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BEFORE THE

CALIFORNIA ENERGY COMMISSION

In the matter of,	)	
	)	Docket No. 17-BSTD-01
	)	
2019 Building Energy Efficiency	)	
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STAFF WORKSHOP

2019 NONRESIDENTIAL ENERGY STANDARDS

CALIFORNIA ENERGY COMMISSION

FIRST FLOOR, ART ROSENFELD HEARING ROOM

1516 NINTH STREET

SACRAMENTO, CALIFORNIA

THURSDAY, JULY 13, 2017

1:00 P.M.

Reported By:
Gigi Lastra

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P R O C E E D I N G S

JULY 13, 2017 1:00 P.M.

MR. BOZORGCHAMI: Good morning. My name is Payam Bozorgchami. I'm the Project Manager for the 2019 Building Energy Efficiency Standards development.

Before we start there are some housekeeping rules. Restrooms are located out the double doors here, at the Energy Commission, this room to your left. The snack bar is on the second floor.

And in case of an emergency, if the fire alarm goes, please let's meet at the Roosevelt Park, kiddy-corner from us. And we'll reconvene there and make sure everyone's out there safely.

What we will be covering today? This morning we'll be doing -- Gabriel Taylor, from our office, will be presenting on the demand response presentations, the cleanups.

We'll have Rolf Bienert. I apologize for the last name pronunciation. Try to pronounce my last name. He's the Technical Director with the OpenADR Alliance and he will be giving us some input on what DR is.

And then in the afternoon, at 1:00, we'll reconvene after lunch and we will have discussion on the healthcare facilities and licensing.

So with that, how did the Energy Commission

start? The Energy Commission started in the 1970s by two legislators. Warren Alquist that developed what we call the Warren-Alquist Act, under Governor Ronald Regan. And under Governor Jerry Brown it became funded and the start of the Energy Commission began.

We have some policy drivers of what we're doing for the Building Standards and what we do has to be energy efficient, provide clean energy job plans. The California Air Resources Board has a requirement that we have to follow to meet the climate change scoping plans.

Other measures or other areas of the Energy Commission's responsibilities, we have to permit power plants greater than 50 megawatts, look at transportation, develop alternative fuel methods of transportation, and other areas.

The Energy Commission's policy for the Building Standards is to try to avoid more power plants, provide grid harmonization for transportation of electricity. And what we do is our primary goal is energy efficiency and demand response.

Energy Commission staff, with the help of its utility partners, those being Pacific Gas & Electric, Southern California Edison, SoCalGas, San Diego Gas & Electric, Sacramento Municipal Utility District, the Los Angeles Department of Water and Power, and Southern

California Power Authority work on developing the standards every three years.

We provide workshops, like this, both at the utility level and at the Energy Commission, to present the proposals for the code changes.

A lot of communication is done between the Energy Commission staff and the utilities' CASE Teams and Authors, who develop these codes. And those could not be happening without the help of Heidi Hauenstein and Kelly Cunningham.

As you know, California's a little bit different than other parts of the country. California has 16 climatic zones and when we develop an energy efficiency measure we have to look at all 16 climatic zones to make sure there's a benefit, there's an energy benefit and there's a savings to the building owner.

So with that, we do a vigorous lifecycle cost analysis based on where we look at the cost of fuel, the cost of electricity and gas at every hour of the year, and we go through a whole energy assessment on that for the lifecycle cost methodology. And as long as the benefit cost ratio is above one, it's showing a benefit.

The Zero Net Energy Standard, what we're doing so far here at the State, we're showing a lot of energy savings in the homes currently, with water heating,

space cooling, and heating. Notice the downward trend.

And we have this goal that we have to meet, this thing called ZNE, zero net energy, by 2020 for residential and by 2030 for nonresidential buildings. And to do so, we have these codes. We have three more code cycles for nonresidential and these are the mandates that we have to meet.

Our prerulemaking schedule so for, these are the workshops, the prerulemaking workshops that we've had here at the Energy Commission.

And today, July 13th, we're going to be talking about hospital measures and demand response.

And next week, on July 18th, we'll be looking at residential HVAC measures and ATTs requirements.

On August 22nd, we will be looking at solar and PV systems, the whole energy design rating methodology for the residential measures.

And on August 13th, we're going to be talking about the CalGreen Part 11 proposals.

All of the presentations and the CASE Reports for these will be posted on the utility-sponsored stakeholders' website. You'll see that that's the one on top.

The hospital measure will be posted on our website, and that's on the Building Energy Efficiency

website. And any comments for today's workshop could be submitted to the link below, the third one. And we would like to get those comments by July 28th, at the close of business. And that gives us enough time to work on getting the measures, looking at the comments, and providing feedback for the standards.

We're looking into having another workshop later on, in late September, early October, to look at the express terms, prior to going to the 45-day language for the development of the standards.

Here is some key contact information. Mazi Shirakh, who will be leading the ZNE Technical, as an advisor for the 2019 Building Energy Standards.

My information, Larry Froess, he's our Senior Software Development Advisory, lead, Peter Strait, who's our Supervisor for Building Energy Efficiency Standards.

Christopher Meyer is our Office Manager. And Todd Ferris, he's the Supervisor of staff for the Software Development Team.

This presentation and the rest of them that you'll be hearing today will be posted on our website later this afternoon. Or, excuse me, by tomorrow morning.

Any questions? If not, I'm going to hand it off to Gabe and he'll take over from here. Thank you.

MR. TAYLOR: Good morning everybody. My name is Gabe Taylor, Gabriel Taylor. I am an engineer in the Buildings Standards Office here at the Energy Commission.

And I've been asked to essentially project manage the portion of this Title 24 update cycle devoted to demand response.

And as Payam introduced, also, Christopher Meyer, he's the manager of the office for Building Standards, he's here as well.

And there's a number of other staff that are involved in this update cycle, but I'm the focus for the demand response section so I'll be the only one speaking today.

Before I get started, I wanted to acknowledge a few people. First, like to acknowledge Commissioner Arthur Rosenfeld and Commissioner Jaclyn Pfannenstiel. When I started working on demand response issues almost ten years ago, they were Commissioners and they were very passionate about demand side management, demand response, and the opportunities for efficiency on the demand side of the equation.

And I think a lot of the progress that we've made is due to their strong support. And although both of them are no longer with us, their memory lives on in

the work that we do today. And I just wanted to thank them.

In addition, I'd like to thank the Codes and Standards Team for the excellent suggestions and the report that they provided to the Energy Commission, which is published on our website, as well. And it is a high quality analysis and it contains a lot of excellent suggestions. So, thank you very much for the CASE Team.

And, in particular, the authors of the report on demand response, Heidi, Bijit and Kitty. Thank you very much.

Also, we had some very quality discussions with the California Efficiency Alliance. CEA is a new organization. I'm delighted to see industry, and unions and many other stakeholders spend time discussing their differences, and where they agree, and provide quality analysis and suggestions to the Energy Commission. It makes the whole process better, and it makes the code more reasonable and better in the process.

So, my goals for this presentation today are primarily to educate you on the changes that the Energy Commission is proposing in this code cycle. This is a prerulemaking phase, so this is our call to you, the stakeholders who are interested in demand response, to provide your suggestions and comments on our proposals

before we get into the formal rulemaking process.

So, as Payam mentioned, by July 28th, I believe, we'd like to see any comments you have in writing. But even after that date we will enter into the formal rulemaking process in a few months and there will be more opportunities to comment. But we're counting you to help us make this the best recommendations possible.

A large portion of the suggested changes to the code, in this cycle, for demand response is that we are suggesting that OpenADR be used as a standard protocol for demand response communications, external communications.

Because of that I'm going to devote a section of my time this morning to a briefing on both the history of OpenADR and what exactly OpenADR is.

And then, finally, I'll close my presentation today with a review of the schedule, just to remind everybody of the important dates for this code cycle.

On that topic of schedule, I also want to take a moment to say that this is the 2019 code cycle. And the Title 24 code change cycle is a three-year series of cycles. I like to think of it as like a subway station. We have a subway car pulling in. This is the 2019 subway car. We're loading it up with a bunch of ideas and suggestions, and then that's going to pull out and

make room for the 2024 car.

So, any ideas that you have that don't make it into this code cycle that's okay, keep them, bring them to our attention and we'll just push that into the next car, or the one after that.

This is an iterative process. Our goal here is to make the Building Standards, Energy Efficiency Code as effective as possible in saving energy for the people of the State of California.

So, first what is demand response? Fundamentally, demand response is the shift or shed of energy in response to changing conditions, such as price, or over-generation from on-site resources, or possibly from some sort of emergency.

This is a concept that was part of the Warren/Alquist Act that created the Energy Commission back in the early 1970s, in response to the energy crisis in the early 1970s. And the original language in the Warren-Alquist Act required the Energy Commission to implement a number of different standards in order to manage the demand side of the equation.

Back then, the technology available was pretty crude. You would have a utility manager who would call a manufacturer and say, we need you to reduce your demand, and they would do so, if they chose to. And,

potentially, they'd be paid for it. But the opportunity for true demand response was just in its infancy.

We have, obviously, advanced a lot today. We have numerous additional tools. And the real goal here is cost-effective actions. What is cost effective? That's part of the Building Standards Code. And the point here is to put in standards that are focused on the owner or operator, that gives the owner/operator the information and lets them response to motivation provided by the utility or other party, and then the tools so that they can make demand responsive actions at a minimum cost. The transaction cost is the time or the money required in order to make this response. And if we can minimize that transaction cost by providing integrated tools into the built environment that provide the opportunity to institute cost-effective actions, that's an advantage to the owner or operator of that building. So, that's really the goal of this section of the code.

So, the proposed changes can be broken into two major sections. We have a lot of cleanup. Primarily, we're harmonizing with ASHRAE 90.1. There's a number of sections where the definitions, particularly in the definition section there's a little bit of a disconnect between ASHRAE 90.1, and we're just bringing those into

alignment. These proposed cleanup changes shouldn't change any significant section of the requirements.

And then the other section that changes are actual code changes that will either appear to or actually change the requirements.

The first of those is the consolidation. We're proposing to pull all of the disparate demand response language from many different sections of the Title 24, Part 6 code, into one section, one new section. This will make it easy for those, who are familiar with our code, to find all of the demand response requirements.

It looks like a fairly significant change, so I've listed it under the code change section, but in practice that consolidation should not significantly alter the requirements that you're presented with.

And then the final change that we're proposing is to specify the OpenADR protocol, as I mentioned.

So, first I'm going to focus on the cleanup and give you a brief overview of how those cleanup changes will be implemented and the specifics of those cleanup changes.

In Section 110.2 there are definitions for thermostatic controls and we are harmonizing those ASHRAE. We're deleting the reference to "setback thermostats." Those were giving the impression of a

requirement to setback, whereas the goal here is to provide the owner or operator of the built environment the ability to control the thermostat in response to a signal, when they choose to.

This is a cleanup requirement. This will not change any of the requirements. It's simply changing the language subtly so that it is consistent with ASHRAE and remove some confusion.

The solar ready section of Section 110.10, again we're going to clarify the thermostat requirements. The language "thermostatic controls," specifically. And also clarify the reference to "energy management control systems," EMS.

We're consolidating a number of different terms within the code that essentially referred to an energy management control system. And so, we're eliminating a lot of those disparate terms and simply pointing them all to the term "energy management control system" in the building.

We're also going to delete the term "home automation system." This is essentially an energy management control system in the residential environment. It was not defined previously and so that section of the code will simply point to EMCS, rather than to home automation.

Again, this is a cleanup. We do not think this will change any of the requirements in the code. If you disagree with the language that we're proposing, please let us know.

In the additions and alterations section, Section 141, we're also going to clarify the thermostat requirements. This is repeated throughout the code. We're changing the definition to be consistent with ASHRAE. And so, in a number of places in the code where it refers back to that definition, we need to clean that language up to make sure it's consistent. Again, cleanup, no significant change.

Similarly, in Section 150.0(i), we're going to change -- delete the word "setback", proposing to delete the word "setback" and change the thermostat requirements. So, it's a reference to thermostatic controls, rather than the thermostat.

There was some confusion about whether or not the requirement was for a separate device that controlled the temperature in the space. The requirement is simply for the ability to control that temperature.

The code, and this is a repeated theme and I mentioned this earlier, owner/operator-centric. The goal of the code is to make sure that once the building

is built the owner and operator have the ability to take the actions that they choose to take, or need to take.

Many devices, as a slight tangent, many devices, as most of you know, are much more expensive to add after the building is built than they are to add at the time of construction, or the time of a major addition or alteration. And so, the code focuses on giving the owner or operator that ability to engage in that type of behavior that they choose to engage in, at the minimum cost.

And then, finally, Joint Appendix 5 is a whole section dedicated to occupant-controlled smart thermostats. There's been a lot of confusion on this section. We're looking at a fairly significant rewrite of this section. There's not an intent to change the requirements, simply to clarify what the intent is.

The section, as we have it marked up, has a lot of changes and so we're counting on you to read it very closely.

There is one change in that section, which I'll go into the next, when I talk about the actual code changes, and that is the OpenADR, which I've mentioned a number of times. That will appear in the Joint Appendix 5.

Okay. So, now onto the proposed changes. This

is probably what you're more interested in. Although, I do hope that all of the stakeholders will spend some time reading through our proposed cleanup language to ensure that we are not engaging in any unintended consequences.

In the code change section we have three primary sections here, as I mentioned before. I'll go through those in a little more detail, now.

In the definitions section there are a few definitions that we're correcting. The automatic control system, energy management control system, these are two definitions that we want to clarify.

Automatic control system is a general definition intended to clarify the difference between the control of taking an action without manual interventions and a control that requires manual intervention.

So, we wanted to be clear that when we say that, say a light needs a control that is automatic that can be engaged -- they may communicate with the energy management control system. We want to differentiate very clearly between that and a simple switch.

As I mentioned earlier, we're consolidating various redundant terms in code that generally refer to a system that can be classified as an energy management control system. So, we are hoping that we can

consolidate all of those general terms into one term, energy management control system in a building space.

As you all know, there are many different types of systems that can behave as an energy management control system. Some are in the Cloud, or have parts in the Cloud. Some are on site, hardware on site. So, there's a lot of variations there. And we're trying to make the code specific enough that we can achieve the goal of giving the building operator the ability to control their energy, but general enough that we're not confining the requirement to a specific type of device.

Now, we're also adding definitions in Section 100.1 for OpenADR 2.0a and 2.0b.

And we're similarly adding a definition for the Virtual End Note, which is a term used in OpenADR and defines the specific needs for what will be part of the building at permitting.

And, finally, as I alluded to a number of places previously, we're changing the definition of thermostat and thermostatic controls to harmonize with ASHRAE. So, that's a change in the definition section.

The rest of the changes that I mentioned earlier are simply to align with that change in definition. They do not change the intent or the requirements, they simply point to the new definition.

And to be consistent with ASHRAE there are two definitions. At first, it's a little confusing. But there's a thermostat, which is an individual device, as I mentioned, and a thermostatic control which is a group of devices or part of a larger device, like an energy management control system.

The consolidation is another major code change that we're proposing this cycle. All nonresidential DR requirements. It's also the most obvious change. When you see our markup language there's going to be a lot of redline and strikeout, but a majority of that is this proposed consolidation.

The new section will be likely in Section 110, numbered sequentially at the end of Section 110. As a part of this consolidation, we'll take the opportunity to review all of the language and to make clarifications, and simplification changes wherever possible. So, our goal is to make this as easy to understand and clarify a few issues that have been proven confusing over the past code cycle. We've received a lot of questions about them.

So, this is actually a fairly large chunk of code that we're going to be consolidating here. All of these sections, listed on the screen here, so Sections 120, 130, 130.1, and 120.2, et cetera, these all contain

demand response code.

Over the past decade or more this language has been put into each of these sections as the technology has become available. Frequently, that has been written by different analysts, proposed by different groups. You know, the lighting industry, the HVAC industry, and whatnot, so there has been a bit of divergence in the specifics of the language used in each of these sections. Sometimes a difference in the terms for the same, for example the energy management control system, different terms used for the same, essential device.

So, the effort here is to collect all of these disparate demand response sections, make sure that the definitions are consistent, make sure that the requirements are consistent and there's not subtle differences between them, and then put them in the one section.

So, that brings us to OpenADR. The proposal is to reference OpenADR 2.0a and 2.0b as the external communications protocol for all demand responsive activities in the built environment.

I think this is a huge success story. The Energy Commission, at the end of the energy crisis back in 2000, 2001, in 2002 we funded a research project for looking into protocol, and open source protocol to

enable demand responsive behavior.

We worked with the -- the Lawrence Berkeley National Labs won the award, and the Demand Response Research Center did a large amount of the initial work on this and continued for a long time. They brought in many different organizations, both Californian, national, international standards organizations, the utilities. There was a huge number of entities working on this project over the ensuing time.

Between 2003 and 2006 there were a number of field trials and pilots using the early iterations of this protocol, and early designs of the hardware.

By 2009, the Energy Commission adopted OpenADR 1.0. This was an Energy Commission publication, based on Energy Commission-funded research, and based on our identification of a need for this type of protocol.

By 2011, the OpenADR Alliance took over management of this protocol and published OpenADR 2.0a and then 2.0b in 2014.

I'd like to at this time -- so, this is a success story. The Energy Commission saw a need, funded the research to meet that need, and now we're able to propose a proven and tested solution for inclusion in the code. So, I'm really excited about this.

I'd like to introduce, at this time, the OpenADR

Technical Director, Rolf Bienert, to provide a briefing on OpenADR. I think he's much more able to provide the detailed technical understanding of this code.

MR. BIENERT: Perfect, excellent. Thank you, Gabriel. I'm honored to be here today. Thanks for inviting me over to give you this overview here. Gabriel already outlined what happened over the years in OpenADR. I'll fill in some of the gaps a little bit and then tell you what OpenADR really means and what it is.

But first of all, a real quick look at what the OpenADR Alliance actually is. So, we are not a product company. So, we are not making OpenADR products. We would not sell them to you or anything like that.

We are a nonprofit membership organization. So, all of our revenue comes from our over 130 member companies, which are manufacturers from Honeywell to now EV companies, and so on. So, all these manufacturers that make home controls, thermostats, things like that, are members of the Alliance. And that's how the Alliance is, in California, a nonprofit organization is funded.

Our vision is to really facilitate the cost-effective deployment of OpenADR technologies. And that means that we want to make them interoperable. So, if you buy a product from one vendor it will work with a

different vendor, as well. If you later have to replace products or if you replace, for instance, the head end, the server, VTN as we call it, the Virtual Top Note, there should be no interruption of service except, of course, new commissioning that needs to be done.

Otherwise these devices are interoperable from a protocol perspective and we test for that.

We leverage, also, a number of other smart grid related standards from different organizations that you may or may not know. There's a lot of efforts going on, of course, in the internet space, in the Oasis Group, which is also an internet services group building exchange models for computers, and for other machine-to-machine communication. And, of course, other groups like NAESB, and FERC, and so on.

We also have a testing and certification program. So, we support really the development of the technology there. We certify the devices. If you go to our website, openadr.org, there's a tab for products where you will find all the certified products, what they are certified for. There's, I think, probably about 140 now. I should know since I certified them all, but I lose track sometimes.

So, these are certified systems. Sometimes there are iterations to them or, if they are cloud-

based, then there may be a lot of different versions. So, sometimes you have to dig in a little bit to see if a product is certified.

So, what is OpenADR, really? Well, it is, first of all, a standard that provides nonproprietary and open interfaces. The idea is that you have web services. Imagine it similar to a web browser. You have your computer, you log on to website. So, basically, you type www dot, and I'll say Google.com, and your computer pulls that information from that web address.

A very, very similar service here. The machine-to-machine communication uses the internet or through any kind of link, like broadband, like Wi-Fi, like existing modems or, of course, you could use cellular, or any internet connection that you can establish to pull the information from the utility server or whoever operates the demand response program. Very straight forward.

It contains messages to communicate what needs to be done, but not how to do it. That's one of the biggest differences in OpenADR. One of the very initial thoughts that the Energy Commission, Lawrence Berkeley National Labs, and those very first companies had that we don't want to force anything down the throat of the participants.

Not like some other technologies that virtually switch on or off a device, OpenADR does not do that. We send information elements that can be used for the local system to make a decision on how to fulfill the needs. So, for instance, there could be a price, and there could be a request for energy savings, but then your system would be reconfigured to do specific things that are applicable for your building, for your facility, for your office building, whatever it is.

And you can, of course, also opt out of these events if they are not convenient for you.

It provides secure message exchanges, as well. We use standard internet communication security. A very high level of this with security certificates on both sides. And at this point all of the California electric IOUs are using OpenADR for their programs.

So, this is the timeline. Again, I think Gabriel had a few of these milestones already on there earlier. So, after this initial development that Gabriel mentioned, and we had OpenADR 1.0, that was when a lot of the new smart grid requirements came into play, like between 2008 and 2010.

So, a lot of the different smart grid groups, for instance the NIST Smart Grid Interoperability Panel, added additional requirements that they wanted to

fulfill and essentially extended the scope of OpenADR beyond California to make it a standard that is now used, in fact, globally. It's used in Japan, and Korea, some European countries. And it's being promoted right now through the International Electrotechnical Committee, the IEC, as an IEC standard as well. So, it's a fairly open spec and it can be obtained through all of these resources.

By the way, if there's a product manufacturer listening in, or here in the room, you can always go to the website, go to resources, and you find the specification to download if you want to look at it. There are also open source platforms, and so on, that can be used.

Let's get this all up here, yeah. So, as I said, OpenADR has now been internationally recognized. And there can be different types of messages that are being exchanged.

Here on this picture you see a very simple pathway for OpenADR. On the left-hand side you see, again, the VTN, Virtual Top Node or, simply speaking, the server, whoever controls the demand response resources. That sits either at the utility, in the case of California that's mostly the case. Or, of course, at any kind of other DR program operator.

And then, on the right-hand side you have that VEN, this Virtual End Note, that Gabriel also mentioned, or whatever, it's in the rule making here, which is the client device. We like to call them virtual because you shouldn't picture them as a fixed PC, like an actual server, or a PC as the client. Not like when you browse your website, right?

It could be in the Cloud environment. There could be Cloud clients that control their thermostats, for instance. It could be in a little box, a little gateway box that sits right under your desk, just like your router and your other modems. Or, of course, it could be built in a building management system already.

So, a lot of commercial building management systems are starting to have OpenADR interfaces built in natively. It's just another port for them, basically. They use the same internet connection that they would already use for their control systems and they can just also understand OpenADR through that interface.

So, typically, the event has, of course, day, hour and other timings included. When it's happening. And then, it includes what is happening. So, there could be different price signals, for instance.

So, like the second example, we could say tomorrow, from noon to 6:00 p.m., there is an event.

And this event may be a price event. And it could be that from noon to 6:00 p.m. it's one specific price. That would be, of course, a very easy event. Just like a calendar notice, if you have Outlook or other calendar applications, when you send the calendar notice tomorrow, noon to 6:00, XYZ is the event, that's easy enough.

There could, however, also be different intervals in there, so the price could change during that time frame. So, in your calendar notice for tomorrow, it could say from noon to 2:00 p.m. it costs X. From 2:00 p.m. to 4:00 p.m. it costs Y. And from 4:00 p.m. to 6:00 p.m. maybe there's a different price or it goes back to the first one. It doesn't matter what it is, there are these options that you can have a price curve basically passed on to the building, so the building can make a decision what to do with that.

If you can shift the load away from these high-price times, that would be ideal. You save money and you can adjust your curve, basically, to the pricing.

There could, of course, be also curtailment events or events, with other words, that give you a specific energy level. They could ask you to save a certain amount of energy at a certain point in time.

Conversely, of course, it could also, if you

have generation, like if you have batteries, if you have solar, maybe even other plug-in systems or generation, it could also even ask you to increase power consumption. If the grid, at some point, has too much power, and we're starting to see that now with renewables coming online during the day, midday, all of the sudden we have more power, right, because all the solar initiates kick in and we have a lot of power. So, it could be that it asks you to use more power. You may charge your batteries. You may plug in your car. Things like that could happen.

So, there is an up and down request there that can also be used, eventually, to balance all these renewable energy resources out there. We like to call this the distributed energy resources control, or DER, as well.

So, the same kind of messages can control all these typical energy consumers, but also the resources. For us, from an OpenADR perspective, that's all the same. You know, up or down the energy consumption, it's the same for us. It's a resource, right.

In particular, we see that now, also, with the EV chargers. EV chargers, obviously, in particular the public ones, or the ones at the stations at companies, they can be huge power things. Right, they can blast a

lot of power to charge these batteries very quickly. But it also gives us a tremendous opportunity here for flexibility, right, because you can tell them, hey, slow it down a little bit or speed it up. So, they can vary their output very easily.

And with that, this is also a future opportunity for balancing the grid as a whole.

Anyhow, those are the typical signals. As you can see here depicted, a little bit hard to see, but these can be sent directly to the facility. Again, gateways, Cloud environment, or things like that. Or, they could go through an aggregator, as you see here at the bottom.

This aggregator, there is multiple business models for this. This could be a company that makes it their specialty to sell power back to the utility. So, they could actually go out and start these programs. Right, they sell building owners or resource owners, in general, a demand response program and then sell that power at certain times back to the utility.

One business model there, on the East Coast, they do that a lot.

Another business model would be that the aggregator is simply a technology provider. Like, for instance, almost everybody knows like the Nest

thermostats, right, the nice round, Nest thermostats. And they are Cloud services is really where all the intelligence of these devices is. They look very smart on the wall. I hope nobody from Nest is listening, but I don't think they're that smart locally, right. They're smart in the Cloud. I'm sure they're great devices. I have to say that, right. Locally, as well.

Anyhow, so they're facilitating the connection here and this could be the case for, of course, a lot of different technologies that they have, these aggregators. Solar systems do that a lot, as well.

All right, real quick, I'm not going to go into all of these details, there are a lot of programs now, at the California IOUs. As I said, all of them use it. One example here, I'm not going to go into the details of the numbers. You can read that, if you're interested. But there are, for instance, capacity bidding programs. This is one at PG&E, where the resource in retail, or wholesale market, offers load reductions at a certain price.

This is predetermined how much load they can give back at a certain price. Or, conversely, how much load it is willing to curtail to save at a certain price. So, there can be negotiations going on back and forth, to the advantage of the customer and the utility.

The utility has less balancing to do, the customer can save money here.

And then, Sacramento here, they have some critical peak pricing programs where they essentially try to regulate the consumption by sending different prices, as I mentioned before.

So, during peak times, if it gets tight somewhere or if they have to balance out certain unwanted variations in the grid, they can increase the price. And the facility can then decide, okay, I see a high price, so like a facility manager might get the red light of the traffic light pop up, or get a message. Or, of course, machine-to-machine lighting systems start to dim and things like that, in buildings to adjust for this higher price, and basically shift the load away from these areas. Again, helping both the customer, the connected resource, and the utility balancing everything out.

And then, Southern California Edison has -- one of the programs that they have is the Bring Your Own Device. Mostly, these are thermostats or I think a few gateways, as well, where there is a cloud service available and you can buy your thermostat, or other device that participates in these programs then.

One thing I should mention is, I believe it is

more or less official, that the professional HVAC manufacturers' groups, like AHRI, are also now thinking about requiring OpenADR directly to, say, rooftop units and things like that. This is not finalized, yet, but they're strongly working on that. So that they can actually circumvent thermostats which, for them, is actually better because they can control a building much easier if they have access to the actual units directly. So, they regulate the demand side that way.

And then, of course, also for the zero net energy measures there's a lot of communication being done with OpenADR to different systems. Again, the advantage of OpenADR is we only provide you the information. We don't force you to do anything.

So, the manufacturer of these building systems has all the freedom to put in their intelligence, to make smart device, to be creative on what to do in the building to save power.

So, I'll go just quickly through these. So, we already discussed this a little bit. So, we have the residential side typically, again, like small gateways or thermostats. There can be pool pumps involved, other systems like that.

Commercial, industrial, small, medium businesses typically through gateways. And, of course, here for

Title 24, under commercial side.

And then we are starting to see, as I have mentioned before, more connection to renewable energy resource systems. Again, better re-supported solar systems and other resources out there.

And then for the EV chargers one of the big topics for electric vehicle chargers is, of course, the price. So, some of the initial projects here send the price information to the control system of the electric vehicle charger. And if a customer comes up, plugs in, slides their cards, or types in their membership number or however they do it, they get right away the real time price. So, if you charge your car, it will cost you X amount of money. Or, by 3:00 p.m. today maybe it gets more expensive. Do you want to stop charging then? Things like that the customer has control over and gets those price signals through OpenADR.

Again, all of this also possible through the aggregator model here.

So, those were my main slides. I don't know if you want me to go into a little bit more detail, but I think time wise we're pretty good so --

MR. TAYLOR: Yeah, you're welcome to go into a little more detail, if you'd like.

MR. BIENERT: Okay. Maybe we'll see if there

are some questions, I think I saw one.

MR. SHIRAKH: Mazi Shirakh from the CEC staff. This is very helpful. My question is, you know, when the 2019 standards go into effect we expect PVs, batteries, heat pump water heaters, and all that, how is it the utility actually will communicate with these devices physically? Because we don't want them to use the customer's Wi-Fi system. Because, you know, that has its own risk. You know, if you depend on the customer's Wi-Fi system they can change the router or, you know, it can go down. So, how would they actually, reliably communicate with these devices?

MR. BIENERT: Very good question, actually. Yeah, there are a few options, of course. And I'm sure during the implementation phase there will be probably more discussion about that.

As I mentioned before, any kind of internet connection would work. I agree, I would for instance not use, necessarily, a customer's Wi-Fi network. You would want to go closer to the source of the internet or service provider.

So, it could be that if you have a larger facility that there is one particular access point.

Now, I understand, of course, that there are a lot of variations in buildings. Right? So, you could

have a commercial building where each and every office has their own service provider. One chooses, I don't know, Comcast, one chooses somebody else. One has only Wi-Fi -- sorry, like cellular, Wi-Fi through cellular, and things like that.

So, there we will have to determine what is the best requirement for this, whether the building as a whole would need a dedicated internet connection, for instance? It would be extremely low speed. There's not a lot of data going over this.

Or, if there is a preexisting network available, where you could, you know, with a wire basically plug into the internet router somewhere at the --

MR. SHIRAKH: Do you have any specific suggestions for residential?

MR. BIENERT: Residential, to be honest, all the residential that I know of just use the customer's broadband, yeah. A few years ago it used to be problematic. Nowadays, pretty much everybody has it.

MR. SHIRAKH: Everybody has it. But what happens is the customer switches out the router, would they have to, you know, reregister all the devices that's --

MR. BIENERT: No, not necessarily. In fact, if he would switch out his router and just plugs in his

gateway, or whatever it is again, there is no difference, it just keeps working. I mean, unless of course he misconfigures his network as a whole and that's a different story.

But as soon as there is internet connectivity, there is no other reconfiguration.

MR. SHIRAKH: Okay, thank you.

MR. PENNINGTON: So, I'm Bill Pennington with the Energy Commission. So, a number of your slides showed the ISO has one of the possible administrators, or whatever your term was. But all of your examples were about utilities.

And so, I was wondering if the Cal-ISO is using OpenADR or is using some other communication protocol?

MR. BIENERT: Yeah. I can't say that I'm aware of all the programs, obviously. Cal-ISO actually used to be a member of the Alliance, so they're very well aware of OpenADR.

I know that in some areas where the ISO is operating demand response programs they have servers. I don't know if Cal-ISO, for instance, even operates, right now, a demand response program that goes down all the way to the customer.

MR. PENNINGTON: So, my understanding is that they're beginning to look for aggregation of the same

kinds of resources, primarily to benefit the transmission system.

MR. BIENERT: Okay.

MR. PENNINGTON: But, you know, there's a growing congruence between what the ISO is doing related to transmission and what the utilities are doing related to distribution, and sort of a need to make sure that there's consistency there as much as possible.

MR. BIENERT: Yeah.

MR. PENNINGTON: And so, that might be a hang up for us. If they're using a different communication system, we might have to sort of allow for that or think about how that would fit.

MR. BIENERT: Yeah, it makes sense if they do have systems all the way to the building. I know that the Lawrence Berkeley National Labs has had a number of discussions with representatives of Cal-ISO. And I think I'm sort of overdue to also try and meet with some of them. So, I'd be happy to kind of put it on my to-do list.

MR. PENNINGTON: Yeah, maybe if you could help us clarify that, that would be useful.

MR. BIENERT: Yeah.

MR. PENNINGTON: And I'd like to join Mazi in saying this is an excellent presentation. Thanks, Gabe,

for organizing it and it is very timely. So, thank you.

MR. BIENERT: Very good, thank you.

So, I'm sure the slides will be provided later, so if you are a little bit more interested in some technical aspects, here in the back of the slide deck there are some more details on how the event works.

MR. MCHUGH: Hi, this is Jon McHugh, from McHugh Energy. Could you just describe a little bit in terms of the aggregator, in the situation when the aggregator is communicating, you know, potentially with not an OpenADR, but they're receiving an OpenADR signal, in that case are they the Virtual End Note?

And then, in your topology how do you describe the communication from the aggregator to the thermostats or other devices in the individual houses? Thank you.

MR. BIENERT: Yeah, very good question, actually. So, again, obviously, I don't know all the business models of all these companies out there. But here are a few examples of what I've seen.

A lot of times the aggregator is, as it was just mentioned, the Virtual End Note. So, the aggregator represents the OpenADR client to the utility, and the aggregator then has a different kind of connection to their specific control systems.

The biggest reason for that is that a lot of

times these are very customized, tailored systems that the aggregator company puts in the resource facility.

So, to give you an example of a big aggregator company, NRNEX -- sorry, EnerNOC, a big network operation center here in San Francisco, very impressive, and in Boston. The way they do it is they typically work with very large resources. So, these are not residential buildings. These are not small, medium businesses. These are factories that use upwards of a megawatt and more power. For them, this is the low-hanging fruit, right. Because they can go into these factories and say, hey, if we put X amount of automation here and there, with your permission and maybe with your building manager's sign off each time this event happens, we can get your power down by 500 megawatts. So, these are significant numbers there.

So, what they do then is if the factory, the manufacturer agrees to that, and of course they get paid for it, they get paid for this half-megawatt. They get good money for it. Then, EnerNOC goes and brings their automation equipment, sets this up in this factory. Some of it manual, also through the building manager and so on.

And a lot of times, as far as I know, they even have their dedicated cellular link because they don't

want to lose this link. They don't want to lose this half-gigawatt or whatever it is, resource, right. So, they're very specific about that.

So, that's sort of like the large-scale end, right. So there, they have their communication. EnerNOC, for instance, also uses OpenADR in some of these systems, but it's probably their own version.

The upside is this all belongs to them. They manage it. They're responsible for it. They're responsible for it to work, basically.

Then on the other end of the scale like, for instance, the thermostat model that I mentioned earlier, right, probably a little more applicable for California, for small, medium businesses and so on. There, it's a little bit more like, say, your i-Phone. Right. Like a lot of people now have internet-connected devices, whether it's i-Phone or Android, or other systems that you use in your house. All of these devices are very, very dependent on the cloud that sits behind them.

You know, without them, if the Apple cloud goes down, your i-Phone will probably become useless in a short period of time.

So, there, then this cloud control system hosts the OpenADR client. So, the client is only built into that cloud once. And then, typically, they communicate

with other means to their devices.

So, let's take again the Nest. I always like to use them because people know them. The Nest thermostat, for instance, for those of you that have one will know it connects via Wi-Fi to your home network. And once you're connected to the Wi-Fi network it goes into the cloud and the cloud has control, basically.

So, there is no OpenADR all the way down to that thermostat. So, this is then at the far other side of the spectrum, the small device here.

So, yes, to answer your question there can be proprietary technology that connects the actual control system with the device that is being controlled. Right.

Now, the distance between the two can vary. Right, you have the cloud which is sort of virtual, somewhere outside, or nobody really knows where it really sits, and the thermostat, right. Or, of course, you could have a little gateway device, a little gateway in your building.

And I think for small, medium businesses that's kind of a very common solution. There are several of our members that provide these building management gateways, little boxes. They are, then, the OpenADR, or VEN, the Virtual End Note, the client. They sit somewhere in the building. And then they can

communicate with all kinds of other devices in the building, with the thermostat, with other devices via typical things, Wi-Fi, Zigbee, Threat, all these common building management systems.

So, there's really no need to have, in every device an OpenADR or Virtual End Note, which requires the device to have web services. So, it requires a little bit of computing power to do that. So, a pool pump wouldn't have that kind of computing power, for instance, or a hot water heater and things like that.

So, as you can see there's a lot of variety in there. But, yes, that final link does not have to be OpenADR.

MR. SHIRAKH: Mazi again. So, you mentioned these gateways for small commercial facilities. Why can't we have the same for residential? There could be a gateway that all the --

MR. BIENERT: Absolutely. Absolutely. Absolutely. No, no, you could have that for residential. It's just at this point I think less likely that you have a home energy management system. Will there be some in the future? Absolutely. Maybe. Right, with the whole internet of things and more and more connected devices at home, there may very well be a service provider that gives you a little gateway, right.

Service providers like Comcast, and AT&T, and so on, are already pushing towards this inclusion of other devices, right, because they give you now a home security system. Right, so all of a sudden your modem becomes a home security system as well, and talks to the door sensors and other sensors.

And at the same time it could receive, for instance, energy signals to then vary the different resources in the building. So, we have some service providers that are interested, for instance, in energy signals because of that.

MR. SHIRAKH: Could the local utility provide these gateways?

MR. BIENERT: Yeah, why not? I couldn't comment, really, on who is providing the gateways but, yes.

MR. SHIRAKH: Thank you.

MR. TAYLOR: I believe we have a few questions from online. Go ahead, Bill.

MR. PENNINGTON: So, a question. So, does OpenADR had any security capability within it that is guarding against hacking, or might control communication that might access a utility system? You know, the VEN, I guess.

MR. BIENERT: Yes, let me just go back to this

picture here to just show it. Yes, in fact it took us the better part of a year to fulfill all the cyber security requirements that were given to us by NIST, and other organizations out there.

And there are a few aspects here to look at. The nice thing is that OpenADR on purpose is not a mesh networking technology. So, we see, or in the past we have seen a lot of problems. You know, if you start meshing everything together, every device talks to every device it becomes more difficult to control cyber security.

I'm not saying it's impossible. They do it. These technologies, like Zigbee, like others, are very, very advanced, now, in security as well, so they are secure also.

We, however, decided from the very beginning this is point to point. So, it's only one VTN to one VEN. So, the VENs do not talk to each other. And again, this is by design at this point.

So, we only need to worry, really, about that one connection between the server and the client and make sure that this is secure.

Now, the internet community has been working on security, of course, for decades. And so we worked our way through, okay, what's possible for OpenADR? And it

used to be that a typical system, if you for instance look into your bank, right, you type the URL of your bank, wellsfargo.com, or something, and then your browser, in your computer, verifies that the security certificate, the fingerprint so to speak of this website that you're just getting to is correct. So, it verifies it through some online listings. It knows the certificates.

Sometimes, if you go on other websites, you might get like a warning that the certificate has expired, do you really want to proceed, right.

So, the same thing here, your bank shows a certificate and your browser says, yeah, okay, this is really the bank. It didn't reroute you to wellsfargo.expert whatever .com, right, to get your information. That's why we should never click on links in emails, right?

Now, OpenADR uses also these server certificates so that the client sees the server, specifically identified by a certificate.

However, in OpenADR we also added the same type of security certificate on the client side. So now the server, in turn, also sees, oh, okay, this is an OpenADR client and it verifies that it has a valid client certificate. These client certificates can only be

obtained by companies that have OpenADR certification or in other words have certified the protocol interface of the OpenADR portion.

And they all go through the certificate authority, which is the organization that issues these electronic certificates and then it is approved by us.

Of course, to be honest, we have no control over what the utility in the end does. If the utility decides to turn off security there's nothing I can do about it. Just like when you buy a Wi-Fi router at the store it typically comes with a high security turned on, with a nice long password. If you go in and turn off that security, the manufacturer can't really prevent you from doing that, right, so the same scenario here.

But we require, for certification, that devices fulfill this what's called TLS, the transport level security 1.2, which is the latest transport layer mechanism. And using our certificates on both sides, so these two certificates will be exchanged and there will be some processing done before a link is established.

So, we feel that the OpenADR link, itself, is actually very secure. There are probably more security risks on the utility end just from hacking into basic utility systems would be my guess.

And another aspect to OpenADR is also using a

technology like OpenADR to connect these resources to the utility provides you with a certain firewall. Because the OpenADR server manages these resources and then you link them in as the customer resources. So, these systems, these OpenADR clients, they are not directly connected to any kind of grid control network.

So, it's not like you're all of the sudden opening up your grid control network to millions of access point, right, where hackers could hack in through like a thermostat, into the building control system.

And this is the nice thing about these kinds of technologies, they provide a demarcation point, right, between like somewhere on the back here, on the left-hand side, somewhere left of this VTN there is the grid control. There is like your substation control, your transmission control, everything, ISO messages flowing there about distribution, transmission, and so on.

And then, some information feeds into the OpenADR server so that the server can make the intelligent decision, okay, where do I need to deploy my resources?

And then, they're completely disconnected. Again, they're disconnected through this one specific link. So, even if somebody were to get into a building, into a building control network, really, the worst thing

that could happen is they maybe claimed to have more resources available than they actually have. But this is also predetermined, already, during initial configurations. There's not much you can fool around with at this resource level.

So, we feel that the security is fairly well covered.

MR. TAYLOR: So, over the next few months --

MR. BIENERT: I guess the mic's probably not working there.

MR. TAYLOR: So, over the next few months we'll be continuing these discussions with the OpenADR Alliance and with stakeholders who are interested in discussing the really technical details of this protocol.

We do have a few questions online and two people, I believe, raised their hand. Please state your name?

MR. WICHERT: Claire, do you have a question?

MS. WARSHAW: I'm here. Can you hear me?

MR. WICHERT: Start with your organization and name. Yeah, we can hear you.

MS. WARSHAW: Okay. My name's Claire Warshaw and I am just listening for education purposes today. This is an interesting discussion. I've not heard this

discussion, kind of this concept before of an internet-based control system for residents.

And the reason I say that is I used to work for SMUD. And several years ago, when they were introducing smart meters to us they were discussing the ideas that smart meters would be the devices that would control a resident's devices, like thermostats and things like that.

So, in a sense it seems like we've departed from that idea. It sounds like this is more internet-based, even for the residents. Is that true or is that up to who OpenADR sends their signal to, or their message to? So, they send it to the utility and then the utility still might be thinking about using smart meters to control resident energy?

MR. TAYLOR: No, no, this is specifically a protocol for getting information. The utility here is very much like your computer and your web browser. So, the OpenADR protocol simply says that the house has to have a device that can read this protocol, like a web browser, right.

So, what the homeowner would do, what you would do is you would tell your device, say you had a battery in your garage and you were using it to charge your car, and you had solar panels on the roof, the device would

have the ability to understand the protocol. You would tell the battery to go get the information from the utility or from the aggregator in order to take action.

So, there's no control from outside. It's you having the ability to get the information.

Rolf might be able to explain that a little better.

MR. BIENERT: Yeah, I think -- I guess we're getting a little bit into the realm of personal opinion here, too. But you're absolutely right, I think very exactly 10 or 11 years ago, when smart meters were initially introduced, and of course you had the AMI, the advanced metering infrastructure in place, it seemed logical to say, okay, now we have a link to the meter. Why not going from the meter into the building and control various devices, like a thermostat, like providing an in-home display for people to see energy usage and things like that?

Very quickly, and I'm speaking now for some California utilities or, I should say, I'm reiterating what I heard from some California utilities; there were big concerns about doing that. And some of them are, for instance, who is responsible for products?

So, if you have the utility basically controlling a thermostat, or an appliance, or something

else in your building through the smart meter, it now becomes quite problematic. What happens if these devices fail? Or, what happens if, you know, some of these commands, for the lack of a better term right now, get stuck or something? You know, the communication stops and who are they going to call, you know, as the old saying goes, obviously, not the Ghost Busters, but the utility.

And the utility very quickly figured out that that would then involve a lot of possible service calls. You know, every time a thermostat is not working any more they would call the utility, potentially, things like that.

So, the idea of controlling household appliances, devices, and things like that in the home behind the meter, and through the meter was fairly quickly modified. There are still possibilities for this. Of course, meter reading is still being done.

Anything up to this very physical demarcation point of the smart meter control of that is still being done through this AMI network. For instance, connect, disconnect, again the energy readings, things like that, all of this is still being done as planned through the AMI network. So, I believe that the rollout of the smart meters was a really good success for this and for

the stability of all of this.

But the ideas of advancing this into the building I think are only here and there to be seen these days. I'm not sure if anybody's still doing that.

MS. WARSHAW: Okay, thanks.

MR. TAYLOR: Thanks for the question. That's a very important clarification. We get really deep into the details here and sometimes we forget that it cannot sound like we think it sounds. So, I appreciate the question.

But just to be clear, this proposal is that for a new building, that in the areas of the code where there are devices that can allow the occupant or the owner of that building to respond to demand response signals from the utility, so this is where the utility says I will pay you to do something. The devices that exist speak a certain language, a common language that's open source. It's not proprietary. So, you can't have a certain company corner the market on that type of device.

Okay, I believe we have --

MR. BIENERT: I think there's some microphone problem. Do you want to just talk into this one here?

MR. TAYLOR: I believe we have one more question by Michael Jouaneh.

MR. JOUANEH: Yeah, hi, this is Michael Jouaneh, with Lutron Electronics. I actually have four questions. The first one is can an occupant-controlled smart thermostat still be used in place of solar readiness?

MR. TAYLOR: Michael, why don't we answer these one at a time, as you go?

MR. JOUANEH: Okay.

MR. TAYLOR: So, the first question --

MR. JOUANEH: Did you hear my first one?

MR. TAYLOR: Yeah, the OCST. So, our proposal is to modify JA-5 to change the term OCST, to bring that into alignment both with 90.1 and also with the term of an energy management control system. Because an OCST is simply a very limited energy management control system, generally in a residential setting.

So, we're simply trying to streamline the code there. The intent at this point is not to change the general requirement in JA-5, but simply to streamline the code so that it's more of a common requirement that uses the same terminology throughout.

MR. SHIRAKH: I think what Michael is asking is that there's a requirement for solar arrays to be 250 square feet. And there's a provision in the standards that if you install a smart thermostat, an OCST, you can

reduce that square footage from 250 to 150.

That's what you're asking, Michael, Correct?

MR. JOUANEH: Correct.

MR. TAYLOR: Correct. And we didn't change that requirement at 110.10 that references JA-5.

Thanks, Mazi.

What's your next question?

MR. JOUANEH: So, are OpenADR certified products required to comply with the new demand response provisions or will only VENs needed to be certified, OpenADR certified?

MR. BIENERT: For me that's kind of the same thing. So, the way I understand it and, of course, we're not in the implementation phase quite yet, where the actual implementation requirements are going to be defined. But the way I understand it is that there needs to be an OpenADR interface somewhere on premise or in that loop, which I'm assuming should be OpenADR certified.

MR. TAYLOR: Yeah, this does touch a little bit on the implementation phase, but I want to go back to the owner occupant enabling.

The code is written so that the owner or occupant of the space, once it's constructed, has the ability to take the actions they choose to take. So, in

this context I believe the VEN would need to be certified, but there's no specific requirement for hardware.

MR. BIENERT: Yeah, and I think maybe what is meant here is that I think if you have -- for instance, if Lutron for instance has a lighting control system, the way I see it and, again, we can discuss it in the future, but the way I see it is that control system does not necessarily have to be OpenADR certified if it is being served through an OpenADR gateway, for instance. There could be an OpenADR gateway that then provides, you know, or requests to the lighting control system.

In fact, Heidi and I had a discussion about that the other day, how do we ensure, though, that this OpenADR enabled gateway can actually talk to the lighting system. So, there needs to be some kind of a functional confirmation there.

MR. JOUANEH: Okay.

MR. TAYLOR: What the customer does with the information once they receive it is between them and their utility, or aggregator, or whoever is paying them to take the action. The energy code here --

MR. JOUANEH: I lost you. I lost your audio, Gabe.

MR. BIENERT: Yes, it's fading in and out.

MR. TAYLOR: The code simply requires that the building have the ability to obtain the information so that the customer can take the action.

MR. JOUANEH: Okay. So, the third question, so for demand responsive lighting in commercial buildings, will the new provisions require demand response events to happen from current lighting levels? So, today in the existing language, if lights are already dimmed down by more than 15 percent, then the lights don't need to do anything after receiving a demand response signal. Lighting should respond upon receiving a demand response signal.

MR. TAYLOR: Yeah, Michael, those specific requirements in the lighting section are being handled separately, under the lighting topic area. And so, Simon Lee is the subject matter expert in that. And I believe we already had the workshop on that. Were you able to attend that workshop?

MR. JOUANEH: Yes. And I think I made basically the same comment at that workshop.

MR. TAYLOR: Was that question not resolved?

MR. JOUANEH: They basically said bring it up at this workshop.

MR. TAYLOR: Oh, that's terrible. Okay. Because we're not -- we're not proposing any specific

changes to the lighting section here. We're simply collecting the language that they're proposing and putting it in one area.

MR. JOUANEH: Okay.

MR. TAYLOR: Okay, please submit that comment in writing and we will get you an answer.

MR. JOUANEH: Okay. And lastly --

MR. TAYLOR: Hold on a second, Heidi's coming up to the mic. I think Heidi's going to answer.

Heidi, please give your name and --

MS. HAUENSTEIN: Hi, this is Heidi Hauenstein, representing the Statewide Utility Codes and Standards Team.

So, Michael, we aren't recommending any changes to the actual dimming requirement. So, at least from the CASE proposal it remains the same, where the dimming is required for the maximum output level. And if you are already dimmed when the event comes through, then you don't have to dim further.

MR. JOUANEH: Okay. That's disappointing to me but you answered my question.

MR. TAYLOR: Well, please provide that comment in writing and we'll go back and we can discuss it with Simon.

MR. JOUANEH: Okay. Lastly, can BACnet be added

as an alternative to OpenADR, because many building systems, such as lighting systems, already speak BACnet to talk with the building's BMS system?

MR. BIENERT: Yes, but in a sense it's not necessarily an alternative to OpenADR because BACnet does not provide the link to the utility.

However, you're extremely welcome to continue using your already existing BACnet control networks, of course, whether this is BACnet, whether this is Echelon, or whatever building control systems you have in place. These can remain in place. There does not have to be any change to this.

As long as at some point virtually or physically, in your network the controller can receive an OpenADR signal. So, again, it could be like a gateway that is being added somewhere that then feeds into the BACnet control network in the building. Or, if your BACnet control system, let's call it like this, whether it's a computer or some integrated system can be upgraded to have internet access and an OpenADR interface that would do it. So, the BACnet can definitely stay in place.

MR. JOUANEH: But it can't be an alternative, instead of OpenADR. You would still need, somehow, a device or gateway that speaks OpenADR, and then that

device can then talk to BACnet, if it needs to, to control the lighting system for example.

MR. BIENERT: Correct, yes. BACnet is not really designed to talk, say, to the utility or the utility does not have any systems that could talk BACnet at this point. At least that I'm aware of.

MR. JOUANEH: Okay, thank you very much.

MR. TAYLOR: So, in a few minutes we'll have another opportunity for questions, if anybody has any lingering questions they didn't get to answer, yet.

I'm going to go back to my presentation now and continue on. I just have a few more things I wanted to get to.

To summarize the proposed changes, the dominant change that we're making right now is the cleanup change, both harmonizing with ASHRAE, clarifying the intent, and just cleaning up more than a decade of demand response language contained in code. We're trying to make it as understandable as possible, implementable as possible.

And then consolidating that DR language into one section and the new section 110, and then the OpenADR, which we've had quite a bit of discussion about.

Obviously, it's going to take a little while for everybody to get really comfortable with OpenADR. This

is a protocol that's been around for a long time. The reason that the Energy Commission funded the development of this protocol is because this is a very complex topic. Developing a language that enables the customer to do anything they want to do in this arena, in response to a utility or an aggregator signal is a very challenging language. And we've spent more than a decade developing it in collaboration with all the utilities, the ISO, with national and international standard-setting bodies, and manufacturers. This is a robust protocol that has been in development for a long, long time now.

It's not entirely simple because this is not a very simple problem. But we believe that this is sufficiently developed that it is ready to be implemented in code and we look forward to further discussions.

If you do have any detailed technical questions, please, please submit those in writing. Again, the deadline is July 28th.

And now, I will give you an overview of the schedule for the total rulemaking and then we'll have another opportunity for a few more questions before lunchtime.

So, the 2019 Title 24 Standard cycle started in

2016, with research and outreach on a number of parties, including the Energy Commission staff. Right now we're in 2017. This is the prerulemaking phase. This is before we get into the legally mandated schedule of a rulemaking.

In 2018, we'll enter -- actually, it will start late, late 2017, probably around November. We'll start the formal rulemaking process. The formal rulemaking process is mandated in the law to protect everybody outside of the government from laws that they're not aware of, basically. It seems kind of funny, but many, many years ago, a century ago or more, it would happen where an authority would make a law, and nobody knew about it, and then they would be held accountable for that. And it didn't seem particularly fair, so now we have a formal rulemaking process.

Essentially, there's a law that governs how we make law. That's the rulemaking process. It requires that we publish all of our proposals publicly, and then there's a rigorous 45-day period for anybody who's interested to comment on it. We're required by law to respond to those comments. And then, there's a whole process for approving the language.

And then, finally, once it's approved by all parties, and in this case it would be both the Energy

Commission and the Building Standards Commission, there is required by law a one-year waiting period.

So, this rulemaking, this 2019 rulemaking will be finished by the end of 2019 and it won't go into effect until January 1st, 2020.

Okay, so right now in the prerulemaking phase we started our draft code change proposals back in May. And now, we're in the workshop here in July. The comments from all stakeholders at the end of July and then we'll respond to those comments later, in October. And then, in November we'll have the start of that 45-day public review process that I mentioned.

In January of next year we'll end that review process and we'll handle any comments that we receive from the public. Again, we're required by law to respond to those comments. And then we'll issue any revisions that we have to the code.

If, in response to comments, or if we identify any errors in the code and we need to issue a revision, there's a 15-day public review process. Later in that code cycle it gets a little bit more rapid, a little faster. And this is the reason that we have this prerulemaking phase. Hopefully, we can resolve all of your questions, all of your concerns now so that when we enter that rulemaking phase we're just dotting I's and

crossing T's. Hopefully, we're not still worried about any significant issues. That's the goal.

And then in May of 2018, the Energy Commission, if all goes well, we'll adopt, formally adopt these proposals. And then, the Building Standards Commission will review them and adopt them by the end of 2018. And then there's that one-year waiting period where the code goes into effect, it's published, everybody's aware of it and everybody has a year to get ready to comply with it.

These are some of the same links that Payam provided earlier. These will be published on the website as part of this presentation. And here we have contact information for the key players in the demand response section of this Title 24 rulemaking process.

At this point, I'd like to ask if there's any further questions, it looks like we have about 20 minutes left before lunch?

If you do have any questions that you don't get to ask today, don't worry, you have until the end of the month to provide them in writing.

So, Peter Strait is actually on the phone right now and he'd like to make a comment. He's the Supervisor of the Standards Development Office.

MR. STRAIT: Hi. First of all I'd like to

apologize. I was intending to be on-site so we could discuss the DR topics that you had in a little bit more detail. But I'd ask if he could get back up on the mic and give a little bit more background on the other topics that he had interest in DR.

I know that this effort right now is primarily cleanup effort and I know that there were a few other topics that he wanted to discuss related to DR.

MR. BOZORGCHAMI: Peter, this Payam. Michael Jouaneh is also on the phone, so he's not here in person.

MR. STRAIT: Oh, okay. Can we unmute him?

MR. WICHERT: Yeah, Michael, you're unmuted.

MR. JOUANEH: Hey, thanks Peter. I think my questions were asked and they've been answered. I guess my big concern as far as demand response of lighting right now the existing language basically says, you know, reduce by -- have the capability to reduce lighting by 15 percent upon receipt of a demand response signal. And if your lighting is already reduced, you don't have to do anything with the lighting upon receipt of the demand response signal.

MR. STRAIT: Right.

MR. JOUANEH: That's not really demand response. If you really want to do demand response, something's

supposed to happen when you get a demand response signal. So, that's my big issue.

MR. STRAIT: Sure. Well, what we're looking again at that language in that particular area is the 15-percent reduction is ultimately going to be moved to be a test standard that they have to meet for the acceptance testing. To say, if my lighting's on 100 percent and I receive this signal, is the system at least able to issue an order that lowers it by that amount, and just to show that all the different pieces are talking to each other.

As was mentioned, our intent is to move to a general framework where what that response looks like in practice, how that building responds to that signal can be variable. But we know the building is capable of responding and that owner can then determine when I receive the signal, and in these circumstances what do I do with it.

I think that was mentioned kind of in the middle of the presentation, by the OpenADR representative. But that is our intent that the 15 percent not be a specific benchmark of this is what demand response means. But, instead, this is a criteria demonstration that the building's components can respond to a signal, and the specific response they engage in is up to the

conversation that's going to be had between that building owner or operator, the tenants of that space, and the utility that they're interacting with.

MR. JOUANEH: Okay. That sounds good to me. I guess somehow, how do we make that clear in the standard or maybe in the user's manual for the standard, or whatever, but that would be good.

MR. STRAIT: Yeah, we're still working. And that's the tricky part. I can tell you that that's our intent and that's the direction we're trying to go. Trying to embody that in language is pretty difficult. So, we're chewing on that question right now.

MR. JOUANEH: Okay. Thank you, Peter.

MR. STRAIT: Sure, thank you.

MR. TAYLOR: We have a comment here in the room. Please introduce yourself for the court reporter?

MR. HALL: Hi, I'm Phillip Hall, Director of Lighting Control Systems for Enlighted.

A couple of comments, today as was just stated, essentially in seven rooms, we have to prove that we're compliant. The problem that I have with the way manufacturers have been going about that is there are many different ways of saying that, yes, we're compliant. Some of which involve a zero to 10 signal, which will go out to those seven rooms.

So, really, it is not compliant, as far as I'm concerned, because should you actually want to use ADR the building's not wired for that. The building is not designed at that point to take a systemwide signal to drop 15 percent. Should the owner actually ever want to implement that, well, they're basically going to have to start opening and ripping up walls because it's not a network system.

I would like to see this as a mandatory 15 percent drop based on wherever the system is currently at, and the test should be done systemwide.

The other problem that exists today is how the testing is actually being done. Because an ADR signal is not required for the testing, you just have to prove that there's a way to do it, again you basically have systems that will never work should you want to be able to do that.

I think what we're talking about in not changing the code is, again, we're going to end up with systems that are not ADR 2.0 compliant. They're system that, you know, they're just not going to function unless you start using the word "mandatory".

Being able to be BACnet compliant is fine as long as there is a BACnet system within the building that is ADR compliant. And I think that's a big point

because a lot of the smaller buildings are not going to have building management systems. So, thank you.

MR. TAYLOR: Will you be providing those comments in writing? Thank you.

Heidi?

MS. HAUENSTEIN: Heidi Hauenstein with the Statewide Utility Codes and Standards Team. So, Michael, I wanted to go back to your question about kind of the required dimming. And so, Title 24 can require that you have a DR control system, but it can't require that anyone actually sign up for a DR program.

So, I think part of this effort is to make sure that everyone in this room, and everyone who complies with Title 24, gets a better understanding that when you comply with Title 24 your building is capable of communicating through OpenADR, but that doesn't replace the need to actually enroll in a DR program.

And part of enrolling in a DR program, you'll work with your utility or the DR aggregators and make sure that the link between whoever's sending the DR signal and the component within the control system that actually implements the control strategy is functioning from end to end.

And the other thing that the occupant will work on with the utility is customizing their control

strategy.

So, the acceptance test does say that, you know, it only tests dimming to 15 percent below. But in reality, when that building goes and signs for a DR program that control strategy is going to be customized when that user is enrolled in a utility program.

MR. TAYLOR: Claire, I see your hand raised again. Do you have another question?

MS. WARSHAW: I do. And it's a pretty different one, but I'm sure that some of you have thought of it a little bit. We've increased a lot of wireless frequency over the last decade. And at SMUD, I listened to some board meetings where customers are coming in, complaining about possible health issues, and you're about to address healthcare facilities. And I think that there is some concern, I don't know, maybe it's some of the people I've listened to, because I've kind of focused on this the last few years, that are concerned about radio frequency affecting human health.

Does the code, the Building Efficiency Department updates ever considering looking at how these connections are considered safe? For instance, even using OpenADR, itself, which is a whole new concept to me today, but I've enjoyed learning about it, you are sending a signal from someplace, again to someone's

internet or something similar, a building something. And so, that's a big connection that happens. And there's a lot of that going on. And the more that these things happen where you have thermostats that are receiving connections, it seems to me that it ought to be considered somewhere in our codes to address to make sure we aren't going to put human health at any risk. Especially with, for instance, a thermostat that's close to bedrooms receiving a signal from some place.

MR. TAYLOR: Yeah, the code certainly takes into account health and safety issues. In this case -- specifically, so there's a couple different questions you mentioned there. OpenADR is just a language. It's not introducing any new signals or any new wiring, or anything like that. It simple says that there needs to be the ability to understand the specific language.

It's sort of like, and Rolf will correct me if I'm wrong here, like your computer can understand HTML, which is a language that your computer speaks. And so, when you go on the internet other webpages are written in a computer language, and you can actually flag your computer so you can see the HTML. It looks like computer code. It's pretty confusing.

But your computer speaks HTML, and the other computer at the other end of the line speaks HTML so

they can talk to each other.

What this is simply stating is that we need to have a device in the home that is capable of understanding this language. So that if the utility has a program where they're willing to pay you to take an action, and you want to take advantage of that program you can go to your utility and sign up to that program, and you already have the ability to understand the language. Your house already has the ability to understand the language. It's not introducing anything new that -- and you're not required to take advantage, to sign up for that program. That's entirely up to you, as Heidi mentioned earlier.

The goal here is owner/operator-centric. We're just making sure that the built environment has the tools in place so that if the owner or operator of the building wants to do something, they can do so at minimal cost.

MS. WARSHAW: Okay, I think I understand that already.

MR. TAYLOR: Okay.

MS. WARSHAW: I'm still wondering about the idea of whether your code has already considered human health, as far as these connections are concerned? Because even what you just spoke to me about, a message

is sent to a computer wirelessly; correct?

MR. TAYLOR: It depends on what you have installed. Do you have a Wi-Fi, a router in your house? Do you use a cell phone?

MS. WARSHAW: I'm not even talking about me, alone.

MR. TAYLOR: Okay.

MS. WARSHAW: I'm talking about your making code for new buildings, new residences. They are going to put in something, potentially, and agree to it, potentially, to have demand response messages sent to some device in their home; right?

MR. TAYLOR: The OpenADR system will use any existing wireless or wired connection. In my home, I have a wired connection for most of the computers because I think it's a little more reliable. So, it's whether you have --

MS. WARSHAW: Okay, but then from there the movement has been towards wireless. And the talk was somewhat of individual devices that were being managed by internet, right?

MR. TAYLOR: But those are devices that are purchased by the owner or occupant. So, in your home, if you buy a thermostat that has wireless, then that's up to you.

MS. WARSHAW: True. But is there -- and all I'm asking is has there been any consideration of wireless connections considered for human health reasons? Has that been brought up into these codes in any way?

MR. TAYLOR: Absolutely, there are.

MR. STRAIT: This is Peter Strait.

MR. TAYLOR: Go ahead, Peter.

MR. STRAIT: If I can just jump in really quick? As the Supervisor of the overall effort for the Title 24, the 2019 revision, part of what our standards are doing is we're not restricting the ability of the builders and owners to make those decisions for themselves.

MS. WARSHAW: True.

MR. STRAIT: So, if somebody were to decide they do not want wireless devices in their house, or they want to disable the wireless protocol or communication that's taking place, they're able to do so.

Someone that says I don't believe that these are of a significant risk to me, I'd like to have all this wireless communication, they're able to do so.

So, we're leaving that choice up to the people that are affected by that choice.

MS. WARSHAW: Okay. And so, is it something more that the FCC would consider, when it comes to human

health issues and devices that are wireless?

MR. STRAIT: Yes, the FCC would have the authority to regulate emissions.

MS. WARSHAW: Yeah, they are all seeming to roll that direction. And even recently I had an AT&T person in my home, discussing my modem, saying that they were going to -- they're going towards wireless. And she was discouraging me from using my wired system.

So, it doesn't -- I mean, it kind of seems like we're going to have a choice. But in the case of like records going to CDs, going to iTunes, you know, those kinds of things are things that even the general public kind of accepts and kind of thinks, oh, this is great, this is great, this is great. And sometimes there's little things lost and things that aren't even considered, really, or talked about much. And so that's why I asked these questions.

MR. TAYLOR: Sure.

MR. STRAIT: Sure, sure. And from our perspective it's just a matter of we don't want to put a law in place that says that someone that wants that can't have it. So, that's kind of the perspective that we have.

MS. WARSHAW: Right.

MR. TAYLOR: And also, our code is governed by

the California Environmental Quality Act, which looks at all sorts of environmental and human health issues, as well. So, there is a look at these things.

I think if you go back and look at the analysis of a number of those wireless communications impacting human health, and whatnot, I think there's been determinations made on that. And this code cycle doesn't dig into those in any detail.

MS. WARSHAW: Yeah, a lot of the regulations that they've used, some of those are very old, and we've increased electromagnetic frequency so much over the last decade I don't see how we shouldn't keep looking at that. But I'll stop talking. I think you got my gist. I think you know a little bit why I asked. A thermostat, especially, I think of that. My thermostat, I have a little EMS meter, and it's a wired in thermostat, and I can record like a mechanical frequency off of it.

MR. TAYLOR: Sure.

MS. WARSHAW: It's not something nice to put your head next to. A digital clock records a frequency. It's not a radio frequency, but it's another kind of frequency. So, once you start introducing more, you know, different things, these are things to consider.

Some of these are in buildings, you know, where

these things are and where the people are.

MR. TAYLOR: Yeah, absolutely. Anywhere you have electricity you're going to have the electromagnetic frequency. That's physics.

Well, thanks for your comment. If you'd like any more comment on that, please submit it in writing and we'd be happy to look at it.

MS. WARSHAW: Okay, thank you. Thank you for addressing it.

MR. TAYLOR: You're welcome.

There's a question on the chat room, real quick I think I can address it. The question is, "What's the purpose of developing mandatory requirements if the owner or occupant can disable those mandatory requirements?"

And I think that's a very important point. It's kind of a core concept in a lot of these standards here. These standards are owner/operator-centric. We are putting restrictions on the way that a building is built so that an owner or operator of that building has the ability to do something that they want to do.

We're not requiring anybody who lives in a building to do something, but we are requiring the builder of that building to -- and this is just a general, not related to demand response, but let's say

to put insulation in the walls. Because we've proven that that insulation is cost effective. So, an occupant of that building, it would cost a lot of money to go into a building and add insulation to the walls. But when that building is first built, it's cost effective to put the insulation in, in the first place.

So, in this context, as far as disabling things, we are giving the owner or operator the ability to do something if they choose to. That's the requirement. We're not requiring the owner or operator of the building to do something at this stage.

Okay, I think we are done for the moment, five minutes early. Again, this is a stop in a long journey, so we have a lot more work to do.

Please submit your comments in writing on demand response by July 28th.

And I guess everybody can go to lunch. And then, we'll be back here at one o'clock, sharp, to start discussing licensed healthcare facilities.

(Off the record at 11:55 a.m.)

(On the record at 1:02 p.m.)

MR. BOZORGCHAMI: All right, good afternoon. My name is Payam Bozorgchami. I'm the Project Manager for the 2019 Building Energy Efficiency Standards.

I'm going to start, just because I want to get

you guys out of here before traffic gets going and the heat comes in.

So, some of you that were here earlier this morning you may have heard this, and I'm sorry I'm going to bore you, but I'm going to have to do it.

The first thing, first, restrooms are out the double doors to your left. Our snack bar's on the second floor, if you guys need to grab something to eat or so.

In case of an emergency, please don't take off and go home. We'll reconvene across the street, at the Roosevelt Park. And we need to grab a head count and make sure everyone's out. And if not, we're going to have to send our student assistant back to get you.

So, today's presentations, if you were here this morning Gabe Taylor, one of our subject matter engineers, here at the Commission, discussed our proposal for the cleanup on demand response.

This afternoon we're going to be talking about healthcare and what the roll of healthcare is within Title 24, Part 6.

But with that, let me give you guys a quick history of why we're here, how did the Energy Commission start. The Energy Commission started in the 1970s, early '70s, by two Legislators, Warren and Alquist, and

that's how the Warren-Alquist Act comes about. They're the two Legislators that proposed to the Governor, at the time Ronald Reagan, to develop the Energy Commission to deal with the energy crisis and environmental impacts that's going to be happening in California.

In 1975, when Jerry Brown came into office, he funded and we started the Energy Commission.

A couple of the key roles that the -- excuse me, before I say that. Some of the other action plans that were set upon us by the Governor, years after years, is one main issue is we have to get to this so-called ZNE, zero net energy. For a residential building it has to be 2020, which is we've got one code cycle left. This is it, 2019. And for commercial, nonresidential buildings is 2030. And there's also other environmental and energy policies that we have to also abide by.

The Energy Commission has other responsibilities than just energy efficiency. We look at research and development, coming out with better energy-efficient measures. We look at alternative fuels, alternative type of transportation. We look at permitting of power plants, anything greater than 50 megawatts, and other areas.

How do we do this? Our current policy is to try to reduce power plants, actually try to reduce our power

plants, our transmission, make sure that there's a viable way of getting power to homes, so we don't have to go through those blackouts we did in the early 2000s.

So, how do we develop the energy codes? The energy codes are developed every three years. Every three years, with the assistance of our utility partners we develop these codes, we present them at rulemakings like this. And the utilities also have pre-stakeholder meetings, where they bring in topics that they're going to fund, that they're going to be proposing to the Energy Commission. And we have pretty much a powwow where we discuss measures and proposals, and see how it's cost effective, and where it's not, and have a big dialogue.

The utility partners that helped out for this code cycle was Pacific Gas & Electric, Southern California Edison, San Diego Gas, SoCalGas -- excuse me, San Diego Gas & Electric, Sacramento Municipal Utility District, Los Angeles Department of Water and Power, Southern California Public Power Authority.

But in reality a lot of this could not happen without the help of two key people; one being Heidi Hauenstein from Energy Solution and the other being Kelly Cunningham from PG&E, who helped facilitate the communications between the Energy Commission, and the

utility staff, and the consultants that work for the utilities.

When we develop the codes every three years, we have to go through a vigorous lifecycle cost analysis based on a certain time-dependent value. The time-dependent value is the cost of power, utility. As it fluctuates during the day. It's a little bit pricier in the mid-afternoon, than it is in the early morning. And all that's captured in our lifecycle cost.

So, everything that we proposed has to have some sort of savings, both energy and cost.

For the 2019 standards, right now we're in the prerulemaking. In the past few months we've been presenting all these measures at the utility level, and now it's the first time it's coming here at the Energy Commission.

The measure that you guys are all here for this afternoon, the healthcare facility, and the role that's going to be going into Title 24, Part 6. I think Gabe Taylor's been doing a lot of presentations, a lot of workshops and meetings with your folks, at your level, and at your facilities. But now, I think it's coming here at the Energy Commission as a prerulemaking, prior to going to the formal rulemaking. And the formal rulemaking will most likely start mid-September to early

October, where we will present the final measures that we're thinking of for the codes.

Then, we go into this 45-day language where we do more of these types of meetings, try to clean up anything that we missed. And then, we go into approval by the Commissioners, and adoption in March of 2018.

It seems like a lot of time is there, but there's really not that much time. It's all-hands-on-deck here, at the Energy Commission, to get these measures going forward.

Here's some of the earlier prerulemaking scheduled workshops we've had here and some of the topics. After this one, we have three more. We'll have the residential HVAC measures coming up next Tuesday. Then August 22nd, we're going to be discussing solar power and storage and incorporate it into the whole energy design rating.

The energy design rating is mainly for residential type buildings at this time.

And August 30th, we'll have another workshop here at the Commission, where we will be discussing the proposals for the 2019 CalGreen. That's Part 11 of Title 24.

Currently, there's three main websites where we've been keeping all the information at. The first

one is the title24stakeholders.com. That's where all the measures, all the CASE Reports is what we call them, that were held, that the utilities funded and have been supported. The Building Energy Efficiency Program website, that's where the -- actually, where the measures that we've been funding ourselves, here at the Energy Commission, like the healthcare facility CASE Report, and the presentations.

The last website is key for all you folks. That's where we would like you to submit your comments to, for today's meeting. We're hoping that we get comments in the next two weeks. Hopefully, we get most of these comments by July 28th.

And we will be reviewing, evaluating and starting a communication with you folks to make sure we get the right message into Title 24, Part 6.

This presentation that I'm doing right now and the one Gabe will be doing shortly will all be posted on our website, hopefully tomorrow, if not by Monday. But we'll that to you guys as soon as we can.

Some key contact information. Maxi Shirakh, who in the past was the project manager for the Building Standards, has now become the Technical Lead Advisor on zero net energy and energy design rating, and he's also my advisor on the 2019 development of the Building

Codes.

There's my contact information. Larry Froess, he's our Senior Mechanical Engineer, responsible for all of our computer modeling programs. Peter Strait is our Supervisor for the Building Standards Development Team, so he's our staff supervisor.

Christopher Meyer, I'll get to him shortly. But Todd Ferris is our other Supervisor, who deals with the staff with the software development program.

And if you don't like any of us, Christopher Meyer is our Office Manager that you can complain to, and he's sitting there.

Any questions? If not, I'm going to hand the mic to Gabe and, hopefully, we'll start here soon.

MR. TAYLOR: Good afternoon. My name's Gabriel Taylor. As Payam mentioned, I'm a subject matter expert in the Building Standards Development Office. I'm an Engineer, Mechanical and Material Science by training, with a focus in energy policy and energy systems.

And I'm really excited to be asked to project manage the California Energy Commission's effort to extend the Title 24 Energy Efficiency Standards to healthcare facilities.

A lot of my family are doctors. I have grandparents, great-grandparents who are doctors and

nurses, and physical therapist. And having spending a lot of time in the healthcare industry, in hospitals when I was a kid, following my dad around or my grandparents around. So, I have some familiarity with the passion that is associated with the operations of these facilities. I know that the people who work and operate these facilities believe very strongly in what they do, obviously.

I want to assure you that we believe strongly in what we do and we're here to help you. We're not here to force you to do anything that you otherwise wouldn't want to do.

So, the job that we have now is to figure out what we should do and to make sure that the code that we write does exactly that.

So, I do want to acknowledge Christopher Meyer, who is the Manager of the Building Standards Office, and Peter Strait who is the Supervisor of the Building Standards Development Unit. Christopher's here, Peter's on the phone, I believe.

Also, this proposal is a little different from most of the other proposals in this code cycle. This is the only proposal that is solely coming from the Energy Commission. Most of the other proposals were initiated by an outside party, who did a bunch of analysis and

they brought a proposal to the Commission to be part of our public process.

This proposal was initiated by the Energy Commission and it was developed by Energy Commission staff. In particular, I want to identify Mark Alatorre, who is our Heating, Ventilation and Air Conditioning Expert. Danny Tam, who's our Water Heating, Solar, and Process Energy Expert. Simon Lee, our Lighting and Electrical Power Distribution Systems Expert. Thao Chau, who's also our Lighting Expert. And Michael Shewmaker, who is our Envelope and Fenestration Expert.

All of these staff helped prepare analysis, and review the code, and worked with outside parties to develop this proposal that I'm going to present today.

In addition, I absolutely want to acknowledge the Office of Statewide Health Planning and Development. OSHPD is clearly the lead State agency for regulating and licensing healthcare facilities and their advice, while we developed this proposal, was invaluable.

We are very clearly not trying to step on their toes. OSHPD is the lead agency here. The Energy Commission, however, has authority delegated by the Legislature, and clearing state in the Warren-Alquist Act to propose and implement energy efficiency measures. So, we're here to provide that support to OSHPD, as the

lead energy agency for the State of California and as the expert in the area of energy efficiency.

The OSPHD Hospital Building Safety Board staff and Management have been very supportive and helpful. They've provided a lot of comments and a lot of advice on where to change the initial proposal. We've gone through a number of iterations here.

The Hospital Building Safety Board Energy Management and Conservation Committee, and also the Administrative Process, Code Changes, and Standard Details Committee, we presented an early draft of this proposal to both of those Committees, and accepted comments from them before we published this proposal as you see it today.

And just to be clear, the current version of the proposal is the one that's dated June 29th.

So, today I'm going to go through three general topics. First, I'd like to give some background on the legal requirements that led us to this proposal. This is gone into a lot more detail in the paper that I mentioned, but I'd like to talk through it a little bit because it can be a little confusing. Particularly, the timeline there because there were some confusions on a number of parties that led us to this position we're in today.

Then, I'll go through the proposed changes. So, the proposed changes can be broken down into two separate sections, the changes to code and the exceptions that we're proposing to the existing code.

And then, finally, I'll outline the schedule so that you have, hopefully, a very clear understanding of where we are in the schedule, where your opportunities are to participate, and when key dates will happen, when key changes will happen.

So first, the legal requirements. So, the original Warren-Alquist Act was adopted in the mid-1970s by the Legislature, in response to the energy crises. And as Payam mentioned, this was legislation that was developed under a Republican Governor, Ronald Reagan, and then was implemented under a Democratic Governor, Jerry Brown.

And this legislation created the Energy Commission. And in that legislation it defines nonresidential buildings as buildings that meet these specifications here. So, this is occupancy groups.

What this means is that any building which is heated or cooled, and is one of these three occupancies -- or, not one of these three occupancies, is considered a nonresidential building.

Occupancy H, in the 1973 Uniform Building Code,

referenced here, are hotels, apartments, convents and monasteries.

I are dwellings and lodging houses, which is essentially residential.

And J are garages, sheds, fences, basically unconditioned spaces.

In effect, what this original definition of nonresidential buildings means is that a nonresidential building is anything except a residential building. That's important because that means that in the original code hospitals are considered nonresidential buildings.

It was interesting and it's not recorded why, but the Energy Commission, in 1974, implemented our first set of building standards, and appliance standards through 1978 and 1980. In each of these code cycles, we correctly represented hospitals as being part of the scope, part of the standards.

We didn't implement specific requirements on them, but they were part of scope, subject to the code.

In 1982, there was a change and we do not have clear records of why this change was made, and there's a number of different theories. But suffice it to say that the hospital facilities was excluded from scope in 1982. And since that time it's just that error has been carried forward.

Over the recent couple of years the Energy Commission legal office and the OSHPD legal office have consulted and determined that this was, indeed, an error and that there remains an opportunity here for a standard.

I want to emphasize, though, that this is an opportunity, not some sort of an unfortunate requirement or anything like that. The Energy Commission is the State expert on energy efficiency. Now, OSHPD is clearly the State expert on hospital buildings, and health and safety, and everything associated with that.

The Energy Commission is here, as a sister agency, to help OSHPD implement standards that make sense for this community. We are here as a subject matter expert to provide our advice and to, hopefully, support the code that will lead to the most effective and cost effective hospitals that can be.

And that naturally leads me into the basis of the code, itself. This is written into the Warren-Alquist Act, itself. That's the code that created the Energy Commission.

The Building Standards, the Energy Efficiency Building Standards are required to be cost effective. That is part of the law and that's one of the most fundamental. It's the first analysis we do in any

proposal for new building standards. Is it cost effective? Does it save more cost than it costs to implement?

Frequently, this is important because many energy-efficiency measures are much less expensive to implement at the initial construction of the building.

An obvious example would be if you put insulation into the walls of a building, it's much cheaper to put it in there when you first build that building than it is to try to add it after the building is completed.

I lived in a house for many years here, in East Sacramento that was built in 1947, and it had no insulation in the walls, absolutely no insulation in the walls. And when I did a major remodel, I actually proved it. I pulled the walls apart and there was sheetrock, and air, 2-by-4s with air in between, and tar paper, and external siding. There was no insulation in there.

That's because in 1947 there was no requirement for the builder to put insulation in the house and natural gas was relatively cheap. So, the builder didn't spend the money to put the insulation in there. And for the next 60 plus years the inhabitants of that house were burning gas in that house to heat the house,

and it was just going out through the walls.

So, these measures, the Energy Commission has done the analysis and have determined that a certain level of insulation is cost effective in those walls, and so we put that into code to require that the builder put that in there, because we know that the owner or occupant of the house will benefit.

They have to be technically feasible. This should be obvious, but it's amazing that you get a lot of proposals that aren't actually technically feasible. So, we have to prove it's technically feasible. The standards do not implement speculative, or theoretical, or test type of technologies. They have to be proven, and tried and true in the industry, and you have to have many different manufacturers providing the technology before they can be implemented into the code.

This is important. I've hinted at this a number of times here, but it's something I'll probably come back to a number of times or I definitely will come back to a number of times through my presentation.

The code, the Energy Code is owner/operator-centric. In the same way, or a similar way to the Health and Safety Code, and many other types of code focus on the occupant of a space and make sure that the space does not harm them. The Energy Code focuses on

the owner or operator of the building to ensure that they have the services and they have the features that are cost effective and that are beneficial to them.

So, this is generally a requirement that's put on the builder of that space.

And also, our code is designed to be flexible. This was added many years ago, where there are a number of strict requirements, but there are a whole host of measures that can be traded off for other measures. And the Energy Commission has worked with outside parties to develop software that helps to do the analysis necessary to determine what exactly can be traded off. So, there's a significant amount of flexibility within the code.

So, this is the basis and design of the Title 24, Part 6 Energy Efficiency Code, itself.

Now, I'd like to move on to the basis of the proposal for licensed healthcare facilities. We started our discussions with the Office of Statewide Health Planning and Development. We wanted to coordinate with them closely and make sure that they were aware of everything we did. And our proposal, our goal, ultimately, is to seek their endorsement. And we're still working on that, but we anticipate getting that before we're done with this process.

So, this is absolutely something that is coordinated with OSHPD and will be done with them as closely as possible. We're they're sister agency and we're here to help.

The remainder of the proposal is based on the Facilities Guideline Institute guidelines for licensed healthcare facilities, for hospitals, that specify that compliance with ASHRAE 90.1 is a target for licensed healthcare facilities.

The Energy Code, itself, is modeled off of 90.1 in many ways. And generally speaking, we take 90.1 and we make it specific to California and sometimes a little more strict in cases where it is cost effective to do so.

I think one excellent example of how we do this is in the case of climate zones. ASHRAE 90.1 specifies 7 climate zones in the continental U.S., five of those in California. So, this means that San Diego, Bakersfield, San Francisco, Redding are all in the same climate zone.

Title 24, Part 6 separates California into 16 different climate zones. This is especially important in the coastal zone where moving just a few miles inland can drastically change your local climate.

Why is this important? It goes back to the cost

effectiveness of the code. If the climate is different, then the level of insulation, the level of various different energy efficiency measures, your HVAC design could change. If the ambient humidity is different, then the HVAC design might change. All of these factor into the cost effectiveness of the requirements that we propose.

So, it's critical that the standards that are available outside of California be made specific to California so that we can ensure that there is not a requirement that is not cost effective. Or, to put it another way, we can ensure the requirements that we propose are cost effective.

So, that's the background. That's the legal background to the code. Now, I'd like to go into a little more detail about what exactly we're proposing.

The proposals are all based off of the 2016 code. This is the 2019 code cycle, so we've taken the 2016 code and we've marked it up, and said here's how we'd like to change it.

There are six different sections that we're proposing to change. Here are the six sections, scope, definitions, systems and equipment, design and installation, lighting and electrical, performance and prescriptive, additions and alterations.

These are not the actual titles of those code sections. I've summarized them here to make it easy to discuss and understand.

In each of these sections we're proposing exceptions. In my presentation here, the exceptions are highlighted in green so you can easily identify where we're proposing to create exceptions to the code.

In our initial discussions with OSHPD, there was a lot of concern about creating a shock in the industry. you know, if we all of a sudden impose an enormous amount of new requirements it's going to be very -- it could be a bit of a shock to the industry.

So, we wanted to take an iterative approach. We wanted to take kind of a baby steps approach. In this first iteration we are not proposing any new requirements on healthcare facilities. We simply looked at the existing code. We carefully went through and we determined places where there was a question about whether or not they would be cost effective, or whether or not a section of code could have an impact on health and safety.

In those sections where we identified a potential for lack of cost effectiveness or a potential impact on health and safety, we simply created an exception.

So, what remains are sections of code that we believe, and that we've vetted through a number of staff at OSHPD, and others, and received at least a level of comfort to discuss this with a larger audience.

We believe these sections are both cost effective and will not have any significant impact on health and safety.

So, I'm going to go through each of these six sections in a little bit more detail. And all of these are discussed in much more detail in the hardcopy proposal.

So, first, the scope and definition. This is really the key major change we made to the code. In Section 100 there is a section that excludes occupancy group I from the scope of the Title 24, Part 6 Code.

We, based on the legal analysis that I mentioned earlier, are changing that to include occupancy group I, with a specific exception for I-1, I-3 and I-4.

So, that's occupancy group I-2 is now in the scope of the standards and is subject to all the subsequent sections of the Energy Code.

We're also adding a definition for healthcare facility. And this is referring back to the OSHPD Code. So, "Any healthcare facility is a building or portion thereof that is licensed pursuant to the California

Health and Safety Code Division 2, Chapter 1, Section 1204 or Chapter 2, Section 1250."

So, this is kind of the core change we made to the code. Everything else flows from here.

We're also making a minor revision to our code. We had, previously, a definition for a medical and clinic building, which was sort of convoluted definition that was intentionally trying to skirt the occupancy group I definition. It's obsolete, now, that we have defined healthcare facility, so we're deleting that definition.

Systems and equipment. These are large systems. These are large package chillers. These are boilers, large HVAC systems. This section of the code governs the efficiency of these systems. Generally, it places guidance or restrictions on the manufacturer of these systems. It's very likely that facilities currently built in the State of California already comply with this section of code, since it's considered normal practice.

It's broken down into a number of different sections and we're specifically proposing some exceptions to the water heating section.

Water heating temperature controls, in our code we're proposing an exception that would simply reference

the Plumbing Code for healthcare facilities, which is already current practice, as far as we understand, in industry. So, hopefully, the minimum energy efficiency, the tank and recirculation system, and insulation requirements for water heating systems to have isolation valves to allow for cost effective maintenance, and a prohibition on pilot lights. These all should be efficiency standards that exist in the code that the industry is already complying with.

This was a topic that we had a number of discussions with. And at the end of the day, after extensive discussions, we're proposing an exception for healthcare facilities. The Energy Efficiency Code requires a small portion of a rooftop be set aside for potential future solar.

It provides a number of exceptions. It only applies to buildings that are three stories or less. It's only 15 percent of the roof. It's a fairly small portion of the roof. It allows for that solar-ready area to be on an adjacent parking structure. And it provides exceptions for heliports, or vehicular traffic of sorts.

So, there are a number of existing exceptions in the code. And I believe that the existing language in the code is sufficient to provide the flexibility that

healthcare facilities need. But after extensive discussions with stakeholders, we believe that an exception to the whole section is necessary, so healthcare facilities will not need to consider solar-ready requirements.

It is something to consider, if you are in the development industry. To consider, if you have a parking structure adding, or at least making solar-ready the top of that parking structure or potentially adding the space, or considering the potential future need of the owner of that facility for photovoltaic. Since the cost of photovoltaic is dropping rapidly, the value of photovoltaic in a potential future micro grid at that facility, to support islanding and local reliability could be very significant.

So, it's something to consider. But we're, at this time, not putting that requirement on the industry.

The design and installation section governs a whole host of systems within the building and how those are designed and installed. Anything where you have ventilation, or space conditioning, if you have water heating, fluid transfer, or refrigeration, the roof and wall insulation, and project commissioning all falls under this section, Section 120 of the Code.

It turns out that effectiveness of many of these

systems is heavily dependent on the way the systems are designed and the installation done in the first place.

So, if you have, for example, wall insulation you can have a specified product from a manufacturer, and a design, and a blueprint, and everything. But if, at the end of the day, the worker who is installing that insulation in the wall does it even slightly incorrectly, it can significantly harm the effectiveness of that system. So, this section covers those systems.

We're proposing a bunch of exceptions in this section, especially for ventilation, HVAC systems, and a number of other systems, which I'll go into detail here.

So first HVAC. Zone control, heat pump use and fan and pump efficiency. These are obvious efficiency opportunities. The Energy Commission reviews the efficiency of all of these systems regularly and we propose what we believe to be cost effective working with many different standard-setting bodies.

So, we are here to offer our expertise on this topic to say, here, look, this is the most efficient, cost-effective level of system for the demand that you need.

This doesn't specify anything regarding what you need. You specify what you need in terms of ventilation rates or anything like that, and then we say, okay,

here's the most efficient level of device that's available and the design of that system.

We're providing some exceptions to demand shedding, to demand response for HVAC systems. For obvious reasons, in healthcare facilities you don't want to have any demand shed, necessarily have any demand shed.

For shutoffs and resets if you have, for example, a patient care space where you have a shutoff or a reset in the event of non-occupancy, if you have a patient who's not mobile there could be a problem where a sensor doesn't notice that, so we're providing an exception there.

And the 5-degree dead band, this is a plus or minus 2.5 degree. It's to prevent cycling of HVAC systems. But we know that in a healthcare facility it requires, frequently, tighter bands of control. So, we're leaving that up to you.

The pipe insulation section is it's well established, the cost effective level of insulation on piping and process equipment. So, we're leaving that untouched.

This also includes fire resistance of pipe insulation and protection of that pipe insulation when it's in an exposed situation so it doesn't get damaged

by working around it.

For parking garages, and this is part of the covered processes section which covers a number of different systems. Parking garage ventilation, for example, boilers, escalators, elevators. We're proposing some exceptions for compressed air systems. We do believe there are a number of specifications in our compressed air systems recommendations, which are valuable, but we're proposing an exception for med gas and healthcare systems to give additional flexibility. But we hope that the developers will look at the requirements we have there and consider if any of them apply to your facility.

Elevators we have, again, occupancy sensors to control both lighting and ventilation. And we're proposing an exception there for ventilation because we know that ventilation rates are critical in the healthcare environment.

Now, I love this picture right here. This right here, you can see "get well soon" written on this I beam here. This was a hospital construction zone that was right next to a children's ward, and there were all these kids in the windows and stuff. And so the workmen climbed up there and they would wave to the kids. And one day they wrote "get well soon" because they had

received -- they knew there were some kids there that were in pretty critical situation. So, a number of families commented that it meant a lot to them.

Insulation, I think, is one of the most obvious sections of the code that apply to hospitals. The design of insulation, both roof and walls, and the durability of that insulation, the installation of that insulation, all of this is the result of decades and decades of robust research and science.

And we, at the Energy Commission, are experts on this and we have been doing a lot of research on this, and we believe we can provide recommendations to the industry here. This not only benefits the thermal environment and provides a more stable thermal environment but it also improves the acoustics of the space. And it's just critical that, based on the climate zones that I mentioned earlier, that you get that right level of insulation in a space to achieve a cost effective built environment.

The lighting and electrical section, there's less topic headers in this section, but a lot of content here.

We're proposing exceptions to three different sections here. The controls, in particular sign controls and power distribution systems. Specifically,

indoor controls. This is a really interesting section of the code. There's been a lot of development in controls for indoor lighting.

This goes back to something I mentioned earlier in the kind of design guide principles of the code. The goal is to give the owner or occupant of a space the tools that they need to do what they want. To operate their space in a cost effective and optimal manner.

So, these controls here don't require the owner or occupant to do anything, they simply require that the building have these controls so that the owner or operator can do these things.

In particular, area controls, which is just an on/off switch. Believe it or not, just a few decades ago there were buildings that were built without on/off switches. The only way to turn the lights off was at the circuit breaker. And there were many, many buildings that were built and the lights pretty much stayed on 24/7. It was just cheaper that way to build the building. It's a lot of wiring, and a lot of switches, and hardware, and stuff to turn the lights off and they didn't think it was worthwhile.

So, our code requires that you have an on/off switch in each space. And this is not just energy savings. If you are in a space and you went to turn the

lights off, for other than energy savings, you know, just because you want to sleep or something like that, which is particularly appropriate potentially in a hospital, necessary.

Multi-level, this is something that is becoming more and more available. As we move away from fluorescent technology and towards LED technology, which is a significant energy savings, it also gives us the ability to dim. Multi-level lights under fluorescent technology usually meant a two stage, and you have to have a high and a low, or something like that. Or, something like this.

But with the LED lighting now we can dim. So, providing the functional devices in the space to allow you to dim the lights is a requirement in the code.

Automatic shutoff, simply if nobody's there, the lights should turn off. There are exceptions in the code, as I mentioned earlier, for patient spaces. But in a lot of areas in the hospital, if nobody's there, the lights should turn off.

And then automatic daylighting. This is exciting new technology because we have new architectural designs for many spaces, including hospitals that include a lot of daylighting. A lot of windows and a lot of appropriately designed windows that

have low E, so they don't let in the heat, but they let in the light. And here we have a sensor that senses the amount of light in a space and it simply dims the lights. Hopefully, if it's designed right, it's imperceptible to the occupants. But it dims the lights so that it takes advantage of that ambient light that's coming in through the windows.

I think I just went through all of my slides here so, yeah, I'll highlight the exceptions here.

So, in the area controls we're making exceptions for psychiatric and secure areas. Obviously, if you have occupants of a space and you don't want them to be able to control the lights we're going to allow you to put the light switches in a remote location, a secure location.

For the multi-level no exceptions. That's simply a dimmer or a bi-level switch. It's a very inexpensive technology and it gives the owner or occupant additional control.

Automatic shutoff, pretty simple.

Patient care spaces, as mentioned earlier, if you have a space where patients could be unconscious or unable to be noticed by the sensor, then you want to be able to have an exception for that.

I got too excited. I went through all my slides

there without flipping the pages.

So, just to summarize the exceptions in the lighting and electrical sections, three major exceptions. In psychiatric and secure areas we're making an exception. The automatic shutoff in patient spaces and this is both in the lighting and the HVAC section.

And then a flat exception for outdoor lit signs. Hospitals and healthcare facilities are generally 24/7, so having a shutoff for outdoor lit signs is not necessary.

Two more sections here. The performance and prescriptive section. The performance and the prescriptive section is where the code allows flexibility. It's especially important because many designers are aiming for a level of energy efficiency above the standards.

And we know that healthcare facilities in the State are frequently built well above what we specify here in the standards. It's important to emphasize that these standards are a minimum of energy efficiency.

If you're attempting to earn accreditation, or you're going for zero net energy, or just going for some other form of hyper-sustainability, or increased level of energy efficiency and environmental sensitivity, you

will likely exceed most or all of these standards.

Our standards represent a minimum level that we've determined is absolutely cost effective given currently technology. And so, we're providing this guidance to the industry here.

The performance and prescriptive section allows for some flexibility when you're designing your building. So, if you want to go way above code in one area, we'll let you sacrifice some in another area, if it makes sense. And we have rigorous software to help you do those calculations and determine if that makes sense or not.

And this is a well-developed industry in the State for commercial buildings, large commercial buildings. This is a very understood process for calculating both the performance and the prescriptive approach.

This is how we get flexibility into the code. The Section 140, the performance and prescriptive section, refers back to a lot of the previous sections. And it gives you the opportunity to calculate the energy budget for your space and then perform tradeoffs and calculate a proposed energy use for a proposed space. And then you compare the two and you iterate. So, it allows you to kind of change, make little changes in

your design in order to achieve a certain target.

And again, this is based on cost effectiveness. We've done a lot of analysis to determine what is absolutely cost effective, and providing you the support tool to allow you to focus on what's really important to your design, the function of your design, health and safety, and all the other things that are core to your goals.

I put together a little flow chart here of this so, hopefully, this makes a little more sense. So, we have a series of mandatory requirements there on the top. And then you have two options. You can either do a prescriptive approach, which simply says here's what you need to do, you do it, you're done.

And in a lot of facilities, if you're going above code, you probably have already done everything so it's pretty straight forward going that route.

Or, you can do a performance approach where you identify areas where you want to go above the code and areas where you want to go below the code. You calculate your proposed budget and you determine if your proposed energy usage is less than the budgeted energy usage. If it's not, you iterate. You come back to the performance tradeoffs and you maybe change a little bit here and there, and you iterate until you meet the

budget. And that's how you determine if you're in compliance with the Energy Code.

The goal here is flexibility. It's to give the designers and the developers the opportunity to create the space that meets their end goals, as best as possible for their stated goals.

The final section I want to identify is the additions and alterations section. As I mentioned to the HBSB committees, this is an area where we especially would like some advice. This section is all on major additions, alterations, and repairs to a facility.

It references back to the previous sections. It includes all of the proposed exceptions that I've already highlighted. But it does not include any new exceptions at this point.

So, we need -- we believe that it should apply. We believe that it is cost effective. It has been proven cost effective. Additions and alterations are major changes to a facility and we take into account all the iterations you can think of. You know, we're not going to require you to change wiring if you're not already opening the walls, for example. And we take into account asbestos, and we take into account health and safety, and all those issues.

But we do have a set of recommendations here.

We believe they should apply. We believe they're cost effective. And we hope you'll take a look at them and let us know what you think.

And we absolutely understand that this is a sensitive topic, so we're just asking for some help reviewing the code here, in this section, and ensuring that it is what we intend it to be.

So, that's the proposal, a summary of the proposal rather that we have contained in the document that we've published. It's on the website, along with the agenda and the notice for this meeting.

And if you have any additional questions or comments about it, please feel free to contact me even before the public comment.

I want to remind you that we're in the prerulemaking phase. In fact, that takes me into my next section, which is the schedule. Emphasize here the Title 24 Energy Efficiency Rulemaking process is a three-year schedule.

This current cycle is the 2019 cycle. The previous was 2016. The next is 2022.

I think to think of it as a subway car. So, we have the 2019 subway car's moving in. We have to load everything up onto that subway car. We send it on its way. And the 2022 is going to move in and we'll start

loading that one up.

So, if you have ideas or concerns that don't make it onto the 2019, they will absolutely be considered in the next cycle, or the one after that, or the one after that.

This is an iterative process. We're trying to make something that works the best it can for the residents of the State of California.

So, the 2019 cycle started in 2016, with research and outreach. We initially contacted the Office of Statewide Health Planning and Development, and a number of other healthcare facility stakeholders in that time. And we're continuing to reach out to anybody that is interested in this rulemaking.

We're currently in the middle of the prerulemaking phase. So, this is a relatively informal phase of the process. We have a formal rulemaking phase that starts late this year. So, it actually starts in November, but it really goes into 2018 here.

And then, in 2020, so that's January 1st, 2020 the standards go into effect.

To break that down, in the prerulemaking phase we have the draft code change proposals put out in May. It actually wasn't published in May. We provided it to the Hospital Building Safety Board first, and discussed

it with OSHPD staff. We wanted to get the obvious stuff taken care of before we put it into public circulation.

Today we're at the staff workshop. This is relatively informal. This is just the staff. You're just talking to the Energy Commission staff. You know, we don't have any Commissioners up here.

We want your ideas. We want your concerns. And we'll take those into account.

The deadline for comments this round is July 28th. So, that's in about two weeks. Anything you can get to us in written comments we'll consider immediately.

But our rulemaking won't start until November. So, if anybody wants to have additional discussions, or you'd like me to brief some other stakeholders in your group, that wasn't here, please let me know. We're happy to help in any way we can. We want to get as many of the stakeholders involved as possible. We certainly don't want to surprise anybody.

We absolutely believe that these standards will be helpful to the industry. But if you have any concerns, we want to hear about it.

And then in November we'll start that formal rulemaking. For those of you -- I'm assuming most of you are familiar with a formal rulemaking process as it

stands in the State of California. This is a requirement on agencies, like the Energy Commission or OSHPD, to adhere to certain legal requirements when implementing new regulations.

This is because at some point in the distant history there were agencies that implemented requirements and didn't tell anybody about it, and that created some problems. So, now, we have laws that require you to have a public process.

The Energy Commission is very proud of our public process in a number of different ways.

So, the schedule in 2018, we have the 45-day rulemaking will end in January. We'll receive comments from the public. We're required to respond to those comments.

Then we'll issue revisions, as necessary, to that rulemaking. And this includes not just the rules for licensed healthcare facilities, but there are rules for all sections of the code.

If all goes well, the Energy Commission Commissioners will vote and adopt this proposal in May. And then we'll move it over to the Building Standards Commission for approval.

Throughout this process here we plan to work closely with the Office of Statewide Health Planning and

Development and to coordinate with their staff, as necessary. We are very dedicated to the coordination with our sister agency here. They are clearly the experts on healthcare facilities and we want to respect that.

I mentioned this a second ago, but this is something that the Energy Commission's very proud of. We have a very public and open process. The Energy Commission has a number of different responsibilities, including licensing new power plants in the State of California. And we have extensive public workshops for those facilities, in the local communities.

For the Building Standards we're reaching out to as many of our constituents as possible for this rulemaking. Again, we don't want to surprise anybody and we're very much looking forward to your input to make sure that this is the best possible proposal going forward.

I already mentioned this, coordination, coordination, coordination.

I've mentioned this a couple of times, but I do want to emphasize, as I said, I have some background with my relatives working in the healthcare industry. The focus is on health and safety first. Energy efficiency is about efficiency, not conservation. There

are places for conservation. You know, that's putting a sweater on in the wintertime. And we all do it rather than cranking the heat up as hot as you want it to go, because it saves you some money. But that's up to you.

In this context in particular, in the healthcare environment in particular, it's about efficiency. Efficiency is where you get the same or better quality of service for your investment. So, when you have high quality LED lighting that provides better quality, higher spectrum light, better controllable light than the incumbent fluorescent technology, for example, that's one of the requirements in the code.

When you provide an optimal level of insulation in the walls, as I've discussed probably a little bit too much, that's what's in the code to provide the comfort, to provide the cost effectiveness to the occupants of that facility.

When you specify pumps that are optimally-efficient pumps, and you specify a level of insulation on hot water piping so that you don't lose energy into the space and then have to pump that back out with your air conditioning system.

These are all examples of energy efficiency. They do not degrade the quality of service. In fact, they improve the quality of service. And they improve

the comfort, and they improve the health and safety of the occupants, and they save money, and they save energy. That's the goal, that's the primary goal of the code.

Here are some links that, hopefully, you might find useful. These will be in the presentation, which will be posted on our website by tomorrow or so.

In particular, the second one down, the Building Energy Efficiency Program, Title 24, and the third one down, the docket for comments. If you click on that link there, the docket for comments, it will take you to our e-filing page. This is a page where you can either upload a document or you can directly type in your comment it's very, very simple. It walks you through submitting comments.

So it should be, if you can type up a document, on a computer, then you can upload it right here to comment on this.

Again, the deadline is July 28th. But I also want to emphasize that's not a deadline. That's just the date that we're putting out there for this informal, prerulemaking phase. There will be additional opportunities to collaborate and to comment after that, as well.

Here's contact information for a number of the

people in our office. Again, I'm the lead staff person for this effort to extend Title 24, Part 6 to licensed healthcare facilities.

Payam is the lead staff for the overall 2019 Building Standards cycle.

Peter Strait is the Supervisor of the Standards Development Unit.

And then, Christopher Meyer is the overall Manager of the entire office, which includes not just the standards development, but the implementation, and a number of other topic areas.

At this time that's the conclusion of my presentation for today. And I'm hoping that this has elicited some questions in some of you or maybe some of you have some comments. And we will dedicate the rest of the day to questions and comments.

If you have any questions, please just come up to the podium here, identify your name and affiliation for the court reporter.

And please, also if you have questions, feel free to come up today, but also submit them in writing if you can, so that we can answer them a little more thoroughly over the coming weeks.

MR. GALL: Hi, my name is Glen Gall. I'm the Regional Supervisor for the OSHPD Building Standards

Unit. And we have worked with the Energy Commission, and Gabe and company, and we thank you all. I think your efforts have been great.

One thing you showed on your slide is the Facilities Guidelines Institute's guidelines for hospital construction. That book, I think may be in an effort to produce more publications and sell more books, has divvied itself up into two books as of the last cycle, and in this current cycle is going to three books.

They're addressing hospital construction. They're addressing what they refer to as residential construction, and that's the current, second existing book. And the third one is outpatient clinic facilities.

When you look at the facility types, even though they're I occupancies, even though they're under OSHPD jurisdiction, skilled nursing facilities tend to present a lot more like, let's say, multi-family housing, or more of a residential environment.

And I don't know, because I'm not recalling, how deeply you chose to maybe separate those things within the proposal. But I'd make a suggestion that you do. And primarily because the systems that are utilized, the ways the facilities operate, and the care that's

delivered in those facilities is much more akin to a residential setting as opposed to a typical institutional setting, and they're different animals.

So that said, you may in fact be able to get a lot farther with the skilled nursing facilities in terms of your current standards and as they apply to similar facility types. And I'll tell you that that particular industry is in desperate need of updating, upgrading, saving bottom line money, even though there might be an upfront expense, because their margins are so slim and their facilities are really at the end of their useful life.

The vast majority of them were built in the 60s. And you lived in East Sac, I still live in East Sac, and I remember those days with my 1912 Craftsman. You know, it makes no sense to continue to operate in the manner that the facilities were originally constructed because it's just a loser. But thanks, Gabe.

MR. TAYLOR: You're welcome. Thank you very much for the advice and the collaboration, both before now and going forward.

Hopefully, the definition that we have for healthcare facilities here will cover healthcare facilities in the nature you're talking about. The definition for the nonresidential buildings is

essentially everything except for residential. So, if these buildings are not classified as residential, then they should be covered by the code already.

And one of the concerns that I would have is that if they do not fall under this definition of a healthcare facility, then they may be subject to requirements that they shouldn't be.

MR. GALL: They are a healthcare facility. They're a licensed healthcare facility.

MR. TAYLOR: Okay.

MR. GALL: And they are an I-2 occupancy.

MR. TAYLOR: Okay.

MR. GALL: The difference being is that the care delivered in those facility types is much, much different. One you're doing what I call hard healthcare. And those are the hospital -- that's the hospital setting.

In the skilled nursing setting, you're typically doing, I won't say board and care, but it's a much lower level of clinical care, mostly. That's where people live. They live there because they need ongoing nursing. But you're not doing a lot of procedures, as you'd see in a hospital setting. So, it's very, very different.

And we actually have varied requirements for

ventilation of those facilities in terms of the way they operate, acknowledging that. When you look at the FGI guidelines for residential healthcare facilities, they're a lot more attuned to 90.1 than the hospitals, which look at multiple other requirements, multiple other ASHRAE requirements that apply specifically because they're doing hard healthcare. Like, ASHRAE 170 is an example.

And that particular document is segregating as well on the ventilation end because there's that acknowledgement that it's not a one-size-fits-all. One is care and maintenance, a lot of times are and maintenance at end of life. Or, I shouldn't say end of life. To be sensitive, it's where you go to live when you need additional assistance with your health maintenance.

Whereas the hospital you're in and out, hopefully.

MR. BOZORGCHAMI: Glen, would it be something similar to a two-story hotel or apartment complex?

MR. GALL: A two-story hotel but, typically again they're one story, they're single-story.

MR. BOZORGCHAMI: Yeah, but it could be something similar to like a multi-family.

MR. GALL: It's similar, yes.

MR. BOZORGCHAMI: Okay, a wood frame and et cetera.

MR. GALL: A lot of them are wood frame, single story, or a light metal frame. Some of them don't necessarily utilize central air handing systems. They have a bunch of package units on the roof, distributed around. But they're a little bit of a different animal, I think they take a different -- they should take a different look in terms of the energy perspective.

MR. TAYLOR: Okay, thanks.

MR. GUITY: Hi, Arash Guity with Mazzetti, Mechanical Engineer, Chief Energy Engineer.

We decided to perform an exercise and just do an analysis of one of the hospitals that we currently had in design to just compare it against the proposal. This hospital, which will remain nameless to protect the innocent, did not have a direct goal of sustainability, other than just looking at lifecycle costs of the proposed measures. Since we understood that there isn't a CBEC Con software currently available to do a performance-based analysis, at least given the exact measures in the proposal, we just did a prescriptive comparison. Just to look at, based on the design that we started in 2014 and we're going through the design right now, we're meeting 90, 95 percent of all these

things already from a prescriptive basis. And these are things that are really just best practices.

This hospital is currently tracking an EUI of about 190, which certainly is not at the upper end of the spectrum in terms of percentile.

We have another hospital we designed in Washington, which is also an acute hospital that's operating at 112 right now.

So just as a comparison, we don't see anything that onerous in here and it's really including a lot of the things that we're already putting in our designs. It's not changing any of the compliance that we have with code from a health and safety perspective here. So, just wanted to share that and just giving an example of the exercise we went through to just show that this is not something that should be seen as a shock in the industry. These are things that we're already doing in our designs.

MR. TAYLOR: Thanks. That's good to hear, yeah.

MR. ZOMMER: Bill Zommer with Sutter Health. And I wanted to first applaud your interaction with OSHPD. We fully support that. I think that's the right call.

The second thing I wanted to say, though, is the remodeling part of this I think you guys have dialed

into something that really is going to be important and probably very difficult. I would bet on it. About 90 percent of our work is remodeling. So, I would encourage you to take all the time that it takes to get that right. Because our bread and butter, our garden variety projects are always remodeling and it's a wide range of projects from replacing radiology equipment, how is that going to work?

How about if you're doing an ADA project? How about if it's a seismic upgrade project?

I think it needs to be clear how each one of those kinds of remodel projects are going to be handled within your document.

So, the last thing about that, you know, in my humble opinion the building codes are set up to show you how to design new buildings and remodeling is kind of an afterthought that's jammed in there. Don't do that with this one, please. Thank you.

MR. TAYLOR: Thank you.

MR. CARPENTER: Good afternoon, Scott Carpenter. I'm a mechanical engineer, a former Hospital Building Safety Board Member.

Just I downloaded the stuff you had on the website and I just had a quick question. You're talking about compliance forms change summary and we talk about

the mechanical ventilation and reheat form having to be changed. And then, also, the fan power consumption changed. Yet I see in the document, itself, those sections are excluded or there's exceptions on it.

So, can you clarify that? Why do we have new forms if those are not required to be done?

MR. TAYLOR: Let's see.

MR. ALATORRE: Yeah, I'm Mark Alatorre with the Energy Commission. So, I believe the proposal is 2 point for ventilation, you know, to OSHPD's amendments to the Mechanical Code.

So, the documentation would probably reflect that or maybe we would construct a document that would show for the plan examiner, for who's doing the plan check what the minimum ventilation is according to the Mechanical Code, something to that effect.

MR. CARPENTER: Okay. I mean that's all we require right now. They already check the ventilation calculations. It's really the reheat one that I'm more concerned about. I mean, are we just going to now start documenting all the reheat portions for every --

MR. ALATORRE: No, I believe there's an exception for the reheat.

MR. CARPENTER: I agree, there's an exception in here for the reheat. But you're stating here, under

your forms summary, that a new version of the mechanical ventilation reheat form will be created. So, I just don't want to do redundant work.

MR. ALATORRE: Right.

MR. CARPENTER: If we're already showing Table 4-A calculations for compliance, why fill out a form for reheat.

MR. ALATORRE: No, that's a good comment. So in some instances in our forms we'll have a block where it's just identify where on the plans to find the info. So, you wouldn't have to redo all the calculations, you would just specify there checked the mechanical schedule, or checked the ventilation workshop, or whatever it is that you put on the plans.

It's not meant to be overburdening or, you know, do it twice.

MR. CARPENTER: Okay, thank you.

MR. ALATORRE: Sure.

MR. TAYLOR: I believe we have a few comments on the phone while everyone here in the room is thinking about what they want to say next.

MR. WICHERT: David Baker, I'm going to go to you. If you're ready to go, you're unmuted, now.

MR. BAKER: Okay. This is David Baker with Prime Healthcare. I've just got a couple quick

questions. One, we do a lot of energy projects that are hospitals and I'm just kind of curious about -- we rely heavily on some of the State and utility incentives that are provided. And I'm wondering if these codes all become mandatory, do you anticipate those incentives going away for us?

MR. TAYLOR: I'm going to have Kelly Cunningham, from PG&E, try to answer that question.

MR. BAKER: Okay. Hello, Kelly Cunningham, Pacific Gas & Electric. And I can't speak on behalf of the programs team, but I can connect you for a discussion with the healthcare leads from that team. Historically, Title 24 does play a strong role in sunsetting incentive programs that are now considered the norm.

But, you know, as our incentive programs evolve, as the legislative environment evolves there may be opportunities that may increase or decrease, so that's why I can't say for certain today.

But I can provide my contact information and we can have a further discussion about that. And I think it's a really good talking point for me to take back to my colleagues inside PG&E, and our Statewide Codes and Standards Team, which includes all of the IOUs. Thank you.

MR. TAYLOR: Yeah, thank you, Kelly. This is fundamentally a policy question between the CPUC and the utilities. So, it's not something that the Energy Commission can comment on at this time.

MR. BAKER: Okay. And there was one last question, if I may. Do you know, is there going to be a crosswalk done from like the current and proposed 2019 Code changes? Like some type of a matrix or anything like that?

MR. TAYLOR: You mean between 2016 and 2019?

MR. BAKER: Correct.

MR. BOZORGCHAMI: There will be. This is Payam with the California Energy Commission. There will be and the express terms will show the cross outs, underlines, and cross out of the 2016 Standards, that language that's no longer valid versus the underlined or the new language that will be proposed.

That information will be -- that presentation will be given hopefully later in September or early October.

MR. BAKER: Perfect, thanks.

MR. BOZORGCHAMI: And hospital will be a part of that discussion, presentation.

MR. BAKER: Okay, good deal. Thank you.

MR. BOZORGCHAMI: While we're looking at the

computer, are there any more comments from the folks in this room? No.

(Pause)

MR. TAYLOR: We received a comment in the chat online about ventilation rates. It's a very detailed comment referencing a number of tables.

There are a number of exceptions for ventilation, very broad exceptions for ventilation in this proposal. But if the commenter would please submit their comment in writing, it will give us a chance to respond to it in writing, in much more detail.

If the commenter would like to actually comment now, just let us know and we'll unmute you.

Is there anybody else in the room who would like to comment? I don't want to hold everybody here longer than necessary, but I absolutely want to give everybody a chance to chime in.

I'll take this opportunity just to say, once more, the real purpose of this workshop today is to reach out to all the stakeholders, to all of you and any of your colleagues that you know, who may be interested in this, please let them know that we're starting this proceeding. I want to hear from everybody who's interested, have an opportunity to discuss the proposal with you, and give you an opportunity ask any questions

you have, provide comments, analysis, whatever. We're really dedicated to the public process here and I'm here to help.

So, please contact me directly. If you don't have time to speak today submit the written comments, or just e-mail me, or call me and we can discuss it. Again, I'm happy to set up a briefing for you, or your organization, if you feel it's necessary. And that's about it.

All right, we've got one more. I knew if I talked long enough somebody would want to speak.

MR. CARPENTER: Okay, this is Scott, again. I just wanted to let, you k now, the hospital industry and OSHPD k now that, you know, a standard commercial office building you do Title 24 and it's great. It's all good stuff, we're all about that. But it's a lot of work to do the modeling, or the prescriptive, the forms, the package. You know, dotting the I's, crossing the T's, it's a lot of work. So, I hope OSHPD's aware of that for their inspection time. Or, for their review time, number one, because there's costs associated in time. And there's costs associated with the designers, the modelers.

And then, when you get to the IORs, who are already so busy doing the inspections on everything in a

hospital, there's a lot more work. Well, not a lot, but there's a significant amount of more I's to dot, and T's to cross. So, as long as we're all aware of it, you know, yes, there's added costs. There's a good reason for doing it, but just want to make sure it's not a surprise to anyone out there.

MS. BELAIR: And this is Louise Belair with TK1SC and also HBSB Board Member.

To Scott's point, the commissioning aspect, too, will bring a very new perspective. Some hospital systems are already implementing commissioning, but some of them have not so far, so there will be an impact creating an OPR. You know, creating a basis of design. Some of those terminologies may not be as well known in the hospital industry.

And I have another question. I'm curious about the rationale to exclude, to exempt from economizer. This is a common practice in the hospital for new buildings, so I was just trying to understand what was the rationale here.

MR. TAYLOR: I think Mark Alatorre's coming up to answer that.

MR. ALATORRE: Yeah, this is Mark Alatorre with the California Energy Commission. When we were developing our recommendations we were real conscious of

impacting the indoor environment. And we currently have exceptions for -- I believe the exceptions we currently have are for if the environment had specific community requirements or things of that nature, you're already exempt.

We felt that hospitals, you know, or to use Glen's term, the heavy healthcare, you know, would be a specific environment where if you brought in too much outside air you might be having to de-humidify it more, or something of that nature. So, we thought it was appropriate it.

Happy to revisit it, you know, or maybe not exempt them from water economizing if they have a chill system.

MR. TAYLOR: Yeah, just to clarify, an exception is our code is not a prohibition. It simply says it's not required. As I mentioned with, for example the solar ready section, we hope that the industry will look at our requirements, even though it's not required, and consider implementing some or all of those suggestions. WE believe they're cost effective. We believe they make sense in this type of a building, but we're providing an exception at this stage to ensure that no unintended consequences happen.

MR. JACOBSEN: Yeah, this is Eric Jacobsen. I'm

the Senior Architect with OSHPD's Building Standards Unit.

And I'm noticing that there's provisions for a performance-based approach to responding to the documentation of your energy efficiency. The modeling that's going to be associated with that, paired with the amount of exemptions and exclusions for a lot of the ventilation, which is maybe the largest component of the model, can you explain a little bit how that's going to work when you've got this huge portion of the model that really doesn't apply, I guess, to some of the standards that are with exemptions?

MR. TAYLOR: I would generally have to refer that to our model development office. Payam might be able to answer some.

MR. BOZORGCHAMI: Yeah, Larry Froess would be the one to answer this question, but I'll try. When I had this discussion with Larry a while back, what he informed me is that what we would do is we will provide another category within the program, CVEC Com hospitals. Within the background, a lot of the exceptions will be already captured.

So, more than that, I'm going to have to discuss it with Larry. I apologize.

MR. TAYLOR: It's a great question, though, and

please submit that in writing if you get a chance. And then, it's on the record, now, so we'll definitely go upstairs and talk to Larry about it.

That is definitely part of the implementation phase. It's something that we'll have to consider, and consider very careful, obviously, yeah.

All right. Well, I guess going once, going twice? Again, this is not the last opportunity to comment. I really appreciate everybody taking the time out of your busy schedule to join us here today, to consider this very important regulation change.

We are here to help and to listen to any concerns you have and this is going to be another, almost another year developing this proposal. So, please, don't use that as an excuse to wait to participate, but please let us know what you think.

And with that, I think we're done for the day. Thank you, everybody.

(Thereupon, the Workshop was adjourned at 2:23 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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