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STATE OF CALIFORNIA

CALIFORNIA ENERGY COMMISSION

In the matter of:

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IEPR Commissioner Workshop on Building Decarbonization: Quality Installation of Heating and Air Conditioning Equipment

REMOTE VIA ZOOM

FRIDAY, SEPTEMBER 10, 2021, 9:30 am

Reported by:

Elise Hicks

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P R O C E E D I N G S

9:30 A.M

MS. RAITT: I'd like to just give a minute for people to log on.

Alright, well, let's go ahead and get started. Good morning, everybody. Welcome to today's 2021 IEPR Commissioner Workshop on Building Decarbonization, Quality Installation of Heating and Air Conditioning Equipment.

I'm Heather Raitt, the Program Manager for the Integrated Energy Policy Report, or we refer to it as the IEPR for short.

This workshop is being held remotely consistent with Executive Order N-08-21 to continue to help California respond to, recover from, and mitigate the impacts of the COVID 19 pandemic. The public can participate in the workshop consistent with the direction in the Executive Order.

To follow along, the schedule and slide decks have been docketed and are posted on the Energy Commission's website. Just go to the 2021 IEPR page. All IEPR workshops are recorded and a recording will be linked to the Energy Commission's website shortly following the workshops, and a written transcript will be available in about a month.

Attendees had the opportunity to participate today

in a few different ways. For those joining through the online Zoom platform, the Q&A feature's available for you to submit questions. You may also upload a question submitted by someone else. Click the thumbs up icon to upload. Questions with the most uploads are moved to the top of the queue.

We'll reserve a few minutes near the end of each panel to take questions, but likely, we'll not have time to address all the questions submitted.

Alternatively, attendees may make comments during the public comment period at the end of the morning. Please note that we will not be responding to questions during that public comment period. Written comments are also welcomed and instructions for doing so are in the workshop notice and written comments are due September 24th.

And with that, I'm pleased to turn it over to Commissioner Andrew McAlister who's the lead for 2021 IEPR. Thank you.

COMMISSIONER MCALLISTER: Thank you, Heather. I'm really happy to be here. I want to first acknowledge you and your team for putting together all of these workshops in the IEPR. Generally, the building decarbonization track within that, and specifically today's workshop. And I also just have to recognize all the staff in the Efficiency

Division who've been working on so many fronts.

And in a way, the IEPR kind of comes over as an overlay to all their day jobs, working on specific issues in Buildings Efficiency, and Load Management, and all the other things we're working on; the Building Code update, Appliance Standards, flexible demand — Appliance Standards, just the list is arm's length and longer.

And so, I just want to acknowledge that and all the … from Mike Sokol, the deputy, all the way down through all the offices and all the individual teams and cross-cutting efforts -- I just want to acknowledge that there's a lot going on and people are just rolling up their sleeves and giving their best effort every day. And I just want to appreciate that across the Commission.

And for this workshop, I also want to acknowledge all the panelists and really want to thank them for their time and attention here. I know they have day jobs and also are chiming into a Commission event and preparing for that is not a trivial investment of their time and expertise. And so, I want to appreciate all of them as well.

Bill Pennington and Fritz Foo and Bryan Early on my team; Bill and Fritz are moderating today's sessions. And Bryan is always behind the scenes, making sure that what needs to happen does happen and my office is fully

engaged on the issues as they come up. So, just a big team effort here, I want to acknowledge.

This topic of quality installation of HVAC equipment is one that's kind of been long simmering. And it's a relatively difficult topic in terms of there's no perfect solution here. And what we're talking about is kind of an ecosystem that needs some care and feeding and needs some course correction, and is a very diffuse activity.

We have hundreds of thousands of replacements happening every year in existing buildings. They're relatively small projects. We have an incredibly diverse state. We have thousands and thousands of contractors installing a variety of different equipment, and across many, many, many local jurisdictions who have the permitting and the enforcement obligations.

And so, there's just a lot of chefs in this kitchen and it's a pretty complex meal. And so, I think there's an ongoing need for creative thinking and for improvement, just continuous improvement.

The positive message, and I think why we're having this workshop now today is that we have increasing numbers of tools in our toolbox, the digital age is kind of helping create lower costs, reduce transaction costs, and enabling tools to help this ecosystem function properly.

And that's both on just the quality of activity out there in the marketplace, the installations, the ability of consumers and others to get information, the contractors and building departments to work together. And COVID has sort of stimulated a lot of innovation on that front in terms of not having to be physically present at every step. So, we'll hear about some of that today.

And I want to just highlight that we have a real opportunity as the state pivots to electric HVAC, to heat pumps, as those installations take place, and as additional electrical panel changeouts and things like that become a focus of state policy, that the permitting endeavor changes in nature.

I think it’s … fingers crossed, but I believe it's more likely, I think we believe it's more likely that permits take place for wiring, generally for panel replacements, et cetera. And that there's an opportunity to both invite and apply and expect a little more rigor and transparency and more widespread permitting for these jobs because they do involve things that are much more likely to get permits than just a straight HVAC changeout like for like.

So, there are a lot of ideas. We've got a record that's actually pretty long in multiple years already around SB 1414. That activity really, we want to be

wrapping that up in earnest here in the next couple or few months.

And so, this workshop today is really along those lines, that we want to refresh the record, bring in the new ideas that have cropped up in the last couple or few years, and highlight some of the innovation in this realm.

And so, I'm really happy with the range of participants today, panelists – I won't read them all by name, but they will come up. And then also, we have invited David Fogt from the Contractors State License Board to be with us on the dais. He does have a potential time conflict. So, I just want to acknowledge that he may be showing up here in the next little while.

MS. RAITT: Commissioner he's here, actually. He's joined.

COMMISSIONER MCALLISTER: Oh great.

EXECUTIVE OFFICER FOGT: Yeah, Commissioner, I'm here.

COMMISSIONER MCALLISTER: Oh, here he is. Okay, thanks a lot. Sorry about that. I have a limited number of Hollywood squares on my screen here, so I didn't see you crop up. But you certainly deserve the top Hollywood square. So, thanks for being with us.

And I wanted to just highlight just the multiple jurisdictions, the various entities that are involved in

this ecosystem as we could call it, and that there are a lot of synergies, I think now; there's a lot of opportunity to collaborate with the CSLB and local building departments and others to kind of unpack the process, relative process improvements, take advantage of our access to better data, think about how we could develop our authority at the Energy Commission to support enforcement activities.

At the same time, you know, we don't want it to just be sticks. There need to be carrots and it does have some cost. And so, reducing that cost and highlighting the benefits of proper installation, quality installation, and alongside that, permitting as required by law.

And so, I think there's a lot of sort of common interest across our two agencies, certainly. And again, we're working with the Public Utilities Commission and the Air Resources Board, and everyone on building decarbonization more broadly.

And as we pivot towards electrification and heat pump technologies, there's just the real opportunity for alignment and for refreshing the policy and enforcement regime around heating technologies and buildings.

So, with that, David, I'll pass the mic to you in case you want to make some opening comments here. I really appreciate your being with us. I think you've seen the agenda. We have a couple panels. First one kind of

focused on some industry participants and the next one on some new technologies that are out there that we might avail ourselves of.

So, pass it over to you. Thanks for being here.

EXECUTIVE OFFICER FOGT: Thank you Commissioner McAllister and good morning to everyone that's participating today. I just want to really thank you all for the opportunity to be part of this workshop. At the Contractors State License Board, permit compliance in working with the California Energy Commission has been a top priority.

So, I look forward to sharing some ideas with all of you later this morning, and maybe talking about some of the tools that we now have to increase compliance for permit requirements. I mean, one tool's our letter of admonishment, which requires that a contractor that doesn't obtain a permit, take a course on the need to obtain a permit and why permits are so important.

We have a training video that was put together by building officials throughout the state, and we're finding that to be really very effective. So again, thank you for having me this morning. I look forward to contributing.

COMMISSIONER MCALLISTER: Great. Well, thank you so much for being here and I look forward to your contributions. I will say to everyone here, I do have a

time conflict. I have to step out for a Western Interstate Energy Board meeting at 10, and that I'm at the front end of the agenda. So, hopefully, I can be back expeditiously.

But when I disappear at 10, hopefully, this won't be a surprise for folks. I'll come back as soon as I can. So, with that, I want to pass it to Heather to introduce our first panel and with Bill Pennington moderating.

MS. RAITT: Yeah. Great, thanks Commissioner. So, as we mentioned … well, I'm Heather, so Bill Pennington is the first moderator and he's actually a technical advisor to Commissioner McAllister. And so, he's going to be moderating the panel on actions to improve the quality of installation of HVAC equipment. So, go ahead, Bill. Thank you.

MR. PENNINGTON: Okay, thank you. Can you see my video?

MS. RAITT: Yes, you're good.

MR. PENNINGTON: Okay, beautiful. Could you open the slides for me please? Thank you.

Alright. So, next slide, please.

So, I'm just going to try to give some background to the issue area that we're talking about today, a little historical background and kind of how that's brought us to today.

The Energy Commission first started doing

Appliance Standards and Building Standards in 1978, and that was all about efficiency ratings and that sort of thing. And it became quite clear about 15 years in on that, that the quality of installation was potentially a major detractor from the savings that we were trying to accomplish otherwise.

So, there actually was national research at that time in the mid-nineties, early nineties, that identified widely that there were installation problems and those problems could lead to energy saving losses of 30 to 40%. And also, the defects in installation could lead to comfort problems and indoor air quality problems.

So, it's very significant and, and the Energy Commission felt like it needed to address this within the Building Standards. And actually, we were the first Building Code nationwide to start trying to think about this problem.

And so, the commission was active in the early nineties. We were on the ASHRAE Standard 52 committee, a historic committee on duct leakage testing, and Jon Leber from the Energy Commission staff was secretary to that committee, Mark Modera led it. So, it was a really California-driven committee.

We also had an active collaboration at that time with CBIA and IOUs to try to develop installation protocols

on HVAC equipment and other things. So, we called that the Quality Home Program, and it was pretty active in that timeframe.

And then beginning in that time period, and kind of starting off with LBNL research related to ducts, and then branching off into other problems, the commission has sponsored or been engaged in field research related to these problems for a long time.

And some of the sort of brightest researcher names in the state were involved in that; Mark Modera, Iain Walker, Bruce Wilcox, John Proctor, Rick Chitwood -- actively had done field research for the commission and informed our actions.

We developed a field verification process early on in 1998, and started that voluntarily and then rolled it out into the standard. So, that was an early action and we focused on quality installation first as a compliance option, and then as a standards requirement for newly constructed buildings in 2001. And then started with duct sealing for HVAC changeouts in 2005.

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So, Assembly Bill 2021 in 2006 directed that the Energy Commission develop a plan to improve the energy efficiency and decrease the peak electricity demand of air conditioners. And so, the Energy Commission brought

together a large working group of industry experts to help think about the direction of the legislation.

And I just want to give you a flavor for who was on that committee; people that are widely recognized as being influential people within the industry were on that group.

Just a couple few names here. Mike Messenger was the lead from the Energy Commission. Mike Carson, Dave Diaz, Eric Emblem, Susie Evans, Russ Geary, Kristen Heinemeyer, Glen Hourahan, Scott Johnson, John Proctor, Charles Segerstrom, and Bob Weisman were just a few of those people. And I'm sure the industry members here recognize those names as being important to their interests.

So, that group viewed quality installation of HVAC as a critical aspect to improving the energy efficiency and reducing peak demand for air conditioners. And so, working together, they came up with an estimate that the lack of quality installation would increase peak demand by 20 to 30%.

They also together with their knowledge of the market and the field concluded that only 10% of the residential replacement installations of HVAC equipment were being pulled. And they estimated at that time that there were about 350,000 installations annually.

They also thought about okay, that's about permits. So, what about the quality of the installations industry-wide. And their conclusion was that about 15% of all installations would meet the CEC quality installation standards that had been developed up to that point. And they also estimated that if we could change that 15% to 85%, then there would be an annual peak energy reduction of 130 megawatts each year.

And at the time, just to kind of compare that -- as a basis for comparison, that amount was at the time equivalent to about 80% of the entire energy efficiency portfolio of Southern California Edison.

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So, as a result of that work, the plan that was put together on that, there were quite a bit of actions taken subsequently. Governor Schwarzenegger actually had done an Executive Order in 2004 and directed the Energy Commission to coordinate with CSLB on Building Standards compliance issues. And so, we initially established an MOU with David and team way back then to coordinate.

And there were actions like CSLB Stings, good industry information. The Energy Commission tried to assist CSLB related to complaint investigations. We actually originally proposed to CSLB that we provide budget to cover a staff person at CSLB to be sort of on ongoing

basis to look at energy issues but that didn't work out.

So, we ultimately hired a person from CSLB that worked solely on this coordination for a few years trying to move this along.

Also, the CPUC was an active partner with the Energy Commission on the working group. And one of their actions was to establish the Western HVAC Performance Alliance, and the CPUC had done a strategic plan themselves. And so, the Alliance worked on a more detailed action plan at that point. And so, there was a very long laundry list of things that were worked on for several years by that Alliance.

Also, the Codes and Standards Programs from the IOUs established the Compliance Improvement Advisory Group, which was kind of a group of knowledgeable researchers and industry actors. And they produced a lot of white papers on what kinds of actions could happen.

The Energy Commission also during the ARRA time period, in the funding of programs, strongly encouraged permits and strongly encouraged a focus on improved quality. Another thing that happened was that the Attorney General's office became concerned that utility rebates were potentially going to unpermitted projects and unlicensed contractors.

And so, there was an interaction between the AG's

office and the IOUs that led to the need for owner declarations, that the installation was done according to permitting requirements and by a licensed contractor. So, that was happening all through the time between 2005 and 2015 or so. And the PUC and their consultant DNV-GL did a check back related to the 10% permit rate.

And they did a pretty deep dive on the data that was available to look into that again. And they found at that time that the rate was 7.9%. That was what their finding was. And their estimation was that there were about a million annual changeouts at that time.

So, that million number is about three times the number that the original working group estimated. And so, if the 135-megawatt loss was ballpark correct, then this three times multiplier would get us over 400 megawatts annually that potentially could be accomplished or avoided if we had better installations.

So, there were a ton of really well-intended actions that occurred in this time period. A lot of hands-on-deck within the industry, but at least related to permits, we didn't seem to move the needle on the problem, and there still was a concern for lack of quality installation.

So, as a result of that, there's an ongoing challenge for the industry and for government or all

stakeholders to try to improve performance.

Next slide, please. Thank you.

So, also, the Legislature has been interested in these problems and has given related direction. AB 350 was this mammoth Clean Energy and Pollution Reduction Act aimed at trying to identify ways that we could achieve climate change goals.

And one of the call-outs in that legislation was that the Energy Commission should work to ensure that retrofits meet high-quality performance standards and reduce energy savings lost due to poor quality workmanship.

The next year, SB 1414 passed, and that directed the Energy Commission to approve a plan that would promote compliance with Title 24 in the installation of central air conditioning and heat pumps.

And a provision of that direction was that the Energy Commission could adopt regulations to increase compliance with permitting and inspection requirements. And also, could have regulations associated with sales and installations.

About the same time, the Legislature also passed SB 1383, which was focused on reduction of short-lived climate pollutants. And the urgency of getting control of these pollutants that have high global warming potential and focused in particularly on hydrofluorocarbon gases

being reduced by 40% by 2030.

And this has a touch point with the quality installation area because a substantial part of the problem related to refrigerants, occurs at point of change-out when that refrigerant should be recaptured, and otherwise, it escapes to the atmosphere.

And so, having good quality installation in handling at that change-out point would give us also a means to address this important legislative direction.

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So, these problems have been important to address and correct from an energy standpoint for a very long time, but they also relate to the climate change imperative that we now have. In 2018, Governor Brown released his Executive Order B-55-18, that made a worldwide commitment that California would achieve carbon neutrality no later than 2045.

And as soon as Governor Newsom came in, he immediately endorsed Governor Brown's action. And this has been a conscious and major goal of state government all along.

About a year ago, Governor Newsome had very strong press release language that pointed out we're in a climate crisis, and the impacts are happening radically faster than had been anticipated, and made a call for fast-tracking of

all efforts to address the ultimate climate crisis that we may face as well as trying to act on the immediate consequences.

So, another kind of new factor here is that the commissioner alluded to early on is that building decarbonization to achieve these climate goals is going to call for the use of heat pumps, energy efficient heat pumps as a new technology for space heating systems.

And we're going to have to rapidly expand to do that. And that's going to put a lot more air conditioner-type equipment out there that if we continue to have problems with installation quality with those heat pumps, that puts us at risk for meeting our climate change goals.

So, not only are the quality installation problems problematic from the energy losses, but also from the refrigerant losses that I mentioned before. And both of those compromise the GHG reductions that we need to have.

So, now's the time really to try to figure out how we can do better related to these problems and make critical changes. So, that's the background for today's workshop.

So, related to panel number one, this panel is focused on kind of revisiting as the commissioner alluded to, some of the recommendations that came up in the SB 1414 workshops that were held leading up to COVID and revisiting

those, and kind of dusting those off and seeing which of those remain and what new ideas are there, what evolution has happened in that timeframe.

And so, we have a strong panel of key actors that come from organizations that each have the potential to influence the improvement of the quality of installation of HVAC equipment.

So, let me give a brief introduction to Josh Dean from the California Energy Alliance, and then Josh can make his presentation.

Josh has served, I should say, as the Executive Director with the California Energy Alliance since September of 2020. And formerly was the Executive Director for the San Diego Green Building Council, and he brings over a decade of experience in the sustainability, construction, and real estate industries. So, Josh.

MR. DEAN: Alright. Thank you, Bill. And thank you to Commissioner McAllister and your staff and all the Energy Commission staff supporting this workshop. We really appreciate you having us today for this conversation.

My name is Josh Dean. I'm the Executive Director of the California Energy Alliance. I'm delighted to be presenting on behalf of CEA and it's over 40 members representing the energy industry.

We were a part of those discussions as Commissioner McAllister and Bill mentioned back in 2018 to 2019 looking to improve the quality installation of HVAC equipment. So, we're happy to be here today to be discussing some updates and opportunities as a part of the 2021 IEPR report.

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Just a quick introduction into the California Energy Alliance for those who're not familiar with the organization -- CEA is a leading advocacy organization for California's energy stakeholders. Founded in 2016, CEA is a nonprofit, nonpartisan alliance of business, government, environmental, and NGO leaders advocating for energy productivity to achieve economic growth, environmental justice, energy security, affordability, and resilience.

CEA envisions a healthy and equitable built environment that is powered by carbon-free, reliable energy sources. And we work towards this vision by bringing beneficial, equitable change to energy standards, policies, and programs by developing consensus among diverse and engaged stakeholders.

So, that's why we're excited to be here today because much of our focus is on the evolution of codes, standards, and policy, doing some of that research, and then providing the education and outreach once that's done.

So, one of CEA's major initiatives is code compliance improvement. We have a history of working with the Energy Commission, Acceptance Test Certification Providers, workforce training programs, and a number of others on proposals to increase code compliance. So, that's why we're happy to continue these discussions and bring back some of those ideas and recommendations that were discussed back in 2018, into 2019.

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Speaking of those past discussions and previous proposals and ideas around this approach to increase HVAC compliance in California, the program compliance issues as they've touched on and ways to improve those installations, have been under discussion for a couple of decades now.

And then going back to those 2018, 2019 workshops and discussions, there are potential solutions that were discussed in order to address this question of permitting compliance, and quality installs of the equipment. So, some of those discussions that came out from a range of stakeholders, included things like equipment registration, tackling out-of-state equipment sales, installs by unlicensed contractors.

The need to increase consumer awareness around the need for permits and how proper HVAC equipment installations can provide greater energy efficiency for the

homeowner; stronger enforcement options, workforce education, and training, and then the need to reduce permitting barriers, costs, and time. And a lot of that will boil down to some of the online permitting that I'll talk about here in a little bit.

CEA understands all of the positions and ideas represented, including the one major sticking point and kind of pushback on the equipment registration, particularly with serial number tracking, because that really provides or puts a lot of pressure on the manufacturer side of things to create a whole new system to really track what's going on from manufacturing to install.

Additionally, CEA does agree for the need for more training for contractors and building officials, the need for more enforcement, both from a state and local level, and the need for homeowner education and the homeowners should be held responsible for pulling these permits. And also, that inspectors should keep their employments, the continuing education should be required for licensed HVAC contractors and a uniform statewide permitting system, which would be very preferable to a lot of the local jurisdictions.

So, the commissioner staff asked us to kind of come back and rediscuss, and reintroduce some of these ideas that CEA put forth based on our membership and our

stakeholder engagement, and we were happy to reconvene our members and discuss some of this middle ground approach that we had back then.

So, next slide please.

And since those previous discussions that we've held on this particular topic, we now include much more representation from the HVAC manufacturers, the workforce education and training programs in this particular field, and then even code compliance stakeholders.

So, CEA represents a wide spectrum of stakeholders within the HVAC industry and hundreds of years of experience by these folks. We really wanted to pull back in and reconvene this group of folks to look at the code compliance, improvement opportunities and pathways.

So, we're able to tap into the experience of our members in order to develop consensus around the possible solution or solutions to improve permit compliance and the quality of installation of HVAC equipment.

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So, I mentioned, we brought back together this group just last week to really discuss the overall HVAC manufacturing process, from distributing to installation and permitting processes. We brought up past ideas that I mentioned earlier for improving this overall process, and highlighted some of the hurdles and concerns as well as

discuss some new opportunities.

The main focus of the group was to consider an approach or approaches that take compliance from that 10% range that's been discussed to even the 50 or 60% plus range, knowing that reaching 90% compliance is going to be quite difficult in such a short period of time. And that there's no real silver bullet.

So, the group really kind of came together to discuss everything from the serial number tracking type programs and the concerns and cost that are associated with it, to consumer and contractor education, as ways to increase compliance. So, having the diverse stakeholder group allowed us to hear multiple solutions and concerns to a continued problem of low compliance.

And some of the additional concerns that came out of that conversation and that are continued to be had are data security when sharing equipment and consumer information, proper education and training for the contractors and installers, as we see heat pump technologies becoming that baseline for replacement.

Cost for implementing new compliance programs, such as what we'll kind of recommend, the need for a uniform permitting platform, capabilities of the local jurisdiction for enforced as permit requests are increasing, and then much more.

But like I said, while there's no one solution that'll help turn this around immediately, we did agree on a multi-pronged approach that can be sort of the near-term cost-effective solution to hopefully increase compliance, and thus supporting the quality of installation for HVAC equipment.

And in the bubble there, it really kind of outlines a little bit of what the group came up with and agreed on for that full stakeholder group that was a part of the conversation. And so, that includes a uniformed online permitting process. There's a number of examples that came out one from the Center for Sustainable Energy and their findings in a submission from January 30th, 2019.

And that was a 2016 study on a statewide online permitting platform for residential HVAC alterations. So, that's a really good format that they came up with. And this system that we're looking at too, should integrate with the existing HERS form registry, that's maintained by the CEC and with all permitting systems in use today by municipalities across California.

We know that this online permitting option would help speed up the process, allow for those weekend installs and reduce costs due to contractors not having to spend as much time going down to the Building Permit Office and sort of the back and forth.

One of the other items is the compliance reconciliation system. So, back in 2018 and 19, the CEA recommended this approach to an equipment registration program. This system does require a statewide online permitting platform to be in place to make it the most sort of cost-effective. And what it really does is just track the number of units sold by distributors to contractors, and then reconciles that against permits pulled for those particular contractors' licenses.

And so, just want to reiterate that this isn't a serial tracking system. It really is … there's no equipment numbers being tracked or where it's installed. It's really trying to reconcile those numbers of units sold to license contractors, and then the number of permits pulled and closed out.

So, the next point is also the key piece of selling to licensed contractors so you can make that reconciliation. And so, then that helps to be able to reconcile the number of units purchased with HERS testing documents, building permits that have been pulled and then closed by the contractor. This helps present the enforcement agencies with a narrowed target group of non-compliant contractors, along with the clear evidence trail to justify their selection.

And finally, still agree that there's a need for

consumer and contractor education. This is always critical for increased education, and the more that the consumers know what's required for a permit, the more they're going to request that. But then also, kind of boiling it back to the online permitting process that then would help encourage contractors to follow through with that if that particular pathway is simplified.

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And so, finally, I just wanted to leave with a couple next steps since we're reintroducing some of these ideas and things have changed in the past couple of years -- - is that we should really reevaluate that faster uniform online permitting process. What does that look like since the pandemic has really pushed some of the jurisdictions into online systems, enforcing that selling to licensed contractors from the distributors, reconvening additional stakeholders.

CEA does see the need to bring everyone back to the table to hash out some of these solutions to include the distributors, the HERS providers and raters, code officials and contractors to discuss these ideas even further.

Again, with the workforce education and training, as I pointed out, our options at this point are to really initiate some more studies to try to answer these questions

so that there is a need for further analysis of pilot projects to answer things like the cost of implementing the program, such as the impact on the building departments if more permit requests are happening, and the increased efficiency of installed HVAC equipment that could lead towards statewide energy savings.

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I just want to say thank you again. We think that the great next step is pulling together a convening of all the industry stakeholders on this topic and identifying a pathway to research the cost hurdles, opportunities, and quickest ways to implement a meaningful program that brings increased efficiency of installed equipment, increased permitting compliance, consumer satisfaction, and energy demand savings.

On behalf of CEA, I just want to say thank you again to the commissioners, your staff, and the Energy Commission for having us on the workshop today. And I look forward to the discussion. Thank you.

MR. PENNINGTON: So, thank you very much, Josh. That was really good and very thorough. So, I appreciate that very much.

Next speaker is Alex Ayers from the Heating Air Conditioning and Refrigeration Distributors International organization, they're known as HARDI.

Alex is the director there and he serves as HARDI's primary lobbyist and policy expert working to educate policymakers on the HVAC and refrigeration industry and the wholesale distribution process.

MR. AYERS: Thank you, Bill. I also really want to thank the commission for hosting this workshop. I think it's great to have an opportunity to discuss a lot of the issues that we've been really discussing for several years and bring back to the table some of the most important parts of that.

I really want to highlight today specifically what we would consider the role of equipment distributors in increasing quality installation. This is not to say that there's not lots of other great ideas out there. I fully agree with CEA on the need for a uniform online permitting process, but I wanted to keep mine specific to what it is that the role of distribution plays.

So, if I can go to the next slide, please.

So, really when we look at what HARDI does, our job is to advocate on behalf of HVAC our wholesale distributors. Our goal is to make sure that the way they operate their business, they serve their partners and employees, and they add value to the economy; they do that by remaining the channel of choice for HVAC manufacturer contractors.

And so, if we go to that next slide.

You can see what we mean by the channel. And that's where HARDI distributors serve as essentially the middleman of the industry. We buy from manufacturers not only the equipment, but the additional supplies like refrigerants, tools, ducting from various suppliers and serve as a one-stop shop for the contractors to then deliver products and install them for our consumers.

And so, by being that primary source of equipment and supplies, we also serve as the knowledge base. We make sure that contractors that come in get additional information about specific equipment, make sure that it meets all the requirements, whether it's an energy efficiency requirement or the new refrigerants that are coming up as a changeover in coming years, but then also service warranties. And then also in many situations, serve as a place for training to occur in a kind of continuing education format.

So, if we move on to the next slide, please.

So, when I say that we're a source of information for contractors, it's everything from selecting the correct equipment based on the situation, whether it's a changeout, knowing that maybe it's an older home that has smaller ducts. So, you can't put an oversized unit in there and end up just wasting the amount of energy that's put into

that unit, or making sure that there's the correct training available to technicians, so they're properly installing this equipment because not all equipment is identical. The basics are there, but there are certain parts to every piece of equipment that's slightly different from another OEM and other manufacturers.

But then we also want to make sure that we're not installing things that don't meet proper energy efficiency requirements or refrigerant regulations, and this is going to become more and more important over the next half decade.

So, if we can look at the next slide, please.

So, for us, proper installation really comes down to in a lot of ways, looking at warranties because distributors are the source of the replacement parts or the equipment that's under warranty. Well, yes, the cost gets passed on to the manufacturer, it still takes inventory out of our business and time to replace those parts as they come and go.

So, having quality installation reduces the need for warranty repairs. And then that way, we can also look at ways we're making sure that the annual servicing of equipment prevents unnecessary repairs that don't need to happen because at the end of the day, the fewer warranty repairs there are, the better off we are for distributors.

And the way we see this is needing more and more education to the contractors to help reduce these warranties.

So, if we go to the next slide, please.

And this is where training comes in. So, our members as HVAC distributors work with the OEMs to train contractors on the specific equipment from those OEMs for proper installation. And we know that not being properly trained actually ends up leading to problems.

Just last week in conversations, with one of our Councils, we had a distributor blatantly say, he said we've had more than four different warranty calls from one specific company, simply because that company didn't want to take the time to go through the specific training for that equipment.

And the owner of the company was very specific, was like, "I don't want to take my techs out of the field for four hours of online training" because that hurts his bottom line. Because even though the warranty calls and everything else, also hurt it in his mind, having them not working was worse than doing the warranty calls.

And so, it's this type of lack of training that we want to counteract. We want to make sure that this is not something that's commonplace among contractors, that way, when something is installed, it's installed right the first time. And then there's those fewer warranties that end up

impacting distributors.

So, if we can head to the next slide as well.

I also want to point out that training is going to become even more important in the next coming years. We have a new minimum efficiency for residential air conditioners and heat pumps coming in 2023. And so, while the equivalent won't change much for this energy efficiency change, not having quality installation loses the gains that we're doing by having this new efficiency increase.

In California, you're looking at 15 SEER residential air conditioners that if they're just not properly installed, it's not any better than the current 14 SEER. So, that's going to be a major changes coming in 2023, where training would help with that. But even larger than that is the upcoming refrigerant change looking at 2025 in California and likely nationwide. We just don't have an EPA regulation on that one yet for residential AC. And then in 2026 for VRF, so slightly different timeline there.

But with A2L refrigerants coming, these are much different refrigerants, as far as the safety parameters go. They are considered low flammability. And so, we know that servicing equipment that has refrigerants that have a low flammability component to them, are going to be different than how we operate today.

And so, EPA also was looking at doing regulations on a contractor certification to make sure that they are certified to operate with these new refrigerants, but we just don't have those regulations yet. And so, that's going to be very important in the training that's going to be necessary prior to 2025 and then 2026 for VRF.

But then at the same time, as Bill mentioned, when you take out old equipment, the refrigerant needs to go somewhere. And the way it should work is that it's recovered because recovery is going to become very important in this transition. So, that that recovered refrigerant goes to a reclaimer, gets essentially recycled and re-enters the market without it leaking into the atmosphere so that we can have a smooth transition without shortages of refrigerants.

That's going to be a major issue if we are venting too much HFCs into the atmosphere, which then also has the GHG impacts that Bill was talking about earlier.

So, we can go to the next slide, please.

And so, one of the things that we want to look at is what are the current requirements for training and really at the federal and state level; it's initial training that is required, but there's no additional training as you progress in your career.

So, with the federal EPA 608 certification, it's a

one-time test. And what makes this one actually worse than I would say at the state level, is that you only need one technician certified on the company level in order for a distributor to sell you refrigerant. Obviously, there was the purpose of you know, you're going to have a runner. The runner doesn't need to be certified. So therefore, the company was what required the certification, but it wasn't intended to be only one technician would have the certification.

And so, we're looking at how will EPA update these regulations and possibly make it stricter so that more technicians are trained and certified in A2Ls, but then also making sure that certified technicians are the ones actually doing the changing of line sets or charging or evacuating systems. We don't want untrained technicians doing this improperly releasing of these HFC refrigerants into the atmosphere.

And then you look at things in the California system, the C20 license, while it has excellent training requirements for that initial license, there's no requirement for continuing education. So, you could have a person that got their initial C20 over a decade ago, and hasn't done any kind of continuing education to understand how equipment has changed over that decade.

Even worse, is if you have someone that allows

their license to expire, and I don't mean just a few days of expiration, but months or years of expiration, they simply pay a late fee. They don't actually have to go in and prove that they've kept up with the industry if say they left the industry and decided to come back.

And so, it'd be great to see some changes in that system so that we're making sure that contractors are aware of how the industry is changing, how equipment is changing especially with this transition to new refrigerants, so that we're making sure that they're doing it safely, but also doing it in a quality way.

And with that, I think that's my last slide. So, can you go to the next one just in case?

Yep. So, with that, looking forward to the discussion later on at the end of this panel.

MR. PENNINGTON: Thank you very much, Alex. It's very interesting to get a better understanding of how the distributors fit into the whole system and the potential influence that you have.

So, the next speaker is Randy Young, representing the Sheet Metal Workers Local 104. Randy has over 30 years of experience in the HVAC sector, and has worked on manufacturing all the way to servicing of HVAC systems.

He's currently involved in the Uniform Mechanical Code Development process at IAPMO, and participates in the

PUC's Procurement Review Group for Investor-Owned Utilities, and is assisting in the development and implementation of training curricula for the HVAC sector. Randy?

MR. YOUNG: Good morning. And thank you Commissioner for putting on this workshop. I'm going to try to make up a little bit of time today because I didn't put together a slide deck because I think a lot of things that we're talking about have already been addressed.

And on the actions to improve quality installation of heating and air conditioning equipment, Local 104 feels this is a very complex problem that has been kicked down the road for a better lack of terms. And now, our energy efficiency goals that are set for the state of California are in jeopardy of not being met.

One of the leading factors will impact the HVAC equipment and systems that are not installed, and will continue to be uninstalled or installed without permits, as long as we do not know where the units are going.

We've all heard the numbers from 8 to 10% compliance in the residential sector and as high as 24% in the commercial sector. What we don't know is if the equipment and systems are operating as designed or what the installations look like, but we can assume these systems are installed not to code.

The system is broken and a faster response is now needed to address the issue in order to achieve the state goals set forth in SB 350 and SB 1414, for push for decarbonization, and the other bills that were mentioned earlier today.

Here are just a few actions the Local 104 feels would help increase quality installations and increase permit compliance. Because after all, we're really talking about permit compliance. If you get permit compliance and the project for being inspected, the quality of installations is going to rise automatically.

So, a skilled, trained workforce definitely is a piece of the puzzle. I don't feel it's a primary piece, but again, it's a piece. The installers, the technicians, the contractors should all be trained properly, and this needs to be ongoing training as new technologies emerge, such as the A2L refrigerants.

Permit compliance should be somehow tied to the sale of equipment. If it's serial number tracking or equipment registration, I'm not sure what it needs to be, but somehow, we need to track that equipment so we know where it goes, and we know that it was installed properly.

I feel we should -- the Local 104 feels we should survey other states and jurisdictions to see what their compliance rates are and mirror what others have done if we

find some better, above 50, 75, or even at a hundred percent. Much like the City of Davis, I believe is about a hundred percent and Denver is close to 75% compliance. So, we should look at those areas and see what they're doing and try to mirror that.

We feel inspector training should be standardized. There should be required training for all inspectors specific to the craft for the portion of the building that they're inspecting. Currently, many building departments are undercut and underfunded, and they have combo inspectors. So, the combo inspector may be proficient in electrical, but may not know anything about mechanical.

Therefore, you're sending somebody in to check on a project to see if it's built up to code when they really don't understand what they're looking at thoroughly. There's no knock on them. It's just the way it is.

And Local 104 feels that there should be a requirement for annual certifications for inspectors, such as the mechanical inspectors for IAPMO. They have a program where they can certify mechanical inspectors relatively quickly and easily.

Inspector qualifications need to come up. Currently, they are not disciplined in the trade they're typically inspecting. I just talked a little bit about that.

Continuity in the codes adopted and equal enforcement in jurisdictions. Different jurisdictions adopt different parts of the code, or they don't adopt the entire code in its entirety. And therefore, you have several different jurisdictions within the State of California that are currently putting in projects, products, duct work, heating and air conditioning equipment to different standards.

And there needs to be some continuity there so it's likewise throughout the state. As CEA mentioned, we need to streamline the permit process, online options with the designated specific area for HVAC unit changeouts, I feel would be helpful. We need to pass legislation to allow the Contractor State License Board to work concurrently with the building divisions, building departments to enforce the permit violation.

So, I think people get confused about what the CSLB is and does. And I believe what they really do is they look for unlicensed contractors as their main charge, but if they could somehow work together with the other agencies and develop a task group that could go after non-permitted work, that would be very helpful in getting to where we need to be.

Again, equipment registration is defined by the CEA as a good baseline to start. In talking with many

manufacturers, they already track their equipment for warranty issues and to track inventory. So, it really shouldn't be that difficult to track this equipment.

If I can track a letter or a package that I ordered from Amazon and I can track it and find out exactly where it is, there's no reason why we shouldn't be able to track units with some of that technology that's available today.

And enforcement's a key piece. I think the juice must be worth the squeeze. And I think that currently with the system, the way it's set up, if you get caught doing an HVAC changeout without a permit, I don't know what the fine is. I don't know if it's worth doing it without pulling your permit. I don't know what those issues are, but I think that if we are able to enforce it, then the homeowner and the contractor who does the work should both share a little bit of that responsibility.

Because the contractor will tell the homeowner that they can save 500 to a thousand dollars on a 12,000 to $20,000 system. And if you could save five to a thousand dollars by not pulling your permit, most homeowners are going to say, "Hey, you know what? I'll take that deal. I'll take that chance." And that needs to stop.

The Local 104 firmly believes that all these discussed items and others brought forward today are key to

moving the needle forward in achieving our desired results; what order they're in, and what's most important, that can be debated forever, but the choice needs to be made and implemented soon.

And with that, I will end my time. And thank you and looking forward to any questions later.

MR. PENNINGTON: Thank you very much, Randy. That was really good. Thank you. I appreciate the information from the sheet metal workers.

So, the next presenter here is Scott Blunk from SMUD. Scott is the Strategic Planner for Energy Efficiency and Electrification at SMUD. And also, is an Adjunct Professor of Building Science at Consumnes River College, a licensed general contractor and a real estate broker. So, go ahead, Scott.

MR. BLUNK: Okay. Well, thank you all for having me here, honored to be here as well, and really happy to see the focus today on building permits. I think it's very vital.

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As it has been outlined, permitting today for HVAC is somewhere around 10%. And I know today's focus on HVAC, but water heating as well is kind of a critical issue at this juncture and I would guess it's probably less than even 10% and really needs to come up.

Yeah, permitting really for HVAC quality installation, I think permitting is foundational. Permitting is not necessarily going to make the highest quality HVAC installations, but it's just the first step. Everyone knows when someone checks your work, you do a better job. And there's so many benefits to the customer.

You know, value of the property is maintained and the neighborhoods are maintained. There's going to be fewer derelict properties around. It's going to save money and energy for the customer. And there's going to be health and safety impacts that are just with permitted work.

The contractor, it's really leveling the playing field. When I was working as a contractor bidding against other contractors who are not pulling permits and are not doing what they're legally obliged to do, it just makes it more challenging. So, everyone's racing to the bottom. And one way to do that is to just cut out the cost of permits.

I think it's going to reduce liability to the contractors just having that quality check from … or the permit check to some level of quality check from … the building inspector. And I think it just increases the legitimacy of the profession when everyone's pulling permits.

And unpermitted work does cost utilities and all incentive programs out there because most of them require a permit to be pulled, which is counter to how things typically run. And if a building permit costs 200 to $400, which may be a little low -- when that cost includes the cost of the actual permit, the time it takes to pull that permit, the time it takes to wait for an inspector, which can sometimes be half a day or more … 200 to $400 is low.

But the counter, without pulling it for a minute cost zero. And just in the last three years, our electrification program because we require that permit, it's cost SMUD at least $1.1 million and our incentives are being diverted kind of away from what the goal is, is to electrify, it's being really spent on just pulling the permit. And I think that's just SMUD. Statewide, it’s going to be a really large number.

Next slide.

And just from what we know and where we're going, there are a lot of gas furnaces that need to be replaced. The charts below just kind of show that transition, from E3, have kind of when and how many of these are coming in.

And I think quality installations are even more important for heat pumps to be able to maintain satisfaction. And if we don't get the customers changed out so they are satisfied with their heat pumps, it's just

going to slow the progress toward electrification. We really want people to have heat pumps, but also be happy with them, where they're properly heating and cooling their homes. And they see the bill savings that they should be seeing.

And I think yes, permit compliance is a step in ensuring that the quality will be better than in unpermitted work, I think in general.

Next slide.

And just the equipment registration program that CEA put forth in previous comments and again, today, I think is a step. It's not going to get us where we want to go just with equipment registration program. But also, we can do many things and see what works and or lots of little things can help the situation. Anything can help. I don't know what could hurt it at this point. So, let's start trying things.

Like Randy Young said, we know where it's working. We know the City of Davis has near 100% compliance. That's phenomenal across the country. And at Boulder, he said Denver, maybe it's Denver somewhere in Colorado, there's near 75% compliance.

Let's get out there and study these jurisdictions. There's probably more out there with good compliance. Let's see what they're actually doing and how it works.

The City of Davis, I was a contractor there for a while and every homeowner that I worked with out there, they knew that the permits are required. They were over my shoulder making sure, "Did you get that on the permit? Did you get that on the permit?" Like it's just well-known.

And I know that program's been in existence since something like 1976 and I'm sure it takes a little time, but it can't take … again, anything is going to help. The City of Davis, just doing a little Google search and talking to them, and just from my own experience working there, this is a resale inspection program. So, when you sell a residential … they don't do commercial, they only do residential.

But when you sell a home, you need this resale inspection report done by an inspector, and they verify the compliance of that building to codes in effect when the home was built, and or when anything subsequent happened; an addition or water heater changeout, or an HVAC changeout.

It's a $438 inspection fee that's good for 18 months. So, that long window of 18 months helps it not slow down the sales process. And again, all the residents know. So, it's not going to be a surprise when they're selling their home.

It does create jobs for building inspectors and

officials. I think it's something like four FTEs is what it takes to manage the Davis resale inspection program. And it's cost-neutral to the city, especially when you combine it with there's $438 for that inspection, but there's also everyone pulls permits and there's money on all of those permits that are pulled. So, they felt it's cost-neutral to their city.

Obviously, it creates jobs, cost neutral, and it's just a peace of mind to the home buyer. If it's just, it's part of living in Davis, it's part of living in society there that … and they know that again, at least at some level, that what they paid for has been installed in a quality manner.

And one of the things is when a customer decides not to pull a permit, part of that is that I've heard this contractor say, "Well, don't you trust me?" And when you're about to spend 10 or $20,000 for the contractor, of course, you trust them. If you didn't trust them, you wouldn't be paying them 10 or $20,000.

So, it's an easy like, "Well, yeah, I mean, I'm trusting you with $20,000." So, I just think the peace of mind from the home buyer, it reduces that decision for the homeowner as well.

Next slide.

And then CSLB so happy to see you on the call.

And also, something Randy said, I believe CSLB right now, is really not in charge of maintaining or verifying the contractors pull permits. But I would like to see that happen at some level. Again, I'd like to see CSLB working with the contractors to maintain a level of profession with all the contractors.

Maybe they lack the funding or the workforce to do that, but that can be fixed. And I just think they're a very important partner in improving permit compliance and working with them to help create a solution.

And since I have the pulpit now, maybe not directly related, but I think it would be great to see CSLB expand the licensing ability of plumbers and HVAC contractors; one, for plumbers installing heat pump water heaters so that those plumbers can either do the electrical work that’s going to be required to pull a circuit for a heat pump water heater, or at least they can subcontract that out.

Right now, it's going to take either two separate contracts, two separate contracts for an electrician and a plumber, or a GC. So, I think that would really help our transition. And then the other one, allow HVAC contractors to also do installation and or air ceiling when they pull a mechanical permit to do. And that's really getting to the systems approach, which I think we're going to talk about

in the afternoon.

The systems approach is that an HVAC contractor can come in and insulate and air seal. When they install an HVAC, they can install a smaller HVAC that's going to say, ultimately bundle all that together and that systems approach, and it's going to save the customer money. And it's going to make them more comfortable.

And with that, I'll wrap up my presentation and I appreciate the time and happy to answer any questions.

MR. PENNINGTON: Thanks Scott. It's great to hear the concerns and recommendations with an eye to reaching our climate change goals and the important steps SMUD's placing on that. So, it's really terrific to get that.

So, Brian, this is your point? Oh, hi commissioner.

COMMISSIONER MCALLISTER: Hi, I'm back actually. I caught the tail end and have perused the overall presentation. So, sorry I did not get to listen to everything.

Let's see … so, we are a little bit behind schedule. And I wanted to just really first, thank the panelists for being on. And as a proud resident of Davis, I have lived both sides of that transaction that Scott just described and it works, it works. And Davis is super responsible … and I've been on both the purchasing and the

sell side of a transaction that has gotten this inspection.

So, I'm going to ask a question about models here. I don't know about Boulder but I imagine they're sort of similarly committed. One of the real advantages that a city like the City of Davis has, is that it's a relatively young community in terms of its building stock.

And so, the permitting or the city actually, the building department has as-builts for almost every structure in the city. And so, that's a baseline of information that they've got that I think is probably relatively uncommon where … so the inspector, the transaction, the guy who comes and inspects the building to enable it to be sold has a huge amount of information, the whole permit history and the drawings of that home.

And they go through and they determine, "Look, this gas valve wasn't there, or this or that wasn't there. Did you get a permit?" And they track down all these details that are evident from the difference between the actual situation and the as-built that they have.

And so, I guess, I'm wondering if our panelists could sort of comment on informational limitations and how we might sort of shore those up, and how other cities such as large cities with super diverse housing stock that they don't maybe know as much about, could do something along those lines and improve sort of rigor and accountability,

whether it's around the retail transaction or some other kind of hook to be able to apply the code more rigorously.

MR. BLUNK: I'll jump in here because I've done a little thinking about it. The City of Davis didn't really start with all the as-builts either. They had to be built up over time.

So, how a program like this could start was you set a date for compliance of, let's say, 2024. Really, no as-builts are necessary. All the water heating and HVAC have, at the very least, they have an ANSI date on them. So, what ANSI standard they were built by, and that date can be a few years younger than when it was installed, but it’s not going to be 20 years different.

So, if it starts in 2024, you can say the date that the equipment was … what standard it was built under. So, you could say any equipment with the ANSI date prior to 2020 or something. You know then it's unpermitted. Or there's a way to start with just with the dates that already exist on the equipment.

I mean, if we could have a manufacturer date on the equipment, that would be even better, that’s closer to the time. But I think that's an easy way to start. You don't look at anything in a building that doesn't have a date.

I don't know, additions or something … like if you

don't know, you don't know, but in that first inspection, you can set a baseline at the very least for the mechanical equipment, which is really one of the big things we want to do. We don't have to check for every light fixture.

COMMISSIONER MCALLISTER: Super helpful. Yeah, thanks. And I well know the City of Davis and I don't know … I mean, I imagine some other jurisdictions do this, but there's a time certain requirement to replace high flow toilets with low flow toilets that has long passed.

You know, I think 2014 was the date that that was beginning to be enforced, 2014 or 15. And if there's a solar permit that's being closed, they check the toilets. If there's any permit that's been closed, they check the toilets. And so, I think that level of just rigor and kind of best practices and process and procedures just being in place and just being sort of a matter of course, is really important.

So, anybody else wanted to chime in, on sort of what sorts of initiatives cities could do to what Scott is suggesting, which is basically build up that database over time as equipment does get replaced?

MR. YOUNG: Commissioner McAllister, Randy Young. I think that like Scott mentioned was a great idea, but I also feel like since we have an M-ATT coming up, I and II, I think that's also an avenue where you can start

implementing and start collecting some of those data, especially on the newer houses.

The older houses are going to be difficult. Like Scott said, you can look at the ANSI numbers and they could change, or they could be the same, depending on what … because sometimes those ANSI numbers stay the same. They just get updated and they have a different year attached to them.

So, I think the mechanical acceptance testing, there's an opportunity to start gathering this data, moving forward. Capturing the old data is going to be very difficult to do. You're going to have to take a point and move forward.

COMMISSIONER MCALLISTER: So, totally a point taken, I guess as a matter of just general credibility of this sector, I mean, if you're going to buy a new car, you search on a VIN and you find out the whole history of that car, and that's nowhere nearly as valuable as a house. And it can be sold across state lines and everything else.

So, like a house isn't going anywhere. And it seems like we ought to be able to build a database of what essentially is the most valuable sector of our economy if you add it all up. I mean, trillions and trillions of dollars of value there. It seems like that could be a focus of public policy to kind of … and then if you think

about where we're going with our carbon journey, that would then sort of create a basis for targeting investment and building this kind of broad database of energy performance that it's a little touchy, maybe politically at some level.

But if we focus on the policy goals that we have it seems like there ought to be some pathway there. And I think we'll hear in the next panel that we have that there are some electronic tools that are kind of enabling that kind of data collection in a much more low-cost way.

I wanted to give David the chance to ask questions as well. Because CSLB was mentioned a couple of times and interested in your thoughts.

EXECUTIVE OFFICER FOGT: Yeah, thank you. I learned a lot from the panel and I wanted to clarify a couple things. So, one, it was mentioned we don't have continuing education and that's correct, we don't.

I would say though that if the contract has expired more than five years, would have to retake the trade exam. Now, granted that doesn't really get us where we want to be. We do have a proactive enforcement unit and it was correctly stated that they do focus primarily on license and workers' comp violations.

However, we do have strategic planning coming up on September 22nd, and I noticed that Randy Young represents Sheet Metal Workers Local 104. I think that's

where David Diaz came from. David Diaz was a fantastic board member that we had for eight years. He's been replaced by Michael Mark.

And so, I'm going to relay some of your ideas to Michael and ask if he would like to champion these at the strategic planning session, because one idea that came out is look at what Davis is doing; very successful in getting the buy-in, it sounds like, from the community and the building department. And that's really something that we need to try to do more on a statewide level.

I'm active with the California building officials. And as some of you probably know, some of them are motivated to work with us and identify unpermitted projects, others aren't. And that's really something that we need to work on. We need to strengthen that relationship and I would be willing to dedicate staff to be dedicated to working with all of you, but work with building departments to take action against the violators and to educate them.

That's something else that I've thought about, is having an Ambassador program. We have our C20 contractors going out and they're trying to get work, they're bidding jobs; why not educate the consumer at the point of sale as to the benefit of getting the permit and doing it right.

Recently, I had an HVAC system installed and I got

three bids. Two of the bidders wanted to do without a permit. So, they saved money. And I was so glad we used the one that wanted to get the permit, so they save money. I was so glad they used the one that wanted to get the permit because if I hadn't done that, I probably wouldn't have had my duct work replaced. I would have had leakage in my attic; my bills would be much higher.

Consumers need to understand that, but it's a question for the panel; what can we do to further strengthen our relationships with building departments to really get them on board, to be a partner, to work with us? Again, we can go out and do inspections and we get a lead from a HVAC contractor who bid a job and didn't get it, suspects the person that did didn't get a permit, we should go out and inspect that. And the building department and CSLB should take an action.

So, any thoughts about how we can work with the building departments, maybe a coordinated approach? They have quarterly meetings and I attend a lot of those, and it'd be helpful if somebody from CEC if would did a presentation together and maybe really show how the community's benefited in Davis and why that can work elsewhere.

MR. DEAN: This is Josh. I might --- would just add that -- and I think Alex May have mentioned in his

presentation -- that some of the contractors maybe aren't willing to share or send someone out for four hours because they find it's easier to just go and do the other work.

I think finding maybe the funding for the inspectors and for the building departments to be able to beef up the staff a little bit and to spend that time for the continuing education would really be beneficial.

MR. YOUNG: This is Randy. If I can add on to Mr. Fogts' comments. Yes, I actually replaced Dave here at the local level and Michael Mark's replacing him at the CSLB, so I know Mark as well.

But to answer your question, during my presentation, I didn't do a slide presentation, but I do feel … I don't know if legislation has to be passed to allow you and the building departments, the authority to work together closely. But I think whatever that mechanism is, that has to take place, needs to take place.

So, you guys can communicate because I know a lot of departments or different entities are forbidden from communicating with each other on certain aspects because of the Brown Act or whatever it may be. But there needs to be some continuity between the CSLB and the building departments across the state; how that takes place. I don't know, but something has to give.

MR. BLUNK: I agree. From my friends who are

building inspectors, one is a head building inspector, their comment is when they do try to work with the CSLB, the process is onerous on them and it sounded to me like they wanted to let you know and then be done with it.

And instead of like a constant back and forth and working together, they just have a lot on their plates. So, if we can streamline that a little bit, it may help them to report unlicensed work.

EXECUTIVE OFFICER FOGT: You're absolutely correct. That's the complaint I've heard is that if they make the referral, then we would generally want to issue a citation with a civil penalty. What that does though, is it affords the person that's cited the right to appeal it in front of an administrative law judge. And if that happens, then often the Attorney General's Office wants to bring in the building inspector and the building inspector, they don't want to do that.

That's why we now have what we call a letter of admonishment, though. We don't have to have that, that testimony. We can do it all internally. It doesn't have a civil penalty, but it does have disclosure on the license for one year. It requires that they take our training course.

So, we think that can overcome some of the concerns that building departments have. So, what we need

to do as a contractors board though is to make sure the building officials are all aware of this and the benefit to them. And I think that would encourage them to make more referrals. And we're here to work with you and do … we hired someone that's doing videos now about … again, we have a permit compliance, so we can segue that into HVAC compliance.

So, we can put that on our website, we have an email address as far as C20 licensees, we can educate them too. That way, we can help to step up the compliance.

MR. AYERS: One of the things that you were just talking about was the ways to get the building inspectors more involved. And I think one of the folks mentioned when you're talking about utility rebates and the need for a proper inspection, maybe it needs to be working with the utilities and how those rebates work that maybe some of that funding can also end up being shared with the inspector because they're doing the inspection or just the inspection fees as well. It helps them beef up their ability to do these inspections by hiring more staff.

I know that's been mentioned, is the need for more staff or need for staff that are properly trained in what they're inspecting?

EXECUTIVE OFFICER FOGT: Absolutely. If we were to pursue legislation, one idea might be that when we do

issue the fine, that a part of the fine collected goes back to the jurisdiction. So, that would cover the cost of sending their inspector to our hearing. You know, ideally, we could probably issue a fine up to $5,000. So, that would be the max right now if legislation approves that. But a fine of $5,000 might have an impact.

MR. BLUNK: It would also be really wonderful how it's reported doesn't have to come from your neighbor or another contractor. Like nobody likes to tell on their neighbor. Like we need some other way to catch them other than your neighbor ratting you out.

EXECUTIVE OFFICER FOGT: Well, what we will do though, is we do allow for the informant to remain confidential. So, if it's a neighbor or it's a contractor that didn't get the job, they can be confidential. But it might require that we would have to go out and either catch them in the act or gain the cooperation of the property owner to tell us that yes, they hired a contractor to install it.

Many of these homeowners were complicit in the unpermitted work, so they're not always as cooperative as they could be. But I think what we could do is look at maybe some different jurisdictions to start in and see if we can have some success.

We could dedicate staff to the project. So, let's

say that we decided to use Sacramento. Well, we could assign an investigator to work with the city and county building departments and all of you, and let the industry know in Sacramento that if they did lose a job, we're willing to go out and proactively or broadly investigate that without having to wait for a complaint.

COMMISSIONER MCALLISTER: Yeah. I wanted to … sorry, go ahead. I want to move us along a little bit, but go ahead.

MR. YOUNG: When you're talking about sending a crew out to go investigate an HVAC unit changeout for non-permit, time is of the essence. Coming from this industry, I could pull a unit and put a new one in less than two hours. So, time is of the essence. If you're just doing a quick unit changeout, you could have it on the roof and nobody knows that you were there with the exception of the client. So, time is of the essence.

MR. DEAN: I was just going to quickly add that I think too that that's where we see that equipment tracking program or something along those lines, understand how many units are being sold to licensed contractors. Can you then reconcile that with the permits that are pulled, and that at least should narrow down some of what you're proposed plan is going to be.

COMMISSIONER MCALLISTER: Yeah, thanks for making

that point. I was going to ask exactly that. What's the … I think we need to work -- maybe I'll just make a statement.

I think we need to work to figure out what is the good enough … not maybe create the perfect. Not let the perfect be the enemy of the good in terms of keeping track of the marketplace, creating some sunshine, and therefore, some accountability, but without sort of maybe the full monty of individual level tracking by serial number all the way to the end user.

But I think there's a lot we can do sort of in that middle ground to help surface data that helps understand the marketplace and sort of begins to identify the sticking points and to therefore, resolve them.

I mean, I think we probably all have had similar experiences to let's see … who was it who had to changeout? Oh, it was David where you get multiple bids and some would say, "Well, I can do it with, or without a contract it's up to you, it'll be the same installation your way."

And it's just kind of, we need to sort of up our game a little bit statewide in that regard. And I want to get to some questions here. There's Q&A, and Bill, could you moderate that? There's a couple of questions there that are, I think, quite incisive along these lines.

Three people have asked questions in the Q&A, so

we can sort of work through those quickly before we move on to the next panel. That'd be terrific.

MR. PENNINGTON: Okay. So, the first question was from Kiki Velez. So, the question for SMUD.

My understanding is that SMUD customers who qualify for electrification incentives can install new appliances with a SMUD recommended contractor. If that is the case, has that increased permit compliance in SMUD territory? Yeah, I'll stop there.

MR. BLUNK: Yeah, it has because essentially, we're paying for the permit to be pulled. One key thing, we feel permit compliance in our territory is probably closer to 25%, but of course, we're paying $3,000 incentive on the HVAC equipment; 2 to probably 4, or $500 of that goes toward the permit. So yeah, it has but it's at quite a cost.

And the other thing when you talk about pulling permits or permit compliance, but oftentimes, even for our jobs, we require a permit, but we don't know that the permit has ever been closed and or inspected because that can often happen much later. So, that's also an issue of closing permits.

MR. PENNINGTON: Okay. The next question is from Pierre Delforge from NRDC. And Pierre, you asked a second question here. So, are we going to have time to cover all

the questions Commissioner, or should we be …?

COMMISSIONER MCALLISTER: Let's plow through the questions. I want to just make sure … because I don't want to assume that our panelists here are going to be able to stay throughout the very end. So yeah, let's go ahead and knock them out.

MR. PENNINGTON: The City of Davis point of sale enforcement is perhaps the closest thing we have to a silver bullet with upwards of 90% compliance. While it's the responsibility of local governments to implement such a policy, and none have so far followed Davis's lead -- what can the state do to help cities exercise this leadership opportunity by adopting the Davis model of point of sale enforcements?

COMMISSIONER MCALLISTER: I think we've kind of covered that actually a little bit. If anybody has anything to add, maybe we can also move on to Aanchal, instead of Pierre's second question.

MR. PENNINGTON: Yeah. So, I'm Aanchal Kohli from CARB; it makes sense that improving permit compliance could improve the quality of installations, but is there any data that demonstrates the extent to which high permit compliance is linked to high-quality installations? So, Randy, did you say you wanted to reply to this?

MR. YOUNG: Well, I could reply to it. I did find

some data in the last week or so online that did correlate with permit compliance and quality install. So, yeah, I would say yes, there is data available. I could probably google it and send it to control if they wish.

MR. PENNINGTON: Yeah. Thank you, Randy. So, Aanchal, hi.

So, there's been one study that the PUC did back in 2018, it's the same time that they were evaluating the permit pulling extent. They did some field work to look at installs. And in their studies, they found that the level of performance was not good for both projects that were pulled under a permit and not pulled under a permit.

One thing about that study, however, that's kind of problematic. First off, they had very small sample sizes, like a few homes per climate zone kind of thing. And the other issue was that their selection process, that was a self-selection process for participating in the sample. And one source of people they contacted were participants in their incentives programs related to quality installations.

And probably, they didn't get a lot of responses to take the survey from contractors that are sort of purposefully cutting corners on the job. And so, that could lead to kind of incomplete conclusions about what's the difference.

COMMISSIONER MCALLISTER: It's a great question. And I think there are lots of reasons that a permit is supposed to be pulled; for health and safety and just for it is the law and everybody's supposed to do it. And so, that assumption does make sense as Aanchal says, but it'd be good to … one of our activities is really understanding this marketplace and as we gather more data, it'll help us target programs to get the most kind of energy savings bank or a bank as well.

And certainly, the duct work and that sort of maintenance is something that ought to happen regardless for a number of reasons. But in any case, what's the last question from Pierre, it looks like it's for Director Fogt.

EXECUTIVE OFFICER FOGT: Yeah. There's a statute that permits a contractor to perform work outside their classification if it's considered supplemental incidental to the trade. So, I jotted down two issues here.

One is what's written down in the Q&A, and that is burying the air ducts in insulation. I would think that would be incidental to performing the work. And the other one was the C36 contractor needing to hook up to the electrical circuit.

And again, I think that would be considered incidental. Upgrading an electrical panel would not, it would require a C2 electrical contractor. But what I'd

like to do though, is we have a full-time classification deputy. I'm going to run both of these questions by that classification deputy and I'll report back. And if I could maybe have him write something up that could be shared with all of you, I think that would be ideal. I just want to make sure I give you the true correct answer.

COMMISSIONER MCALLISTER: That'd be fabulous. Fabulous. Well, great. Well, thank you all four of you, and Bill for being on the panel. This was fabulous. The part that I was able to be present for was terrific, and I'm sure the rest too.

And Josh and Alex and Scott and Randy, thanks a lot for your expertise. You guys know so much, it's really great to have you helping us build the record and determine the path forward. So, I really appreciate that.

So, let's move on to panel number two. Heather, if you don't mind, I'll just go ahead and introduce. So, Fritz Foo will moderate this panel. Fritz is an advisor in my office and this will be Approaches That Facilitate Quality Installation of Heat Pumps and HVAC Equipment.

So, we'll see some interesting technology that can help us improve the sort of the quality of installation obviously, and do that with sort of using modern tools to take advantage of the digital economy and hopefully we can leverage some of these to do a better job broadly. So,

Fritz take it away.

MR. FOO: Thanks Commissioner. And good morning, still to all of our attendees here today. The second panel really is focused on either novel approaches or new ways that are currently being implemented, really looking to change the landscape of permitting.

I know in the first panel, there were a lot of suggestions, things like online permitting, breaking down some of the barriers that currently exist to make it more streamlined, even just having better relationships between the permitters and the inspectors. And so, again, the second panel provides some case studies looking at again, what's going on in the field now addressing this.

So, I'm going to first introduce Mike McFarland from Energy Docs Home Performance. Mike is a state licensed general contractor for the last 24 years, and he's owned and operated multiple companies specializing in residential construction, deep energy retrofits, and designing building high-performance, zero energy home.

His work also includes Central Valley Research Project homes in addition to other laboratories and training projects. And for this one, Mike is going to captain the slide presentation. So, I'll invite you to share your screen and proceed. Thanks.

MR. MACFARLAND: Great Fritz. You seeing that?

MR. FOO: Yeah, sure.

MR. MACFARLAND: Wonderful, thank you. Thank you Fritz, and good morning, everyone. You know, besides really enjoying my day job, I've had a lifelong love of aviation ever since my grandfather introduced me to building airplanes at a very young age.

Aviation for very good reason is highly regulated, but back in 1982, an interesting thing happened and no, I'm not talking about when Lawnchair Larry soared to over 16,000 feet above Long Beach in a Lawnchair tied to helium-filled balloons, although that was awesome and inspirational.

Despite Larry's stunt later that year, the FAA recognized that two very different types of aircraft, conventional and ultra-light, could co-exist and operate safely together. They pulled in the industry and the stakeholders for their rulemaking, and they created a pathway that exempted a class of aircraft from regulation that could be assured by performance to meet their safety minimums.

So, still today, ultralight aircraft can be flown with no registration or license requirements. So, I'm proposing today that we do the same in HVAC retrofits, that we reduce the registration and inspection burden when technology and or measured performance can take the place

of that.

I'm proposing today that we'll give more value to the permit process and make it much easier for contractors to be able to complete. I'm proposing today that the Energy Commission ask manufacturers to reward only legal installations with warranty protection.

Early on, I want to make it very clear that I don't own any horse in this race. My work these days is entirely as an energy efficiency consultant and a provider of laboratory and field research support.

So, the first and by far the most important one to me is a recommendation to create this measured performance pathway that circumvents regulation. Over the past decade, a group of home performance practitioners and trainers here in California have been discussing and implementing the metrics that separate high-performance work from industry standard work. And we call this Certified High-Performance HVAC Metrics.

Following this path, utilities are asked to support this high-performance program through a statewide or regional implementer, which would track participation, quality, and results. A program rebate would help offset the process and the time to commission, to measure, verify performance, which would return dividends to the rate-payers in the form of peak energy savings.

Because the installers themselves have to self-test and certify their results, they finally get a performance feedback which is critical to their becoming expert installers. The customers win by not having to pay for industry minimum third-party testing that may not actually improve installed performance.

Instead, their money goes directly into commissioning and ensuring an excellent result. So, here's a summary list of the high-performance metrics. Just like in aviation, there are two classes in HVAC -- there's the conventional and the high-performance.

When we clearly limit the societal risk, in HVAC, the risk from a grid standpoint, at least, is oversizing. Clearly, we can't allow huge air conditioners to be grid connected without some kind of inspection like HERS to limit waste.

In contrast here, though, we're limiting the maximum size of the air conditioner and furnace right from the start, and then ensuring that this right-sized system operates exceptionally well in that home through extensive test and balance.

It's interesting to note that the way the FAA created their zero-regulation pathway was to change how they refer to them from aircraft to vehicles. So, by calling them ultralight vehicles and clearly defining their

operating characteristics, they created this exemption pathway around aircraft regulation. So, that's the example, I propose we follow by classifying conventional versus high-performance HVAC.

The former is strictly regulated. The latter becomes the realm of experts that don't need to be continually tripped by the low and broken performance bar of third-party verifications.

But how does all that information come together in like a useful system? The lead HVAC technician measures the actual performance at the return and supply inlets and outlets, and then enters their results into a two-page spreadsheet, which is shown here. And that helps them compare the measure performance to the manufacturer's rated values.

If they can install the system to deliver most of the available performance into the home, meeting the minimum basics of rated efficiency, the sizing limitations and the extreme air tightness for the duct work, then the lead installer certifies the installation complies, and they submit the design and performance documentation as proof at their final inspection.

Utility programs would then verify a sample of these projects, and they ensure the results are accurate and the rebate amounts are appropriate. Participating

companies achieve this market differentiation through their directory listing as a participating contractor in the program.

Installers gain this incredible skill and knowledge of the measured results of their decisions. And they learn in very short time, how to make really good decisions over very bad ones by using measured data. I also would propose that there should be other ways including technology to create an alternate pathway around regulation.

One example is the fault indicator display device detection and notification pathway. Language in current use in the Energy Code under fault indicator display, the placeholder that's there for the residential systems, it should alter the requirement of requiring a display to instead a notification since our very way of life has changed since this category was created many years ago.

Today, it turns out the most likely notification you're going to see instantly is one that pops up on your phone, your watch, your computer screen, and certainly not something that's hanging on the wall over somewhere randomly next to your thermostat.

A compliance pathway example might be that any fault indicating device that simultaneously alerts the equipment owner and the occupant for a minimum one year

from installation, would qualify as exempt from all third-party verifications for that system. In the past, I did do some consulting work for a startup developing an FID. And I want to mention again, that in no way, do I have any current or financial interest in this technology or realm.

But I do want to stress that if we can get manufacturers incorporating this technology into their heat pumps, the brains of their systems, and if this information stream can begin leaving California installations, we will have fundamentally transformed the industry in a very beneficial way.

So, with over half my slides gone in the lion share of time, we better get onto number two, which is applied technology.

There was a news article in 2015 about my city embracing smartphone technology to get projects signed off the same day. Since then, we have jurisdictions that are using FaceTime, Skype, and other great types of video conferencing to safely and efficiently inspect work from remote locations.

Other ways to improve this process, to bring more into the fold are to standardize the ease and automation of online permits between communities. And this has been talked about already this morning.

Any contractor shouldn't have to figure out 20

different systems and the processes of 20 different communities that they serve in order to navigate the permit process. Standardization at a single source would be a huge positive step in the right direction.

But keep in mind that technology is capable of many things, but it's only as good as the willingness of the department to commit to those new processes. In other words, if the inspector isn't allowing the fundamental time to promote, or if he's not promoting these new methods, he or she, what good can it do for the contractor?

So, this fundamental paradigm shift has to occur for any hope of creating a positive experience that will encourage future compliance. Inspectors need to adopt the attitude of coming alongside the industry, the workforce as a teammate to get the job done as efficiently as possible.

Site visits, then become either a time to verify completion or create a pathway towards same day completion for the many common retrofit and home upgrade items. This must start with an attitude from the top of the department, that that department exists to serve the construction community and a shared goal of ensuring the very most efficient processes and positive outcome to happen for all.

So, what is your inspector saying? Just like on the slide here -- are they, are they saying things like, "Hey text me a picture of that smoke detector by 4:00 PM,

and we'll get this thing taken care of for you." Besides tracking their same day completion percentage, that is how you're going to know if this attitude exists in that building department.

And if my AA batteries and insoles from Amazon are important enough for a package tracker, how much more important would one be for an inspector when hundreds of dollars in labor on the line every day for a company that's just trying to manage field inspections. Contractors can afford to put a person that's capable of making immediate corrections on that site if the period is scheduled within about an hour of time accuracy.

The result is a more successful inspection completion percentage and the contractor that's more willing to continue to pull permits. So, having systems like this would alleviate the fear that if today's inspection isn't perfect, at least, hey, it's not going to be a whole another day of misery and hemorrhaging cash for the contractor.

And lastly, this one came to me when the maker of our travel trailer recently issued a recall of its propane regulator. We put in a new one, we send in the receipt, and just thought we'd get a reimbursement, but it turns out they won't replace it without a certified test being done called a drop test to ensure that the installation was

performed safely and to meet minimum standards.

And this is exactly how HVAC manufacturers should approach all of their warranties: "Sorry, we can't support your installation until we know it was verified to meet minimum safety standards."

I never suggest this in some cities in California, where currently it takes three months to move through all the necessary departments and they get a permit just to replace simple equipment in a backyard. This only works if you change the permit process to one that could be completed in a day.

Since I'm out of time, I'm going to leave this one queued up in case we want to discuss it later in the question-and-answer period.

So, put concisely my contractor perspective to improve installation quality and code compliance, is to work with manufacturers, building departments, and the rule book to reduce regulation, apply technology, change attitudes, and reward those that measure and ensure performance with an alternate compliance pathway.

Thank you very much,

MR. FOO: Thank you so much for those comments, Mike, and appreciate you teeing up really very nicely our next panelist, and also touching on some themes.

So, next I'd like to introduce Bob Wiseman. As

our first moderator Bill Pennington had mentioned, Bob is a juggernaut in this field, and we're very, very pleased to have him here today to provide some feedback on what the current landscape looks like, but also to discuss Visual Service, which is a new remote inspection tool that they have been working on.

So, Bob, I will invite you to turn on your video.

MR. WISEMAN: I am here. Thank you Fritz. And thank you so much to the commission for having me here. Yes, IHACI has been involved with this process for many years. We're certainly not new to it, far from it, and we're happy to be here.

So many great things have been talked about; uniform, statewide permitting systems, distributors selling only to licensed contractors. You know, these are things that IHACI has long supported and we continue training education of the workforce, some type of an equipment registration process, I think is very, very helpful.

And as I think you'll see in a few minutes, video inspections are something that we are very keen on as well. So, you know, with that, I want to go to the next slide here, and I want to introduce Visual Service.

You know, several years ago, the Board of Directors for IHACI, the Institute of Heating and Air Conditioning Industries saw this gap in the market and said

there's a problem. And we as contractors have the ability to really make a difference here.

So, Visual Service was created by contractors for contractors, that was the intention. We have a diverse team from around the industry that has put a lot of time into this, as well as the IHACI board who serves as advisors for this process.

So, next slide, please.

I'll get into what we're talking about. I'm not going to go through all the problems in a lot of detail because I am limited in time, but I think we know a lot of these problems.

It takes three to five years for a technician to become a real asset to a contractor. It takes time. They, work, they train, but for them to be really productive and a money maker, it takes time. Contractors report that finding trained and qualified technicians, it’s a number one problem, meeting demand and growing their business.

Manufacturers, it's already been stated, improper installation remains the number one cause of equipment failure. Visual Service was designed by contractors for contractors. It also includes service. So, this is not only for quality installation. It also looks at service.

But as we were creating this product, it became very clear that there's a very clear correlation between

contractor's needs and some of the things that we're talking about today. Energy efficiency, compliance with energy codes, and climate goals are very elusive and challenging. And we have some solutions to be able to help with that.

For consumers, they don't trust us. They lack trust in contractors. There is a credibility issue that grows by the day, and that just personally just breaks my heart, but it's true. The most information that most consumers get about their system is billing information. That's it.

Next slide, please.

I'd like to introduce you to Visual Service. It's a live video enabled diagnostics and monitoring technology for the HVAC industry. What we do is we take Bluetooth enabled tools -- BLE transmit live data to a service manager. That service manager can be anywhere. And with live video coming through smart glasses or a cell phone, the service manager can watch live that equipment being serviced.

We can see current refrigeration. We can see supply temperatures, return temperatures, amp draws on motors. We can see what draw, we can see amp draw. We can see superheat, we can see subcooling. We have full psychometric workups on this equipment.

Next slide, please.

The way we do this, we have two different apps. One is the field technician. So, if you would, just picture this field technician, a very simple app using tools that he already uses. We are tool agnostic. We're not tied to any particular tool manufacturers. We're tool agnostic as long as it's modern BLE equipment, Bluetooth enabled equipment, it will work with our software.

Technicians identify a job, they add in some very basic information. They record the problem, they pair instruments, the Bluetooth instruments, the first time only, as the first time you pair your instruments and then you're able to attach this equipment, the Bluetooth equipment and monitor everything live.

We use the same technology that modern chat services do to be able to bring that data from the technician's phone back to the service manager. And so, it is virtually live. We're talking a second, maybe two second intervals. All this data that is collected is stored and archived as well.

We have basic health indicators for service and for quality installation to look at how has this system been installed? Our goal with this as we started thinking about it in these terms is to really simplify that compliance process, because as we're talking about

compliance, we're talking about contractors who time is everything. And being able to, as it's already been said, many times, getting through the installation process quickly and efficiently in one day as Mike just said.

It's brilliant to be able to do something to verify quality installation. At the same time, you get a video inspection with a building department and your health and safety inspection.

So, getting everything done at one time with the homeowner is something that … it's one of those huge things that contractors are burdened with. So, we're really happy about this.

Next slide, please.

This information all comes back to the service manager. The service manager has a live video feed. He has a numerical representation of all the numbers. He also has graphical information of every single data point that's being collected. And there are tens of thousands of them that are being collected.

Some of the things we're seeing are fluctuations and amp draws and motors that we've never seen before, compressor failures, improper air flow -- things that we can see over time now, that we've really never been able to see in the past.

So, all this data is collected and it's stored.

The contractor can use this information on one call today, come back in another year and actually compare the data between the two sessions and this is something that was very important to us to be able to have this data exportable either for compliance purposes or for the homeowner. We have significant reporting capabilities here.

Next slide, please.

Technicians can now … I'm not going to go through this. Just for time purposes, I'm not going to go through the problems we have on the left side, but I'm going to go through some of the benefits with Visual Service.

Technicians to now make diagnostic-driven decisions, receive instant support and on-the-job training. Technicians can become productive in weeks rather than in years. After some safety orientation, basic training using the tools, technicians can become the eyes and ears of a service manager, a more experienced technician in the trade.

The great tsunami is overtaking our industry, so much talent is leaving so quickly. And we see this as a tool to be able to save a lot of that talent and pass it on much easier. Technicians learn their trade more quickly with a positive accountability and live mentoring abilities, built individual service, and technicians gain

confidence through successful diagnostics of HVAC equipment.

Next slide, please.

Customers can view reliable, independent third-party data, independent. Visual Service is a device, something that shows up on a phone, which can be shown to a customer independent. They get actionable data about how their equipment is working overtime, visit after visit.

And the for the first time, we believe customers will actually be able to have a window into the overall efficiency and health of their system that they've never seen before.

Next slide, please.

Visual Service is a way to train a more qualified workforce properly. Visual Service leverages existing and emerging technologies to provide real-time feedback during equipment installation. And Visual Service provides quality assurance, the documents, installation, and service from a job's beginning to end.

Visual Service is a pathway to improve HVAC systems that can help meet climate goals through better installation practices, including those such as proper refrigerant management. We are able to weigh and watch refrigerant being recovered from a system through Bluetooth digital scales.

And Visual Service provides a means for high performing contractors to transparently demonstrate quality in every installation; not one in seven, one in 30 -- every installation that they do, because this is part of the process that they do anyways.

So, next slide.

It's a lot of information I went through very quickly. I love this conversation. Thank you very much for this opportunity.

MR. FOO: Thanks so much for that information, Bob. I really appreciate it in your presentation, how you touched upon not only some of the streamlining benefits, but also some of the workforce and data as well. I think that's really important.

So, with that, we are now going to turn in our last two presenters towards some local jurisdictions. They are doing some exciting and innovative work. We'll be turning now to the County of Sonoma where we'll have Aris Knoles and Brian Keefer.

Aris Knoles supervises a team of building inspectors who provide building inspections on projects throughout the county. Aris has led the implementation of Permit Sonoma's Virtual Inspection tool that provides inspection services to contractors remotely with the use of an Apple or Android smartphone.

And also joining Aris is Brian Keefer. Brian is the Permit Sonoma ombudsman. And in this role, he's a member of the management team focused on providing a more user-friendly permitting process for both the customers and the staff.

And in addition to that, the ombudsman also acts as the Permit Sonoma ambassador to the business community and the citizens of Sonoma County. And so, with that, I'll invite Aris and Brian to present … turn on your video if you do have that and begin your presentation. Thank you.

MR. KEEFER: Thanks, Fritz. I'll go first.

So, thank you for the opportunity to share what Permit Sonoma has been doing and is doing to try to streamline the processes for the contractors and the residents of Sonoma County, which is very important right now with all the pressure put on the construction industry with the rebuilds, the fire burned areas. And just a normal thing that we tried to do to make things easier for people.

Josh Dean with the California Energy Alliance earlier mentioned the importance of reducing permitting barriers and costs to try to encourage people to get permits for these types of things. And that online permitting process is an important step towards that end.

And so, in early 2020, Permit Sonoma had a goal of

about four or five months out to go to a full paperless system, online processing of all our permits. And when the pandemic hit and everything shut down, the divisions pulled together and we were able to do that in two days.

And so, we admit that it's not a perfect system yet. We'll constantly be working on it. We do have some backlogs mostly at the intake, at the front end of the permitting processes. And the more that we can do to automate these, the permitting will help alleviate that and make it easier for people to get permits.

One thing that we've done just in the last couple of weeks, we rolled out a solar app program from the National Renewable Energy Laboratory, which allows qualified solar contractors to process roof mounted residential solar applications completely automated.

So, it doesn't go through a permit tech, it doesn't go through any kind of plan check -- they fill out the information online and automatically pull the permit. And that's really important. If we can do that for HVAC also, that would be great because a lot of the reason people don't get permits is because they're worried about the time it will take to get them.

And some of them do take quite a bit of time to process as they include plan check. But in this way, we can bypass that and get them the permit right away, so they

don't have that obstacle anymore. We're, also moving towards a digital plan review system we're going to be rolling out here in a month or two to actually alleviate … it won't completely replace obviously the plan checkers, but it will alleviate a lot of the work they have because it will be going through the first plan review digitally rather than taking a lot of time from the plan checkers there.

So, that will certainly help with processing this type of permit. And then we're investigating other apps like the solar app to use on other permitting processes also.

So, as we mentioned, Aris is our supervising building inspector, he kind of led up the charge on setting up a virtual inspection process also, which is another thing that can really help save time for people. So, I will turn it over to Aris and let him talk a little bit about that.

MR. KNOLES: Hello. So, our virtual inspections came to us as a … it came very quick like Brian had said, we had to do some changing as the pandemic hit.

And we didn't want to put the public out of not being able to get inspections, not being able to get their equipment or get anything that they may need to. So, we had developed virtual online inspections right away. What

we did is we ended up connecting with a company -- there's a lot of different companies out there that provide this service… is a video online, virtual two-way talking. It's like a FaceTime kind of a deal, but what it does is it provides GPS, so we know that the contractor or that homeowner is onsite at the time of the inspection. We know that they're not at their own home doing an inspection on their own furnace.

We also know that now that … I'm not sure, I'm sorry; in the past, a lot of the time when a HVAC installer installs a furnace, one of the issues is they leave the homeowner up to completing the inspection. One of the benefits of having this virtual inspection is the installer is able to do their own inspections at the end of their inspection day.

There's two ways we do it. We do it online, which is live person, live chat with somebody, video chat with a building inspector or an offline system. Let's say these folks don't have any kind of a Wi-Fi or any kind of a signal. And so, we're able to set them up where they can go and provide a video and explain the entirety of the installation.

This wouldn't be possible without really having duct testing and other stuff involved because we otherwise, would have to be there to actually physically feel, looking

for air. So, with duct testing, duct leakage testing available or required in most instances, that allows us to be able to just do a visual inspection over a video.

It's something where we did quite a bit during the pandemic. We're back in the field now, and we're doing maybe about 50% of these. But like I said, it really makes it efficient for the contractor, the company that's actually putting the installation in, because they're able to perform the inspection as well, where before, they'd have to come back if there's anomalies and it would cost them more money.

So, I'm not sure … that's about it for me. Thank you.

MR. FOO: Alright, thanks Aris and Brian for that information, it's great to see kind of a convergence of ideas happening at both on the contractor side and also on the building permit side almost naturally. And so, for our final panelist, we're going to turn to the City of San Jose and Ron Davis.

Ron is the Building Inspection and Special Projects Manager for the City, and he's also the recent recipient of a SPUR Impact Award for his work on the San Jose Reach Code and Gas Ban Ordinance. So, with that, we'll invite Ron to turn on your video and begin your presentation.

MR. DAVIS: Thank you, Fritz. Thank you, commissioners, for putting this program together today. This has been very, very helpful for me to hear the various comments from the panel members. I hope that San Jose is a leader in this industry right now, as far as inspections go.

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So, we have permits for heat pump HVAC available online, and quite honestly, all residential permits are available online. This has really been helpful in shortening the wait. Obviously, through the COVID-19 pandemic, we had to pivot to a method that would allow us to do this. Fortunately for us, we were already doing this to a pretty large extent. And we were able to do it, expand and do some commercial applications as well.

So, we have done this through our permitting center, through our IT department. Everybody has worked together to make this happen and be very viable.

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So, we can not only pull a permit online. You can schedule inspections online. This has been greatly beneficial to shortening the time that it takes to get a permit, the time that it takes to schedule inspections.

I know I heard from some of the other panelists that the amount of projects that actually get inspections

or get permits is very low. I agree with that. Our goal is to incentivize by shortening the process. But also, by scheduling online, we are able to … a customer is able to get a discount. So, we have incentivized them through not only a shortened timeframe, but also through a monetary reward that has been quite helpful.

And I think that San Jose is leading the way on this and I do understand that a lot of jurisdictions are struggling with this. Fortunately, for us, we've had the wherewithal to be able to do this through the pandemic. It's certainly motivated us and pushed us to do it quicker. And it's working well, I think for everyone involved.

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Remote video inspection. So, early in the pandemic, we had fortunately already been talking about the need for video inspections. And so, while we didn't have a complete roadmap for it, I quickly put together some SOPs so that we could perform video inspections and have a guideline if you will, a guidebook for how to do it.

And what we expected, that worked really well. We were successful early on. Initially, we were doing every type of inspection that could be done residentially, at least, via video. And so, we had a large number of inspectors engage in that on a daily basis. We have scaled back since we have moved back to field inspections.

However, our goal is to continue to push the parameters on what we can do via video. And at this point, we're doing furnaces, water heaters, some solar installations, PV solar installations, and many other things. Anything that we can possibly do accurately, we are doing.

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So, I think our secret sauce with this is the ongoing in-house training of inspectors. I think that we have a very unique situation and that we have a lot of very talented individuals in our inspection group. And so, our inspectors are trained for, in this case, heat pump technology. They're trained for … every type of inspection, we're trained for at a very high level.

And it's ongoing training. It's not just a once and done, but it's a system whereby we go through about every six months, we start rotating through and doing in-house training so that our inspectors are up to date.

And the end training is not just done in-house. I mean, it's … I'm sorry, it is done inhouse, but our training is via … right now, we're using a Zoom app, cause we're not able to sit in the classroom. But prior to the COVID-19 outbreak, we were doing classroom training. We're now doing Zoom training.

And then we also go to the field. We pair up with

the experts, go to the field and actually look at installations and inspect those installations. So, we're able to vet our inspectors that their knowledge is sufficient to do a quality inspection and what to look for in those inspections.

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Inspector training is also because we understand electrical training is an integral part of heat pump installations, heating and cooling, heat pump water heater. The inspectors are trained by experts. Once again, in electrical installations, they are trained via a Zoom classroom, and then vetted in the field to be able to make sure that they are in fact capable of doing the inspections.

We are unique in that in San Jose, we have specialty inspectors, which are our expert trainers and specialty supervisors. And we have combination inspectors. So, we are able to train our inspectors, our combination inspectors, at a very high level and know that they understand what they're looking at. And there's also resources available on a daily basis to check in, to make sure that what they're looking at is okay.

And once again, we're using modern technology. We take pictures, we take videos, we send those to one another, and that allows us to verify what we're looking at

is accurate.

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Building Energy Efficiency Standards. So, this one is a big one for me. Energy Code compliance is something that building departments have been tasked with for some time now. And I believe it's a very important part of what we do. I mean, we're looking at the sustainability of cities.

We're looking not just from a health and safety standard, but from a greenhouse gas emission perspective as well now. And so, energy inspectors are trained by experts in Energy Code compliance. We use a lot of day room training, we use in-house training.

I get to train on that often, and same as our trade inspections. This is trained often and also, verified in the field through actual ride-alongs where we look at what the inspector is seeing, what they're looking for and so on. And so, they're very well trained for what documents to look for, what the energy compliance documents should have in them.

And also, the importance of doing this, it is part of an overall inspection and we're looking for really quality installations and understandably so, for some of the previous panel members, we're not looking at everything, but what we're looking at is definitely being

looked at a very high level.

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So, our goal is to provide access to permits and inspections as conveniently as possible. We really, in San Jose, we feel that that is our number one way to get permit and inspection compliance. So, I think I didn't spend enough time talking about our video inspection program.

Not only can you get your permit online, get your schedule, your inspection online, but you can also schedule your video inspection online. The good thing that we have done with video inspections and that's been talked about by some of the panel members, is that we have been able to, once we schedule that inspection, which was always the next day, we keep that permit open until we can approve that inspection.

So, our video inspectors go on, they look at the installation, they then say, "Well, this is missing, or you need to do this or that. And if you're able, we will look at it again this afternoon. If not, we'll look at it again tomorrow morning, depending on your schedule."

So, we're working very closely with the contractors to make sure that it works for them at the highest level possible. Contractors are the ones that are taking advantage of this, because it does make their job much, much more efficient. They don't have to wait around.

If they do have to make corrections, they're able to do that in the same day and go back and get that inspection completed. For us, it makes sense, because it gets it off the books, we get to put it in the completed files. And we're done. We don't have to look at it again.

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One of the ideas that was brought up is the fact that simplifying the process that I think that's been talked about by everyone here this morning, for the most part. The simplifying of the process is our goal as well. We feel like the easier we can do this process from start to finish, the better it is for the customer, for the contractor, and for us.

And so, it's a win-win for both parties for all parties. And we also, we understand that time is money to a contractor. We understand that they need to get their jobs done so they can get to the next one and make money. And I think we've done a pretty good job of making sure that we're able to you know, meet that need of the contractor and get their projects done in a timely manner.

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So, we really do believe that when our customers are successful, we are successful. The biggest part of interacting with the public is that we do have an obligation to perform at a high level. And I think that

from San Jose's standpoint, my standpoint as well, that interaction by a high level, I mean that we are trained for what to look for, we are trained for what is important, we are trained for efficiency, and that's understood by everyone involved, including the homeowner and the contractor.

Our goal of the inspection process is to make sure that everything is done to the highest standard possible. And I think we're doing that pretty well.

I wanted to touch on some of the comments that had been made earlier about the … Davis for instance. San Jose is a city of a million people plus. I would love to, I think it would be great if we had a presale inspection.

You have to understand that the size of the city does matter. I think that those things would have to be done/would have to be scalable to do it simply because we are doing right now 500 plus inspections a day on regular inspections. To add that to that part of it would be pretty intense.

So, anyways, it's a great idea. I think it's something that we should look into. I think that the other thing that was brought up is the CSLB portion of this. We do check contractors' licenses, and we do make sure that the contractor is licensed and licensed for what they're installing. So, our contractors are on file with the city.

They have to have a business license and the contractor's license registered with us in order to even be able to pull a permit online. And so, it's very important that we check that. We feel that licensed contractors are the only ones that should be installing this type of equipment in the city of San Jose, at least. Actually, I think, in the state, in the country for that matter.

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Yeah, the summary facilitation of quality installations, online permits, online inspection, scheduling, remote video inspections, and training for new technology -- those are our number one keys that we understand need to be met in order for everybody to be successful in the City of San Jose.

And that is the end of my presentation. So, please ask questions if you have any. Thank you very much to the commissioners and have a good day.

MR. FOO: Ron, thanks for that presentation. We're going to invite now all those previous panelists to turn on your video, if you can, and get ready for the discussion.

Commissioner McAllister, at this point, I will invite you all to provide some … or ask some questions now, if you have any.

COMMISSIONER MCALLISTER: Great, thanks a lot,

Fritz. And thanks to all four of you; Mike, Bob -- well, five of you; Aris and Brian and Ron for your insights, super helpful.

And I think there's a lot of innovation going on here that we want to support. And the question is, how do we best support it? How do the cities, how do all those stakeholders, including the city building departments find ways to bring resources to this so that they can really, fully buy-in in ways that make them you know, most effective?

And so, you know, I think the City of Davis is a great example of a situation where we want to support and you've got a lot of leadership going on and how the state and local governments can work together.

I guess … I think one theme I just want to highlight here is that there is a need to modernize and that takes resources. So, the inspection training in each building department, you have to find ways to support that.

I've been in this business long enough to sort of have seen the cycle of the big bust where housing market crashed and there was just this … yeah, I think was just this widespread, this massive layoff of inspectors. And cities had staffed up previous to that. And then the bottom sort of fell out. And I think it's reasonable to understand a little bit of reticence to step up at those

previous levels at the individual local jurisdiction level.

But on the other hand, we have this massive enterprise that is with us that's here and is going to scale quickly to decarbonize our buildings. And that really requires us to up our game as a state. And not just California, but across the country.

So, I just want to highlight the imperative of finding some resources. We want to do that at the Energy Commission to the extent we can. There looks like there's … depending on how you do the math, there looks like there's some billion plus dollars coming through various pipelines from the federal government to this sector in some form or another. And whether that's through the state energy program or grants or any other number of directly federal or federal via the state agencies initiatives to support this sector.

So, we'll definitely keep tabs on that and would absolutely expect to work with local governments and others.

I guess I'm wondering -- I want to ask Sonoma and San Jose and then just ask this one question really, and then pass it to Director Fogt. And Fritz, I know you have a few questions as well that you want to tee up.

But for the local governments, I guess, what kind of collaboration … we heard from Davis, about Davis this

morning as well, and some other cities; what collaboration is happening between cities? I remember when solar was kind of starting to take off, it was early days, it was still kind of pricey. The federal government actually sponsored initiative called the Solar America Cities. It took different names through the years and different iterations.

But basically, it provided a convening platform for local governments to get together across the country and share best practices and kind of egg each other along and collaborate and share ideas. Is there a conversation like that going on?

I mean, how palpable is kind of the imperative to really up the game at the city building departments, and is there that kind of cross-city- and -county-sharing going on amongst you all?

MR. DAVIS: I would love to answer that Commissioner McAllister. No. I've been involved in the Reach Code. I've been involved in the gas ban at that level. There is a lot of talk throughout the state and throughout the country for that matter. But as far as building inspections and modernizing building inspections and having a more common way of not only issuing permits, but doing the inspections, the training and so on …

I mean, I approached that subject with some local jurisdictions, and there's not a lot of buy-in. And it

really has to do with the economics of the situation. I mean most building departments are short-staffed and most building departments are struggling to do what they do. And so, the idea that they would try to change what they're doing based on somebody else's input, or to try to be more uniform across, at least across a region is not getting any traction. So, that conversation is not being had.

COMMISSIONER MCALLISTER: I don't know if Sonoma, if Aris or Brian wanted to chime in on that. I guess, the following question I would have, would be, what can we do to help facilitate that conversation? What would be a kind of a platform that would enable local governments to feel comfortable just getting in the same room, whether it's physical or virtual and really just sort of rolling up their sleeves and taking a hands-on -- like how could we do things better within our means?

MR. DAVIS: Yeah, and this question, this really has come up by Santa Clara Valley Clean Energy, is actually trying to promote those conversations because we run into problems with permitting and inspections on clean energy products, electrifying buildings, if you will. And every jurisdiction has their way of doing it, and it's across the board different.

And so, those conversations have come up and I've offered even … not that I have the authority to do that,

but I've offered to maybe have some sort of training where we cross-train, where we have different jurisdictions come into the City of San Jose. We go to their cities and we do those kinds of interactive cross-trainings so that we can learn from one another. I mean, I've learned a lot on this panel today of what some of the situations are.

So, but those conversations have not taken place. I think the commission, the state could help by offering some funding and offering a platform that would get everybody in the same room and have an open discussion about that.

And the other thing, you mentioned earlier about the layoffs and the amount of inspectors that got laid off in the last downturn. You know, I want to say that that in many cases has been a benefit to the building departments because they were able to bring new blood in, new people that had new ideas, that weren't … actually, that came from the contracting field, that understood what it felt like on the other side of the table.

And that has increased our productivity immensely. And I come from that scenario as well. So, there's a big shift that's taking place in building departments as either through attrition or layoffs, we're getting new ideas and new blood. We're not stuck in the old -- for lack of better word, good old boys club that kind of does things

that way.

So yeah, there's opportunity there. I think that some funding would be very, very helpful.

COMMISSIONER MCALLISTER: Great. Thanks for that.

MR. KEEFER: Yeah. I think if I can jump in too, I think the County and Sonoma too, and just like what Ron was saying, we try to introduce a practicality to inspections that comes from that background in construction that people might have. Sometimes if you apply a real stringent interpretation of the code, it really just … I mean, that's one of those things that turns people off to even getting permits.

And so, the main thing is that is it installed right? Is it safe? Does it have the longevity that it needs to? The main things that the code is there for is I think what our inspectors are looking for. And Aris, you can jump in and correct me if I'm wrong, but I think that's … and sometimes, it seems that the attitude in inspections changes from jurisdiction to jurisdiction based on what they have to deal with in the field, based on the experience that the inspectors have.

I mean, there's so many things that go into it. It is a human scenario. But some collaboration across county lines and city borders and everything I think would help. We get a lot of input from contractors that work in

other jurisdictions and say, "Well, this isn't really how they do it in another jurisdiction." And that might give us an idea for looking at something to change.

But it is kind of a tough thing, I think to get everything even over all the jurisdictions. I don't know if that's … I mean, our guys out in the field in rural Sonoma County are encountering much different things than I'm sure Ron's guys are in downtown San Jose or whatever. So, there's a difference in the different jurisdictions. And I think that's important to realize.

COMMISSIONER MCALLISTER: Yeah. Great. Thank you, Director Fogt did you have any follow up questions for this panel?

EXECUTIVE OFFICER FOGT: Yeah, just one. A very impressive presentation. We appreciate learning about the best practices. I do have a question as it relates to training of the contractors. I know in manufactured housing, there's a federal training requirement. The contractors have to be trained at certain points.

The swimming pool industry has established training for contractors. So, really a question for Bob Wiseman; I'm just curious, has there been any talk amongst the HVAC contractors in having some type of training, even if it's just voluntary? Because you explained that by being more efficient, you could actually be more successful, make

more money.

MR. WISEMAN: Yeah. There always is. Additional training is one of the things that our members are constantly striving for. Every time we poll members, how can we help them, it's training. That's what they want. And as far as in the licensing scenario, I mean, IHACI doesn't have a formal position on this at this point, but there's a lot of talk about it

And it's something that really needs to be investigated because there's a very real possibility of doing something that could really benefit the industry there. So, yeah, there's a lot of talk there.

EXECUTIVE OFFICER FOGT: Thank you. That's all I had.

COMMISSIONER MCALLISTER: Great. Well, thanks very much. And really impressive panel. Fritz you had a few other topics I think that we wanted to make sure we covered. So, I want to pass it back to you. And looks like we have one question in the Zoom Q&A as well.

We're still good for time. We have nominally until 12:30, including public comment if there is any. So, I think we're good for time. So, thanks everyone for sticking with us.

MR. FOO: Yeah. I had some questions teed-up. But let's first turn to the Zoom Q&A to make sure those are

addressed. And I see one from Kenzo Minami -- I like this question.

It says regarding Bob Wiseman's Visual Service, what are your thoughts on addressing the homeowner's privacy concerns over having the interior of their home recorded? Has that been an issue?

MR. WISEMAN: Well, at this point, Visual Service is just entering a beta phase and it's an internal beta at this point. So, we have limited experience with this. What we're doing at this point is just having a waiver signed by the homeowner, as we're walking in.

Many contractors actually have a homeowner sign a document, you know that, "Okay, we're going to do service work for you. Here's what it's going to cost you. And here's kind of the process" and kind of lays it out. So, this is just another paragraph on that, if you will.

That's how we've addressed it so far. We are not getting pushback from it. In fact, this type of video documentation, it's becoming much more mainstream than it ever has. So, we're just not seeing issues with our internal beta at this point. We're not seeing big pushback.

MR. FOO: Thanks for the answer. I'll turn to some of the questions that I had now.

One, I have for Mike; Mike, you have presented a

couple recommendations or possible opportunities. And one of them that you mentioned was attached to the equipment, having some kind of fault notification or display.

I was curious, has that idea been floated more widely? Has there been pushback on that from the manufacturers? It seems a great way to have an automated system and I was curious to know a little bit more about your experience with that.

MR. MACFARLAND: My limited experience was just in a consultancy role for a developer, as I mentioned in my presentation, of that technology, that was a standalone version, as opposed to something that's integrated or built into the manufacturer's equipment.

It has tremendous possibility to be able to analyze every single cycle and have a device alert you when you are clearly wrong, has tremendous potential for things like spotting refrigerant leaks at the time that they're occurring to where that can be dealt with, and that's something that should be in the forefront of all of our minds in terms of stopping environmental damage.

But in terms of pushback for manufacturers, I would just note that what they can do at the manufacturing level for a very small cost is a very detailed process and expensive one to sort of retrofit into an existing system.

So, I think that most of the possibility for that

realm is there at the manufacturing level, that if we can get, much like one manufacturer in the Central Valley Research Homes where we're testing one of their systems that they've done an onboard diagnostics system on their outdoor unit, that will run a cycle and tell you if a charge appears be correct.

So, manufacturers have moved in this direction, but it still isn't the full monty of alerting you of that defect. They're halfway there in this particular brand's case. So, we need more of that, and I think it all starts with we have the space in the code for this technology, we've got to populate it. And the way to do that is to of course drive it with demand, which is eliminating the regulations, so lower the bar so that this system can then become that pathway around that regulation.

MR. FOO: Great. Thanks for that response. I will just have two more questions lined up. I know one of my questions that I had originally had actually been answered already. So, that's great to have.

One thing Bob that you had mentioned was this mistrust, perhaps between consumers and contractors and so kind of broadly posing it to everyone; what are some of the misconceptions that maybe you all see from your vantage point and what can be done to improve those relationships? Whether that's simply more education and outreach or

something more visible.

I was curious as to what you thought might be done to improve those relationships or perceptions?

MR. WISEMAN: Well, I'll go first. One of the by-products of Visual Service is documentation, and one of the goals is to provide documentation to homeowners, transparency, and that's something that just on a large scale hasn't been possible before.

If a service technician says you need access to a homeowner, you need to replace your condenser fan motor. Okay, they have no way to know if that is true or not. They have no way. There's no ability to check that. Your compressor is defective. The homeowner has no way to know that.

So, there's a very strong consumer protection portion of Visual Service to help address that. And we're getting very good feedback on it at this point.

MR. MACFARLAND: Yeah, just add to that -- those are great points. Just that onboard system would do the same thing where if the equipment itself is telling the person, "Hey, you need to replace this item, this item has failed," then obviously, they don't have to trust our contractor. It's the manufacturer that's saying this is operating out of spec, and this is going out.

So, I'd love to use systems that can do that

whether it's a single point in time or ongoing continuous commissioning type systems.

MR. FOO: Great. And I think to round off this panel, I would love to hear from all of you if you could make one and just one near term change whether that's more resources, a platform, picking that one, what would it be? And maybe a little bit of a reason behind that.

MR. DAVIS: Yeah. So, I would really like to see a platform to have the building departments get a more organized situation together where we are inspecting similarly. I don't think that any building department has the misconception that we could all be the same. And I don't think that's expected.

However, I think a platform where we can … I know in San Jose, we hear often I went to Cupertino or I went to Sunnyvale and they didn't ask for this, and they didn't want us to do this. And while that is troubling to me, I understand what the code says, we understand what the code says, we understand what the requirements are.

And so, if they're not being asked in other jurisdictions, I oftentimes tend to think that they're being overlooked in other jurisdictions. So, I would like to see a platform where we could raise the bar if you will, on our inspection processes across at least, like I said, at least across various regions in California, where we are

interconnected by distance where it would be a more equitable approach to doing building inspections.

MR. MACFARLAND: I'll jump in and say my single thing would be just like consumer awareness, that not only is there going to be this time of reckoning when you go to sell your home, that you're going to need to release whether or not the work that you did was done to code and with the appropriate permits.

So, the time to deal with that is we have to change-out time or the upgrade time, but also awareness that 30 to 40% that was mentioned in the first panel of opportunity exists in these installations and that things, even if they are done to the minimum code standard, are still not what they could be.

And so, that could be driven and funded by utilities that are funding these programs that can help show some case studies of what customers have saved by me when technicians actually measure things with these systems; what does an RFID device or what does following a measure of performance pathway actually do?

So, technicians start to measure, they start to learn incredible things about the results of their decisions, and then their next installation is that much better because of that feedback loop completion. And then that has that spillover effect outside those programs, so

those technicians are better for of their jobs and they understand what they're doing so much better.

So, it's a supply technology like these systems that enable that to happen by putting these tools and combining skills between technicians into something that creates real change, but it all starts -- the customers have got to be aware of it and ask for it so that then the companies will put their people into training to figure out how to deliver this thing that's being requested of them because there's actual demand for it.

So, I can't start like, oh, I just want to do training. It's got to be like, "Well, we've got to learn how to do this thing that my customers are asking me to do.

MR. WISEMAN: I'll go next. I think of everything that's been discussed. I mean, I think there is no silver bullet, if you will, for anything that we're talking about here, but ease of the permitting process has been mentioned several times.

Ron just mentioned it; again, this consistency across jurisdictions, it's one of the reasons that IHACI has supported this unified statewide permitting system of some sort, because not only would that create that upfront process of actually getting the permit, what's required for a permit, which varies so greatly between jurisdictions.

But it could create the process for, okay, well,

how are we going to standardize inspections for these across the state? Because the variances that we see from jurisdiction to jurisdictions are mind-numbing. And it's just one of those huge things that a contractor will say, "I am not going to pull a permit in that city. I'm just not going to do it, because it's a nightmare and I know it is, and I'm not going to do it."

And I say "I" -- I'm speaking to the generic guy from contractors in general, but that's the reality of what happens. So, if I was going to pick one thing, I think from the suggestions that I've heard that unified statewide permitting platform, I think at least for changeouts, for equipment changeouts, there could be things for new installations that for very real reasons need to go through a plan check.

But that's not what we're talking about here. You know, 90% of the systems that are installed are changeouts and those are the ones that are not getting counted. So, that's my 2 cents.

MR. FOO: Are there any other comments on that last question?

MR. KNOLES: Well, I just kind of the same thing as our previous panelists were saying, just trying to work across the board, having some kind of standardization, it would be nice. It'd be nice for our contractors, our

customers, and for our inspectors just to be all on the same page.

MR. FOO: Excellent. Well, I think on that note then, I will thank the panelists and will turn it over now to public comment. I think it's RoseMary who's handling that, I don't know if we currently have anything.

MS. AVALOS: Thank you. Thank you, Fritz. Yes commenters, please allow one person per organization to make a comment, and comments are limited to three minutes per speaker. I will first call on folks using the raised hand feature on Zoom. So let me see if there's anyone.

I don't see any raised hands on Zoom. So, I'll move on to the phone lines. And a reminder to phone users; dial *9 to raise your hand and *6 to mute and unmute your phone lines.

So, let's see. Okay. I'm not seeing any raised hands. So, that completes public comments. I turn now to Commissioner McAllister.

COMMISSIONER MCALLISTER: Great. Thanks, RoseMary. And thanks Fritz for moderating that panel, really great panels, both of them this morning. And I want to thank all of our, I guess nine panelists overall and Bill and Fritz for facilitating.

And let's see … I guess I don't have a whole lot of summary comments. We really are I think building a

great record for this conversation. As I think everybody has said, and I think I said in my opening comments, this is a really moment of opportunity to improve this ecosystem and to do better installations, do more installations, and increase the level of professionalism, accountability for every installation.

And I think thanks for Director Fogt, David for being here. I really appreciate it as well. And your insights, they make a huge difference here, and I'm really looking forward to working together and figuring out ways we can guide this conversation kind of in concert, because there are lots of different threads of this tapestry across the state.

And it's a very diverse state, obviously, with lots of different local jurisdictions and different communities. And no one size fits all, really. I think as several of our speakers have said, no one size fits all is really going to sort of fit every … there is no one size fits all for the state, really. We have to create tools and abilities and skill that can be adapted across the different contexts in our state. And so, I think that's doable.

I'm really glad that we're having/refreshing this conversation. And we have a lot of people who are very knowledgeable as participants in this call as well.

Really looking forward to receiving written kind comments. There's a fair amount of creative thought going on here. Bill talked about some of those ideas, and we heard about a lot of new ideas or sort of newly, I think, possible approaches that maybe even just a few years ago, we just didn't have access to these kinds of approaches.

And COVID sort of put all that on steroids in terms of being able to use remote digital tools to accomplish a lot of these things at lower cost than maybe historically, would've been the case.

So, anyway, I won't drone on, but I just am really excited about this conversation. Compliance isn't often all that sexy in terms of … from the homeowner's perspective, I think we do need to do a better job to articulate and really demonstrate the value proposition for that homeowner. And through these tools, I think we should be able to do that. But continual improvement I think is all of our job together. So, really looking forward to collaboration on this.

And the IEPR document will take this conversation into account and be reflected in the building decarbonization section, but that's really just a moment in time. You know, we really need to figure out a longer-term strategy just to keep focusing on this and rolling with new developments and taking advantage of those beyond the IEPR.

And just finally, I'll just point out, and we all know this -- but our carbon reduction and goals are immense. They will be challenging. We're doing great on the kind of generation side and decarbonizing the grid itself.

We really need to take advantage of that clean resource to help our buildings be a part of the solution here. And that means doing good installations and really taking advantage of all the latest technology, implementing the Building Code, but particularly in our existing buildings making sure we have all the ingredients for success as we really try to scale up retrofits of existing buildings. So, thanks everyone for your leadership here on that.

And with that, I'll pass it to David for any wrap up comments, you might have. Really appreciate your being here.

EXECUTIVE OFFICER FOGT: Yeah. Well, thank you. Again, I really appreciate the opportunity to participate. Just a couple things came to my mind and that is that the Contractors Board can be a very valuable partner to all of you. Not only do we need to look at ways to enhance our enforcement of permit requirements, but also the education of consumers and contractors.

So, what I'm going to do after this meeting is

I'll follow up with an answer to the classification questions, but I'm also going to provide some direct contact information for all of you. If you have any ideas regarding outreach opportunities, if you can serve as a subject matter expert for us, that would be helpful.

Because what I'm envisioning is that we're going to put together a video and also some consumer awareness information regarding the need to make sure that the permit is obtained for these installations. That'll help the consumer understand, but also, we need to send something out to our C20 contractors. So, I'll make sure that'll happen next week. And again, thank you for inviting me to the meeting.

COMMISSIONER MCALLISTER: Thank you, Director Fogt. Really appreciate your insights here and the collaboration going forward. Very optimistic about that. I totally agree; the contractors are really the lifeblood of what makes all this possible. I mean, your guidance and management of that community is just invaluable. It will be critical for success.

Over on the comment on the chat there, are a couple of links; one, how to submit comments to the docket, which are due September the 24th. And then also, the link to the recording of the workshop, which will be posted in the next day or so. And a written transcript eventually

will turn up. But certainly, feel free to listen again. A lot of content today.

And then finally, Denise Costa with the Energy Commission has put in these notes, so thank you for that. But don't miss the next IEPR workshop on Building Decarbonization -- this thread is a really rich one this year -- and Grid Interactive Efficient Buildings. And there's the list, great.

So, there's the list, save the date, opportunities on all the IEPR workshops that are coming up; October 5th, building decarb. And October 25th, the sort of redux of the energy efficiency doubling goal conversation, we began last week, I believe it was. And then various forecasts and different topics that are turning up.

So, we're, we're working across a lot of themes in this IEPR, and they are all inter-related under the carbon reduction banner. Our forecast, our reliability work and taking advantage of, in particular, demand side resources in ways that we really haven't done sufficiently in the past.

So, that's related to building decarbonization, but it's also related to sort of interacting technologies at the local consumer building level that dovetails very well with energy efficiency in our kind of current program environment, but really need to be sort of evolved and

matured in a way that does underpin reliability and enhance reliability as we scale up our consumption of electricity with vehicles, with buildings and electric end-use technologies.

So, lots of different interacting themes here, but today is really critically important because all these installations have to be done well, they have to achieve the efficiency goals and the emissions reduction goals that we're kind of counting on in the state. And so, that is a human very hands-on process, that just involves hundreds of thousands of decisions, people, contractors, professionals, homeowners, business owners throughout the state every year.

So, again, I wanted to just wrap up with that context and thank again our panelists, and our moderators and the IEPR team for another bang-up job on the workshop front. So, really appreciate it. Heather, anything else I should say?

MS. RAITT: You covered it all, thank you Commissioner and we thank you for the support.

COMMISSIONER MCALLISTER: Great. Alright, well done. And we are adjourned for the day. Thanks everyone.

MS. RAITT: Bye.

COMMISSIONER MCALLISTER: Thanks, David.

(The workshop concluded at 12:34 P.M.)

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I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a certified electronic court reporter and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

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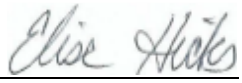

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