we don't build it right. We don't implement code practices as well as we should. And so there is lots of problems. But, just in general, existing homes cost more than

new. I mean the incremental cost is small.

MR. COX: Sure.

MR. NESBITT: Just a couple -- a thought. As a contractor, if the supplier stocks something it's probably more likely to get used. So in the sense one thing we do need to focus on is getting equipment stocked and also reducing price difference.

MR. COX: Right.

MR. NESBITT: So a traditional water heater, well, it used to be like 300 bucks or even less, but a high-efficiency water heater would run like 1400. And so, you know, bringing those price differences down. And I mean it may have to come through even taxing lower-efficient equipment to make -- to bring their price up. So the better stuff has to be available and it really shouldn't be so much more expensive.

MR. COX: Right. Thanks.

MR. BUCH: Hi. Dan Buch from the Public Advocate's Office.

So one of the things I've been hearing in the conversation is a bit of slippage between what the legislation requires, which are midstream and upstream market transformation approaches, and downstream sort of customer-facing programs and incentive design. And that makes me think that there was a comment earlier about having a clearer definition of what market transformation means in this context, but that might be helpful

to try to steer towards the approaches that are permissible for -- say for the TECH program and those that are the off the table, so like, you know, incentivizing panels is probably a downstream issue that isn't really where you're headed here and --

MR. COX: Right.

MR. BUCH: -- for -- just as an example or what the incentive design is and to try and focus more on distributors, contractors, incentives, manufacturers, those level of intervention may be helpful just in terms of framing the conversation.

And then a couple of specific comments. One and sort of a question which was I noticed that the budgets for TECH are the same across all four years, but some of the purposes of the budget elements seem that they have different timing. Like you have a grant program that seems like it's supposed to get some things off the ground --

MR. COX: Right, right.

MR. BUCH: -- really quickly, and similarly you have a prize program but that at least as budgeted that's two million a year for four years. I wonder if staff considered moving some things around and we'll think about how we might be able to make some recommendations about how to meet your purposes, you know, --

MR. COX: Yeah.

MR. BUCH: -- in comments, but it seems like you might want to frontload certain things and then backload others, and as you sort of ramp up, you know, like if you want to do small grants that to do something rapid.

MR. COX: Right.

MR. BUCH: Maybe you want to do $10 million upfront and then over the first two years and then no more while -- as you ramp up your larger program.

MR. COX: Um-hum.

MR. BUCH: I'm not vouching for those numbers, just as an example.

MR. COX: Yeah. No, and that's -- that's a good suggestion.

MR. BUCH: And I guess the last one is that the prize, so far we haven't heard -- I haven't heard a clear articulation of what the presenter was sort of saying, that Goldilocks principle of you need a specific thing that you're looking for, not too specific, but you know specific enough. At this point it looks like an invitation from staff for folks to propose what that is.

It may make more sense, if you don't have that yet, to move that prize into a set of possible tactics rather than to allocate funds specifically dedicated to it and therefore not -- that you can't allocate to something else, since you wouldn't want to have $8 million, you know $2 million a year or a

significant portion of your budget locked up if nobody ever really identified something --

MR. COX: Sure.

MR. BUCH: -- that's appropriate for a prize and -- for example, like a competition to have the most installations, you will essentially award a prize to the largest installer in the state. Whoever starts as the largest installer --

MR. COX: Yeah.

MR. BUCH: -- will win your prize.

MR. COX: Right.

MR. BUCH: I don't think that's the specification you want, so you may want to make some modifications along those lines.

MR. COX: Right. Thanks, Dan.

MS. BROOK: You're doing good on time, actually.

MR. COX: We do have till 2:45 now or 2:30?

MS. BROOK: Well, we were going to start BUILD at 2:30, but we came back five minutes late --

MR. COX: Okay.

MS. BROOK: -- or ten minutes late, yeah.

MR. COX: Okay. All right, gotcha.

MR. COLE: Yeah. Hi. Sasha Cole, also from the Public Advocate's Office.

And I was inspired to get up by Jennifer's comments about whether we focus on customers in the Central Valley or on

the coast, but there is a whole bunch of questions of who we prioritize with these programs, low income or not low income.

I try to think about this from a market transformation perspective, which means in the end maybe we want everybody to get stuff. But we can't do everybody at once and so you think about it from how do you build a market. Where is the easiest place. What are the first barriers that we want to address, and then you iterate on that.

So from that perspective if the benefits are bigger for people in the Central Valley, then maybe you say, well, this is where the clear benefits are short term. And we build a workforce and we build a market, and then we move.

The same thinking can go through low income. I'm not going to follow through the logic for each segment, but I just want to encourage people not to think about it as this limited pot of money that let's make sure we get this for our little -- our little segment of the market, but to think strategically like everyone's going to get this. Hopefully over time the costs will come down too, so people who get it later will pay less. The installation qualities will go up, the installers will have more experience about how to use the technology and how to adapt it. But those are learning outcomes. Those things will occur over time.

And so in thinking about priorities in the short term, we'd want to think about what can we -- where can we make the

biggest impact right away. And then we'll, in doing that, discover barriers that keep us from spreading out from there and develop strategies with our new experience to address those other segments that aren't getting addressed properly. And that's the approach that I plan on encouraging my team to make in comments. And I just want people to think about that. It's not about, like, okay, does the Central Valley get it or do the coasts get it. It's about where can we make impact and grow the market most effectively and develop that expertise and knowledge to keep the momentum going.

MR. COX: Right. Thanks.

MS. GANATA: Hi. Good afternoon. My name is Jennifer Ganata. I'm a senior staff attorney at Communities for a Better Environment.

So we represent folks in East Oakland, Richmond, Southeast L.A., and Wilmington. And actually I wanted to -- you know I appreciate the use of equity and prioritizing equity. And I want to say that I think as a lot of our folks that we help, our community members, a lot of them are tenants. And I think as California is both facing a climate crisis as well as a housing crisis, I think this is one of those things that while you're creating incentives that the people who are benefitting are the people who spend the most of their income to utilities as well as the people who are living in these frontline communities who are being impacted as a result of climate

change, the climate crisis.

And so as we look forward in terms of the TECH, to ensure that whoever is taking this, if it's a multi-dwelling unit or, you know, housing, et cetera, for tenants, that those people who are going to benefit from the actual technology they won't be displaced because you know they're retrofitting the building, et cetera. And I think that a lot of programs in the State of California don't think about that long term, because we do have a lot of tenants and we do have a lot of low-income tenants, and I just wanted to stress that part.

MR. COX: Great. Thanks.

MR. BLUNK: Hi. Scott Blunk from SMUD.

A couple things. You mentioned the permitting offices and not -- having trouble getting them through. We had that trouble initially as well. The first few took a lot of extra work to get through. After that it's now simple, so that shouldn't be a big focus of this.

MR. COX: Except that there's hundreds of permit offices --

MR. BLUNK: Yeah, yeah. Yeah, but -- I mean hundreds of offices, sure. But it's a very short-term problem.

MR. COX: Yeah, yeah.

MR. BLUNK: I also kind of reiterate something somebody just said, was money going to a local jurisdiction kind of directly. I think if we want to talk about market

transformation, I think the biggest market transformation thing that happened this year so far is Berkeley banning gas. Even though that may save no carbon or almost no carbon this year or next year, I think the ripple effects through the state and through the country are going to be really huge. So money going to a local jurisdiction to ease the transition, so basically offering at the same time where you're implementing, the jurisdiction is implementing something, it doesn't have to be a ban. There's also an incentive to go along with it at the same time, not just a carrot, but -- or a stick but a carrot too on both sides may -- may help.

I also think a prize on a low-global-warming potential refrigerant will be really great. We have them. We don't have them in the technologies we're installing right now. I know Sanden is doing great with their CO2, but to get that in the rest of the equipment would be -- or something like that would be a big winner.

And also to go back to before lunch, explaining this to my mom, you know, using that paradigm, how do I explain to my mom I'm working on -- or I'm working on carbon emissions, what does that really mean. And to me that simply means gas pollution. When we talk about buildings and carbon emissions, carbon emissions is a very nice way of saying gas pollution. So I just want to kind of frame it that way. Thanks.

MR. COX: Thank you.

MR. PILGAARD: Ole Pilgaard from Heliodyne Solar Hot Water.

In fear of stating the obvious, we have 12 million water heaters installed in California. It's representative of a replacement market of around 800,000 water heaters a year. My experience after 25 years in that branch is that the majority of those are emergency replacements. Very few is planned replacements.

MR. COX: That's right.

MR. PILGAARD: That means the person that has to take the decision about a new way of heating water may not be presented with that alternative fuel-switching technology.

MR. COX: Right.

MR. PILGAARD: So they're going to go with the same brand, the same type, and be over with it and probably at a much less cost. So -- so that's one of the biggest barriers, as I see it, having been in that business for so long.

MR. COX: You only want to take a cold shower one morning, and then that's --

MR. PILGAARD: No, I mean you know how it is, right?

MR. COX: That's right, yeah.

MR. PILGAARD: You know you have a water heater, we all have a water heater.

MR. COX: Sure, yeah.

MR. PILGAARD: We don't really know which brand it is,

we don't -- we know approximately where it is, and so on.

MR. COX: Yeah, yeah.

MR. PILGAARD: But we only really care about it when you get a cold shower.

MR. COX: Yes, exactly.

MR. PILGAARD: So that's one of the keys that has to be solved in order to get --

MR. COX: Yeah.

MR. PILGAARD: -- mass deployment of a new technology.

The second thing I would like to say is that obviously I represent solar hot water. We made a study with the Air Source EC that the equivalent caught value of solar hot water is around 16 compared to heat pumps about average two and a half. So consider having a rated incentive structure to reward the technologies that gives the most displacement.

MR. COX: Okay.

MR. PILGAARD: Thank you.

MR. COX: Great. Thanks.

MR. GAHAGAN: Greg Gahagan, UMA Solar.

Following up a little bit on that, in terms of water heating and greenhouse gas emissions, are you looking at all in terms of multi-family projects where there's pools?

MR. COX: Yes. I don't believe pool heating is in the -- it's just space and water heating. When I think -- when it's water --

MR. GAHAGAN: It's water heating. It's water heating with really large amounts of natural gas --

MR. COX: Right.

MR. GAHAGAN: -- and greenhouse gas emissions.

MS. BROOK: Yeah.

MR. COX: Yeah. I'm not -- pool heating I think is -- I'd have to look at the bill language to see.

MR. GAHAGAN: We would appreciate you --

MR. COX: But multi-family, certainly. I mean that's --

MR. GAHAGAN: Yeah, it is multi-family.

MS. BROOK: Yeah, yeah, yeah, yeah. So please provide your comments and --

MR. GAHAGAN: Okay.

MR. COX: Yeah.

MR. GAHAGAN: Thank you.

MR. COX: Yeah. Thanks.

MR. DINOLA: Hi. Ralph DiNola, New Buildings Institute.

Sorry I didn't answer your question 3 when I was up here last time. I'm just wanting to reinforce that these pilots, moving forward with SB 1477 and the TECH program is an ideal opportunity to do grid-connected water heaters. And I'd point to NEEA. They have an advanced water heating specification, the Northwest Energy Efficiency Alliance. And

then the State of Washington, recently the Legislature passed a requirement that all electric water heaters have that grid-connected capability.

So following the State of Washington and really embedding it in the program I think would be a real benefit and especially given the challenges of the duct-driven California, the 12 and a half million water heaters, as we do this replacement would be a great resource for energy storage.

MR. COX: Great. Thanks.

Are we done?

MS. BROOK: So Bruce is coming up and let's make that the last one. It has to be quick. Thanks.

MR. SEVERANCE: I'll be quick.

MS. BROOK: Okay.

MR. SEVERANCE: I just wanted to advocate for midstream incentives because I think supply chains are really key. And that has been a real barrier, but I also advocate for what one of the commenters said about targeting low income and high AC cost regions. I think it makes sense to -- we're going to get the most ROI for the investment if we're doing electrification on homes that have both AC and furnaces. And for that reason I think focusing on low-income regions in the Central Valley really makes a lot of sense and that we really should pair with that, the HVAC industry as a whole, the contracting side of it, is very short of workforce and workforce

development. And this initiative provides for that. And there is a high retirement rate at this moment in time and very few new people coming in. There is a need for recruitment at the high school level.

There is also a need for a new HVAC business model, where HVAC contractors currently are not allowed by state law to address things that impact the heat load calculations in the system sizing and the house. They're not allowed to replace insulation in the attic, perform air ceiling, hire subcontractors to do that even though those are very nontechnical things that general contractors are required to do, the HVAC contractor should be allowed to do that as well and benefit from those subcontracts, be able to mark those up so that that's offsetting the money that they're losing for downsizing the system. If we were to implement Chitwood's methodology -- I think everybody here is familiar with Rick Chitwood -- we can cut the typical five-ton AC system down to two tons. And there is no reason why we shouldn't be mandating that as part of this program because that's solving the grid harmonization and the grid capacity issues of electrification as well. So those are my main comments.

And, oh, one last thing. I disagree, incentives should be for both space heating and domestic hot water because we face the same market barriers.

MR. COX: Um-hum.

MR. SEVERANCE: Yeah.

MR. COX: Right. Thanks.

All right. Thank you. Those were great questions, everyone. Thanks so much.

MS. BROOK: Don't all of you leave, Bruce. So thank you for staying and listening to Bill. And this is the last thing that we're going to torture you with today.

So -- and we do -- even though you guys have had great questions, they have not been the same ones that we asked ourselves and ask you to respond to in the Staff Proposal, so we really do want you to consider those in your comments back to us because they'd be very helpful.

So we're proposing that the California Energy Commission administrates BUILD as, you know, a direct connection with our new construction of Building Efficiency Standards efforts. We recommend that the -- we provide direct incentives, financial incentives to the deployment of near-zero emissions technologies to reduce emissions in new residential buildings. The focus is new and single- and multi-family dwellings, so the eligible recipients that we're proposing are either owners of building -- of new buildings, you know, new owners or the builders or even the subdivision developers of new residential housing. So all those are options for where we place and target the incentives.

A minimum of 30 percent of the funds must be reserved

for low income, as defined in the legislation. And we're proposing that the Energy Commission, if we are the administrator, or any -- whoever administrates the program actually lets competitive solicitation quickly for administration of technical assistance to be provided specifically to low income building developers because we understand there is really specific needs in that area, both in matching the technology with the building needs and getting access to the funding in specific ways and, you know, understanding that whole low-income, development marketplace. So we don't have that expertise at the Energy Commission and we think that it would be well served to provide that direct technical assistance.

So the budget summary for BUILD, I think we had talked about this, so I'm going to keep going, reflect for time. There is nothing new there.

This also I don't think is too helpful. I'm going to talking about each of these elements. This is in the proposal.

This is our streamlined proposal for how the BUILD program structure would go. Hey, it all fits on one page, so it's simple.

(Laughter.)

MS. BROOK: So there's a lot of information here which is in the proposal. So it is a one-page summary.

So this again, what I just said about a competitive

solicitation for technical assistance, experience focused on low-income property development. And we would love your feedback on the amount of funding we're proposing for this. We have, even internally, debated whether the low-income funding should go directly into incentives or a split between incentives and design -- you know, technical assistance. So -- or if we could -- if we should actually spend more money on low income and say at a minimum 30 percent goes directly to incentives and in addition to that we should have tech assistance, so we would love your feedback on that. I think it's an important thing to do right and we want to pilot the right contributions to the low-income market.

So we're thinking about this pretty directly as, you know, a technology-specific -- like what we do in a building standard, where we would provide you a performance credit for a specific technology that saved energy. Here we're proposing to do a specific incentive level based on emissions reductions for specific technologies. We know that some of the emissions will obviously change by climate zone if the technology is climate sensitive, like space heating and space cooling.

We're proposing two levels of incentives: A base level of incentive for space heating, water heating, and electric cooking. One of the things that I only said once this morning but I should reiterate here is that we are proposing to have an entry-level requirement of an all-electric home. So we

think there are very big policy benefits for the state of California to pilot not extending the gas infrastructure to help us meet our climate goals. And so we would love to see the BUILD part of 1477 really focus on low-carbon, all-electric construction. And, again, there is a huge paradigm change here for new construction, so we acknowledge that, even more reason to focus on it, we think. We would love your feedback.

And then so that's the base level. We do think that we have the ability to incent electric cooking, so high-efficiency electric cooking, because the legislation didn't limit us the way it did in TECH for space hearing and water heating. In BUILD it's just low-carbon technologies. And so since we have that all-electric requirement, we really want to get that cooking part right, again for market transformation, to get consumer acceptance of cooking with electricity and also to really get the emissions savings.

We're also proposing kicker incentives that would encourage additional emission reduction benefits beyond the baseline level, so this would include thermal storage either through really good envelope technologies that allow you to shift space heating and space cooling load to lower-carbon periods of the day and evening, or electrical storage. Low-global-warming potential refrigerants.

The other question mark is an idea that again we want to keep open, the idea of a kicker incentive, the thing that

comes to mind for me is this new construction, it's going to be largely targeted at production builders. They build the same thing over and over again in different parts of the state. So if we really want the best technology and technology combinations for low-carbon solutions, we probably want them to design differently than they do now.

So the combination, like what we heard from Rory's sister where she got air conditioning as an outcome from her heat pump water heater. That's not going into any production building that I know of in California. So if we could offer a little bit of other kicker incentive for design assistance, to help people get over the hump of doing a production build with the new technology combinations, we think that would be money well spent.

Let's see. Perform metrics for BUILD. Obviously greenhouse gas emissions reductions and avoided emissions. The cost that we would be spending on the emissions reductions, projected bill savings, so again this is new construction. So we would basically use the 2019 Building Standards as the baseline, assuming that everyone's going to build to that level, as estimated with our Performance Compliance software. And then the bill savings would be what we would project using that same modeling software.

We're going to track the number of low-emissions systems installed and other things that you recommend to us, we

will include in our final proposal.

So this is the evaluation part that is for both BUILD and TECH. I think we have talked about this. I'm reading quickly. Tell me if there is anything new here. I think that what I've -- you guys have already given us great feedback about the relationship between evaluation and the program implementer and how we'll have to really design that well for both BUILD and TECH in order to do a really -- also to innovate on the evaluation side of repair programs. So we heard that part.

We are proposing that the Energy Commission is a good option for administrating BUILD, again because we have the implement, the Building Standards, we have experience implementing new construction programs like the New Solar [Homes] Partnership Program. We have this great working relationship with the CPUC but we also know that they tend to provide oversight in a really effective matter and low-cost matter. So we propose that we would actually -- similar to what we do for the EPIC program, where we propose -- we submit an implementation plan for BUILD to the Public Utility Commission, which they then review and approve. We have regular staff meetings which include the reporting on our implementation status.

We'll have a joint evaluation contractor, so we'll be able to communicate through that mechanism as well and track progress. And then if there is any, you know, significant

change in direction or funding levels, then we would bring that back to the Public Utility Commission for their -- first to discuss and then review and approve.

Time lines. This is in the proposal. Basically, we're going to try and get started as quickly as possible. We're aiming for, you know, spring 2020 to begin BUILD implementation. That would require us to finish the Staff Proposal and also propose an implementation program for BUILD to the PUC before, of course, we would begin implementation.

There are a few things in the appendix that we added for BUILD that we would really like you to look at. There is a bunch of different ways that you could focus a new construction program to get emission reduction. So we've done enough review in terms of how we would calculate incentives using our standards performance compliance software. But you know it actually -- it already does hourly kWh and therms and GHG emissions. So it's a good tool to use for a new construction program.

In the appendix there is a listing of the baseline amount. So what a new standard-level building in different climates zones will emit, just the standard -- the baseline home that uses gas water heating and gas space heating. So those -- that would be the baseline that any BUILD program would be using to prove emissions reductions.

And you can see the difference by climate zone, you

know, where it really makes sense to focus on space heating in terms of emissions of that -- of that mixed fuel standard. You know, if it's a nicely built house but it uses gas versus water heating is constant across areas of the state.

We're also proposing to reduce the number of climate zones. So again because we have a little bit of money and we don't want to spend it on administration, we want to design an incentive program that really -- and, again, I think for a market transformation perspective, you want to give a limited number of signals to the builders in terms of how we value emissions reductions.

So we tried to organize the 16 climate zones we used in the Building Standards into climate regions. I think we came up with six that are obvious when you look at it. You know, north and central coast and the south coast and the deserts and the mountains and the Central Valley, and the emission. So we're proposing to create those higher-level climate regions based on a weighted average of where we expect new buildings, new residential construction to be built in the state. So I want you to look at that and see if there are any issues that you would have there.

And the other thing that we are asking a question that we would like you to give us feedback on is since we have a limited amount of money and we want to do great, big things, does it make more sense to focus a BUILD new construction

incentive at the individual home level, like we do with our new construction residential programs now, which we heard earlier, the incentives are calculated per home, but they're actually delivered to the builder, the production builder like as a package for all the homes in their subdivision. Do we aim at that level, do we aim higher up and ask the developers to commit to an all-electric development and provide the BUILD incentives at that level. So there's a lot of different ways that we could approach BUILD and we're looking for your feedback.

I think what we have learned just from the little bit of analysis that we have done already is that the -- if we want to reach this, say, something not too aggressive like five percent of new construction in California with a BUILD incentive, we -- the money that we would have to spend would be ten times less than what I heard this morning for the fire rebuild. So instead of 10,000, you'd be getting 1,000, or something like that, which doesn't seem like a lot of money to ask for an induction cooktop, a heat pump water heater, a heat pump space heater.

So that's the challenge we have, is how should we best focus BUILD to do the right things and pilot things that we want to scale for new construction, low-carbon new construction.

So I think that's all I have and happy to answer questions.

MS. MENTEN: Thank you, Martha. This is Beckie

Menten, Center for Sustainable Energy.

I'm really intrigued by the question of incentives, financial incentives versus technical assistance. When I was at [Marin Clean Energy] and we were administering multi-family to low income, we found by and large that developers were much more interested in engaging with technical assistance than rebates because, as you noted, it was such a small portion of total project cost that they didn't know where to start, they didn't know how to evaluate, they couldn't pull together financial models that would help get engagement from the C suite (phonetic), so I think that's really compelling.

MS. BROOK: Um-hum.

MS. MENTEN: One other thing I've recently learned while trying to convince a developer to avoid natural gas construction to an entirely new planned development is that they have a lot of concerns about how homeowners are going to be willing to buy into the homes. However, if they were able to get [California Environmental Quality Act] recognition, that would give them some kind of benefit or an easier pathway to actually getting their development implemented through avoiding that natural gas tie-in. And if there was some assistance to help them quantify and justify that, --

MS. BROOK: Okay.

MS. MENTEN: -- that could really help them avoid lawsuits from the Sierra Club or others --

MS. BROOK: Okay, okay.

MS. MENTEN: -- who didn't want to see developments come into place.

MS. BROOK: Okay.

MS. MENTEN: So that would be something that I would consider as working with the government's office or others to see if there can be some sort of coordination to get --

MS. BROOK: Great.

MS. MENTEN: -- easy -- easy paths for development.

MS. BROOK: Okay, okay.

MR. COLVIN: Hey, Martha, Michael Colvin from Environmental Defense Fund.

Since we have the time line up here, I have a couple just quick process clarification questions for you.

MS. BROOK: Okay, okay.

MR. COLVIN: The first one is, as we have discussed today, the budget doesn't seem to quite add up. Are you all going to give us a revised Staff Proposal before we have to submit comments on the 13th? So that way we actually can react to an actual proposal, or are we just supposed to make something up, or what would you suggest --

MS. BROOK: So we don't want to reissue Staff Proposal because that would slow everything down. So I don't know, what do you want -- do you want to just -- say assume that we're going to lop off two million from both BUILD and TECH equally?

I don't know. I don't know how the math is wrong right now, so.

MR. COX: Part of your comment, part of what you could suggest is what is the right number for evaluation. Is it two million? It doesn't have to be two million. It could be less.

MR. COLVIN: Right, but the total needs to add up and it's not adding up right now, so I can't reflect --

MS. BROOK: Right.

MR. COLVIN: -- back on what the right amount is, but --

MS. BROOK: So -- so I think --

MR. COLVIN: -- see what your suggestion is --

MS. BROOK: I think you should assume that --

MR. COLVIN: Okay.

MS. BROOK: -- our original proposal, which we don't want to change, is 40-60 --

MR. COLVIN: Okay.

MS. BROOK: -- between BUILD and TECH, and that -- and that evaluation comes out equally from those.

MR. COLVIN: Okay. Okay. Second question, just on your second-to-last bullet point here, you say three months after a final staff proposal decision. That's not a thing. So what's the time line? Do you mean three months --

MS. BROOK: Not a thing.

MR. COLVIN: -- after the Staff Proposal that just got issued a couple -- you know, a couple weeks ago? Do you mean

the actual final decision adopting the Staff Proposal?

MS. BROOK: Yes, the -- that one.

MR. COLVIN: Okay, that's not clear from that. Okay.

MS. BROOK: Okay. So --

MR. COLVIN: So the intent is if the Commission, let's say, adopts something in the second December meeting, that you will then submit an implementation plan three months after that date?

MS. BROOK: Yeah.

MR. COLVIN: So it's not a final Staff Proposal decision, it's when the Commission acts adopting something?

MS. BROOK: Yes.

MR. COLVIN: Okay.

MS. BROOK: And you could comment back that you want it to be -- you want us to work in parallel, assuming that we're going to -- see, our issue at the Energy Commission is we don't want to do the implementation plan if we don't get approval to run the program.

MR. COLVIN: Sure, of course. That's fine.

MS. BROOK: Yeah, yeah.

MR. COLVIN: I just -- it wasn't clear, like there is no second --

MS. BROOK: Okay. Okay. Yeah, yeah.

MR. COLVIN: All right. Thank you so much. I have a couple of other thoughts, but I see the queue, --

MS. BROOK: Okay, okay.
MR. COLVIN: -- so I will let it go.
MS. BROOK: Okay.
MS. OSMAN: My first issue is on the target population, are the beneficiaries --
MS. BROOK: Yeah.
MS. OSMAN: -- of this programs for both BUILD and TECH, and I see in the Staff Proposal mention of statewide. And we are at the Public Advocates Office, based on the CARB regulations, the beneficiaries should be the ratepayers for gas utilities for the investor-own gas utilities, so --
MS. BROOK: Oh, okay.
MS. OSMAN: Yeah, that's --
MS. BROOK: We'll --
MS. OSMAN: -- primarily should be the targeted population.
MS. BROOK: Okay.
MS. OSMAN: The other question I have is about the incentives in the BUILD program.
MS. BROOK: Um-hum.
MS. OSMAN: I'm a bit confused whether the incentives will be at the prescriptive incentives of technology categories or is it based on the amount of GHG reduction? In like is it a dollar per GHG reduction?
MS. BROOK: So, yes, it's that. So what we were

intending is that the technology categories that save the most emissions would get the most incentives. But we -- what we're not sure of is whether we should be super granular in that, you know, or just for the sake of simplicity and implementation ease and communication with the builders and developers just round it off, like you might get -- you might deserve a little bit more in one area of the state for space heating. Should it be exactly to the fourth significant digit or should we round it off, like what -- we're not -- that's what we're not sure about. But the basic premise is that the technology categories that save the most emissions would get the most incentive.

MS. OSMAN: So is it by technology or by emissions? So are you paying the builder by how much emissions they would reduce below the base line or are you incentivizing --

MS. BROOK: No. We're proposing it's by -- that we predetermine the incentive, so we're not allowing them to do just whatever they want in the full blown performance approach and say we have saved this much emissions, give us money, again because we think that it requires more cost to the Energy Commission to enable all those calculations in the software and to support that and update that over the course of the program period. And we also think for communication and for market transformation and public awareness, including building awareness, we should say, look, this technology category is worth this much to us right now for the state of California, and

have a more simplified incentive approach.

MS. OSMAN: Yeah.

MR. LITH: Martin Lith, Elane Power (phonetics).

I am -- one of the -- I have a few questions. One of the first ones you have mentioned is the track home is your target market. I'm curious if multi-family housing is not on your radar?

MS. BROOK: Yeah. No, no, it is.

MR. LITH: Okay. Because I want to encourage the --

MS. BROOK: I was speaking in generalities. I'm sorry. Yeah, yeah.

MR. LITH: Okay. Multi-family house, especially transit-oriented multi-family housing and affordable transit-oriented multi-family housing is like a ridiculously good target market that you should be trying to incentivize as much possible.

MS. BROOK: Okay. Yeah. And you --

MR. LITH: Should be clear.

MS. BROOK: Okay. Yeah, and you could argue in your comments that that deserves way more than 30 percent of our focus.

MR. LITH: Well, it's just a paring. There's always -- there are already a bunch of incentives for them to like --

MS. BROOK: Okay, okay.

MR. LITH: -- be really efficient and -- but they

don't really have all the funding to supply that, so it helps everybody in that long run.

MS. BROOK: Okay.

MR. LITH: The second one is kind of paired to that, is: How much is site PV going to be associated with whatever technology that your -- that is paired with? So, you know, if like right now you can't really do electric resistance and offset it with PV, for example, for heating and claim that as like greenhouse reduction, but if in theory you could do that type of horse trading with this type of program, so I'm kind of curious where you come down on that market?

MS. BROOK: Well, so we are thinking about this as the building standards are still the base line. So if PV is required in the standard, we're not really thinking that -- are you thinking more about the emission reduction from --

MR. LITH: The emission reduction, so like --

MS. BROOK: -- from the coincidence of electric resistance heating and the PV on the roof or --

MR. LITH: Well, that if -- it's if -- if -- okay, you're doing this net zero above and beyond what the core -- you know, what the core minimum requirement is or larger than a four-story building for multi-family housing, --

MS. BROOK: Right, right, right, right.

MR. LITH: -- if you're doing that option and you're offsetting that, you know, a heat pump water heater with

electric -- with PV as the generating element, that is a net zero, a lot of carbon reduction compared to using the grid, right, --

MS. BROOK: Right, right. But what -- if --

MR. LITH: -- so is that coming into that -- was PV coming into that calculation and you get additional incentives because of that?

MS. BROOK: So right now we are thinking about the battery part of that being where you would get an incentive, but that was -- but that was --

MR. LITH: But batteries -- batteries use energy, they don't --

MS. BROOK: No. What I'm saying is that if you're -- there is a little bit of coincidence with water heating and almost none with space heating. And when you have solar generating on your rooftop, --

MR. LITH: Does it have to be coincidence. You're just trying to reduce -- it doesn't have to be one to one. Why wouldn't it just be reduction of overall --

MS. BROOK: Because then it's the same as a grid metric, right, like the emission -- it's really a grid-emission intensity metric which we're planning to use anyway. So what we're saying is from an emission-reduction perspective, if you've got storage you should get extra credit. And I can see the point that for PV, when it's not already a requirement in

the standard you should get credit, but I hadn't thought about that till now.

MR. HEAVNER: Hi. Brad Heavner with CSSA.

I'd like to comment on what you consider to be an above and beyond measure that wouldn't happen in absence of the program. The legislation rightly says that incentives should be targeted through actions that are beyond standard industry practices. Of course you would want that. You don't want to incentivize things that would happen anyways.

MS. BROOK: Right.

MR. HEAVNER: The [Order Instituting Rulemaking] kicking off this proceeding said that the Commission intends to define that according to the list of prescriptive measures in Title 24. And I don't think that's the right metric because most builders do not use the prescriptive option. Most builders use the performance option with some of the measures that are on the list of the prescription measures are not commonly used with the performance option. Solar water heating is what's mostly on my mind. Even though it's on that list, most people don't use that list. And we should instead look at the database of compliance of what builders are actually using for Title 24 compliance.

MS. BROOK: So I think what you're arguing for is you don't want pre-calculated incentives that are prescriptive. You want to use the software and calculate performance incentive --

MR. HEAVNER: Not necessarily. I think -- I don't really have an opinion on that. I'm just saying don't rule out measures that are on the Title 24 list of prescriptive measures because if builders aren't really using those measures they're not standard industry practices.

MS. BROOK: Oh, interesting. So --

MR. HEAVNER: This program can encourage it to happen.

MS. BROOK: So you're saying that we should give an incentive for a Tier 3 heat pump water heater?

MR. HEAVNER: Depending on whether it's actually standard --

MS. BROOK: But we are -- we are -- we're already saying we're going to do that because we're using the mixed-fuel home as the basis.

MR. HEAVNER: Okay.

MS. BROOK: Okay. So --

MR. HEAVNER: I mean I'm not as familiar with --

MS. BROOK: Okay.

MR. HEAVNER: -- how many -- you know, what type of heat pumps are commonly installed in new homes. But that should be the measure. You know, is it truly commonly used as a building practice today rather than what's on the prescriptive list --

MS. BROOK: I -- I --

MR. HEAVNER: -- of Title 24 measures.

MS. BROOK: Okay, I understand that. Okay. Thanks.

MR. BEST: Hi. This should be easier than the previous callers.

MS. BROOK: That's what you think.

MR. BEST: I'm Kevin Best, Real Energy up in Napa.

So I just wanted -- as we think about the cost of greenhouse gas, it's going to change a lot over the next few years. Using some previous vernacular, curtailment was not a thing three years ago. We're on track to curtail a million megawatt hours this year, so we are all paying to get rid of renewable energy.

MS. BROOK: Um-hum, um-hum.

MR. BEST: Now the more we have the more we have to pay to get rid of. It's just the way it is. So as we build we're developing several power to gas plant, so as we put that renewable electricity into the gas pipeline and pull it out during clean peaks, running a carbon-neutral natural gas peaker, the gas grid decarbonizes, but your cost of renewables is going up. So we're electrifying to put in more renewables and it's not perfectly efficient to take that renewable electricity, put it in the gas grid, burn it, and then get it back to that appliance.

So I would just think about your costs as we are running pell-mell into the vertical neck of the duck here with

all these appliances.

MS. BROOK: Okay.

MR. BEST: Okay.

MS. BROOK: Yeah.

MR. CALDWELL: Good afternoon. Alan Caldwell, SoCalGas.

I'm here to be a voice for our approximately 20 million customers and my question is: A third of those customers are some type of incentive or some type of a bill assistance; what is the plan to expand the diversity of voices in this proceeding?

I see where we're pretty aggressive here on August 13th. And we talk a lot about low income, but I don't see a lot of those voices and faces here. And I know resources are thin, but I have worked in environmental justice and you have to go out there and get to churches, communities, you know, school groups, whatever it may be. Is there a plan that we can envision before the 13th that will bring more diversity, particularly low income so that their voice can be heard without a decision being made for them, without their input?

MS. BROOK: Okay. Thanks.

MS. HAINES: Hi, Martha. Thanks for this. I wanted to address a couple of things about resiliency. I have a good story like Rory. Thanksgiving a couple years ago, my electricity went out for eight hours and I was hosting 22

people. And the only thing that saved me was my gas stove and my gas barbeque. I was able to cut it out. And I had a natural gas generator.

April 8th workshop, a woman described the Woolsey Fire and her survival of that fire. Her mom was on medical equipment. A natural gas generator made sure that she was -- you know, she lived. It was a matter of life of death.

So I think that the resiliency issue is a very serious issue. The person from Mitsubishi you know mentioned that a lot of gas appliances are electric now, but the gas stove being able to cook is critical to people surviving, being able to have the natural gas at your home so you can run a generator if the electric system goes down is critical.

There's also new fuel cell technologies that I think it would be really helpful if this program can help incentivize those, especially for district heating, multi-family heating, for combined heat and power. The more options that we have to be able to be grid independent and not rely on the grid, that has become more and more unreliable, is going to be really important for not only those folks that are living in the Paradises of the world, in that wildfire urban interface, but also for those folks that, you know, don't have the choice of buying their own home, they're going to be renting, and they should have that choice. That's the other issue: People should have that choice --

MS. BROOK: Okay.

MS. HAINES: -- and that we shouldn't be taking that choice away from them, of what they should have for their own use. So that's one issue I wanted to raise there.

The other issue is, you know, I have been hearing a lot about asthma and gas stoves killing you, and things like that. I think that -- you know the California Energy Commission has done research on this, they have found that the act of cooking itself is the primary driver of indoor air quality issues and really lack of ventilation. And it's unfortunate but as we tighten our homes, our homes don't breathe as well. And that lack of ventilation of exhausting gases from the act of cooking is really the primary driver of that. Plus now our cleaning products that we use in the home.

There has been a University of Texas study that was recently talked about in a couple of articles in the *Daily Mail*, things like that, that talked about the act of toasting, you know, if you want to toast your bread in the morning.

MS. BROOK: I love making toast.

MS. HAINES: I know. And they said you really need to be careful. I like to go a little blackened on my toast, but they said that produces as much particulate matter as standing next to a busy highway. It's 3,000- to 4,000 parts per million. It's a huge amount of particulate matter.

I don't think the CPUC wants to ban electric toasters.

I think we all know that we have things that we do every day, cleaning our house, using products that may have a little more [volatile organic compounds] than we like, but I think we need to keep that in perspective --

MS. BROOK: Okay.

MS. HAINES: -- in how we think about this. And we need to think about things more integrated or holistic.

Renewable natural gas, I know a previous person talked about that, could be carbon negative and it can tie into our leveraging getting rid of carbon from hard-to-decarbonize sectors, like the ag and waste sectors, and moving that into our building sector. And we have found that that can be a really inexpensive way of doing things. And you don't disrupt people. And you can actually -- you can get that RNG into the system and it can be used for a bunch of sectors, the transportation sector, the electric sector of the building sector, and the industrial sector. So I think we need to think more futuristic about that.

MS. BROOK: Okay.

MS. HAINES: Most people -- most scientists are saying that we need carbon-negative type technology for the future, and that mid-century, RNG can be that carbon negative, and hydrogen. Hydrogen is another one that Dr. Muniz from -- you know, President Obama's Secretary of Energy had said hydrogen is a real promising thing for us. And the previous gentleman talked

about how we can move excess electricity during the day. Instead of wasting it we can move that and make hydrogen, blend it into our natural gas system to help decarbonize it, or combine it with, you know, some CO2 source from the exhaust --

MS. BROOK: Yeah, yeah.

MS. HAINES: -- from a -- and make renewable methane.

So those are some creative things that I think we need to think about so we don't lock ourselves in and entrench ourselves into a mindset that's going to miss all these opportunities, that can work more holistically.

MS. BROOK: Okay. Thank you.

MS. HAINES: So -- um-hum.

MR. HINTZ: Hi. Tom Hintz of SeaHold. I'd like to make a few comments on SB 1477.

First of all, the main premise has been about greenhouse gas reduction. The Commission is really -- it's about choice: Electric and gas. I don't think it needs to be a choice between the two. Let the market sort that out, let consumers sort it out. Don't take gas off the table, primarily because the gas infrastructure requires customers on the other end to use it. LVCs require customers to buy it.

Natural gas is not just from fossil fuel sources. The previous commenter, who has said several of the things I feel are really important, if you take away all that downstream potential demand you're not going out have an access point for

the biogas and the biogenic gas that can be made from sustainable organics.

Organics aren't going away. The landfills aren't going to go away in a hundred years. You're just going to have organics. So we can digest those, we can process them. We also then have a vibrant infrastructure to deliver gas and power to gas, and then also you would eliminate the hydrogen highway.

What the real bottleneck is the Commission's failure to act to make organic to gas -- or organic fuels projects, gas injection, to be at a much more competitive price. They should create more interconnection points for the digesters and the technologies, and do that. You will take out more greenhouse gases, more short-lived climate change gases in a shorter period amount of time. All this degasification or pro-electrification, you're not going to move the needle for the next 10 or 20 years. Where will you put all those appliances? The new -- it's just a trend to eliminate options and choice. This is not the role of government to eliminate choice. Let the market sort it out. If you have to, have a differential in price, let the home builders do it. This is just a fig leaf to just favor the electrification.

Where will you get the batteries? Gas provides storage. It's dispatchable. Yes, we can move the percentage of fossil fuel lower and lower and decarbonize the gas stream. You can create a demand for that gas and allow consumers to choose

that. And that will immediately improve air quality.

When the CPUC eliminated all the plants to burn all the wood from the tree waste in the valley, that has to go somewhere. We have open burning, we have worse air quality. You want to impact the communities at risk, keep the jobs local -- because they have to harvest the trees, gas is local and it's not some factory in China making the PV. It's not somebody somewhere else. It's somebody every day, getting up, going to work, and making the gas flow.

Now thank you very much.

MS. BROOK: Okay.

MR. HINTZ: Oh, I have one other question.

MS. BROOK: Okay.

MR. HINTZ: Where in the world has complete electrification taken place? Berkeley someone said.

MS. BROOK: Not yet, not yet.

MR. HINTZ: All right. California likes to be first. How about we do it a little bit more thoughtfully. I don't think it's a choice between electric and gas. I think it's a choice between what we get the biggest bang for the buck on greenhouse gas reduction.

MS. BROOK: Okay.

MR. HINTZ: Please address how we can lower the cost to interconnect and get more biogas projects online, create employment. Local fuels, local demand.

MR. STRAUSS: Ariel from SDUA. I have a question and a comment.

My question is: What's in mind with the kicker for a complex emission design? I didn't see a definition or a description of that in the plan.

MS. BROOK: No. So I think there might have been a sentence, but you had to probably look at it -- unless it didn't even make it into the file. So -- so we basically are saying that we should probably be a little bit flexible in terms of the other for a kicker incentive. And the example I used was design a system. So it could either be, you know, combined technology where heat pump water heater, so it really efficiently heats hot water. Then that hot water goes through, you know, a radiator to also provide space heating, or it could be the example we heard this morning where the waste cooling from the heat pump water heater actually provides air conditioning. So neither of those things are routine in residential construction.

MR. STRAUSS: Is that in sense of a catch-all or --

MS. BROOK: It's a catch-all.

MR. STRAUSS: -- other compelling possibilities?

MS. BROOK: Yeah, yeah.

MR. STRAUSS: Okay. And then my comment is I'd like to encourage us to think broadly about the intended pilot aspect of both these programs. And I think from that perspective it's important that we open up the range of types of projects that

can be addressed by this.

MS. BROOK: Okay.

MR. STRAUSS: So two areas where I see a problem are the potential focus on these large builders. So if it's a focus particularly on the largest builders or there is no cap on the amount of incentive for any given builder, very likely the largest builders will just take it all.

MS. BROOK: Okay.

MR. STRAUSS: And I think that when we lose out on the opportunity to understand how other builders in the industry -- and I think those other builders --

MS. BROOK: Okay.

MR. STRAUSS: -- in the industry are probably more similar to those who do the retrofits and other types of building that's not just new construction, and so I think we miss out on educating those groups and receiving data from those groups.

MS. BROOK: Um-hum. So you could propose that a number of builders is actually another metric that we track.

MR. STRAUSS: Right. Or that it's not -- that there is a cap on --

MS. BROOK: Yeah, yeah, yeah. A cap --

MR. STRAUSS: -- a cap --

MS. BROOK: -- on incentive per builder.

MR. STRAUSS: -- on incentive per builder.

MS. BROOK: Yeah, um-hum.

MR. STRAUSS: And similarly I think also focusing only on the 100-percent electric new build I think also runs into a similar problem. Because, as we saw this morning, it seems like there are a lot of consumers who are still demanding --

MS. BROOK: Right.

MR. STRAUSS: -- some gas, which also seems to suggest that once that gas has been put into a development, there are going to be other ways in which it's going to conflict in other structures. And I don't think the amount of incentive here is going to change that factor.

MS. BROOK: I think that's a very good point. And I would point you to the appendix that I was looking at earlier today where the base line emissions from cooking is like --

MR. STRAUSS: Right.

MS. BROOK: -- an order of magnitude or less than water heating and space heating. So it's like you're letting the enemy -- we're being perfect to be the enemy of the good, right?

MR. STRAUSS: Right.

MS. BROOK: So -- so, in other words, --

MR. STRAUSS: So if you --

MS. BROOK: -- you know, less than a hundred -- I don't remember if it was kilograms per year, or whatever -- of emissions for cooking, for gas cooking, and by saying all

electric, you don't get the majority of the emissions reductions for space and water heating that somebody --

MR. STRAUSS: Right.

MS. BROOK: -- would otherwise want to do.

MR. STRAUSS: And I think the project then misses out or the pilot misses out --

MS. BROOK: Yeah.

MR. STRAUSS: -- on reaching a wider variety of different type of systems because there is not funding in this program to actually make that decision point between --

MS. BROOK: Right.

MR. STRAUSS: -- electric and no electric.

MS. BROOK: Right.

MR. STRAUSS: You're going to make that decision because --

MS. BROOK: Right, and then the other --

MR. STRAUSS: -- you want a Viking range or a range, whatever it is.

MS. BROOK: Exactly, exactly. The other example would be the 10X, --

MR. STRAUSS: Right.

MS. BROOK: -- you know, solar water heating thing that it could have a back-up of electric or it could have a back-up of gas, but it's getting the 10X where a heat pump might only get 3 or 4 X, right? So --

MR. STRAUSS: Right.

MS. BROOK: -- we might arbitrarily want to cut that option off if the back-up was gas, right?

MR. STRAUSS: Absolutely.

MS. BROOK: Okay. All right.

MR. STRAUSS: Thank you.

MS. BROOK: Um-hum.

MR. SARTER: Hi. John Sarter with the Clean Coalition.

I'm really happy to see a couple of the earlier comments discussed the need for resilience, which is what I pointed out earlier. That's why energy storage is very necessary. Energy storage doesn't have to be electric chemical. It can be a lot of different things: Hydro, mechanical. So there's a lot of different technologies there.

But I want to put on a different hat. I am also a designer, builder, developer of zero-net-energy and zero-net -- or net-positive-energy buildings. And the absolutely lowest-hanging fruit is creating efficiency in the thermal envelope of building.

MS. BROOK: Uh-huh.

MR. SARTER: And then as one of the other comments suggested that you can create internal sources of pollution that you have to address, so the answer is you put in heat-recovery ventilation --

MS. BROOK: Right, right.

MR. SARTER: -- which helps save energy. It creates a much healthier indoor environment overall. But I didn't see that there are were any incentives necessarily being attributed to that.

MS. BROOK: So there was supposed -- there should be a category under space heating and space cooling, or maybe it's just space heating for envelope efficiency.

MR. SARTER: Okay, great.

MS. BROOK: And that's where that would get captured, but --

MR. SARTER: Okay. It's also thermal-energy storage, essentially.

MS. BROOK: Right. And then there was the kicker incentive for thermal-energy storage.

MR. SARTER: Okay, that's good to know, yeah.

MS. BROOK: Yeah.

MR. SARTER: And, you know, it's -- the other technology that's coming forward that I haven't heard mentioned for storage is vehicle-to-building energy. And that's technology that is about to be deployed in the market beginning in 2020. I'm bringing a system in. I think it holds a lot of promise as well. So you can really start to value stack these different sources. Your vehicle is your energy storage. It's your transportation, it moves goods, et cetera.

MS. BROOK: Um-hum, um-hum. Okay.

MR. SARTER: Yeah.

MS. BROOK: Great.

MR. LITH: Yeah. Hi, Martha. My first comment was to keep things simple in terms of incentives. So I was actually going to make a comment in favor of doing a per-building incentive, --

MS. BROOK: Right.

MR. LITH: -- especially on new build.

MS. BROOK: Right.

MR. LITH: I just heard Ariel's arguments for doing things piecemeal and leaving a gas option in houses. And those are interesting. So I'm --

MS. BROOK: Yeah, I feel the same way. I'm very --

MR. LITH: I can see arguments on both sides of that.

MS. BROOK: Yeah, yeah.

MR. LITH: But the idea of incentivizing stoves, for instance, and then incentivizing the heat pump, it seems redundant. What you really want to do is get people to think about how to build a carbon-fee home. So that was the argument in terms of that.

The other thing is I just wanted to -- I know this is repetitive. I heard you listening to me but talk about focus on market transformation. So you made a comment maybe ten commenters back about how combining heat pumps with storage

could lead to greater sort of efficiency in reducing greenhouse gas and by doing load shifting. And maybe that was worth greater incentives.

And my thoughts about that is that it's just -- when you start to think about how to optimize each incentive, you're getting away from the larger vision of market transformation, which is really about growing the market and not worrying too much about whether you have optimized each investment but whether builders are more familiar with the technology, customers are demanding the technology, installers know how to install it and are recommending the technology.

And so when you come from it from that perspective, I think it's a much simpler problem, that you don't get caught up in all of the sort of arcane calculations of optimizing each installment, --

MS. BROOK: Yeah.

MR. LITH: -- but rather you think about how can I really get this market ball rolling. And then you let the market take care of it, --

MS. BROOK: Yeah.

MR. LITH: -- because those people will optimize.

MS. BROOK: Right.

MR. LITH: When the technology is more likely available, people for whom it's more optimal will look around and say, hmm, this is an option now for me. They might not have

thought about it before. So you achieve the same ends.

MS. BROOK: Right.

MR. LITH: But I think you have a much more simple public policy proposition and much more simple aims. And you don't have to get caught up in thinking about -- and to that end, the metrics I noticed should be focused really on building markets and building different market segments. It's not just one market obviously.

MS. BROOK: Okay.

MR. LITH: There's going to be lots of different segments, both climate zone and housing type and income levels, and such. And tracking, not just how you're doing in those segments but also whether people are -- are liking the technology, whether they're recommending it to neighbors and those kinds of things.

MS. BROOK: Okay.

MR. LITH: Customer acceptance. So, yeah, that's my big comment, --

MS. BROOK: Okay.

MR. LITH: -- is don't get too caught up on optimizing --

MS. BROOK: I appreciate that.

MR. LITH: -- energy savings because that's not the point. The point is that in a sense you get to our -- our goal is we're going to need to have a whole lot of us, and so it's

going to have to not just be where it's optimal but everywhere.

MS. BROOK: Yeah, and I agree with you, and I think that's definitely the -- those are the two ends of the scale we're trying to balance is --

MR. LITH: Yeah, market transformation, market transformation --

MS. BROOK: Well, and I think that there is a real -- and especially if you look at the history of the Energy Commission where we spend a lot of money giving all these options to builders so that they have various ways to comply with our code, and so it would be natural for us to say, okay, well, now we'll give you lots of options for a new building incentive, but at the same time I completely agree with you that really we want that whole building to be low carbon. And if you just did these things, these very limited number of things, we would consider you low carbon, so we should just give you that incentive and forget about all the math, so --

MR. LITH: Well, I would aim for the people who most benefit because they're the most likely to adopt early.

MS. BROOK: Right, right.

MR. LITH: But in the end I'm not so concerned about whether the next person I give an incentive to was the perfect person so much as whether that increases the chances of yet someone else adopting and yet someone else adopting.

MS. BROOK: Okay, okay. All right. Thank you.

MR. NESBITT: George Nesbitt, HERS rater.

So the people's republic of Berkeley could not implement the HERS rating system to educate the citizens for fear that the State was going to force them to replace their single-pane wood windows. Yet they can force everyone to have an all-electric new home. And I was born in the city of Berkeley, so I can -- I can criticize it.

So if you're going to do an all-electric program, are you going to incentivize projects in Berkeley if they're required to be all electric?

MS. BROOK: Yeah, I think we would, because we're still saying that the mixed-fuel home is the base line.

MR. NESBITT: Yeah.

MS. BROOK: Yeah.

MR. NESBITT: You know, I think we -- one of the problems with so many of our programs is we're always so technology-widget focused.

MS. BROOK: Um-hum.

MR. NESBITT: The reality is we need to -- someone on WebEx asked what's the role for the architect. And, as I said earlier, both new construction and existing has a lot of the same problems. You could take a good design and bad construction can ruin it. You can take a bad design, construction -- construction might be able to save it. New Building Institute's got lots of data, you can show that, you

know, basically similar buildings or similar uses have as wide range as new buildings of energy use. So the better ones had better design. They had better construction. We know things like commissioning is very vital.

So I think we need to really focus more -- if you teach an architect how to design a good building, and they do it on every building as opposed to, well, we got this project, we got to get ten percent better than code to get this incentive or to meet this CTAC or whatever requirement, you know, what have you done, the earlier we get involved in projects the easier it is to shift and to come up with better decisions and not have it value-engineered out. So if we can educate architects, general contractors, contractors, trade people, if we can get them to learn how to do their job right and well, and to make good choices and implement, that emergency water heater situation may actually be a better replacement and not just a slap -- slap --

MS. BROOK: Well, and that's what we're -- that's exactly what we're trying to do --

MR. NESBITT: So that -- and --

MS. BROOK: -- with the technical assistance portion of the BUILD program.

MR. NESBITT: And that would be market transformation, --

MS. BROOK: Okay.

MR. NESBITT: -- because we've got -- every day

there's' retrofits. Whether it's single measure, multiple measure, additions, it's happening. We just -- we live in this world of a program and six-percent participation rate, and, well, what's the rest of the market doing.

MS. BROOK: Yeah.

MR. NESBITT: You know, maybe we need to incentivize pulling a permit on existing buildings more. That's the incentive, for you to pull the permit. What you do, we almost don't care.

MS. BROOK: Okay, all right. Thanks.

MS. YARNALL LOARIE: Good afternoon. My name is Jessica Yarnall Loarie and I represent the Sierra Club and the Law Program.

I just wanted to make a quick comment that I was heartened to hear in your presentation that you're considering a 30-percent floor for low-income incentives, that potentially that number could be higher. Since I know the Sierra Club and other groups have commented that certainly frontline communities don't deserve to not see these incentives and it would be important to ensure that a good component of this program is aimed at those.

MS. BROOK: Okay.

MS. YARNALL LOARIE: I also wanted to mention there has been a lot of rhetoric today I think about gas and I think, you know, these programs, the intent seems to be about

decarbonization and I'm not sure that the rhetoric about gas really appropriately belongs within the four corners of this proceeding. So I think transparency and moving forward and looking at, you know, truly decarbonized solutions would be important. And thank you for your time.

MS. BROOK: Yes.

MR. SEVERANCE: Bruce Severance, Mitsubishi Electric.

I wanted to just point out that we have been talking about hydrogen and power-to-gas scenarios since the mid-1980s that I can remember, and that it's been always 20 years out. Like 10 years go by, and they say, well, it's still 20 years out. So -- and I don't think that that's necessarily greenwashing. I think it's been a difficult goal to attain. And I think that some of the comments on the part of gas advocates today are valid. There should be kind of a moonshot program to try to get that scenario off the ground and achieve economies of scale. And certainly there is a role for that in California.

The idea of, you know, running that in peaker plants or a lot of industrial applications are going to require high heat: Aircraft, trucking infrastructure, there's so many applications where we need that as part of the solution --

MS. BROOK: Right, right.

MR. SEVERANCE: -- regardless. And it can certainly supplement the RNG, which currently it's projected can only meet

about 20 percent of current projected demand for 2050. And if we are really good at energy efficiency, it might meet 30 or 35 percent.

So you know if there was a way to satisfy that where it wasn't just another prototype program but that it actually got into some kind of economies of scale to bring the cost down, I think that would be an exciting innovation and a critical part of the global solution.

So, you know, I don't think that those of us that talk about electrification in the residential sector are in any way adverse to that, we just don't see that happening. There is a skepticism about it. And I have heard some of my friends on the environmental advocacy side say that they think it's greenwashing, and I don't believe that it is. I think that that's a viable technology and one that we should look closely at.

But at the same time if we're talking about leveling the playing field, which I agree with in principle, we should look at the historic subsidiaries for gas exploration and extraction over the last 50 to 100 years. And you know now we distinctly have a problem with carbon emissions. And 85 percent of our greenhouse gas emissions are from burning fossil fuels and about 5 percent is what I understand is associated with methane emissions. And some of the estimates, there is a range of estimates on just how great a problem that is. So that's 90

percent of the problem, and we do need to electrify where we can.

So I think, all that being said, I want to agree in principle with the idea of a level playing field and perhaps other legislative initiatives that hold out an XPRIZE kind of competition for how to make power to gas really happen and not just on a prototype level. I think it would be super to see that accelerated in some way.

MS. BROOK: Okay. All right.

MR. SEVERANCE: Yeah.

MS. BROOK: Thank you.

Okay. So thank you, all, for staying for the day. And if there are no other WebEx questions, then we're going to have Rory wrap up.

MR. COX: Yeah. Well, thank you, all, for being here, and especially for you that haven't left already and sticking it out to the end. I think it's -- we've had a lot of really good and thoughtful discussion and comments and questions. So we really appreciate that.

And also just -- you know, this is -- so this is a $50 million-a-year program which, we've heard over and over again, isn't that much for the task at hand. But I do want to remind you that there are two other proceedings that -- where this kind of program is being considered, where these kind of incentives are being considered. One is the SGIP proceedings, which I

already mentioned, regarding energy storage and qualifying water heaters for that.

The other is the Energy Efficiency proceeding. And this is like the first time I have been to one of these decarbonization proceedings where the three-prong test does not come up, which is kind of amazing. But that's what's being --

(Comment from the back of the auditorium.)

MR. COX: Yeah, there is a vote Thursday. So that's being considered by the Commission right now to revise the three-prong test. So that's kind of happening in the Energy Efficiency proceeding. So that's -- that's going on as well. So this is just, you know, kind of one piece in a jigsaw puzzle of different program opportunities.

The last thing I want to do is thank the CEC staff for coming here and helping out. We've got the IT department, we've got a court reporter, we got the -- we have Martha, we have the analysts. And it's great. This is the second time they have traveled to one of these workshops, because we had one in L.A. in April, and they traveled to that. So I think next time we have one of these, it's definitely your turn, you know -- no. Yeah.

And so that -- I just wanted to make sure that, you know, that we really appreciate your coming out and helping out. And you've been excellent collaborators and partners on this whole project and it's been great, it's been a great

collaboration.

So thank you all for your participation. And thanks.

(Applause. The workshop was concluded at 3:41 on the p.m.)

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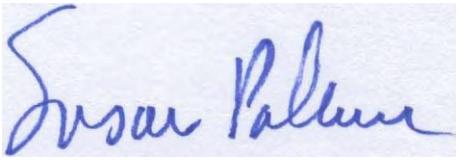

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