

<b>DOCKETED</b>	
<b>Docket Number:</b>	21-IEPR-06
<b>Project Title:</b>	Building Decarbonization and Energy Efficiency
<b>TN #:</b>	239220
<b>Document Title:</b>	Transcript - 6-22-21 for SESSION 2 BUILDING DECARBONIZATION EQUIPMENT, TECHNOLOGY, AND SUPPLY CHAIN
<b>Description:</b>	6-22-2021_Session 2_IEPR Workshop transcript FINAL
<b>Filer:</b>	Raquel Kravitz
<b>Organization:</b>	California Energy Commission
<b>Submitter Role:</b>	Commission Staff
<b>Submission Date:</b>	8/9/2021 5:06:48 PM
<b>Docketed Date:</b>	8/10/2021

CALIFORNIA ENERGY COMMISSION  
IEPR LEAD COMMISSIONER WORKSHOP

In the Matter of: ) Docket No. 21-IEPR-06  
 )  
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 )  
RE: *IEPR Commissioner Workshop* ) COMMISSIONER WORKSHOP  
*on Building Decarbonization -* )  
*Equipment, Technology, and* )  
*Supply Chain* )

SESSION 2: BUILDING DECARBONIZATION: EQUIPMENT, TECHNOLOGY, AND  
SUPPLY CHAIN

REMOTE ACCESS ONLY

JUNE 22, 2021  
SESSION 2

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## Panelists:

Bob Raymer, California Building Industry Association (CBIA)  
Betsy McGovern-Garcia, Self-Help Enterprises  
Bryan Dove, Mutual Housing California  
CR Herro, Meritage Homes  
Brandon DeYoung, DeYoung Properties  
Matt Price, Activate Global  
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## P R O C E E D I N G S

1  
2 June 22, 2021 2:00 o'clock p.m.

3 MS. RAITT: So good afternoon, everybody. Welcome  
4 to today's 2021 IEPR Commissioner Workshop on Building  
5 Decarbonization - Equipment, Technology, and Supply Chain.  
6 We had the morning session. This is the afternoon Session.  
7 I'm Heather Raitt, the Program Manager for the Integrated  
8 Energy Policy Report, which we refer to as the IEPR.

9 This Workshop is being held remotely, consistent  
10 with Executive Order N-08-21, to continue to help California  
11 respond to, recover from, and mitigate the impacts of the  
12 Covid-19 Pandemic. The public can participate in the  
13 workshop consistent with the direction in the Executive  
14 Order.

15 To follow along, today's presentations have been  
16 docketed and posted on our website. Also, all IEPR  
17 workshops are recorded, and both the recording and written  
18 transcripts will be linked to the Energy Commission's  
19 website after the workshop.

20 Attendees have the opportunity to participate in a  
21 few different ways today. For those joining through the  
22 online Zoom platform, the Q&A feature is available for you  
23 to submit questions. You may also upvote a question  
24 submitted by someone else. Click the thumb's up icon to  
25 upvote. Questions with the most upvotes are moved to the

1 top of the queue. We will reserve a few minutes near the  
2 end of each panel to take questions from the Q&A, but we're  
3 likely not to have time to address all the questions  
4 submitted.

5 Alternatively, attendees may make comments during  
6 the public comment period at the end of the afternoon.  
7 Please note we will not be responding to questions during  
8 the public comment period.

9 Written comments are welcome and instructions for  
10 doing so are in the meeting notice. And written comments  
11 are due July 7th.

12 And with that I will turn it over to Commissioner  
13 McAllister. Thank you.

14 COMMISSIONER MCALLISTER: Very well. Thank you,  
15 Heather.

16 Can you see me? Oh, here we go. Okay. Now you  
17 can probably see me, okay.

18 Thanks, Heather. Really great workshop this  
19 morning. Want to thank everyone who put that together and  
20 all the speakers, to sort of set the stage.

21 And this afternoon we're going to delve into the  
22 latter two panels, the last two panels, final two panels of  
23 today, first getting builder perspectives and then looking  
24 at emerging technologies and some barrier-busting approaches  
25 that we should consider going forward. So really looking

1 forward to everyone, just thanks in advance to our ten  
2 panelists this afternoon. And I think we're laying a really  
3 great foundation for this track of the IEPR.

4           So thanks, Heather, for keeping this train firmly  
5 on the track and rolling forward.

6           We have a series of workshops about building  
7 decarbonization. We laid out some of those themes this  
8 morning, but certainly weaving equity throughout the  
9 discussion. I would encourage our panelists today and  
10 subsequently to do that. Looking at financing, looking at  
11 the HFC path forward in terms of penetration of heat pumps.  
12 So lots of meaty topics that all together wrap up into an  
13 aggressive building electrification and decarbonization path  
14 forward for California.

15           So along the way also, I will just give everyone  
16 the heads-up, we will be trying to this morning we talked a  
17 bit about other states and what they're doing and different  
18 ways that the different states are leading from their  
19 particular contexts. And California is working with a lot  
20 of other states through the Climate Alliance and also  
21 through the national associations of both the PUCs and the  
22 state energy offices to really share best practices and  
23 learn from each other, and that's going to be critical. We  
24 also have some international partnerships with some of the  
25 leading states, primarily in Europe. So lots of learning.

1           And it's really a heavy time right now for  
2 building decarbonization because everyone is figuring out  
3 the path forward. And we need these technologies, we need  
4 them to scale, and we need all of these market participants  
5 that we're hearing from today to really do it, you know, on  
6 behalf of all of us but together with all of us. You know  
7 the rubber hits the road with the speakers that will be here  
8 today on the builder's perspective and the OEMs we heard  
9 this morning. These are -- the supply chain is really  
10 critical, and I just want us to be very conscious of keeping  
11 our finger on the pulse of the actual world that we live in  
12 and how we can shift it at some scale and do that in an  
13 equitable way.

14           So with that I just want to Commissioner Monahan  
15 if she has any opening comments and, if not -- well, please  
16 go ahead if you'd like.

17           COMMISSIONER MONAHAN: Thanks, Commissioner  
18 McAllister.

19           Well, I don't really have any opening comments.  
20 We have a jam-packed afternoon, so best we turn it over to  
21 the panelists.

22           COMMISSIONER MCALLISTER: Great. Thanks a lot.  
23 Back to you, Heather, and to the first panel.

24           MS. RAITT: Thank you.

25           So we have -- our first panel is moderated by



1 Tiffany Mateo.

2 And so, Tiffany, if you could go ahead.

3 Tiffany is the Mechanical Engineer in the Existing  
4 Buildings Office at the Energy Commission's Efficiency  
5 Division.

6 Go ahead, Tiffany. Thanks.

7 MS. MATEO: Thanks, Heather.

8 Yes, I'll be introducing the panelists for the  
9 Builder and Developer Perspectives on Building  
10 Decarbonization.

11 Just a friendly reminder for Commissioners to hold  
12 questions until after all the panelists have presented.

13 First up we have Bob Raymer, the Technical  
14 Director at California Building Industry Association.

15 Go ahead, Bob.

16 MR. RAYMER: Thank you, Tiffany.

17 And thank you, Commissioner McAllister, for  
18 inviting me today. I'm Bob Raymer, with the California  
19 Building Industry Association. And for those of you that  
20 aren't familiar with CBIA, it's a statewide trade  
21 association. We have 3,100 member companies that are  
22 involved in residential and light commercial construction.  
23 And our member companies are responsible for roughly 85  
24 percent of the new single-family dwellings built in  
25 California each year.

1           Sort of the message I'd like to impart on the  
2 attendees today is that industry is trying to do a whole lot  
3 in a short period of time right now. The legislature, the  
4 administration, and especially the Energy Commission clearly  
5 wants industry to move away from the traditional mixed-fuel  
6 home to one that's all electric. At the same time the  
7 administration and especially the Air Resources Board would  
8 like us to replace the traditional gas-powered cars in the  
9 garage with electric vehicles. And due to rising utility  
10 rates, public safety power shutoffs, and net energy metering  
11 rules for rooftop solar, we're looking at an urgent need for  
12 onsite storage, for grid harmonization, and to insulate our  
13 homebuyers from peak-load rates. With all these policies  
14 coming together simultaneously, and a good way to describe  
15 this is like a three-dimensional chess game, we're looking  
16 at a threefold increase in the amount of electricity that a  
17 typical residential dwelling will be consuming in the near  
18 future.

19           Thanks to the Energy Commission standards, we're  
20 going to be using this electricity very efficiently, but the  
21 fact is we're going to be using a lot more of it. At the  
22 capitol a lot of this policy takes place at the 30,000-foot  
23 level, but what does it look like at the parcel level?  
24 That's where myself and Chris Ochoa, the fellow who is  
25 taking my place, we're trying to figure out how all of this

1 works together on sort of a micro basis.

2           For example, with all this going on, do we have a  
3 clear understanding of what the electrical panel on the side  
4 of the house is going to look like in the coming years.  
5 Will we have to make a leap from a 200 amp panel to a 400  
6 amp somewhat commercial-size panel? Or should we be doing  
7 it with a 200 amp panel and one or more sub panels, and  
8 possibly segregated, depending on the use of the solar panel  
9 and the battery that will be in the garage.

10           So it's kind of a trying time in terms of market  
11 penetration. We heard a lot about that this morning, but  
12 particularly with the heat pump water heaters. The current  
13 market penetration in California is about two to three  
14 percent. And that's not so good. We need to change that  
15 and we need to change it quickly.

16           Thinking back to 2012, the market penetration of  
17 solar on new homes was less than one percent. Through the  
18 application of the CEC's New Solar Home Partnership Program  
19 and the CEC's Photovoltaic Compliance Credit, we were able  
20 to work with the Commission and increase our market  
21 penetration of rooftop solar to 30 percent by 2020. And  
22 that's when the mandate took effect. And I have to say,  
23 having done this for 40 years, that was a steep hill to  
24 climb, but we did it. And we did it in a way that  
25 California did not fall into the ocean. Through this

1 effort, the transition to Solar Mandate was a lot smoother  
2 than had the CEC tried to accomplish this back in 2012.

3           Now the good news here is the transition to heat  
4 pump technology is not going to be nearly as trying and  
5 challenging as the Solar Mandate. But, once again, it's  
6 also not something that necessarily happens overnight. And  
7 so we need to do the same thing for heat pump technology.  
8 We need to get thousands of designers, builders,  
9 subcontractors, and building officials familiar with this  
10 technology so we can move the needle from the 2,000, where  
11 it currently is, to 100,000 a year. And that's a heavy  
12 lift, but we've shown in the past that it can get it done.  
13 We just kind of all need to work and play well together.

14           Now I'd like to kind of speak on the market  
15 tipping point here. It's no secret that one of the biggest  
16 obstacles to all electric construction for consumers is for  
17 gas stoves. Builders build homes that people want to buy,  
18 and so builders are very keen at understanding the  
19 marketability of various features in the home.

20           When it came -- a few years back, we surveyed a  
21 large group of potential homebuyers, and over 80 percent  
22 absolutely wanted a gas-powered stove in the home. And when  
23 it came to space heating and water heating, they didn't much  
24 care. What they did care about was that a water heater that  
25 provided plenty of hot water when they wanted hot water and

1 a space heater that provided enough heat in the winter. But  
2 when the question regarding the stove, that invoked emotion.  
3 New home buyers really, really wanted the gas stove.

4           Unfortunately what we failed to ask during that  
5 first initial survey was that for those of you that really  
6 wanted the gas-cooking stove, of that 70 percent, are you  
7 familiar with the electric induction stove. And my gut  
8 feeling here is the vast majority of them are not familiar  
9 with induction technology, but they sure are familiar with  
10 the old, red coil electric resistant heaters that they used  
11 to learn to hate years ago.

12           So if you take that 70 percent of the potential  
13 homebuyers who love gas stoves and get them to warm up to  
14 the induction technology, consumer pushback for an all-  
15 electric home is going to drop off like a rock. And clearly  
16 that's why we view that kind of as the tipping point here.  
17 It's not the space and water heating out there. And, quite  
18 frankly, part of the survey that we did, it was clear that  
19 many of the respondents weren't all that familiar with  
20 whether or not they had electric or gas water heating in the  
21 first place, and the same thing went for the dryer, the  
22 clothes dryer. Many of them were unaware of whether it was  
23 electric or gas powered. And that kind of shows you that  
24 the transition in terms of marketing won't be that  
25 difficult, but it is the stove. And once we get people to

1 kind of fall in love with the electric induction stove,  
2 that's going to be a game-changer going forward.

3           Now some approaching challenges. As I mentioned  
4 early on, we have several agencies involved in this effort.  
5 In addition to the CEC's Energy Code, we've got the  
6 Department of Housing, the Office of the State Fire Marshal,  
7 and the Building Standards Commission who are deeply  
8 involved in the adoption of the electrical, mechanical,  
9 building, and fire codes. And every one of these agencies  
10 are scrambling right now to keep up with these evolving  
11 policy proposals and to do it in a way that keeps us all  
12 safe and keeps costs to a minimum.

13           These agencies are going to need ongoing technical  
14 assistance for the near future. And I strongly encourage as  
15 many of you as possible to engage in California's code-  
16 adoption process.

17           And, lastly, the PUC is currently engaged in  
18 several proceedings that could have a profound impact on  
19 this, in addition to the usual rate proceeding where  
20 increases in electricity rates are being considered, there's  
21 also the proceeding to update net energy metering rules that  
22 apply to solar energy systems. And of course this could  
23 have a significant impact on the economics associated with  
24 solar energy, but the fact here is the Solar Mandate is not  
25 going to go away. And I do see the potential for solar

1 economics to change, which could significantly increase the  
2 value of onsite storage.

3 So with that, Tiffany, I'd like to kind of turn it  
4 back over to the next speaker. Thank you.

5 MS. MATEO: Great. Thank you, Bob.

6 Next up we have Betsy McGovern-Garcia, Real Estate  
7 Development Director at Self-Help Enterprises.

8 MS. MCGOVERN-GARCIA: Well, good afternoon,  
9 everyone. As Tiffany mentioned, my name is Betsy McGovern-  
10 Garcia. I'm the Director of Real Estate Development at  
11 Self-Help Enterprises.

12 Next slide, please.

13 Just briefly, who is Self-Help Enterprises? We're  
14 a 55-year-old nonprofit organization. We're based in the  
15 San Joaquin Valley. We serve eight counties in the valley  
16 and Mariposa County is our only mountain community. We  
17 build rental housing and single-family housing. We work  
18 with small community districts, providing emergency  
19 services, water, sewer, and energy solutions. And we  
20 participated, we have participated in the alphabet soup of  
21 programs: The Greenhouse Gas Reduction Fund programs, Low-  
22 CARB Transportation, Affordable Housing and Sustainable  
23 Communities, LIWP, SOMAH, all of those programs.

24 We really view sustainability through the lens of  
25 disadvantaged communities and low-income families, and so

1 that really is who we represent. Next slide, please.

2           Some examples of our recently completed  
3 developments, Sequoia Commons and Palm Terrace. Both focus  
4 on greenhouse gas reductions and VMT reductions. And we  
5 recently went through an evolution where we have increased  
6 our density from 20 -- 10 to 20 units per acre. And all of  
7 these are grid-neutral, zero-net energy projects, but they  
8 do include natural gas, so we have not entirely transitioned  
9 to all-electric building. Next slide, please.

10           Here is a graphic of where we're going in the  
11 future: three-story buildings, some more dense development,  
12 solar over everything so at one point hopefully we have  
13 enough solar to offset all of the electrical loads. Next  
14 slide, please.

15           Just a bit on some of the decarbonization  
16 challenges we see. We've got a 56-unit project in downtown  
17 Visalia. Wanted to go all electric. And there was an  
18 extra price tag of \$320,000 for using heat pump central  
19 electric water heaters. And in the absence of any incentive  
20 program or funding, it just wasn't a price tag that we could  
21 swallow. I really like Bob's analogy of talking about solar  
22 incentives and how that shifted absorption rates. If there  
23 was some kind of incentive program for heat pump all-  
24 electric water heating in conjunction with affordable  
25 housing, I think we would really see broad absorption across



1 the state.

2           We continue to see lack of technology and labor in  
3 the San Joaquin Valley. We tend to be kind of late adopters  
4 when it comes to certain types of technology, yet we've got  
5 a huge amount of disadvantaged communities and we've got a  
6 huge amount of old buildings that could benefit from all-  
7 electric retrofits.

8           And then we worry about the costs of electricity  
9 versus natural gas in communities where we can't get a  
10 sufficient amount of solar PV to offset the costs. In our  
11 communities, all of our residents are low income. They're  
12 under 80 percent of varying median income, and so if we  
13 don't have a sufficient amount of solar PV to offset  
14 electrical loads, our residents end up paying the bill, and  
15 they end up in housing situations that are no longer  
16 affordable. Next slide, please.

17           Some additional challenges we see. Changes in  
18 time-of-use tariffs. You know five years ago we ran our 20-  
19 year projections based on the knowledge we had available at  
20 the time, and then time of use started shifting, and  
21 everything got turned on its head. We've got threatening  
22 legislation through legislation like AB 1139 which would  
23 dramatically change the economics of solar PV. And these  
24 are affordable rental communities where we don't have the  
25 benefit of marking up our rents to absorb the additional

1 expenses. And so our risk is potentially having projects  
2 that are not feasible or having to displace low-income  
3 families if the solar becomes so unaffordable that we can't  
4 continue to operate our projects.

5 We're concerned about the VNEM process at the CPUC  
6 and want to make sure that there is equity throughout that  
7 process. And these communities that are designed to be  
8 primarily all electric continue to have the benefit of  
9 affordable solar.

10 I've talked about physical constraints. There is  
11 an ongoing need for solar PV incentives. We are huge  
12 adopters of LIWP and SOMAH, and SASH and MASH, and all the  
13 programs. And I will say the one thing about LIWP was the  
14 intensive technical assistance. If you want to work with us  
15 hand in hand to go all electric and really decarbonize the  
16 San Joaquin Valley, we need programs with technical  
17 assistance, that they can come out, really evaluate our  
18 buildings and give us good constructive direction on how to  
19 accomplish those energy goals. Next slide, please.

20 Community-wide solutions. We're finding that a  
21 lot of solutions are too narrow in focus. Many of our  
22 really remote rural small communities are also disadvantaged  
23 communities. So not only are they suffering from expensive  
24 propane, lack of distributed generation, they've also got  
25 air quality impacts and low economic attainment and

1 educational attainment rates. We're seeing a lot of older  
2 single-family homes and mobile homes that are in need of  
3 housing rehab, and currently are working on a pilot with 11  
4 communities to help get families off expensive propane and  
5 identify community-wide all-electric solutions.

6           A few things that we think will help with the  
7 future as we go this direction are community-wide solutions.  
8 If we've got a community with older roofs in need of rehab,  
9 can we identify community-wide solar that really benefits  
10 the residents in those communities and not just the  
11 electrical provider in those communities. We recommend  
12 funding pilot projects in the communities you want to  
13 change. If we were to fund the larger-scale pilot projects  
14 throughout the San Joaquin Valley and share those lessons  
15 learned with our peers, I think it would go a long way for  
16 furthering decarbonization goals.

17           I've talked about extensive technical assistance  
18 in community design and engaging local implementers. We've  
19 seen other incentive programs where, you know, people are  
20 hired from L.A. to come into the San Joaquin Valley and  
21 implement programs and it's not just effective. We need  
22 local implementers who know the communities, who can really  
23 get to the residents.

24           And the final thing I just want to share that I  
25 skipped over earlier is that a lot of the state's funding

1 programs are focused on cost, so they're driving down the  
2 cost of housing communities. At the same time we're being  
3 told we should go all electric and focus on energy goals.  
4 And so there needs to be some collaboration between the CEC,  
5 CPUC, and HCD to identify energy goals, exempt them from the  
6 housing costs within funding, rating criteria, and  
7 competition criteria so that we can simultaneously identify  
8 cost savings in other areas while also working together with  
9 the state to achieve all electric and decarbonization goals.

10 So we're happy to be at the table, excited to have  
11 a say in this, and hopefully can continue working with our  
12 partners to help achieve decarbonization. We want to  
13 support sustained healthy communities and we want to go all  
14 electric. We just always don't have the economic resources  
15 to do so. Thank you.

16 Back to you, Tiffany. I think I hit my eight  
17 minutes.

18 MS. MATEO: Yes, really good. Thanks.

19 Next we have Bryan Dove, Director of Asset  
20 Management at Mutual Housing California.

21 MR. DOVE: Yeah. Good afternoon. Bryan with  
22 Mutual Housing California.

23 And thank you, Betsy, for that presentation. I  
24 could just cede my eight minutes to Betsy, because we're  
25 going through the exact same thing.

1           Mutual Housing California is a nonprofit based in  
2 Sacramento. We own and operate about 20 apartment -- low-  
3 income apartment communities throughout the Sacramento and  
4 Yolo Counties. And we're developing more as well. We can  
5 go to the next slide.

6           Decarbonization is a great goal, but it's not the  
7 only goal, is what we're implementing -- excuse me --  
8 features in our communities that help with indoor air  
9 quality and just life on the property, such as farms -- or  
10 gardens for the residents. We've gone smoke free. We've  
11 implemented four community car-share programs at four of our  
12 sites, where residents can check out an EV car free of  
13 charge for local errands. And this gal here is holding up a  
14 sign saying: I use the car to go get groceries.

15           We also have resident education seminars, like you  
16 see here in the picture with -- on different subjects around  
17 clean living and green living. Okay.

18           One of our marquee projects is Mutual Housing at  
19 Spring Lake. This is in the city of Woodland, just north of  
20 Sacramento. This is 101 units all electric, zero-net  
21 energy. And we were able to do this because of all the  
22 alphabet soup that Betsy mentioned, the various programs  
23 that are available, and that we were able to coordinate and  
24 put one on top of each other to make this feasible,  
25 including the California Utility Allowance Calculator,

1 Virtual Net Metering, the financial incentives and rebates  
2 for PV, as well as energy efficiency. And then new -- we  
3 did benefit from newer technologies that helped reduce the  
4 electrical load at the property.

5 We have three projects either under construction  
6 or about to go under construction. And two of them are not  
7 all electric. One, we were able to patch together the  
8 financing and the will to make them all electric. The other  
9 two that are under construction now are not all electric  
10 because of these things that just weren't available to build  
11 this project here, so the virtual net metering wasn't  
12 available. There wasn't enough incentives for solar panels  
13 or just enough energy-efficiency rebates.

14 And to reiterate Betsy's point on the competition  
15 to build affordable housing, a lot of it's based on the cost  
16 of development. And so going all electric or adding more  
17 expensive technologies hurts that competition. Okay, we can  
18 go onto the next slide.

19 One thing to point out is that the buildings  
20 aren't the only thing. There are people living in these  
21 houses and there's end users that are consuming the  
22 products. And so this is a chart of the first full year of  
23 operations at the property on the annual net energy  
24 consumption. So those at the far left, they experience  
25 zero-net energy, so their bills were less than zero, and

1 then it went on up from there to some users that were off  
2 the charts. And this is after their solar credits.

3           And so, you know, we investigated what's going on.  
4 It's just people use energy differently. And if we go to  
5 the next slide, we can see some of the reasons. You know,  
6 one had this cooler with beverages in it that they had on  
7 their patio, so you will get a cold drink if you visit them,  
8 but their electricity bill was off the charts.

9           You know they have -- we installed energy-  
10 efficient refrigerators, but then they added their own from  
11 the 1960s. And so some are at a necessity, there is a  
12 household with an electric wheelchair that needed to be  
13 plugged in. So we can go onto the next slide.

14           And so again this messaging and simplicity is  
15 important, especially for a household where English is not  
16 their first language. And so we're explaining to resident  
17 who had just moved in and saw huge bills, like how to read  
18 their bill and how to read their true -up statement. Has  
19 anyone seen a true-up statement from PG&E for their solar,  
20 it's complicated.

21           And so it's interesting. Another story, we built  
22 this project, Mutual Housing in Spring Lake in two phases.  
23 And the first phase we advertise: Zero-net energy, all  
24 electric, and you should have low bills. So people moved  
25 in, and that wasn't exactly the case. We had the wrong

1 messaging. It's complicated. Some had higher bills, we saw  
2 on that chart, and others lower.

3           And then on the second phase, we did advertise it  
4 as all electric with energy-efficiency features. A little  
5 more simply. We didn't guarantee low bills, didn't  
6 guarantee anything, and it was night and day on how the  
7 residents experienced their bills living at the property,  
8 and so on. So we can go onto the next slide.

9           So some recommendations: Keep up with those  
10 incentives and subsidies for all electric, that alphabet  
11 soup. And the more the better, because one size does not  
12 fit all. A statewide virtual net metering mandate would be  
13 helpful in those areas where there is not virtual net  
14 metering available. Educational, technical assistance for  
15 maintaining new technologies.

16           Oh, another reason we didn't go all electric at  
17 the new communities is the electric hot water heaters, the  
18 central hot water heaters. We're hesitant because there's  
19 not many out there, concerned about maintenance and upkeep  
20 on them.

21           And then, finally, a simple -- simpler the better  
22 for the end user and the occupants. So thank you.

23           MS. MATEO: Thank you, Bryan.

24           Next up we have CR Herro, Vice President of  
25 Innovation at Meritage Homes.



1           MR. HERRO: Great. Good afternoon, everybody.  
2 Hopefully I'm going to walk through something that's  
3 relatively self-evident and then Brandon DeYoung, who is  
4 going to follow me, can add some more context around how our  
5 industry is operationalizing decarbonization. And it really  
6 starts as a general thesis which is there is plenty of  
7 benefits available to decarbonize our housing inventory on a  
8 go-forward basis. The challenge is, is their enablization  
9 and is there awareness in alignment with all our  
10 stakeholders. So next slide.

11           You know, I think that the main four stakeholders  
12 are obviously the utility companies, municipalities,  
13 builders, and consumers, -- next slide. And when you look  
14 at the opportunities, there is a tremendous amount of  
15 financial benefit with decarbonization if done correctly.  
16 And, you know, I think Bob pointed out a lot of the  
17 challenge and opportunities as we adopted renewable energy  
18 as a standard. It was, you know, not just trying to do the  
19 right thing but trying to do the right thing in the right  
20 way.

21           And so, you know, there's billions of dollars of  
22 financial benefit with peak load reduction. And so, you  
23 know, tying electrification and decarbonization into  
24 promoting utility grid optimization and distribution  
25 efficiencies, you know looking at the financial benefit of

1 removing combustion sources from the home and having single  
2 utility services and the financial benefit there. And, as  
3 I'm going to touch on, there is a tremendous benefit for the  
4 total cost of home operation that has not been  
5 operationalized well enough to really promote this  
6 transition from our existing organization in mixed fuels  
7 into something better.

8           From a builder's perspective right, there are  
9 these opportunities for lower infrastructure costs if we're  
10 not pulling in, you know, dual fuels. There is an  
11 opportunity to differentiate new product to have better  
12 indoor air quality by removing combustion sources. There is  
13 an opportunity to combine peak load reduction for utilities  
14 with smart homes from the builders to enhance consumer  
15 interaction and quality of life.

16           So there's all these opportunities and consumers,  
17 right, they get a more simple approach. They get the  
18 potential to tie in to direct renewable energy that ties in  
19 to direct offsets. They're not trying to change BTUs for  
20 kilowatts and do some sort of financial conversion that  
21 doesn't happen because there are two different utility  
22 companies in most markets. And then total cost. And I'm  
23 going to keep coming back to total cost because one of the  
24 enabling opportunities is to fund this cost of change in a  
25 meaningful way by capturing the long-term value in the

1 transaction. So next slide.

2           Hopefully everybody on this call recognizes that  
3 the reason home builders are at the table is they're almost  
4 half of the energy consumed in California and across the  
5 country in operating buildings. And so it is the big  
6 elephant in the room. And we need to do this correctly in  
7 order to achieve the country goals of reducing global  
8 greenhouse gas emissions. Next slide.

9           And so, you know, to understand the challenges, a  
10 lot of them is the psychology of change and the financial  
11 cost of change. From the utility companies, you know,  
12 providing accurate time-of-use rates has always been  
13 politically difficult because of the short-term impact into  
14 people that don't have the infrastructure to flex their  
15 heating and cooling costs when their appliances run around  
16 optimizing running off peaks.

17           The second piece is we're adding electrified  
18 vehicles and we're adding electric appliances that were  
19 normally gas, there is additional loads. And unless they're  
20 made smart, there is the potential to model these as  
21 additional service sizes. And Bob talked about this and we  
22 talked about this as an industry. You know we can't afford  
23 that service rate increase per unit across the inventory of  
24 homes we build. But, more importantly, it's not necessary.  
25 The opportunity is to make the energy consumption smarter so

1 that we can add these loads at the valley parts of the days,  
2 offset them from peak, make the utility more efficient, and  
3 not require us to drop in additional service size capacities  
4 at significantly additional costs.

5           You know for municipalities, there's the real cost  
6 of infrastructure investment, if we end up having a net  
7 increase in the service size and the change management  
8 associated with going from mixed fuels to single fuel, so  
9 much of that can be solved by, A, monetizing; and then, B,  
10 enabling energy to be used at the right time of the day so  
11 that it's leveling instead of just increasing a peak  
12 consumption problem that already exists in the utilities.

13           From builders, a lot of it is to leverage what I'm  
14 going to close today with, which is enabling structures.  
15 Right, can we have time-of-use rates that enable us to build  
16 in a way that we can show our consumers total net benefit in  
17 load shifting and electrification. Can we do that load  
18 management in a way that doesn't impair consumer's quality  
19 of life. And from consumers, right, can we create the  
20 awareness and the financial benefit to offset things like  
21 gas cooking, to make sure that technology doesn't create an  
22 impact during the cold days -- with electric heating, and  
23 making sure that the current capacity is available to go  
24 from multiple fuels to single fuels. Next slide, please.

25           You know not minimizing at all, a lot of times

1 there are these debates between renewable energy companies  
2 and utility companies about the duck curve. The duck curve  
3 isn't something that, you know, is a one-sided issue. It's  
4 as we move towards electrification, as we move towards  
5 renewable energy adoption, we need to address the pattern  
6 upon which people consume energy. And so this has got to be  
7 an enabling policy, an enabling part of the solution that  
8 we're leveraging to make this happen. Next slide.

9           So I think there's five major enabling  
10 requirements in order to effectively decarbonize. You know  
11 one is there the need to have better energy models, both at  
12 the utility level for forecasting demand, and just in the  
13 energy-efficiency models to adopt new technology and get  
14 credit for it in the CEC models, and for utilities to depend  
15 on technology to do consistent load shifting to size  
16 services according to new available technology that exists  
17 but ends up reflective in utility companies' modeling.

18           The second one is smart energy controls, right.  
19 There is a tremendous amount of technology coming in from  
20 Europe that's being developed that allows a prevention of  
21 stacking and load-shifting opportunities so that we can  
22 achieve additional electric load with the existing  
23 infrastructure and grid system that we have today so we  
24 don't incur billions of dollars of additional infrastructure  
25 costs unnecessarily.

1           The third would obviously be the political  
2 policies in order to do accurate time-of-use rates to drive  
3 behavior that create benefits around load leveling and peak-  
4 reduction strategies.

5           The next is the financial benefit of viable  
6 energy-efficient mortgages. They exist but they're not  
7 being used because there is not a downstream market for  
8 them. So we need to align with these energy-efficient  
9 mortgage policies with enabling technology, which means the  
10 last piece of enabling change is the influencers, the MLS,  
11 the appraisal process, the underwriting process needs to  
12 take these policy shifts for decarbonization, energy  
13 efficiency, and peak energy reduction, and reflect it in the  
14 long-term improvement in reduction of operating costs at the  
15 time of transaction, both to allow equity, to allow  
16 affordability, and to allow consumers the sophistication to  
17 make good choices in the marketplace. The next slide.

18           And it all comes down to kind of how consumers  
19 work at a choice decision. We've got to make the future  
20 promise greater than the cost and fear. And with that I am  
21 out of time, but I think all of this kind of translates down  
22 into aligning all of the stakeholders with achieving the  
23 right policies with the right outcomes.

24           MS. MATEO: Thank you for that.

25           Next up we have Brandon DeYoung, Executive Vice

1 President at DeYoung Properties.

2 MR. DEYOUNG: Hi, guys. So Brandon DeYoung,  
3 Executive Vice President, DeYoung Properties. Next slide.

4 We're a family company, as you can imagine with  
5 the name of the company. Three-generation homebuilder. And  
6 it's been in our family for kind of a long time. And my  
7 whole family of five, we all work full time at the company.  
8 The two siblings and I are starting the to run the company  
9 now. Location, we're in central San Joaquin Valley, the  
10 Fresno/Clovis area.

11 We're doing around this point in time around a  
12 hundred homes a year, but that varies just based on the type  
13 of the market we're in. It goes higher and lower. So just  
14 to kind of give you a little background on us. Next slide.

15 Just a few kind of pictures of the exteriors and  
16 interiors. You can go to the next slide. Just so you can  
17 kind of get a sense of the types of homes we build. It's  
18 all single family, detached homes. Next. And also our  
19 target market, which will kind of come into play a little  
20 bit later in my talk later, is more of a move-up, move-down  
21 buyer, so it's not their first time, they're not first-time  
22 buyers. You know, their second or third or fourth home that  
23 they have purchased in their lifetime, so they have a little  
24 bit more money to spend. They'd rather have higher-quality  
25 products. You know, they'd spend more money for a better-

1 value product. Next slide.

2           So what do we do. We have built about 8,000 homes  
3 since we started. Over the last 10 years, 10, 15 years  
4 we've really made a more strong focus on building high-tech,  
5 high-efficient homes. Really when sort of the market, the  
6 consumer trend starts to go that direction, we saw where it  
7 was heading and decided to kind of take the bull by the  
8 horns and turn it into, you know, a niche for ourselves here  
9 in the San Joaquin Valley.

10           So we've been building what we call the DeYoung  
11 Smart Home for many years now. That included high energy-  
12 efficiency, green, sustainability features, water  
13 efficiency, indoor air quality, resource conservation, and  
14 then of course energy efficiency. And then on top of that,  
15 obviously greater comfort. And then obviously some smart  
16 home features too, all the thumb gadgets, smart locks, and  
17 video doorbells, all that good stuff.

18           The thing here in our area of the state and the  
19 Central Valley, as evidenced by this last week here with the  
20 temperatures over a hundred degrees, most people -- pretty  
21 much every single person that comes to our sales office  
22 doors is wanting a high-efficiency home. And it's for two  
23 reasons, one, they want comfort, of course, but they also  
24 want lower bills. Most people have to sacrifice one for the  
25 other, right? They have to have high bills to have good



1 comfort or they have to sacrifice comfort for lower bills.  
2 And so we are able to provide both. And on top of that,  
3 obviously air quality is an issue in our state, especially  
4 here in the Central Valley as well. And so better indoor  
5 air quality. You know, people wanting to feel more safe in  
6 their individual homes, especially because of the whole  
7 pandemic situation, so providing that sense of comfort and  
8 better indoor air quality has been especially important this  
9 last year.

10           Yeah. And then we've built also our first zero-  
11 energy home, just to try to -- you know, how do we push the  
12 boundaries after we really already did. Where is the end  
13 game. And we figured it looked like zero-energy homes was  
14 that end game, of what was the direction everything was  
15 going, what seemed actually feasible. So we built our first  
16 prototype home in partnership with PG&E, Bear Energy, a  
17 number of other partners in 2013; showed it was possible and  
18 feasible. We then sort of value engineered further and  
19 eventually built another one a few years later, and then  
20 felt it was ready to scale up. So then we built three  
21 communities, over a hundred homes in total in Clovis,  
22 California, and that are all zero-energy homes. I would say  
23 about 90-, 95-percent electric -- because of the old pesky  
24 cooktop. We'll get to that in a minute here as well. Next  
25 slide.

1           So what would I say the remaining challenges are.  
2   You know, first of all, I would say I definitely echo all of  
3   the sentiment of the previous speakers. I have gone through  
4   all those same, you know, processes and challenges, and have  
5   thought through all the same stuff. So -- but, you know,  
6   we're all definitely aligned on what everyone else is  
7   thinking and doing. And so these are just kind of a few  
8   thoughts that come up in my mind reflecting back on  
9   everything we've already done to this point and what we  
10  should be looking at going forward from our perspective.

11           So it really comes down to electrification is the  
12  issue. You know there are a few things to keep in mind, and  
13  obviously everyone has already mentioned the gas cooking.  
14  You know Bob had a nice specific number there. I don't have  
15  a number, but I can tell you we would lose sales if we  
16  required only electric cooking. And if I went to my  
17  executive team and said, hey, guys, we're going to switch to  
18  a hundred percent electric and no option for gas even for  
19  cooking, they would shoot me, shoot me down there. So it  
20  just wouldn't happen, at least right now.

21           And I would say it's two things. And the second  
22  point there it's a consumer education issue, exactly as Bob  
23  has mentioned. And also it's just a stubborn human issue,  
24  as I call it. You know humans do not like change. And when  
25  they say I look my gas cooking and, you know, you're going

1 to have to pry that from my cold dead hand, some people just  
2 mean that, right. And that's just -- it's what it is,  
3 right. No matter how much you educate them of why this  
4 other thing is great and then potentially better in many  
5 ways, that's just how a how a bunch of people are. And so  
6 that's just going to be a thing.

7           So I would say on the consumer education  
8 standpoint, you know, we've done as much as we could to try  
9 it with the time that we have to devote to an issue like  
10 this, to try to educate the consumers as best we can, so at  
11 the point of sale when they're picking what they're going to  
12 put in their home, as far as appliances we go, we show a  
13 very short little YouTube clips from the manufacturer. That  
14 made it really easy to show the benefits of an induction  
15 cooktop versus the gas, you know, standard included  
16 cooktops. And there's really great aspects to it. Really  
17 great.

18           Safety, the cooktop surface is not what actually  
19 gets hot, it's the pan or pots, right. Anyway, you could go  
20 on, right? Everyone already knows. But trying to promote  
21 that has been really important, but just even that is making  
22 it still -- it's still a tough sale, let's put it that way.  
23 So let's go to the next slide.

24           Okay, cost. I would say, you know, CR and a  
25 number of other people have talked about costs. I would

1 say, you know, trying to push efficiency further beyond  
2 where the Code minimum is now under the 2019 Title 24, I  
3 would say is a problem. And I would say since we've built  
4 beyond the Code minimum at zero-energy levels, which the  
5 current Code in my opinion is not a zero-energy code, as  
6 some people might say. What we built was true zero energy  
7 beyond that. And, unfortunately, building to that degree,  
8 we have found that there are sort of a diminishing returns  
9 issue. You know homebuyers perceive value of a zero-energy  
10 home versus one that's just very energy efficient, which I  
11 would consider is the Code minimum now. That perceived  
12 value is not really all the way there. And so not every  
13 buyer would be willing to put their money out there for  
14 something like that. And so we've actually kind of pulled  
15 back from zero energy being our focus and have focused more  
16 on just very energy efficient, right, but all that comes  
17 along with that and of course just the sustainability in  
18 general, better health, indoor health, comfort, etc.

19           And then regarding electrification, the upfront  
20 costs, you know, it's a much smaller delta than we  
21 originally thought for a long time, but it's still there.  
22 You know, switching, as a few other panelists had mentioned,  
23 switching to heat pump systems, going to induction from gas,  
24 there is a delta there for sure especially because a lot of  
25 these items are just so uncommon still, unfortunately, so

1 the scale is not really there.

2           And then also just as other panelists had  
3 mentioned, the operation costs going from gas to kilowatt  
4 hours, you know, it's -- it's significant. And unless you  
5 have solar on the home to offset that and bring that cost-  
6 per-kilowatt hour down and make it relatively equivalent to  
7 gas, it's an issue. Next slide. I know my time's out, so I  
8 might not be able to hit some of these other ones.

9           But, basically, the last two slides say, in  
10 summary, right now, with all the craziness going on right  
11 now in the homebuilding and construction world with supply  
12 chain issues, with labor shortages, of cost, inflation  
13 issues, everything you can imagine, it's every other week  
14 there is another major fire I've got to put out, whether  
15 it's lumber prices, whatever, luckily that's starting to  
16 come off a little bit. And even the Texas storm screwed up  
17 a bunch of supply chain, you know, normal supply chain  
18 processes.

19           Anyway, efficiency and electrification, and all  
20 these things that we have all been pushing for for so many  
21 years now starts to kind of take a little bit of a backseat  
22 when you're struggling just to fill the house itself and  
23 build it affordably so you don't lose money. And so I would  
24 say a lot of the R&D and innovation efforts tend to, you  
25 know, take a little bit of a backseat compared to some of

1 these other issues. So I just kind of want to put that out  
2 there so everyone realizes that, you know, in our world  
3 there's bigger issues that kind of play into the resources  
4 that our company can devote to this topic. Just  
5 something for everyone to kind of keep in mind. So, anyway,  
6 I'll go ahead and stop there.

7 MS. MATEO: Thank you, Brandon.

8 Thank you to all the panelists. Looks like we  
9 have good representation from the builder and developer  
10 perspective. Now I will invite questions and discussion  
11 from the Commissioners.

12 COMMISSIONER MONAHAN: Commissioner McAllister, we  
13 can't hear you.

14 COMMISSIONER MCALLISTER: Okay. Sorry about that.  
15 So thank you, Commissioner Monahan.

16 I want to just thank everyone. Nice job, Tiffany,  
17 moderating. And thanks, everyone, for sticking on time.  
18 We're exactly on time, so appreciate that. Good to see all  
19 of you. You know, thanks a lot to our speakers, Bob, Betsy,  
20 Bryan, and Brandon, and CR. So thanks, I appreciate that.

21 I do have some questions. I think I'll actually  
22 defer to my colleague Commissioner Monahan. I think  
23 Commissioner Gunda was not going to be able to join us this  
24 afternoon but wanted to just make sure you had a chance to  
25 ask any questions you might have.

1           COMMISSIONER MONAHAN: Yeah. Well, this could be  
2 for all the panelists -- but maybe mostly Bryan and Brandon,  
3 because some of the things both of you said really struck  
4 me.

5           Bryan, you were talking about how the cost of  
6 development hurts the competition and, you know, basically  
7 you want to go for always the lowest cost so you could build  
8 more housing, which completely makes sense.

9           And then Brandon's comment that the upfront costs  
10 of electrification are lower than expected but they're still  
11 there. I wonder, can you talk about what specifics of what  
12 costs are higher and just whether there -- I mean I'm  
13 wondering what we can do to on the policy side to impact  
14 decision making around, you know, having it be more than the  
15 upfront costs at the deciding point in how to invest in low-  
16 income housing, in particular.

17           That was a little convoluted. Maybe start with  
18 this first one, maybe Brandon, around what upfront costs are  
19 higher still and what was kind of surprising in terms of  
20 costs being somewhat comparable or lower.

21           MR. DEYOUNG: Yeah. Well, there is kind of the  
22 three main components that I'm thinking about which would  
23 be, you know, heat pump HVAC, heat pump water heating, and  
24 induction cooking. The heat pump HVAC, it was really kind  
25 of the really big one for us for a long time. You know,

1 three grand a home, or something like that.

2           We came to find -- come to find out years later --  
3 or maybe, yeah, probably a year or two later that the main  
4 reason for that delta is -- not the entire reason but the  
5 key reason for that cost delta -- was that we actually  
6 jumped to higher-efficient equipment. And so if we just  
7 simply switched from gas to heat pump electric with a  
8 relatively equivalent efficiency rating between the two and  
9 it was true apples for apples, the cost delta would be no  
10 where near as high as it had been when I was comparing that  
11 before. And so it was kind of a false equivalency, you  
12 know, it wasn't a true apples for apples in our estimates.  
13 But we were so focused on using that higher-efficiency  
14 equipment to get to zero energy, which was our goal for so  
15 long. That's why we were using that higher-efficiency  
16 equipment.

17           But if we want to just meet Code minimums, which  
18 is again very efficient already, right, it's super stringent  
19 now with the new 2019 Code, but if you want to just meet  
20 that and use, you know, what the equivalent heat pump  
21 equipment would be for that, it doesn't have to be as high  
22 efficiency as we were using for our true ZE homes. So  
23 that's kind of one thing in mind.

24           So I actually kind of am semi exploring off to the  
25 side making a switch early and offering as an option maybe



1 to customers that would want to go heat pump HVAC if it's a  
2 relatively -- you know, relatively a wash cost wise. But  
3 then when you get into the operating-cost issue that I  
4 mentioned, right, of kilowatt hours versus gas and, luckily,  
5 we install solar on every home, right, so that helps  
6 significantly mitigate that issue, but to what degree I  
7 don't know yet. That's what I want to research before we  
8 actually decide to do that.

9           Can I say with confidence to my customer walking  
10 in the door that, you know, your energy bill will be  
11 relatively the same if you go electric heat pump HVAC versus  
12 gas furnace, I can't right now. I don't have that data  
13 myself to feel comfortable saying that, so at this point I  
14 wouldn't feel comfortable offering it.

15           COMMISSIONER MONAHAN: And it sounds like Bryan's  
16 experience was opposite, that the customers didn't find that  
17 they saved money, which actually was one of the most  
18 disturbing parts of this entire panel to me, because we  
19 always think of higher efficiency and fuel switching between  
20 natural gas and electricity, which is higher efficiency, but  
21 it would be cheaper in the fact that it's not turning out to  
22 be cheaper, I mean that actually is -- that's a place that  
23 policy should be able to play a role to fix and it's  
24 concerning that we're experiencing that here.

25           MR. DOVE: Some do save money, some save a

1 significant amount of money, and they all benefit from the  
2 solar credit, so it's less than it would have, but with the  
3 heat pump water heaters and the electric resistance, so it  
4 works well for average or typical water heater usage, but  
5 when you're overloading that water heater, that -- those  
6 extra water heating gets -- that uses electric resistance  
7 that costs more money to run.

8           Back to the question on the policy decision on --  
9 it's the competition, lower development costs win the  
10 competition through the California Tax Credit Allocation  
11 Committee, and so that's a policy decision. And to the  
12 extent any energy-efficiency upgrades could be excluded from  
13 that.

14           I see Betsy chiming in. You probably know more  
15 about this than I do, but that --

16           MS. MCGOVERN-GARCIA: Yeah, I would just add that  
17 I think back to the New Solar Homes Partnership and how  
18 effective that was in shifting our adoption of solar PV. I  
19 think there could be something similar for heat pump  
20 technology within the context of low-income housing tax  
21 credits. If you bring in incentive dollars to cover that  
22 expense, it takes it out of your total development costs,  
23 and therefore has no impact on your competitiveness. So I  
24 think if the State was strategic on allocating incentive  
25 resources to pay that cost differential that Brandon talks

1 about, in going with all-electric technology, you could  
2 mitigate the losses in competitiveness and really start to  
3 shift utilization of those technologies, because it would no  
4 longer impact their competitiveness for funding.

5 LEAD COMMISSIONER MCALLISTER: Coma, do you have  
6 any other --

7 COMMISSIONER MONAHAN: Commissioner McAllister,  
8 I'll turn it over to you because I --

9 COMMISSIONER MCALLISTER: Okay, great.

10 COMMISSIONER MONAHAN: Yeah.

11 COMMISSIONER MCALLISTER: Thanks a lot. No, great  
12 question. And I actually wanted to follow up with Betsy and  
13 Bryan in particular about the TCAC and that approach. You  
14 know they just actually got rid of the favorable treatment  
15 or the sort of point system around energy efficiency, in  
16 particular in the criteria that they use to allocate funding  
17 and prioritize projects. And I think, so at the Energy  
18 Commission we're convening, at the Governor's Office  
19 request, the multi agency group together with the PUC and  
20 the ARB but also the housing finance agency and others that  
21 are involved in low-income finance, HCD. And I'm going to  
22 ask you to be open to maybe presenting at that at some point  
23 to help level-set across all the agencies around this very  
24 issue because it's critical. And you know we can create  
25 some kind of record here in the IEPR, but I think there's

1 nothing like getting it in front of the agency leads across  
2 the board and get on the same page and have a discussion.  
3 So I'm going to just put that out there and ask staff to  
4 follow up with you on that.

5           Let's see, I wanted to also talk about -- Betsy, I  
6 think you mentioned and, Bryan, I think as well around these  
7 larger central heat pumps in multi-family situations. And  
8 we have found that in our work on the Building Code, the  
9 staff has found that that is an under-developed segment of  
10 the heat pump market. And I guess I'm wondering if you  
11 could provide a little more color, what do you think is  
12 necessary, what conditions would need to be met? Is it  
13 purely cost? Or do you not understand the performance? Or  
14 is it just they don't have the sizes that you want? What  
15 are the various issues that are all wrapped up in that  
16 segment of the heat pump market.

17           MS. MCGOVERN-GARCIA: Yeah, sure. For us, we had  
18 an 80-unit rental housing community and it was relying on  
19 four central water heaters throughout the u-shaped building.  
20 And the cost differential for those units was 60,- to  
21 \$80,000 per unit for the four units. So that's upwards of,  
22 you know, 260,- to \$320,000 overall. And so we really had  
23 to determine whether or not that was a good use of  
24 resources.

25           Secondly, is getting enough solar on the rooftop

1 to offset those expenses, which we have talked about. If we  
2 don't do a good job of sizing our solar and it doesn't  
3 offset all of the electrical load, then our residents pay  
4 the bill for that, right? And so we have to do a good job  
5 through VNEM, making sure that the generation allocations  
6 offset the usage.

7           We just don't have a lot of data ourselves on the  
8 loads and actual implementation, and so I think seeing some  
9 of that data and how it actually plays out over -- over a  
10 series of time. We've also had the curve ball during Covid  
11 of having consumption habits change dramatically, so we have  
12 one site that we converted to heat pumps and we went mostly  
13 all electric, and then everyone stayed home for the next  
14 year and our consumption quadrupled and now we can't pay any  
15 of our bills. So we're trying to do a better job of  
16 projecting forward consumption habits, but when it's an  
17 unknown, and you have the added expense of the technology  
18 plus the additional solar, and you no longer have a solar PV  
19 incentive like you used to under the New Solar Homes  
20 Partnership for new construction, it's a double whammy and  
21 it's just enough to push it over the edge of not going all  
22 electric.

23           COMMISSIONER MCALLISTER: Okay. Thank you very  
24 much. I have one other question. I guess we are headed  
25 towards this heat pump future, right, and once we figure

1 out, once the marketplace understands and embraces that  
2 piece, produces the right, you know, boiler replacements  
3 essentially for hot water in multi-family larger buildings,  
4 there will be options there.

5 I guess, do you think about future proofing? In a  
6 new construction setting, do you think about future proofing  
7 in that way? Like if you have to in the near term put a  
8 boiler in, a natural gas-fired boiler because you don't have  
9 any other options, do you set your building up so that 15,  
10 20 years, 30 years down the road when you are faced with a  
11 boiler upgrade or replacement, would you be able to  
12 accommodate electric?

13 MS. MCGOVERN-GARCIA: Yeah, that's an interesting  
14 question. I don't know that we would -- I guess it would be  
15 a question of our panel configuration and our loads, you  
16 know, those types -- that type of backbone infrastructure to  
17 make sure that we have the electrical loads to support it.  
18 We have not done that type of forward thinking. We're not  
19 against doing that. We -- you know, we put in conduits for  
20 charging stations and communities where we don't have the  
21 resources to put in the electric vehicle charges upfront.  
22 For a long time, many years on our single family, we were  
23 stubbing for solar PV and then Grid Alternatives or another  
24 organization would come in and put in that technology. So  
25 we're certainly open to that line of thinking and it's one

1 area that we have not done that kind of forward planning, so  
2 I think that does present some unique opportunities.

3 MR. RAYMER: One of the challenges with that in  
4 multi-family, particularly existing multi-family, and CEC  
5 staff found this out as we were going through the last year,  
6 and it's the size, a lot of times when you're doing a  
7 retrofit in multi-family, getting rid of the boiler, you're  
8 going to have to knock out a wall because you need to  
9 increase size. And many times that wall is a bearing wall,  
10 and that's a problem. So it just -- it depends, you know.

11 MS. MCGOVERN-GARCIA: Yeah.

12 COMMISSIONER MCALLISTER: Yeah. We're doing  
13 actually quite a bit, as you know, Bob, in the single-family  
14 space, --

15 MR. RAYMER: Oh, yeah.

16 COMMISSIONER MCALLISTER: -- you know in the low-  
17 rise and single-family detached with that substitution, but  
18 we have apples to apples in the marketplace. In the larger  
19 systems, we don't. So just want to get people thinking  
20 about that.

21 Really appreciate you and Brandon and CR kind of  
22 helping us understand the pulse of the buyer, so thanks a  
23 lot.

24 I just wanted to mention the SB 1477 BUILD  
25 Program. You know we are talking about retrofit. We

1 haven't talked much in this panel about retrofits, but any  
2 thoughts you might have, you know, about -- maybe it's for  
3 the next panel more, but how we sort of follow the line of  
4 thinking from this morning around how we get retrofits and  
5 that portion of the supply chain and, you know, that's --  
6 that's what the TECH program over at the PUC is targeting,  
7 so also very important.

8 But I think if we have any time left, do we have  
9 any attendee questions, Kristy or Heather?

10 MS. RAITT: I'm not seeing any open ones.

11 MS. CHEW: Yes. Hi, this is Kristy. There were  
12 two questions that were asked, but it looks like the  
13 panelists had already gone into the Q&A and answered them.  
14 Although, Ram Narayanamurthy said that he wanted to answer  
15 it live.

16 COMMISSIONER MCALLISTER: Oh, okay, so we may be  
17 getting an answer in the next panel for one of the previous  
18 questions?

19 MS. CHEW: Yes.

20 COMMISSIONER MCALLISTER: Okay. Let's see, I  
21 guess so if we don't have any -- do we want to open up for  
22 any public comment, or are we waiting till the end of the  
23 afternoon for that?

24 MS. RAITT: Oh, we'll wait till the end of the  
25 afternoon.



1 COMMISSIONER MCALLISTER: Okay.

2 MS. RAITT: We can just go ahead and move onto the  
3 next panel.

4 COMMISSIONER MCALLISTER: Okay, we're a few  
5 minutes ahead of time, I think we're about ten minutes ahead  
6 of time, which is great.

7 So thank you very much to our panelists. Really  
8 appreciate. Lots of follow-up to do. Thanks for helping us  
9 build the record here around these issues and we'll have  
10 lots to talk about going forward. So thanks again. And  
11 staff will certainly be following up.

12 MS. RAITT: Great. Thank you so much.

13 So we'll move onto the next panel. This is  
14 Heather. I'd like to introduce Yu Hou is the moderator. He  
15 is a Supervisor in the Building and Energy Efficiency  
16 Research Office within the Energy Commission's Energy  
17 Research and Development Division. And the panel is on  
18 California Building Decarbonization Activities.

19 So go ahead, Yu.

20 MR. HOU: Thank you, Heather.

21 Good afternoon, Commissioners, panelists, and  
22 everyone. My name is Yu Hou. I'm from the Energy  
23 Commission's Research Division, as Heather mentioned.

24 In this panel we'll look at some of the emerging  
25 technologies and solutions that we have made to bust some of

1 the barriers. And I think there are a couple of projects  
2 that we may highlight and my fellow panelists might talk  
3 about. And we perhaps address some of the discussion from  
4 the last panel, so thank you for setting that up. It's a  
5 very good setup for this discussion.

6 So before I present and introduce my panelists, I  
7 will take the opportunity to present briefly the overview of  
8 the particular work by the Energy Commission's Research  
9 Program. Next slide.

10 The CEC's R&D program focuses on innovation  
11 scenarios like energy efficiency and generation storage for  
12 resilience, low-carbon fuel transportation, to bring  
13 breakthroughs from lab to market. The investment organized  
14 around investment areas shown on this slide.

15 For building decarbonization, the focus is on  
16 investing in new energy technologies to improve the  
17 affordability, health, and comfort of California residential  
18 and commercial buildings. Next slide.

19 The CEC has two main R&D funding programs. The  
20 EPIC program investment charge, or EPIC, which focuses on  
21 research and to benefitting the electricity ratepayer. The  
22 Natural Gas Research and Development Program which  
23 emphasizes the research to benefit natural gas ratepayers.  
24 Both programs provide funding through a competitive  
25 solicitation process to invest in technologies and the

1 strategy to catalyze change and accelerate achievement of  
2 policy goals. Next slide.

3 Our research also focuses on supporting under-  
4 resourced communities by increased access to clean-energy  
5 technology that can lower energy burdens, address  
6 challenges, and reduce costs. Under-resourced communities  
7 include disadvantaged communities, low-income communities,  
8 and Native American Tribes. As an example, the map shows  
9 the location of all EPIC projects that have benefitted those  
10 communities. Next slide.

11 So I'm going to highlight a few of our projects  
12 related to building decarbonization in the next set of  
13 slides. Electrifying HVAC and the water heating system with  
14 high-efficient equipment is a critical strategy for  
15 decarbonizing our buildings. Our research has focused on  
16 developing advanced heat pumps that integrate the best  
17 available energy-efficiency technology into one system.  
18 This came through with the variable-capacity compressor,  
19 variable-speed fans, thermal controls, and so on. Our  
20 research has showed that such system can reduce cooling  
21 energy use by 20 to 30 percent compared to current  
22 technology.

23 And the retrofitting multi-family buildings could  
24 be difficult, costly, and very disruptive to tenants. We're  
25 working on developing an integrated mechanical module that

1 includes the HVAC and water -- and the hot water heater in  
2 the same pot. And those models can be mass produced and  
3 installed. The project focused on demonstrating those  
4 modules in low-income and disadvantaged communities. And  
5 those modules, just a response to some of the discussion  
6 earlier, those modules are for individual dwellings. And we  
7 also have other projects for large capacity centralized heat  
8 pump water heating -- water heater using CO2 as a  
9 refrigerant. And I'd be happy to follow up with some of the  
10 panelists from the previous panel if you are interested in  
11 those technologies.

12           We're also working on low global warming heat  
13 pumps that can be plugged into a 120-volt outlet, and so it  
14 can be easily installed. Those units incorporate a low-cost  
15 exchanger and reduce energy use by 30 percent. Unlike the  
16 typical window air conditioning unit, and you can still open  
17 and close the windows when ventilation is needed. Next  
18 slide.

19           Building envelope retrofit are critical to  
20 improving efficiency and reducing energy costs for  
21 residential but are rarely included in renovations because  
22 of cost. Multi-family buildings are especially challenging  
23 to retrofit. We have a project using an aerosol ceiling  
24 technology that was previously developed by the CEC's  
25 research program, in combination with the blown-in

1 insulation and the new phase-changing material technology to  
2 improve the building insulation.

3           Windows are the poorest thermally performing  
4 envelope system. High-performance triple-pane windows have  
5 a low rate of adoption due to the increasing weight and  
6 cost. We are funding a research demonstration project of a  
7 thin glass triple-paned windows used with multi-family and  
8 single-family housing unit. Those window units have the  
9 same size and weight as double-paned windows. In other  
10 words, the thermal performance over the much better thermal  
11 performance compared to a double-paned window.

12           We heard from last panel the discussion of siting  
13 the solar PV to achieve zero energy. As the roof space  
14 become more limited of PV installation, one possible  
15 solution is to embed PV into windows while at the same time  
16 letting the visible light pass. This project will  
17 commercialize a transparent coating technology that can be  
18 applied directly to glass window panes to generate  
19 electricity and simultaneously provide high-energy  
20 efficiency by insulating the building from solar heat.  
21 Potential to reduce HVAC heating and cooling demand, up to  
22 30 percent. Next slide.

23           So the hospital is among the most energy-intensive  
24 facility in California. I think healthcare has the highest  
25 natural gas usage as a subsector. In a healthcare setting,

1 the moisture from the outside incoming air is removed by  
2 cooling the airstream with chilled water. A chiller is  
3 providing the chilled water for this purpose. After this,  
4 the airstream needs to be reheated back to a comfortable  
5 level before being supplied into a room. And this heating  
6 process is done by hot water. And the hot water is often  
7 provided from a heat source, either a boiler or a heat pump.

8 In this project, the humidification process and  
9 the reheating process are combined together using a single  
10 water loop. The water is heated up by the incoming air, the  
11 warm water is then used to reheat, to dehumidify the  
12 airstream. The goal of this project is to reduce or  
13 eliminate natural gas use for the reheating process, while  
14 in the same time reducing your cooling load.

15 We're also developing and in the process of  
16 preparing a decarbonizing healthcare guidebook to provide  
17 healthcare facilities with the clear path to decarbonize  
18 their buildings. The guidebook will be interactive and you  
19 can get more information using to the link provided on this  
20 slide. Next slide, please. Next slide.

21 So I know my time is up. So we also have a  
22 platform that helps people to connect, to networking, and  
23 finding demonstration sites, for -- and funding  
24 opportunities, so Empower Innovation is the site for that.  
25 Next slide.

1           And we are in the process of developing our EPIC  
2 program for the next four years, for the EPIC Investment  
3 Program. There are some topics that are covered here. You  
4 can sign up to receive more information. And next slide.  
5 That will be all my talk.

6           And so now I will introduce our panelists. First,  
7 we will have Matt Price, who is the president of Activate  
8 Global.

9           Matt.

10          MR. PRICE: Thanks, Yu. Good afternoon,  
11 everybody. So Matt Price, President of Activate, which is a  
12 nonprofit organization based on in Berkeley and a part of  
13 the Regional Energy Innovation Cluster as supported by the  
14 CEC and a proud kind of partner of theirs in how we think  
15 about what we do. So next slide.

16          We set up Activate as a nonprofit organization a  
17 little over five years ago, because our general view is that  
18 scientists are needed now more than ever as it relates to  
19 manipulate the fundamental building blocks of the physical  
20 and biological sciences so that we can dramatically shift  
21 how we consume energy and resources in our built -- and  
22 industrial environments. And in the 2013, 2014, when we  
23 were getting off the ground we were seeing that there was  
24 phenomenal intellectual capital and intellectual talent all  
25 throughout California that had novel, you know, technology

1 ideas, especially in energy-related applications, but there  
2 was no investor appetite to give them the initial amount of  
3 money that they needed in order to build a first prototype  
4 and a first concept of their idea.

5           And so that's where we came into play, is to  
6 enable a pathway to dramatically increase the success rate  
7 of these innovations going from the thought in a scientist's  
8 mind to a widget that can be manufactured locally and turned  
9 over to stockholders in California. Next slide.

10           You know part of the problem that we were seeing  
11 especially in the Bay Area is that a lot of innovation, and  
12 there is a lot of powerful innovation especially in the  
13 energy market that can happen via software, and largely  
14 because it's relatively cheap and it's relatively fast in  
15 order to iterate on software innovations. You know a few  
16 months of code, several conversations with stakeholders, you  
17 know, and a small skeleton team can get a first prototype  
18 out there and into the hands of a couple of different end  
19 use and applications.

20           If you go to the next slide, the story becomes  
21 very different if you're innovating with barrier-busting  
22 technologies or what we call hard technical innovation. You  
23 know here expensive equipment is needed, safety  
24 considerations are in place, and the amount of time and  
25 money that it takes in order to go from first concept to



1 access to the tools and equipment that are needed to  
2 validate these things are just incredibly time-consuming.  
3 And so that's what we set off to solve for as an  
4 organization and looking forward to sharing some of the  
5 technologies that are coming out of this type of program as  
6 well as some of the things that we have learned about what  
7 are some of the challenges that these types of really early  
8 stage companies are facing. Next slide.

9           The recipe for success in our model is we need to  
10 find this really unique breed of entrepreneurial scientists.  
11 These are people who are trained in our university and  
12 academic settings to manipulate these fundamental building  
13 blocks but have a desire and capability to work in a  
14 resource-constrained way and in an entrepreneurial way.

15           And so the four kind of recipes of our success is:  
16 We need to give them time, so we provide them with a two-  
17 year fellowship where we say if they dedicated their time to  
18 tackling these really hard problems, we'll commit two years  
19 of funding and then a team to work with them.

20           They also need access to world-class research  
21 labs, so we've been a really fortunate beneficiary of a  
22 great partnership with Lawrence Berkeley National Lab, where  
23 this model really originated with Cyclotron Road, and came  
24 up with a methodology in a legal construct that allows these  
25 entrepreneurial scientists to come and access Berkeley lab

1 and U.C. in order to get really fast learning cycles on  
2 these technology concepts.

3           A lot of the scientists have been trained in how  
4 to think about record-breaking technologies in performance  
5 but not necessarily in how to develop commercially-oriented  
6 technologies. So there is a lot of education that we wrap  
7 around this, and the CEC and the EPIC Program has been  
8 really helpful in providing us with resources to help invest  
9 in building out entrepreneurial, educational libraries and  
10 examples of excellence that entrepreneurs can use regardless  
11 of whether they're in our program or not.

12           And then, lastly, they need to be connected to an  
13 expert community. You know experts like the builders who  
14 were on the prior panel, EPRI, utilities, investors, other  
15 corporate partners play a really important role in quickly  
16 helping the entrepreneurs figure out what are the right  
17 problems to be tackling, versus what are the problems that  
18 should be left in a more academic setting. Next slide.

19           We've done this over the last five years. We've  
20 actually just brought in our newest cohorts. So it's over a  
21 hundred fellows that we have supported since the -- since  
22 the founding of this concept. And the success rate has been  
23 phenomenally high in terms of being able to go from first  
24 concept to a prototype that we can start handing over to  
25 integration partners and utilities to start testing out the

1 capabilities of this system. And we're now supporting  
2 fellows mostly in the Bay Area and then our program that was  
3 launched in Boston recently as well. Next slide.

4           So in terms of a couple of examples, I have got  
5 three here. Gradient is actually one that you just saw a  
6 slide on. That is the new name of TREAU that had developed  
7 a new compressor technology that allows for non-  
8 hydrofluorocarbon -- non-HFC refrigerants for air  
9 conditioning and using this low polymer heat exchanger to  
10 dramatically increase the efficiency of window units,  
11 participated in our program, benefitted from the RAMP  
12 Program (phonetic) as well as SGC funding order to get, you  
13 know, from their initial prototypes to something that's now  
14 getting ready to be launched in the market four years later.

15           Nelumbo is a company that developed a surface-  
16 modification technology. They can manipulate metal and  
17 allow metal to repel water. This becomes enormously  
18 important for heat exchanger applications broadly for all  
19 different types of built environments. You know their  
20 success came from finding customers who really had a big  
21 pain point, in this case it was heat exchangers who were  
22 world class and global in nature as it related to micro-  
23 channel heat exchangers. And they wanted to bring micro-  
24 channel heat exchangers into refrigeration applications but  
25 couldn't because water was always fouling up the channels

1 that provide the energy efficiency benefit. And through a  
2 partnership with Nelumbo they now have the ability and are  
3 bringing large-scale industrial micro-channel heat  
4 exchangers to different refrigeration applications because  
5 of their ability to repel water.

6           And then AeroShield fits into the theme of in the  
7 built environment, so they're working on -- on aerogel  
8 technologies. So think about window panes that are thinner,  
9 you know thinner than single pane, lighter than single pane  
10 but have an energy efficiency and insulation capability  
11 that's higher than triple pane. They are based out of  
12 Boston and newer in their developments, and going through  
13 kind of the early stages of working on getting their  
14 transparent aerogels evaluated and adopted in the built  
15 environment. Next slide.

16           So in terms of the challenges, you know at the end  
17 of the day it's really just about -- it's long, thank you  
18 for the note, and I'll wrap up -- a lot of technology,  
19 development time, UL certifications, proving out the  
20 business cases in different climates, and just a very  
21 complicated sales process. Next slide.

22           In regard -- you know, because of these  
23 challenges, a bunch of really innovative programs have been  
24 created a lot here in California as well as in other places.  
25 The Flex Lab is a phenomenal facility at Berkeley Lab in

1 order for testing integrated technologies. The CEC's Cal  
2 Test Bed program which is providing vouchers to 60  
3 facilities across the state is something that a lot of our  
4 companies have benefitted from. And then there's other  
5 incubators and accelerator programs in New York, like Urban  
6 Future Labs and the Innovation 2 Program at Colorado and  
7 NREL where they focus on both doing the validation in a lab  
8 setting as well as connecting it to commercial applications  
9 as quick as possible. And so we've seen these types of  
10 programs be really catalytic and starting to tackle some of  
11 the challenges that were in the prior slide.

12 Thank you. Those are my comments.

13 MR. HOU: All right. Thank you, Matt.

14 And next we have Ram -- Ram, I've known Ram for a  
15 while now, especially we worked together after the Pandemic,  
16 and I still can't pronounce his last name correctly, so I'm  
17 not going to butcher it.

18 Ram, you can teach me how to do that.

19 MR. NARAYANAMURTHY: Yeah, no problem.

20 MR. HOU: Ram is the Technical Executive Director  
21 and Program Lead from Electric Power Research Institute.

22 Ram, take it away.

23 MR. NARAYANAMURTHY: Thank you, Yu. And good  
24 afternoon, everyone. I'm kind of broadcasting live, so  
25 hopefully this goes well.

1           So I know this is a panel on emerging  
2 technologies, but I couldn't help but be fascinated by the  
3 discussion of multi-family retrofits from the previous  
4 panel, and hopefully we can touch on that a little bit too.  
5 Next slide, please.

6           So when we think about decarbonization of  
7 buildings, right, we look at it as there's multiple tasks  
8 for decarbonization. So one of the things that we tend to  
9 focus on is decarbonization doesn't have to be a straight  
10 path right now today. Let's keep our options open. We have  
11 to drive efficiency. Efficiency is indeed a part of  
12 decarbonization, but then we have electrification. We have  
13 to look at the embodied carbon in buildings. And we should  
14 also keep in mind the potential for low-carbon fuels in  
15 buildings. So all of these can play together as we look at  
16 our overall strategy for decarbonization. And that drives  
17 the technologies that will help us achieve our  
18 decarbonization goals in 20 years. Next slide, please.

19           So our big challenge as we see it is how do we get  
20 to decarbonize our existing building stock at a dollar per  
21 square foot? All working, CR and Brandon, and there is a  
22 technically-feasible pathway, there are a few small gaps in  
23 the supply chain, maybe a \$3,000 difference on heat pumps  
24 versus natural gas furnaces, but we can get there.

25           Now the next challenge is what do we do with our

1 existing buildings, and that becomes the big, big challenge  
2 that we are facing today. So, yes, electrification is a  
3 technically feasible pathway, but we are seeing in actual  
4 implementation is a lot of these challenges and trying to  
5 figure out those application challenges leads us to new  
6 technologies. Next slide, please.

7           So what are the key electrification challenges?  
8 And a lot of lessons we take are from work we have done  
9 through the EPIC Program with doing whole building, all  
10 community-scale retrofits for existing low-income multi-  
11 family buildings. So we look at existing multi-family  
12 affordable housing as probably the leading edge. If you can  
13 figure out the solution for that building stock, we can  
14 figure out the solutions for all the other building stocks.  
15 So, A, we need innovative heat pump solutions. And by  
16 solutions it's not just the technology but the technology in  
17 the perspective of the application. I think Bob mentioned  
18 breaking down walls to get heat pumps in. So how do we  
19 actually find solutions that fit those institute challenges.

20           We see a lot of challenges that are in the  
21 existing distribution system. The distribution system  
22 today, especially in areas that don't have air conditioning,  
23 don't have enough capacity. Yes, with single family you can  
24 -- you can get away with electrification just doing a panel  
25 upgrade, but when you get to multi-family, it goes up in

1 scale. An 80-unit multi-family means that you usually have  
2 to end up updating your transformers and wiring, etc., so we  
3 have to address that.

4 And, finally, the customer economics. With our  
5 current rates, getting to all electric or electrifying our  
6 existing building stock usually means the total energy cost  
7 goes up, so we got to figure that out too. Next slide,  
8 please.

9 So when we look at the existing affordable  
10 housing, right, this is a great example of what you see when  
11 you walk in the field. You have panels that are 60-amp  
12 panels, not enough capacity to take out your gas water  
13 heater and put in a heat pump water heater.

14 You have space constraints. The heat pump water  
15 heaters in the market cannot go into the spaces where the  
16 gas water heaters are. You have issues with existing air  
17 conditioners, right? You have really old air conditioners  
18 sitting there, great targets for turning to heat pumps, but  
19 then that's not what the workforce does, or the Energy  
20 Efficiency Programs today. They don't allow us to easily  
21 switch those air conditioners out to heat pumps. So these  
22 are all challenges that we want to do with existing  
23 affordable housing. Next slide, please.

24 So what are we looking at? So when we look at  
25 these technologies, I think what we have come around to is



1 it is not the latest and greatest but finding technologies  
2 that fit the application. So we know that a big challenge  
3 is how do we electrify existing buildings without increasing  
4 the total electrical -- all the electric power draw, right?  
5 So that's why we are really focused on the 120-volt heat  
6 pumps. So we have the first installation of 140 of these  
7 120-volt heat pumps in Fresno. We have to bring them in  
8 from Italy, get them UL certified, get them in place. Now  
9 we have a year of data, and they're getting scaled by the  
10 affordable housing community in new construction. They're  
11 looking at like Smart Panels. Can you use those Smart  
12 Panels to be able to switch your circuits, both to provide  
13 demand response. And if you get them into a panel use  
14 future -- future, how do we actually enable energy  
15 management but also make sure that we don't exceed panel  
16 capacities.

17           We are looking at centralized heat from water  
18 heater systems. Going from an individual gas water heater  
19 to an individual heat pump water heater means that you are  
20 significantly increasing the electrical power draw. So  
21 going to a centralized water heating system helps us  
22 substantially mitigate the power draw requirement, which  
23 avoids a lot of cost of upgrading our existing electric  
24 capacity.

25           So these are all good. Technologies that are not

1 really leading edge, but they are there, they have not been  
2 implemented in scale. And we think these types of  
3 technologies might actually help us overcome those cost  
4 barriers we see for retrofitting existing multi-family  
5 housing. Next slide, please.

6           So 120-volt heat pumps. A great technology. Matt  
7 talked about TREAU and what they are trying to develop for  
8 today. And I think TREAU's -- I mean TREAU's technology is  
9 great. We are working with them. And they are working on  
10 the 120-volt window air conditioner options. For today,  
11 what they are working with is this company called Ephoca out  
12 of Italy, now in New York. The New York City Housing  
13 Authority is actually working with those units.

14           What we are trying to do is get in these units  
15 today so we can start retrofitting our existing multi-family  
16 very quickly. The other advantage of these units is that we  
17 don't have to remove a huge chunk of wall which creates  
18 things like asbestos-mitigation issues. So we are looking  
19 at these types of technologies that help us with the  
20 application itself. I think they are about 16 SEER, 9 HSPF,  
21 so that's not really top of the line in terms of efficiency,  
22 but they bring down the total cost of application and  
23 electrification. Next slide, please.

24           Water heating. Again existing gas water heaters,  
25 so what -- what did we do, we tried different approaches.

1 Existing heat pump from water heaters don't really work as a  
2 one on one replacement. So we went in, we brought in a  
3 Sanden system, and we are displacing four homes -- or four  
4 gas water heaters with a single Sanden heat pump system with  
5 additional storage. So it's all about how you apply this,  
6 because that helps us bring down both the energy use and the  
7 total peak demand down. Next slide, please.

8           And, finally, another technology that we are  
9 excited about is what we call the Smart EMS, looking at  
10 things like Smart Panels, circuit splitters. I think the  
11 circuit splitters found their home and they started -- they  
12 got their start in the EV space. We are looking at them for  
13 electrification, but we also think of the Smart Panels. And  
14 we actually put them in so that we don't exceed panel  
15 capacities. If we don't exceed panel capacities, then we  
16 don't -- you don't have to upgrade your transformers,  
17 retrench your wiring, etc. Saves a ton of costs even though  
18 the panels themselves might be expensive. Next slide,  
19 please.

20           And I think that's a quick summary, but overall, I  
21 think the overall goal is: How do you -- how do you bring  
22 down the overall cost of electrification retrofits. There  
23 is a recency bias. I was just walking another 192-unit  
24 site, affordable-housing site today, this morning. We had  
25 all the different low-income program people come out. And

1 the programs today are all about one-on-one replacement.

2           So we said, hey, let's take out these -- these big  
3 gas boilers that are old, replace them with heat pump water  
4 heaters, the first response we get is, hey, efficiency  
5 programs today won't pay for that. So the program  
6 installers, I think from the policy level, we really have to  
7 address it because the program implementors are all out  
8 there as part of their program. They are recommending one-  
9 on-one gas -- gas boiler replacements because that's what  
10 the programs allow.

11           So, anyway, lots of barriers. I think there is a  
12 way around it. There is a financing aspect to it, we don't  
13 have time to get into today. But this is just a quick  
14 snippet of some of the technologies that we think are really  
15 fascinating for retrofitting multi-family affordable  
16 housing.

17           So with that, Yu, let me turn it over to you. I  
18 think we stayed on time. Thank you.

19           MR. HOU: All right. Thank you, Ram. Lots of  
20 familiar pictures.

21           So next we have Dan Cronin from the U.S. EPA's  
22 EnergyStar program. And he is going to talk about a heat  
23 pump clothes dryer which was talked about from the last  
24 panel. Dan.

25           MR. CRONIN: That's right. Thank you, Yu.

1           Hi, everyone. I'm Dan Cronin. I'm a Program  
2 Manager at EPA, EnergyStar products. EnergyStar is a  
3 program jointly run by DOE and EPA that helps consumers  
4 identify efficient products and help save money on their  
5 utility bills.

6           As part of that effort we're always looking for  
7 new products to add to our over 75 categories. And so today  
8 I'm going to talk a little bit about some emerging  
9 technologies: Heat pump clothes dryers; induction cooktops;  
10 SHEMs, which is Smart Home Energy Management Systems; as  
11 well as our emerging tech awards. So next slide, please.

12           So heat pump clothes dryers. How do they work?  
13 Very quickly, so there's no heating element, there is no  
14 vent in the product. It works like an air conditioner in  
15 reverse. So air is pulled through a condenser where it's  
16 heated before entering the drum. The hot air then absorbs  
17 moisture from the clothes. Next, the damp air goes into an  
18 evaporator which removes the moisture and collects lint.  
19 That same air is pulled back through the condenser to be  
20 reheated while still warm. It saves money by recycling the  
21 warm air instead of releasing it through a vent. Next  
22 slide, please.

23           So as a result this can reduce energy use by at  
24 least 28 percent compared to standard dryers. Very quickly,  
25 EnergyStar Most Efficient is the program run by EnergyStar

1 at EPA that identifies models that go above and beyond the  
2 performance of EnergyStar products. And so in this category  
3 we have our 2021 recipients of the Most Efficient  
4 recognition. They're models with efficiency only achievable  
5 with heat pump and hybrid heat pump technology. And so so  
6 far we have 23 models from eight different brands. Go to  
7 next slide, please.

8           So the overall market, right now there is less  
9 than one percent of households that have a heat pump dryer.  
10 When this technology first was released in 2012, consumers  
11 didn't like the long cycle time. In the early going it took  
12 a long time to dry the clothing. After a lot of design  
13 improvements and working with the manufacturers who make the  
14 products, now that cycle time has been reduced to a much  
15 more manageable amount of time, somewhere around 35 minutes.

16           And so the other advantages that without a vent  
17 are required to use the product, it means customers have  
18 more flexibility as to where they can put their dryer.

19           In terms of incentives, right now incentives are  
20 available from utilities for about 22 percent of all  
21 households in the U.S. And there are other kind of exciting  
22 advances being made in this category, from GE and Samsung.  
23 GE is working on an ultrasonic dryer and Samsung is working  
24 on a thermal electric heat pump dryer. Next slide, please.

25           We also wanted to touch on induction cooktops. So

1 how does this work. An electromagnetic coil creates a  
2 magnetic field when supplied with an electric current. So  
3 compatible cookware, when brought over this field is warmed  
4 internally and then transfers that energy to what you're  
5 heating.

6           So right now, as many folks were speaking previous  
7 to me, said that gas cooking is currently king compared to  
8 conventional electric cooking. The residential market for  
9 induction is low for now, but most manufacturers offer  
10 induction. We're starting to see utilities incentivize or  
11 promote residential induction in various different parts of  
12 the country.

13           And there are many other advantages to this  
14 technology. It boils twice -- it boils water twice as fast  
15 as gas or conventional electric. It doesn't heat up without  
16 cookware on it, so that makes it safer and easier to clean.  
17 And so no more guessing with precise digital controls. So  
18 there are a lot of reasons to consider it. The next slide,  
19 please.

20           So on the commercial and residential side for  
21 induction cooktops, the comparative efficiency is definitely  
22 notable. So on the commercial side, natural gas efficiency  
23 is between 25 and 40 percent. Electric resistance between  
24 60 and 70. And then induction electric is somewhere between  
25 80 and 90 percent efficiency.

1           The EnergyStar specification, including induction  
2 cooktops and ranges in development, is expected effective  
3 May of next year.

4           And then on the residential side, the efficiency  
5 is approximately 32 percent, conventional electric is about  
6 75 percent, and induction electric is 85 percent. On the  
7 residential side, this is included in our Emerging Tech  
8 Award for residential cooktops, which was extended into  
9 2022, and we are going to announce our first award soon with  
10 hopefully more applications expected. Next slide, please.

11           Smart Home Energy Management Systems, or what we  
12 called SHEMS. This is a really exciting new area that  
13 several colleagues of mine have initiated. So this program  
14 recognizes Smart Home systems that help you simplify,  
15 reduce, and manage your energy consumption. And so this  
16 recognition applies to a bundle of Smart Home products and  
17 services that are centrally managed by a service provider  
18 and can be controlled and customized by individuals.

19           So what's included in a SHEMS package? An  
20 EnergyStar certified package requires at minimum an  
21 EnergyStar certified Smart thermostat, two EnergyStar  
22 certified Smart lights for Smart switches that measure  
23 energy use, and a plug-load monitor for control for like a  
24 Smart powerstrip, a Smart plug or circuit monitor.

25           In addition to the minimum requirements which I



1 just mentioned, additionally it can also include additional  
2 devices like EnergyStar appliances, electric vehicle  
3 chargers, Smart security systems, and the like. And next  
4 slide, please.

5           And, just very quickly, the EnergyStar Emerging  
6 Technical Award is given to innovative technologies that  
7 meet our rigorous performance criteria to reduce energy use  
8 and lower greenhouse gas emissions. This year, as I stated  
9 earlier, we are accepting applications for residential  
10 induction cooktops for that award. So if you do have any  
11 nominations, send them to EmergingTech@EnergyStar.gov,  
12 before July 27th, and you can learn more on our website.  
13 And that's all. Thank you very much.

14           MR. HOU: Thank you, Dan.

15           And next we have Andre Saldivar from SoCal Edison.  
16 Andre is a Senior Engineer from Southern California Edison.  
17 And he is going to do a little deeper dive on electric  
18 cooking. Take it away, Andre.

19           MR. SALDIVAR: Thank you, Yu.

20           Yes, Andre Saldivar, Senior General Manager of  
21 Food Service Technology Center down here in Irwindale. Next  
22 slide.

23           I'm going to cover a little bit more on commercial  
24 induction and then move back on the residential side and  
25 cover two technologies.

1           Dan explained it right before. An electromagnetic  
2 field. Only the pot and food gets hot. Next slide. Here  
3 is a thermal image of what it looks like, so all the energy,  
4 all the heat goes into the pot, the vessel, you know, the  
5 comal, any type of pan you're using, a wok pan, things like  
6 that. So very efficient.

7           And why induction on the commercial side or even  
8 on the residential side? Next slide, please. A couple  
9 benefits, as some of the panelists mentioned before. It's  
10 very fast. It's going to change the style of cooking, so  
11 there is going to be some trial and error, but it's very  
12 fast.

13           Flexible. There are some portable units there.  
14 On the residential side, you can get -- you know, if you  
15 have multiple burners and multiple BTUs, you can get them in  
16 different kilowatts or watts as well. Very modular, very  
17 efficient. As Dan showed the efficiency compared, it's two  
18 or three times -- at least -- more efficient than gas. It's  
19 just -- it's on and off, there is no idle period. It's very  
20 controllable, is one of the big adoptable more -- I should  
21 say nonenergy benefits that why people are moving over or  
22 converting to induction. It's very controllable. You can  
23 dial in a precise temperature. You can move over to a  
24 holding temperature, and I have some examples on that.

25           As Dan and other panelists mentioned, it's very

1 safe. You pull that pot or pan, it's going to shut off  
2 automatically. You don't have to go back and remember, 'Did  
3 this turn that stove off? Did I turn that pilot off? Am I  
4 going to leak gas into -- if I have the pilot running and  
5 it's not lit.

6           There's a lot of testimonies with ADA and  
7 disability, people that are using it as well, and it's just  
8 totally safe. It's -- you know, again, they have the high-  
9 heat limit or over heat, so if it senses that it's getting  
10 real hot, it's going to shut off. It's going to beep at  
11 you, it's going to blink at you, it's going to let you know,  
12 hey, there's nothing here to heat, so it's going to shut  
13 off, so basically no idle.

14           And then easier to clean. Once you take that off,  
15 the glass is easy to clean. It's very doable. That's one  
16 of the biggest questions that we always get: Is it going to  
17 crack, is it going to shatter. Is it -- well, there's a  
18 test that they pass, that each of these, whether it's  
19 residential or commercial there, they have got to pass with  
20 UL and NSF and all that. They drop a steel ball several  
21 times from a certain height down to make sure the glass is  
22 able to pass that. It's going to be very doable.

23           And then this is one of the technologies in the  
24 cooking side that there is a lower ambient heat gain. So  
25 you're going from any type of gas cooking to an induction,

1 whether it's a residential unit or commercial, there is  
2 going to be lamber -- a lower ambient heat gain in the  
3 kitchen. You're just going to have going to have a cooler  
4 kitchen overall. You're going to have less radiant heat in  
5 your face, and so that's going to be another benefit.  
6 You're going to see some HVAC savings in that area where  
7 you're cooking. Next, next slide, please.

8           On the commercial side, induction started in what  
9 we considered the front of the house. There's a lot of  
10 holding, there's a lot of drop-in. It's a lot of holding  
11 equipment. Countertop. And so we'll start with holding.  
12 Next slide, please.

13           So one of the holding considerations that it's  
14 considered a dry heat. If it's new construction, no water  
15 lines or drains required, it's going to save a lot on  
16 plumbing costs. If it's a retrofit or remodel and I have a  
17 case study on the next slide, it's going to show you how  
18 much water they save and how much energy saved. But on the  
19 holding side again, no water there to be used or to be  
20 refilled or delime, or any of that. So that's going to save  
21 a lot on labor and cleaning and things like that.

22           Again, if there's no pan there, it's going to  
23 detect, is going to shut it off. And then again very  
24 precise holding temperatures. You can actually dial in the  
25 temperature what -- on the food you're going to hold. Next

1 slide, please.

2           So this is a case study. We worked with a very  
3 large chain. They had a water-based system to where they  
4 hold their food for both a drive-through and inside dining.  
5 And they were having issues of temperature control, water  
6 was obviously being vaporized, and so there was low water in  
7 this -- in this holding well and there's more water in  
8 another holding well and it's just temperature fluctuation  
9 all over the place. A lot of delimiting problems with the  
10 water. And so they converted over to the dry induction  
11 holding wells and not only saving on labor but -- and not  
12 only on energy but also water savings. So now that is their  
13 standard specification in either existing or new sources as  
14 they move forward and there's some savings there. And this  
15 report is also on the ETCC website, so it's part of the  
16 emerging technology. Moving on, please.

17           So I talked a lot about front of the house and  
18 holding equipment. And so it's making a huge, I would say,  
19 move in the market. It exists in Europe and in Asia  
20 already. They're using it. They have smaller kitchens.  
21 They don't have, you know, the standard cook lines of 13, 14  
22 appliances. And also they moved to induction. They're  
23 using it. And so right now there's almost a one-for-one  
24 replacement on the gas side or what we consider the back-of-  
25 the-house cooking. Next slide, please.

1           Here is a study done by Frontier Energy up in San  
2 Ramon, looking at a six-burner range over to a six-burner  
3 induction range. So if you're just replacing appliance for  
4 appliance and you're running these much hours in these days  
5 and this is what you're paying for a therm or in a kWh, you  
6 see -- you know, you are going to save some energy. That's  
7 not including the HVAC or, you know, the cooler space in  
8 there that you're going to get with induction.

9           So is it -- is it a little bit less expensive,  
10 yes. Does it cost more upfront, yeah, but you're going to  
11 get that paid back. Again there's just no idle time. And  
12 then you're going to get labor savings as well by converting  
13 to induction. Next slide, please.

14           As I mentioned, there is almost a one-for-one  
15 replacement now. Not only going from gas to electric, but  
16 going from taking that bigger huge step from going from gas  
17 to induction. And so, you know, they're trying to cover all  
18 the markets, all the different styles of cooking out there  
19 that exist. You see the benefits there on the left of, you  
20 know, moving from a griddle to -- a Blanco or griddle that  
21 they have on the induction side. Next slide.

22           We're talking about stock ranges here, so you can  
23 have either a big old single stock range or a double stock  
24 range and moving over to an induction unit. Again, you're  
25 just -- when you pull that big stock pot off, it's going to

1 shut off. You really don't even have to remember, if I have  
2 to go turn the knob off, or anything like -- it's going to  
3 shut off and beep at you and let you know that it's off and  
4 be able to carry on with the cooking and serving. Next  
5 slide, please.

6 We talked about gas residential burner ranges in  
7 stock, but another gas huge consumer out there is the woks.  
8 You can see in the efficiency, very low. And what we found  
9 from the field and case studies, they even get lower than  
10 that because the chefs go in there and drill those nozzles  
11 out because they want more BTUs. You'd think that -- you  
12 don't see enough BTUs or enough fire with these woks, they  
13 go in there and drill these what we call burners out, these  
14 nozzles, and just decrease the efficiency even more and just  
15 adding a lot more heat to the space, so that requires a lot  
16 more ventilation and also cooling in the space.

17 So this number just reflects what a gas efficiency  
18 gas wok is. And then moving on to now there is an induction  
19 wok. Next slide, please. And again testing by Frontier  
20 Energy, just shows that it's almost 90 percent with the  
21 standard commercial wok, so there is a replacement for those  
22 large woks out there now. Not only the countertop that you  
23 see in strip malls and maybe at the airports, but now  
24 there's what we call standalone or floor-type induction woks  
25 out there that are hitting the market, slowly uptaking in

1 the United States, and we're trying to find some pilots here  
2 in California. But they exist. That's the good news, is  
3 they really exist, and they work and they're fast and  
4 they're very efficient. Next slide.

5           And I'll just wrap up here real quick. We talked  
6 about residential. Here's -- I think it's kind of an answer  
7 to the solution. A lot of these cities and munis are  
8 offering these induction for free, and I think that's the --  
9 that's the three, I would say: Educate, demonstrate, and  
10 incentives is to be able to move this market both on the  
11 residential and the commercial side. So these utilities,  
12 these munis are offering a free induction unit out there for  
13 a free lending program, up to 14 days. So check them out,  
14 try it out, and that will wrap me up. Thank you. So I  
15 think you got to click a couple times.

16           MR. HOU: Thank you, Andre.

17           And next we have Jeff Morris. Jeff is the Senior  
18 Director of State and Government Relationships from  
19 Schneider Energy.

20           MR. MORRIS: Great. Thank you so much.  
21 Commissioner McAllister, thanks for your leadership on the  
22 Commission and thanks for your leadership at the National  
23 Association of State Energy Officials as well. We  
24 appreciate you sharing your experiences with your colleagues  
25 in other neighboring states. Next slide.



1 I'm going to talk to you about the connected home.  
2 And we have a new product that we have just rolled out in  
3 the state of California, and a little bit about Schneider  
4 Electric. We have about a thousand employees in California,  
5 about 19,000 in the United States, about 140,000 worldwide.  
6 We're an energy management and automation company. We're on  
7 schedule to be net zero carbon in our operations by 2025.  
8 And we were actually declared the most sustainable  
9 corporation, global 500 corporation in the world by the  
10 Global Knights this year, so we're quite proud of that.

11 We do a lot of work in buildings with our energy  
12 automation products, but also with our hardware products  
13 with the Square D Line. And with all the, you know, climate  
14 change impacts we're seeing with severe weather across the  
15 entire United States, there's a triple bottom line  
16 developing for building owners and homeowners around  
17 resiliency and decarbonization and efficiency as being a  
18 triple bottom line for what folks are trying to achieve to  
19 create a sense of security at home and work. Next slide,  
20 please.

21 You know at Schneider we think it's time to really  
22 rethink things. You know 39 percent of the world carbon  
23 comes from buildings, 30 percent of the energy is wasted in  
24 buildings through efficiency challenges, 87 percent of our  
25 time is spent indoors. Certainly during the time of the

1 Pandemic, air handling, doing that efficiently has become a  
2 new resiliency challenge as well. And then we're not quite  
3 sure what business as usual is going to be going forward.  
4 Next slide, please.

5           One of the things that we've seen in the home, and  
6 again with our Square D products, we're at about 50 percent  
7 of the homes in the United States and 75 percent of  
8 hospitals, but just like folks don't know how to operate  
9 their home thermostats that are programmable and manageable  
10 because they're too complicated, the average homeowner is  
11 you're not a day trader for energy, they're not going to be  
12 monitoring the CAISO wholesale market prices. Most garages  
13 that have rooftop solar have a labyrinth of different boxes  
14 and conduit connecting both inside and outside in the case  
15 of California, of the building. A lot of different  
16 scattered technology on different platforms and evolving  
17 needs. Next slide, please.

18           So what we've rolled out, actually just this last  
19 month in California and what will be available in our supply  
20 chain in California in July, is a grid-to-plug solution,  
21 Connected Home by Square D, where we're pulling all these  
22 external boxes that are part of a rooftop solar deployment,  
23 putting the beginning of what I call a semi-automated  
24 platform into the panel box into the home where the meter  
25 connects, and then also giving an easy-to-use platform, and

1 an app form on your phone, and that goes all the way to the  
2 plug, and it is for the first time giving consumers a home-  
3 energy management system that could be planned; predictive;  
4 preventative; and, probably the most important piece,  
5 personal, meaning they get to bring their values to their  
6 home and not take necessarily the external values that comes  
7 through the meter. Next slide, please.

8           So again in a typical home, I think this was spoke  
9 to from the first panel this afternoon all the way through,  
10 you know, everyone has personal decisions they make about  
11 what's important and what's critical to them. You know what  
12 is resilient, where is efficiency going to come from, you  
13 know, what does sustainability mean to them personally.

14           In the all-electric home of the future you're  
15 going to have all these different resources that could be  
16 managed, particularly if you have a two-car EV-charging  
17 garage, an induction oven -- or a stove, I mean, and all the  
18 other devices that you can control. Automated load  
19 management, whether it's a HEM, a BEM, or an ALM, whatever  
20 acronym you want to use, is really the center of what the  
21 focus needs to be on about what's going to make an efficient  
22 optimization behind the meter. Without these -- without  
23 these platforms, consumers are going to be forced to  
24 basically go into a rush hour sizing, whether it's for  
25 batteries to match the rooftop solar, whatever the worst

1 case scenario is for an outage. That's the same way the  
2 distribution system is being built, is one-way analogue  
3 build to rush hour for peaks, and it's a very inefficient  
4 system.

5           So using these platforms to optimize all the  
6 thermal loads in the building, the water loads, whether they  
7 be in resistance heat -- water heaters or in heat pumps,  
8 HVAC systems, car charging, ovens. If you don't want to see  
9 a 600 amp breaker box, you know, on the outside of a  
10 building, load management is the key to reduce those  
11 hardware costs and really installation costs in the end as  
12 well. Next slide.

13           So what we found with this, by pulling some of the  
14 pieces of the solar insulation into the panel, is that we  
15 have cut installation time in materials and we're finding  
16 out more granularity to that as we start build out. You get  
17 a more aesthetically-pleasing garage for consumers. And  
18 you've got a future-ready panel box that could do work.  
19 It's prewired for storage, whether that be batteries or  
20 whatever device wants to be plugged in, including a  
21 generator, if that's what you choose, using some sort of  
22 renewable fuel that's compliant in California.

23           Also we're bringing to the box those external  
24 solar panel boxes, so a lot of the command and control for  
25 the solar panels are being brought into the breaker box.

1 And what you can't really see here in the bottom is the  
2 Wiser product. And that's the product that can tell every  
3 single device that's plugged into the home and can operate  
4 and do command and control of the circuits. Next slide,  
5 please.

6           So if we just rolled out this, the first 100 units  
7 with KB Homes down in San Diego County. This is what one of  
8 these panels look like on the exterior of one of those homes  
9 that have been built already down there. And, again, this  
10 installation, all you get, it simplifies the installation,  
11 it enhances the user experience. And, again, I want to  
12 really bear down on this because I'm going to close making  
13 some policy points around this, but this is version one that  
14 I would call a semi-automatic command and control system,  
15 meaning the consumer is going to be able to put into their  
16 values into this box. You know what is critical, loads are  
17 going to be wired into the top of the panel, and what's not  
18 critical is loaded into the bottom. And on the platform  
19 they will be able to decide what's critical for them as  
20 well. And so when they put those values in during like a  
21 PSPS event, they get to decide whether they want to keep  
22 their HVAC going, their frozen products frozen, or they want  
23 to charge their car. And they can control that and it will  
24 manage it during that outage.

25           The Version 2 of this will be able to do automated

1 command and control where they set their values. You might  
2 see like an onboarding thing like you do for a Turbo Tax  
3 interview or one of those products where you set to forget  
4 your values, and then I like to make the equivalency that,  
5 you know, when you had to take your aluminum cans down to  
6 the recycling center, the recycling rate was about six --  
7 yeah, six percent, when you got all-in-one curbside  
8 recycling, it went up to over 90 percent, so as easy as you  
9 can make participation happen for consumers, the more  
10 participation you're going to get.

11           And this concept that you're going to have direct  
12 utility-to-appliance communication and people are going to  
13 give up that control, that's just a broken business model.  
14 People are going to want to set their own values and let  
15 these automated platforms deliver their values to the grid  
16 and not the other way around. Next slide, please.

17           So here are some quick policy considerations.  
18 We're really trying to get commissions and energy offices  
19 across the country to get out of technology silos. You  
20 know, whether it's grid to EV or EV to grid, building to  
21 grid, home to grid, microgrid to grid, all these different  
22 proceedings and rules should be more focused on the  
23 outcomes. In order to extend this optimization by these  
24 platforms over to the utility where it can take personal  
25 values and line them up in a social contract with what's

1 going to benefit ratepayers on circuits below substations.  
2 You know at Schneider we really believe the most efficient,  
3 economic, and environmentally friendly -- meaning  
4 decarbonized transaction -- is where supply and demand could  
5 meet itself as close as possible.

6           And the top 200 hours in an outcome basis, so  
7 should be focused on either providing capacity, taking it,  
8 or giving ancillary services. And in the end, it doesn't  
9 matter what's behind that meter and a coupling, these  
10 platforms are going to manage that and deliver that when it  
11 lines up. And the utilities need to really focus about how  
12 they can get more visibility at those uptake rates.

13           Just to skip down to the end, the EnergyStar  
14 platform where they were talking about SHEMS was great. You  
15 know we really want to move past EnergyStar and more out of  
16 these technology silos where things are efficient as an  
17 appliance on their own and more where they will be rewarded  
18 for how they can communicate and optimize as a system.

19           And California, I think, is still working on it,  
20 but Washington and Oregon have moved to the 20- -- CTA 2045  
21 communications port for high-load appliance like HVAC heat  
22 pumps, heat-resistant water heaters. That type of  
23 standardization is really going to help move this sector  
24 along.

25           Just to close, you know this technology is being

1 deployed today, but we don't have the tool to work with or  
2 communicate with the utility to optimize past the meter  
3 inner coupling, and so some of these capabilities won't be  
4 rolled out until there is a reason to do it. And so you're  
5 kind of in one of those cart-and-horse situations, but once  
6 the tool is there and people can get compensated, the  
7 products will, the technology will follow. And I will wrap  
8 with that and thank you for the time today.

9 MR. HOU: All right. Thank you, Jeff. And thank  
10 you, all the panelists, Matt, Ram, Daniel, and Andre.

11 Now I'd like to invite the Commissioners to ask  
12 some questions.

13 COMMISSIONER MCALLISTER: Thanks, Yu. Really  
14 appreciate it. And, Matt, and, Ram, great to see you. Dan  
15 and Andre and Jeff, thanks very much for being here with us.  
16 Really appreciate all of your leadership. Actually we're  
17 just the convener here trying to figure out kind of what  
18 policies we can most productively implement.

19 You know the State has a role, I think we've heard  
20 that all day, but we also not want to get in the way of  
21 private sector innovators, and so to find that balance is  
22 really the key. And I guess my first question is kind of a  
23 general one. You know, what are your kind of -- you know,  
24 you suggested sort of policy direction. And, Jeff, you had  
25 a slide there at the end on that, but what -- I guess I'll



1 ask it in terms of, you know, what -- really what the State  
2 should be doing and what we should leave for the private  
3 sector, okay?

4           So we have regulatory authority. We are doing  
5 load-management standards. We have the appliance-load-  
6 flexibility work that we're doing under SB 49. Building  
7 standards, trying to really embrace load flexibility that,  
8 you know, pretty much everybody has brought up. I think we  
9 all accept it. And all the panels today brought this up to  
10 some extent, that load flexibility is really a key attribute  
11 of this highly electric future in order to optimize the grid  
12 itself and really integrate.

13           And, you know, Jeff, I think the word for you is  
14 integration. That's the key piece.

15           So what -- so I worry about proprietary standards  
16 getting in the way of some of this plug-and-play type of  
17 approach. And I wonder how much those of you out there  
18 working on these programs and developing technology and  
19 innovating, trying to create the conditions for innovation,  
20 do you think about it in those terms or do you think about  
21 proprietary standards as a tool for good or potentially  
22 both, that and a barrier?

23           You know, if we're going to step in and sort of  
24 try to create this plug and play, enable this plug-and-play  
25 approach, what's the appropriate kind of role for the State

1 there in terms of setting down the standards that everyone  
2 has to comply with? You mentioned CTA 2045, so that's one  
3 example.

4 MR. MORRIS: Yeah, I'll just jump in since I think  
5 I'm still live, but thank you, Commissioner for the  
6 question. Yeah, I mentioned the CTA 2045. That's one  
7 example where, you know, that's like the, what was it, the  
8 RS32 Jack back in the '90s, right?

9 COMMISSIONER MCALLISTER: Yeah.

10 MR. MORRIS: And not only that, but it's an all --  
11 it's a multi-faceted communications tool, so you don't  
12 become dependent upon one critical infrastructure for  
13 resiliency. And I think it's important, you know, like in  
14 that case to have a comport that the utility, even though  
15 they may be disconnected from DERs, can still be able to get  
16 some sort of granularity back about, you know, what  
17 resources are available that aren't currently connected  
18 before they're connected again during like a blackout  
19 condition.

20 So without getting too far in the weeds,  
21 Commissioner, I think that the -- you know, really starting  
22 to focus on the outcomes -- and I'll take a battery, right?  
23 I put a battery in a car, I can put it in a bus. I can put  
24 it in a building. I could put it in a house. I could put  
25 it in a microgrid. That's going to get treated five

1 different ways and valued five different ways, but in the  
2 end it can provide the same function, which is taking  
3 capacity, giving it, or providing ancillary services no  
4 matter where it's located at.

5           And so getting back to what needs to be a  
6 standard, you know, we can optimize to a utility, but  
7 there's no -- right now I know you have a proceeding going  
8 on trying to get there. And, you know, deciding, hey, open  
9 -- open ADR 2.0 or 3.0, whatever it is that's going to be  
10 the language to get some of these things that at first mimic  
11 a DSO signal across the state of California is really going  
12 to open the door for all sorts of technologies to provide  
13 those positive outcomes and more resource flexibility for  
14 the utility to actually deliver on those outcomes too.

15           And right now I think a lot of the DERs are like  
16 white noise coming at utilities. And, you know, what all  
17 these technologies use to organize these DERs and make them  
18 into a flash mob instead of just a mob when they show up in  
19 the end, so.

20           So I think, you know, the other issue too I'll  
21 just mention quickly is that we have pretty good standards  
22 behind the meter for cyber security, and we're taking a  
23 pretty highly sophisticated digitized system and hooking it  
24 up to in a lot of cases an analog distribution line, so  
25 having -- so having all utilities, no matter what the

1 ownership type is, focus on digitizing their circuits below  
2 substations, and to give them more visibility I think is  
3 really key to get the most decarbonization from the ground  
4 up instead of the top down.

5 MR. NARAYANAMURTHY: I'll take the --

6 COMMISSIONER MCALLISTER: That's really  
7 interesting, yeah. I want to just encourage you to stick  
8 that idea, to write something and put it on the record for  
9 us. If -- maybe somebody in your team can do that, I think  
10 that's not -- you know, that's probably more in the PUC's  
11 realm in terms of asking utilities to make an investment  
12 into digitization, etc., but we will certainly work with  
13 them on this and it would be nice to bring -- start to  
14 develop the record on that, in that direction.

15 So, yeah, I wanted to actually ask Ram and also  
16 potentially --

17 MR. NARAYANAMURTHY: Sure.

18 LEAD COMMISSIONER MCALLISTER: -- Matt about that  
19 as well, this sort of -- yeah.

20 MR. NARAYANAMURTHY: Yeah, I can take a shot at  
21 it. I think one of the most successful programs you've  
22 seen, right, is the Smart Thermostat Programs for  
23 Flexibility. And, you know, every -- what we have seen is  
24 everything that -- all the DERs, right, have some level of  
25 proprietary and some level of open-standard capability.

1 It's all about where that interface is between where it  
2 becomes proprietary and where it's open standards, right.  
3 So for like if you take the Smart Thermostats, I think  
4 they're all open ADR 2.0 compatible. They get the open ADR  
5 signal. And then they can do their flexibility, whether  
6 it's changing customer set points, etc. And the advantage  
7 of it being at the manufacturer is that now they're the one  
8 point of contact for the customer and they also understand  
9 the customer's preferences. So instead of us trying to  
10 reach indirectly into these end use devices, having that  
11 layer in letting the manufacturers manage these, I think it  
12 actually de-risks the whole process.

13 COMMISSIONER MCALLISTER: Interesting.

14 MR. NARAYANAMURTHY: So what we tend to think  
15 about is more in terms of data standards, not -- not try to  
16 control the signals going in, but try to measure what comes  
17 back, because if we measure what comes back and make sure  
18 that the data is transparently shared, then you can do your  
19 evaluations, measurements on the back end.

20 So it's a different -- I mean I'm -- you know, we  
21 have seen a lot of open standards, including things like  
22 Back Net, which have kind of been buried behind proprietary  
23 layers, and so I think it's not a very black-and-white line,  
24 it's a very gray line. And what we really would like to see  
25 is more transparency on what happened versus trying to

1 control these devices.

2 COMMISSIONER MCALLISTER: That's super helpful.

3 Thanks a lot, Ram.

4 I don't know if, Matt, you've got anything to add  
5 there.

6 MR. PRICE: Probably not a whole lot with my  
7 Activate hat on, but before Activate I was at a wireless  
8 lighting and controls company called Enlighted. It actually  
9 wasn't a nomenclature that they were wireless, they were  
10 actually a wired lighting control company, but they were a  
11 wireless data transmission company that was focused on  
12 driving energy efficiency in the built environment. And  
13 they're still around, they're now owned by Siemens, I  
14 believe.

15 And to Ram's point, you know, it was really  
16 challenging for Enlighted because there was elements of what  
17 they were doing that was proprietary which was the signal  
18 processing and the technology of the sensor was proprietary  
19 and novel and important and valuable and needed to be  
20 protected. But the data in terms of its ability to  
21 integrate with building management systems and Building  
22 Management 2.0 was open. And they -- you know, that  
23 organization, there was just a lot of confusion and managing  
24 towards specifications about is it open, is it closed, --

25 COMMISSIONER MCALLISTER: Yeah.

1           MR. PRICE: -- it's not a -- I think a lot of care  
2 has to be provided in terms of like where are regulators and  
3 policymakers drawing the box around the definitions that are  
4 being -- that are being used.

5           COMMISSIONER MCALLISTER: Yes. So thanks for  
6 that. That's exactly what I'm -- we're trying to figure  
7 out, so maybe we could keep talking about this because it's  
8 a balance and it's kind of an art more than a science I  
9 think, depending on the context, so. So, anyway, we're  
10 going to need all your help on that.

11           I don't know -- you know, I really appreciated,  
12 Daniel, your presentation on EnergyStar. Obviously it's  
13 voluntary, but I wonder -- but actually EnergyStar does set  
14 -- I mean it does set a very clear sort of standard  
15 benchmark that then mandatory standards can use or piggyback  
16 on or use directly or go beyond. So I wonder if you could -  
17 - if in the EnergyStar context you have any thoughts about  
18 the sort of communication versus the Smarts kind of  
19 standardization.

20           MR. CRONIN: I mean that is -- that is really  
21 great, I mean a really tough question too. I don't know if  
22 we have put enough thought into the standardization aspect  
23 of that. And I'm assuming you're talking about a Smart Home  
24 or you're talking about --

25           LEAD COMMISSIONER MCALLISTER: Yeah, yeah, yeah.

1 MR. CRONIN: -- larger than that, yeah.

2 COMMISSIONER MCALLISTER: Well, even  
3 communications protocols, you know, for white goods, or  
4 something like that, in terms of just the -- what  
5 communications have to be common amongst all the appliances  
6 versus allowing some proprietary stuff to filter in that.

7 MR. CRONIN: Yeah. Well, you know, in my  
8 experience when I worked on product development along with a  
9 few of my other colleagues, and I'm pinch-hitting here a  
10 little bit, I mostly don't do the technical work with  
11 EnergyStar, but from what I recall a lot of what we do is  
12 attempting that, saying that, okay, well, if there is a  
13 barrier to creating an EnergyStar specification for whatever  
14 product category, is the lack of standardization in  
15 communications protocol or whatever it might be the main  
16 pain point of figuring out whether or not we can have a  
17 specification. And if it is, then working hand in hand with  
18 industry is the only way to sort that out.

19 COMMISSIONER MCALLISTER: Okay. Yeah, great.

20 So, first of all, before passing it off to  
21 Commissioner Monahan, if she's still on and wants to ask  
22 some questions, I want to just make a plug for induction.  
23 You guys did a great job of that, in particular Andre.  
24 Really appreciate your -- on the commercial stuff. That's  
25 really, really exciting what you're doing with induction.



1           But I think of induction sort of like this: The  
2 split or the multi-split screen TV because it's basically,  
3 you know, a horizontal surface and you can put the pan  
4 pretty much anywhere within reason, at least some of the --  
5 you can join where the burners, quote-unquote, would be, you  
6 can join those, you can -- you can have it behave  
7 differently depending on the movement of the pan across the  
8 surface, you know, from front to back, to go like from  
9 cooking to simmering, for example. So the functionality is  
10 just such a pleasure once you sort of learn about it, that  
11 it just blows any other technology out of the water in terms  
12 of just the flexibility and just the industrial strength of  
13 how much power you can get, how much energy you can get into  
14 food, how quickly and how responsibly. It's just a really  
15 tremendous technology. And the electronics and the controls  
16 are getting better every year.

17           So my first one was some years ago in a previous  
18 house. And my mother-in-law left on the resistance heater  
19 on the cooktop that we had before. And of course left it  
20 on, left the house, and it cracked and broke and shorted.  
21 And so I needed to get one. So I dropped in an induction  
22 and never looked back. So I have to -- have to say this is  
23 a shameless plug for induction, but we need this technology  
24 in California to really proliferate, so I feel justified in  
25 doing so, and I haven't mentioned any brands, but we can

1 talk about that offline.

2                   So I wanted to ask Commissioner Monahan if still  
3 on and if you wanted to ask any questions.

4                   Sounds like possibly not.

5                   Do we have, Kristy, Heather, any attendee  
6 questions? Or is there any additional discussion, maybe  
7 I'll ask the speakers here, is there anything you want to  
8 say that you didn't have a chance to say in your comments,  
9 or you want to respond to anything anybody else said on the  
10 panel?

11                   MR. SALDIVAR: Speaking -- Commissioner, yeah,  
12 thank you for that. For the induction, I think we hit on  
13 the point of education, but I think the second point is  
14 demonstration, right. You can watch a YouTube video, you  
15 can look at a brochure, but like you installing it, you've  
16 really got to try it to be able to understand the benefits.  
17 Not only the energy benefits but the nonenergy benefits. So  
18 to the builders, you know, we're talking with the building -  
19 - the BDC in our kitchen electrification group. Can -- you  
20 know, model homes, can you put an induction unit in there,  
21 just to get the discussion going. Hey, what is that. It  
22 looks like a piece of glass, what is it. At least get the  
23 discussion going, right? To say, okay, maybe I'll think  
24 about that option, right. Or even some type of literature  
25 in the model homes of induction, hey, you have an option of

1 induction and here is -- you know, you can try something for  
2 free with your local utility or muni.

3 But I think demonstration is going to be the key  
4 to move the market. Without showing it -- a video goes only  
5 so far. But we actually had tried it, right, and see how  
6 fast it cooks and how easy it is to clean. And when you  
7 pull it off, you can actually walk away and not worried  
8 about, you know, that's it's off or on, and things like  
9 that.

10 I think the more demonstration we have, whether  
11 it's in test kitchen or in model homes or at dealer places,  
12 I think that's really going to really move the market, both  
13 residential and commercial, is really having -- having  
14 people or future customers just trying it. They're going to  
15 be like, hey, I felt -- I tried it, I was able to do this  
16 recipe or that recipe, I tried it. And that's going to --  
17 what we consider, you know, burst those myths out there,  
18 right. So I think the demonstration key -- and then  
19 incentives will obviously move the market as well, but I  
20 think the demonstration is a very -- a key component of  
21 moving this market, not only on the residential side but the  
22 commercial side, just be able to get -- get these future  
23 customers or buyers to be able to try it somehow.

24 COMMISSIONER MCALLISTER: Great. Thanks for that.

25 MR. MORRIS: Commissioner, Jeff of Schneider

1 jumping in, and sensing maybe a top chef induction coming up  
2 in California's future as a good demonstration project to  
3 really show the possibilities with induction cooking. But  
4 two things I want to mention is just that I should have  
5 covered that all of our Panel Blocks products are compatible  
6 with Amazon and Google, the thermostat systems. They're all  
7 interoperable because you can't really optimize behind the  
8 meter unless you have access. So their devices can tell our  
9 product what to do and, you know, in that panel box, so  
10 you're not locked into necessarily a Schneider product to  
11 actually do that command and control portion.

12 COMMISSIONER MCALLISTER: Interesting.

13 Jim, can I ask a follow-up question about you, and  
14 Ram I think would be relevant here, is there -- are there  
15 limits -- so, you know, we're talking about doing --  
16 basically using high-frequency switching to take better  
17 advantage, to use low-voltage water heaters, for example,  
18 and even in these induction cooktops there is -- you know,  
19 take advantage of a 110 or 120 circuit, get more power  
20 through it with high-frequency switching, basically, right.  
21 And I think that's at least part of that solution that  
22 you've got in your panel. I'm not sure. But I wonder if  
23 there are limits to that. Like have we started to explore  
24 the limits of, you know, how far we can go down this  
25 avoiding 240-volt upgrades in existing buildings by using

1 these advanced switching technologies?

2 MR. MORRIS: Yeah. I don't know if we've seen,  
3 just from a Schneider perspective, you know we think that  
4 the way we've built this breaker box, it allows for  
5 expansion, quite a bit of expansion on those both 240 and  
6 the 120 circuits, and then dividing what's critical and  
7 what's not in the home too, right.

8 COMMISSIONER MCALLISTER: Yes, yes.

9 MR. MORRIS: And so as like in -- I think it was  
10 in Ram's presentation or the EPRI one about the 120-volt  
11 systems, if people start converting to 120s in the future  
12 from a 240 because something has become more efficient or  
13 requires a lower voltage, you can drop those within those  
14 panel boxes without it being a large retrofit. And so when  
15 we talk about future-proofing, that's what we're trying to  
16 get at.

17 COMMISSIONER MCALLISTER: Yeah, yeah.

18 MR. MORRIS: And just to give a little more  
19 granularity, you know when the homeowner can personalize  
20 that's that plan, preventative and predictive, the planned  
21 and preventative and predictive is knowing the homeowner  
22 gets home at 6:30 every night, there is, you know, the duck  
23 curve. They can precool the house knowing what energy code  
24 that house is built to. And it will be the 68 degrees or 72  
25 degrees when they walk in the door. And they don't care --

1 they don't care how it gets there. That's what the load  
2 management system does. And that's the optimization piece,  
3 you know, that gets you the decarbonization gain, is by  
4 using that resource on the circuits where it's produced.

5 COMMISSIONER MCALLISTER: Right. Okay. I'm not  
6 sure if Ram's still -- oh, I see Ram's still on, but I'm  
7 just wondering if -- I'm interested in the results of all  
8 the work you're doing on the -- how to make best advantage  
9 about 120-volt circuits without requiring these upgrades,  
10 you know, so get more load onto those circuits without --  
11 you know, as they are without upgrading them or rewiring.  
12 By that, -- oh, there he is. There he is.

13 I wasn't sure if you were on yet. Ram, are you  
14 still with us? It looks like you are but maybe having some  
15 connectivity issues.

16 MR. NARAYANAMURTHY: Yeah. So let me turn. So,  
17 yeah, I think in terms of electrification, right, there's  
18 like -- we are looking at all these different parallel  
19 options. And the challenge is that I think the AAJs where  
20 we are running into trouble with these panels, right. We  
21 don't know if they will pass electrical code inspections.  
22 So I think it's like I'll try all these different -- all  
23 these different angles to see if we can get the  
24 electrification done.

25 COMMISSIONER MCALLISTER: Sorry.

1 MR. NARAYANAMURTHY: On --

2 LEAD COMMISSIONER MCALLISTER: Well, on -- no  
3 worries. But on your -- on the retrofit and upgrades and,  
4 you know, trying to take the best advantage of the existing  
5 circuits in a house. Like, for example, putting in an  
6 induction cooktop where there wasn't, the 240 volt before.  
7 Maybe there was gas. So trying to not have to rewire, are  
8 you getting a sense of what the limits of that are?

9 In terms of just trying to get more energy across  
10 an existing lower-voltage circuit.

11 MR. NARAYANAMURTHY: So that's what we are trying  
12 to do.

13 COMMISSIONER MCALLISTER: Yeah.

14 MR. NARAYANAMURTHY: We think we can get -- what  
15 we are trying to do is try to get better 100-amp circuits,  
16 but can we get all-electric 100-amp panels, right? So we  
17 don't know yet if we can get there, but that's what we are  
18 trying to do by trying to get everything down to 120 volts.

19 We know from new construction we can get EV ready,  
20 all electric for 200 amps, and we have demonstrated that.  
21 But for existing it's I think still a challenge, but it's  
22 almost like we are trying to go down different pathways to  
23 see what we can do to electrify different amps.

24 COMMISSIONER MCALLISTER: Okay, great.

25 MR. NARAYANAMURTHY: So we think we can get there,

1 but right now that's part of the new -- like a new series of  
2 demonstrations that have to be undertaken to see if we can  
3 actually get there.

4 COMMISSIONER MCALLISTER: Thank you very much.

5 MR. SALDIVAR: Commissioner, and there are some --  
6 there are some examples of what Ram showed in the circuit  
7 splitters. If an existing residential had a 240 volt or 208  
8 electric appliance, say a water heater or electric dryer,  
9 there are some installs that have been successful with the  
10 circuit splitters. Now there is going to be a change of  
11 behavior and change of use in an appliance where you can add  
12 the induction and not maybe use the water heating or the  
13 electric dryer at that time, you switch it over to the  
14 cooktop, right, and do your -- do your cooking --

15 COMMISSIONER MCALLISTER: Yeah.

16 MR. SALDIVAR: -- and then be able to switch back,  
17 so there's been some successful installs of those circuits -  
18 - circuit splitters on that side of the house. So that kind  
19 of prevents going to panel upgrade as well.

20 COMMISSIONER MCALLISTER: Yeah, okay, great.

21 All right. Well, thanks a lot. I'm going to  
22 cede, I'm going to stop talking and stop asking so many  
23 questions and call it a session for me.

24 I guess I'm wondering, Kristy and Heather, are  
25 their attendees who have questions? And I know we have



1 public comment after this as well.

2 MS. CHEW: Hi. This is Kristy. Yes, there are a  
3 few questions on the --

4 LEAD COMMISSIONER MCALLISTER: Okay.

5 MS. CHEW: -- Zoom Q and A. I think we already  
6 started responding to some, but Randall Higa had asked: Is  
7 it possible for EnergyStar or anyone else to establish  
8 standard communication protocols so all SHEMS devices can  
9 communicate with each other? Consumers are not willing to  
10 have multiple devices with their own proprietary -- oops --  
11 oh, it looks like -- sorry, it got moved and was answered by  
12 Steve and Daniel, so I'll move onto the next question from  
13 Adel Suleiman: Builders of new home construction should be  
14 required to offer a full range of electrical appliances.  
15 Currently new builders can offer only natural gas cooking,  
16 while they are required to install PV panels. It's more of  
17 a comment. I don't know if anybody wants to touch on that,  
18 though.

19 MR. MORRIS: You know, from our perspective there  
20 is a higher concern about the codes that have gone to the  
21 reach codes, not requiring any type of load-management  
22 platform to align with those codes, and it gets back to the  
23 load-management question, meaning if -- if you don't have a  
24 load-management plan, you know, in the codes that you're  
25 adopting, you're going to end up with oversizing all the

1 hardware and not -- and not being able to provide a platform  
2 for a software solution in kind of going forward that  
3 doesn't involve another retrofit. So it would be a shame if  
4 you built the home today and within eight years you would  
5 have to do a retrofit to actually get to these home  
6 management platforms in order to get the efficiency and  
7 optimization gains that you can get.

8           And I'll just comment on the retrofits. I think  
9 some of the solution that is not having to rerun the wire a  
10 bit, but then I think it was touched on that doing the plug  
11 management is the most efficient way to, you know, extend,  
12 that you don't end up with an overloading on that wire  
13 that's currently going through a building, without having to  
14 yank that wire and replace it.

15           MS. CHEW: I'll go to the next question, unless  
16 there is anyone else that wants to address that. Katie  
17 Gladych asked: What can policymakers or utilities do to  
18 support the incentivization of products like SHEMS, which  
19 required integrated pilot programs and standards for groups  
20 of devices rather than single-product measures?

21           MR. CRONIN: Right. So I mean traditionally when  
22 there's a new product category that has not been adopted  
23 very widely, utilities in the past have played a big part  
24 in, I suppose, improving the availability of those efficient  
25 products. In this case I would say by starting the pilot

1 program, some utilities I think have already started to look  
2 into those pilot programs, but, yeah, that -- with anything  
3 that's new and somewhat unfamiliar, that's the way it can  
4 start with, with baby steps with a pilot.

5 MS. CHEW: I'll go to the next question, from  
6 Harrison Reynolds: Aside from more information, what values  
7 or perceptions do you believe need to be changed or  
8 addressed to get people to adopt this technology?

9 Andre or Daniel.

10 MR. SALDIVAR: Yeah, I could take it. I think  
11 just back to demonstration, you know, on our heat pump  
12 water, heat lab, it's just demonstrating. They want to  
13 know: Can I shower, can I wash dishes, can I do a load of  
14 laundry all at the same time with adequate water, what hot  
15 water do I need. And so if you're able to demonstrate that  
16 in maybe a model home and all that, you know, I think that  
17 will go -- they just want to make sure that it works, I want  
18 -- they just -- I think in the earlier panel they don't care  
19 where the hot water comes from or the cooling or heating  
20 comes from, they just want it, right? They don't want to  
21 think about it, turn on the A/C or turn on the heating, turn  
22 on the hot water, and just be able to be comfortable and do  
23 it. So I think the more demonstration or the more proof of  
24 concept that can be out there and answer those questions, I  
25 think that will help move the market as well or answer those

1 questions or get them to take a chance on it, right.

2 MS. CHEW: Makes sense. The last question is from  
3 Jim Lutz: What are the policy tools to reach existing homes  
4 and buildings for electrification, efficiency, resiliency,  
5 health and safety, etc.? They seem much harder to reach  
6 than new construction and a much bigger fraction of the  
7 building stock.

8 MR. MORRIS: Jeff Morris with Schneider. I think,  
9 you know, we commented in our policy considerations about  
10 reshifting some of the appliance and equipment rebate  
11 programs, more towards the load system, the system  
12 management systems, the plugs, and so forth. You know if  
13 you just get the next iteration more efficient dryer or HVAC  
14 system or whatever that is, you're not -- then you're not  
15 going to have access to the technology. And when it gets to  
16 equity issues, not aiming those subsidies where they really  
17 make a difference and folks talk of tenancy and energy cost  
18 for the home, I think is really missing the mark. So that's  
19 why we like to see them more aimed at systems and load  
20 management and not at necessarily just the next version of  
21 the -- you know, of a technology that's in a silo, not  
22 communicating.

23 MR. NARAYANAMURTHY: I'll take a shot at it too.  
24 I think one of the big challenges right now from a policy  
25 perspective is we don't have these comprehensive whole home

1 programs. Like -- I mean the LIWP program is there but it's  
2 kind of phasing out. What we're seeing is a lot of siloing  
3 of different programs. The money is there, especially if  
4 you look at affordable housing. What we don't have is all  
5 these different programs working together so that for the  
6 property owner it's an integrated view into how they could  
7 take a million dollars, two million dollars to completely  
8 revamp their -- their hundred-unit housing property to be  
9 all electric. So right now it's a huge struggle to actually  
10 stitch all these things together.

11 MS. CHEW: That was the last question from the  
12 Zoom Q&A.

13 MS. RAITT: Thank you, Kristy. This is Heather.

14 So we can -- Commissioner, if it's okay with you,  
15 we can move on to public comment.

16 COMMISSIONER MCALLISTER: Yes, please. Thanks a  
17 lot. Heather, please do.

18 MS. RAITT: Okay, great.

19 So first I'll just mention that we do have  
20 nominations open for the Clean Energy Hall of Fame Award and  
21 that's to award individuals and entities who are making  
22 exceptional contributions to help California achieve its a  
23 hundred percent clean energy feature. And so we're still  
24 taking nominations and they're due on this Friday, June  
25 25th, and so we encourage you to check out our website and

1 make any nominations if you'd like to.

2 And so now we'll go onto public comment. And  
3 Dorothy Murimi from our Public Advisor's Office is here to  
4 help us with that.

5 Go ahead, Dorothy.

6 MS. MURIMI: Thank you, Heather.

7 So just a few instructions -- pardon me. So we're  
8 going to have one person for organization who may comment.  
9 And comments are limited to three minutes per speaker. If  
10 there are numerous parties interested in commenting, I will  
11 reduce that time to one and a half minutes per speaker.

12 One person per organization, like I mentioned  
13 before, again, may speak up to three minutes.

14 If you're using the online Zoom platform, use the  
15 raised hand feature, looks like a high five, to let us know  
16 you'd like to make a comment. We'll call on you and open  
17 your line to make comments.

18 For those on the phone, dial star 9 to raise your  
19 hand and then star 6 to mute or unmute from your end. And  
20 we'll unmute you from our end.

21 And so first I will call on folks on Zoom. Let's  
22 check the raised hands there. Again, if you're on Zoom, use  
23 the raised hand feature. Looks like a high five.

24 I see none there. I'm going to check for folks on  
25 the phone. If you're on the phone you can press star 9 to

1 raise your hand. Again, the star 9 to raise your hand.

2           Seeing none, no raised hands, I will hand the mic  
3 back to you, Heather.

4           MS. RAITT: I was just on mute. Thanks, Dorothy.

5           And I neglected to thank our panelists and Yu for  
6 moderating, thank you to Matt and Ram and Daniel and Andre  
7 and Jeff for the great afternoon, second panel too.

8           And I'll just say that comments, written comments  
9 are due on July 7th, and see the notice for all the  
10 information on how to do it. And I will give this to  
11 Commissioner Monahan -- excuse me -- Commissioner  
12 McAllister, if you would like to make any closing remarks.

13           COMMISSIONER MCALLISTER: I'll speak for both  
14 Commissioner Monahan and myself, to just thanking all of the  
15 presenters at this panel and the previous two panels as  
16 well. Really a terrific day, lots of I think integration of  
17 a bunch of different themes repeatedly through the course of  
18 the day from a different perspective, and I think that's  
19 really helpful.

20           I think we understand increasingly, there have  
21 been several questions about how do we get to scale, well,  
22 that's exactly what we're trying to, you know, understand  
23 what policy, moves, what frameworks, what advice we could  
24 potentially give to the Legislature for them to talk about,  
25 providing program direction and resources together with the

1 Governor's Office. That's what we do as an agency, is try  
2 to figure out what the path forward ought to be to reach our  
3 goals or what paths might work to reach our goals, we think  
4 would work, and then provide support to our elected  
5 officials and decisionmakers to be able to act at scale with  
6 resources that the State of California has.

7 I think in our built environment, you know, we're  
8 talking about dollars that are very large, and so I think we  
9 -- and future workshops will talk more about this, but  
10 figuring out how to have a relatively light touch as the  
11 state, you know, whatever agency has the jurisdiction for  
12 any particular effort, but also just make it worth the while  
13 for the private sector actors, the funders of multi-family  
14 low-income housing, for example, for that affordable piece  
15 is really critical, we've heard that over and over again  
16 today. We really need to focus on solutions in the  
17 affordable sector, particularly multi-family, both existing  
18 and. And if we can do it there, it will really open up  
19 pathways for all the buildings across the state, you know,  
20 all the building sectors that we act in.

21 So I want to just again thank all the different  
22 speakers we had today and the staff, really moderators,  
23 Tiffany and Yu, this afternoon, great job. And Gabe in the  
24 morning, really appreciate your effort. The IEPR team.  
25 Thanks again, Heather. Really I think the smoother one of



1 these days goes, the -- the more work has gone into making  
2 it so, and we absolutely recognize that. The IEPR team  
3 deserves a lot of kudos for getting us here and letting us  
4 focus on the conversation and the content.

5 With that I think I will -- I don't think there's  
6 anything else, Heather? Should we just call it -- can I  
7 adjourn the meeting or is there anything else you need to  
8 say?

9 MS. RAITT: I think it -- no, go ahead and  
10 adjourn. I think we have everything.

11 COMMISSIONER MCALLISTER: Okay, well, great. All  
12 right, well, thanks a lot, everybody. And please do submit  
13 your comments. We read every one and they really do make a  
14 difference. It's really the lifeblood of the process and  
15 the IEPR will -- the document itself and the policy  
16 recommendations that come out of that will reflect all the  
17 input that we get. So -- so thanks again for your  
18 consideration and your -- really putting your thinking caps  
19 on and helping us be provocative and help us really figure  
20 out how we're going to ramp this -- this big effort, because  
21 it's urgent. The state needs it, the load needs it, and  
22 we've really got to find these solutions quickly, we don't  
23 have a lot of time. So appreciate everyone's attention.  
24 And we are adjourned. Thanks a lot.

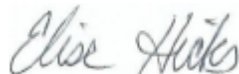
25 (The Workshop adjourned at 4:35 o'clock p.m.)

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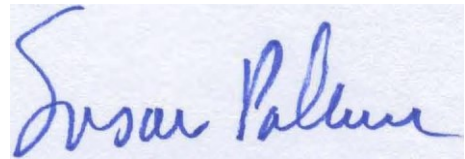
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IN WITNESS WHEREOF, I have hereunto set my hand this 9th day of August, 2021.



Susan Palmer  
Certified Reporter  
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