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BEFORE THE

CALIFORNIA ENERGY COMMISSION

In the Matter of:	)	Docket No. 18-IEPR-02
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2018 Integrated Energy	)	
Policy Report	)	

IEPR COMMISSIONER WORKSHOP

North Coast Regional Energy Perspective

ARCATA D STREET COMMUNITY CENTER
1301 D Street
Arcata, California 95521

FRIDAY, APRIL 20, 2018

9:08 A.M.

Transcribed by:
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APPEARANCES

Commissioners Present

Karen Douglas, Commissioner
David Hochschild, Commissioner

Staff Present

Heather Raitt, IEPR Program Manager
Scott Flint, Energy Commission Staff
Alana Mathews, Public Advisor

Other State of California Officials Present

Christina Snider, Tribal Advisor to the Governor

Presenters Present

Dana Boudreau, Redwood Coast Energy Center
Jim Zoellick, Schatz Energy Research Center
Peggy O'Neill, Yurok Tribe
Andrea Alstone, Humboldt State University
Jana Ganion, Blue Lake Rancheria Tribal Government
Dave Carter, Schatz Energy Research Center
Jon Stallman, Pacific Gas & Electric
Necitas Sumait, Bureau of Ocean Energy Management
Steve Chung, Department of the Navy
Richard Engel, Redwood Coast Energy Authority

APPEARANCES (CONTINUED)

Public Comment

Jerome Carman, Schatz Energy Research Center

Peter Lehman, Schatz Energy Research Center

Frankie Meyers, Yurok Tribe

James Lanard, Magellan Wind/Copenhagen Infrastructure Partners

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P R O C E E D I N G S

9:08 a.m.

COMMISSIONER DOUGLAS: I'd like to welcome everybody to this Regional Integrated Energy Policy Workshop.

Most of our Integrated Energy Policy Report -- or IEPR -- workshops that the Energy Commission does are in Sacramento. They aren't always. But we've wanted to do more local workshops and actually bring more of a regional perspective into our State Energy Policy Report and also recognize and acknowledge some of the really impressive work that's occurred on the North Coast in planning for achieving renewable energy and climate goals and deploying extremely cutting-edge microgrid applications that have a real potential to both improve the delivery of services here and reliability and resilience on the North Coast, but also establish some replicable models for the rest of the state.

We're also going to have I think a really interesting panel on offshore wind. I recognize a number of people in the room who have been part of our informal outreach meetings that we've done in the last couple of days. I'm really glad that some of you are here, some new faces as well, and we'll have a good dialogue about that.

So, I think right now I'm going to see if

Commissioner Hochschild or Christina Snider have any opening comments, and then we'll go ahead and get started.

Thank you everybody.

COMMISSIONER HOCHSCHILD: Good morning. Thank you for being here, all the people from the North Coast. This is my first opportunity to have a hearing here in this part of the state and I'm really happy to be here. I really want to do a lot more listening than talking, but I will say what's happening generally with energy in the state. We are moving very rapidly to a clean energy future. We only had 12 percent renewables in the state of California in 2008. We're at 30 percent today. We don't count hydro in that. We're at 48 percent today. And we're on track to not just hit but to exceed the 50 percent renewable energy mandate by 2030 and there will be progress beyond that.

If you look out ahead at resources like offshore wind, it's incredible potential. We want to work through all the issues there and hear all the concerns and have an ongoing conversation with all of you about the potential and a path forward there.

So, I want to thank all of you for being here. And, Heather, did you want to say anything else?

MS. RAITT: Yeah, just a couple of logistical items.

COMMISSIONER HOCHSCHILD: Yeah. Okay. Go ahead.

MS. RAITT: Hi, I'm Heather Raitt. I'm the Program Manager for the Integrated Energy Policy Report. And just a couple of logistical things.

So, we are -- everything is going, broadcast, through our WebEx system so people who can't be here in person can sort of participate remotely. And, also, just wanted to let you know, so we'll be posting an audio recording of today's workshop in about a week. And we also have a court reporter here who is going to be developing a written transcript for us. So in about a month, we'll have a written transcript posted.

And all of our materials are posted on our website, and we do have handouts in the back of the room. And we do have a couple of more presentations today. So those will get posted, if not today, early next week.

Oh, and at the end of the day we will have an opportunity for public comment so all the folks in the audience can -- we allow three minutes per person to make some comments. And we also welcome written comments. And those are due in two weeks, so on May 4th.

COMMISSIONER DOUGLAS: Heather --

MS. RAITT: Yeah.

COMMISSIONER DOUGLAS: -- Alana is signaling sign-in sheet or --

MS. RAITT: Okay. And we have a sign-in sheet.

I'm sorry. I can't see that well right now. So, Alana is our public advisor in the back. And if you wanted to make public comments, just go and see her and she can help you get signed up to do that at the end of the day.

I think that's it for me.

COMMISSIONER DOUGLAS: Christina.

MS. SNIDER: Great. I'm just going to stand in place because I don't want to take up too much -- but thank you for having me commissioners.

I'm the newly appointed tribal advisor to the governor. I was appointed in February. And my role is to facilitate consultation and relationships between tribes, locals, and state stakeholders.

You know, as we approach climate change, it's really essential that we have these relationships solidified and that we're having ongoing communication and that we are proceeding in a respectful manner, you know, taking into consideration all of the different sides and all of the different interests.

And I'm interested to hear your ideas today on climate action and how we can collaborate and how we can create those relationships, solidify them, or facilitate them.

So, thank you, and I'm looking forward to it.

COMMISSIONER DOUGLAS: Thanks, Christina. So,

we'll go ahead and start with our panel now. And our first speaker is -- on North Coast Energy Perspectives is Dana Boudreau with Redwood Coast Energy Authority.

So, I'm sorry about the cord.

MR. BOUDREAU: Start off with a physical exam.

(Laughter.)

MR. BOUDREAU: Good morning. I'm Dana Boudreau. I'm the Director of Operations at the Redwood Coast Energy Authority.

And our agency was started in 2003 with a grant from the California Energy Commission, so we particularly thank the Commission for coming all the way up here and visiting us, being with us directly. Thank you.

So, for today, I'm going to give a little bit of background of the realities on the ground in Humboldt County. Then talk about the energy research and planning that we've done to date as a whole. Also talk about actions and strategies toward the future regarding the renewable Humboldt and talk about future opportunities.

Just starting off, no real surprises here, we're a remote, rural setting with the usual factors that come with that. We're geographically isolated, so 132,000 or so of us living on a broad swath of California real estate.

We have typical rural economics, mostly oriented around resource extraction, initially fishing, and then

leading into forest products, now focusing heavily on tourism. And, thankfully, we have a university here which helps a lot economically.

Also, we're grid constrained. We're pretty much at the end of the line for both electricity and gas, natural gas.

We've got strong local commitment despite those factors of being rural and isolated. One of the real benefits for us is that we've got historical collaboration between academics, government -- local government, state government -- and our investor owned utility, Pacific Gas and Electric Company.

So, for some reason we've all figured out how to collaborate together to get good work done. And that's something that's really synergistically worked well for Redwood Coast Energy Authority, because we can serve as a hub to bring those conversations into one conversation and then other work can happen around that.

We're very fortunate that the California Energy Commission had that foresight to create a regional energy office. I think there were only two in this state when we were founded in 2003. And the second one turned into the California Center for Sustainable Energy, I think, more or less.

Well, anyway, we've had 15 years now of working at

public engagements and working on planning and now we're diving pretty heavily into implementation activity. So, it's been a nice progression.

And you can see some of our activities on the slide here. And you notice that CEC was involve heavily in a lot of these activities. So, we appreciate the state engagement.

One of the major efforts that helped guide our conversation was the Repower Strategic Plan. Again, we worked with the Schatz Energy Research Center and with PG&E to develop this with many stakeholders, about 60 people, were directly involved. And it branched out to the public at large. And the general consensus was, the good news, a renewable energy future for Humboldt is quite feasible.

Our goal was to find out can we achieve 70 to 100 percent renewables; and at the end of the day, the high lift (phonetic) is, yes, we're going to get a hundred percent for about 15 percent above business as usual. That's pretty attainable.

How are we going to get there? Our cheapest solution is almost always energy efficiency. So, no matter what we do, we're going to be doing energy efficiency all the time. It's just a natural component of it.

For Humboldt County, biomass, wind, and perhaps more hydro can play a key role for our renewables. And

we'll be talking a lot about wind today.

We need to switch to plug-in electric vehicles or zero-emission vehicles. And also do fuel switching for domestic and commercial heating because that's the lion's share of our greenhouse gas emissions. So that's going to be an essential component as well.

Also distributed generation. Historically our grid wants to push from power plants out to all of us users. Now we have to figure out how do we distribute the generation across the landscape. And that's a tough nut to crack.

Coming out of that plan, our basic actions were to pursue biomass energy because we've got some restoration concerns and also enforce fire fuel reduction consideration as well, as I'm sure this last fire season has been a sobering reminder. Again, develop distributed generation so that we can have more opportunities for renewable energy rather than centralized power production. Focus on developing the technology that we need to get past our conventional renewable energy, so what kind of R&D can we do in our area.

Also, continue to engage the community. It's really important to us that we have campaigns that bring the public dollars back to all of our great constituents. And we need money. It's always a question of how are you

going to fund these projects. So, what can we do to develop those funding sources to help businesses, residence, and government fund these renewable projects.

Finally, all of these components really come together in the form of creating community energy supply. What happens here on the ground, taking personal responsibility for how energy is generated and used in our own neighborhood.

And that became our main focus, which brought us to a community choice energy program. These programs have been around in the United States, mostly on the East Coast. They've just recently kind of wandered over to the West Coast, and there's over a thousand of them now.

It's basically a way for local community to generate -- to take more control over how energy is produced, and to develop their own local perhaps, and to engage their community in the decision-making process on where energy comes from.

So, as our stakeholders got together to discuss this, the main factors to address were to have local controlled priorities, which community choice energy does by default.

Environmental quality was a concern. You know, everybody on the North Coast is here mostly because they know it's a beautiful area and we want to keep it that way.

Economic development is critical as well because, again, we were relying on the resource extraction. There's only so long you can do that, unless you're very sustainable at it. So, you need some form of economic sustainability moving forward.

And energy independence. Again, how could we be responsible over the energy that we consume locally.

The program was launched in 2017. We have a 93 percent participation rate, so the program is doing extremely well and it's stable, which is great. It's always good to get past those big initiatives with success.

We've got an initial power mix defined, and I'll show that in a minute. And we've also got new projects on the horizon.

Our initial power mix had 12 percent local biomasses.

Oh, we have a working mic here? Technical issues, please stand by.

What's interesting about local biomass is I think we had about 55 percent biomass in our power mix about 20 years ago. So, we've been reducing the amount of local renewable energy. And biomass right now is considered renewable at the state level. So, we're down to 12 percent. But this year, it's increasing back up to about 24 percent. And, again, this is where we could work

on R&D. Humboldt's not the best for solar. 71 percent installation rate. Any hands in the audience?

Never mind. A technical detail again.

Where we have solar potential up here because solar costs have really plummeted. So, it's coming. It will be a little slower.

We've got wind, but we're buying that out of Washington and Oregon right now. Lots of potential local. Let's see what we can do about that.

And also hydropower coming out of Washington mostly.

So, generally, we're doing pretty well. Right now, I think we're at 42 percent renewable energy for our conventional mix, and we also have a 100 percent renewable option as well. So, people can pay about $5 a day for the average residential consumer and have 100 percent renewable.

Community purchases are really important to us because we want to maximize the use of renewable energy in the region. But we also had to provide competitive rates because dollar is king in our economy. If we can though, let's give people an option to opt up to 100 percent. For me, I've been waiting for 30 years for the option to operate my lights on 100 percent renewable. As of last year, I could do that. I own an electric vehicle, and now

I can drive 100 percent renewable. These are real important things for me, and I hope they're important for the community as well.

Through our funding mechanisms that we can develop, we can promote a variety of interesting things, such as, enhanced net metering so that people at their homes can install perhaps a little more solar and get paid full value on that energy. So that creates more of an opportunity to distribute solar across the landscape. You can also work on promoting fuel switching, such as, electric vehicle charging and electric vehicle local incentives. This has been working really well in Sonoma and other places with community choice energy programs. So, there's a lot of potential for these types of projects.

At the state level, probably the biggest ask is let's do whatever we can to create energy security and resilience in our remote and rural communities. And I think they -- California Energy Commission -- has been doing a fantastic job with this. The renewable energy secure communities grant that was done in 2009, I believe, through 2012 was instrumental for making this happen. So, I'm really appreciative that the state is paying attention. Much of California is rural so whatever we can do here as a demonstration, has a lot of opportunity for replication through much of the geography of the state.

Also, we've got a lot of energy expertise in the North Coast now, that combination of the utilities, the academic research facilities, a local government agency, being able to talk about energy has created an excellent pool of knowledge and background for us to continue the dialogue on energy-related topics.

And, finally, we think there's a lot of opportunities for the North Coast to serve as a test bed. We're a finite community. We're pretty engaged as a public, I would say. And there are plenty of opportunities for us to figure out how to advance the energy technologies locally.

So, for next steps moving ahead, we need to really work on first at home get our regional renewable energy going, so focus on that business first. Then, also --

Hang on, we've got a WebEx-er displayed. Thank you. Great thanks.

Also, sea-level rise is definitely a consideration. We have a power plant. We all know the ocean is pretty close. We've got a power plant that is fairly low. We've got substations as well. We have transmission lines. In a coastal community, we really have to consider how that's going to be impacted by rising sea levels. And as groundwater tables rise as well, because of pressure, and we see those are all considerations. So, we

can't forget our existing infrastructure. We need that moving into the future to be able to tie in all of our renewable energy resources that's distributed across the landscape. So, got to take care of our infrastructure, too.

I personally feel like we really need to accelerate fuel switching capability. Transportation is probably about 49 percent of our local greenhouse gas emission challenge in the north state. So how are we going to get people out of petroleum-based transportation. So that needs extra scrutiny.

Finally, we have a wealth of renewable energy in Humboldt County. And so we'll be able to achieve our local vision pretty feasibly. I feel very confident about that. The challenge is what can we do to share that wealth out of our area. We have a very limited transmission line. It can do maybe 40 percent of our peak capacity. So, it's going to be a challenge to figure out how to move that energy out of this region to support the rest of the state to achieve its long-term mandates.

That's it. Thank you for your attention.

(Applause.)

COMMISSIONER DOUGLAS: So, I'm just testing -- testing the mic. Is this working? All right. Good. So, I think that we have a working mic. I'm going

to pass this to the next speaker.

So, I think we'll go to Jim Zoellick next with Schatz Energy Center, followed by Peggy O'Neill, Andrea Alstone.

MR. ZOELLICK: Do you want me to stand in front of --

COMMISSIONER DOUGLAS: You can go ahead and stand in the front.

MR. ZOELLICK: Okay. All right. It's a slight limbo. I could do the limbo under it, or I could --

(Laughter.)

COMMISSIONER DOUGLAS: All right.

MR. ZOELLICK: All right. Well, actually --

COMMISSIONER DOUGLAS: Can you -- is that all right.

MR. ZOELLICK: No. I have -- I made some notes for myself which I don't usually do. But that's fine.

I have three things to hold: The clicker, the microphone, and my notes, so -- and I only have two hands.

UNIDENTIFIED SPEAKER: Here I can advance the slides for you.

MR. ZOELLICK: Okay. That would be great. Thank you.

All right. Well, good morning everybody. Thank you for being here. Thank you to the Energy Commissioners

and the Energy Commission staff for making the long trip up here to the North Coast. We know real well how far it is to get to the rest of the state. So, thank you very much for being here today.

And a key point in my presentation today is really about the importance of partnerships. The importance of partnerships for energy sustainability and successful projects here in the North Coast, but really throughout the state. And we really appreciate the partnership that we've been able to create with the Energy Commission in moving these projects forward here on the North Coast. So, thank you for that. And, again, thank you for being here today.

So, my first few slides here --

If you could go to the next slide. Thank you.

My first few slides really kind of, you know, give the take-home message that I'm trying to get across today. And I kind of have a three-legged stool in my message. So, in these first two slides, I hope that comes across.

So, the first leg of the stool is that the North Coast has some very unique characteristics in terms of its energy picture. And those characteristics present both opportunities and challenges. And I think you'll see that a number of the things that Dana mentioned, there'll be a number of sort of common threads here. So --

Next slide, please.

So just to mention some of these unique characteristics. We're geographically isolated. We're essentially an energy peninsula here on the North Coast. We have constrained transmission, both for electricity and for natural gas. And Dana mentioned this. We can't generate all of the electricity we need to serve our load here on the North Coast.

Those connections are rather tenuous. There's a single natural gas line. There's two transmission lines that go to the Central Valley that connect us. So, you know, our connection is not all that secure.

We have a modest electrical load here on the North Coast. And a very unique characteristic compared to the rest of the state is that we're winter-peaking area.

We also have an abundant renewable energy resource portfolio: Off-shore wind, on-shore wind, wave perhaps down the road, and biomass and other resources as well.

We have strong expertise here on the North Coast from the university, from the Schatz Energy Resource Center, the organization I'm with, Redwood Coast Energy Authority, and some local contractors and consultants here on the North Coast. We have the Community Choice Energy Program that RCEA has started. And this is just a tremendous asset to help us move our sustainable energy vision forward. And we have a committed and engaged

community here on the North Coast that's willing to create the strong partnerships that are necessary.

So next slide, please.

So the -- the second leg of my stool then is that, what this all adds up to is that Humboldt County is an ideal location for a test bed for sustainable energy programs and projects, for a place that we can explore the challenges and demonstrate the strategies that are going to be necessary to achieve renewables at scale in California and to really create a renewable energy economy, and not just in the current electricity sector but also by converting the transportation sector and the heating sector over to electric and to a green electric future.

Next slide, please.

So, the third leg to my stool is partnerships. And the importance of partnerships and being key to our success. And some of the photos here are some of the partnerships for projects. It's the Schatz Energy Research Center has been involved with. The one in the upper left is a wind and hydro feasibility study that was funded by the U.S. Department of Energy that we did with the Yurok Tribe. And we'll hear from Peggy O'Neill next.

This was a 50-meter MET tower for monitoring wind energy on the Yurok Reservation. A couple of other slides in there are the Repower Humboldt strategic planning

workshops with stakeholders. And the slide to the right there is a recent -- the microgrid possibly at Blue Lake Rancheria and that project.

So, these partnerships include both local partnerships, but partnerships also with the state and also at the federal and even international level.

So federal level, folks like BOEM that was just here to talk with us about off-shore renewable energy. The Department of Energy. We just completed biomass project with the Department of Energy that was under the biomass research development initiative called Waste Wisdom. And lots of partnerships with the national labs. We're working -- the solar plus project that was just celebrated yesterday -- we're working with Lawrence Berkeley on that project. We worked with NREL on the microgrid project at Blue Lake. We worked with Idaho National Labs. And then the offshore wind, you know, possibility here has just brought these international energy firms, EDP Renewables and others, you know, Statoil.

And so really the partnerships go from local partnerships to regional, state-wide, federal, and even international.

Next slide, please.

So, in terms of the partnerships that we've built to date, to put -- to create these successful projects

here, this slide kind of shows some of the key partners. And I've left this slide very generic. The next one I'll kind of talk about the specific partners here on the North Coast that we worked with. But I left this one generic because I think that the partnerships that we've developed here is a model for how you can do sustainable energy projects successfully in communities.

So, some of the partners have been the state, a university with university research, local government, and perhaps local government and community choice aggregation, the local utility is a critical partner, local tribes, and then vendors and contractors. And this type of model could perhaps be replicated in other rural areas and other communities throughout the state.

Next slide, please.

So here on the North Coast the entities that have sort of constituted these different partners, so the university is, obviously, Humboldt State University, Schatz Energy Research Center, the organization that I'm with, and then talk a little bit about the roles that these different partners have played.

So, there's some of them that are common. Leadership and vision I think really have come from all these partners. I think one of the unique things that the universities can bring are research and analysis, but also

planning, project development and implementation.

For local government, we have the Redwood Coast Energy Authority, again leadership and vision, project planning, development. I think one of the unique things that local government brings is civic engagement. And then with CCAs the ability to finance projects. That's very critical.

Local tribes. And I listed a number of our local tribes here. Many of them that we've partnered with on energy projects here on the North Coast, again bringing leadership and vision, planning and project development and implementation. I think the unique thing that the tribes often bring is the ability to be a project host. And then also sometimes financing.

The state and the California Energy Commission, your leadership and vision, funding, and support, and expertise to support your local communities.

The utility. So, I think one of the really unique things here on the North Coast is that we've established a really strong partnership with our local investor-owned utility, Pacific Gas and Electric. And I think is especially unique for a community that started a community choice aggregation program.

You know, I think the way things have gone that there's been so contention between the IOUs and the CCAs.

And here on the North Coast, we really saw that, you know, we need PG&E. They're a critical partner to success here on the North Coast. And so we don't want to alienate them and say we're going to do this without you. No, we want to embrace them and look for ways that we can find projects that benefit our IOU and our local community. And they've been a great partner.

And then vendors and contractors and we've had the, you know, the fortune to work with some -- both local contractors that are very important to these local projects and very important to economic development in our community, but also with important project partners and vendors that are from, you know, big international firms, like Siemens, Tesla, and so forth.

So next slide, please.

So just a couple more slides here. So just a few of our sort of successful projects to date through these partnerships has gone from planning to implementation. So, Dana talked about the Repower Humboldt strategic plan, which really set our vision for the community and some strategies to implement that vision.

We've been able to really have some successful projects. We still have a long way to go. But the Community Choice Energy Program is again a great vehicle to allow us to move that vision forward.

We have a plug-in electric vehicle network publicly owned by RCEA. That really needs to be further developed, but I think that was a pretty unique thing for RCEA to take on that responsibility here locally.

The Blue Lake Rancheria low-carbon microgrid has been a tremendous success. It's really kind of put us on the map as far as microgrids. And it's already lead to additional projects here on the North Coast and additional al opportunities outside of the North Coast. So, the Solar Plus project we talked about -- or celebrated yesterday - is another sort of small microgrid project.

And then the ACV airport microgrid. And my colleague, Dave Carter, will talk more about microgrids. I won't go into the details. But that's a, you know, tremendous opportunity. Again, tremendous partnership with PG&E. And we think really has the ability to offer replication for microgrids throughout the state. And some of the work we'll be doing with PG&E in terms of experimental tariffs and things like that will be incredibly important to that work.

And the picture here is the Blue Lake microgrid that was just finished recently.

Next slide, please.

So, couple of slides here are really about our opportunities moving forward. So offshore wind and

microgrids are two of the, I think, key areas that we have tremendous opportunity right now. And both of those topics will be covered in a lot more detail today, so I won't say any more about them.

The bottom bullet I have here on this slide, Expanded Energy Efficiency Upgrades, Dana mentioned that. Yesterday, Lori Biondini spoke for the RCEA, talked about how, you know, that was really their original mandate and mission and still is today. And she talked yesterday about how they started, you know, one light bulb at a time. But, clearly, that being the, you know, top resource on state's loading order, it's the most economical, there's still a lot of work to be done. And we know our existing building infrastructure, a lot of it was built, the study we had done, over 70 percent of our buildings here were built before there was an energy code in California.

We have a tremendously, you know, ambitious and wonderfully aggressive energy code here in California. So, our new buildings are tremendously energy efficient. But the ones that were built before there was an energy code, not so much. And is he we have a lot of work to do there.

The other two bullets here, Electrified Transportation and Electrification of the Heating Sector --

If you go to the last slide, please.

So, I'm not going to spend a lot of time on this.

It's a bit busy. But this is a Sankey diagram, an energy diagram that was developed when we did the Repower Humboldt strategic plan. And the numbers and the proportions here are different than the rest of the state and perhaps some other communities. But the take-home message is that the transportation sector is a huge piece of the greenhouse gas emissions pie.

And I know that the Commissioners know this, and many people know this, but it's really important, I think, to keep that in mind. If we -- so here on the North Coast we had over 60 percent of our greenhouse gas emissions, we estimated were coming from the transportation sector and 20 from the heating sector. So that leaves 20 percent from the electricity sector. If we're 100 percent renewables, we have no greenhouse gas emissions from our electricity sector, we still only have achieved 20 percent of those greenhouse gas emissions, of removing them. So, transportation and heating sectors are really critical.

And transportation and electric vehicles are obviously really, you know, coming on strong. We have a lot of work to do here locally. We see that really moving forward. I will just say that we also see fuel-cell electric vehicles as still being an important part of the mix. And battery vehicles have really come a long way. But one example is -- one of our partnerships with

California agency, with the Caltrans, both talking with folks at the -- in Sacramento with the state -- you know, the main office of the state, but also here with our local District 1, they see fuel-cell electric vehicles as being critical for them to meet their mandate for zero-emission vehicles. And particularly in rural areas like ours, because for District 1, the distances that they have to drive in their vehicles are such that battery electrics just don't cut it for them for most of their vehicles.

And so District 1 has basically told us -- and there's fuel-cell vehicles now that -- you know, we've driven them for years here. We have a fueling station at Humboldt State -- they work. They're wonderful vehicles, but we have no fueling infrastructure here on the North Coast.

And if -- Caltrans said if we had hydrogen fueling station here, they would by a lot of fuel-cell vehicles and would use them. And so we've been looking at that partnership and trying to figure out a way to do that; but, you know, that's an important next step, we think.

And if we have -- so if we had a lot of -- let's say we have offshore wind and we haven't upgraded the transmission -- which that would be an important thing as well -- we could be generating hydrogen for vehicles and leading that transportation sector.

COMMISSIONER HOCHSCHILD: Can I just ask a question about the EV side of --

MR. ZOELLICK: Certainly.

COMMISSIONER HOCHSCHILD: Can everybody hear me okay, or --

So, we're adding about 12,000 electric vehicles a month now in California. Next month, we'll hit 400,000. Obviously, the state just set a new goal of 5 million, zero-emission vehicles about year 2030. Thank you very much. And that, by the way, raises electric load eight percent. Okay? So, this is where the nexus with offshore wind and renewables is. But I'm just curious, you know, most of the growth with electric use has been around bigger metropolitan areas, the Bay area, LA, and so on. There's challenges in the more remote areas. The ranges are longer and so on.

But I'm just curious are there any special rates, for example, that the CCA is offering here to encourage electric vehicle adoption, or what's the strategy you've seen around EV charging infrastructure locally?

MR. ZOELLICK: So, I'll just say one thing I can -- and then I can hand it to Dana --so definitely this public charging network -- which is how many stations now?

UNIDENTIFIED SPEAKER: 14.

MR. ZOELLICK: -- and largely funded by -- first

the planning and then the implementation by the AB 118 program from the California Energy Commission.

So, a number of stations have gone in. The RCEA has done a number of ride and drives. But in terms of actual incentives, certainly with the CCA, there's that opportunity.

Dana can you say more about that or ?

MR. BOUDREAU: Yes, thanks.

We've just launched the CCA, so we're still in the stabilization mode. But we're working out the variety of projects that we work on. Transportation will figure highly in that. Probably one of the first things that I'm going to promote is incentives for electric vehicle purchase. We're a rural area, so used vehicles are a major component. There really are very few incentive opportunities for used vehicle, so we'd like to see if we can figure that one out.

Also, incentives for Level 2 charging at home, for panel upgrades because that's a real bottle neck, and also in our electric vehicle network, charging network, we subsidize using our program. So that's been really helpful. We absolutely want to keep our costs well below gasoline per mile cost.

COMMISSIONER HOCHSCHILD: Great. That's really good to hear. I really encourage you to engage with Sonoma

Clean Power. They have done, I think, a lot of primary work on how to best incentivize their customers to go EV. And the other point that I want to make is that one thing with electric vehicles, they actually are a downward force on rates over time because you're -- unlike solar or efficiency where you're then using less power and you're distributing that fewer kilowatt hours, the cost incurred -- this is expanding of use and so your fixed costs can be spread over more energies.

But, you know, I really want to encourage you to keep current. It's good to hear.

MR. BOUDREAU: Yeah, thank you. We're fully engaged with Sonoma on that --

COMMISSIONER HOCHSCHILD: Great.

MR. BOUDREAU: And we also -- one of the reasons why we talk about tariffs is that gives us the ability to experiment with addressing the duck curve and dealing with excess renewables and charging and getting more dynamic behavior on power --

COMMISSIONER HOCHSCHILD: By the way, the last thing that occurs to me, we just got given $75,000,000 to give away for electrification of school buses, which is run by our colleague Commissioner Janea Scott. And that's for -- it's going to be rolling out this year, and that's a big opportunity. There's a big renewable integration for

that as well, because the buses are plugged in during the day when you have surplus renewable generation. So that's an opportunity that's just going to be (unintelligible) as well.

MR. ZOELLICK: Great. And that actually ends up -- my last (unintelligible) about electric -- the heating sector and (unintelligible), but so that's the end of my presentation.

Thanks very much.

COMMISSIONER DOUGLAS: Thank you very much.

(Applause.)

COMMISSIONER DOUGLAS: So, we've now made it easier to get to the front of the --

MS. O'NEILL: I'm not going to go up there.

COMMISSIONER DOUGLAS: If you'd like to sit down, that's just fine.

MS. O'NEILL: I don't think (unintelligible) very low. (Unintelligible) slip and fall. So, I'll wait for -- we're going to kind of go in a different direction.

Our project is probably not about innovation, it's about perseverance and challenge and trying to get up to the same point everybody else was. Because on the Yurok reservation, probably two-thirds of the reservation were not electrified. I tried to figure out why, but I think the closest I can figure is that there was going to be a

dam at Blue Creek. And all of the reservation that's not electrified was going to be under water. And so I think they just didn't bother.

And back in the day when people were putting in lines, they didn't follow --

UNIDENTIFIED SPEAKER: Peggy, your microphone. Can you turn it on?

MS. O'NEILL: I just don't want to start squeaking.

-- they didn't follow environmental laws like we do now. You know, often types they used -- they didn't have prevailing wages. So, distribution lines were put all over the state of California, but they were not put on the upper portion of the reservation.

There was a lot of resources that were being extract the up there. There were phones for a while, but later those were taken out because they had copper wire when the timber companies left.

So, in 2000, when I started working for the tribe -- two things -- three things to do here.

(Laughter.)

We were trying to figure out what direction to go. Do we just go all renewable? And doing renewables without a distribution system is very problematic, especially in our area where we have fluctuating weather patterns. We

have great sun up river, in the summertime, not so great because of the trees in the winter.

So, then you go, well, maybe we'll go biomass. And, you know, there were so many opportunities that it was really hard to sort through. There was even a point where I went to the council and said, let's create our own phone company our own power company. And I brought in -- they thought I was crazy I think. It was like, what are you thinking, you're going to run your own power. Maybe now it makes sense, but in 2000, it didn't make so much sense.

So, these two pictures here kind of show you some of the challenges. That's not Photoshopped on the left. That's actually the Department -- the military, we brought in the military to help us put in some of these difficult lines. And they have -- the military has an innovative readiness program. They come into communities and they practice, you know -- they're getting along in communities. The problem was then we actually went to war and they didn't need to practice anymore, so we were unable to continue to use them every year.

But they actually brought in -- they have people that are in, you know, PG&E equivalents that are on the East Coast that -- you know they're very experienced. And we brought them in. At first, we introduced them to PG&E and they weren't really sure what we were up to, but they

realized quickly that these were their counterparts and so that was fine. And they were great. You have -- they paid for all of their own labor, their own heavy equipment. We had to provide all the materials. But they are only there for a short period of time, so if you want them to finish, you have to keep up with them because they're all business.

On your right, that's just to show you what we're up against when we're putting in poles. We actually put poles up that hill. One of the largest poles on the reservation was put on that hill and then it burnt up in a fire and we had to replace it -- or PG&E had to replace it.

So that's just one of the biggest challenges.

So how does this thing work.

UNIDENTIFIED SPEAKER: There you go.

MS. O'NEILL: So, this is the reservation. The reservation is about 50, 60 miles long, a mile on either side of the river. And it goes into two counties. We also have two power companies, we have Pacific Power in Del Norte County, and in Humboldt County, we have PG&E, which is another challenge.

Hydropower provides power to the Del Norte section of the reservation. We're also the end of line on two power companies. So, we're the disconnect in California between Oregon and California.

You can see we have some ability to have

hydropower. There's our river and some of our larger creeks.

I keep wanting to tell somebody else to turn, but it's me so I better pay attention. Oops. Maybe you should do this for me, because I can't do two things at once.

Okay. So, this is the history of our grid projects that we did. They started actually in 2000, because we had to do a year of design. And then these are the years of construction. And then they are kind of color-coded to have the right.

But we've so far done about 30 miles and it's cost us about $19.2 million. And I have to say that if someone walked in and said here's all the money you need to do this project and don't worry about right away and don't worry about cultural and environmental issues, I probably would have finished this project in about three years. But the challenges that you face when you're in the areas that we're in turned it into a 20-year project basically before it will be done. We will have power to the end of the road by next year. We're always up against weather. We're doing a large swath on this last phase of underground through a very highly cultural area, so that was determined to be the best course to go through that area.

We're also going along the highway. And we have one-lane state house, and so that's problematic, too.

The next one.

This is the upper reservation, and this is the project from the beginning to the end that we've been working on for the last 18, 20 years. And the circled areas are areas that are still not electrified. So, while this is this big project to electrify the reservation, it's really only accomplished a partial electrification.

We still have another third of the reservation in between Humboldt and Del Norte County that has no electricity, but it's an area that people lived in traditionally and maybe someday would like to live again, but because of the lack of a good road system, phones, and power, they've concentrated in areas. And that's kind of been an issue.

We also have, you know, you can see the borders of the reservation. But the ancestral areas are, you know, beyond there. There's over, you know, it's 60, 80,000 acres of ancestral territory that is beyond the reservation. So, a lot of our critical areas for wind are in the high country, which is also very significant cultural to the Yurok people.

So, we still have a long way to go. You know, it seems like we've made a lot of progress in putting in distribution lines, but, you know, now we're ready to kind of keep going. And I don't think this is going to stop.

It will certainly out last me.

So, I put this first because I cannot underestimate what right-of-way challenges have been to this project. Probably if I'd known how hard this was going to be, I don't know if I would have even taken on this project. But getting right-of-way, I could write a book on stories about right-of-way. We've had people -- we have absentee landowners who don't answer the phone when you call, don't answer letters, gets thing in the mail and just throw it to the side. And so you're literally, you know, are stalking these people and chasing them down. In some cases, they haven't done probates on property for several different owners. And, you know, you have stories about a man and woman -- this was 30 years they had been divorced. And he had got the land in the divorce, but it had never -- the paperwork had never been done. So, we literally have to -- you know, these people hated each other, and we had to be the conduit between them to finish this process. And then the man died. The week we can that he was going to sign the probate, we call him up, and he had died. So, we had to start all over again.

But that's just one example of many that I could give you on what it takes to get right-of-ways.

We have highly fractionated Indian trust allotments, which means you could have a thousand owners.

And that's another problem and a challenge.

And the tribe has no tribal right-of-way condemnation powers. This is something that's unbelievable. Your gas lines that go through, your oil distribution lines, they can condemn. Counties can condemn. The utility companies can condemn. But tribes cannot condemn. So, we have to go through, you know, just stalking people, showing up, trying to be nice, you know, doing everything. We would actually have our office of tribal attorney start their probates for them so that we could have executors assigned. It's been the biggest nightmare of everything. Like I said, if I didn't have to worry about this problem, we could have done a long time ago.

The picture off to right, I want to just call out. On the right you can see that, that's not a PG&E pole. That was actually a family that created their own power for their family. And so they -- this was a nightmare for PG&E. We had a standoff. They weren't going to take their power down until the other power went on and PG&E was like there's no way we're going near that thing, that looks like -- so we had to negotiate between the two entities to be able to do this, you know, shift where one goes down, the other one goes on.

But I want to show you that people were

innovative. They created their own hydro system. And several families that were connected ran off of that system.

We can go to the next one.

This is a picture of kind of where everybody lives. But it shows that off-grid renewable energy sounds really great, but if you've ever had to live like that where you don't have a grid, it's very problematic, especially if you're living in poverty, if you're an elder, you need batteries, they're expensive. It was costing about $25,000 a house to get a solar system when you don't have a grid.

So, getting -- we went back and forth and not having been an expert on energy at all when I started this, and I'm probably still not, it was what direction do you go. And we -- it sounds really good to have everybody off grid all renewable, but it's not. You really do need PG&E. Like you said, it's a partnership. And it's a partnership that we've built. I'm not going to say it's always been good. It's much better now than it was in the beginning. You know, it's a different lifestyle up there. And sometimes when people go into a community, we have the tribal community, we have a lot of poverty, but we also had a lot of illegal Cannabis growing up in that area. And so you're literally taking PG&E workers into places and

they're just blown away. You know, but that's what we had to do to get this project done. And so we've developed a pretty good relationship now.

We haven't had to deal as much with Pacific Power because, like I said, Del Norte County has been electrified. We've just done some smaller projects with them.

So, you want to keep going.

So, a large percentage of the population up there is in extreme poverty. And when you mentioned about houses not being up to code, we can't just put electricity in a house that looks like this. And this is pretty representative of a lot of the housing up there.

So, you have to get their home ready. PG&E is not going to turn power onto something that is going to burn down and start a forest fire. So, in addition to bringing in distribution, you know, it's like do you put solar panels on a house that, you know, needs a new roof? So, there's so many more challenges than you might have taking electricity to a city, you know, taking it to a very rural population.

Also, we don't have a lot of discretionary funds and we don't have a lot of staff that we can just put on one project. And really you do need to have an energy planner or manager, somebody that's just working on this

all the time. And, you know, in addition to not having electricity, we didn't have phones, we didn't have -- all of our water was boil-water notices when I got there. You know, we didn't have a road system. You know, it's ironic because we're on the Klamath River which, you know, it's fed by the Trinity River, which are big energy producers for other people, but nobody seemed to, you know, say, well, gee, what are you guys doing down there with no power, no phones? Let's help you out.

Everything that we have done has been us going after grants, having to come up with matches, and the matches have gotten higher. So that's you know, and competing. Early on, we went back to DC, my first trip to DC, I lost my luggage and I had to lobby in my jeans. But they must have thought we were really needy. But we went to [USDA's] R.U.S. and they -- when we told them we had schools without power, we had schools without phones, they really kind of adopted us and they've seen us through to the end of the road. And they've been a good partner. But still we have to complete. You know, we have to write a grant. We have to tell our story. We have to meet all of the benchmarks to get funded. And that's what we've done all along. There's -- no one has ever walked up and said, this isn't right. Here's a check. No, that has not happened.

The next slide.

So still 50 percent of the Yurok reservation does not have grid electricity or phones. That's still a challenge that we're going to work on. But, as you can see, the distribution of where people live, there's not as many people in the mid-section. But going into the future, I really do feel that those are areas where people will want to live again. And we're going to need to plan for some form of electricity in those areas.

Off-grid residents pay a very disproportionate share of their annual income. You know, in the very beginning when I was writing these grants for R.U.S, it was shocking to me, you know, to -- you know, you go home on you turn on your microwave and your TV and you dry your hair and all of those things that you do, people did not get to do on the reservation. They had to have gas generators. The school -- Jack Norton School is still run on a gas generator, which is in total violation of -- when we called up -- we called up Sacramento, the school superintendent, one time and said, "Do you know we have schools without phones and electricity?" And they were going to shut them down. So, we were like, well, we better not call them again. But they still are on generators.

And you have to have propane appliances. They're very expensive and they're not as large as some of the

other appliances. You know, you have to have wood stove, propane, kerosene, wood fuel and the cost is so high that most people don't have all of the above, you know. So, they literally did without most of the time or they had, you know, they would turn on the generator a little bit, they'd turn it off. You know, so for a large portion of their income that they really didn't have, they were only getting part-time electricity because they did not have grid power to back up. You know, so when it's raining and your solar system is not working or -- you know, you just turn on the -- and the nightmares like going into people's houses where they have one extension cord that like snakes all over the house and -- it's like what you would encounter during a disaster is like everyday life.

So, we've had challenges. The lack of the back-up grid somebody has already mentioned, the seasonal varying weather patterns -- we have completely different weather from the upriver to the -- you know, yesterday, when I was at Blue Lake I was sitting there a while and listening. And I was excited for them. All I could think of is, I wish had it this easy. Because we can't just build one system. You know, we have to build them every way. Because it's 50 miles, you know. And there's communities all over the place.

We always do not have -- although this is changes

as the tribe has acquired more and more lands -- we don't always control the land that is the best place to put things. Ironically other people bought them, and so we don't have those.

We also have very mountainous terrain with high-density tree cover, which you could see, you know, viewing those -- just putting in that anemometer from DOE was like -- we had to clear all these trees and it was very -- everything is expensive. Clearing for anything is very expensive. It's one of your higher costs.

We have numerous cultural resources in these areas. High country are very sacred areas for Yurok peoples. It's where they have their dances and prayer spots. And so as soon as you find something and you think it's going to be a great place, the next place you go is to culture to find out if you can even think about doing something there.

We also have salmon and steelhead, same thing. Here's a great place to put hydro system, and then they go, no, that's not going to work.

So, I've become very callous, I guess, over the years. I could -- you know, bring me onto any project and I'll tell you all your problems you're going to encounter.

There's a high debt-to-revenue -- I hope I'm saying this right -- for capital loan paybacks. So, if you

go in and you say okay we have hydro system, then you have to figure out if you can repay the loan. And sometimes you can, sometimes you can't, depending on the cost of energy. Same thing with biomass. You know, if the price of energy is really high, biomass makes a lot of sense, except for then you've got large haul costs, too, because fuel costs are up.

So, you have to -- the economy of having renewable energy always doesn't pencil out all the time, so -- but we do have opportunities. Even though I sound nothing but negative, we have the Klamath River and we have the tributaries of the Klamath River. And what I think is, you know, you can see all the different opportunities that we have, but I think we can't just rely on one, we have to rely on multiple ones. And, you know, we would like to see a day -- and that's why we're working with Schatz right now to develop a Yurok strategy, energy strategy, and action plan, sort of like your repower plan because you could really bounce all over the place with this.

And if you don't stay focused -- we did a transportation plan, and that's worked out good for us. So, we really see the value now of having an energy plan and not having it just be something that's in my head and, you know, letting people work on various different components of this. And we could be working on this

forever, basically. Right? Yeah. No shortage of projects, just funding.

And like everyone else, this -- you know, I don't think anyone in the room doesn't believe that, you know, everyone wants to have affordable, cost-effective energy services. We want to have a tribal energy program that promotes self-sufficiency, environmental sustainability, reliance on renewable resources, but we also want jobs. And we want economic opportunity, also, whether it's in generating power or having businesses that depend on hour, we cannot continue -- we're the largest tribe in California. And every time I write a grant and I say we're the poorest, largest tribe in California, I wish I could not say that. You know, I mean being large is fine, but I don't want to be known as the poorest tribe in California when we have so many resources available to us. And so many other people that have taken advantage of those resources. You know, we have a history of -- we're up against this right now with cannabis -- you know, competing with other people wanting our resources. And yet we're never getting anything out of it. And we have to turn that corner and not just always be, you know, trying to catch up. We need to be a leader someday. And I hope that some of the younger people in the tribe will be able to make that turn away from poverty.

Thank you.

(Applause.)

COMMISSIONER DOUGLAS: So, thank you, Peggy. And I just wanted to say a number of comments. The people on the state team who came up here the last couple of days had an opportunity to visit the Yurok, and we really appreciate you Peggy and Gino and others just taking the time to meet with us and to give us an opportunity to really see what you're up against here. I really like the idea that you have of , you know, finding a way to create a plan, an energy plan that, you know, engages the tribal people on the Yurok reservation and really kind of creates a vision that you can work to implement. We've seen that be successful in other places. But I also want to commend you for your persistence over decades of work to try to bring electricity to the reservation because it's -- as is clear from everyone who listens to you and as was clear from our visit-- it's a tough project. And you've made tremendous progress, as much as I know there's work to do and work ahead, you've made tremendous progress.

I think we'll finish the panel, but I'll put a question your direction for when we get into some panel discussion, which is in terms of partnerships, I know that the Yurok Tribe has worked with PG&E, I know you've worked with Schatz, I know that you probably have had some other

regional partners, I'm interested in your thoughts on kind of effective regional partnerships and how to strengthen that and help build that towards coming to fruition on planning and on bringing projects, you know, on the ground to benefit people.

But thank you.

Andrea.

MS. ALSTONE: Hello. Can you hear me? Am I coming through?

So, thank you. I just want to say thank you for inviting me to be on this panel. I'm Andrea Alstone, and I'm the energy planner and analyst in facilities management at HSU. And I just wanted to touch on things that were more sort of unique to HSU. I think Dana and Jim did a really good job of pointing out the opportunities and the challenges in Humboldt generally, so I didn't want to repeat a whole bunch of that stuff.

So just some statistics about HSU. We have about 7,600 students across 51 majors and 12 graduate programs in our three colleges. We have about 600 faculty and a similar number of staff. We've got about 114 buildings on our campus. And I think we might be the largest energy user in the county. We use about 13 million kilowatt hours a year with our peak demand of 2.1 megawatts, usually it's about two megawatts typically, and about a million therms

of natural gas. And we are a direct-access customer, so we don't participate in the community choice aggregate, and we are non-core gas users, so we also use third-party gas suppliers. And those contracts are negotiated with the Chancellor's Office for the CSU, so we don't have -- I mean, we have say in who chooses them -- but we don't directly get to choose who our energy providers are. I think about half of the CSU campuses are direct access. A little background.

So, some of our challenges -- and it was mentioned a little bit earlier -- but is building age. So, our average building age on campus is 45 years old, and that is accounting for square footage. And so with that building age comes a long list of deferred maintenance throughout campus. And that deferred maintenance is only aggravated by the ongoing budget crisis which is happening right now. We're cutting something like $9 million from our budget for the next fiscal year, more than $1 million of that is coming from our facilities' budget, which will just make that deferred maintenance list even longer.

And kind of compounding that from the facilities' view is that when we do projects to save energy around campus, we don't get to actually realize the savings from that because they're sort of different pots of money. So, the money that goes to pay for the utility bills is

different from the money that goes to pay for these various projects. So that's -- it's a big challenge, particularly from my perspective as the energy planner.

And then, of course, there's climate adaptation in our coastal community. You can see from this picture, we're right by the bay. And as sea-level rise happens, we're going to be affected. The university itself, I think, is out of the all the sea-level rise projections; but our community at large is not. And so that's going to be a big challenge.

And so some of the opportunities, though, we're fortunate in that our campus has done a lot of planning and is taking climate change seriously. And so we've done some strategic planning, and part of that is our climate action plan, which is our roadmap that's trying to reach some of these sustainability policy goals that the Chancellor's office has laid out. Our campus has fully embraced those opportunities, and so we did a very collaborative process for getting a lot of stakeholder buy-in for how we're going to reach our climate action goals, our climate adaptation goals.

We also have a lot of student involvement, even for our city. So, students are important, but we have the Humboldt Energy Dependence Fund, which is a tax on students. Students voted to tax themselves so that they

could have a pot of money to do interesting projects. And these projects are all student ideas and they're kind of developed by students, and it's great that students have that foresight.

And, of course, we've got the Schatz Energy Resource Center, which is housed on our campus, which is doing all kinds of really interesting and innovative research. So that is definitely an asset to us. And as has been mentioned before, we have a really engaged community of energy professionals. I mean, we just have a lot of collaborations. We know each other. We really well together. And that's just something that's really great to be around.

And then I'll just highlight, the students, the past, the present, the future students. There are a lot of HSU alum in this room, on this panel, and they're doing a lot of really cool stuff. And I think that's really what a university really brings to the, you know, the game: Our students.

And so just to talk a little bit about our climate action plan. The main goals are to reach a 1990 greenhouse gas levels by 2020. We're actually there. And then 80 percent below 1990 levels by 2030 -- by 2040 excuse me. And our president has kind of put out are what she calls the moonshot, which is to be climate neutral by 2030 and

potentially negative after that. So, that's a pretty ambitious goal, but this really sets the stage that, you know, we take this stuff seriously on our campus and it's really important in our climate goals.

And so our climate action plan has 55 strategies across all levels of transportation and curriculum, but really the largest opportunity is from electrification. And I point out heating, specifically, because in our climate action plan, we didn't look at the transportation of commuters coming to and from campus. So that would change the picture substantially, but, you know, as has been mentioned, we have a lot of -- we're a winter-peaking load, with our natural gas, we have a lot of really old furnaces and boilers that are heating our old building. So, moving over to electrification really is our biggest opportunity.

And just to date, we've, you know, started action on about 22 of those strategies. So, it's happening on our campus, and it's really great.

And then I'll just touch on some of our resiliency planning, which is, again, you know, we are taking climate change seriously in our campus-planning efforts. And so we just started a resiliency-planning effort with a goal of being to really incorporate climate adaptation into our general planning on campus. So just the typical things

that you would think about with climate adaptation, like emergency and hazard planning, but also some of our business-continuity planning, which is just kind of like business as usually and how these will be affected by climate change. So, an example is that during the wildfires that were happening in the fall, there was really bad air quality around because of all the fires. And that was impacting the way some athletic programs were going to be held. And so we have to start thinking about how climate change is going to be affecting our normal business operations. And so the university is taking seriously those efforts and taking that into account for their planning for the future.

So, we held an initial workshop, and that was just earlier this month. And it involved stakeholders from HSU, from the city of Arcata, and also from the Redwood Coast Energy Authority. And it was, you know, pointing out what our strength and our assets and our vulnerabilities are. And I'll just mention that one of the strengths that was kind of repeated in that was just our local, engaged, connected community and the partnerships (unintelligible) them. So that's a theme that, you know, we didn't discuss it together, but it just turns out that that was something that we've all kind of recognized as a really important part of our local community.

So, our next steps, we're going to be holding more workshops to include more students and other community stakeholders to just kind of get this ball going and plan more for that.

So, I have a very brief presentation but I'll just end with this really photo montage of all of our students. I was picking pictures for this, and it was really hard because we have so many awesome students. And I'll just reiterate again that our students are our biggest strength.

(Applause.)

COMMISSIONER DOUGLAS: Well, thank you, Andrea. And I was going to ask you a question. You know, the issue you raised that facilities budgets are going down and there's deferred maintenance and yet when you do a project that effectively saves energy, those savings go to somebody else's budget. That's a problem that we've seen replicated in many places, including the state. And, actually, one of the programs I put my shoulder behind years ago when we had some ARRA money, American Recovery and Reinvestment Act money, was to create a modest revolving fund within the Department of General Services where they could provide, essentially, loans to agencies to do projects that would reduce energy bills and actually get repaid from the energy savings so that they could continue kind of working on these projects and the departments would eventually, you

know, realize the benefits of those savings in the proper part of their budgets, or at least to their proper departments.

But, has that been something that the university or the CSU system, you know the university system more generally, has tried to address? Because that is pretty fundamental. It is much harder to sell a project like this.

MS. ALSTONE: It is. And we have talked about doing some revolving fund things on campus. It's more sort of a sustainable like green fund revolving fund, and so that kind of limits the kinds of projects that you can do with that.

On-bill financing from PG&E is another opportunity that we have for kind of funding projects out of that energy pot of money where the -- you know, you take zero-interest loans from PG&E and you repay them on your bill-- so that way it's not coming out of our capital budget. And so that's another opportunity to do some of those switchings.

But it would be nice if there were easier mechanisms for being able to realize those savings back to us in facilities.

COMMISSIONER DOUGLAS: Yes, absolutely.

Do you have any other questions? Let's see.

COMMISSIONER HOCHSCHILD: I'm just curious, you know, one of the big successes I would say for the state in terms of energy efficiency over the last years has been the PACE program. It's something in the order of, you know, a-billion-and-a-half or $2 billion in PACE -- the project (unintelligible). How much of that has happened in this area?

COMMISSIONER DOUGLAS: Give that over to Dana.

MR. BOUDREAU: RCEA has been working on PACE for about four years now. We -- initially there was a lot of excitement about it. I think one of the challenges is just the low-income nature of our community. We had two levels of involvement. And we really wanted to see people participate in the higher cost, more comprehensive project because that's where you really get into the energy savings, and most people defaulted toward the lower end.

Now we're still getting pretty good engagement, but our residential programs are really challenged because of the age of the building stock, the additional activities that you have to do to prepare the facility to be properly retrofitted for energy efficiency, so if you have to do a roof replacement, cladding and so on, it really drives up your cost. So, if you're looking at a $50,000 project, it's a daunting task for a resident to think about taking on that level of financial burden.

COMMISSIONER HOCHSCHILD: The other question I had was just, you know, almost 20 percent of our electricity in the state gets used for moving water, wastewater. And, you know, just my observation about what's happened with our weather and our climate here. You know, this -- it's going to be feast or famine, I think. And we had 200 percent annual rainfall last year followed by another drought and the worst forest fires in the history of the state.

And just looking at water conservation, I'm just curious if there's any update on what's been happening on that side of things.

MR. ZOELLICK: I know there has been some efforts. I think actually that the state, if I remember correctly, gave a little bit of a reprieve for our region. Actually, one interesting challenge that we face, so our water district, Humboldt Bay Municipal Water District, provides water for a large part of the region, not all of the region, but the area around Humboldt Bay.

The water comes from rainy wells in the Mad River. And there used to be pulp mills on the peninsula of the bay, two large pulp mills, that consumed -- I don't remember how many millions of gallons of water per day, but it was a tremendous amount of water. And it wasn't treated, but it largely subsidized the cost of water for the rest of us. It also gave us the water rights to that

water. In California, if you don't use it, you lose it in terms of water rights.

And so what's happened is those pulp mills have shut down. And the water district is looking at possibly losing those water rights. And they've been -- they've gone through a strategic planning process over the last number of years trying to identify how can we use that water, actually looking at bringing, you know, breweries or soda -- you know, whatever -- bringing the industry here to use water. And what they've found was there's really no industry that uses water at the level that these pulp mills did.

They've also explored the possibility of being able to keep water in the rivers, because that's an important thing, you know, for fisheries and so forth, and whether that could be a sort of, you know, a use that would allow us to maintain those water rights.

But that does add a challenge in terms of water conservation where there's this sort of perverse incentive that if we conserve water we might actually lose those water rights.

That said, I think there has been some water conservation effort. But we are a weather region of the state, so I think that there's less focus on that here.

COMMISSIONER DOUGLAS: So, I'll ask a question,

and I'll also ask -- oh, did you want -- go ahead.

MR. BOUDREAU: Just to elaborate, there's an opportunity -- I don't believe right now there's an accredited association for pump testing services. So, we tried ten years ago to get somebody accredited and there's no testing institution to send them.

So, if we had an opportunity at the state level to support that, I think that would help. Again, there's an economies of scale. You usually have to get about ten horsepower on a pump itself before it can pay for the engineering exercise to figure out how to make it more efficient.

COMMISSIONER DOUGLAS: Good -- okay. Hang you. Okay. Go ahead.

MR. CARMAN: And if I can make just a quick comment that --

COMMISSIONER DOUGLAS: Go ahead and introduce -- identify yourself, please.

MR. CARMAN: Jerome Carman with the Schatz Center.

Just really quick also that in terms of the energy intensity of moving water, there's a significant difference between Southern California and Northern California, almost an order of magnitude. So, we have -- it's less of an issue up here.

COMMISSIONER DOUGLAS: Great. So just for sound,

if we could -- can hold the microphone close. And I think they're getting the volume up as high as they can without getting interference. So, we'll make sure everyone can hear.

I was going to ask, you know, we're in obviously a very heavily forested region and there have been references to bio mass, and yet we all know that biomass has been really challenging. We've got kind of older plants and some of them are at the end of their lifespan and having various sorts of challenges. There has been some investment. And the Energy Commission has funded some investment in smaller scale biomass and opportunities like that. And I wondered if Schatz or RCEA or anyone else wanted to speak to where that is in your view.

MR. CARTER: Dave Carter with Schatz Center. So, we've been doing biomass research for the last -- oh, it's been five years or so, most recently with a large project that -- it was funded by the Department of Energy that was looking at how to utilize forest residuals that are generated from timber practices. These residuals, we have a high abundance of them in our forest locally. And they cause fire hazards, and there's a need to be able to utilize those for beneficial purposes. But they don't pay their way out of the wood, so that's been a real struggle for us here.

And so we've looked at some biomass conversion technologies to try to increase the value of those residuals by either densifying them into briquette that can be co-fired with cord wood or in like an industrial broiler, like a school for example. And then biochar, that's something we've looked at extensively, which has a lot of climate change mitigation benefits.

And then we've looked at torrefaction, which is -- it's a way to condition the biomass to make it burn cleaner. And in the end, if you're going to, for example, use it in a power plant, which one way that torrefaction is viewed as a strategy to utilize biomass residual.

So, we've also looked at gasification through working with some machines that are built by All Power Labs in Berkeley, California. We have some active projects with them, better CEC funded, where we're doing the measurement verification piece to sort of help verify that their performance goals are being met for those grants.

And so -- and of course Redwood Coast Energy Authority is paying premium for some biomass power here locally because it benefits the community from a jobs' perspective. And forest residuals fuels reduction wild fire mitigation perspectives.

So, we're doing a lot; however, the margins are very, very thin on biomass utilization. And that's

typically what we bump up against.

COMMISSIONER DOUGLAS: Okay. So, I'm just curious, is this microphone easier to hear than the other one?

(Collective answers.)

COMMISSIONER DOUGLAS: Why don't we trade?

UNIDENTIFIED SPEAKER: Can't hear the other one at all.

MR. ZOELLICK: The microphone is off.

UNIDENTIFIED SPEAKER: Yeah.

UNIDENTIFIED SPEAKE: This work just fine.

MR. ZOELLICK: The on-off button.

MS. RAITT: Being engineers we're overqualified.

UNIDENTIFIED SPEAKER: We're overqualified.

MR. ZOELLICK: But thank you for -- see, I said we need support from the California Energy Commission. (Unintelligible) expertise right there.

(Laughter.)

MR. ZOELLICK: Commissioner Douglas, I would just add a few more comments about that. So -- and Dave mentioned there at the end that our you know, traditional ranking cycle biomass power plants, there are three. There's one that's running now, and there's one that's about to come back online.

All three of those would be shut done at this time

if not for the Redwood Coast Energy Authority and the Community Choice Aggregation Program, because the price of that power at this point is so expensive, that it would not be part of PG&E's portfolio, it couldn't be, in terms of the CPUC, the regulatory environment. However, the local community sees the value in those biomass power plants continuing to operate for local jobs and for supporting what's left of our local timber industry.

And so we could be paying lower prices for power from our CCA, but the community has chosen to pay a little bit more -- we're still paying a little less than we would be paying PG&E, so the RCEA has been able to accomplish that -- but we're paying a little bit more to maintain those -- to keep those power plants going.

So, I think that's a huge benefit of the Community Choice Aggregation Program and shows that a local community can take in their own needs and goals and vision and act on that.

The other thing I just would add is that in terms of gasification, we -- there was one CEC-funded project out at the Blue Lake Rancheria. It's not one that we tend to a highlight a lot, because it wasn't a great success. There were certainly some important lessons learned. But the fast fire we tried to deploy there didn't meet up to the specifications and what the vendor had committed to.

I say that also, though, there are a number of those SB 1122 projects that have been funded throughout the state that we're really watching closely. There's a number of other gas-fired technology, sort of small, community-scale gasifiers. There's the one from Cordis. There's the -- anyway, there's a couple of other once. There's North Fork project, there's the west Biofuels project.

So, I have a real strong interest in seeing how those projects play out. And I know there's small boiler project as well or (unintelligible) ranking cycles system. So, I think it will be very interesting to see how those projects turn out and, you know, build hopefully on successes from those projects.

COMMISSIONER DOUGLAS: Great. Great, thank you.

And, obviously, I'm trying to track the success of the small -- or community-scale gasifier-type approach as well, because it does seem like if we could get it to work the way we would like it to work, it could be -- at least play an important role in a niche in rural and forested areas like this one.

I was going to ask Peggy, I sort of teed up a question to you before community partnerships and to what extent or how that has worked for you in the electrification project. I know you spoke a bit about it,

but I wondered if you had anything more you wanted to add.

MS. O'NEILL: Well, we kind of operate sometimes behind the bamboo curtain on the reservation where I think we try to accomplish a lot more without those partnerships. And I can't emphasize that when you work for a tribe, there's so many competing needs. It's not like you're just working on energy. So, times you get -- you know, you fall down.

But we have had the military. We've had RUS. We've had Schatz. PG&E was a little slower to coming around, but I think we got them in the last few years to see our needs and to be a strong partner.

We haven't reached out yet, and we've been wanting to reach out to you, and I think we'll follow-up with that to see how we might be able to benefit.

We also looked at biomass. And early on I attended a bio mass conference, it was put on by the Forest Service. And they brought in all of the biomass geeks, and there's a lot of them out there that are just in love with this industry.

And what we found at that time -- because, you know, like you said, it's not cost effective, unless there are maybe other collateral kind of businesses that you can -- you know, for a tribe -- can create. Because we have a rural area where we're also looking for industry

that doesn't -- you know, we're not into big factors necessarily. But looking at what other businesses, whether it's a nursery or -- that avoided cost -- energy costs that you might have if you're providing it.

And that's -- I remember meeting a gentleman who was from Vermont. And he said in Vermont, basically, a bio mass is two guys in a pickup and they're like, you know, fueling a school. But that $30,000 that they save for that, you know, school, goes to help pay a teacher.

So that level I think is something that we could look at, whether it's in creating soils or nursery and doing biomass to provide power for the local needs of the community. That makes more sense. That's maybe the model we should be looking at.

And at that time China and Sweden and places like that were doing, you know, a lot of things, that we weren't yet. And I remember there was also a junior college that was -- Shasta I believe -- that was biomass fueled. I don't know if they still are.

But I think maybe having that kind of conference and bringing those people out of the wood work again would be a good collaboration.

COMMISSIONER DOUGLAS: All right. Well, thank you very much.

And I think what we're going to do now is go

straight into our next panel. Let's give this panel a round of applause.

(Applause.)

MR. ZOELLICK: So just so people -- I turned it off. So, whoever comes next needs to turn it on.

(Whereupon, there was a pause in the proceedings to reset for the next panel.)

(Whereupon, off the record at 10:32 a.m.)

(Whereupon, on the record at 10:33 a.m.)

COMMISSIONER DOUGLAS: All right. Very good. This next panel is focused on microgrids because of the particular leadership and innovation we've seen in the microgrid space up here on the North Coast.

So, our first panelist is Jana Ganion with the Blue Lake Rancheria.

Please turn your mic on.

MS. GANION: I'm trying. All right. Does that work?

UNIDENTIFIED SPEAKER: You should have a green light.

MS. GANION: It has a faint green light. Can everybody hear me?

UNIDENTIFIED SPEAKER: Yes. Yeah, that's good.

MS. GANION: May I ask you to forward the slides for me. Thank you.

MS. GANION: So, I will sit, even though I'm uncomfortable doing so, just so I can control this microphone a little bit better.

But my name is Jana Ganion, and I'm the Sustainability and Government Affairs Director for the Blue Lake Rancheria Tribal Government.

I want to thank the California Energy Commission for inviting us all here today. It's great to be able to talk about these issues in the context of overall energy review.

Next slide, please.

So, first, for those of you who aren't familiar with the Blue Lake Rancheria Tribe and Tribal Government, it was formed as a tribe in 1908 as a refuge for homeless Indians.

Today, we have about 100 acres of trust land spanning the Mad River. We have several economic enterprises, including a casino, hotel, and event center, which I'll get to in a minute.

We have over 400 employees across government and economic enterprise operations. And so we're usually in the top ten employers in Humboldt County.

We have about 15 governmental departments, travel utility, some emergency services, and many other programs that the tribe supports and deploys on a routine basis.

I want to talk a little bit about our outreach efforts. We spend a significant amount of time -- and I'll add to the partnership theme of today -- we spend a significant amount of time conducting outreach to our federal, state, and local partners.

So, I have the honor to serve at the federal level on the Department of Energy's National Tribal Working Group where I work with tribes across the country on energy developments.

We always are excited to talk about the California policies and programs that we're able to participate in. And, obviously, we get a lot of envious looks and comments from tribes across the country and other states that maybe aren't as progressive.

We sit on the BOEM California Task Force. And we have participated in a number of federal climate action initiatives primarily under the prior administration. And one of those examples is the Climate Resilience Toolkit.

On the state level, I serve on the, what's called the ICARP, which is the Integrated Climate Adaptation Resilience Program - Technical Advisory Committee. I also serve on the AB 617 consultation group, which is an effort to look at air pollution as it's cross-referenced with energy and disadvantaged communities.

We were featured, the tribe was featured as a case

study in nd Safeguarding California and I'm involved in the Fourth Climate Assessment for California.

Locally, we have served on lots of planning committees, like the Regional Long-Term Water Resource Planning. And that has been really incredible effort to underwater pursuant to some of the comments that were made earlier.

And then there's a little bit about our recognition there.

But, today, what I really want to talk about is one of our recent projects, which is the microgrid.

Next slide, please.

And it is low carbon, community scale. But I want to first just briefly mention that the reason that the tribe does these things is because we have a defined energy strategy and plan. So, our goals are to lower and stabilize costs to repair the environment and reduce GHG emissions. I want to create energy resources that are resilient, because they, in turn, support our lifeline sectors, like, water, food, communications, IT, and transportation.

We, also very well energy projects because they support our continuity of operations across tribal government and across our economic enterprises.

We think that energy development within California

within a rich and aggressive climate context creates innovation, and by pairing mitigation with adaptation, we can create what has been referred to nationally and in California, a "Climate Resilience Marketplace." And that brings the kinds of projects and jobs and other opportunities that we've heard about. The off-shore wind is a great example of that.

This nexus of goals and developments really does spur innovation. And, of course, the tribe's overall goal matches California, and hopefully we'll exceed that, too, to exceed zero emissions by 2030.

Next slide, please.

So, we've heard a lot about our area, but I just want to point out that when I travel nationally and I talk about California and our energy sector, I point out that we really are in Northern California as opposed to being in Sacramento and that we have limited conductivity to a larger region.

Next slide, please.

So, our microgrid really is at the core of our resilience right now. We're expanding from that; but, right now, it's at the core.

So, a little -- a couple of details for those of you who aren't familiar with it. We purchased -- we're at the end of the line. So, we're at the end of the PG&E

distribution and transmission line at Blue Lake Rancheria. So, we purchased a portion of that infrastructure from PG&E. We developed a point of common connection with PG&E that's upstream of about a six-building campus of critical infrastructure.

For generation, we put in a new solar array. You've seen it in some of the pictures, and I've got a few more pictures in this presentation. It's just under a half a megawatt, so it's 420 kilowatts AC. We've got about 1 megawatt of battery storage right now, and we're expanding that this year to double that size.

We do have -- we primarily use in business-as-usually situations and even in emergency situations the solar and battery storage for our generation.

But we do have some preexisting diesel gen sets. We don't like them but in the short-term, they were important for microgrid stability and internal redundancy.

With the microgrid we can cost effectively de-prioritize those diesel generators over time, and we can regulate them, as we already have in practice, to deep, deep backup.

However, lots of people, especially on the North Coast, have diesel generators. And so a microgrid allows us to implement cleaner and lower carbon sources of energy

while we de-prioritize these other sources of energy that aren't so clean. And so that's one of the benefits of the microgrid.

Next slide, please. So, this is a bird's eye view of the way it's laid out at the Blue Lake Rancheria. The point of common connection is there on the lower right. You can see our government offices, our casino and restaurants, hotel. The PV array, it's to the back, and the battery is right next to it.

Next slide, please.

You've heard a lot about partnerships today. We want to reiterate that and talk about the partnerships that were specifically necessary for our microgrid.

First of all, the California Energy Commission was a primary funder through the EPIC program. And, again, as I travel nationally and I talk about these program, I talk about the EPIC program as a keystone R&D pilot project and deployment effort in California that has resulted in so many incredible areas of progress.

The top of that org chart there is the Schatz Energy Research Center. Really, I sit next to two of the heroes of microgrids in our area. Schatz Energy Research Center is one. They acted as our primary contractor, our engineering manager, our technology integrator, which is so incredibly important for microgrids. But it just wouldn't

have been possible without their expertise and their project management.

In addition, I want to just thank PG&E. When we started the microgrid project back in 2015, microgrids were really firmly outside anyone's core business model, including our own. And PG&E really stepped up to the plate. They provided incredible support at the application phase for that EPIC funding, but all the way through the project, they provided technical assistance. At one point, helping us value engineer our project to save over $400,000 in costs, that at that point in time might have been a deal breaker.

Thank you.

UNIDENTIFIED SPEAKER: Uh-huh.

MS. GANION: Our project partners here I think are indicative of what Dana was saying that, you know, really in this area we work hard to form public, private, academic, governmental partnerships. And you can see an array of expert local providers, like Robert Colburn Electric, Kernan Construction, and then Fortune 50 companies like Siemens and Tesla.

We've just had the good fortune to be able to work with all of these on this project.

Next slide, please.

So, when we talk about the need for resilience on

the North Coast, as you've heard and as you'll hear more, we really mean it. This is a photo of a 25-acre wildfire that sprang up right across the street from us last October. And, of course, all of us here are experiencing all of those wonderful items on that list.

We did have an outage during this wildfire, and our microgrid performed beautifully. In fact, so much so, that we didn't even know that we had islanded from the main grid until it was mentioned by California Energy Commission Chair Weisenmiller in a meeting. And we heard about it through word of mouth and investigated, and, sure enough, we had sailed through this event so beautifully that we didn't even notice it.

Next slide, please.

This is just one shot of one of the landslides that occurred last year. This was south of us on the 101. That impacted, I think, some members of the California Energy Commission coming up here for a prayer event.

Next slide, please.

One of the things that I just really want to highlight is that we are within one of the most dangerous and actively seismic zones in the world. The Cascadia Subduction Zone, Mendocino Fault, Gorda Plate, Pacific Plate, and North American Plate all converge at the triple junction directly offshore from the city of Eureka, about

20 miles from the tribes' lands.

Large earthquakes and/or tsunamis are a constant threat here. Cascadia Subduction Zone earthquake predictions are dire. And since 1900, as this graphic shows from Humboldt State University, nearly 40 earthquakes of magnitude six or larger have occurred in California north of Santa Rosa and in the adjacent off-shore areas. So, you know, that's a big earthquake about every few years or so. In fact, just a couple of weeks ago when we were having an economic development forum south of here in Fortuna, an earthquake rolled through as we were having the meeting. So, you know, it does tend to focus our attention a little bit on what we need to do here.

Next slide.

So, we've seen this. I won't go into detail on the tenuousness of connections, except to say that in 2017 that land slide that you saw in the photo earlier, our Play Station 777, the tribe's small fuel station and convenience store, diesel shipments were reduced by 60 percent for over a week due to those simultaneous landslides. And keep in mind that diesel constrictions not only impact fuel stations and sort of the retail availability of diesel, but it also impacts the ability of our diesel generators to create back-up power. So, diesel generators up here aren't quite as robust as -- we can't think of them as robust as

other people really do that don't have as much of a threat of diesel constrictions.

Diesel here is also very expensive. Typically, we are the most expensive in terms of diesel prices in the United States.

Next slide, please.

Now, I'm going to talk a little bit about the need for decarbonization because I know it's a State of California priority, maybe a top priority. I think it needs to be a top priority for all of us. And I'll say that to all of the climate change impacts we are suffering on the North Coast, climate change adds multipliers and feedback loops in really interesting -- I mean, somewhat morbidly interesting -- but interesting ways.

Sea-level rise is one that I'd like to just highlight because we have a lot of infrastructure on the North Coast, including Highway 101, our wastewater treatment plant in the city of Arcata, our power plant, our main power plant as was said earlier, that are in the direct path of even a modest sea-level rise here.

And then, of course, it's critical to decarbonize because of public health -- I'm going to go into detail on that on one subject in a second -- economic and, of course, ecosystems.

Next slide, please.

Now, this is just the way I think, and I had to throw this in here because I thought it was fascinating. So, sea-level rise, the Greenland Ice Sheet holds 22 feet of sea-level rise within it. Many of you probably already know this. But there was just a recent news article in Science that highlighted -- this has been known about for 150 years, by the way -- but it highlighted a feedback loop specific to the Greenland Ice Sheet, but probably not solely confined to the Greenland Ice Sheet, that there are these -- and I don't know how to pronounce this word -- cryoconite cones, with little colonies of black algae in the bottom that attracts for sunlight to sort of keep this feedback loop going and is having an overall effect of melting that ice sheet a lot faster when it's combined with the overall temperature increase of climate change.

So, we've got some feedback loops we have to pay attention to, and they're not just here, they're across the globe.

Next slide, please.

Here, however, I want to point out that Humboldt County currently exceeds air quality standards. We are in non-attainment for PM10. The Mad River is a listed impaired waterway under the Clean Water Act Section 303(d) for temperature and sediment. So, the impacts of this are

that we do have -- even though it looks beautiful outside -- we do have some air impacts that we have to pay attention to. And we are seeing annual impacts in our waterways, an example of which is the cyanobacteria toxic blue green algae that was a relatively rare event prior to about five or six years ago and now happens every year.

Next slide, please.

So, our microgrid allows us to -- because we have created an energy anchor of solar-plus storage, it really has allowed us to replace these air-polluting sources of energy. And that's important because most of the major climate health impact studies have air pollution as an apex issue. This is not just something that is something that we should put up with, this is something that we need to tackle head on.

It is critical to reduce especially the fine particulate matter, PM 2.5 for climate and health benefits. So, there is a study and I encourage all of you not to take my word for it, please go out. You will not like what you read, but it's important that we all become educated on it. And search for PM 2.5 health impacts on Google and see what pops up by in the scientific literature and in the general news.

And I will say that solar power in our microgrid replaces this type of energy in our mix and it helps

replace it in our regional mix, which we feel good about.

I want to take this opportunity to follow-up on a question you asked about biomass energy. So, we have looked carefully at biomass energy because the Mad River Valley is a hotspot for the impacts of biomass air pollution. Without going into any more detail on that, I'll say I've looked carefully at this and I continue to look carefully at it, and as Dave Carter mentioned, Humboldt State University is doing research not only on the ways in which we could use biomass for useful commercial products outside of energy, but also the carbon lifecycle, the actual carbon lifecycle of biomass power, which is by no means proven to be at all beneficial.

So, the cost is high. The Co2 lifecycle is not -- it's not -- it's very complicated and it's not at all clear whether or not its status as a renewable power supply should be questioned.

But, at the end day of the day, biomass energy industry needs to understand that that particulate matter, PM 2.5 and PM10 are something that is creating a serious, significant and sometimes fatal health issue. And so they need to understand that if they're going to operate these plants, they need to invest in technologies that are going to reduce, and ideally eliminate, those types of emissions.

The good news is there's technology out there that

can do that. I guess the questionable news is that they do, of course, cost money and require investment.

Next slide, please.

So, a little bit more about how our microgrid equals resilience. It powers our critical infrastructure. The Blue Lake Rancheria tribe is also an American Red Cross shelter-in-place. As I said, it improves our lifeline sectors and it improves our economic control. So, we think of energy development as economy enabling infrastructure investments. And that's why the tribe has chosen and prioritized these investments over other things that it could be doing. And we have achieved some significant savings. It's between about $175- and $200,000 a year.

Next slide, please.

So, the other reason we do this is because it strengthens the wider grid. So, our solar-plus system and our ability to increase our demand response and remove some of the demand from the grid, hopefully in perpetuity counters the volatility. It flattens what I think most people are familiar with, if flattens the duck curve caused by solar generation in the middle of the day, and our system has gone through a cybersecurity review. Actually, we worked with the National Renewable Energy Laboratory on that. And, so, we are hoping that these microgrids -- ours, we believe, is pretty cyber secure,--

but we're hoping that the advent of microgrids in general improves cybersecurity by not having all of our digital energy eggs in one basket.

Solar-plus storage, as I've mentioned several times, is working here on the North Coast. It's fully mature. It's cost effective. It has manageable operations and maintenance. So, that part of it has been pleasant.

We have, of course, 365 days of perpetual fuel onsite. We don't have to truck anything in. And, of course, my personal favorite, there's no emissions.

We have used the savings -- to talk about something Andrea mentioned -- we have used a portion of the savings from our energy efforts to create new jobs. And we have increased travel employment in our energy sector on the government side by ten percent, which is a grandized way of saying we've created four new full-time jobs, but ten percent sounds better, so we're going to go with that.

And it augments regional resources. PG&E hopefully knows that if there's an extended outage, BLR will be just fine and they can take care of other things elsewhere and get to us when they can.

Next slide, please.

So, we are going to reduce our Co2 by between 175 and 200 tons per year. So, that makes us feel very proud. We like the microgrid for the fact that it is a smaller

project and it enables rapid wide-spread deployment of solar or wind or other renewables at the community and facilities scales.

And I'll just point out that at the most conservative analysis -- and this is from the Atlantic -- the solar industry broke even on all of its GHG emissions in 2018. The most favorable analysis is that the solar industry broke even on those in about 1987. So, regardless, every single solar panel is contributing to reversing the cause of climate change as we speak, and we feel great about that.

Microgrids make green investments more feasible. To sort of build on what Peggy was saying about the, you know, it's always a puzzle to pull together funding for those projects. But we're hoping that microgrids take these projects down to a scale where people can leverage their own -- maybe smaller governments can leverage their own smaller infrastructure investment buckets with other investments to make overall grid improvement more feasible for everybody.

Next slide, please.

So just quickly, replication is important. At the Blue Lake Rancheria, we know even if we zero out our greenhouse gas emissions that it's not really going to matter in terms of global climate change. We have to build

things that have the opportunity for replication and rapid replication. We have to move quickly on these things. So, we're expanding our microgrid, as I said, by adding battery storage this year. That's through the Self-Generation Incentive Program in California, which, again, I talk about nationally and which, again, people are envious of.

We are building a new microgrid at our gas station and convenience store with the hopes that we create a resilient package. Often times those gas station and convenience stores, especially when they're in rural areas in California, are critical infrastructure. They do need this kind of emergency power package to make sure that they are able to operate in times of emergency and more cost effectively in business as usual.

We are adding electric vehicles and charging. We are looking very carefully at electric vehicle buses for our public transit system that the tribe sponsors. We are developing a smart water grid that will be tied into the microgrid to make sure that we have at least emergency stand-by power for our American Red Cross emergency shelter. And then we're also looking at expanding that smart water grid community-wide.

And then I'll just say that because these projects have been in part funded by the California Energy Commission, the Schatz Energy Research Center has really

taken the lead on this, but we do a lot of public reporting outreach and knowledge transfer activities. We do a lot of these things. We take them seriously. And we do that because we want to make these follow-on projects more cost effective and we want them to happen as quickly as possible.

Next slide, please.

So, solar is -- this is a grainy picture of our solar ray -- but solar is a rapidly increasing mix of the Humboldt energy platform. We are similar in latitude to Germany, which has an incredibly aggressive solar platform and approach. So solar works just fine here, I can tell you, and it's a wonderful form of energy and we just love it.

So, I'll just end by saying that the State of California, the California Energy Commission, and governments like the Blue Lake Rancheria with expert partners like PG&E, the Schatz Energy Research Center and the Redwood Coast Energy Authority are firmly at the forefront of resilience and reduced GHG strategies for all the economic, health, environmental benefits that these strategies have proven to create.

We do great workup here in Humboldt County. We do it with our partners, especially at the California Energy Commission, and we look forward to doing much more.

Thank you.

COMMISSIONER DOUGLAS: Thank you.

(Applause.)

COMMISSIONER DOUGLAS: Let's go on to Dave Carter.

MR. CARTER: Thank you.

Can you pass me (unintelligible)?

Make sure it's on this time.

All right. Okay. Good morning. My name is Dave Carter, I'm a Managing Research Engineer at the Schatz Energy Research Center at Humboldt State.

I'd like to thank the Energy Commission for holding this workshop here in Arcata and --

UNIDENTIFIED SPEAKER: We can't hear you.

MR. CARTER: Okay.

UNIDENTIFIED SPEAKER: Is it on?

MR. CARTER: I would like to thank the Energy Commission for hold thinking workshop --

Is that better?

UNIDENTIFIED SPEAKER: Not much.

MR. CARTER: Let me try that one. You know, this one's got -- is that better?

UNIDENTIFIED SPEAKER: Yes.

MR. CARTER: Okay. Thank you.

Okay. How is that? Is that better?

UNIDENTIFIED SPEAKER: Yeah, much.

MR. CARTER: Okay. Great. Thanks.

Again, just like to thank the Commission for being here and holding this workshop and thank everyone who showed up today to participate and shape in our energy future here locally and state-wide. I'm grateful to be here with the opportunity to speak to folks about implementing microgrids.

Jana, you want to pass me the clicker there and I'll --

UNIDENTIFIED SPEAKER: Oh, sure.

MR. CARTER: Yeah. Thanks. I got it. There we go.

So, my goal today is to provide the sense of what it takes to implement microgrids, starting with our experience implementing the Blue Lake Rancheria microgrid. Then I'll explain the differences between that project and the upcoming airport microgrid project, and then I'll explain other plan to implement that airport microgrid project and some of the biggest challenges that we face, and I'll end with a summary of the benefits of that project as far as the local and state-wide benefits.

Okay. So, Jana did a great job of providing background on the Blue Lake Rancheria microgrid project and why microgrids are important in general.

Implementing the Blue Lake Rancheria microgrid,

and really any microgrid at this point in time, requires integrating a complex array of inner-connected technical systems, because the electricity generated in the microgrid has to continually match the electricity being consumed on a scale of milliseconds. So complex controls are required to accomplish this, then to manage the transitions to and from islanded mode, which is the term used to describe when the microgrid is operating independently of the larger grid.

A diverse range of equipment, vendors, and engineers provided the technological systems used at the Blue Lake Rancheria microgrid, and intensive coordination was required to make sure that each partner was supported to meet their contractual obligations and also ensure that their technology functioned so that the overall microgrid could function as it was designed.

The time line for implementing the Blue Lake Rancheria microgrid was very tight. We had just a little over two and a half years to implement the entire project. We had to complete construction of one season and we had to navigate a complicated and uncommon inner-connection process with Pacific Gas & Electric.

So, to meet our scheduled requirements, we used an innovative design-build approach where our engineers and contractors worked together to overcome significant

technical and logistical challenges. And, thankfully, we had an amazing project team and we completed the project on time. We had full microgrid functionality achieved at the end of the project, and we didn't have any safety incidents or incident of equipment damage.

I can't over-emphasize the importance of having a supportive site host when implementing a microgrid. The Blue Lake Rancheria took on significant risk with agreeing to be the site host for this project. There were significant financial risks associated with the grant funding because you have to fix your project budget before you have final design in place, which creates a lot of risk for everyone. On the technical side, this was the first deployment of the Siemens' Spectrum 7 Microgrid Controller on a live microgrid, as well as the first deployment of a multi-invertor Tesla battery energy storage system on a live microgrid. So, what could go wrong, you're deploying two brand new systems.

Thankfully, due to our amazing project team, nothing went seriously wrong. We did have some hiccups along the way, though.

So as far as how the airport microgrid is different than the Blue Lake Rancheria microgrid, this graphic shows some of the main differences. We're looking at size differences, the generation mix is different,

customer type, asset connection type and ownership are different.

For size, the airport microgrid is about five times larger than the Blue Lake microgrid as far as the generation and storage capacity. So, we're making a big step up there.

For generation mix, the airport microgrid is 100 percent renewable, whereas the Blue Lake microgrid incorporated a preexisting diesel generator to support the loads during extended islanded periods, which was a great use of that preexisting, very expensive asset.

For customer type, the Blue Lake microgrid involved one utility customer, the Blue Lake Rancheria, and they're fed through one utility meter.

For the airport microgrid, there will be 18 utility customers. And some of those customers will be bundled PG&E customers, and at least one will be an unbundled customer that receives their energy from RCEA and their distribution services from PG&E.

For asset connection type and ownership, at the Blue Lake Rancheria microgrid, the distribution and generation and storage assets are all connected behind the meter and they're all owned by Blue Lake. At the airport, the main generation and storage assets for the microgrid will be connected in front of the meter, and they'll be

owned by RCEA. So RCEA will use those assets for wholesale power production for their customers throughout the county. PG&E will retain ownership of the microgrid distribution circuit, however.

So, when the airport microgrid is in islanded mode, PG&E will end up having to buy power from RCEA to supply their bundled customers within the microgrid. And that hasn't been done before. So, we'll have to generate new agreements and tariffs under the project to support these types of transactions. And figuring out how that is going to work is of keen interest to everyone, PG&E and RCEA in particular, because with community choice aggregation programs on the rise in California, the lessons learned on this project for how to manage those transactions are going to be applicable state-wide.

So, our plan to implement the airport microgrid project, we are getting our funding from the California Energy Commission scheduled for a vote here in June of this year. At that point, we'll enter into a contracting phase to get all of our subcontractors and vendors unloaded to the project. And from there, we'll finalize procurement details for major components, and launch into our final engineering design effort.

In 2019, we'll continue designing procurement activities and start developing those tariffs that we need

to develop. And we'll start the inner-connection process. In 2019, we'll also complete construction of Phase I of the project, which will consist of installing a net metered solar electric array, to offset the energy cost of the airport, as well as the installation of four demand response capable electric vehicle chargers.

So, these Phase I components can be installed independently of the rest of the microgrid. We're going to get those deployed in 2019 while, in parallel, continuing some of our design and testing efforts for the larger generation system for the microgrid.

In early 2020, we'll continue tariff development and inner-connection activities and start testing the microgrid protection and control software and hardware in a real-time simulation environment. And then we'll complete Phase II of construction and commissioning in the summer of 2020 and the fall. And then our goal is to obtain commission to operate from our friends at PG&E, who are critical partners on this project, at the end of 2020.

And then in 2021, the microgrid will be fully operational and we'll be collecting data in order to quantify the benefits from the project and validate the business case and replicability of this microgrid model.

We have many challenges ahead of us as we work to

implement this project. Here is a list of several of them that we have identified. Undoubtedly there will be many more that will pop up as we go along.

This graphic here on the slide shows in the red there's -- we're sort of -- our project is at the intersection of three trends that are emerging right now. In the red we have increasing need for resiliency around critical facilities due to climate change impacts. In the green we have investor-owned utilities transitioning to the sustainable smart grid of the future. And then in the blue we have community choice energy programs that are installing their own energy-generation and storage assets. So when you combine all that, this is sort of our business model for microgrid where we think that there is a lot of potential to replicate this type of a project, and we're seeking to demonstrate that.

Similar to the Blue Lake Rancheria microgrid, we will face significant technical integration challenges on the project, as well as contractual integration project challenges with so many technologies and contractors on the job. There is going to be significant electrical and controls engineering challenges to address. I mentioned previously that this will be the first multi-customer microgrid on one of PG&E's distribution circuits where they maintain ownership of the circuit and they operate it.

Additionally, PG&E will be able to control the microgrid remotely from the distribution control center in the Bay Area, which is also a first. So thankfully we have a great engineering team that's lined up to face these technical challenges.

I mentioned previously we have some new tariffs that we have to develop and, in some ways, this work is going to be a lot more complex than the technical challenges we face. These regulatory challenges, transactional challenges, are really I think going to open up the -- if we can solve those challenges, it will really open up the opportunities for this type of thing to be replicated.

Cyber security for critical infrastructure is always a significant challenge because of course hackers never sleep, so we have to be ready for that challenge, and we are. We have specialists on the team who are eager to get to work on that.

Our interconnection pathway is going to be more complex at this time because we have -- not only do we have an interconnection agreement with Pacific Gas & Electric but we're going to be doing a new resource implementation process with the California Independent System Operator. So that's the lengthy process we have to get going on right away.

And then one of the unique and exciting challenges we face in the realm of technology advancement is that we're planning a couple of the two megawatts solar electric array to the batteries, energy-storage system batteries. And this type of configuring is called DC coupling and it reduces the number of inverters needed so the cost gets lowered. It provides more efficient solar energy capture and buffers the distribution system from -- and the microgrid itself from - large power fluctuates that happen on partly cloudy days with large solar arrays. And this also enables RCEA to shift when they release solar power from the site onto the grid, to be able to take care of wholesale pricing and help address the duck curve.

So in terms of the benefits to the ratepayers locally and statewide, there will be many. Pacific Gas & Electric will gain valuable experience with multi-customer microgrids, advanced distribution system controls, and experimental tariffs. The project will demonstrate a partnership model where we have an investor-owned utility and a community-choice aggregator collaborating to implement a microgrid. We think that the agreements and tariffs that result from this project could be broadly applicable and lead to replication of similar microgrids in California and potentially beyond.

So we'll demonstrate how multi-customer

microgrids based on this partnership model can create resiliency hubs around critical facilities, which we think is one of the real niches for microgrids. Yeah, we hope to demonstrate how microgrids with generation and storage assets that are sized for wholesale market participation can provide grid services, such as voltage support, solar smoothing and shifting, and fast ramping to meet evening peaks.

And we'll demonstrate technology advancements in DC coupling of solar PV and battery-energy storage systems, as well as integrated protection and control software for cyber-secure microgrids.

And then we'll validate the business model that you have seen and we'll do that by analyzing the performance data from the system and reporting out to stakeholders with valuable information that can be used to replicate similar projects. And, on that note, I'll just note that that our final report for the Blue Lake Rancheria microgrid is just in final review and that will be coming out soon. So there is going to be everything you ever wanted to know about that project and more publicly available soon.

That's all I have. Thank you.

(Applause.)

COMMISSIONER DOUGLAS: Great. Next we have Jon

Stallman, PG&E.

MR. STALLMAN: Thank you.

Fantastic tough acts to follow here and great technical detail on both projects. I really appreciate that. And myself and PG&E thank you for inviting us to this session. It's really fantastic, innovative work, and I thank the Humboldt community for inviting me down and to join this panel. Thank you.

So I'm Jon Stallman. I'm in a group called the Grid Innovation and Integration and Integrated Grid Planning. And I just pulled up our mission, as: Design, test, and integrate innovative solutions to accelerate PG&E's transition to the sustainable grid of the future.

So what all that really means is that our group is tasked with really trying to understand the distributed-energy resource technology and marketplace and how that fits into customer usage. And I think you have great examples right here at the table of how those types of efforts and, in particular for this session, microgrids. We're also exploring things from block chain transactional energy marketplace.

We're exploring deploying our EV electrification, vehicle electrification and EV charging stations, our storage interests in managing our grid, and all of these elements come into play when we start to look at the

microgrid space. So I'm deeply interested in these developments.

So I'd like to just touch on a little bit of the foundations. I want to try to build off from the two previous presentations . And so if you could go to the next slide, please.

Let's just touch on some foundations and policy drivers of this. And I hadn't heard this mentioned yet, so let's just take a look at the DOE definition. And a couple of highlights out of this definition is interconnected loads. I think we all understand that distributed energy resources and, as we gain a higher density of distributed energy resources within an area, it definitely facilitates us leveraging microgrids and, in particular, leveraging the distribution system to enable microgrids on a broader scale.

So clearly defined electrical boundaries. And in BLR's case clearly defined electrical boundaries is everything behind the meter in that behind-the-meter example. And it still uses a distribution grid to feed a number of different buildings. However, there is a very defined electrical boundary, or what I like to call a controlled area.

So then the ability for a microgrid to connect to the grid and disconnect to the grid is a very key point

because that creates the sustainable operation of that microgrid. Microgrids typically have a duration that they can stay autonomous. And that duration depends on the distributed energy resources that are behind those controllable boundaries. And depending on how much you install within that controllable boundary, allows for that prolonged duration. And often times to get longer and longer durations of autonomy, you need to have some form of typically fossil fuel generation, a diesel generation. Now we're testing a different way to get there using advanced battery-storage technologies paired with solar, and so that's all very wonderful innovations coming up to reduce the emissions from long-term generation sources.

Let's see. The CEC added onto that DOE definition: Managed customer critical resources. And I think BLR highlights how that microgrid really serves as a center for critical resources for the community as well as the tribal unit.

And then the next one is: Provide customers, utilities, and grid system operators with critical services. So this is a really interesting area to the utility, obviously, is how do we pair this concept of resilience with operational benefits to the grid; and how do we tease that out of how these technologies grow and advance, and we create more sophistication; how can we pair

the tariffs and the operation of these systems to the grid and the grid needs that are there. And so we're deeply exploring this within PG&E, within our group at the Grid Integration and Innovation.

So if you will go to the next slide, we will talk briefly about: So in terms of the utility, you know we needed to get a clear understanding of what are the different buckets of microgrids and what do they mean to the utility, the distribution system, the transmission system; what does it mean to be able to use those different microgrids within -- to leverage for the grid as well as leverage for the customer.

So these three buckets were basically how we placed different types of microgrids. And in the first one, the single customer facility. We use the term behind the meter, behind-the-meter microgrid, meaning you have a single account of record, it's generally a customer, a single facility. You know hospitals have been doing this for a very long time, right. They have their back-up generation. They need to stay energized regardless of what the grid is doing. That essentially is a behind-the-meter microgrid. We've come to call them microgrids more often now, but previously that was really back-up generation.

So now if we think about that controllable boundary, it can be: An individual customer; it can be

multiple facilities within an individual customer; it can be a military base that has its own distribution system, a vast number of facilities, very high loads, its own generation, but it's still a single account of record from the utility's perspective. So that all falls within the behind-the-meter resource.

Typically these are -- behind the meter is used for a customer need. A hospital is a great example. They need to stay energized for the critical purposes that they serve, so the customer resilience aspect. Sustainability, I think BLR, Jana, you've really highlighted a lot of the sustainability goals that align with leveraging a microgrid for your area there.

And then outage costs and manufacturing facilities, there's definitely a very high cost to grid outages. So microgrids and the manufacturing environment, the industrial environment, can really help with business costs.

Oftentimes all of these drivers revolve around how they're working with peak rates and charges with the customer. So that's all really great. PG&E's role within that is really primarily to facilitate the interconnection processes. What do the generation resources mean? Is the grid remaining safe, reliable, affordable, and do we have the proper protections in place to keep the system

correctly operating. So that's our role within that Category 1.

Category 2 gets rather interesting in the utility space in that these are remote locations, remote locations similar to the Klamath River Basin and the Hupa area. It's Angel Island, which is in the picture there. And these areas, we know that if we can enhance the reliability of a remote area that has a lot of reliability challenges, whether it's landslides or trees or difficulty assessing those areas, then potentially we can use microgrids as a least-cost option to the wires that we would normally deploy in an area like that.

And, so just to highlight, one particular project that we're working on currently is Angel Island. If you're not familiar with that, Angel Island is in the Bay Area. It's in the Bay off from Tiburon and right near the Golden Gate Bridge. It has an undersea cable that extends over to the Tiburon area. There were two cables, one cable failed, the next cable was at the end of useful life. So we said, our microgrid team stood up and said, hey, we should really analyze a non-wires alternative for turning this island into a microgrid.

You will notice the circuit is in blue, blue and yellow, and it navigates around the perimeter of the island, so we are using a distribution system similar to

what Dave was explaining in the Arcata Microgrid Project. However, in this case we will remain connected to the land as long as that cable is in operation. When the cable does fail, then all of the generation facilities, all the communication protocols to the control center in Concord, will all be established and ready to operate that island completely autonomously as a microgrid from that point forward.

This was a non-wires alternative to our typical planning process that put together a number of different alternatives for addressing the cable. And what we've been instrumental in doing is developing this alternative-use case to be considered as a least-cost option, best fit for that island. We are considering these types for many different locations around, in the PG&E territory, and we're excited. It's really a wonderful opportunity to start to really think about using the density of distributed energy resources and maybe putting additional ones in, as we have to in Angel Island.

Angel Island will have a PV array, it will have a battery system, and it will have a propane generator as back-up when those two other systems are not available for whatever reasons.

Our big challenge in these types of systems is developing the ways of isolating the island from the

broader grid safely and having visibility with that in the control center, so we can actually see, yes, power has stopped to the island; yes, power is being delivered to the island and loads are being served and they're being served within Rule 2 compliance of energy quality, frequency voltage, and that it's safely being operated. So all that's observed and controlled through the control center.

And then there's a local autonomous controller on the island that's actually managing the voltage stability. As people are using different loads and the generation sources shift from PV to battery, it will be managing those different loads and keeping the grid stabilized that's on that local area. So that's remote applications.

I want to add an exciting innovation that we have been doing into looking into remote areas is also adding these essentially low-cost options to developing a microgrid, which is these pre-installed interconnection hubs. And the idea here is you have a transformer base, a ground grid built up, the ability to quickly bring in a generation source that isn't a permanent investment.

So one of the challenges with microgrids is you make a large investment in these energy resources and they sit there. And the value and the investment of that capital expense is challenging at times to justify. So one approach to more rapidly deploying these in our more remote

areas is to deploy these pre-installed interconnection hubs, which allow us to have the infrastructure and to be able to bring in generation sources on an as-needed basis, reduce the time that it takes to get there, reduce the outage rate.

And then there's also some resilience strategies with this in that we could plug in a portable EV charging station to it. We could bring in, as technologies change, anything and plug it into it, so it could be portable battery storage. When that becomes more cost-effective, we get over some of the DOT regulations, we'll be able to bring in portable battery storage to support certain communities. We have deployed one of these in Orleans, along the Klamath River, and we have deployed one of these in Petrolia, in Southern Humboldt, two areas that typically have long duration outages, frequent outages each year, and are very difficult to get to, takes many, many hours to get to them, 10 to 15 hours just to get there, and then another 6 to 10 hours to set the units up and get it plugged in. And so you're looking at almost 24 hours of downtime before it's reenergized. And that's just once we've been deployed to do that, so they may have already been out of power for much longer.

So we see these as a big strategy. We're excited to be able to use them and deploy them, and we're moving in

that direction to develop the standards to be able to do that in a lot of different areas.

So moving onto the exciting notion that we have on the third one, which is by far Dave highlighted a lot of the challenges with a multi-customer microgrid. But now essentially we're taking a broader usage of the grid. We're isolating the control points on that grid with multiple customers. And in that environment, as Dave mentioned, you may have a certain entity will own the energy services, a certain entity will own the distribution services, and then you have got your customers and your customer loads. And then you may have critical loads within that pocket. You may have controllable loads within that pocket.

And, as I mentioned earlier, there is a time of duration. So if we have a certain amount of generation investment into that pocket, we have created the ability to see it and control it and know that it's safely being operated. We also need to know who's participating as customers, who's willingly participating in that incremental benefit of resilience.

So the grid is rather reliable as it stands, and what we're providing is an incremental additional reliability benefit. And so we have to sort out how is that incremental reliability benefit passed onto the

beneficiaries of that service. And as you know one of the big questions is, does PG&E broaden our application of these incremental benefits to the broader rate base and pass it across the system to help pay for these or do we create a rate structure that the very customers that are benefitting from it benefit from it and pay for those services? So there's a lot of questions to be answered. We're really excited to do this.

I'll move to that in this particular example with the Arcata microgrid, we had an early partnership with Schatz. They reached out to my team. We started working together. We realized that this is a movement, this is a direction we want to go in, these multiple-account microgrids, using the distribution grid.

We also realize that we need to gain the infrastructure in order to be able to do that. So we started figuring out, you know, what can this project bring to develop certain aspects and what does PG&E need to do. So we applied and generated another EPIC-level project that would help us create all the distribution standards to allow microgrids to happen. How are we going to control it, what safeguards do we have in place, what programming is going to be required in all these third-party microgrid controllers, how do we need to see this at the control center, how are we going to communicate with it, what are

the protocol for the operators to be able to operate the microgrid and to what level? So all of those things need to be sorted out, so we developed a separate project altogether in partnership with the Schatz team to use this particular project as that demonstration piece for essentially the state. So we're very happy to be doing that.

We should be getting word from the CPUC in the coming months on whether that funding stream should be approved, --

COMMISSIONER DOUGLAS: Great.

MR. STALLMAN: -- which would be really fantastic.

Lastly about this, in the multi-account microgrids, you know we're really focusing a lot on resilience and we're focusing on additional grid benefits. And we see a lot of usage of microgrids from the grid and operational benefits from peak shaving to voltage control to offloading, which allows us to shift load to other locations during peak. There is a lot of dynamic activity that goes on behind the scenes with operating the grid. Our grid operators are switching electricity from one location to another location, depending on the demand that's occurring and what generation is available. And microgrids play a role in that because we can take load off

from a historically challenging area and shift load to another area that might be equally as challenged without the same facility. And now we actually open up bandwidth on our system to increase those options and the optionality. So I'm really focused heavily on when we are considering a microgrid. There is a resilience element to it, but there should also be the value out of the operational benefit to it to make sure that the value is there out of the overall project.

Lastly, I think I'll mention that we are heavily focused on taking a lot of the learnings from the state's recent natural disaster activities. And we're focused on looking at critical facilities; essential and certainly facilities defined by the CPUC; critical facilities as defined by our restoration priorities. And those restoration projects are categorized, you know, one, two, three, and four, one being the highest restoration priority. And those are often in partnership with different entities designated as what do we need to restore because it's that critical; like 911 communication towers to give you an idea of what category one. They're truly critical resources in the event of a natural disaster.

So we are identifying what those critical resources are, partnering with the Red Cross to identify those evacuation facilities and shelter-in-place

facilities. We are partnering with communities to try to identify where are the community resilience zones or hubs need to be, where do people need to congregate and shelter in place, similar to BLR, to be able to identify. These are opportunities for potential microgrids in the event of a natural disaster.

And so I think I'll leave it at that but know there is a lot of groundwork being done. We're doing it right here in Arcata, which is really exciting. We're doing it in remote locations, like Angel Island and the Klamath River Basin and in Petrolia. We're doing a lot of resilience-level focus throughout our territory as we develop operational strategies to operate our grid in a way that will be advantageous to communities during the face of natural disasters, and microgrids play this really key role in that.

COMMISSIONER DOUGLAS: All right. Well, thank you very much.

(Applause.)

COMMISSIONER DOUGLAS: So the enthusiasm of this panel is really infectious. And you know it's clear as we listen to you that we are seeing the future kind of unfold in front of us through some of these early projects and early opportunities and we're just seeing this confluence of technology development and change and how that affects

the grid and how we need to evolve the grid and then our thinking, you know, environmental change and climate change and resilience and renewable energy. And all of this is coming together in these fascinating ways.

I don't have a question right now. I want to see if Christina or David do.

MS. SNIDER: I do.

COMMISSIONER DOUGLAS: Go ahead.

MS. SNIDER: This is for Mr. Stallman. We're talking about the pre-installed interconnection hubs. And I wanted to hear a little bit about how you determine where you're going to put those and whether it's generated just by PG&E or whether you have community input.

MR. STALLMAN: I would say that community is always involved in these decisions and they're usually driven from a reliability standpoint. As we start to look more intently at resilience applications, then obviously the community becomes a very important piece to that.

Meeting and working with emergency operations; working with Cal Fire; working with different entities that have interests in where to move people; what the procedures are during a natural disaster is really important, to know where the greatest value of any form of microgrid, including pre-installed interconnection hubs. A lot of these PIHs, the intent behind that is reliability and

improving reliability on remote areas. And we have adapted that purpose to begin to experiment with leveraging lower-cost levels of deploying microgrids. If that answered your question.

MS. SNIDER: I think so.

MR. STALLMAN: Kind of.

MS. SNIDER: Thank you.

COMMISSIONER DOUGLAS: You know, as we move forward with these new technologies we're really excited to see the pioneering work and then of course we're immediately after you about, well, how can we employ it more broadly, how do we ensure that everyone benefits from this, you know, what about rural and more remote areas that don't necessarily have the wealth of at least immediate in the location expertise and partnerships and what's the outreach and how are you -- you know, I know that there are -- I know that you're all working in that direction, but maybe I'll just ask the question.

You know in terms of getting the benefits of this kind of technology and resilience and greater reliability and even as we heard from Yurok presentation earlier today, expanding electricity to areas that don't have that service yet, what are the steps we need to think about as a state to be able to maximize the outreach and the broader benefits of this kind of technology?

MR. CARTER: It's a great question.

MR. STALLMAN: It's a great question.

MR. CARTER: Yeah.

MR. STALLMAN: You want to take a stab at it.

MR. CARTER: Sure.

MR. STALLMAN: There's a lot to bundle up there.

MR. CARTER: Yeah. Well, I think to the extent that you can encourage utilities to be more like PG&E, I mean in terms of statewide, I've heard a lot of stories about some projects that try to get traction in other areas and, you know, you get stuck in the mud basically trying to get through the interconnection process.

And I mean we -- I think that you do a good job of focusing -- making your projects report out to these technical, these knowledge transfer plans, and Jana has done a phenomenal job on the Blue Lake Rancheria Microgrid Project of getting the word out, and so that the word is getting out.

I think where I don't see it really soaking in is at some of the other utilities. I'm sure it is and, you know, I'm just probably catching the couple examples. I'm not sure how you guys can influence that, but the type of project that we're doing out at the airport with PG&E in the way that you can see how PG&E is moving that architecture forward and is thinking about it, so you know

if there is a way to -- maybe through the Public Utilities Commission we'll pull together more of a knowledge transfer among the IOUs, that that might be something that could be done.

COMMISSIONER DOUGLAS: Okay.

MR. STALLMAN: I have an addition to that.

MR. LEHMAN: I'm Peter Lehman from the Schatz Energy Research Center. The reason -- there are now -- there's one microgrid at BLR and there is another one coming, the Solar Plus Project, and there's a third one coming, the ACV Project. They're all funded by the CEC. We couldn't have done them without that funding. So supporting future projects with funding is certainly necessary. I think as communities and as governments become more concerned about resilience and wanting to pay for it and plan for it, then you will see more and more of these systems coming.

MR. STALLMAN: I just wanted to quickly comment that in doing a lot of my research around this state and trying to figure out where is the best benefit, where do they really, really need to go, and the remote areas definitely have high gravity for these types of projects. And I have looked at a number of other areas that we've had requests to look into, which are high density areas, lots of grid infrastructure, lots of transmission, lots of

distribution networking where there is lots of switching opportunity. And you look at the reliability histories and you go, wow, there's been one outage in ten years. And then you have to really question the value of what happens there.

So there is -- I keep floating back to there is operational value on a daily, weekly, annual basis. And then there is this that when the big one hits, that value is immense, but to only do it for the value of the big one is hard for us to get a handle on as a utility. We look at it and we got a lot of costs, we're going to pass a lot of costs onto the electric using community and how -- what does that really mean. And if we really do this a lot in a lot of different areas, what does that mean to our rate base, what does that mean to our consuming population?

So I really just want to encourage a partnership with the operating entity, the utility, in the case of my perspective, where we can help inform where the best money could be leveraged in different areas, not from the utility's perspective but from that community and the overall rate base and what is the best strategy for deploying those funds to the best benefit, to the best resource centers. And I think that's a very important piece of the puzzle.

MS. GANION: So having worked with a stellar team

of partners to build a microgrid, I think one of the things that we have really come back to time and time again is that because we have this experience now on the North Coast and the expertise on almost every level, I mean Dave Carter really has led this effort, -- we need to be able to download what's in your brain, just some sort of mechanism for everybody to have access to, but -- so this is my point, which is, you know, we are poised here to become certainly a clean energy, that's specifically a microgrid, center of excellence. But across the state I think looking at academic, industry, governmental partnerships to not only take this recent and really exciting learning and transfer it broadly but also pay attention to our STEAM and STEM education, try to figure out how we could use our facilities here, because we're going to have three very different scale and different operational microgrids, so that people can come learn both the strategic reasons to do it and the benefits and the safety but also the technical details, how do you integrate these systems. Because, as you said, you know, before it was just sort of called emergency back-up power, microgrid is a better word. It sounds better, it's just more attractive, more exciting.

But underneath all that it's very complicated and it's not off the shelf yet. And so I would just put that out there, that we need engineers, we need electricians, we

need electrical engineers, --

MR. STALLMAN: Standardization.

MS. GANION: -- we need standardization across a broad spectrum of equipment and technologies in the integration of all of this stuff. And I think that's what the Schatz Energy Research Center certainly has to bring to the table, is this integration knowledge and really we are going -- as I said, we were going to have that at several scales, facility, community, and now this big sort of airport complex. And -- and that's something to look at for a wider resource for field study and for technical integration.

COMMISSIONER DOUGLAS: All right. Well, thank you. Thanks for that.

(Applause.)

COMMISSIONER DOUGLAS: All right. I think we are going to roll straight into our next panel. And so the first three speakers on this panel will be from state and federal agencies, just kind of talking about different approaches on offshore wind and resources available. So we'll strike that with Necitas Sumait with BOEM.

* MS. SUMAIT: Hi. I'm Necitas Sumait with the Renewable Energy Section for BOEM. And it's been a pleasure to -- you know this is the first time I've been in this area and it's been a pleasure to meet many of you.

And I look forward to this forward-thinking energy planning that you have here, all these ideas born in Humboldt that will become the model for replication elsewhere. I thank the Energy Commission for facilitating this and allowing us to have this forum to inform and to share data and, again, the hospitality of you all here. And I had my Dungeness crab and baked oysters yesterday, so I'm a happy camper. Thank you.

So, anyway, the Bureau of Ocean Energy Management, quite a mouthful, thank god we have an acronym, one syllable, BOEM. Next slide, please.

So BOEM is involved in the process because we oversee the nation's energy resources in the outer continental shelf. Outer continental shelf defined as 3 to 200 nautical miles off the coastline. We have -- we got our renewable energy authority through the Energy Policy Act of 2005. I come from the Pacific Region, and we handle waters off of California, Oregon, Washington, and Hawaii.

The OCS is a big place, but we have no jurisdiction within areas that are designated as national park, national wildlife refuge system, national marine sanctuaries, or any national monument. Slide, please.

In addition to our energy leasing program, which I will spend on more of the slides, we do participate in ocean planning with the West Coast Regional Planning Body

and we have a fairly robust environmental studies program. It's basically in two sections. We have a group of scientists that reviews the potential impacts of the projects and we also have an environmental studies program in which we have invested funds to try to understand the potential impacts of offshore renewable energy. Actually it has the costs where we spent 7 million from 2010 to 2017, growth curve 2018 to 2021, whether or not that continues, it looks like we doubled it. So we are trying to understand the different impacts that offshore renewable energy could have on our resources. Next slide, please.

This slide is just intended to give you the links. I obviously can't read it. Just that all of the studies, ongoing and completed, are posted on our website. We try to organize it by state. And I think we may still have hard copies of all the various studies that are either ongoing or completed that are most relevant to the Pacific Region. So I have some of those slides -- our papers are still out there, the hard copies. Next slide, please.

So the Renewable Energy Leasing process. The key mechanism is this Intergovernmental Renewable Energy Task Force. It is established upon request by the Governor, so Governor Brown requested that we establish a task force on May 12th, 2016, almost two years ago. The task force is comprised of federal agencies, state agencies, local

agencies, federally-recognized tribes. It is a forum in which we share data, try to inform what we know about the different technologies, environmental issues, and just conflict-use concerns.

With that said, all task force meetings are publicly noticed and the public is welcome to attend. So it is a task force and it is a forum, but everyone can attend any of our meetings. Next slide, please.

So offshore wind. The offshore wind turbines is a proven technology, right. Fixed, fixed foundations, they exist. I think there are 14 gigawatts of deployed technology already in Europe, primarily in U.K., Germany, and Denmark. We have an offshore wind project in the U.S., in Block Island in Rhode Island. The trick is then -- and then there's here in California, as you're familiar, our shelf drops off very quickly, and so we must rely on the next generation technology which is floating. So the innovation really comes from marrying two proven technologies, I think, which is the offshore wind turbine and floating platforms, which has been used in other industries. So that is the -- those are just three of the different platforms. There are several of them. And so California is going to have to rely on floating technology going forward.

The largest deployed floating offshore wind is a

30-megawatt unit that is off of Scotland, so there is such a project that's already in place. Next slide.

So we begin on the Central Coast, primarily because that's where we have received the initial interest from commercial developers. It's an area with good wind resources and it also has the potential to have transmission grade interconnection available with the closure of the Morro Bay Gas Power Plant as well as the Diablo Canyon Nuclear Power Station. So I believe there is about 3,000 megawatts there that could be available for offshore wind. And that's for emerging technology and new projects. Not having to pay for the transmission infrastructure is a big help for these initial projects.

So that's why we have a lot of commercial interest in the Central Coast. And we have been in a planning process there. Where we are right now is that -- and you will hear from Steve Chung, the Department of Defense issues, there are some, they have some assets and some operations in the Central Coast. And so we're continuing to review the mission compatibility, military operations with offshore wind deployment. And so, you know, that's the current status with the Central Coast. Next slide.

So moving onto the Northern Coast, we have not yet received any kind of formal application from RCEA, but

you should know they have put out an RFP and they're interested in trying to do a project here in the North Coast. So it's a natural progression of our outreach to now be here.

We've been collecting data all along the coast, but we wanted to be here to try to understand, you know, we can have spatial data and all that in the computer, but we wanted to reach out to the different groups right here in the local community to find out other inputs into our planning here in the North Coast. Next slide. please.

So far here is what we have done in California. Before we even started after the task force was formed, we identified all the different stakeholders we ought to reach out to, the different materials we should have to inform them, the different contacts that we have, and try to come up with an outreach plan with the timeframe, I believe we put ourselves six months, and we actually did a pretty good job in doing that.

And so what do we do with all this data? The State has used it in the past and what we're using now, and Scott will give you some information on that, the database and gateway. It is an incredible, very transparent, useful data portal to put in all of the datasets that we have, over 600 datasets from academia, from NGOs, from environmental, from - -- you know from all sorts of people,

we put that in there. And so it provides a very transparent, easy-access way for everyone to know what we have found so far.

We also have had focused meetings. You know we have general meetings, but sometimes it allows -- you know, it's good to have more time. Let's say the fishing community and the environmental groups, the tribes, to just reach out and look at their more specific concerns with regards to potential offshore wind in the ocean, and so we did that.

So far I think we have done 50 plus now, and I know that's old data, stakeholder in-person meetings or phone calls, to be out there in the community to try to understand potential concerns with offshore wind.

We have also put together all of our data so far -- not data but all of our inputs that we have received through the stakeholder outreach. It's posted on our website. So there is an Interim Outreach Report. You're welcome to take a look at that and see what we have heard so far.

So this is the famous renewable energy leasing process slide which many of you have seen. It's really not as -- you know, it's fairly lengthy. It's a multi-year process. All the work that I have just said, we're still at the first bullet on that first phase. So it should give

you an idea of just how important it is to have pre-planning for BOEM. We have invested all of this time and we haven't really started reviewing the process, because we want to understand upfront what those potential issues are so we can try to de-conflict them as early as possible.

And so through all of this outreach, once we have sufficient information, the next step for us would be in a public notice to identify potential areas in what we call a Call for Information and Nomination. So basically this is a public notice in the Federal Register that would say these are the call areas along California. That goes out for a public review process. And depending on the comments received, which is from, you know, industry as well as just local stakeholders, we could refine that data and identify within that big call area wind energy areas, okay. Then those wind energy areas, which would be smaller, not any bigger than the call area, would be subjected to an environmental review under NEPA.

The federal action that the review will be in accordance to is the issuance of a lease, so the NEPA review would be commensurate with that federal action to issue a lease. Once the environmental review is done on that wind energy area, we could then identify lease areas, potential lease areas.

In the leasing process now, which is the second

phase, once we identify lease areas, we first issue something called a Proposed Sale Notice. In it, it will show the areas that we're proposing to lease and the general parameters of the lease process going forward. That is issued for a 60-day notice period. That is a point where if you want to input into how you believe, you know, either we've missed it or things we haven't considered, if there are other suggestions on going forward, that would be a good place again for public comment.

So after receipt all of that, we issue a Final Sale Notice, which will include the details of the lease, the instructions primarily to the potential bidders. And assuming a competitive process, then an auction will then be held.

The lessee at this point does not have the authority to construct. The lessee at this point simply has the right to characterize the site. So they do that by submitting something that we call -- now I'm in the third phase -- a Site Assessment Plan. And so they will include, if they want to do more wind resources monitoring, if they want to do sea floor mapping, they include all that in a plan. We review the plan. And they really -- they have five years to complete all of that plan. If depending on how much information they need or they think they need, then the next phase would be for the developer, the lessee

to file what we now call the last phase, which is the Construction and Operations Plan. So really this is where we begin to see the details of the project, potential layouts, the size of turbines. This is where we have the detail on which to do a comprehensive EIS. So here is another place where a NEPA would be performed.

After approval of the COP, the Construction Operations Plan, the developer will then complete a Facility Design and Fabrication Installation Report, which is just simply how are they going to plan to carry on the construction of the design and construction of the project.

Before they can begin any construction, we do ask developers to have a Conceptual Decommissioning Plan and a fund to initially fund that potential decommissioning, which is assessed on an ongoing basis, so it would be commensurate with what we believe it would take to decommission that project.

COMMISSIONER HOCHSCHILD: Necy, can I ask a question?

MS. SUMAIT: Yeah.

COMMISSIONER HOCHSCHILD: Yeah. So your agency has been involved in offshore wind analysis all over the United States. Could you just for the benefit of the audience here share how California's offshore wind potential as a resource stacks up against the rest of the

country? And I mean on a scale of 1 to 10 how good is the resource here? Then, you know, how does this portion of the resource compare to the rest of the state?

MS. SUMAIT: Well, there -- you know, the public, the private industry is here, but a minimum of seven meters per second is the wind resource that we work with that, and we have that. Up here it's like a leap up to ten in the North Coast, so it's even a better resource.

And just even to put in stack, I know the Atlantic Region has several leases, but if you look at the potential RPS demand, California as a single state matches or even exceeds, say, the Mid-Atlantic Region RPS demand. So California can really weigh in on offshore wind in a big way because the RPS demand is just there.

MR. STALLMAN: A question about the interconnection process to the transmission offtake. Where does that fit in this scale?

MS. SUMAIT: It would be that we don't necessarily -- we would review the cable that would come from the inter array that traverses the OCS.

MR. STALLMAN: Uh-huh.

MS. SUMAIT: And then any cable that is on State lands would then go through a state review. The interconnection process really is where the developer could feel that they need the de-risking part. In other words,

it's really up to them to file when they want to go ahead with the transmission planning process there. I mean selfishly, from my perspective, it would be good to know if PG&E can tell us the likelihood and advantages of -- you know there is that 3,000 megawatts in the Central Coast.

MR. STALLMAN: This is where I'm kind of leading to, is does it get included in the environmental review process from the infrastructure and development that would need to occur to handle the offtake of the report?

MS. SUMAIT: Yeah, to the extent that it's within our jurisdiction. If it's -- obviously, you know, if it's interconnecting it to an existing transmission, there is no --

MR. STALLMAN: Right.

MS. SUMAIT: -- there is minimum environmental impacts. So that's why the Central Coast is particularly interesting and that's why that was our first focus. So 3,000 megawatts on the Central Coast, we'd love to hear -- I mean that would be a good input, I think, to the BOEM process, is for us to understand, or PG&E, how putting projects here in the Central Coast would help the transmission grid, so perhaps we could chat about that a little bit more.

Next slide.

Next steps. So it's been a pleasure to work with

the State, with the leadership of Commissioner Douglas and Commissioner Hochchild. It's just been -- you know BOEM has all kinds of renewable energy task force meetings all along, on the Pacific and in the Atlantic, but I think we have the best in here, because the State has really been involved with us in all of the stakeholder outreach.

You will hear from Scott in terms of how they have housed the data and how they have -- you know, they know how to do planning here in the state, so it's been a collaboration, so that's where we're going to continue to do that. In the Central Coast, we're going to continue to work with the Department of Defense to understand the mission compatibility issues there. We're going to continue North Coast outreach here.

To the extent -- I mentioned the Intergovernmental Renewable Energy Task Force - if you belong to any one of those groups that I said, which is federal, state, local, or federally-recognized tribes, and you're not already in the task force, we do have a California task force, so let us know about that and potential participation in that.

And the next step, I believe, would be to do an in-person task force meeting sometime in the summer/late summer, and if we find areas then, you know, the next step in the process would be to do a Call for Information and

Nomination.

So I believe that's it. I do have other colleagues here and a couple of whom are standing out there. Jean Thurston is our Renewable Energy Coordinator. We also have Susan Zaleski, who is in our environmental group; and Donna Schroeder, she is, among other things, our fishing expert. So feel free to reach out to any one of us and we'll be here. So thank you.

COMMISSIONER DOUGLAS: Thank you, Necy.

(Applause.)

MR. FLINT: Thank you. Let me get this going here.

Thank you, Neci.

Can you guys here me okay?

COMMISSIONER HOCHSCHILD: Yup.

MR. FLINT: Great. So that is on and not off, okay, good.

Thank you, Necy. It's been great to work with BOEM, so I just wanted to keep that going, share that camaraderie.

The Energy Commission is the lead planning entity for the State in energy matters, and so under that we have been -- we have undertaken a leadership role in supporting the renewable energy -- Interagency Renewable Task Force by gathering data and information and entering into an early

planning process. And, basically, that just means pulling together existing information and having a lot of conversations around that information. One, to get more information, to do a better job; and, two, to identify areas that might work best for wind energy off the California coast and at the same time take an early look at minimizing potential conflicts that lessens our effort needed to deconflict those areas when we get to the project level.

So what we've been doing is a lot of data gathering, and I'll talk a little bit about what data is in a minute, but we've been putting it all on the site, which is called Data Basin. And the State and the Energy Commission did not develop Data Basin nor the concept but we discovered access to it and have been using it as a platform to make data available for folks, data and other sorts of things, and I'll talk briefly about those.

So step one has been to collect a lot of existing data. There's a lot of places where data already exists. You can go to those many sites. We're not just duplicating that here. We're bringing together the most pertinent information and related ocean wind energy planning and putting it on the site so that we can make it accessible to everyone. So, one, we're transparent with data. Everyone has access to the same data on the Data Basin, and it has

some unique functionality. A couple of those are: One, not only can you just download data from here, you can actually go in and make your own maps or work with the maps that are set up on Data Basin and save them.

So you can do some GIS here on your desktop, essentially, just in a browser with an internet connection, so this is one way to interact with the data. So, one, you can download it if you have your own system, and work with it. Number two, you can work with it right here in an internet-enabled web space.

A second unique feature of Data Basin that we like to use and take advantage of in these planning processes, is you can actually upload your own data here. So if you have datasets that you don't want to share publicly but you want to be able to look at and with the publicly-available information and you don't have the capability to download it, you can even do that in the system. You can set up private accounts and protect your data. You can share that account with a work group and just limit access to that particular work group.

The folks who run the site, the CEC, can't even see or know that your data is there, so you have complete control over your data. This has worked well and has been a feature that folks took advantage of, certain stakeholders took advantage of, in the desert planning

effort. It worked really well. So that's available to folks, again, to level the playing field and be transparent and provide more access to folks, to either one, take that data and actively participate in the process, or at least follow along in the process and understand what data is there and how it's being applied to decisions that are being made during the planning process or the siting process.

So what's next with this site. We have 600 datasets gathered. They're organized into these primary categories that you see in the middle, the California and Marine Coastal Energy, California and Marine Coastal Management, California and Marine Costal Ecology and Natural Resources, California Marine Fishing and Traditional uses. So within those categories there are hundreds of datasets, up to 600.

The next step for here is to identify the key datasets out of those 600 that we're using in the planning process and identify them for folks. They would show up when you go to the website, this is actually what it looks like. Down there in the Featured Items category you will then see key datasets and you will see some maps prebuilt with those key datasets. Maps about infrastructure and where the good wind resources are, maps about habitat and fishing and where the good resources are. Maps about other

elements of the environment and other uses going on out there and where they are in conjunction to good wind areas, so that's what we're working on next.

We've gathered a lot of data. It's taken time and we're not done yet. We're just getting started. This data that we've gathered so far gives us a really good head start on how to identify those areas that would perhaps go into a BOEM Call for More Information or a wind energy area identified by BOEM. So that's the purpose of gathering this data, but we're just getting started because we also have a lot of things that aren't here. And, as Necy described, all during the development process there will be more information being gathered and brought to bear on the analysis of potential impacts and effects of specific projects. And that will get more and more specific as we go along. So for now it's the big areas that we're trying to look at to help narrow down the conversation.

So there is also data that you can't map, data you don't want to map, and we still want folks to be able to provide that sort of input to this process. So while we're going to hand the keys off to folks with the site to use the data, we'll move into the backseat to be a backseat driver. And just remember this time it will be in an electric vehicle, so we might be a little closer. It's a little small and maybe a little closer than usual in the

backseat.

(Laughter.)

MR. FLINT: So we want to continue to work with folks and add a lot of to do around data, particularly fishing data. The fishing data on the site only tells a small part of the story. So we want to bring that data out, work with the fishermen, fishing groups, however they want us to do that, and really tear that data apart and figure out a way to integrate their issues and information that may not be mappable but still have a way to deal with it in this environment and make it visible and clear.

We started that conversation with tribal governments too and we hope to continue to pursue that and make this information available to tribal governments for the same sort of effort.

A lot of our focus has been on science data. We've had some ad hoc science help. We've asked a set of key data questions: Do we have the most relevant and up-to-date data; would you consider these complete and appropriate; how do you recommend they be used in performing a screening, planning exercise; is this data usable by itself or with other datasets, should be looked at in combination.

It says scientific data here, but data does not have to be scientific. There is data that comes from hard

science. There is data that's science-based. There is data on community issues and community values that are just as valid and can be put on this site and integrated into the planning process, so that's part of our effort as we go forward, and we'll assist with doing that.

So I promised Commissioner Douglas I'd hurry and not show any maps, but I can't not show a map and talk about data.

(Laughter.)

MR. FLINT: So to answer Commissioner Hochschild's questions a little bit, I don't have the numbers elsewhere in the world, but we have about 112 gigawatts of technical capacity off the California Coast. Not all of that is accessible. The stronger winds and better wind from a capacity factor are in the north of the state, where we are now. The set-up in the South Coast being close to load and having more areas to access the existing grid provide other opportunities that folks are looking to take advantage of. So there are different sets of opportunities at each part of the state.

I'm only going to show you one more map. How would you put together this data and start using it for this sort of conversation, so let me get to this one. So what we have here are three sets of data that are available on Data Basin. The blocky data you see near Humboldt Bay

in the light green, transparent, is fishing data. It tells us some of the highest value fishing areas off Humboldt Bay. This is just one piece of data, and I set the cutoff on what I wanted to show, so this is just one look at it.

The areas in blue, the blue bubble at top and bottom, and the little gray area on the very north off of Crescent City are Humpback and Gray Whale feeding areas, so those areas of importance to those species that we might want to look at avoiding.

The high value areas of fishing are areas we might want to look at avoiding.

And then vessel traffic on the outside, probably a good idea to avoid that.

What you see in the dark gray in the middle is assembly of technical data that identify optimal areas for wind based on wind speed, depth and distance to the connection, which is Humboldt Bay Power Plant.

So this is just one way to start putting this data together and getting an early look at narrowing down the conversation that is just getting started through this early planning effort about what are the best places to look at, so we can narrow down that conversation a bit and focus on those areas most likely to produce viable projects and to avoid important resources and important community values. Thank you.

MS. [SPEAKER]: Which color was the best?

MR. FLINT: Pardon?

MS. [SPEAKER]: Which color was the best for offshore wind?

MR. FLINT: And this, again, is one way to look at, only one way to look at it and only certain data, but it's the dark gray things that are up kind of in the middle. And you can see some of them are half conflicts and some of them have no conflicts based on the datasets that I have decided to put up. But if I put them all up, it would be really messy. So another reason to work with smaller groups through the issues as we go along.

And the only other thing to say about data, it doesn't have to be in scientific -- Crayons are okay. When we go out and talk to folks, we want -- bring your Crayons but bring the 128-color box, because we're already running out of colors to represent a lot of the resources and the interests all up and down the state. So thank you.

(Applause.)

COMMISSIONER DOUGLAS: All right, Steve Chung.

MR. CHUNG: Can you all hear me up there? Yeah, I don't do that quite too well. I don't (unintelligible) too well. You got a new clicker? All right, great.

Unlike Scott, I do listen to my State colleagues and I will keep my portion short, but for some of you that

we've met this week, thank you for your hospitality. I'd like to thank the Commissioners for the invitation and the local agencies here in Humboldt. My name is Steve Chung. I am with the Department of the Navy. I'm the Encroachment Program Director overseeing the six southwestern states. California is one of them. I am also here with my compadre from the Air Force, Scott Kiernan. Raise your hand, please.

And I also am the Department of Defense Point Lead Coordinating Offshore Activities in the state of California. I will say I knew today was going to be a good day, when the Department of Defense provide a presentation and the slides and we are the shortest slides there --

(Laughter.)

MR. CHUNG: That is a good day. That doesn't happen too often. We usually could kill folks with our slide decks. We have four slides, two of them are maps. I will try to leave a couple key messages here because this is only the first of a series of visits that the Department of Defense will do. We have maintained an enduring relationship with the State of California and other agencies over the past 10, 20 years. And we are very open and we're very happy that the additional relationships that are going to be built, the friendships that are going to be built with the agencies in Northern California, we embrace that.

Let me share with you real quick high level, a couple points there, I hate reading through the slides, so I'm just going to hit the highlights.

At the Department of Defense, we conduct a series of operations both onshore and offshore. These operations revolve around and center around two key fundamentals. We train and test our forces so they are ready when the country needs them, plain and simple. Whether that is our people for training or whether it is our platform, weapons, assets that we test, we train. So when they are called and the assets are called to bear, elements of that training and testing, manpower and people work right the first time and every time.

In many instances there is no second chance. We're called upon to go into hostile territories. There is no second chance. So the training and testing that occurs onshore and offshore are pivotal. That's message one that I'd like you to just take away.

The other part is we always look at the art of possible, what is possible. And this is where the collaboration with the State and other agencies become important. You always hear that a picture is worth a thousand words. Well, if I were to sit here and try to explain this in a slide deck with words, we would be in the hundreds of pages. But what I wanted to do is just

highlight here to give you just a quick visual, a representation of -- does this have a little wave here? I'm not going to point it in my face. Okay, so --

COMMISSIONER DOUGLAS: Steve, those mics are picking you up for our transcript, so I'm going to give this to you as you wander around.

MR. CHUNG: See, be blessed I listen to Scott. Good point.

So a quick illustration here. The little spaghetti lines I think you see in brown, those are essentially our freeways in the sky. We call those our military training routes. They are no different than the on-the-ground street networks that you have with our roads, our highways, our system.

Our network in the sky for that brown has similar parameters. We have speed limits on our roads. We have boat elevation from the floor, how low we can go, how high we can go within those corridors. The green represents our special use air space or training range areas. And the purple lines that you see out in the water, those are our warning areas where we conduct offshore.

Now the takeaway on this map here is simple. There is a lot of operations that are happening in six southwestern states. There are operations that are happening offshore. No single operation or testing that is

conducted is independent. If it is not, we put into a box. There are operations that go from shore to land and land to sea, air to land, and land to air. The connectivity of that takes place between the operations for our warfighters, essentially going from installations, they traverse to the range areas where they conduct testing and training and then they traverse to areas either onshore and offshore. The connectivity and the interrelationship is the takeaway I'd like you to go ahead with this vision.

Now obviously if there is a desire to dive down into any particular area, as we have started this week with our colleagues at Humboldt County, our friends at Schatz Research Center, and others that we have met with this week, we are very open and we will continue to keep that door open to continue educating, sharing information and, most importantly, continue to strive to see the art of possible.

What I mean by the art of possible. Now here is our spaghetti network. The complexities of our operation, training, and testing, and I put the Is, T in the areas in the south called the DRECP and just adjacent to that called the San Joaquin Valley Solar Initiative. So those are two very onshore, large-scale planning areas and planning initiatives that the Department of Defense embarked on with the State of California and a number of local agencies.

They also contain one of the most complex onshore operational areas in the entire State of California.

So what do I mean by the art of possible? Through those two ventures, each covering vast areas, big chunks of California, in the collaboration and the communication and the sustained efforts that the agencies, the State, and the military took, we were able to find not just little pockets we were able to collectively land on enabling a number of different renewable energy technologies within those planning areas.

Now why do I stress onshore when we're here talking about an offshore context. Ladies and gentlemen, it's context. Yes, in 2016, the Department of the Interior through BOEM asked the Department of Defense to review and assess mission compatibility for offshore floating wind technology. What you see in the two color codes there, red and yellow, and I know my good friend here Scott said bring your 126 different colors, we're limited, we like simple things, so we go with four colors typically. In this case offshore, we were asked to do it with three colors -- even better. Red, yellow, and green. Let me explain to you what each means.

Red obviously bad stuff. Well, red means the offshore technology is not compatible with the military mission. Yellow means that we'll likely find a solution to

enable offshore floating wind technology. Green means you're good to go. Go straight ahead.

So, yes, I heard it two days ago, Steve, there's no green. Very good, yeah, there is no green. And let me explain. We did have green areas in Northern California. At one point early last year the area north predominantly was green. And if you had seen that map, that was a correct map at that time. However, earlier this year our colleagues from NORAD, basically that's watching the entire West Coast, made a comment and said, well, you know if we -- we probably need some details of some of the concepts of what the project and when the project would go, we're pretty sure it's still going to be okay, but we need to see some more detail.

Well, in good faith we could not keep it green because we had one of our operational colleagues, and a very important one, that said we need to probably see some more details. So on February of this year, during one of the other public engagements and collaborations that we did in concert with the State and industry, the map that was displayed was the map that you see here before you.

So I'm going to keep it short and I'm going to end it with this message and it is we say what we do, we do what we say. That's how you maintain relationships. This will not be like The Ramones, a one-hit wonder. The

Department of Defense is here to stay to continue that collaborative effort. We're on this journey together. We think it's going to be a very good journey in Northern California. And for any additional contacts and incentives that we've heard, such as the Oyster Festival in June, we will be back here in June.

(Laughter.)

MR. CHUNG: We also heard that crabbing season starts in December, so I'm sure something will be scheduled in December.

So with that, folks, thank you so much. And if we have questions, we're more than happy to address any questions that you may have.

COMMISSIONER DOUGLAS: All right. Thank you.

(Applause.)

MR. STALLMAN: All right. Back to me again, Jon Stallman with PG&E. I will keep this extra short, and you will see why here in a moment.

So offshore wind and at the request of our friends at the Schatz lab, we have engaged in, again, trying to understand what does it mean to incorporate and interconnect offshore wind in this area to energy island.

And I think we established earlier in the day some of the constraints -- if you will go to the next slide -- we'll just dive right in here and I promise to keep this

short. So obviously upper left-hand corner of the map -- another map -- and you can see two transmission lines that traverse from east to west. And basically one goes over roughly around the Trinity's, Highway 299, and one of them goes over Highway 36. Those are 115 kv transmission lines.

To get a little bit better landscape, those 115 kv transmission lines connect at Cottonwood, in the Central Valley, and they connect up with the 500 kv line that goes from the California-Oregon Intertie, from Oregon all the way down to Vacaville area, down feeding into the Bay Area.

As you, you know, like track your way up the Central Valley and you track your way across the 115 kv lines and you enter into the Humboldt pocket, you will see a line that runs up and down the 101 corridor and that's a 60 kv line. That's a pretty small line. It's used for -- basically, the 115 line moves the energy over from the Central Valley, from the 500 kv over into this pocket. Then the 60 kv line moves it up and down the coastline.

The 60 kv line is not really designed to move any form of bulk energy. The 115 kv line can move a certain amount of energy, but it's rather limited. It wasn't really designed to necessarily export large volumes of energy. So, you know, having our conversations, trying to figure out how do we study this, we developed a way to study it in buckets of development, to try to incrementally

understand if we start with a small amount what are the impacts to the transmission system in order to take that energy and at what point does that become stressful on the system and we have to make major capital investments to allow for this type of generation to exist off the coast.

So I just want to highlight in the first bullet that's essentially the landscape that we're looking at from a transmission system. PG&E's role in this case is interconnection again. Understanding what the volume of production is going to be, where is it going to land onshore. And right now it's speculated to land at the power plant, Humboldt Bay Power Plant. So there are some things that come up with that interconnection point. And then how we get the energy from that point over to the bulk system, which is the 500 kv and how do we move that energy southward where the loads are, in the Bay Area, Sacramento, Central Valley, that area.

So when we look at that, and in talking with my colleagues, and I'm not the transmission expert but I'm conveying the message between all of my colleagues, that the line, the 115 kv lines, that runs through a pretty rugged terrain. If you ever cross over 299 and you understand the Trinity Mountains through there and the river basins, that's a pretty rugged terrain. That's a pretty fragile system. And I think that's one reason why

we're having this conversation. And in order to change that system to make it larger is going to be a fairly costly event, but I want to emphasize that we won't know that until there is an actual interconnection study applied for.

So once that interconnection study is applied for, then our organization can dive into it and really start to evaluate what does it mean to move it over on the 115 lines, what does it mean to develop some alternatives. Can we go south, down the 101, and build a whole new system down to the Petaluma area? Can we go with an undersea cable all along the coastline and intertie somewhere down where the loads are in the Bay Area? There's lots of questions to be asked there and it all comes down to feasibility of interconnection and hence my question about interconnection and where does that tie in with the planning process and assessment process, because it's very evident to us when we talk about it from an interconnection standpoint that as you scale this wind system up, and at whatever point that it makes financial sense for the developer to install and operate that wind system, at some point there is a critical export that occurs and the system needs to be addressed to handle that amount of expert.

The in-pocket loads within the Humboldt area is really only -- I think somebody could correct me if I'm

wrong, I'm going to throw about a couple of numbers -- about 75 megawatts on average with a peak of around 150 megawatts --

MR. [SPEAKER]: It's about 110.

MR. [SPEAKER]: A hundred and ten.

MR. STALLMAN: A hundred and ten average, right.

MR. [SPEAKER]: A hundred and seventy peak.

MR. STALLMAN: A hundred and seventy peak, okay. Thank you. Thank you.

So with that said, you know if we're producing more than the in-pocket can absorb, then we're going to be exporting. We need to take that delta of whatever is going absorbed in-pocket and take what we're going to export and figure out what that impact is on the system.

So I have mentioned the undersea cable options. The formal interconnection study is what catalyzes all that effort to occur. Once we get that, then we can really start taking a look at the very intimate details of the system, and those costs need to be incorporated into the overall assessment. And that's a known process. That's a unique opportunity and a unique system, so there's some other things that come up with this.

And what's unique about it is where there's two additional things that are very unique. With an offshore wind system in Humboldt, where it ties into the generation

facility, now the way the way that that generation facility gets used is actually very complementary to the wind system. When the wind isn't blowing, the generation system is there. When the wind is blowing, the generation system is there and can be used for different purposes. We need to assess that. We need to figure out what that is, what are the different operational modes, what are the costs of that operational mode, and those types of things need to be evaluated with that generation facility. So we'll leave that at that point.

And then I think lastly is to be observant and aware, and this is out of PG&E's purview. However, the degree of contracts that exist on the 500 kv, called the COI or California-Oregon Intertie, and the contract bandwidth of off-taking that power that's produced in this area. And so if those -- that conduit, that 500 kv conduit, is preoccupied by a lot of other resources from Oregon and Northern California and Washington, and so if we're going to bring power in at the 500 kv, we've got to take a look at the contracted bandwidth and figure out how we're going to make room.

And I think the CEC has prepared -- I read a letter recently that you're prepared to take a look at that and open that up to more renewable resources on that 500 kv. So I think some of these things are going to unfold

over time as we dive into it more.

In exploring the offshore cable option and where it would enter and where it would tie in, the same conversation kind of comes about. It's a different bulk system that it's tying into, but you've got a contracted bandwidth that's occupied by the geysers generation and a couple of other generation facilities that tie into that Petaluma area. So, again, we have to look into and observe that contracted bandwidth. And I think the CEC is prepared to do what needs to be done to really take a look at that.

COMMISSIONER DOUGLAS: Thank you.

MR. STALLMAN: So I'll leave it at that.

COMMISSIONER DOUGLAS: Can I have a microphone back? Thank you.

So I just had one question. You know, I had understood, and you might have said this, that really right now because the electricity system here in the Humboldt area is meant to be able to import some electricity but it isn't really an export center particularly or at all, you know would exporting some amount of electricity trigger upgrades within the system at the distribution or transmission level? Can you speak to that a bit?

MR. STALLMAN: Well, yes. In a previous study that was done, and now the dynamics have changed, there's been other renewable energy mixes, energy efficiency, and

hence a real comprehensive study would take a look at forecasting those values out in time, so there is an immediate impact based off from the amount of generation that's done. We need to also -- and what we've written into a scope of work with the Schatz team is to look at the forecast of the uptake of energy efficiency and distributed generation onto the distribution system that could affect the in-pocket demand, which hence would increase the export volume, right, so -- which is a good thing. We want to have more distributed generation, and that's the beauty of distributed generation. And we want to have more energy efficiency, but that will increase the export volume.

So, yes, prior I believe there was a study done, and I don't have the numbers off the top of my head, you'll have to pardon me, but something on the order of 200 megawatts was evaluated to be exported. And that evaluation was -- triggered a number of capital projects and that's everything from conductor sizes to voltages and maybe changing the voltages on certain lines to raise the voltage to be able to get more capacity out.

There is -- mostly, if I'm running my head through the article, the report, is it was thermal overloads on a number of different devices. And those thermal overloads would all need to be upgraded in order to handle any kind of export volume. I think there is a

little bit of export bandwidth, but it's relatively small.

COMMISSIONER DOUGLAS: All right. Great. Thank you.

Well, we are onto our last panels. Thank you.

(Applause.)

COMMISSIONER DOUGLAS: All right. Richard Engel, RCEA.

MR. ENGEL: Thank you. Thank you, Commissioners and CEC staff for making the trek here to talk with us. I'm Richard Engel, Director of Power Resources at Redwood Coast Energy Authority. The great thing about being the last speaker is I get to cut out probably half of my material because it's already been covered in some form or other.

So you heard from Dana, my colleague at RCEA early this morning, giving some background on our organization. Thanks, Dana. And then the panels that just spoke talked about offshore wind. I'm going to tie those two topics together. Can I get the clicker, please? Thanks.

So I'm going to frame RCEA as being kind of a key stakeholder locally for making offshore wind happen. So I want to talk a little bit more about RCEA and our Community Choice Energy Program just briefly, because Dana already did a good job with that. I want to talk about why

offshore wind should be happening in Humboldt and why RCEA is an interested stakeholder in that. I want to talk about the partnership that we've been developing to make this happen, and just kind of review the time line for what's happened so far.

So when I talk to folks from other CCAs, I was just actually down in Oakland yesterday meeting with folks at East Bay Community Energy and several other CCAs, as we periodically have meetings to talk about a power procurement, and that was our group meeting yesterday, we're different from most of those other CCAs in that we're a pre-existing organization, as Dana explained. We've been around since 2003. To this day we continue to, by a slight majority, dedicate most of our resources to things other than CCA. In terms of staffing, I think it's a little bit less than half of our full-time equivalent staff that works on the CCA program.

We have the Energy Efficiency Programs, including the Energy Watch Partnership with PG&E that's been around for many years. And then Dana oversees our Clean Transportation Program. So we've got a lot else going on besides the CCA.

To dive down into the CCA a bit, we're serving the whole county. We launched with most of the county onboard. Ferndale was a little bit slower than the rest of

the communities to get through the final steps of joining, but we rolled them into the program a few months after launch in January of this year. So we now have everybody in Humboldt County is eligible to be in our program. We have 62,000 customer accounts, which is 93 percent of Humboldt County participating in our program. In terms of -- if you sift that down to unique customers, it's about 55,000 unique customers. A lot of the commercial customers of course have multiple accounts.

We have about 130 megawatts of peak demand that we serve, about 700 gigawatt hours a year delivered. We have set our generation rates to be three percent below PG&E's. That was actually just in March when PG&E raised their generation rates for bundled customers, we also raised our rates but actually slightly increased the increment by which we're below PG&E rates, which we see as a necessary viability of our program because CCA programs by their nature allow customers to always have that option to not participate and go back to bundled service.

We're offering a 40-percent power -- a 40-percent renewable power mix to our customers, but people can opt up to a hundred percent renewable program. And currently we're getting -- just for this year we'll be getting just under one-fourth of our total portfolio from the local biomass power, which has allowed us to keep two of Humboldt

County's three biomass power plants online. We started almost from the beginning of our program with the Scotia Power Plant and we're just as of May 1st going to be bringing the DG Fairhaven Plant online as another generator.

This is the overall map of the country. You've already seen plenty of maps today. The point here is just that one of the key reasons for Humboldt County looking at offshore wind is that we are one of the windiest places along the North American Coastline, but it's not just the wind resource. And this is the old version and the map before the NORAD got ahold of this, so we can dream about when the whole Coast was still all green, but anyway, so like Steve tells it, this shouldn't take too much wind out of our sales now that the yellow color is back. So this is not surprisingly brought a lot of the developers to come talk to us here in the North Coast.

And then the harbor facilities are an important part of this too. It's become clear that the combination that we have of having one of the few deep-water ports on the California coast and having a lot of vacant industrial land from kind of the legacy of the decline of the timber industry and the closing of the pulp mills and all that has created an untapped resource there of land that could be used for the onshore facilities that are needed to support

deployment of offshore wind.

And also another interesting point is that we don't have any bridges between the onshore docking areas and the open water. And most of the wind technologies would be significantly hampered if there was a bridge in the way that they had to get stuff under, so that's one less obstacle that we have locally to offshore wind and all this is brought up.

So why is RCEA taking an interest in this? Well, one of our underlying principles is bringing local control over our local energy resources. And we see the opportunity to do that by getting involved as an active stakeholder in the offshore wind development on behalf of the whole county.

You know our board of directors consists of elected officials from all of the seven incorporated cities, the county, and also the Humboldt Bay Water District, so we're really representing the will of the people through our board of directors.

Also this is an RPS resource that potentially helps address the duck curve on a regional and state level. The fundamental principle of grid management is having supply and demand match each other, not having conflicts there. And, when you look at the shape of the duck curve, this is admittedly an old forward-looking version of the

graph from 2013, so I really should have a contemporary picture to show you what it really looks like, but you get the idea, the belly of the duck has gotten lower and lower as more intermittent energy has come online. And the shape of the wind resources in the lower right, this is from the NREL-BOEM study that looked at modeled data for several locations up and down the California coast. And the two upper most curves here, the blue one and the orange one, are off of Humboldt Bay and off of Crescent City, respectfully, so those are like the flattest curves of all these curves that are based on different places up and down the California coast. And you see that it peaks in the evening, which coincides nicely with reducing that ramping need that's implied in the duck curve for bringing otherwise lots of thermal generation online really quickly, as is the situation we're currently in.

There's also the port revitalization and local job creation, which tie in really nicely with some of our -- the priorities of the local elected officials that make up our board of directors and give us our direction for what we did.

So we have -- we put out a solicitation at the beginning of February, looking for a public-private partnership to help move all of this forward with RCEA as part of that partnership. We were looking for developers

with capabilities in three areas, one of those being technical studies, being able to help with preparing the site assessment plan and the construction and operations plan that we heard about earlier from Necy.

We're also looking for somebody with the technology that could be deployed for floating wind farms and project design. And we're also looking for somebody with all the juice that it takes to make this project happen, so financing it and being able to do construction and operation and eventual decommissioning.

And so we framed the project in our solicitation as being a public-private partnership, looking for a project in the 100- to 150-megawatt range. This is far more than RCEA ourselves would be interested in procuring probably, so we would probably be looking for a project that would involve other off-takers, but our communications with developers led us to understand that probably a minimum project size of this scale would be necessary to make the project financially viable from a developer's standpoint.

We're looking at depths up to 900 meters, so that's why this is certainly going to be floating technology that gets developed, and we're hoping for a time line of 5 to 7 years to get it up and running.

We got 6 responses out of 26 interested companies

that we sent it out to. And we put together a review team that really represented a broad range of stakeholders here in Humboldt County, so RCEA staff, including myself, reviewed it. We got PG&E; we have like local labor unions; commercial fishing; local governments; nonprofits including environmental groups to participate; the Harbor District; and energy consultants; and we did have a participant from Sonoma Clean Power, our sister agency down south, they're very interested in potentially being an off-taker which could help drive this project forward too.

In terms of time line, we -- before we did the solicitation we had actually entered into a nonbinding memorandum of understanding with Principle Power. That was the first company that had come forward and approached us and it looked like they had a lot of the capabilities needed to make a project like this happen and one of the very few companies that have actually developed and deployed a floating offshore technology at megawatts scale. So we started this MOU with them just to kind of get the process going of exploring the project in partnership with somebody that had the knowledge and the capacity to help make the project happen.

We've been holding a series of stakeholder forums. Nancy Stevenson, in the back of the room, is our Community Strategies Manager, has been providing that

process. We issued a solicitation in February, got our responses in March. Our board approved the selection of Principle Power Incorporated and the team that they have put together as our preferred private partner to develop the -- to develop an agreement with for collaboration. And then just this week our partners, our putative partners, we don't really have an agreement in place yet, that's to be negotiated still, but they submitted a CAISO interconnection study on Monday and on the same day our board approved us chipping in one-fourth of the cost of that so that we've got some real skin in the game on this. The next thing that's going to come up will be our leased application.

So, again, thank you very much, Commissioners and staff, for coming to hear about this.

(Applause.)

COMMISSIONER DOUGLAS: Well, thank you very much for being here. I think given the time and the number of people in the room, we're going to go straight into public comment, but we want to thank the panel again for being here.

(Applause.)

COMMISSIONER DOUGLAS: So we'll have a microphone for folks who would like to make a public comment.

And do we have a sign-in list, Heather?

All right. Alana, you have the cards?

So the Public Adviser has some cards if you'd like to make a comment. So come on in the back and fill in a card if you'd like to make a comment. They will be brought to me, and you can use this microphone right here.

So, Frankie, if you want to come on forward. I can't read your last name.

MR. MYERS: So my question is do -- or my comment is our --

COMMISSIONER HOCHSCHILD: Could you identify yourself, please?

COMMISSIONER DOUGLAS: Just for the record.

MR. MYERS: Frankie Myers, Yurok Tribe, Heritage Officer for the Regional Officer.

I heard a lot of disturbing facts today. One of them that I think is the most concerning of all the maps I've seen is the map showing the green area, the go ahead that encompasses the entire Yurok territory. And having had no consultation for the creation of that map and whether we are going to be okay with it or not, that is very concerning to me that all of my ocean is up for wind energy without ever having been asked whether that was something that's appropriate for the Tribe and for the culture.

I'm glad the military stepped in and at least put

a yellow color on it now so that we have some sort of consultation.

My other concern I have is with RCEA. Numerous times it was mentioned that local governments are included and all of Humboldt County is included, however, given the Yurok Tribe is the largest tribe in California with a membership of 6,500 members and estimated descendency of 12,000 members, which would make the Yurok Tribe the third largest incorporated city in Humboldt County, why tribes and tribal governments are not listed and included as local governments? Given our extremely long history here in Humboldt County, the work that was highlighted by our planning director that we're doing for electrification, I don't understand the discrimination towards tribal governments in this process since it does have a huge, could potentially have a huge detrimental effect on our cultural landscape.

The idea of ten windmills on our coast is concerning. The presentation given from PG&E, looking at exporting energy means there would be a considerable more amount than ten proposed within our aboriginal territory, of which we've never ceded rights to. And today for the first time that we have heard a presentation from RCEA is very, very concerning to the Tribe. We'll be sending out an official letter requesting a government-to-government to

follow up, but the Yurok Tribe is very concerned about what has taken place so far without any prior consent or consultation. Even a postcard would have been nice.

COMMISSIONER DOUGLAS: Frankie, thanks. Thanks for being here. And as you know, because we have discussed, the state and the federal governments both have consultation obligations to tribal governments, and so -- we have so far we have only had informal conversation, but consultation definitely is something that follows that, so we'll be happy to talk to you, the federal government as well.

And, you know, I don't know how tribal governments and community choice aggregators work together, can work together in terms of membership. It's -- or other relationships. It may be a conversation worth having. But I just want to express appreciation for you and the Yurok Tribe being here today and the meeting yesterday, as well and the discussion before that.

MR. MYERS: Absolutely and we appreciate that. We want to be good neighbors and good community members and would like to be afforded the same kind of respect coming from whatever it was would be a good organization.

COMMISSIONER DOUGLAS: Um-hum. Thank you.

I've got Jim Lanard with Magellan Wind and Copenhagen Infrastructure Partners, and invite others in

the audience to fill out blue cards.

MR. LANARD: Hi, Commissioners. Jim Lanard with Magellan Wind and Copenhagen Construction Partners. Thanks very much for hosting this today and coming up to the North Coast. We're glad to be here as guests ourselves.

What I'm not going to talk about but are probably more important than anything would be how offshore wind interacts with community, community relationships, environmental protection, the fisheries community, the tribal community, and the military, the Department of Defense. I'm leaving that off just in the interests of time.

I want to talk about technology readiness and I want to talk about competition for the time that I have here.

On technology readiness we're talking about floating offshore wind technologies. Right now 11 different technologies have been deployed worldwide and 27 different foundation -- or foundations are going to be deployed with seven new designs over the next few years, so there is a lot going on in the floating world and we're going to be seeing costs coming down significantly.

Humboldt has great winds. We've heard that today. We've heard that there's great transmission capacity constraints as well, but -- so the way that we're

going to have to get this industry deployed has to do with getting the price down so it could be competitive with solar, with land-based wind, and other energy sources that California has access to. So for both the North Coast and for the Central Coast of California, the Magellan CIP Team strongly proposes that there be competition. And for there to be competition among developers, that would mean multiple wind energy areas in each of those regions of the state. And as New Jersey did, the developers proposed and the state supported that no developer could win more than one lease in one region, so that you have now multiple developers directly competing against each other. That results in the only way to ensure that you get the lowest price of power. I'll give you a great example.

In Maryland there were two leases, one by one company and they put in a bid for $176 per megawatt hour. Unknown to that company, another developer in Delaware was using lease to bid into the Maryland proposal and put in a bid for $134 a megawatt hour. The public utility commission in Maryland -- and the Maryland developer sued to try to keep out the Delaware competitor. They lost that. And then the public service commission worked through their analysis and said that the real price is $131 and then asked both companies, would they accept that. So the bid at $176 came down to $131 simply because there was

competition. Without competition there is no way to know whether an off-taker is getting the best price possible.

Massachusetts has three leases going right now with competitors going against each other. New Jersey has multiple leases with multiple winners competing against each other and New York is now going for that as well. So we think that in order for this industry to be stood up in California, we've got to show you, the Commission, and the Public Utility Commission that price is competitive. To do that we need to compete against each other. Thank you.

(Phone ringing.)

MR. LANARD: Hello, hello.

COMMISSIONER DOUGLAS: Thank you, Jim.

Do we have other -- I don't have any other blue cards, but do we have others who would like to speak?

Jim? Oh, you're just coming up.

MR. ZOELLICK: I was just shifting in my seat.

COMMISSIONER DOUGLAS: You were just sitting, okay. Great.

Do we have other cards or other speakers who would like to come forward?

Would anyone else who hasn't filled out a card like to come forward and say a few words?

All right. Well, it looks like we'll step into some closing comments then.

Do you want to start, or Christina?

MS. SNIDER: I don't have any.

COMMISSIONER DOUGLAS: Okay.

COMMISSIONER HOCHSCHILD: No. I just want to say thank you. I really appreciate the hearing, all the perspectives here this morning. And this is -- the whole purpose here is to really listen and understand what the issues are and the concerns.

And I will just say you don't have to be a big county or a big city to make a big difference. And what I have seen happen across the state and across the country is models -- as we work to build a clean energy future, models that get pioneered often in very small, rural communities become templates for states and can spread. And that's really what I'm always looking for is best practices and I just was very impressed by some of the thinking that I have seen here. And I just want to really want to encourage all of you to stay engaged and we will definitely be looking forward to continuing the conversation.

I especially want to thank my friend and colleague Commissioner Karen Douglas for setting this all up and doing the outreach as well.

COMMISSIONER DOUGLAS: I want to say some of our team has been here for the last two days as well as today and so we've had a chance to meet and talk to a lot of

people and hear a lot of different perspectives, even beyond what we've heard today.

I want to thank the people of this region for your time, your hospitality, your interest in engaging with us and your willingness to share your viewpoints, your perspective, your work, your ideas. It's definitely we've learned a lot from being here. Definitely appreciate it and look forward to continuing to work together in the future. So thank you and, with that, our IEPR Workshop is adjourned.

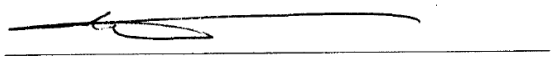
(Applause. Workshop adjourned at 4:00 o'clock p.m.)

REPORTER'S CERTIFICATE

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.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 28th day of May, 2018.



PETER PETTY
CER**D-493
Notary Public

TRANSCRIBER'S CERTIFICATE

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 transcribed by me, a certified transcriber and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 28th day of May, 2018.

_____

Kelly Farrell
Certified Transcriber
AAERT No. CET**D-772