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CALIFORNIA ENERGY COMMISSION

In the Matter of:	)	Docket No. 19-IEPR-10
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2019 Integrated Energy Policy Report	)	RE: Climate adaptation in California's Energy Sector
	)	
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IEPR COMMISSIONER WORKSHOP ON

CLIMATE ADAPTATION IN CALIFORNIA'S ENERGY SECTOR

WARREN-ALQUIST STATE ENERGY BUILDING

ART ROSENFELD HEARING ROOM, FIRST FLOOR

1516 NINTH STREET

SACRAMENTO, CALIFORNIA

THURSDAY, AUGUST 8, 2019

10:00 A.M.

Reported by:

Gigi Lastra

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Claire Warshaw (via WebEx)

AGENDA

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P R O C E E D I N G S

10:03 A.M.

SACRMENTO, CALIFORNIA, THURSDAY, AUGUST 8, 2019

MS. RAITT: Welcome to the 2019 IEPR Commissioner Workshop on Climate Adaptation in California's Energy Sector. I'm Heather Raitt, Assistant Executive Director for Policy Development and the Program Director for the IEPR.

I'll go over some housekeeping items. The restrooms are just out the door. And if there's an emergency and we need to exit, please follow Staff through the doors out the hallway and we'll go across the street to the Roosevelt Park.

Please be aware that our workshop today is being broadcast through our WebEx conferencing system and it's being recorded. And so we will post that audio recording and a written transcript in about a month.

And there will be an opportunity for public comments at the end of the day, limited to three minutes per person. And if you'd like to make a comment, go ahead and fill out a blue card and you can give it to me.

And if you're on WebEx and would like to make comments, go ahead and use your raise-your-hand feature to let our coordinator know that you would like to comment.

And then just a reminder, I want to thank our presenters for being here, our participants. And we do have a very full agenda, so if you could be mindful of your times. And Harrison will give you a little reminder of when you have two minutes and when time's up.

And materials for this meeting are at the entrance to the hearing room and posted on our website. And written comments are welcome and they are due on August 22nd.

And then just one last reminder. When you're speaking, if you could please just remind us who you are for the folks on WebEx because they can't see, and it's easier to follow along if you just say your name before you start talking.

And that's it. I'll turn it over to the Commissioners. Thank you.

VICE CHAIR SCOTT: All right. Thank you very much, Heather.

Good morning everybody. We do have a

very chockful agenda here on an incredibly important topic, as you all know, making sure that we are prepared for climate adaptation within our energy sector and continuing to think through what issues we need to be mindful of. The types of solutions and technologies that we will need to put in place as we work in this globally-warm world is just -- the importance of that discussion can't be understated, so I'm looking forward to hearing from everyone today.

I am so glad to be joined by my fellow Commissioner, Patty Monahan, from the Energy Commission. We're expecting a couple other Energy Commissioners.

And also, from the Public Utilities Commission, Commissioner Randolph, we're so glad to have you here. Thanks for being here.

Would you all like to make any opening remarks?

COMMISSIONER RANDOLPH: I'll just be really brief. Thank you very much for convening this and inviting me to participate. You know, the analysis and recommendations in the IEPR feed into our processes and so it's really important for us to participate in these robust discussions

and think about the data and the issues that we need to consider as we deal with climate impacts in real time and as we deal with planning for climate impacts going forward.

So thanks to all the panelists for participating and I look forward to the discussion.

COMMISSIONER MONAHAN: Well, I want to say, first, kudos to Staff and to Vice Chair Scott for putting together a great agenda, really compelling topics. And I think, you know, as we move to electrify more and more of our system, including buildings and transportation, and we face an increasingly higher risk of wildfires, we need to really think through, how do we make sure we have resilient systems so that people who are driving electric cars can get out of dangerous situations and know that there's a fueling infrastructure available for them.

So these topics are just really critical to the future of California to make sure, as we're designing clean energy solutions, they are resilient against the changing climate that we're facing.

VICE CHAIR SCOTT: All right. So with

that, I will turn it over to David to kick off our first panel.

MR. ERNE: Good morning, Vice Chair and Commissioners, and good morning, folks in the room and online. I want to invite you to listen to a wonderful panel today that's going to be talking about fostering resiliency in communities.

We have diverse perspectives on the panel, but I guess I would generically say that we have like two different focus areas. So the first three panelists will be giving much more of a community perspectives, the challenges associated with communities, particularly those who are most vulnerable to grid outages. And then the second three will be talking about emerging technology solutions that can be applied to support resiliency in community. So that's kind of how the panel shapes up.

As you mentioned in your opening remarks, resiliency is a challenge. Technology is developing to make clean-energy options. I will say, back in 2014, the EPIC Program funded seven projects focused on developing clean energy microgrids for critical facilities, such as

hospitals, fire stations, emergency shelters, as well as a campus and a community.

As a result of that research, with all of it just wrapped up earlier this year, at the time when it was -- when that research started the technologies were expensive, solar, and particularly storage. Controllers were emerging but they were not mature at that point. And so there's a lot of learning that came along with that process, including communities and how to permit those, and utilities and how to do the interconnection.

Over the course of that research, I think that with the EPIC Program, we've been able to help advance the controllers to get better integration of the technologies to make that more possible. We had some lessons learned on permitting and interconnections, although those are still areas that need some additional work. And, of course, solar and storage are coming down in price. So those technologies are now becoming much more -- those options are becoming much more available for commercial application.

And, as such, we had a solicitation last year to fund nine new microgrids, which their

sole intent is to demonstrate their commercial replicability, so I think we're moving in that direction. Microgrids are not the end all-be all solution. In some cases, they're great, some cases, they're not. There are still other options we need to evaluate and assess.

And so I think what we're going to hear from the panel today is more of that community perspective, particularly how we can address the challenges in vulnerable communities, providing critical facilities with additional resilience, as well as overcoming the obstacle of what is currently the situation in this resilience, which is firing up diesel generators, not really a good option for critical facilities, not really a good option when you have bad air quality from wildfires. So are there clean energy alternatives that can help support that? So that's kind of what the panel is about today.

So I'm going to go through and introduce each of the panelists and let each of them go individually for about five minutes and they'll give their perspectives. And we'll just go in sequence around from my right and your left, all the way around the table. And then we'll open it

up to comments after that, and questions. So let me quickly introduce each of the panelists.

So the first panelist is Nuin-Tara Key. She's the Climate Resilience Program Director for the Governor's Office of Planning and Research. Next to her is Sylvia Chi, who is the Policy Director for the Asian Pacific Environmental Network. Next to her is Jasneet Sharma, who is from the San Mateo County Office of Sustainability. Just joining us right now is Vipul Gore, who is the President and CEO of Gridscape Solutions. Following him is Alfredo Martinez-Morales, who is the Managing Director and Research Faculty at UC Irvine. And following him is Jess Maxcy, President of the California Manufactured Housing Institute.

So those will be our speakers. For those who are interested the bios are available in the materials that came along with the workshop.

I'll turn it to Nuin-Tara.

MS. KEY: All right. Well, thank you. As was mentioned, I'm Nuin-Tara Key. I'm in the Governor's Office of Planning and Research. And I want to thank the Vice Chair and the Commissioners here for inviting me to join this

workshop. It's great to be a part of this conversation today.

So I'm going to very briefly highlight how we work to support local climate adaptation and resiliency efforts through our adaptation program at OPR. I'm also going to briefly touch on some of the key observations that we've been seeing coming through some of the recovery work that we've been doing and supporting in Butte County as a follow up to the Campfire last year.

So just a quick bit of context and background. At OPR, we have our Adaptation and Resiliency Program that was established through Senate Bill 246. And our charge through that enabling legislation is to better align state and local efforts on climate adaptation and resilience, but really with an eye towards supporting local implementation.

There are a couple key components to our program per that enabling legislation. The first is the creation of an adaptation clearinghouse which is intended to support a community of practice across the state, pulling together key resources, guidance, tools, case studies from around the state on how local communities and

state agencies are really incorporating climate adaptation and resilience into their work, and implementation on the ground as well.

And I do want to say, one of the goals of the clearinghouse is also to highlight key state resources that are available to really help support community practice and decision making. And I just want to acknowledge the tremendous value that Cal-Adapt provides, both in the utility sector, but also for local governments as well. And we are very lucky in this state to be able to have that type of resource and investment through the Energy Commission to support a community of practice. We're very lucky here.

So the other component of our Adaptation Program is a Technical Advisory Council. And the Council brings together a very diverse set of stakeholders to help guide OPR in the work that we do around adaptation and resilience and supporting local community implementation.

When we convened our Advisory Council in 2017 for the first time, one of the first key things that we were advised through our council that we needed to do was set a standard language and understanding of what do we mean by a

resilient California? What is it we are working towards? And how do we ensure that we are being guided by consistent principles to make sure that we're getting to that outcome in an equitable and resilient way?

And I mention that because I think the way we think about climate resilience at OPR is really a broad view, thinking about our need to invest in built infrastructure, but also our natural systems in communities, as well, and making sure our communities and individuals around the state have the capacity to respond to climate impacts and work towards a resilient future. So we take a very broad kind of systems view and recognizing the importance of working on cross sectors.

We also, through this process, created a definition for vulnerable communities. There was a lot of discussion around vulnerable communities but we didn't have a definition for what that means in an adaptation context. And I'm happy to go into some of the details of that definition and how we think about it, but there are three really important pieces that I just want to highlight here that are central to that

definition.

One is understanding climate risk and recognizing that that risk shows up in communities very differently. And individuals around the state have very different capacity to be able to respond to climate impacts and, also, then build toward more resilient outcomes. And so those are three components to how we think about climate vulnerability and vulnerable communities.

So that's kind of a quick overview of our adaptation program and some of that foundational kind of visioning work and some of the definitional pieces and how we're thinking about climate resilience.

Now, transitioning very quickly to some of the work that we've been doing in Butte County. So OPR is the lead agency for the Community Planning and Capacity Building Recovery Support Function. That's a lot of words all in a row and can all be shortened to a very long set of acronyms. But our role is really to work with Cal OES on the long-term recovery process in Butte County now, but then, again, thinking long term.

And so, you know, I think we'll have time. I can dive in and give some more specific examples during the discussion portion, but some of the key findings or observations we've seen in kind of the energy space in recovery and some of the key challenges have been around needing to align infrastructure investments, both in the energy sector and systems but then also with other utilities, telecoms and other infrastructures. And there's some interesting dynamics going on in Butte right now of kind of some challenges and specifically around communication and coordination. I'm happy to explain that.

And then the last two that I'll mention here very quickly are kind of need for education and organizing structures to be able to bring communities together to understand what their long-term goals are and figure out near-term disaster response and recovery efforts are making sure they're building towards those long-term goals and outcomes.

And we've heard consistently from communities that, you know, in absence of a space and an organizing structure to actually have

those conversations, we're seeing a lot of kind of splintering of decisions and infrastructure investments, response and investments being made that maybe aren't working towards a cohesive goal. And so figuring out how we create that space for, you know, those conversations and long-term goal setting is really important, recognizing the many challenges that David raised and learnings from all the work that you have been doing here.

The other is around capacity building and the need to really provide education and understanding of the importance of resilient energy systems in long-term community resilience.

So there's a lot more detail I can go into but I'll stop. My time is overdue, so I'll stop and pass it on.

MR. ERNE: Sylvia?

MS. CHI: Hi. My name is Sylvia Chi. I'm with Asian Pacific Environmental Network, APEN. We're an environmental justice organization and we organize and work with low-income Asian-American immigrant and refugee communities across the state, primarily in Richmond and Oakland/China Town. Those are two

like membership bases. And we work on state policy and implementation at the local level, as well as research.

And one of our research products that I wanted to discuss today is our recent report about resilience, it's called Mapping Resilience, and that looks at the existing adaptation frameworks, well, mapping frameworks that address like climate adaptation and resilience. And this slide is an illustration of the complexity that is involved in those frameworks.

I won't go into all of our key findings, for time right now, but I just wanted to highlight that there are many different adaptation frameworks that already exist. The CEC's Social Vulnerability to Climate Change framework was one of the frameworks that we highlighted as one of the strongest examples of a mapping framework in this area. But we found that it lacks a user-friendly interface and that, although it's developed by a state entity, it's not in broad use for the deployment and prioritization of clean energy investments, which we would like to see.

So, you know, our main takeaway from this

report is that we need a comprehensive statewide indicator state and assessment framework and easy-to-use platform that connects all the social vulnerability indicators with climate impacts. In our community, those climate impacts include an increased energy burden, which means that there's less capacity to adapt within our communities.

You know, environmental justice has historically been concerned with how polluting facilities are frequently sited in or near low-income communities of color. And in the climate adaptation resilience context we know that the climate impacts, such as extreme weather, will become threat multipliers, especially in the health context, for these over-burdened communities. So what we're concerned about in particular is if like toxic waste sites, refineries or other facilities are flooded or damaged in these extreme events, that could result in spills, hazardous substance releases or chemical explosions, which is something our communities have experience within Richmond.

And for context, for those who don't know about Richmond, that's a city in Contra Costa

County. There's a very large Laotian-American community there, one of the largest in the country. Many are refugees that were resettled there starting in the late '70s. It's a working-class community with high rates of linguistic isolation. And it's also home to the Chevron refinery and a lot of other heavy industry. And in the late '90s there was a major explosion at the refinery.

Can we advance to the next slide? Yeah.

There's a picture there of the explosion. And after that explosion the emergency information was disseminated only in English, so many of our members were not told how to respond. They didn't know that they had to shelter in place and they experienced a lot of acute health effects, like nausea and vomiting.

So the Laotian Organizing Project was the project of APEN, whereas it brought community leaders together to organize and advocate for a multilingual emergency warning system so the community members can now receive emergency information in Lao, Khmu, Mien or Hmong. So we think this is a good illustration of the important of community engagement. The

community, in this instance, knew what they needed, which was warnings in language, but no one asked them.

So in the context of energy innovation, you know, we're looking at community resiliency hubs as a solution. And that means using microgrids and solar and storage at community sites, like schools or health centers. That would have the benefit of providing disaster relief and shelter. It would also support community cohesion and trust and provide a space for education and organizing. It could displace PM emissions from traditional diesel backup generators and also serve as a cooling center in times of extreme heat. And it also has the benefit of saving money on energy for those, the sites that are hosting it, so that those community organizations can remain rooted in the community and maintain the social fabric.

So those are some of the issues and solutions that APEN is working on and be happy to discuss further.

MS. SHARMA: Sylvia, I've read that report and I would highly recommend everyone reading the Mapping Resilience Report.

Thank you, Commissioners, for the opportunity to be here today. I'm Jasneet Sharma with the San Mateo County Office of Sustainability. And I'd like to specifically speak to three elements that we have found critical to support community resilience in general, just based on the work we do in the county, both with the county and the 20 cities in the county, and also working with our communities to prepare and adapt for a changing climate. These elements that I'm going to be sharing we believe would be easily applicable or replicable to the energy sector as well.

So first is stakeholder and community engagement in developing energy programs and kind of the innovation sector. Second is the need to go beyond just technological solutions and I'll point to an example for that. And the third is this need to build community capacity and empower community-driven adaptation planning, some of what Sylvia was saying where no one asked them, so kind of really adding some pieces there.

So engaging key stakeholders and community-based organizations we found, in a really robust process, is a core element of any

impactful program or investment strategy that you might have. We're currently trying to support our own local CCA (indiscernible) clean energy, identify some site or, actually, some locations for some solar microgrids in the county or on critical facilities across the county. This is, somehow, proving way more challenging than we thought we would encounter.

An example being, firstly, it's difficult to get a list of critical facilities. Even as a county agency, we're having challenges getting a list of critical facilities from Red Cross because they don't want to share that information with us.

Secondly, the model for how CEC has engaged key stakeholders and local communities and some trusted community-based organizations in identifying these community preparedness strategies and, in this case, the siting microgrids on locations or identifying the locations, that model just does not exist right now.

So we are actively reaching out to the CEC and asking them to kind of bring stakeholders together, bring the trusted CBOs to the table, as

well, and really empower those existing community networks to help us identify the right locations. So it's going beyond just providing like in-the-moment service to that critical facility but really building community resilience.

We're also still trying to understand like what neighborhood or community resilience looks like, so a lot of these efforts are very site specific. So I think we do need help understanding, like what does it look like at a larger or a neighborhood scale as well?

I mentioned the need to go beyond just technological solutions. The city and county are already working on a number of REACH goals and policies to support infrastructure for electric vehicles and solar deployment. While we found these efforts to be extremely valuable, and much is needed, especially in these traditionally under-represented communities, we found that these programs often do not go far enough in supporting community resilience.

An example of that being we've heard from nonprofits that are seeking to bring solar technologies to households that typically may not

have access to them. In that process, they find out that they can't do the installation because the roof needs an upgrade first. And the household often does not have that capital or the up-front capital to invest in those home upgrades, as well, so the process really does not go anywhere beyond that.

So the key thing I'd like to point out is that the investment pathways and the funding models that you're using moving forward, they really need to evolve to not just remove these barriers but, also, you need to apply a more systems-thinking approach, especially for the socially vulnerable communities, to promote their quality of life, health and well-being as well.

The last one I'd like to call out is this community-driven resilience planning framework is that is critical to building and sustaining community resilience within any community or neighborhood. Community-driven resilience planning is essentially defined as a process by which the residents of that vulnerable community or that population define for themselves what their challenges are and what strategies they might need to address those assets and threats

they're finding out. The underlying premise is that this kind of community-driven planning is simple but it's, also, the solutions are effective as well.

We're finding that, again, this is way more challenging than we thought because it requires a shift in how governance happens as well. So the county is currently piloting two adaptation efforts within our communities in San Mateo County where we're actually building the capacity of two communities for them to actually go and identify their own climate challenges. And they are going to provide input into the decision-making process within their communities on what their risks are and what strategies they might want to put forward as well.

We're going to be sharing the lessons from this with our climate collaborative, our Climate Ready SMC collaborative that we have, of which both PG&E and PCE or CCA are partners, as well, so we're hoping we can share this framework with our energy partners at the same time.

So, again, thank you once again for the opportunity to share out.

MR. ERNE: Thank you.

Vipul?

MR. GORE: Good morning. My name is Vipul Gore. I am the President and CEO of Gridscape Solutions.

First of all, I'm extremely grateful to be here today, and not only for this opportunity to present the wonderful projects we have done with the help of CEC funding, but also talk about the results of one of the projects that we've recently completed and then, you know, moving on to the next one.

So, first, you know, maybe a minute on the company itself. We, Gridscape Solutions, is a smart energy solutions provider. We build renewable emergency microgrids for cities, you know, commercial customers, as well as many for multifamily affordable housing projects. We also do electric vehicle charging infrastructure solutions.

First of all, I'd like to present the project that's on the slide up there. We are also the proud recipient of two EPIC funding from the CEC. One of them is the EPC-14-050, which allowed us to build microgrids in the City of Fremont in the fire stations. And then there is

subsequent funding that we received from the CEC last year to expand what we learned from this project and build microgrids in several different cities in California.

So in this particular project, the Fremont Fire Station Microgrid Project, we started this back in 2014. We have three fire stations that are deployed as microgrids in those fire stations, and the project has been completed as of early this year in Q1. And, you know, some of the benefits I can talk about of this project, it has provided, you know, 75 to 80 percent of energy savings to the city and the fire stations. More importantly, it has provided the critical resilience capability that the fire stations were seeking in the state -- or in the city.

So, you know, each fire station has a diesel generator backup which, you know, is needed to align that facility in case of a disaster, whether that be a wildfire or earthquake or what have you, what may be. But now, putting a renewable microgrid allows, which is, you know, a solar and a storage combination, I'll talk about specifics in a minute, it allows to make that diesel generator backup of the

backup.

So in the words of the chief fire -- you know, chief of the -- the fire chief at the City of Fremont, he says that, now, we have got our house in order. We do not have to compete for diesel in case of disaster because we have our own power. So, you know, we basically get our house in order first and we can extend the use of diesel as much as we want, so they're really happy and pleased about it.

The city also has benefitted because, you know, the City of Fremont, like many of the cities in California, they have a Climate Action Plan that follows the state mandate for RPS and all of that. And, you know, the city has also benefitted significantly.

Each of these microgrids is about 40 kilowatts solar system and 110 kilowatt-hour battery. We have done multiple tests onsite as part of the result. We have published that in the report that we submitted to CEC, you know, a few months back. The original goal was to island the facility for about three hours with the renewable power. But we have been successful in doing an islanding in more than 12 hours with

renewable power, so we are very pleased with the results.

Subsequent to this project -- can you go to the next slide please?

Subsequent to this project, you know, we have -- actually, what this project and the funding that we got from CEC has allowed us to put together a good business model for companies like us to replicate these systems across, not only just California but beyond California as well.

And now we are building a cluster of microgrids, what we call a virtual wide area microgrid network using other EPIC funding across many cities. So we are deploying this type of systems in city halls in, you know, public sector schools, you know, fire stations, police stations, as well as, you know, industrial customers such as, you know, agricultural customer and what have you where they have 24/7 processes and replicating the system and deploying it multiple locations. We believe that, you know, doing this, we will not only save cost, but also provide the critical grid resilience that all of these facilities need in times of,

you know, taking this (indiscernible) in the future.

In closing, what I will say is we are very thankful to CEC to provide this funding. We also have been able to attract some third-party financing because of the funding that CEC has put into these projects. And we believe that going forward this could become -- serve as a big -- a good model for allowing critical facilities and critical plants to operate with renewable power without any disruption.

Thank you.

MR. MARTINEZ-MORALES: Good morning, Vice Chair and Commissioners. Good morning.

I just want to echo, you know, the sentiment that, as researchers, we truly appreciate the support from the CEC and the EPIC Program.

Today, I would like to describe one of the projects that we have and it's working with Native American tribe, the Chemehuevi Indian Tribe. This is a tribe that is located at the end of the transmission line in Havasu Lake. And the members, the tribe is about 600 members. About half of the members live in the community.

The majority of the members that live at the tribe, their children and their elderly, and the elderly usually have health-related problems, particularly things like diabetes.

The Chemehuevi Tribe is located in the desert and, therefore, experiences a lot of challenges when it comes to power quality, particularly they're driven by the hot environment and some of the, you know, weather, the monsoon season that affects the transmission line.

One of the things that we have done, and I really like the comment that was made earlier before, that you have to look beyond technologies; right? So my center, we are researchers but, also, we're part of the university. And part of our mission is to work closely with the community in terms of outreach and education. And I think that when we talk about microgrids, there is a lot of promise in terms of what can be done and some of that promise has been fulfilled. But when you look at some of the emerging technologies that haven't had the opportunity to be fully verified or documented, I think there's quite a bit of risk

factor.

And when we look at what has transpired at the Chemehuevi Indian Tribe, we have learned many lessons along the way. Some of those lessons have been painful. Some of those have been a little frustrating. But to our fortune the Chemehuevi is, perhaps, one of the most innovative and flexible communities that we have worked with, particularly, they're very openminded to trying new things. And they understand that with trying new things there's always, you know, a certain level of risk.

Through our project we have been able to integrate truly innovative technologies which, on its own, creates very practical challenges, from having the ability to interconnect the components and have a coordinated, you know, management of the assets and resources, to actually having to learn just as much as the developers of those technologies ourselves in order to be able to properly manage and to get the most benefit that we can out of those technologies.

One of the things that we have seen is that technologies can be engineered, they can be tested in the lab, but when you put them out in

the field, they are faced by a series of challenges that sometimes you didn't quite, you know, thought or you didn't quite appreciate at the time. And so we have seen, you know, many instances where developing best practices is very powerful, right, from doing a proper operation and maintenance of the technology to preventing some things by doing, you know, a better design, or even providing some feedback to the companies in terms of, okay, it's great, you have great technology, very promising, it works well, but, you know, let us tell you what we think you should do in your next generation; right?

And so I think that the Chemeheuvi Microgrid Project has been very insightful for us as a research group at the University of California, Riverside. It has provided the opportunity for us to work very closely with the community. In fact, one of the things that we're currently working on is developing a plan for the university to still engage beyond the term of the project because it is extremely important that when the project officially ends, the Chemehuevi have the ability to maintain the project. Otherwise, they will be one failure away from

having a system that is of no benefit to them.

And so I think that right now we are in the demonstration period. We have been able to test some of the functionalities that we intended through the system. And we're also working very hard with them in terms of thinking, okay, what comes next and how can we continue to support the community.

Thank you.

MR. MAXCY: Good morning. I represent the California Manufactured Housing Institute which represents all five segments of the manufactured housing industry in California. Those segments are the manufacturers, retailers, suppliers, financial services, and community owners and developers. Our people manufacturer manufactured homes in California. And we have members outside the state who ship into the state.

I thought I'd give you a brief, brief shot of the differences in manufactured housing so that we clear up some confusion that might exist.

There are, in California, there are basically two kinds of houses that are built in

factories, one is manufactured homes which are built to the national preemptive HUD construction standards, and there are factory-built houses, which are called modulars in all other parts of the country, and those are built to the California Uniform Building Code.

Manufactured homes are also divided. Some people interchangeably use mobile home and manufactured home and those terms really are not interchangeable. There hasn't been a mobile home built in this state since June 15th, 1976. And at that time the HUD Code came into place and it was a complete construction and safety standards change, so the product changed immensely.

Currently, there are about 560,000 manufactured homes and mobile homes in the state. Of the 560,000, 320,000 are manufactured homes and 1.4 million Californians live in those homes. We think that we provide the most affordable and highest value resource for housing in California going into this -- trying to come out of this crisis that California is in.

Roughly 16 percent of our homes are sited as real property outside of land-lease communities. That segment of the industry will

probably grow over the next two or three years to 35 percent or better. There have been very few manufactured home communities developed. As a matter of fact, I only know of one in the last 15 years. There are about 4,500 in the state.

I'm here, basically, to answer any questions that you might have about the product and what we have done as an industry to help ensure fire resistance, to make our homes safer every chance we get the opportunity.

So that's my story and I'm sticking to it.

MR. ERNE: Thank you, Panelists. Appreciate it.

Now we'll turn to the dais for questions.

VICE CHAIR SCOTT: Yes. Thank you. I just want to also welcome Commissioners Douglas and McAllister, who have since joined us.

And so we thought we might, excuse me, start with some questions from up here and see if we get a good dialogue going. David also has a whole set of questions that he's prepared to ask as well.

Do we have questions from the dais?

COMMISSIONER MCALLISTER: I just have one

quick question. It's really a clarifying question for the final speaker.

Jess, you talked about the fire resilience.

MR. MAXCY: Um-hmm.

COMMISSIONER MCALLISTER: And, you know, I think all the different subsets of housing that you mentioned, you know, have unique markets and unique characteristics and, possibility, unique sort of demographics of the folks who use them.

I am the Lead Commissioner on Energy Efficiency and, you know, own the energy piece of the building code, you know, as we manage that here at the Energy Commission, Part 6 of Title 24.

I guess I'm wondering how that aspect of resilience plays out in the manufactured housing space in terms of, you know, really getting -- there are no manufacturers here, it's got its own kind of building code approach, and how can we in California ensure that that sector of housing kind of, you know, comports with the rest of our direction, which is highly energy efficient, you know, focused on indoor air quality, focused on our common energy goals, not just at the property

but at the grid, all of these issues that we talk about here that are less prevalent at the federal conversation?

So I'm just interested in your view of kind of that marketplace in the California context.

MR. MAXCY: Well, I'm not exactly sure where you're going with that. As a matter of fact, I don't exactly know exactly what you're looking for.

COMMISSIONER MCALLISTER: Well, I think the, you know, energy performance of our new building stock, and this is site, for the most part, it's site-built buildings, whether it's a custom building or a developed, you know, manufactured -- or a production builder environment, has a particular approach that is governed by Title 24 that results in a certain high level of performance to the building. And I think the manufactured housing, you know, is a different approach that, you know, in general, I think it's fair to say the performance, the energy performance, is not at that same level.

So I guess I'm wondering sort of that aspect. I consider that to be part of

resilience. And so I guess I'm wondering if you have any thoughts about that aspect?

MR. MAXCY: Well, first of all, obviously, our houses are built to a specific code for energy efficiency, plus every one of our manufacturers offers higher energy efficient options for their houses. And some make those, part of those, standard. So especially in California, we are probably a bit ahead of the rest of the country in that we already have a solid code to start with and we have energy efficient options that we provide to the customer. The customer makes the decision on whether they want to buy those. And some manufacturers, especially those on the higher end of the product we build, make many of those things standard.

As an example, they would -- the standard manufactured got two-by-four walls. Some manufacturers build them with two-by-sixes so there's more room for insulation.

So I think we've -- I don't think there -- as a matter I fact, I know, there's not a manufacturer that does not offer ENERGY STAR as an option in its product.

COMMISSIONER MCALLISTER: Thanks. Thanks.

COMMISSIONER RANDOLPH: I have a follow-up to that.

I'm just interested, are you aware of any manufactured home communities around the state that have sort of adopted, you know, much in the way of solar or storage or community solar at all?

MR. MAXCY: Yes, ma'am, there are several that have. I don't have that information with me but they have. Especially the parks that are -- I can't think of anything newer because we haven't built many parks in a long time, but the better parks in the state have put solar in and they see the value of reducing energy costs, and they're there.

We also have some manufacturers who build homes with solar energy shingled roofs. And one dealer in particular pushes that pretty hard and has done a great job with it. So we are into the solar side of it.

COMMISSIONER RANDOLPH: And what about electric vehicle charging? Has there been much adoption of installing charging infrastructure in

communities around the state?

MR. MAXCY: The all-electric homes? Not really. There's been some discussion about whether or not we could change parks over to all electric and just the cost would be absolutely horrendous because we're going to be going in and trying to -- we'd have to change the houses also. And in many cases those houses are owned by senior citizens who are on fixed incomes and the upgrade would just be atrocious.

All factories do offer all-electric homes but, especially, Southern California has been a gas-powered section of the country forever, it seems, and it has not been a popular option, but we do have that capability.

COMMISSIONER RANDOLPH: Yeah. We, at the Commission, we've been working a lot on safety --

MR. MAXCY: Yeah.

COMMISSIONER RANDOLPH: -- issues around --

MR. MAXCY: Yeah.

COMMISSIONER RANDOLPH: -- gas connections.

But what about vehicle charging?

MR. MAXCY: I don't know the answer to

that.

COMMISSIONER RANDOLPH: Okay.

MR. MAXCY: I believe some of the parks have vehicle charging in now.

COMMISSIONER RANDOLPH: Um-hmm. Okay.

VICE CHAIR SCOTT: I had a question, well, actually for Sylvia, and that is to make sure that we have a copy of the Mapping Resilience Report in our docket for sure. I was excited to hear about the report and would love to take a deeper look at that.

Really, I kind of heard, and it's for any of the panelists who want to answer, but I think Nuin-Tara, you mentioned it, Sylvia mentioned it, Jasneet mentioned it, I think Alfredo mentioned it, as well, which is this similar theme of making sure that the communities really have a meaningful opportunity to weigh in and to identify the types of resiliency that they would like to see built into their communities. And I'd love to hear, maybe more examples from, you know, whether it's from Butte County or the Chemehuevi Tribe or from San Mateo of how that's happening, how you're making that work.

And the reason that I ask that is

because, you know, as you guys all know, everyone is crazy busy. There's so much going on in lots of folks lives and sort of getting the information to them, getting them excited about what's going on and having the time to come in and engage, I think is really important. And I'd love to know if you've got, you know, tips or tricks of the trade or information that you'd like to share about how that's going, I'd love to hear that. And I sort of threw it out there to all of you but --

MS. SHARMA: I can share like two specific examples from the pilot project that I was talking about.

I guess the one thing we've learned is we can have all the data and all the assessments under our belt and the minute you step into a community, sometimes you just have to throw that out the door. That's kind of the lesson we've learned so far. We've completed sea level rise vulnerability assessments. Through SB 1, we're doing a lot of climate modeling for heat and wildfire and all these other things.

But the minute you step into a community, it has to start from a place of what's your truth

and what's your on-the-ground experience. You absolutely just have to start from there. And you cannot tell them what their problems are. You have to just create the space for them to say -- them to identify what their challenges are and what their problems are. And the data can come in to support it, which we already know because we've looked at that, we know what they're speaking to. But you're setting yourself up for failure if you go about it the other way. We've learned the hard way because we've always done it that way in how government kind of works.

So as an example, the City of Half Moon Bay is taking on a Climate Action and Adaptation Plan. They're just starting the process for that. And when we give out this funding, they want to flip the process around. So typically a community will identify or a city will identify, here's what's going to go into our CAP, here are the kind of themes we're going to talk about, and then they'll go and solicit input and feedback.

The city, as part of this pilot that we're doing, said, wait a minute, we're actually even going to go out and ask people, like what are your concerns? What are your priorities?

What needs to even be talked about in the themes that we're going to touch in our CAP? And they're really working with community leaders.

So you're absolutely right, people are busy, but you have to find the community leaders for different populations. If they're working with the Latino population, it's a strong youth presence there. There's a strong senior population as well. So they found those CBOs that served as organizations. We brought them in and then they said, well, build our capacity first. We don't know what climate change adaptation is all about, so first build our capacity and we'll go and engage with them. So we're actually developing curriculum, training curriculum for them to understand what climate adaptation is, how to talk about it, so they can then go and do the outreach.

And so that's like a quick example of how we're trying to shift the typical way we've done like adaptation planning.

MS. KEY: I would add, I think this is kind of a forward-looking opportunity, so I don't necessarily have a great example except, I think, you know, some of the other speakers, beyond what

other speakers have highlighted here, but I think there's, as we think about this, there's a tremendous opportunity for alignment and coordination between utility and energy providers and local governments.

And I think especially as we're looking to figure out how to really bring future climate projections and developing climate vulnerability assessments into the decision-making process, so local governments are now required to incorporate climate into their general plan and are, you know, working to do that. You know, so there's definitely capacity building and some technological and, you know, science information that it needed to help support that.

But there's also, I think, tremendous opportunity as utilities are starting to incorporate future climate risk and projections into their planning and operation and investment decisions, I think there's a lot of opportunity to align those efforts and identify where utility investments can support long-term community goals around energy innovation and resilience outcomes. And, again, trying to think about, you know, opportunities to bring efforts together, think

about the alignment and kind of multi-sector, multidisciplinary activities that are needed to really get things -- a system change that's needed on the ground.

So just an example, you know, forward looking and something that we're very interested in from our position at OPR and working with local governments, figuring out, where are those opportunities for that alignment and coordination between sectors in communities?

MR. MARTINEZ-MORALES: I think because of where the Chemehuevi are located geographically and their environment and how susceptible they are to power quality issues, resiliency is at the heart of the community. The microgrid that was developed at their tribe is at the community center that acts as emergency relief, emergency response, provides services to the community at large, children, the elderly, you know, the entire community and also, you know, as a cooling center, you know, any time they do experience this type of power disruption.

I believe that in order for these projects to be successful the community has to be heavily involved. In fact, they may be the

drivers of the effort to some extent.

In our case, we greatly benefitted from the fact that Grid Alternatives have been doing work with the Chemehuevi for years. Today, I believe about 60 percent of their homes have solar systems through the various systems that Grid manages and oversees. When we approached the Chemehuevi about what we wanted to do they said, well, we already have resiliency at the community center, we do have a diesel backup generator, but we would love to have renewable energy as part of our community.

Through the project, even with the challenges that we have experienced, they have continued to express their support and, in fact, they would like to do even more. We have prepared a couple proposals in response to some opportunities with the CEC, and also with the DOE. And the Chemehuevi would like to do more solar, we'd like to do energy storage.

They have a new casino that is being built. They want to look at energy management. They want to look at energy management systems. They want to look at electrification of their vehicles that are part of the community.

They do want to do more but that's because, first of all, the leadership has done an extremely good job at getting the input from the community, getting the buy-in from everybody, and then the good work of organizations like Grid has allowed, you know, for that strong foundation to take place.

And then, you know, the university, we have greatly benefitted from that.

And so I think that definitely the community needs to be heavily involved.

MS. CHI: Yeah. I just want to echo what the other panelists said about the importance of having community engagement and involvement in the planning process.

The example that I discussed earlier about the Laotian Organizing Project, that highlights, you know, the importance of language access. And I just want to add that -- add to that that, you know, in addition to knowing that there are all these different languages within the Laotian-American community, there are also issues about literacy. So there's high rates of -- like among the monolingual or linguistically-isolated households in that community, not all of

them can actually read in their native script. So it's important to have not just written materials but to also have, you know, verbal ways of reaching out to people.

So that's an example of how there's, you know, there's just so much complexity to how our communities work. And that's why it's so important to hear from them what their needs are.

VICE CHAIR SCOTT: Let me see, do I have other questions from the dais? So I know David worked to prepare some good questions as well.

COMMISSIONER MONAHAN: I have, I think, a very simple -- well, I hope it's a very simple one for Sylvia, and maybe Jasneet, which is, you know, I think it's -- I'm very new to the Commissioner, so if I say something wrong, I hope people forgive me. But I think, you know, as a government, a state government agency, you know, we're trying to make our materials more accessible. And we recognize that depending on the audience, some will find our materials very accessible if you have a Ph.D. from an elite university and you're ready to dive into our documents. And, you know, we're retooled our website to make it more user friendly. We're

trying.

But at the same time, often these tools are always meant for somebody who has a pretty sophisticated technical understanding. And I'm wondering if you have just general recommendations for us about, you know, the balance between, on the one hand, trying to communicate better, but on the other hand recognizing that the folks that are going to come onto our website and start using our tools, generally, will have some level of technical understanding. And are there tools out there that you would say, oh, this is a really good model for you as a state agency. You should be really working towards this as a standard?

MS. CHI: I don't know. But I think that the system or the framework that we really like to highlight and promote is the CalEnviroScreen tool that is used in other environmental justice areas. We think that is -- that kind of hits that sweet spot of like being able to show the complexity that's needed and also be simple enough that it's pretty accessible. And, you know, there are obviously different accessibility needs for different audiences. We think that, in

particularly, there's kind of a paralysis of analysis in this area because there is so much information and policymakers aren't able to kind of sift through it and make decisions. And we think the CalEnviroScreen is an example of how to do that properly.

MS. SHARMA: Thank you for asking that question. I don't know if I specifically have an example of a tool. But if I was to build on what Sylvia said is just kind of taking our example, we, as employees or like county employees, to go to these kind of tools to get the information, we have to find ways to make it accessible when we share it out with policymakers or decisionmakers across the cities, or even community leaders, so I think that's what I would encourage.

Like I agree, we absolutely need that level of technicality, as well, because that's kind of the realm we live in. But what we've heard over and over again is you should not require a Ph.D. to understand some basic things. And I think that's the kind of lens I would encourage you to think from is there is some basic information and basic pieces that everyone needs to understand so that language should

really be accessible.

We, ourselves, I remember when we released our Sea Level Rise Vulnerability Assessment, which was like a 500-page document, as expected, did we expect anyone to look at it? Actually, no. No one's going to go and read a 500-page document. But then really putting a lot of time and effort in redoing the website in a way -- we actually worked with a social science-specific research organization. And that was such a learning experience on like how do you talk about this issue in a way, in a very solutions-oriented frame?

And I think we all tend to have this approach or call out the problem, call out the problem, focus on the program, whereas they come to us and tell us, just call out the problem once and pivot very quickly to the solutions that need to be put into place. And I think just how you communicate and frame things on the website, I think it really helps a lot.

COMMISSIONER MCALLISTER: I have just a question. It's a pretty nebulous question and I guess it's qualitative, let's say, but I think it's interesting to just kind of keep it real.

You know, I was a Peace Corps volunteer, you know, back in the day. And the kind of work in communities is unglamorous, it's really hard, it's long hours, it's lots of conversation, you know? It's -- I mean, so I guess I'm kind of just wanting to get your informed opinion about what kind of scale of community-based activity are we really talking about in a state with 40 million people in it as extensive, large, huge, diverse as Californians, you know, with many, many, many dozens of languages and cultures and, you know, ethnicities and geographies, and just everything? You know, how many people, how often -- like if you do the math, like, okay, you've got to be in front of every person for an hour, you know, in a small group? Like that gets up -- that's serious resources over decades.

And I guess I'm just wondering sort of how do you match up the scale that we're currently operating at with the real like long-term solution to get every Californian involved in this?

MS. SHARMA: I know you were looking at me but I want to be sensitive.

COMMISSIONER MCALLISTER: You said last

and you're what prompted the question, so --

MS. SHARMA: So if anyone else wants to --

COMMISSIONER MCALLISTER: -- and it's for everybody. Yeah. Yeah.

MS. SHARMA: -- answer that first, I certainly have perspectives but I want to be mindful of giving the opportunity to others as well.

COMMISSIONER MCALLISTER: You can think about it and come back to us. But, I mean, I'm not -- this is not a question that means you have to, you know, criticize, oh, we're not doing enough --

MS. SHARMA: No.

COMMISSIONER MCALLISTER: -- and this kind of stuff.

MS. SHARMA: No.

COMMISSIONER MCALLISTER: But I just feel like you're all, you know, thinking about this in cutting-edge ways and you're out there as part of the solution and, you know, maybe have a sense of like, okay, I'm moving the needle just this much but I need to move it this much. And, you know, I've got a contract for two years but I need one

for, you know, 30 years. I don't know. I'm just, I'm curious as to your sort of sense of what the scope and scale that we really need is?

MR. GORE: I can share one incident that the City of Fremont has done.

So the Sustainability Commission at the City of Fremont includes a student, you know, commission in that body. And through that they actually have small groups or, you know, workshops with the high school students and as part of their community service that they have to do for their credits. And in that process they have tried to raise some awareness with the students. And then they go to communities with the city to talk about resilience through, you know, energy innovation, as well as, you know, microgrids and solar penetration and all of that, so that thing has been working quite well in the City of Fremont. You know, I have students come around during, you know, the spring breaks and all of that and they talk about, you know, going like even door-to-door sometimes and, you know, give them flyers and discuss what the city has been doing to promote solar, as well as, you know, microgrids in the city.

So that's for example.

COMMISSIONER RANDOLPH: Can I ask a follow-up to that for Sylvia? Which is the notion of kind of a community-centered sort of resiliency space is -- you know, seems like a good way to do a lot of different things, one of which is pulling people in to have conversations and participate in the discussion because it's really hard to get people to pay attention to an abstract impact that's going to happen to them in the future or what they perceive is going to happen to them in the future. And so getting people together just to even talk about that conversation is a big challenge.

So I guess I was -- so my question is: Has, as you, as your organization has talked about this and has worked with communities, do you feel that you have been able to start to engage on these kind of bigger-picture questions of how do you develop these community resilience centers and getting community members interested? Have you had some good experiences around that you could share?

MS. CHI: Yeah. We -- so, you know, APEN has been organizing in these communities for 25

years now. And, you know, I would say, in terms of getting community engagement, there's no easy trick. There's no shortcut that I know of. It just takes a lot of organizing and a lot of effort, especially in our communities because they are -- they have fewer resources than other communities.

So, yeah, I mean, we have been organizing with these communities for a long time and doing political education, including education about the energy system and how it works. So our members are interested, they are. You know, they're excited about solar. They want solar in their communities. They want a microgrid. It's just a matter of getting those resources to them.

VICE CHAIR SCOTT: I feel like Alfredo wanted to jump in. No?

MR. MARTINEZ-MORALES: Yeah. I was going to say, at the risk of sounding simplistic here, right, and I mean, she said there's no shortcut; right? And that's true, there are no shortcuts, but if we look at the experience that we had at Chemehuevi, I made the comment that leadership has to do a lot with, you know, how well things go; right?

And so in our case, we haven't worked directly with the community, right, not the 300 members, but we do have the support of the 300 members. And that has been done, you know, through the tribal council. It has been done through some of the activities that Grid Alternatives has done in training local members, putting, you know, solar systems in the residential units.

So I think that it has to grow from the bottom up; right? So as researchers, we always look at the resources and we always try to leverage resources as much as we can. So I would say, you don't have to -- you do have to build in some capacity. But if you look, there's probably already plenty, you know, building already. It's just a matter of you identifying what that is and working closely and leveraging whatever you have. I mean, there always will be some voids, some vacuums, but I think that you can probably fill those, instead of trying to rebuild what is already there; right?

COMMISSIONER MCALLISTER: Have you noticed any change -- oh, I'm sorry, did you want to speak to that? Sorry.

MS. KEY: I was just going to very quickly follow on from this.

I think, you know, as a state entity, as well, we have this challenge. And I think given the urgency of the issues that we face and the need to implement, but also thinking about the scale at which that needs to happen, is just a tremendous challenge in California. And I think at this point we, you know, in some of the conversations we've been having with our state partners and communities, as well, is recognizing the value of kind of a regional scale and regional approach, as well, because we, you know, top down alone or bottom up alone is not going to get us where we need to go in the timeframe that we need to get there. And so thinking about how do we combine all efforts at once?

And one of the things we've been talking about across a number of different areas is the importance of regional-scale efforts and regional coordination and collaboration because we, as the state, can't be in every community. Every community member cannot come to every meeting. And so I think, you know, finding trusted leaders, supporting and funding community-based

organizations and network organizations to help be that bridge and convene and, you know, two-way communication is really critical.

And so it's something that we are really trying to figure out how we continue to support regional coordination and collaboration to get at that.

COMMISSIONER MCALLISTER: That rings totally true with me. I mean, I know in the early days of the solar market and just even in the R&D community, I mean, the local government level, climate action planning, I mean, there are a number of examples that just the fact of convening and getting the people that are leading these other efforts, you know, these efforts in relative silos to come together and say, oh, you know, somebody else is facing this, and they just learn from each other and it's just a huge positive. So if we could get some resources to that, I think that would be great.

I guess I wanted to ask, have your organizational efforts in the communities -- or how have they been impacted by the sort of, you know, negative focus on immigrants at the federal level? And is there anything we can do, if

that's the case, is there anything we can do to kind of mitigate that problem?

MS. CHI: What comes to mind for me right now is thinking about emergency response, like facilities, and making -- you know, and the importance of partnering with trusted partners, like CBOs, because there are going to member of the community who are afraid -- will be afraid to go to a shelter if they think that immigration enforcement will be there.

So if, you know, if a trusted partner, like APEN or another CBO, is vouching for, you know, you should come to this shelter in the time of an emergency, then it's safe, you won't be deported, I think that's a better outcome than if we just say everybody come to this government facility. That leaves a lot of questions and anxiety for our members.

VICE CHAIR SCOTT: I might just jump in because we have about six minutes. So this panel is fascinating and we could spend all day, I think, talking about all of these topics and our deep thoughts.

I am wondering, David, if you had a burning question that you want to, you know, get

a minute answer from each panelist in on or if everyone wants, you know, 30 seconds on something that you didn't have a chance to share with us but you want to make sure that we know before this panel wraps up, I'll turn it to you to decide.

MR. ERNE: Well, thank you. You actually asked most of the questions. I think we're in sync in terms of the things that we wanted to ask.

There was one question I did want to ask for Vipul and Alfredo, which is, so you've talked to a lot of different, I guess, communities at the local government level, either soliciting to get them to participate in your projects or to identify them. And I would like some of your perspectives in those conversations, things you heard back from the communities about either why they didn't want to do something or why they wanted to, and what are those lessons learned, that we can get some of that perspective, since you've talked to so many?

MR. GORE: Sure. I can go first. We have spoken to several cities in the state, as well as, you know, outside of the state as well.

A lot of focus has been talking to sustainability managers within the city, planning members who basically are, you know, looking at critical facilities and impacts of, you know, the climate change on critical facilities. Overwhelmingly, they basically like the idea. They want to deploy renewable microgrids at those facilities. You know, so, you know, we are treated with open doors when we get good with them.

The challenge has been financing because, you know, the cities, as well as some of the industrial customers who are non-municipal, they don't have the up-front capital to put into those projects. So that's where I think, you know, there's a challenge.

So we are actually working with third-party financiers. The economics are just working out. They're not there yet. You know, in a pure solar system or a storage-paired solar system, not a microgrid, they are working out. But, you know, when it gets to a microgrid system that can island and work in a grid kind and an off-grid mode, economics is a challenge. I think it could probably take a couple or two or three more years for the innovation to significantly drive the

cost down of the parts and components, as well as some, you know, incentives, you know, subsidies or grants are needed to bridge that gap at this point.

But, you know, that's the only challenge I see. Otherwise, you know, I think we are ready for that option wide-scale because everybody needs this system for sure.

MR. MARTINEZ-MORALES: Yeah. In our case, one of the challenges that UC Riverside has faced is that we are outside of the IOU territory; right? And so our local municipality is, you know, RPU, Riverside Public Utilities. That has forced us to be very strategic in the partners that we choose for our projects. And through our network, we always identify a partner that is already willing to take some risks because all of the projects that we do, they do have some level of risk. And then we incentivize those partners to buy into the project by showing them that even under the worst case condition, we can still provide them enough benefit for them, you know, to make their time and their involvement work.

And so I think that, you know, some of

the concerns are always, well, who else has done this before; right? Because truly speaking, no one wants to be the first one to do it, but we do need those, you know, forward thinkers or risk takers to be the ones that kind of pave the way for everybody else.

And so in our case it has been through a strategic partnership. That's the only way we can make it happen. I mean, we just need to show good results, right, so that other people are willing to buy in and take, you know, that risk on these projects.

MR. ERNE: Great.

So I can't remember, Heather, are we doing public comment now or waiting until the very end?

VICE CHAIR SCOTT: Well, we'll take public comment at the very end.

MR. ERNE: Okay.

VICE CHAIR SCOTT: You have three minutes, though, so if there was maybe a final thought from each person, a brief final thought from each person that you'd like to share, would love to hear that before we wrap up the panel.

MR. ERNE: Do you mind if we go in

reverse order?

Do you have any comments, no, Jess?

Alfredo?

MR. MARTINEZ-MORALES: Okay. One comment I would like to make is that one of the benefits of being with the university is that, usually, parties will trust you, right, because we're not trying to sell something. We're not -- we have no vested interest in the technology, we're researchers. Our job is to take the technology, do what we are intending to do, and report on it. If it works, well, great. If it doesn't work, well, it just doesn't work; right?

And so I think that that's one of the additional benefits that we have had being part of, you know, the university, especially the University of California; right? We have ten campuses.

MR. GORE: And the only comment I'll make is, you know, we're really excited to be part of the Energy Innovation Program through CEC funding. And, you know, we believe that, you know, whatever efforts the CEC has done, plus, you know, all the other cities are looking at, you know, private public partnerships that are

evolving, it's just creating a new business model for, you know, lots of companies, a lot of innovation.

So we just, you know, are excited and we want to continue doing work along with this partnership with the CEC.

MS. SHARMA: Did Jess have any comment?

MR. ERNE: No. He passed. Yeah.

MS. SHARMA: I wanted to, in closing, maybe respond to what Commissioner McAllister was asking about, like it's a big state and, you know, there's only so much we can do. I think we're finding that no matter what scale you look at, we're all facing similar challenges of -- our learning just has been you just have to have a diversity of skills. There's no other way. So at regional, as Nuin-Tara was saying, even within the county, we have to think countywide. We've got 20 cities, so getting them to think collectively, and then within a city, then going to a neighborhood scale and going to site scale, you just have to take a diversity of approaches. There's no other way around it.

But I think the key thing we found is, is who's the messenger? In most of the situations,

the county is not the right messenger or the government is not the right messenger. You have to find the right messenger, but -- but resource them, and resource them in terms of like fund their staff time, give them money so that they can give stipends to people to show up at those -- you know, be participating in those processes on a long-term basis. You really have to think through those processes as well.

MR. ERNE: Sylvia?

MS. CHI: Yeah. I just wanted to say thank you for having me and hearing from us and addressing this important issue.

I wanted to just, you know, emphasis that an important impact that is affecting our communities is the increasing energy burden and how that effects their community members' ability to adapt.

And related to that, there are kind of two populations that we didn't discuss today, and I just wanted to mention to include in the conversation, and that is like large, multigenerational families with young children and elders can be very vulnerable. And also, overlapping the populations that rely on medical

equipment, so like medical baseline customers who are especially vulnerable, especially with like the public safety power shutoffs and there's, yeah, no assistance for them, aside from telling them to make their own plans.

So there's a lot of vulnerability in our communities.

MS. KEY: Great. I also want to send my thank you, again, for being here.

I think the kind of top-line takeaways for me are, one, that we really need to make sure that we're mainstreaming climate risk into our planning and investment decisions today. And there's definitely a lot of capacity building that needs to be done to be able to do that, but that is really critical to making sure we're making wise investments today for our future.

The second is the critical need, and I think the whole panel touched on this, but for funding for convening and bringing communities together and that we really need to make sure that there's funding and support for that convening effort.

And then, lastly, in kind of our early experience here working in the recovery side

more, I think we really need to be thinking about how we bridge from immediate post-disaster needs in communities and making sure those investments are setting us up to meet our long-term goals, and priorities as well.

So those are my kind of three takeaways and wrap-up points here. Thank you.

MR. ERNE: All I want to say is thank you to all the panel members. I appreciate. I know that it takes a lot of time to put your thoughts and ideas and organize them and then come here and present. And it was great having you on the panel and providing your insights. Thank you so much.

VICE CHAIR SCOTT: Thank you very much.

(Applause)

MS. RAITT: All right. Thank you, Panelists.

This is Heather again. And so we're going to move on to our next panel. So if the speakers for the Collaborative Actionable Research to Foster Resilient Planning and Management could come your way to the front tables, that would be great?

VICE CHAIR SCOTT: Yes. As Heather just

said, we'll do a quick shift to the next panel. So if you are on our second panel, please come on up.

In the meantime, while we do that, if you're a member of the public and you'd like to make a comment, please fill out one of these blue cards and make sure you get it to Heather. She'll bring it up to us and that's how we know that you'd like to make your comment.

And it will just take another 30 seconds here or so to get our new panel members up.

All right. It looks like we have all of our second panel members here at the table. Welcome everybody.

And let me turn this over to Guido.

MR. FRANCO: Good morning, Commissioners. This morning we have an excellent group of experts and practitioners in the area of climate adaptation for the energy sector.

Last week I was in Santiago, Chile, invited by the government in Chile to share our experience on climate adaptation for the energy sector. Chile and other nations are starting to recognize the risks posed by climate change to their energy systems. The examples that I gave

them about actions that California has taken -- are taking -- is taking include some of the materials that you are going to hear about today.

For example, technical experts in Chile are very interested to know more about what Dr. Saah and Brian D'Agostino are going to talk about, about the risks in the science and practice of wildfire protection.

I already shared the presentations with our colleagues in Chile. Some of them are listening. That's my understanding. So we -- the collaboration between Chile and California in this specific area of work has already started. They are also very eager to know about the great work that the CPUC is starting with regard to how to mainstream, you know, climate adaptation and all the activities related to utilities, not only energy utilities but telecommunications, water, et cetera, et cetera.

Okay, so we have four presentations. Each one, I believe, is about 12 minutes long. They will go to the podium to give the presentations. You have their bios already in your folders.

So the first person there is Dr. Saah from the Spatial Informatics Group. He will describe a recently approved research project funded by EPIC, the Electric Program -- Investment Charge Program. This project is designed to create a new wildfire model for California to address some of the deficiencies with existing models brought to light by the unexpected behavior of the recent massive wildfires that we experienced in California.

So with that, Dr. Saah, please?

DR. SAAH: So while you're getting this set up, thank you, Commissioners, for allowing me to speak in front of you. We're very excited about this project and we're very excited about this program. And I've got a timer in front of me, so now I'm nervous.

So in addition to being a principal at Spatial Informatics Group, I'm also a professor at the University of San Francisco. And SIG is -- thank you -- is the lead agency for a larger consortium. So what I'm going to talk to you about is being done by a large collaborative consortium.

You know, the motivation behind this

whole effort is really stuff that we've seen in the news; right? We've seen the whole thing. We've seen a bunch of extreme wildfire events that impact the grid. And as it impacts the grid it impacts all of us. It impacts us in terms of costs. It impacts us in terms of safety. It impacts us in terms of reliability, not only to taxpayers but also to the environment.

There's a lot of the science that we understand and we understand it really well. There's a lot of known knowns. There's also a lot of unknown -- known unknowns; right? We know, for example, that our current wildfire models are not really good at predicting what happens with large dead trees. These duff layers that are coming in, we don't -- we're not sure how those actually fit into a lot of our existing wildfire models.

And if you guys have watched the news, again, over the past couple years we have had these huge tree outbreaks, tree mortality outbreaks across the state, which are really contributing and exacerbating some of the wildfire hazards that we have. We know we need to dig into that.

We also know that our existing fire weather forecasts underestimate really severe or extreme wildfire events. Part of that is due to scaling. Part of that is due to technology. Part of that is due to the way we have our mesonets built. We know we need to deal with that and we have to think about how we actually integrate that.

We also know that a lot of our models are really unable to accurately forecast the long-term trajectory of where we're going; right? We have a bunch of base research that gives us ideas of what we're supposed to do. But when you get into an applied sense or an operational sense, there's a gap, and there a known gap and there's a known trajectory of how we could fill that gap, how we could fix that. And all this is really needed by not only the IOUs to be able to predict these overall impacts to the way they operate their systems, but it is also needed by the taxpayer, the resident, the environment that we all have here in California. And that's really the motivation of why we started this whole effort; right?

So we've got a bunch of slides here.

There's a bunch of words here. There's a bunch of collaborators here that you're going to actually see. What we really start with is we start with the field; right? Let's actually -- let's go after those known unknowns in the field. Let's go after the weather stations that we have, the eyes and ears that we have on the ground. Are those weather stations actually in the right spot? Are they picking up the right sort of phenomenon? Are they integrated with other systems that we actually have? You know, those are things that we want to be able to optimize and we want to be able to look at.

We already experience a whole series of extreme weather events. What can we learn from those weather events and how can we integrate that with the mesonet network that we actually have? There's a whole process for doing that. There's an opportunity over there that we could actually leverage and take advantage of.

And then the going back to the tree mortality component. We know what the tree mortality rates are. We know that the fuel recruitment sizes potentially could be. What's the fire behavior associated with that? And do

our existing models actually capture it? And once we actually have that as a local level, right, can we scale that out across the state? Can we actually see this at fine resolution across the state? That's phase one of what we're trying to do.

The second component of where we're going to go after is the near-term models, the long-term models. How accurate are our near-term models, the zero-to-seven-day estimators; right? Are we able to forecast really accurate zero or five days out or seven days out of when a wildfire does actually occur, or the same sort of thing with wildfire weather; right? How could we actually dial that in? Do our existing models work just fine, we just need better inputs, or do we need to retool the inputs along the models to get a better understanding of what that actually looks like?

Same sort of thing for the long-term models, the mid-century models. This of this as the models that we need for the strategic planning; right? How well do they work? Can we just tweak the inputs to these sorts of things or do we need a whole new class of model, or is it a

hybrid approach? And how could those mid-term models integrate or work well with those long-term models in a way that is consistent or workable for the state, operational for the -- operational for the state. Excuse me.

Next up, what we have to do is that now that we have better field data, right, we have a better network, we have accurate models, what do we actually do with it, the scenario planning; right? And when we think about scenario planning, our state is changing. We have this whole wildland-urban interface that we need to think of. And that wildland-urban interface, or the WUI, is changing. Where it's located, it's growing. And the way fire behavior moves through those communities, again, it's one of these places that we know we need to do better in. How do we integrate that into those scenario plans themselves?

And the state, itself, is changing as well. You know, we have a whole shift and change in the way we have land use and land cover and the different uses that we have across the state that we have different sorts of projections with. And so the idea is to run scenarios between those

two elements and a variety of climate change scenarios to see what those patterns could actually look like. Again, we want to do this short term as a tactical response if something does occur and long term for a strategic response to be able to harden our overall system to create a more reliable grid.

You know, that sounds like there's a lot of specific elements, a lot of small elements; right? How do you pull all this stuff together; right? And as we pull all this stuff together, throughout each of this process, right from the very beginning, it's people; right? We want -- we need to have an open dialogue, an open conversation with people and pull them along. It's not okay to build all these models and then just dump them and say, hey, just use this. It's a conversation that starts from the very beginning where we start having workshops in the beginning and we integrate those conversations all the way through this very end.

A whole bunch of outcomes that are going to be associated with that as well; right? And so the idea, really, behind what we're trying to do is that, you know, if we have a whole series

of defined outputs, we're hoping there are great outcomes. And as we get better outcomes, we can get the impact that we desire across the state. And, you know, what better way to prove that or show that is the list of outcomes that we're really trying to target.

The first one is the weather station siting framework; right? Let's get proactive about our observations on the ground.

The second component of it is the extreme weather, historical analysis and data archive, not only for this project, but as we learn from this project and we learn from what other community holders or stakeholders could potentially use or need, make those same datasets available and allow folks to use that as well.

We're going to be doing a lot of learning in terms of the fire models themselves and the wildfire science itself. We want to be able to encapsulate that into our report, not only for the Commission but for the larger community, again, so this is a larger collaborative learning environment.

And then the tree mortality; right? There's been a whole bunch of different tree

mortality reports that have been pushed out and there's a variety of different limited datasets that have been pushed out. What we'd like to do is to create the next iteration of that, really focused on fuel recruitment for larger trees, and make those data archives available, both at the plot level and at the state level in terms of earth observations.

There's the near-term forecasting models. Again, if you look at what we're trying to do here, the outputs that we're really trying to create is not only the modeling framework but to add the data archive that we actually create around it, along with the decision tools that we're building around it. Do the same sort of thing for the long-term risk analysis. Open up the modeling approaches so everyone can see what we're actually doing. And then connect a cost-benefit analysis to it because there might be a solution that makes a lot of sense but what is the overall cost or how much is this going to actually cost us and what are those cost types that we need to think about?

And then last component is really the integration, the integration of the things that

you need to make a tactical response and the things that you need to make a strategic system. And we want to be able to integrate those together and to push into a real-use case scenarios. For example, make them available to the IOUs. Work with the IOUs along this whole process an allow them to grab the parts that they need in order for them to be able to make better decisions. At the same time, take all those same learnings and, from the very beginning, think about how we want to integrate it into the next climate change assessment.

And the last part is my favorite part, is the open source code for all the different models. Let's open this thing wide open; right? The more critics that we can get hammering away at it the more learning we could actually get. And so that's a process that we've done in other programs. It's something that we were hoping to bring to this effort as well.

In terms of the research collaborators, we have a wide group. These are the folks that are in our research consortium internal to building out the specific elements of the project and program. You'll notice that we try to create

a diverse spectrum of, I guess, opinions or approaches. We have academia really locked in. We really want to leverage the academic network that we have in the state. We have a private industry because they have a specific perspective on how this stuff actually works. We wanted to make sure that their voice is at the table internally. We have both small companies and large companies, as well as some government agencies integrated.

And I stopped earlier, so you're welcome. This is all I have. I'm hoping that we could have a chance to actually have a conversation afterwards, if you guys have time. And if you are interested in learning more about what we're doing, Shane Romsos, please raise your hand for a second. He's our project lead, project manager for this program. We're eager to start a conversation.

Thank you for your time.

Stop. Done.

MR. FRANCO: Thank you very much.

So the next presentation is by Dorian Fougeres with Tahoe Conservancy. Dorian will describe to us an excellent collaborative process

that is going on between the utility and a local community to reduce wildfire risks posed by power lines.

MR. FOUGERES: Thank you. Good morning. Oops. Is this on? Yeah?

Good morning, Madam Chair, Vice Chairwoman, and Members of the Commission. Dorian Fougeres, California Tahoe Conservancy. Thank you for the invitation to join you today.

Before going any further, I'll just say, this, actually, is a partnership effort. I'm presenting what is a partnership with the U.S. Forest Service, Liberty Utilities, California State Parks, and also the Tahoe Fire and Fuels Team which is a group of about 20 fire districts, land managers and regulatory agencies.

Very briefly, California Tahoe Conservancy, we own and manage about 6,500 acres in the Tahoe Basin, including large properties, like the Upper Truckee Marsh, six public beaches that are pretty popular.

We also have about 4,500 undeveloped lots, typically small, quarter-acre parcels right where people live. There are about 13,000 of these in the basin if you add federal and private

lands altogether. All of these are managed according to a multijurisdictional fuel strategy.

And then they have neighborhood-scale Committee Wildfire Protection Plans.

So we do a lot of work on a day-to-day basis with the Forest Service and Liberty Utilities, particularly around hazard tree removals.

In terms of the basin's fire context, iconic fire, 2007, was the Angora Fire. You see a photo there that really galvanized and catalyzed a lot of work going on, including the creation of the Tahoe Fire and Fuels Team, 400 ignitions since then.

If you go a little bit further, recent year, the King Fire in 2014. And then this is just an overlay to give you a sense of scale, Camp Fire, around 150,000 acres. If you add all the forested acres in the basin, it's around 210,000. So this idea of just one fire, not even a megafire, compared to some of the recent ones, gives you a sense of the threat.

So basin power lines, the basics here, Liberty Utilities is our partner, an investor-owned utility regulated by the Public Utilities

Commission. Their service area covers the entire California side of the basin, about 40,000 customers. They're about 77 miles of non-residential transmission and distribution power lines that cross public and private lands.

It gives you a quick sense of what it looks like in the basin. And so this is the fundamental concept I'll introduce here. It's this idea of power line resilience corridors. This is the only piece I'll read, so you can see the definition there. So forested areas around power lines is really where we're combining three things that are typically somewhat separate, ignition hazards, fuels reduction and forest health treatments. So you're putting all of these in the same place by partnerships.

Some of the benefits, you create several efficiencies, I'll explain a bit more later, but this is a key to unlocking, at least in Tahoe, that crux of pace and scale, increasing the pace and scale of our work and, as I'll explain a bit more in a moment, really protecting the general forest and communities at the same time.

This is the only semi-technical diagram I'll show. I know it can't be read, it's quite

small, but you can see at the top, roughly, that's what some of these landscapes look like right now in that top row. Then the middle row shows after treatment, when you have this power line resilience corridor. And then that the very bottom, you can see, that's roughly to scale. So let me walk you at a very high level through those zones.

You can see Zone 1, that's the orange zone, that's where Liberty Utilities has the sole financial responsibility for their work, so that's what they're already required to do, where they make sure there's no vegetation within four feet of conductors at any given time. And they also remove any surface fuels within ten feet of the poles.

That blue area, the bright blue, that's Zone 2, so that's where we really focus on removing any dead, dying, diseased, defective trees within felling distance of the power lines. Also in Zone 2 a pretty importance piece is general mitigation or fuels reduction. What we're putting an emphasis on in the basin is using those byproducts, like biomass, so not just leaving them on site.

And then Zone 3 is really this broader corridor that goes out to a total of about 1,000 feet. Again, it's a focus on fuels, but also forest health, including restoration byproducts.

Going a little back to context, so that was the crux of the idea as a power line resilience corridor, let me just give you a bit of context of why we're doing this and why it matters.

So in terms of the impetus for change, we've had 100 years of fire suppression after clear cutting and we're being outpaced by climate change. We have overly dense forests, degraded watersheds, declining keystone species. It's essential there that we match the scale of our management activities to the scale of the ecological processes that historically created and maintained these landscapes. That's particularly fire. The Sierra mixed-conifer forests are fire-adapted forests.

So really what we've been looking at in the basin is treating the general forest in conjunction with communities so it's defensible space, and also the wildland-urban interface.

If you look at fire modeling, you can see

that by treating the general forest, you can actually reduce or minimize or dampen fire behavior, even before it enters the wildland-urban interface, and that's particularly important in this age of the new abnormal. We had, actually, an amendment to the 2017 -- 2014 fuel strategy, amended it a couple years later to call this out, this integration of treating the landscape and communities at the same time.

Large effort to integrate this or operationalize this started in 2016. It's called Lake Tahoe West Partnership. It stretches from Emerald Bay in the south all the way up to Squaw Valley. It's one single geography that covers all jurisdictions moving, as you can see on the left side, lots of great work, lots of projects, but really to one landscape. So instead of piece by piece or my work and your work, it's really all the people at the table planning for all the resources and landscape at one time.

I'm going to skip this slide, it's just a bit more on the partnership, and go to the next one.

This is the framework for that whole planning effort, what we're calling the forest

landscape management cycle. Steps three through seven are conventional, you know, planning all the way through implementation monitoring. But one thing that we had learned through a lot of practice is really putting, number one, this landscape assessment, number two, landscape strategy at the beginning.

I guess I wasn't truthful. This is the second technical diagram. I will walk you through in detail. Ha-ha. Just kidding. But this second technical diagram, what I wanted to say, what was innovative about this was this Quantitative Landscape Resilience Assessment.

Everyone talks about resilience but to really quantify it, we had 19 different indicators covering all the forest aspects, the watershed aspects, and community aspects, including cultural landscapes with the Washoe Tribe, partnered a lot there with the U.S. Forest Service. Scott Conway with their Remote Sensing Lab, he took the LiDAR data and created what are called eco objects which are the smallest ecologically meaningful units, typically individual trees or clumps of trees or gaps, as a way to help us really map that out.

So this idea of heterogeneity, that's kind of the underpinnings or the hallmark innovation in this process to quantify that. Put in simpler terms, it's basically just the variation and the vertical structure of vegetation. So you can think about the canopy at the highest level, the midlevel of trees, and then down towards the bottom, towards the forest floor. So that's this idea of vertical heterogeneity. And then you also have horizontal heterogeneity, similar to what I mentioned before, how are individual trees or clumps or gaps spread across the landscape? So a particularly important indicator of resilience and landscape because it affects disturbance behavior, like fire, it affects vegetative regeneration, snow retention, and habitat quality.

So through our quantitative assessment, this is just what it looks like, again, I'm not going to walk you through details, but basically on the left side, the vertical heterogeneity, you can see that they're -- well, you can't see but I'll just interpret it for you, basically too much forest near the forest floor. We don't have

that kind of canopy structure you'd expect in a mature or an old-growth forest in the Sierra Nevada. And on the right side for horizontal, basically, too many clumps. We don't have enough gaps on the landscape.

The second part of the process, as I mentioned, was the landscape restoration strategy. There's six different goals. It goes through forests and floodplains and communities. I won't go there. But the main point I wanted to call out here is really this approach of working at the landscape was to create these efficiencies in planning and permitting, operations, contracting, the actual costs associated with it, and infrastructure.

Also important for the environmental component is the ability to spread impacts over space and time, whether that's sensitive environmental species or that's watershed effects, whatever it might be. We're aiming really for one large project to cover that whole landscape, including the general forest.

So as a recap, that hopefully gives a bit of context now. Just to repeat this purposely at the basin, the context for the power lines in the

basin in the landscape, you can see the definition. Again, like I mentioned, that's why it's now exciting to put all three pieces together, the ignition hazards that Liberty would typically manage plus fuels reduction plus forest health, this idea of heterogeneity, to create those efficiencies to get to pace and scale and protect the landscape and communities at the same time.

Just the zones again. So wrapping up here, what's distinctive, this is a quote from one of our partners, I just didn't get a chance to get their names so I put them as anonymous, but basically saying, "We used to view this as separate pieces, you know? Liberty was doing the trees that would hit the power lines and we would manage the vegetation. We're actually talking together at the same table now and doing the work at the same time as we go through implementation."

So we have about 17,000 acres that we need to treat over the next several years. We actually had a proposal in for about 7,000 by 2023, so we're on that path. And in terms of status, great news, Liberty included this in

their Wildfire Mitigation Plan that was approved at the end of May by the Public Utilities Commission, so they're already starting some of the work in that area.

We're trying to catch up. The Forest Service has committed money to planning and serving and site prep. They're going to look for their implementation money this year. And we also applied for a California Climate Investments Grant. We weren't so lucky as to obtain that this year but we'll reapply. And, also, we're looking at other funding sources, so we can really get that efficiency of being out on the landscape at the same time. It's not all going to be done in a year, so we're not worried, but certainly, there's an urgency.

In terms of the bigger cost, everyone wants to know about cost, this is part of a larger forest action plan for the Tahoe Basin that will be announced on August 20th. We have an annual summit with governors and senators. Governor Newsom is the keynote and Senator Feinstein is the host. It's roughly about $2 million a year for the first five years to implement this project, and then about $1 million

afterwards to get through and have all these miles treated.

I just will say to be clear, because the question always comes up, this does not include Liberty Utilities costs. They are paying for their own work. They are mandated, required to do that. This is just the public land's component from the Forest Service, State Parks, California Tahoe Conservancy.

In terms of bigger desired outcomes, these are the last two slides, we're very excited. Again, thank you for the opportunity to be here today to popularize this concept among utilities and land managers and regulators. And what we're also looking towards is really scaling up this idea even larger through the Tahoe Central Sierra Initiative. It's 2.4 million acres, two state conservancies, three national forests that includes, in the little green there, that's that Lake Tahoe West project I mentioned, some other work in the basin in the Upper Truckee River Watershed, and then six other landscape collaboratives.

So it's similar to what Nuin-Tara mentioned earlier this morning. What we're

really looking to do is Tahoe as an anchor, or one of the components, and move from projects to landscapes to entire regions.

Thank you.

MR. FRANCO: Thank you very much, Dorian.

Our next speaker is Brain D'Agostino. I think he has been in all our climate adaptation workshops. He's the star of the show, in part because San Diego Gas and Electric has done so much. And I'm excited to let you know that what we'll hear now from him is the latest of the latest of what they have done since last year's wildfires.

MR. D'AGOSTINO: Thank you very much, Guido. I appreciate that. And thank you for the opportunity to be here. Again, my name is Brian D'Agostino. I'm the Director of Fire Science and Climate Adaptation for San Diego Gas and Electric. And a big part of what I want to share today is what we've been working on.

I know the whole organization has really been heads down, trying to enhance our fire science and enhance our ability to deal with this threat across the state of California. And a lot of it is implementing our new Wildfire Mitigation

Plans and really making sure that we push those forward.

So a couple areas I'm going to talk about.

New weather technology. What are some of the new tools that we're looking at? How are we enhancing the science that we're bringing into how we operate the grid in San Diego right now?

We're also going to talk about hardening programs. I mean, as we look at climate adaptation we focus on some of the physical hardening of the infrastructure. So I'm going to talk about kind of the new initiatives we're doing there and the logic behind it and how we're thinking about it. And then part of adaptation right now is that we cannot do enough for our communities in San Diego that we serve. So I want to share the approach that we're taking to do community outreach and try to get as much information from the communities as we possibly can moving forward.

First, I wanted to focus on weather technology and enhancements we have. The whole overall theme is artificial intelligence, integrating big data, how do we take the latest

data science techniques and integrate it into how we operate the system?

The first thing we're doing is rebuilding our weather network. It's now ten years since we started building what became the largest utility weather network in the world. Now we're seeing that expand. The other utilities in the state of California are now building larger networks. We're at 177 weather stations now. But part of what we see from the Cal-Adapt work that we integrate, we're really focused on that wildland-urban interface. So as we expand our weather network we're expecting to be at 225 weather stations by the end of next year.

And it's not just where we find the windiest areas or where this weather information will best improve our fire models, but a big part of it is we have to work with the electric engineers on this system for PSPS events and, say, a weather station located here will enable us to operate and start to minimize the impact that we could potentially have in a public safety power shutoff. So the weather stations are located not just for weather purposes but, also, how does it fit into the public safety campaigns

and our ability to safely execute a public safety power shutoff?

Another thing we look at, and we're putting a lot of time and energy into expanding the fire behavior models, there is a lot of room for improvement, as we've heard. So we're looking closely, one, at continuing to collaborate with the ongoing statewide projects. It's so exciting to see the open source availability of this and I really look forward to working together on this and collaborating moving forward, but we're really syncing in census data, building data.

We're at the point now where we're taking our entire tree database of 465,000 trees and putting them into the fire behavior modeling systems so we can do risk assessments of every tree that has the ability of hitting the power lines.

And that's where this is continuing to migrate. We're still simulating over 10 million virtual fires every day. But now, based off that, we can say, what risk does our entire tree database pose every day moving forward.

Our fire potential index, that's our

seven-day outlook, that we're also integrating updated fuels levels. We're doing higher resolution on the models that are generating that, so we continue to enhance them and refine them every year moving forward.

A totally new index that we're looking at this year, and we're just going to be operationalizing it, is our vegetation risk index. We don't feel like we can do enough focusing on this area.

So what we did is we took our team of arborists, our team of meteorologists, system operators, and we all got together and said, okay, we first did a spatial analysis and said based off all our circuits, exactly how many trees do we have? We did impact analysis on each tree, saying there's a high potential that this tree, it's made of a soft wood, it grows really tall, and it has a higher potential of hitting our system, so we started rating that higher. We looked number of trees, how tall they were, and did an index to say, this is a very high risk portion of line for us.

So now what we can do is we can prioritize this with our arborists to go in, do

higher frequency of inspections, we'll do larger trim rates on that area. And if we get into a really high risk event, maybe we don't operate the system to the same high levels that we would in other areas because we know there's this external threat to the system there. So this is an important upgrade that will be operationalized this upcoming year.

And part of that is updating all the tools that we use and the dashboards to integrate this new technology. So in our Emergency Operations Center this year, we have all facelifts of all of our dashboards and operational tools that our operators are using that can start to flag these things. Whereas, one of the examples, if we're coming into a high-risk extreme weather event and we're monitoring a circuit to try to decide whether we could deenergize that if it poses an immediate threat to that community, now we have the vegetation information for that whole area right in front of the decision maker.

But when we also have all of the historical weather information. So we now have ten years' worth of weather data for all of these

areas so we could say right now you're approaching the 99th percentile of what this circuit is used to seeing. And alarms go off and it really helps us stay ahead of these extreme weather events.

The hardening of the infrastructure, a couple things that we looked at.

One is the pole risk mitigation and engineering. One thing about building the largest utility weather network that existed anywhere in the world and running it for ten years is you start to learn how windy it really is, rather, how windy we thought it was. So that requires us to go back and look at every single pole out there, but now do it with an understanding of what the winds are, not what we had to build to in the code, if that makes sense. So where something that may have been built originally to 56 miles an hour, now we've realized, it blows 80 miles an hour in that canyon.

So now we go back with this new knowledge. And we've replaced 375 poles in this program so far this year. We'll do 700 by the end of the year. We anticipate another 1,700 by

next year. But all of this is being prioritized based off the windiest locations, so the highest risk areas.

We're also looking at the Wire Safety Enhancement Program. This is about the coastal canyons. I mean, some of what we're seeing from Cal-Adapt, you know, showing where the fire threat is going, we're focusing on these areas, targeting some of the older wire, starting to harden the system, not only in the highest risk areas on the top of the tallest mountain, but also down in the coastal canyons as well. We're focused on these areas.

And then as we look at outreach to our customers, this is a critically important piece of what we've been doing recently. And I think a lot of it is more -- it's not just outreach, it's trying to understand how the communities are looking to receive help from the IOU.

So we took a different approach this year and we started doing open houses. And we'd go out to the high-impacted communities. And this whole program is now run by a new community resilience advisor who lives in the backcountry, has a solid relationship with a lot of the

community members, and has gone out. And we've done open houses and we've just brought booths, this is how you update your contact information, this is how you learn about what we're doing. But then we've asked them for -- to fill out a survey and say, what do you really need from us? And then that helped us shape these wildfire resiliency fairs. And the first one is actually on Saturday.

But notice the community partners. So this is where we started getting that input that, you know, Feeding San Diego, the Fire Safe Councils, the Humane Society, the food bank, Community Emergency Response Teams, the Red Cross, like these, this is what they were saying, you know, we have to deal with food, and at the same time, so we'll work with the food bank and we'll do this big fair. So we've got three of those scheduled, two are coming up weekends later this month, and one in September. But it's going to be that real chance for us to get out there into the community.

Yesterday was also our first inaugural Operation Fire Safe Day where we did a full stand-down of the 4,100 employees that we have.

And we went in and said, everybody, it's time to make a plan, build a kit, and stay informed, and went through every -- went through all of those with our entire organization, did media campaigns with local television, got our local elected officials involved. We did a declaration of Operation Fire Safe Day. And we're just trying to take an example in the community that we all have to be ready. We gave away some backpacks for preparedness. And we're actually going to give away 1,000 of them to our backcountry during the fairs that are coming up this week.

But our ability to communicate with our customers is still critically important, so we will be enhancing our ability to do customer notifications because, in some cases, we're reaching beyond just our customers and we're reaching just to community member and those with access and functional needs across our populations. So we've updated our websites. We'll be communicating in eight languages as we head into this upcoming wildfire season.

And with that, I just appreciate the opportunity to give this update and look forward to any dialogue that follows it.

Thank you.

MR. FRANCO: Thank you, Brian. I think you will be back next year.

Okay, our next speaker is Dr. Konsta Georgakakos. He will give us an example of the implementation of attractive adaptation option that we kind of envisioned a long, long time ago. In the early 2000s, I saw a presentation by Konsta. I was highly impressed. At that time, I was in charge of the Climate Change Program in the research division. Well, the program was only one person. That was easy to do. So the -- but to make it brief, it took more than 15 years to -- of successful research projects to actually start becoming operational. So that's the story that Konsta is going to tell us.

DR. GEORGAKAKOS: Thank you, Guido. And thank you very much for the invitation to present the INFORM Project. So the INFORM Project is about integrated reservoir management and the use of probabilistic forecasts to enhance the resilience of energy and water resources at the regional level.

This is a collaborative work between two organizations and several state and federal

agencies. The two organizations are the Hydrologic Research Center and the Georgia Water Resources Institute, both research technology transfer science cooperation and training organizations, and the first one with emphasis and lead in hydroclimatic modeling prediction and characterization of uncertainties, and the second one with risk-based decision support.

So how does that turn on? Okay. Here we go.

So the INFORM Project focuses on the Sacramento River Drainage and the large reservoirs that are present there. A system of reservoirs such as those modulates, essentially, the climate and weather variability to support a range of socioeconomic and environmental services, such as flood damage reduction, hydroelectric power generation, water supply conservation, ecosystem management and others. The effectiveness of these reservoir systems depends substantially on climatic variability and trends, on sectoral demands variability and trends, and interactions of resources and uses.

The challenge in the management is highlighted with the 2006 and 2008 total water

deliveries from the system. In 2006, a wet year, we had about 6 million acre feet of deliveries. It was about half that in 2008, a fairly dry year. And that makes it difficult to plan downstream.

So the vision for the INFORM Project was to improve multi-objective reservoir system management in Northern California using climate-hydrologic decision science to support inclusive stakeholder decision processes.

So this is an example of research to demonstration to operations. Research has started a long time ago in the early '90s. And the emphasis of research was in this issue of coupled climate, weather and hydrology forecasts and the generation of reliable uncertainty measures after this coupling, and with seamless predictions from lead times of six hours to nine months, an emphasis on the available operational data from agencies, such as the National Weather Service and others.

The decision models also had a strong research component. And the idea was to develop reservoir system management templates with explicit account of forecast uncertainty and with

multiple decisional horizons that match the decisional horizons of six hours to nine months that I mentioned.

Given our initial results for particular parts of this system, several agencies decided to proceed with a demonstration project, as Guido mentioned, in the early 2000s. And the idea there was to implement a virtual system and compare, over several years, the performance of that virtual system to the actual system of operating this system of reservoirs.

Of course, during this period, we had reciprocal training between forecasters, managers from several agencies, and the developing organizations. And I think it was due to that training that we were able to demonstrate the utility at the end of this demonstration period.

After the end of the demonstration period the decision was made then to begin the installation of the operational software in the California Department of Water Resources Sacramento Operational Facility, which was completed, the first phase was completed last year. And that facility now generates information in terms of hydrology forecasts,

risk-based performance tradeoffs, and associated decision policies to agency forecasters and managers.

The funding for this work came from research from the U.S. National Science Foundation, NOAA, and USGS, as well as the California Energy Commission, particularly as regards to the impacts of climate and climate variability and trends. The demonstration was supported by NOAA, by CALFED, and by the California Energy Commission over that period of demonstration that lasted about 10 to 12 years.

Operations up to present have been supported by the California Department of Water Resources. You can see, at least of the collaborating agencies, representatives of these agencies served in the Oversight and Implementation Committee and participated in several workshops that led to the finalization of the demonstration, of the shape, of the type of system that we wanted to build and so on.

So the picture there at the bottom indicates the idea in the demonstration where we compared the actual system outputs driven by operation rules and having the same input and

same system characteristics as the INFORM, with the INFORM risk-based trade-off decisions that were made by decisionmakers over a number of years.

Very quickly, the INFORM system components are a forecast component and a management component. What I want to highlight is that both components are very strongly linked to operations and operational forecasts and take these forecasts and develop assessments and characterizations of the uncertainty in these forecasts to generate ensemble inflow predictions to all of the reservoirs in Northern California at the approximately hydrologic scales.

The decision model takes these ensemble predictions and generates risk-based tradeoffs for reservoir managers who then look at these tradeoffs and make decisions about what releases to realize for the system. And then the assessment system built basically quantifies benefits post facto.

These are some examples that I put in there. The first one looks at the projections over a period of time, starting March 1, 2012, a typical INFORM run. These projections are

compared to the historical averages. The projections are for the mean stream flow forecasts in this case. And you can see that the projections depart substantially from the historical inflows for this year. And, also, the departure pattern is not consistent. In various reservoir inflows the pattern changes.

We can also see down at the bottom that in 2012, we've had, in terms of forecasts, essentially, a year similar to 2008, which was a dry year.

Another outcome for managers is this associated mean trade-offs. So for a given water delivery the system is optimized and maximizing benefits to all reservoir system objectives in terms of, shown here, carryover storage and energy production and then compared to the climatological mean trade-offs from the same system.

So 2012 appears to be a drier year with the shown impacts in terms of the maximized trade-off points for carryover storage and energy.

Going away from mean flows, the availability of ensemble predictions that are

reliable allows us to take these predictions and convert them to trade-off likelihood probabilities for carryover storage, in this case, and other system outputs. And decisions then can be made as to how this compares to historical information and whether the uncertainty that is generated is narrow enough to allow decisions to be made for a particular trade-off curve.

For each trade-off curve the likelihood of meeting various targets and constraints is examined. We're looking at the environmental constraints here at the base salinity interface, the saline front that is mandated to be less than -- thank you -- mandated to be less than 80 kilometers from the Golden Gate, and also the water temperature at Jelly's Ferry in terms of the ensemble prediction.

It also allows for the -- for those cases that it -- some of the constraints the targets have violated, it also allows for the quantification of the probability of that violation for each case.

An example of a final outcome from all these demonstrations projects compares the actual

benefits. The actual system benefits with the INFORM system benefits and the energy and deliverables -- and deliveries that I show indicate a more uniform performance by INFORM, rather than by the actual system. So the modulation of INFORM is a little more stable than the actual system.

It also shows that the INFORM has higher carryover storage, especially in the drier years, and that helps with multi-year drought.

We incorporated INFORM within a climate change analysis framework. And this was funded by the California Energy Commission. And the results indicate that the adaptive management that INFORM implements fosters resilience to a changing climate more than the actual management, current management.

So in summary, essentially, I will skip this, the promising future steps is to integrate the INFORM with energy system management tools for more efficient utilization of water and energy resources in both sectors, we're thinking of the hydropower ancillary services and renewable resources and make for a more resilient energy system operation as far as the reservoir

systems are concerned. And then the completion of the real-time implementation at the Department of Water Resources and extension to other river basins.

Thank you.

MR. FRANCO: Thank you very much.

So with this, we'll be opening now for questions from the dais.

VICE CHAIR SCOTT: Great. I have a whole list but let me turn to my fellow Commissioners and see.

I see Commissioner Randolph. Please go ahead.

COMMISSIONER RANDOLPH: I have two questions, if that's okay?

First, on the INFORM, you know, we're highly dependent on or we're becoming more dependent on northwest hydro imports. Is there any move to potentially look at taking INFORM out of state, as well as other locations in state?

DR. GEORGAKAKOS: (Off mic) Not that I know of at this point.

COMMISSIONER RANDOLPH: Okay. Darn.

DR. GEORGAKAKOS: (Off mic) - (Indiscernible.)

COMMISSIONER RANDOLPH: All right. Thank you.

And then for Tahoe Conservancy, have you -- how has the sort of community engagement and conversation around your work been?

One of, to me, one of the benefits of taking this partnership approach is that it's not just the utility because they get criticized a lot for vegetation management. And so I just kind of wanted to hear what the response from the community has been because a lot of people don't like to see physical changes in their, you know, tree landscape, but it's kind of critical and kind of important. So I would love to hear how the engagement has been on that level.

MR. FOUGERES: Sure. Thank you, Commissioner.

Most of that work is done through the Tahoe Fire and Fuels Team, which we're a part of, along with the Forest Service. So it's the fire districts which really are, I think it was one of the previous speakers mentioning, they're the trusted messenger. And so they have, just like every other part of the state, these regular campaigns on an annual basis, there's a whole

fire-adapted communities learning network. University of California Cooperative Extension, University of Nevada, Reno Cooperative Extension are heavily involved as well. There's a whole public information team. So there is a lot of engagement.

The Angora Fire was so close and the basin is isolated in the sense of the limited evacuation egress routes. So it really got people onboard about the need for treating fuels in the forest.

So very much to your point, you know, if you actually take out the tree next to my house, you'd get lots of complaints. But in general, for the work that's going on and the campaigns and that larger scale and increased effort, there's a lot of responsiveness for it.

Liberty also does their own parallel public information campaigns with their mailers and so forth. So it's been pretty well received. I don't think people are tracking yet really on -- so much on the general forest or power lines. It's a little bit more wonkish. But in terms of the overall commitment to that, what the agencies have done, it's been well received. But like I

said, it still can provoke certain people.

COMMISSIONER MCALLISTER: One comment, then a question.

So I was really happy that Guido could go to Chile. And just noting, for everybody's benefit, the next Council of Parties is actually happening in Santiago in December. And so our existing collaboration with Chile is going to provide, I think, a nice basis for extending that bilateral work, but also form, I think, a team approach for how we engage with some of the topics more broadly at the COP. So COP 25 in December, that will be fun. So I was happy Guido could go help set the stage for that.

So I have a question, more for Mr. D'Agostino. Well, really, it's for all of you. We do forecasting here at the Energy Commission. And so we have to look at least ten years out and help our energy systems plan for that, and our utilities, et cetera. And scenario modeling is becoming increasingly important as changes happen more quickly than anticipated. And I'm wondering, you know, in the case of, for example, energy -- electricity demand, you know, well, it's going to look different if we're modeling

for a couple of degrees warmer, you know, projected to the future versus just sort of the average of the last few years or using the last few years of temperature data to model our energy systems.

And I guess I'm wondering how -- what kinds of tools or how explicitly you, in your work, are actually not just sort of trying to get a handle on what's happening today and, you know, look at ranges and sort of, you know, characterize that with some precision, but how much projection forward you're actually doing, say in the case of SDG&E, for your investments and your systems? Are you actually investing or using the data to project forward to invest in, you know, in T&D for those future conditions? And I guess, you know, your equivalents for the other speakers, maybe, as well.

MR. D'AGOSTINO: Yeah. From my perspective as the -- kind of the head of the meteorology, the role I take with the load forecasters is really looking at how does our peak load change? The prioritization of the funding, I would have to -- I'd have to circle back to know exactly what projects are being done

as a result.

But as we look at the meteorology, there's a couple things we're doing differently. Whereas, we used to be looking at a very long time horizon and now, of course, we're just looking at the last few to several years to give us an indication of what to expect.

But the other big change when we look at load, I mean, especially speaking for San Diego, is historically our peak load used to be Santa Ana winds. I mean, it was hot, dry winds that would come out and we'd have these daily peaks, but that has changed over the last ten years. And now we're looking at hot, humid air masses coming up from the south with warmer water temperatures.

Last year we didn't set a new load but our water temperature off San Diego is supposed to be about 68, 69 degrees, and it was close to 80 for almost three weeks in a row, which kept -- our nighttime temperatures weren't even coming down to what our normal daytime high was. And that went on for weeks last summer and caused a lot of challenges in operating the electric system.

So what we're looking at now is a new

type of load. And we are working with the Cal-Adapt Team closely and we are working with our load forecasting teams as well. I mean, in this room today is representatives from our Load Forecasting Team as we continue to move forward with this.

DR. SAAH: Just to build on that, so when we talk about doing the long-term forecasting (indiscernible).

VICE CHAIR SCOTT: Can you get just a little closer to your mike?

DR. SAAH: How's that? There we go.

As part of the program that we're just starting to implement right now, we're collaborating with the Cal-Adapt Team to build those scenarios that, you know, we're all thinking about and talking about into those long-term projections. So, you know, your instinct is right on the money in terms of like what's going to happen, how things are going to change over time? And I think there are still some gaps in that understanding that still need a little bit of investigation.

MR. FOUGERES: Well, I had a tiny bit more on David. This is Dorian Fougeres with the

Tahoe Conservancy again.

For the landscape-level effort that I mentioned, the Lake Tahoe West Restoration Partnership, we started with scenario planning for that very purpose. Altogether, that's about five lead agencies and about 20 or so stakeholder partners from a range of different backgrounds.

That then led into a landscape-level modeling effort with a model called LANDIS 2. Some of our partners, a lot of the work with the Forest Service. That goes the whole -- it's large scale, basically. It easily covers 60,000 acres, goes out 100 years into time. And so it's nice because you can look at decadal changes in vegetation, tree mortality and fire that has weaknesses, but those are some of the strengths. So that piece was really the crux to developing and the landscape restoration strategy was the modeling effort that went into it.

At the same time we're recognizing, things change so fast. And so we actually have -- we're working and finishing up this year a basin-wide Integrated Vulnerability Assessment and Action Plan for Climate Adaptation, which includes, again, the forest, the actual lake, and

then the communities. As part of that we recognize the need that we basically need more robust climate scenarios. That was great to do forest planning. But when you look at tourist patterns, you look at emergency issues, you look at public health and mental health, there's so much more that goes beyond that that - I'm not saying we're going to do scenario planning every three years, you know, but certainly, you know, every six seven years, there are just different angles that we feel like we need to refresh if we're really going to be putting these pieces together.

VICE CHAIR SCOTT: I've got a question for you about the magnitude of the resources. And you put some dollar numbers up in terms of people may be needed for that type of forest management that you're talking about. I think that that was really interesting. It seems very cutting edge to me.

And then I'm wondering, also, is this replicable; right? Like how do we take what you're doing in the Tahoe Conservancy and apply that to other forests all around California or all around the west?

MR. FOUGERES: Yeah. The short answer is that it was a big investment, partly because of the economy there. It's $6 billion, roughly, and so recreation dependent that, in particular the Forest Service was like, we've got to do something. And they've been an anchor in the partnership.

For that Lake Tahoe West, for the restoration partnership effort with all the modeling, not counting staff time, but it's probably approaching -- well, basically, all the planning, all the stakeholder engagement facilitation services, probably about $2 million.

For the power line resilience corridors, as I mentioned, it's about $15 million over a decade. You do shift from initial treatments then to maintenance at a point, so it definitely decreases. But to your point, the take-home is, yeah, we're not interested in doing this as a one-off and doing this every time.

In fact, there was -- you couldn't see it, but in the map there is the Upper Truckee River Partnership, which is down to the south now, so it's south of the project I mentioned. We think we can do the assessment and strategy

for that within a year because we've built the framework for the assessment. Yes, we need to tweak some pieces, some indicators. We need to add a little bit more because there was a more of a watershed focus there. But it's purposely not two-and-a-half years of planning to get there.

And by the same extension, that's the same approach we're taking with the Tahoe Central Sierra Initiative. There are lot of great landscape collaboratives or groups there that are pushing out these pieces. There's a lot of regular exchange and so forth.

So very much to your point, we're willing to make that initial investment. But to go basin-wide and have that, it can't take so long again.

VICE CHAIR SCOTT: Also, you mentioned during your presentation the Quantitative Landscape Resilience Assessment. Will you please make sure we have that in our docket? I think that would be really helpful for us.

I had a question, also, for Dr. Saah. At the beginning, you mentioned that you're looking for some constructive feedback on the modeling. Do you have kind of an outreach plan? Are you

going to let people know when the model is ready or what are the best times to engage to really get that information in? Because I think that's incredibly important. And the modeling effort to try to look into the future and understand these trends and changes that used to be, you know, unique and outside of our skill but actually are now more kind of the scale of the typical things we're starting to see is really important. So I'm just wondering how you're going to get that additional information in?

DR. SAAH: So we just signed off our kickoff meeting paperwork yesterday, so we're very excited to get started.

One of the first things we're really working on is getting a Technical Advisory Committee. And I see some folks on this table that I'm hoping will be able to participate in that. And then attached to that, we actually do have an outreach and stakeholder engagement process that we will release to you. And hopefully you could help us publicize it as soon as we get the details in place, but there is a plan in place to do it. The details and the dates, I don't have yet, but it's going to be

statewide process.

VICE CHAIR SCOTT: And just, I have one more, and then I'm going to turn it over to Commissioner Monahan because she has kind of a macro question that I think will take us up to 12:30.

But I wanted to get -- maybe my question is a little bit of a macro question, too, so maybe brief answers to it.

Many of you have mentioned, and I think we all know this, climate change is going a lot faster than our ability to keep up with it; right? So we've got forest management we need to do. We're looking at the reservoirs. We have planning that we're trying to do. We have models that we're trying to put together. And I would love your take on how do we go faster? What kind of things do we need to do in this space to make sure that we're doing our best to keep up or even get out ahead of things? And so if you have some good ideas here, I think that would be great.

And I just wanted, also, to make a comment about the science that you all have presented and have talked to us about. To me, it's really impactful and it's meaningful science

and it matters. And it helps us inform decisions. And so I'm just excited that we've had this discussion and workshop today. I wanted to make that comment as well.

But if you have thoughts about how we can do this faster; right?

So, Dorian, you mentioned that instead of taking two-and-a-half years to plan the next one will probably only take a year. And getting the modeling, getting the information, I would love to maybe just really brief comments on that and then I'll turn it to Commissioner Monahan for the last question.

DR. SAAH: I'll take the first crack at it. I mean, we're entering this world into this no analog scenario. We have no idea how this thing is going to work. And if you look at the way our infrastructure has been built for a long time, our scientific infrastructure, it's been built around competitive science. I think that era is over. I think we really need to get into collaborative science and the place where we learn from each other as quickly as we can, we change things as quickly as we can, and we're open to those conversations.

I know the project that we're starting, that's built in place. I know the collaboration that we've had with Brian's group before with some of the CPUC mapping efforts that we've done beforehand, a similar sort of approach has worked, and I think that's going to be the way that we can solve this sort of thing in the future.

MR. D'AGOSTINO: I'm just going to second that, that our ability to work with each other at this point is really going to help us move faster.

COMMISSIONER MONAHAN: Well, I'm sensitive to -- oh, do you want to respond, Dorian?

MR. FOUGERES: Sure. I'll just say briefly, I mean, you know, we're finally shifting from assessment to planning. If you look at the literature on how much goes into assessments and the trends, I think we're finally getting there. So we are taking a careful look at actually how we do planning. Part of that is just by reading and staying current with the literature around decision windows or maladaptation.

But really, one of the big things that

we've looked at there is coupling forecasting with really integrating observed conditions in the field because it changes so fast. So really to have that on, you know, a one- or two-year basis versus saying, oh, well, that wasn't supposed to happen for 15 years, we want to have both.

And then the last piece I'll say is that we know, like it's not like we can do the action plan or the vulnerability assessment when we're done. So we really kind of view it as an ongoing reiterative, whatever, interactive process to get through that, so not giving up on the commitment.

DR. GEORGAKAKOS: I wanted to second that last thought in that the demonstration project, INFORM, has shown that adaptive management where you're taking into consideration the latest information and the latest projections on many scales, not just one, short or long, on many scales really provides a very effective management support. And I hope that it's, for reservoir management, systems of reservoirs, it is something that has to be developed in collaboration with the operating agencies and management agencies, that what is done, and

INFORM shows that it's feasible to be done, to move to operations.

I think we may have a good tool to be able to anticipate some of the fast or slow changes that are coming up in terms of many system objectives, so at least that has been our experience.

VICE CHAIR SCOTT: So I do want to be mindful of time. It is 12:30. But if folks want to indulge us with maybe about four more minutes, maybe you can ask your question and we could get real high-level thoughts from each one of you on that, that would be terrific.

COMMISSIONER MONAHAN: Now I'm afraid to ask the question because everybody's hungry. That's never good.

Well, you know, this was a great panel. And I was actually very curious, because you all are in the weeds doing this analysis that's critically important to decision making. And I was curious if you had burning question for each other? My worry is that we do not have time for scientists to respond to questions.

So I'll leave it just if there -- if you did have a thought, just that you would want to

share with your fellow researchers in terms of where you saw opportunity or where you thought, hmm, this might pose a risk or a challenge, are there -- is there anything burning that you would like to say to each other?

MR. FOUGERES: I don't have burning questions or anything like that. But I will say, it was fun to meet David in person because we've overlapped a little bit. And so we've already talked and agreed to share some of the work that we've done at Lake Tahoe West. It's just a very similar effort, so kind of putting those together to reduce, not to avoid duplication but really to find the complementary aspects, because I'm very excited to hear about the work that they're embarking upon.

The only other thing I'll say is, you know, listening to Brian and thinking about our Liberty Utility partners, I'm just wondering about some opportunity for exchange among the utilities? Because in the Tahoe Central Sierra Initiative landscape, the 2.4 million acres, that's PG&E as the utility provider there. So just even being able to take what Brian put on his slides and be able to share that with my

Liberty partners, to have some of that peer-to-peer exchange, it's not the Tahoe Conservancy as a state agency but the utilities, it would really help what we're doing in the basin.

MR. D'AGOSTINO: Just as a brief final thought, you know, there's a lot of potential collaboration here and we have been working a lot, utility to utility. I think there is this new environment that we've talked about where kind of all these walls are down. Everybody's sharing everything and it's just for the good of our communities now at this point. I think that everybody has the same purpose in this space right now, so I think that's going to continue to drive the ongoing collaboration.

DR. SAAH: Yeah. I'm just looking forward to the sidebar conversations that I'm hoping we can start during lunch.

VICE CHAIR SCOTT: Last word? No? Okay. All right.

Well, this was another excellent panel. Thank you so much for lending your expertise and spending time with us today. Thank you. Please do send all/any additional thoughts into our docket so we can make sure we get a really great

chapter written out of this fantastic conversation. We appreciate you being here. Thank you so much.

And thank you for moderating it, Guido.

(Applause)

VICE CHAIR SCOTT: Okay, we're now going to transition into our public comment period. I only have two blue cards. If you're in the room and want to make a comment, please do fill out a blue card, get it to Heather, she'll get it to me. And then my understanding is we have a couple of things that Heather will read to us from the WebEx as well.

So our first come is Jennifer Pezda.

COMMISSIONER RANDOLPH: And this is Commissioner Randolph. I just wanted to apologize. I have to run back to San Francisco for a meeting, so I'm sorry I'm missing public comment, which is always, you know, something I look forward to, but I'll read it later.

VICE CHAIR SCOTT: Thank you so much for being here with us. It was great to have you hear.

Jennifer, please go ahead. Yes. Make sure it's on.

MS. PEZDA: Hello? Does it seem on? Oh, it is on. Cool.

Hi. My name is Jennifer Pezda. I'm here on behalf of SoCalGas.

As we all know, the state is likely to face increasing frequency and severity of climate change disasters, including wildfires, floods and other calamities. As stated at least year's workshop, SoCalGas is committed to continually enhancing the suitability of the natural gas system to preserve the availability of balanced forms of energy that have proven integral in helping communities be more resilient in the face of climate change.

Last year we shared a set of case studies highlighting the resilience of the natural gas sector to four climate related disasters. And this year we've expanded on this work and added two additional events which include impacts from Hurricane Michael and the 2018 Woolsey and Hill Fires. They've expanded these studies, summarized the damages and disruptions experienced, the resilience successes, and the lessons learned about opportunities to increase resilience across the energy sector.

The primary takeaway has showed that, one, the resiliency of the natural gas system enabled thousands of residents to have heat and hot water at their homes when the electric grid was down, especially for days to weeks at a time. Two, the natural gas system provides lifesaving backup generation for critical resources and uses, like hospitals and relief centers, through the use of fuel cells or combined heat and power system. And three, the transit buses, garbage trucks and other vehicles servicing critical infrastructure needs that run on CNG or LNG can keep cities running during emergency response situations.

Oh, sure. Sorry.

These findings emphasize that the serious consequences that can occur from relying on only a single energy resource, especially one that is highly exposed and vulnerable to service disruptions caused by fires, hurricanes and other natural disasters.

SoCalGas continues to actively engage with the resiliency and adaptation efforts of all the cities and counties we serve, which includes working closely with local governments to assist

them in their planning efforts for climate adaptation and hazard mitigation. In addition, we are now taking applications for our second Climate Adaptation and Resiliency Planning Grant Program which awards $100,000 to local governments for local climate adaptation and resilience planning efforts as required by Senate Bill 379.

With that said, we appreciate the research the CEC and the CPUC is doing around climate change adaptation and resiliency. We hope that both agencies recognize that the natural gas grid should not be overlooked when addressing climate change mitigation and adaptation strategies. The natural gas grid is a valuable asset that provides reliable, affordable energy and is less vulnerable to disruptions caused from wildfires and other natural disasters.

We will be providing comments or additional comments that we will elaborate on regarding how natural gas and renewable natural gas can help improve resiliency in communities vulnerable to climate-related natural disasters and plan to share these case studies that I

referenced earlier as soon as we have them finalized.

Thank you for your time.

VICE CHAIR SCOTT: Thank you.

I have Lauren Cullum please.

MS. CULLUM: Hello. So I'm Lauren Cullum on behalf of Sierra Club California. Thank you for the opportunity to comment today and for hosting this workshop on climate adaptation.

We agree with a lot of what was said, especially concerning community resilience. We agree that it is incredibly important to work closely with community members through education, outreach and other engagement efforts. This can help ensure that determinations of what a particular community faces in terms of climate risks and what those communities need to help build up resilience is coming from the residents themselves. Each community across our state is faced with different climate risks, has different challenges and barriers, and has a different set of needs and capabilities.

And in facilitating this community-driven resilience, we need to make sure that we don't lose sight of our clean energy goals and

encourage an infrastructure that supports our need to get off of gas, whether that means more microgrids in rural communities, more EV charging stations evenly dispersed throughout the state, stop having dangerous pipelines that are in vulnerable communities, more electric homes, et cetera, and anything else that can help in our state's transition to clean -- relying on clean renewable energy.

Thank you.

VICE CHAIR SCOTT: Thank you.

I have Julia Levin.

MS. LEVIN: Good afternoon, Vice Chair and Commissioners. It's great to see you all here. Thank you for doing this. This is incredibly important and timely.

I wanted just to bring up a couple of things that, really, I don't think have been addressed this morning or today, starting with SB 1383 and the state's Short-Lived Climate Pollutant Strategy.

Commissioner Scott, you asked, how do we accelerate all of this? How do we go more quickly? And I think one of the most obvious ways to go more quickly is to take climate

actions that both reduce emissions and provide adaptation benefits.

And in the Short-Lived Climate Pollutant Strategy the vast majority of the strategy is relying on bioenergy to address all of our organic waste that would otherwise go to a landfill, or dairies that are releasing methane, as well as forest and agricultural waste that, when it's burned, produces black carbon, by far the most damaging climate pollutant.

More than a third of the state's entire climate scoping plan for 2030 to meet the requirements of SB 32, more than a third of all the emissions reductions have to come from the reductions of short-lived climate pollutants.

So what does that have to do with what you're talking about today with climate adaptation? All of that organic waste that has to be diverted away from landfills now under SB 1383, it's 15 million tons a year that has to go bioenergy and compost production instead of going to landfills, plus all the forest waste that the Tahoe Conservancy and others are talking about is now required by state law. Last year we enacted SB 901. It requires a doubling of forest fuel

removal. And then we have all the other vegetation removal. All of that can be used to produce local energy supplies and provide climate resilience.

And especially in rural communities where we have all of this forest waste and other vegetation that needs to be removed, that can be used locally to provide energy security. And these are some of the communities around the state that are most vulnerable to public safety power shutoffs. They will have a local energy supply if that forest and agricultural waste, other vegetation removed for wildfire reduction, is used to produce local energy supplies. So we really need to concentrate on that.

But even in urban areas, we have over 500 wastewater treatment facilities in California, over 300 landfills. We're going to have all this diverted organic waste. That can also provide local energy supplies in urban areas so that instead of going to diesel backup generators and other fossil fuels, particularly for emergency services, our wastewater treatment facilities, our hospitals, they're all investing in diesel backup generators right now because they're

terrified of the impacts of public safety power shutoffs. They could be running on biogas instead. And if we put that biogas into a fuel cell, then we have no combustion at any point in the process. And so we have enormous climate benefits and air quality benefits that will provide more grid resilience.

I think I'm going to leave it at that. Thank you very much.

VICE CHAIR SCOTT: Thank you.

And then I don't have any other blue cards.

So let me turn to Heather. I believe she had a few comments to read from the WebEx.

MS. RAITT: Okay. Great. So first is from Tom Phillips. It says,

> "FYI, the recent update to CHPS" -- can you not hear me? Okay. Sorry -- "CHPS.net rating criteria includes climate adaptation and resilience credits for sustainable healthy schools in California and other states. This includes low carbon backup power for schools and planning as community emergency shelters, as well as lifecycle long-term energy and thermal health

performance under climate change."

Okay. And then there's a few comments from Claire Warshaw that I will read.

COMMISSIONER MCALLISTER: Hey, Heather, can I just --

MS. RAITT: Yes?

COMMISSIONER MCALLISTER: So the C-H-P-S, CHPS, is the Collaborative for High-Performance Schools. I think that's what that was about --

MS. RAITT: Okay.

COMMISSIONER MCALLISTER: -- just to be clear for the record.

MS. RAITT: Okay. Thank you.

Next, from Clair Warshaw.

"Envoy Electric Car Share has shared options for multiunit complexes which might be worth sharing with manufactured home parks."

She also says,

"I agree, literacy is a huge issue. And wanting to read is a huge issue. There is so much need to read and understand what is best for the community, for a community."

Next,

"Perhaps using social media more to share various programs reaches out to a broad

audience. You can link your more sophisticated websites to the social media posts. It is cheap advertisement for your programs. Commissioner McAllister is correct in how hard it is to address the various community groups who can be so extremely -- have such extremely different ideologies."

So bear with me. Let's see.

"Is anyone doing risk assessments of wireless energy fields in terms of fire behavior? I know this much be an unpopular research choice. It seems fire danger and drought changed drastically in 2016 when our new president was elected. California has had a huge defense industry for a while. SpaceX sent up another satellite, according to the news yesterday, possibly shooting another hole in our ozone. No one regulates that fancy stuff it seems.

"Is there any way to figure out if satellites, and their connections to earth and panel meters, cell phone connections are playing a role in spreading wildfires? Would one not want to make wireless communication shut down, except for certain emergency

phones during wind events, for example? "The other thing is California has had a long history of drought periods. See the book Cadillac Desert. Despite that, urban wildfires with professionals nearby to fight make little sense. Arson-angry professionals may play roles.

I think there's one last one from Claire. "There could be social media posts about how landowners are responsible for their own vegetation management and information on how these small clearances, five to ten feet, make little difference in a big dry windstorm if there are dry trees and vegetation. Taking care of trees matters. They do not burn as much as certain kinds of vegetation has a higher oil content true, for example, oleander and eucalyptus burns even without dry leaves from what I have understood."

And that's all I have. Thanks.

VICE CHAIR SCOTT: And do we have any other comment on the WebEx?

MS. RAITT: We do.

VICE CHAIR SCOTT: Okay.

MS. RAITT: Tom Levin, we'll go ahead and

open up your line.

MR. PHILLIPS: Hi. This is Tom Phillips. Am I on?

MS. RAITT: Oh, yes. Go ahead please.

MR. PHILLIPS: Hi. Yeah. Two quick questions, one in terms of demonstration projects.

Do we have a listing anywhere or a network of (indiscernible) buildings and schools and other things, as well as fire departments, that are doing not only the short-term resilient design but also long-term adaptation?

And then the second question is in terms of the increasing rate of climate change and more and more potential tipping points that we're discovering, are the utilities or others looking at some of these really extreme events, such as the megadroughts or the atmospheric rivers which produce, you know, huge wind speeds and severe heat impacts and so on?

Thank you.

VICE CHAIR SCOTT: Thank you. We will -- one place to look, I think, would be on the -- and this is Energy Commission centric, so it's not a, you know, clearinghouse of

everything, but take a look at the Energy Commission web page under EPIC, E-P-I-C. It has a lot of interesting information about the projects that we've funded in that space. And there's also an energy innovations area that you can look at as well.

Do we have any other comment on the WebEx?

MS. RAITT: I don't think so.

VICE CHAIR SCOTT: Okay. So that is all of our public comment. I want to thank again all of our panelists and moderators. This was a really interesting and robust discussion. I feel like we all learned a lot today. And also to the engaged participation from our audience.

So we are adjourned.

(The workshop adjourned at 12:48 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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CER-915

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Myra Severtson
Certified Transcriber
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