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COMMITTEE HEARING

BEFORE THE

ENERGY RESOURCES CONSERVATION AND DEVELOPMENT

COMMISSION OF THE STATE OF CALIFORNIA

In the matter of,	
	) Docket No. 16-IEPR-03
	)
2016 Integrated Energy Policy	)
Report Update (2016 IEPR Update)	)

IEPR COMMISSIONER WORKSHOP ON

OFFSHORE RENEWABLE ENERGY

CALIFORNIA ENERGY COMMISSION

FIRST FLOOR, ART ROSENFELD HEARING ROOM

1516 NINTH STREET

SACRAMENTO, CALIFORNIA

WEDNESDAY, MAY 25, 2016

9:30 A.M.

Reported By:
Peter Petty

APPEARANCES

COMMISSIONERS

Karen Douglas, Lead Commissioner, IEPR Committee

David Hochschild, Commissioner, IEPR Committee

CEC STAFF PRESENT

Heather Raitt, IEPR Lead

Thomas Gates

MODERATOR

Ella Foley Gannon, Morgan Lewis Law Firm

PRESENTERS/PANEL MEMBERS PRESENT

Studies and Research

Mark Jacobson, Stanford University (via WebEx)

Walt Musial, National Renewable Energy Laboratories (NREL) (via WebEx)

Bill Toman, Cal Poly, San Luis Obispo

Federal and State Permitting Agencies

Joan Barminski, U.S. Bureau of Ocean Management (BOEM)

Jennifer Lucchesi, California State Lands Commission (CSLC)

Kate Hucklebridge, California Coastal Commission (CCC)

Lisa Wooninck, National Oceanic and Atmospheric Administration (NOAA)

Bill Foster, National Oceanic and Atmospheric Administration (NOAA)

Noah Matson, U.S. Fish & Wildlife Service (via WebEx)

Becky Ota, California Department of Fish & Wildlife

APPEARANCES (CONT.)

PRESENTERS/PANEL MEMBERS PRESENT (CONT.)

Interested Agencies and Tribal Engagement

Deborah Halberstadt, California Natural Resources Agency, Ocean Protection Council

Steve Chung, U.S. Department of the Navy

Thomas Gates, California Energy Commission

Offshore Developers and Service Providers

Kevin Banister, Principle Power

Alla Weinstein, Trident Winds

Jim Lanard, Magellan Wind

Doug Davy, CH2M Hill

Stakeholder Perspectives

Chris Shutes, California Sportfishing Protection Alliance (CSPA)

John Mellor, Pacific Coast Federation of Fishermen's Associations

Jennifer Savage, Surfrider Foundation

Garry George, Audubon Society (via WebEx)

Elizabeth Murdock, Natural Resources Defense Council (NRDC)

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P R O C E E D I N G S

MAY 25, 2016 9:30 A.M.

MS. RAITT: And we also are going to have a transcript available, so we have a written recording available in about a month. And the audio recording will be available in a couple of days. And both will be posted on our website.

And today's agenda is very full. Thank you to all our presenters here today. And we just ask that you do keep to your time limits.

At the end of the day there will be an opportunity for public comment and we'll ask each person to limit their comment to three minutes. And if you are interested in making public comments, please fill out a blue card and go ahead and give it to me. And we'll have people first in the room make comments at the center podium, and then we'll move on to our WebEx participants, if they would like to make comments.

If you haven't, please sign in at the entrance to the hearing room. All reading materials are available on our website.

And we do welcome written comments and they are due on June 8th. And the notice provides information on how to submit the written comments.

So with that, Commissioner Douglas, thank you.

COMMISSIONER DOUGLAS: So, thank you, Heather. And we are uncharacteristically being very rigorous about starting this IEPR workshop exactly on time because we have so much material to cover. And I want to thank everybody who helped us set up this workshop and who's here today to take part in it, or to listen in and make public comment.

Let me, just before I start introductory comments, I just want to check on the WebEx, Mark Jacobson, are you on the WebEx? He will be our first presenter if he is live and connected.

MS. RAITT: Not yet, so we may need to go to our second presenter.

COMMISSIONER DOUGLAS: All right. So, just so everyone knows if, at the end of our introductory comments we don't yet have Mark Jacobson, we'll go straight to Walt Musial to speak.

So, just briefly, I wanted to say that I really welcome this opportunity. I've learned a tremendous amount in helping put this workshop together, with the support of my advisers, and the IEPR team. And let's see, Jennifer Nelson, Le-Quyen Nguyen, Kristy Chew, and then Commissioner Hochschild. I particularly want to thank Commissioner Hochschild for encouraging me to

engage on this issue.

I've spent years, and years, and years focused on Desert Renewable Energy and, more recently, San Joaquin renewable energy. And, you know, that's solar, and wind, and geothermal. And I kept saying, well, you know, offshore wind sure, but really now? And he kept saying, yes. You know, yeah, it's really now.

And so, it turned out that it fit very well in the context of this year's Integrated Energy Policy Report, or IEPR because, you know, one of the major themes of this year's IEPR is to look at how our electricity system has changed, especially in the last ten years, given implementation of new policies, particularly the State's climate policies and the RPS.

And we have done these kinds of analyses of the environmental footprint and the physical infrastructure of our electricity system. We did one in 2003 and we did one in 2005. And then there was a long hiatus where we were not producing these analyses, and we're picking it up this year.

And it's a fascinating time to look at it because you can really see the impact of groundbreaking policies, like AB 32, and SB 1368, which reduced the State's investments in higher-polluting facilities and has triggered a tremendous amount of divestment,

ultimately, from coal facilities. We've seen our natural gas fleet get much more efficient. And we've seen a tremendous increase in renewables, both large scale and distributed.

And one of the things that the 2005 Environmental Performance Report did was it kind of looked forward. And it said, well, what are some of the issues going forward that we need to think about, or foreshadow, particularly in terms of how the system might evolve and the environmental or permitting implications of that.

And as we looked through different options, it was very clear that the question of offshore, whether it be wind, or tidal, or wave energy development, the potential for that development was one of those issues. Both because it is extraordinarily complex environmentally, and a lot of our panelists will talk about why, both in terms of permitting and in terms of the actual mechanics of assessing and monitoring impacts, which are difficult in the ocean environment.

And, you know, also because, as I've challenged a number of panelists to articulate, this actually is a pretty enticing resource when you think about it in the context of a balanced portfolio that gets us from, say, 50 percent renewals to, oh, 80 or 90, or above.

And so, I think this is a really timely and important workshop. I again want to thank everyone for being here and being part of it.

I did challenge some of the earlier presenters to please include a slide about why we should be talking about this resource given that it is not easy. And I think probably all of them have.

And so with that, I really look forward to the day.

Commissioner Hochschild, opening remarks?

COMMISSIONER HOCHSCHILD: Well, thank you. And thanks, first, to Commissioner Douglas for bringing us together today. It's actually been an absolute delight to work with you these last three and a half years, both because the work you're engaged in, particularly around planning, has turned out to be very prescient. And I know you've spent, you know, seven years on this Desert Renewable Energy Conservation Plan, but also the way you've gone about it has been very, very thorough and deliberate. I think it's really been to the benefit of us all.

So, just a few opening thoughts. I do think what we're building here in California is sort of an energy postcard from the future to the rest of the country. And if you just look at the trends here and

the way in which other states have already followed suit, you know, we move quickly to get off coal. And now, just to highlight the point, we were at -- the majority of American electricity was powered by coal in 2011, 52 percent. And today, the majority of the -- and so, now, this year, it's going to switch. Gas will be the largest resource.

And the majority of U.S. coal mines and coal assets today are held by companies in bankruptcy. The top four coal companies in the United States, Peabody, Arch, Alpha and Cloud Peak Energy have seen their market caps decline by 99 percent in the last five years, which is the steepest decline in value, in the history of the energy industry.

And what we're building in its place is a clean energy future. And you saw, last year, 65 percent of new electric generation capacity added in the United States came from renewables, and California was the difference maker there. And, you know, particularly on solar and wind, these technologies have fallen almost 60 percent in cost since 2010. So, enormous opportunity.

And because of the vision of the Governor and the Legislature to establish this long-term policy goal, 50 percent renewables, but even before that, the 20- and 33-percent targets, that has helped to drive investment

into the State. And more clean tech venture capital in California today than all of Europe and all of China, combined. And it's a real testimony, I think, to the future we're trying to build.

With wind, in particular, I actually do believe this is going to be -- offshore wind is going to be a viable resource in California. And the goal, really, I think, is to just clarify the pathway for the resource to compete. And then, you know, it will have to stand on its own.

But just looking more broadly at the opportunity, I think it's worth noting the other big trend, in addition to the growth of renewables, and the cost reduction of renewables is what's happening with electrification. The State is now underway in this process of what I call the electrification of almost everything. We have 200,000 electric vehicles on the road today.

In October, Chevy's coming out with a car that goes -- you know, the all-electric Chevy Volt goes 200 miles, for retail, after rebates, of $25,000. Tesla did the same thing.

The following year, we're seeing the electrification of rail from the Caltrans. And, of course, high-speed rail's going to be 100 percent

powered by electricity, 100 percent renewable. Even in the new construction sector, new homes now being built with no gas lines, all-electric homes.

And existing facilities, such as Stanford University, just got off natural gas and they're doing all their water heating, all their space heating with electricity.

All of these things are going to be more demand for renewables. And so, I think that's why the planning work that Commissioner Douglas has been leading is so important. And why the work all of you are doing around this technology we're going to be talking about today, and these resources, matter so much. So, looking forward to the discussion.

COMMISSIONER DOUGLAS: All right, thank you, Commissioner Hochschild.

So, let me just ask, Mark Jacobson, is he on WebEx?

MS. RAITT: Yes, go ahead, Mark.

COMMISSIONER DOUGLAS: Oh, fantastic. Thank you. Go ahead.

MR. JACOBSON: I'm here. Can you hear me?

COMMISSIONER DOUGLAS: Yes, we can.

MR. JACOBSON: Hello?

MS. RAITT: Yes, we can hear you.

MR. JACOBSON: Okay.

MS. RAITT: And so, if you can just let me know when you want to change slides, I'll change them for you.

MR. JACOBSON: Okay, yeah, so I'm going to talk about, well, how -- or, clean energy plans for California, but also some offshore wind energy work and wave work we've done to look at the resources for offshore California.

So, the second slide, please. So, first, just in general we've developed plans for each of the 50 United States and 139 countries. And each of these plans, including for California, is to convert the state or country to entirely wind, water and solar power for all purposes. So, that's electricity, transportation, heating/cooling industry.

So, as David mentioned before, for electric for transportation we use battery-electric vehicles and hydrogen fuel-cell vehicles where the hydrogen's produced from electricity. For aircraft, it could be a combination of batteries plus cryogenic hydrogen, like the Space Shuttle ran on.

For heating/cooling, we'd use heat pumps and some electric resistance for low radar temperatures, some solar hot water pre-heating. For industry, arc

furnaces, conduction furnaces, dielectric heating.

And then all of the electrified sectors would be powered by onshore and offshore wind, solar photovoltaics, and concentrated solar power, thermal power, existing hydroelectric and some small amounts of tidal and wave power.

The next slide, please. So, just to give you a perspective, if you look worldwide, or at least over 139 countries we examined, which represent about 95 percent of all emissions of energy, it's about 12 terawatts of end-use power, which is power people actually use after transmission distribution. In California, it's about .2 terawatts or 205 gigawatts.

If we go to 2050, it's expected to jump to 19.4 terawatts worldwide and 229 gigawatts in California. But if we electrify, first of all you reduce power demand by 38 percent worldwide, 44 percent in California, and only about 6 to 7 percentage points of that is energy efficiency improvements beyond the business as usual reductions.

Most of it's due to the fact that you eliminate the energy needed to mine -- well, transport and refine fossil fuels. And, actually, a larger portion is the fact that just by electrification it's more efficient than combustion. So, electric cars, for example, about

80 to 86 percent of electricity in the car goes to move the car. And the rest is waste heat for a gasoline car. So, only 17 to 20 percent of the energy in the gasoline goes to move the car and the rest is waste heat. So, we need a lot less energy if we electrify things. So, that's a major reason we get such a big reduction.

But the goal then is, in 2050, to get, in California, 128 gigawatts of total end use power and worldwide around 12 gigawatts.

The next slide, please. So, for California, our plan that we published in 2013, and also delivered to the Governor's office, and it was right before the Governor made the decision to go to 50-percent renewable energy, so I think it may have helped out in that decision, was to -- this plan was to provide all of California's end use power by 2050, and that's for all sectors, with 25 percent onshore wind, 10 percent offshore wind, about 13 percent of solar rooftop PV, divided between residential, and commercial, and government rooftop PV, 27 solar PV power plants, 15 percent CSP power plants, 5 percent geothermal, 4 and a half hydro. All of which exist, that's why the number on the right is zero because we don't need any new plants for hydro. Half a percent tidal and half a percent wave. So, that would power all of California

for all purposes.

The next slide, please. This slide shows the land area required, and there's two types of the land areas, one is footprint and one is spacing. So, the green, for the onshore wind, is all spacing area. That little dot in the center for the onshore wind is the footprint on the ground, how much land is taken up. It's just a few square kilometers, it turns out. But you need about 2.6 percent of the land area for spacing that could be used for multiple purposes, such as farmland, ranchland, or it could be in deserts, like Tehachapi and Palm Desert, for example.

But then there's PV and CSP power plants, there's about .6 percent of California's land and that's mostly footprint.

The yellow, rooftop PV is a footprint that's -- well, it's not new footprint because it's existing rooftop, so you don't view that as -- you don't need any more land area for that.

But offshore wind is about .7 percent of the equivalent California land are. So, let me focus a little bit on offshore wind.

So, the next slide, please. Well, first, this slide shows kind of world wind resources, onshore and offshore, kind of at a gross level. And you can see in

North America you have great offshore wind resources in general, but the water is pretty deep. On the East Coast the water is shallow and you also have great offshore wind resources. And then, in the Great Plains there's strong resources.

The next slide, please. And I should point out from that last slide, there's about 5 to 6 times more wind power available worldwide on land, at high wind locations, than you need to power the entire world for all purposes. So, there is plenty of onshore wind, alone, to power the entire world for all purposes, worldwide.

But once we get to California, there's a lot of resource but, you know, it's limited by land use constraints. And so, let's look at the offshore.

So, the next slide, please. And what this shows, in 2010, a student of mine, Mike Dvorak, did a really detailed analysis of California's offshore wind resource potential. And this shows kind of a summary of the results.

And he looked at the resources available in depths of less than 20 meters, less than 50 meters and less than 200 meters. And so, he didn't even look beyond 200 meters. Although, now with floating turbines now available, you can actually go beyond 200. But this

is just in the depths, these particular depths.

The end use resource, delivered power, so this is not installed capacity available, this is delivered power potential based on both the installed capacity and the capacity factors that were calculated. These are by running a scale model and comparing the model with lots of data, bird data and other types of data. And so, it was pretty well evaluated.

But the bottom line was there are about 1.4 to 2.3 gigawatts of end use power available in less than 20 meters, so that would be monopole type turbines, bases. About 4.4 to 8.3 gigawatts of end use power in less than 50 meters, and 53 to 65 in less than 200 meters.

So, let's put that in some perspective. Well, the end use power that we need in 2050, for all purposes in California, according to these plans that we developed, were 128 gigawatts. And 10 percent, we're proposing 10 percent of that should be offshore wind, so that's 12.8 gigawatts.

And you can see from the numbers above, especially when we get to some floating turbines, at just less than 200 meter depths, that there's way more potential available than to power this 10 percent of all-purpose power that we need for offshore wind, in these plans. So, the resource is there. You know, a

lot of it will depend on the cost and getting permitting.

In terms of the wave power, we propose we need about .64 gigawatts of end use wave power. And wave is pretty co-located with wind. I'll just talk about wave in a little bit. But a lot of the resource, the storm resource is in Northern California, although there are spots along the coast in Southern California, as well, if you look into the details of the map that's present here.

So, the next slide, please. One particular location that Mike had looked at was Cape Mendocino, because this was kind of almost a perfect place for an offshore wind park. And so, he actually looked at that particular location in detail. And just this one example is citing 305-megawatt turbines. And the average capacity factor is around 40 percent, so that would give you -- that's .6 gigawatts of average power.

But, you know, and he looked at the transmission, so there's a transmission system on the right here. But, you know, one of the advantages of the offshore wind is you could run a cable right down to San Francisco, for example, as opposed to trying to go back and beefing up the cables from that location to the Central Valley, where's there's the long -- where

there's a long corridor of transmission. So, you need some transmission plan along with this, and so some of it might be undersea cables going down the coast.

The next slide, please. Now, another thing he looked at was the time dependence of the resource, the wind resource. And this is Cape Mendocino. And what's interesting -- so this is hour of the day for four different months, and representing each season. So, clearly in the summer you're getting the highest wind resource, which is good for California since you get the high air conditioning demand in the summer. So, this would help to allay that.

But the other thing to notice is that the resource is pretty smooth all hours of the day, so relatively compared to other locations onshore where you have big spikes and the lulls in the wind power. So, you do have this really, relatively smooth power output. And also, peak power in the afternoon, when you have a sea breeze there's also some months where you have good peak power, as well.

So, that's an advantage of offshore wind versus onshore wind is the more smooth overall power output, plus sometimes matching peak demand because of when you have a sea breeze.

The next slide, please. Another thing to keep

in mind, Eric Stoutenberg had done a lot of studies on wave power. And combining, particularly combining wind and wave power. And he says, although wind power is variable and wave power is a little less variable, it turns out like, you know, just have a part where you have both wind power and wave power together, let's say in this case 50 percent wind and 50 percent wave, you're actually spreading out the overall power output significantly, as well. So, that's another way to make the combination of the two more baseload type power.

The next slide, please. But in terms of trying to match power demand, not only do we need the resources, but we will need some storage. So, our idea for storage, we did do a study looking at the -- for the 50 United States. Well, the 48 contiguous states, by combining the wind, water and solar power resources, with these low-cost storage options listed here, between concentrated solar power, storage, pumped hydro, existing hydroelectric for electricity, water, ice and rocks for heating and cooling and then using also hydrogen for applications in demand response, we are able -- we did a study where we are able to match power demand with supply.

The next slide, please. But let me first just explain some of these storage options. When you

electrify all of the sectors, it makes it actually easier to match power demand because you also have more flexible loads. And also, you can combine heating and cooling loads with electric power loads.

So, for example, here's an ice storage. Where, during the night, and Stanford has a big ice cube, has had one since 1998 under a building, similar to this, but larger, where, you know, at night when the electricity price is low it creates ice. And then during the day, instead of using electricity during peak times of the day, you run water through the ice, through the coils to cool the water and that goes into the buildings to cool the buildings. And so this is, essentially, electricity storage because it prevents the use of electricity in the afternoon during peak times.

The next slide, please. Similarly, Stanford has now a gas plant that, just a few months ago bulldozed it, and replaced it with these two boilers and chiller. And parts of the University need cold, representing by the light blue on the right. And this is a graph showing over the years, the cold and hot peak demand. So, the light blue is the cold demand, the light red is the heat demand. And you can see different parts of the University need cold and heat at the same time.

And when you create cold, you produce heat. And

when you create heat, you produce cold. So, instead of wasting that heat that's produced when you're creating cold, you actually capture it and then use it to satisfy some of the heat demand. So, you can actually offset a lot of your heating and cooling demand just by capturing hot and cold that's used to create cold and hot, respectively. And that's what these boilers and chillers do. It's a big, elaborate piping system.

And then the rest of the electricity, the electricity that's needed is provided by solar, now. So, that gas plant, which was providing 80 percent of the heating and electricity for the campus, is now replaced with these boilers, and chillers, and solar, and heat recovery system.

The next slide, please. And then, finally, the other type of storage I want to mention is this seasonal heat storage. So, this is a community in Canada where they have 52 homes and those homes have these solar reflectors on the roof where there's a glycol solution. Now, in the summer, where they have long summer days, they collect the heat in the solution. That solution gets passed by water to heat the water. The water then gets piped underground to heat rocks that are under the grassy field here. And the rocks get heated up to 80 degrees Celsius.

And then in wintertime, when there's snow on the ground, the whole thing is run in reverse and it provides -- that heat provides 100 percent of the heating for these 52 homes. So, that's called (indiscernible) heat storage.

The next slide, please. So, I just want to mentioned then, so we did a study for the 48 contiguous states, including California, looking at like electrifying everything, then providing -- using this low-cost heating, cold storage and electricity storage that I just mentioned, and demand response. And we were able to match power demand on the 2,050 grid across the U.S. a 100 percent of the time every 30 seconds, for six years. And this graph shows that result in the monthly average, where the supply in the red is matching the demand in the blue.

And the next slide, please. And this slides shows, broken down for four particular days every hour, and we were able to match power demand and supply. In fact, we were able to match it every 30 seconds for six years. At a cost of about 11 to 12 cents per kilowatt hour, and which was equivalent, similar to the fossil fuel cost. Although, the generation cost of wind/water/solar was less, it had more storage cost and long-distance transmission cost.

So, the next slide, please. We're almost done. This shows the unsubsidized cost of energy today, or in 2015, for electric power. So, not including storage or transmission, just the generation. And we can see that this is from Lazard 2015. The cost of onshore wind, now, is the cheapest form of electric power in the United States by far. It's almost half the cost of natural gas. Well, the mean for onshore wind is about 3.6 cents a kilowatt hour, unsubsidized. And gas, the mean is around 6 cents a kilowatt hour, with a range of 5.2 to 7.8. And utility-scaled solar is 5 to 7.

Now, offshore wind is more expensive, just because it hasn't been done in any scale, but its costs are coming down.

And the other thing to notice is that CSP with storage is now 9 to 13 and a half cents per kilowatt hour, which is less than that for gas peaking, which is 16 and a half to 21.8 cents per kilowatt hour.

So anyway, the wind, and onshore wind and utility solar are the cheapest forms of electricity in the U.S. today, less than gas. And so this is why generation costs will be lower in the future, but we'll need more storage and transmission, which has been the overall cost similar.

But by converting to wind/water/solar, we

eliminate another 25 cents a kilowatt hour in health and climate costs. Most of it is actually health costs. It's about 15 cents is health costs and 10 cents is climate costs in 2050, per kilowatt hour. So, we're reducing social costs, so the total cost of energy by 60 percent by doing this conversion.

The next slide, please?

MS. RAITT: Okay, just to let you know, we just need to close in a few minutes.

MR. JACOBSON: Yeah, okay. Well, this is just a transition saying we're trying to convert 80 percent by 2030 and 100 percent by 2050. And I'll skip this.

So, the next slide, please. This last, main slide is the U.S. is -- so, we developed the 50-state plans. They have made some headway in California and New York. Both have adopted the 50-percent goals by 2030, which are about 62 percent of our 80-percent-by-2030 goal.

The House of Representatives has a resolution that's being proposed, that has 44 co-sponsors, HR 540, for the United States to go 100 percent renewable energy. But we'll see how far that goes.

And the next slide, which is the last slide, just a summary. By converting California to 100 percent in water and solar, we reduce 2050 power demand by 44

percent, eliminating about 12,500 air pollution deaths per year, which would save the State $130 billion per year in health costs, and associated lost work days, lost school days, hospitalization costs, insurance rates, higher insurance rates, higher taxes, et cetera. It would eliminate $240 billion per year in global climate costs due to California emissions, alone.

Each person would save about $160 per year in fuel costs and $7,200 per year in health and climate costs.

And it would create 45,000 more jobs than lost in the State of California. The cost of the wind/water/solar plus storage and demand response would be about 11 to 12 cents per kilowatt hour. And which would require about .6 percent of land for footprint and 2.6 percent for spacing.

It would make California energy independent, reducing international conflict, create distributed power and reduce tariffs and catastrophic risks because we have more distributed power. It would reduce energy poverty worldwide if this is implemented in a large scale.

There are barriers, including upfront costs, transmission needs, lobbying and politics. We don't find materials as a limit.

And if you go to the next slide, there's just some websites that have more information. So, thanks very much.

COMMISSIONER DOUGLAS: All right, thank you very much. And, you know, obviously that's a big-picture perspective. As we move from 33 percent or to 33 percent, and then to 50 and then, you know, beyond, I think we'll have a lot of challenges to overcome. And one of those is scale on some of these different technologies and opportunities.

But it's helpful to get a vision of one way that this could look.

And with that, why don't we go on to Walt Musial, with NREL.

MS. RAITT: Okay, Walt, I think your line's open.

MR. MUSIAL: Good morning. Can you hear me?

MS. RAITT: Yes, thank you.

MR. MUSIAL: Okay. Okay to start?

MS. RAITT: Yes, please go ahead and start.

MR. MUSIAL: Well, thank you, everyone. And thanks to the California Energy Commission and the Commissioners for inviting me to speak today.

I'm proud of the fact that I spent the first five years of my career in California, working on the

development of the land-based wind energy industry, under the policies of Governor Brown. And so, I'm really proud to be back here, talking about offshore wind, now.

And I wish that I was there. Today, I'm speaking to you from Colorado.

And I'm going to emphasis floating offshore wind technology because of what's been said, that we have resources in California that are both in fixed bottom and floating. I think the big gigawatt potential is in floating offshore wind. And I know that the perception of floating has been that that's a fairly immature technology and something of the future.

So, hopefully, today I will give you some more, some updated information on how this technology is rapidly developing.

I've been working with the Department of Energy, over the last year, to develop a new strategy for the Department of Energy, after the last strategy has kind of reached a milestone and some end points. And we've been working on some broader studies of offshore wind that touch on the resource, the opportunity space, the costs, and the economic potential for offshore wind.

And this presentation, that I'm about to show, will really show some of the early results of some of

that work and, hopefully, it's some new information to you.

The next slide, please. So, this is just a quick outline of what I'm going to present. I'm going to quickly talk about NREL, I think you know who you are, the technology, the market. I'm going to talk about some of the resources. And some of the future costs and performance studies that are just now being developed for floating offshore wind and maybe give some perspective on that.

The next slide, please. This is just our campus at NREL. This is in Colorado. We have about 320 employees and I think you know who we are.

The next slide. We are the only National Laboratory that's dedicated to the development of renewable energy resources and this is kind of how our portfolio is distributed.

If you click once on this, I think you'll see this is where I am. It's in the Wind and Water Program, which is at the National Wind Technology Center, and that's where I'm speaking to you from today, just to give you a kind of a perspective on that.

The next slide. Please come talk to me, or e-mail me, or text me if you want to know about NREL.

I'm going to start in by talking about the

floating technology and try to give you an update on where this stands right now.

The next slide. This is kind of an overview slide of where we are. And I think a lot of this may be familiar to some people. But floating, this is a review, let's say, floating offshore wind turbines and technology are rapidly evolving from the fixed bottom industry. We've been actually working on this here, at NREL, for over 12 years.

The similarities, though, with fixed bottom systems, especially with the turbines that are being used today, the marine operations, the siting practices in some cases, and regulatory practices are definitely being leveraged to start a floating offshore industry that's in parallel with the fixed industry.

The resource for floating, and this is a big motivation for developing the technology, is larger in many cases and, in many places, has fewer conflicts with the use of the sea, the ocean and environmental aspects, as well. Of course, that has to be handled on a case-by-case basis.

The costs, as have been noted, are higher for floating at this moment in time, but that's because there's only been a few deployments so far, and the prototypes that have been deployed are not optimized.

But over time, indications are that because the floating technologies can introduce reduced marine operations and some of the problems with fixed bottom systems can be overcome readily with floating technology. We think that any of the more expensive aspects that might be associated with the platforms, and the moorings, and the anchors would be offset. And, actually, have the potential for costs that might be competitive or even lower than fixed bottom systems.

And we see that there's really further optimization benefits that might come after there's market visibility into the floating area.

And again, I work on all aspects. So, I'm looking at floating as one part of it. The three turbines that you see on the right side represent the substructures that are being developed and tested right now. And they're all, if you look at them, they're all stable in the configuration that they're shown in right now.

But what's driving some of the early development is that stability is not achieved until you anchor them down. And so, we see in the early phases in this industry that the ones that are stable during deployment are the ones that are looked at more readily. And you'll see that the semi-submersible is stable because

it's buoyancy and it's easy to tow up.

But there are lots of innovations that are going on with the spar and with the TLP that are also creating the ability to deploy those in a stable form, and allow those to be competitive, as well. So, that's still in the future and still being worked on.

The next slide, please. Some of the other challenges with floating offshore wind, of course lowering the levelized -- the levelized costs. The designs that are being used right now are dependent on fixed bottom practices because that's where there's market visibility and that's what the industry is leveraging. But the optimized systems won't necessarily have those dependencies as the market develops.

Floating design standards don't exist right now in a mature form and so those are being worked on right now, and with the help of BOEM, I think and with DOE, that some of those standards are evolving right now, as we speak.

There needs to be more experience directly with the electric and dynamic cabling systems, and those are something that's really being adapted from oil and gas, and fixed bottom systems.

And specifically, on the last bullet, the Pacific Sea states are higher than the Atlantic and

there will be challenges with operations and maintenance that are happening there.

But I've been looking at some of the innovations that are coming out from there and it seems like those are challenges that can be addressed with some of the new vessels that are being developed.

The next slide, please. One of the indicators that we've looked at as to, you know, what the world and the industry is doing, and the interest that's being generated around floating wind have to do with the R&D activities, and the investments that are being made in this.

And this is a summary of a database that we've been collecting on how much money is being spent on floating systems in the world today, broken down by Asia, Europe, and North America.

And the green text, in parts of these bar charts, show the R&D investments. And we tried -- this isn't perfect, but we tried to break this down based on the amount being spent on the demonstration projects, the amount being spent on actual R&D activities. And you can see, these are in large numbers, in tens of millions of dollars being spent, now, to investigate these systems. Some of that being in the United States. A lot of it being outside of the United States, in

Europe and Asia. And this is new stuff that we're starting to see.

The Asia Pacific is really a little bit of a guess based on what we think that the Japanese are doing and a lot of that is going into Japan. And some of that probably could be considered R&D money.

The next slide, please. So now, I'm going to talk a little bit more about the market and that's probably a good segue into it.

The next slide. The market, a lot of times this is broadly the offshore wind market, was covered in a report that we published in September of 2015, and you can see the cover of that, and you can Google this report.

But a lot of the next few charts were taken directly from this and they're based on a database that NREL keeps and maintains. And I'll be using that data directly. It's about six months old, now, so it hasn't been updated since this report, yet, but it gives you a pretty good idea of where we're going.

The next slide. This is a chart that shows the pipeline. And by that I mean we're tracking all of the projects that have entered into the regulatory process in Europe, and in North America, and in Asia. And this is an excellent way to track the activity of the market

and what it's doing.

And we're seeing that the pipeline for offshore wind development is huge. It's almost 250 gigawatts. And a lot of it's still in the planning and the permitting process. But as it funnels into the construction and financial section of this thing it becomes, you know, almost a certainty that it will get developed. And we can track those projects based on the characteristics of those projects and see.

And this actually gives the OEMs and the manufacturers some certainty in making investments into better turbines, and better manufacturing facilities, and infrastructure as we go forward.

And one of the problems is we don't see this type of pipeline, yet, for floating systems. And we think that's just a matter of time, probably.

The next slide, please. With regard to, still, the fixed bottom industry, and this is a bubble chart showing pretty much all the projects that are in that pipeline right now. And the size of the bubble, of course, relates to the size of the project.

The color of the bubble relates to the status that it's in, in that pipeline. So, the dark blue dots are the actual projects that have been installed. And the ones that are open are further out.

You can see the trends are deeper water and further from the shore. And this is important because both of those things add cost to the projects and it's the reason why we haven't seen cost declines over time, as much as were expected. In fact, we've seen costs go up in some cases.

And that's starting to change, now, because the cost of these offshore projects have gone up, but there have also been cost declines that have offset those.

The next slide. We're starting to see that cost curve. This is the Capex of those projects over time. We're starting to see that cost turn the corner, now, and the costs start to come down. And this chart shows that that trend is beginning.

We know this is a real trend because we're tracking projects and the cost of those projects on the financial close information that we can get from those projects. And we see that, that it is coming down. And we'll be tracking that over the next -- as time goes on, as well.

The next slide. So, this is the slide that I just recently updated and put together. This is new from the -- this isn't in the market report. This is something that is up to date as of last week. And what I tried to do is take everything that we know about

floating wind energy technology and we put it on this market timeline, and tried to (indiscernible) -- the same type of regulatory status that the fixed bottom systems were in.

And you can see that that line in the middle is today. And anything to the left of that is what's happened so far. And the stuff that's to the right of that is what we anticipate.

And so the market, as you can see, is growing. And notably, probably the biggest thing that's happened recently is this High Wind Scotland Project. It's the first zero series production project that's just been approved in Scotland and is likely to be installed next year. So, that's exciting and that's happening for the floating offshore wind industry.

But there are other projects. There's the U.S. projects, Wind Float Pacific and Aqua Ventus, which may be materialized as far as the DOE program's concerned. There's Wind Float Atlantic. There's the Japanese projects in Fukushima that are going forward, as well.

And then there are big projects that are being proposed in the U.S., in Hawaii, and also the one that you're aware of for Trident Winds, in Morro Bay.

So, we're keeping an eye on that, but we're seeing an acceleration in kind of the knee in the curve

in the market development.

The next slide, please. So, now I want to talk about the resource a little bit more and then we're probably come back to that market a little bit.

The next slide. The maps shown in this slide here come directly from our Wind Prospector Tool. These are the statistical, long-term averages that I'm sure you've seen before. And this is what we've validated. They're probably not perfect, but they do give an indication of where the strong winds are, out to 50 nautical miles. And this is a rough snapshot of these from Northern, Central and Southern California.

The next slide.

MS. RAITT: Just to let you know, we have about five more minutes.

MR. MUSIAL: Okay, I'll try to move fast, then. These pie charts show new results from our resource study. Probably focus on the right side, which is the technical resource, whittled down from a lot of -- basically, trying to be conservative about what's actually developable in the technical resource of California.

And these are the conclusions we came to. We'll be putting a report out that talks about this. And in the interest of time, I'm going to go to the next slide

here and talk about how we use this to generate hourly data.

We take these statistical data and we merge this with the MERA data, which is the Modern Era data from NASA, and put together an hourly wind speed data series. And this was sponsored by BOEM. In order to allow us to look at how the wind relates to load.

The next slide.

COMMISSIONER DOUGLAS: And I think -- this is Commissioner Douglas. I'll just step in. If it takes an extra five minutes to finish the slides, I think we'll indulge. This is really helpful information. Go ahead, thank you.

MR. MUSIAL: Okay, thank you. Thank you, I appreciate that and I'll try to be brief.

So this last section, and I put this in, this is where we try to put this all together. We are working to try to help inform the RPS calculator that's used by the CPUC to look at the costs, and compare costs of different technologies, and this is part of that work. It was, early on, sponsored by the Bureau of Ocean Energy Management.

The next slide. So, this describes kind of the process of how we went about doing this. We took six hypothetical sites along the whole coast, just to see

what would happen. And we looked at costs from present day out to 2025, because we were basically using a model that was available to us, and in conjunction with BVG consulting, and this KIC Innovate Energy that is from the UK. And they did an extensive modeling exercise and developed a tool to predict future costs of these technologies, which we looked at.

We developed our own reference turbines for 6, 8 and 10 megawatts, because that's what the industry is projecting the size of the turbines will be in these time frames that I just mentioned.

And then we used Windographer to kind of develop energy and cost curves for this whole thing. And I'm going to be -- I'll just kind of go through this quickly.

The next slide. So, we looked at the sites and all along the coast, and we tried to pick sites that had greater wind speeds than 7 meters per second, shallower than 1,000. They were the lowest use conflicts that we could find with the data we had available. And we aren't saying these are necessarily good sites, but they're sites we thought would have the potential to support large scale offshore wind.

The next slide. And this is kind of the results of that analysis. There were six sites, starting down

at the Channel Islands. There was one here in Morro Bay. One up north of San Francisco. And then two kind of up on the Northern Coast. So, one through six, you can see on the right side. And they're just traced out there in red, a little hard to see.

But each of those sites corresponds to one of the curves on the upper left. And this is what we got when we ran the wind speeds for those sites through our power curve. And this is for the 6 megawatt power curve on those sites.

And you can see how the diurnal variations change from site to site, and during the day, and this is for the month of March. This is like the average diurnal variation for the month of March. And you can see there is a pattern. The diurnal pattern varies. We have a low kind of in the early morning and a peak that extends, and comes out around 5:00 to 7:00 at night.

And when we look at this, the bottom curve is just how those same six sites match up against the month of the year, where you have peak winds during the middle of the summer. So, this would have been the third month and kind of ramping up. But, yeah, good wind all year around.

The next slide, please. When we match up these power outputs against the so-called Duck Curve, which I

think everybody is familiar with, that it does look to us, at least, like these diurnal -- first of all, they don't -- they change a little bit from north to south, but they're pretty consistent as you go up the coast. And they are -- the peaks seem to correlate very well with the demand in the areas. And the characteristics are complementary to the solar and to other aspects of the Duck Curve that people were interested in, when we talked to them. And so, I wanted to show this, it's kind of one of our results from looking at this.

The next slide. Then, we took our technology assumptions and this is -- I don't have time to go into all of the assumptions that were used in developing these. But looking at the -- at least the three different turbines today, 6, 8 and 10, and how those turbine technologies are expected to evolve. And about 40 or 50 other technology innovations that go into this (indiscernible) tool that we're using. We've documented and laid out what our projections would be for costs over this time frame.

The next slide. And this is some of the results we did. And this is the same six sites that we looked at, site one through six. We plotted the capital cost, the operational cost, the net capacity factor of those turbines.

And then, in the lower right-hand side is the levelized cost of energy. And you can see that at all those sites, and they do have a range, we're projecting a cost that would be somewhere between, a little below 10 cents a kilowatt hour, and something like 12 cents a kilowatt hour by the year 2030.

And this is, I think, a fairly conservative analysis. We're seeing, actually, a lot better than that in some sites on the East Coast. And this is preliminary analysis, I would characterize it. But this is the kind of cost reductions that we're seeing right now for floating offshore wind technology.

The next slide. I think I'm wrapping up, now. So, I just want to reiterate we're seeing the large pipelines of the global offshore market, 250 gigawatts. We're not seeing that, yet, for the floating offshore turbines because it's a nascent technology. But the market is growing and there is indications that it's going to keep growing.

Floating offshore wind costs are higher, but they are -- but the potential for cost reduction is high, also, and we're seeing that they can come down. And if there are enough characteristics of floating offshore wind that are beneficial, and actually can offset some of the challenges that we're already seeing

in fixed bottom systems, that there's good indication that floating can be competitive, if not cheaper than fixed --

COMMISSIONER HOCHSCHILD: Hey, Walt, this is Commissioner Hochschild, if I could just interject with a question. Which is, just really briefly, if you have any data on maintenance cost differences? Because, obviously, a typical land-based wind project, you know, they're doing maintenance twice a year, getting up into the cell for a day or two. And, obviously, doing that in the ocean presents different challenges.

I'm just curious if you have any operational cost data about what the additional maintenance costs are for offshore wind projects relative to onshore?

MR. MUSIAL: Yeah, and the models for operational costs are much more sophisticated offshore. On the previous slide, if you can just go back one, this is a real summary, but that the operational expenditures are in that lower left-hand graph.

There's a lot of data that backs that up and that goes into that. And there's a lot of new assumptions that we're working on to deal with the sea states, in particular. Because when we go to do the maintenance, it's actually very simple. But if the sea state's too high, the turbines aren't accessible, and

then that detracts from the energy that they can generate and it adds cost to the service.

But we're using the ECN model that we've modified and used for our own purposes here. And that's probably the best O&M tool that there is out there right now for offshore wind. And we can get into it some more.

COMMISSIONER HOCHSCHILD: Okay, thank you.

MR. MUSIAL: Yeah. Okay, so I just -- and then, I guess my final point here was that I think that the preliminary analysis that we've showed is -- I think it warrants a closer look to how it might benefit the California picture, especially getting to 50-percent renewables and beyond 50-percent renewables in California.

And my next -- so, that's the end of my presentation. The next slide just is a bunch of references that I used and you can dive deeper into any of this stuff, if need be. And please, on the final slide, e-mail me if you have any questions, and I'd be happy to answer any questions you have now.

MS. RAITT: It looks like we don't have any. But thank you so much for your presentation.

MR. MUSIAL: Thank you.

MS. RAITT: So, next is Bill Toman, and you can

come here and change slides or I can change them for you, just let me know.

MR. TOMAN: Push. Thank you very much. Thank you very much for having me here today, Commissioners. My name is Bill Toman. I live in San Luis Obispo. I actually live right on Morro Bay. And I'm working with Cal Poly, San Luis Obispo, on a project that is funded by the U.S. Department of Energy. And in part, now, by the State of California, I'm very pleased to report, called the CalWave National Wave Energy Test Center.

This is going to be a talk about what wave energy is, why it may matter in California, what a test center is, why California is a good place for such a test center. And, also, some issues associated with the permitting of offshore renewables, which could be applicable to both offshore wind and wave energy. Stakeholder relations also covers both of those technologies.

And so, siting, and regulatory issues, and licensing are shared tremendously between offshore wind technology projects and wave energy. And to some extent, tidal energy, as well.

And as just a brief background on my history, I'm a power plant developer by profession, a nuclear engineer by training. Three years ago, now, my baby,

the Russell City Energy Center in Hayward, California, came online, a 600-megawatt, gas-fired combined cycle plant. And I have served as the head of the Wave Energy Program of Pacific Gas & Electric in the past.

And so, offshore renewables in California has been a passion of mine for some time now. And tremendous initial work was done by PG&E with their Wave Connect, Wave Energy Project of siting, licensing wave energy projects here, in California. And also was involved with tidal energy project in the Golden Gate Strait area of the San Francisco Bay.

In 2013, the Department of Energy, DOE, gave a $750,000 grant to Cal Poly and gave a similar sized grant to Oregon State University. Go Beavers. To look at the feasibility of siting, permitting, constructing a national wave energy test center.

Wave energy is a very new technology. There's nothing commercial in the world right now. But there are several dozen firms that are involved worldwide in developing wave energy technologies. These are technologies to convert the kinetic and potential energy in waves traveling across the ocean into usable energy, such as electricity, or perhaps in pumping water through a desalination RO process.

My opening slide here is an actual photo of a

whale breaching in front of the entrance of Morro Bay, California. That is Morro Rock in the background there. It's actually a volcanic pluton. And in the background are the three stacks of the now permanently shuttered fossil fuel power plant, the Morro Bay Power Plant, owned privately. Originally constructed by PG&E. Oil fired and then later converted to gas fired, is now being completely, permanently shut down.

The important point about this, that I'll get in a later slide, is that while the power plant may have shut down, and I do not know its disposition, but the PG&E-owned substation, the Morro Bay Substation, right next to it, which received the power from this power plant is still there. It's still part of the grid. It still has 220, 230 KV lines connecting it to the rest of the grid in California. And it is a ready socket, if you will, on the coastline for offshore renewable projects to plug into, in the manner that the original fossil fuel plant did.

The next slide, please. And before I run through this, at Cal Poly, the Institute for Advanced Technology and Public Policy, is the home of the CalWave project. The director of that, the founding director is former California State Senator, Sam Blakeslee. He sends his regards. And he's shown tremendous leadership

and vision in helping to facilitate this particular project.

So, with wave energy, you don't have test tracks in the ocean. If you're developing a racecar, if you're developing a photovoltaic technology you can race cars at test tracks in various places around the country, on land. And with, say photovoltaics as an example, you can be next to an existing substation and hook into that, and demonstrate your energy technology.

With wave energy and it goes to say with offshore wind energy, and especially floating wind energy, there is no substation in the ocean. And so, having the infrastructure for a wave test facility in the form of berths, with mooring infrastructure, with a submarine power cable to bring the power ashore, but also the siting and permitting of a test center to lower the barrier to entry for new technologies from startup companies that have great ideas, but not a lot of capital and testing is a very, very expensive proposition in the ocean.

We've got a two-year grant from the Department of Energy. We will be completing, mid-2017, a final report about how much it would cost, how long it would take to permit, what are the permitting and regulatory issues, what are the stakeholder issues for citing a

wave test center.

We're very pleased to report that a partner in the project is Vandenberg Air Force Base. This will be cited five miles offshore of Vandenberg, in Northern Santa Barbara County, just north of Point Conception. Waves are great north of Point Conception. Offshore wind is pretty good north of Point Conception.

As the two previous presenters have pointed out, Northern California has really fantastic offshore wind and better wave energy, as well. The problem is, is that the people live down here. And the grid infrastructure is down here.

So, my job, in part, is to act as a project developer, taking the market characterizations of Mark Jacobson and the technology characterizations of Walt Musial, earlier, and look at what are the local siting issues, the stakeholder issues. How can you actually facilitate and actually get something built for a project in real time.

We're looking at having a testing center that has four testing berths in it, and I'll show you a map in a moment, each that will be around 10 megawatts of generation capability handling. We're probably going to be coming online, if we're funded by Congress, 2021, 2022.

And most likely, the wave energy devices that will be tested at CalWave are still on the drawing boards right now. So, it's kind of a faraway infrastructure project for long-term national interest.

The next slide, please. Why wave energy? And as you saw in Mark Jacobson's slides, the projected resource for wave energy is quite a bit smaller than offshore wind, on the other hand. There are unique generation characteristics of wave energy that, as he also pointed out, combine well with other renewable energy intermittency. So, terrestrial wind and solar have gaps throughout the day, in the year.

Wave energy is more consistent. But the important thing about wave energy is that it's very highly forecastable. So, we can look at satellite data and ocean buoy measurement data and forecast three, four days in the future how much wave energy is going to be striking the California coast.

And so, having worked at a utility, having worked at two utilities, I can tell you that the grid planners relish having this kind of advance notice for how much energy can be produced by a particular facility.

I'm a huge advocate for solar energy. But a cloud goes over a PV farm and you can get a dramatic

drop off in the power production. Similarly, with wind fall offs, with virtually no advance notice. Wave energy is a way to kind of fill in those gaps in a portfolio of renewable energy options.

The other nice thing about offshore renewables, wave energy being one, but offshore wind as well, is that California has -- most of its people live on the coast, within 50 miles. We have, you know, San Diego, and Orange County, the Los Angeles area, the Santa Barbara area, on up to San Francisco. Most of the State's population lives within 50 miles of the coast.

Most of the power generation facilities and electric grid are also along the coast.

And so, it turns out that in the previous generation of power facilities in California, the thermal boiler power plants that dot the coastline, they're being phased out. The power plants aren't being phased out, themselves, but the cooling system is, the once-through cooling. And it's probably difficult to cost justify back-fitting a replacement cooling system. And so most of these 1960's vintage power facilities are being phased out, leaving their coast-side, large capacity substations to be repurposes and reused for offshore renewables.

This is a unique property of California that our

northern neighbors in Oregon, and Washington, and Alaska do not share.

Another element that makes wave energy more attractive here in California is that a lot of the marine supply chain, the ports, all the fabricators that support the 27 existing offshore platforms, oil platforms off of California, come out of Los Angeles, Port Hueneme, or Carpinteria. And they can be redispatched to support offshore renewable projects, as well.

The next slide, please. And before I go through the State of California, one number that is out there, that I think is consistent with Mark Jacobson, that they put out, is that the California Energy Commission, in their study of ocean wave energy, looked at around 750,000 megawatts of usable wave power off of California. So, it's not trivial, but it's not as big as offshore wind.

Pleased to report that very recently Governor Brown sent a letter to Secretary of Interior Jewell, asking that a Federal/State of California task force be formed to support offshore renewable projects, and specifically mentioned the CalWave project in this letter. We're very pleased for the Governor's leadership on this phase of incorporating offshore

renewable energy in California.

And also pleased to announce and to thank Secretary John Laird, of Natural Resources Agency, they are putting up $125,000 of cost share towards the Federal grant from the Department of Energy for the CalWave project. Mostly in the form of staff time for things like this Federal/State combined task force. And also, to help coordinate the State Agency's needs with that of the Federal Agencies.

The next slide, please.

COMMISSIONER DOUGLAS: So, I'm going to ask just that you accelerate the progress of the slides. We've got about five more minutes allocated to this panel. And despite the next panel being -- you know, having a lot of material to cover, I think given that it's two hours long, we should probably have a short, unscheduled break before we start it.

MR. TOMAN: I will finish in five minutes.

COMMISSIONER DOUGLAS: Thank you.

MR. TOMAN: We'll have to skip through some of the slides here. Not many to go here.

Just to point out, just really fast with this slide, and then we'll move through the others, a very large team, very diverse subject matter experts across the board, including NREL. But also for universities,

including Humboldt State University, Cal Poly, and UC Davis, as well as the Scripps Institute of Oceanography. So, California universities are well represented here.

The next slide, please. Really fast, this is a map of the offshore area from Vandenberg Airforce Base. In the lower right-hand corner is Point Conception. We've looked at five potential to put the wave test center. We're focusing on the two lower most. It turns out that is also the furthest away from Morro Bay. And the Morro Bay fishermen, who we talk with often, tell us that that is a preferable location for them as they don't seem to go down that far south, in the angry seas off of Point Conception. And it's a little too far north for the Santa Barbara commercial fishermen, as well.

The next slide, please. The nice thing about Vandenberg, by the way, is that they will receive the power cable coming ashore, with the power generated from the test center, which they will purchase and use on the base to satisfy their Department of Defense renewable energy requirements.

This slide just really quickly just shows there already are lots of restrictions on fishing and other activities in the ocean around the Point Conception area. We have to carefully thread the needle where the

proper site is for something else out in the ocean.

The next slide, please. Twenty-seven different regulatory agencies that we'll have to work with, in consultation, to get the regulatory and permitting regime understood and completed.

The next slide, please. And we're looking at probably around a three-year time frame of coordinating everything from getting a seabed lease from the U.S. Bureau of Ocean Energy Management, to having other regulatory approvals and stakeholder involvement.

The next slide, please. We've had good initial, both public and agency, stakeholder outreach meetings. Once again, this is a feasibility study. Until we get the environmental studies actually done, the fishermen, for instance, won't be completely comfortable until they get all the facts in front of them. We honor our stakeholders, as this is their livelihood, and we would like to coexist with that livelihood.

The next slide, please. The feedback is, once again, down by Point Conception not a lot of fishing activity. There is a proposed -- there's a nomination for a Federal Marine Sanctuary, the Chumash Heritage National Marine Sanctuary. That is in front of NOAA right now. That is going through its official process.

Our outreach to the Chumash Northern Council and

the Sierra Club has been positive in understanding there is a compatible co-use of marine renewables with the mission and desires of their sanctuary.

And we've just seen, this month, a letter from Director Bill Douros, of NOAA, stating that he believes there are grounds for finding of compatibility of offshore renewable uses with the sanctuary's mission.

The next slide, please. That's it.

COMMISSIONER DOUGLAS: Well, thank you. That was a fantastic presentation. And, obviously, I think Doug Davy and the Developers Panel has worked with you, as I understand. And so, we'll be hearing more experiences that the CalWave Project has had because it is helpful, on-the-ground permitting experience as they've been working their way through the process.

So with that, we will take a short, unscheduled break. Please be back and ready to start at five minutes to 11:00. So, we have a little over ten minutes. Thank you.

(Off the record at 10:45 a.m.)

(On the record at 10:55 a.m.)

COMMISSIONER DOUGLAS: I see our panel is reconstituting itself right on time. I really appreciate it. And I'll just say, quickly, this panel is where we start getting into the nuts and bolts of the

permitting process. We have asked most, but not all, just because, you know, there are many, many, many types of permits that these projects can trigger. But we have asked the primary agencies that have or may have, depending on where a project's located, permitting jurisdiction over some aspect of a project, to come and speak, and give an overview both of their rules and responsibilities and to engage in a facilitated discussion.

And I want to just quickly introduce our moderator, Ella Foley Gannon, with Morgan Lewis Law Firm. I've known Ella for a number of years and she's done projects here, at the Energy Commission, as an attorney representing applicants. She's also been involved in just a broad set of energy -- a broad set of work in the energy area.

I noticed here give a presentation on this topic that was pretty thorough, and I think that it will be really helpful.

So, I'm just going to turn this over to you, Ella, and thank you for agreeing to moderate.

MS. FOLEY GANNON: All of us who do projects in California always like to be able to say, like the grandfather who walked to school in with no shoes, where it's difficult some place, it's more difficult in

California.

And so we thought it would be, as Commissioner Douglas said, to bring together a group of the agencies who are going to have the largest role in permitting this type of project. And to start to tease out some of the overlap and the possibilities.

So, we're going to start with each of the agencies giving a brief presentation on their agency's jurisdiction, as well as kind of some thoughts on the permitting.

And as I said, they're each going to have five minutes, so they're going to get into the highest level of nuances of everything that they would consider as part of this process. We said that -- we asked them just to make a Haiku of their permitting process for you, which we thought would be helpful.

And we're going to start with Joan, from BOEM, if you can introduce yourself and give your presentation.

MS. BARMINSKI: Yeah, thank you, Ella. And thank you, Commissioners for inviting us to be here today.

The Bureau of Ocean Energy Management is a relatively small bureau in the Department of the Interior. We have an office in California, which I am

the Regional Director of. It's down in Ventura County, in Camarillo. And our objective there is to oversee all energy and mineral development in the outer continental shelf. Typically, that's from 3 to 200 miles offshore. So, that is our realm of activity.

And the recent addition to our portfolio, since everyone's talking about portfolios, is renewable energy. That was added to the traditional resource that we help manage, oil and gas offshore, as well as marine minerals, which we don't have any offshore of California, yet, but we're considering that as well.

There is wind energy, and as Bill has mentioned, wave energy, that are possibilities for California. So, that's what we're focusing on.

The next slide, please. This is the Haiku of permitting the leasing process. We would actually look towards leasing lands offshore for our renewable energy project, whichever type it might be. And we are, just so you know where we are in this process of planning and analysis into leasing, into actual site assessment of an offshore area, and into construction and operations, which would be the actual building of something. We are at the first stage.

So, you are here at planning and analysis, and that's why this forum is totally appropriate and really

helpful for us to be able to let people know where we are.

The first item in that box is bulleted as Intergovernmental Task Force. And for California, the Governor has requested a task force. That letter has gone to the Secretary of the Interior and the Department of the Interior is formulating a response. And that is, you know, in our hands at this point. We're very happy to have the letter.

So, otherwise, something that's not listed on this slide, which probably should be there in kind of like big, bold, red letters or whatever in the middle void, is stakeholder engagement. In terms of the opportunities, they are numerous, through the Intergovernmental Task Force, or any coordinating body that would be established through all of the processes that are involved with National Environmental Policy Act reviews that are done along the way, as well as other workshops.

And we do have another one planned, too, for California, or ocean renewable energy coming in the fall. And we're doing that in conjunction with the Energy Commission and we hope the state university, as well. But there are a lot of opportunities for people to be involved, and we have a lot of outreach and other

coordination that we do.

The last slide is on the activities that have occurred, and are occurring and unfolding in the Pacific Region for us. In our BOEM office, it's California, Hawaii, Oregon and Washington are our stakeholder states. And we are coordinating with, obviously with California on the task force formation, as well as the advent of the lease request offshore Morro Bay, which is for a wind project there. And I know everyone will be hearing more about that as the day unfolds.

In Hawaii, we do have a task force since 2011. And there, we also have three lease requests that have been received. They're all around the Island of Oahu. We are conducting, right now, a series of public outreach meetings to neighborhood boards, and other community groups in Hawaii, as well as working with the task force there. We just had a meeting last week with the task force.

That's all in direct preparation for a call for information and nominations. Again, that's one of the steps in that planning and analysis board or box on the previous slide. it's a Federal Register notice, which is a way of putting things out there to the public, noticing them that there is interest in an offshore wind area in Hawaii, and asking for information about that

area, other interest in that area, as well as any information that people would like to provide on concerns or other uses. So, that notice would be coming out sometime this summer. We don't have an exact date, yet.

In Oregon, we've had a task force, the first one we had in the Pacific. We are addressing there, the Wind Flow Pacific Project, a floating offshore wind demonstration project being coordinated through the Department of Energy, funded through the Department of Energy. And another one, the acronym is up there, the Pacific Marine Energy Test Center. This is through Oregon State University. It's a similar to set up to the one that Bill was describing for in the California area. They've had a test center in state waters and they are looking to move or add a federal waters component to that. So, that's in the permitting process, as well.

In Washington State, there hasn't been much interest in offshore renewable energy on the OCS, but there is interest in nearshore, tidal, and as well as some other interest in state waters. So, we are intending there to be involved through some of the regional planning activities that are going on with the State of Washington.

So, that is the end of my introduction.

MS. FOLEY GANNON: Great. Thank you very much, Joan.

Next, we'll turn to Jennifer, with State Lands.

MS. LUCCHESI: Great. Good morning, my name is Jennifer Lucchesi. I'm the Executive Officer of the State Lands Commission.

The next slide, please. The State Lands Commission is an independent commission made up of the Lieutenant Governor, the State Controller, and the Director of Finance. We have jurisdiction over filled and unfilled tide and submerged lands, as well as navigable waterways of the State. We are the State equivalent of BOEM.

In fact, we've worked for many, many decades closely with BOEM, and their predecessor, MMS, on oil and gas development activities offshore California.

So, we have jurisdiction north to the Eel River, Lake Tahoe, the Sacramento, American and San Joaquin Rivers, the Delta, San Francisco Bay. All the way down to Colorado River. And most importantly to this discussion, we have jurisdiction beginning at the mean high tide line along the coast all the way out to the State/Federal offshore boundary, approximately three miles.

The next slide, please. We also manage a significant amount of land, over 400,000 acres, in the Southern California Desert. We manage those lands, the surface leasing, as well as energy and mineral resource leasing, oil and gas, geothermal and hard rock minerals. In fact, we work very closely with Commissioner Douglas, and the Energy Commission, and many other state and federal agencies on the DRECP, and other energy policy working groups.

We also have a very robust oil spill prevention for our offshore oil and gas facilities, as well as at marine oil terminals throughout the State. And we also implement the State's Marine Invasive Species Program.

The next slide, please. The Commission is primarily a land and resource trust manager. It's different from a regulatory agency, like the Coastal Commission or the Department of Fish and Wildlife. We manage these lands and resources entrusted to our care. We issue all kinds of different leases for their use, and occupation, and development.

Our leases involve, types of leases include oil and gas leases, including offshore oil platforms, to marine oil terminals, to marinas, commercial harbors, wharfs, restaurants, hotels, all the way down to your individual recreational piers that you might see in Lake

Tahoe. So, we have a very vast portfolio of leasing activities.

We are also primarily a revenue-generating agency for the State that generates, depending on the price of oil, anywhere between $150 million to $400 million of non-tax revenue to the State's General Fund.

The next slide, please. As a landowner, we are uniquely positioned to partner, to help facilitate the responsible development of marine renewable energy offshore. In 2013, we actually produced a report to our Commission on marine renewable energy and the environmental impacts. This really identified the environmental concerns with these types of energy facilities, and put it in the context of CEQA and permitting. And that can be accessed on our website, the address is at the bottom there.

And the next slide, the next and final slide. And, importantly, our most recently adopted strategic plan recognizes that our revenue portfolio for our leasing activities has been highly dependent on oil and gas activities, particularly offshore. But that we recognize that there is a road, a bridge to a sustainable future and we're looking to change that balance in our portfolio by increasing and facilitating renewables in our leasing portfolio, both onshore and

offshore.

And that concludes my presentation, thank you.

MS. FOLEY GANNON: Great. Thank you very much.

Next, we'll hear from Kate, from the Coastal Commission.

MS. HUCKLEBRIDGE: Good morning. My name, again, is Kate Hucklebridge, and I work with the Energy Ocean Resources and Federal Consistency Division of the California Coastal Commission.

The next slide, please. I just want to go a little bit over, give you background a little bit of the Coastal Commission, our authority and jurisdiction as it relates to these offshore renewable energy projects.

As many of you probably know, the Coastal Commission was created through a voter initiative that was passed in 1972. Subsequent to that initiative, the Legislature approved the California Coastal Act, in 1976. And this Act established the Commission's regulatory jurisdiction over all development within the coastal zone.

Now, the Coastal Act includes many components, but kind of the core of our regulatory mission can be found in the Chapter 3, Policies of the Act. And these policies cover a number of topics, from public access, recreation, industrial development, marine resources.

Now, in thinking about these offshore renewable projects, there's a couple of key Coastal Act policies that will inevitably come into play as the Coastal Commission reviews these projects. So, I wanted to go over those, briefly.

First of all, there are several policies that protect marine resources, including biological productivity, water quality in the coastal waters. There are policies that protect public access and access to recreation activities. Policies that protect commercial and recreational fishing interests. Policies that relate to navigation, avoidance of hazards. Policies that protect coastal public views. Policies that relate to coastal-dependent industrial facilities.

And I just want to spend a quick moment to delve into that a little bit. If a project is determined, under the Coastal Act, to be a coastal-dependent industrial facility, and that project has unavoidable conflicts with other policies in the Coastal Act, then this particular policy allows -- it provides a pathway to our Commission to approve the project, despite those conflicts, if a series of tests are met. And those tests have to do with alternatives, and adequate mitigation, and also looking at the project's impact on the public welfare.

And then, finally, a topic that I'm sure most regulatory agencies will be interested in, are there alternatives and mitigation measures that would minimize impacts associated with the proposed project?

The next slide, please. So, now that I've given you a sense of the Coastal Act, I want to talk a little bit about our authority over offshore projects. And we sort of think of them, and these projects can span, maybe, three different jurisdictional areas. So, we have federal waters, state waters, and onshore areas. And we have, the Commission has different types of authority in those three areas.

So, in state waters, as Jennifer described, those up to three, about three miles, that is all part of the coastal zone and the Commission has direct permit jurisdiction in those areas and would be issuing a coastal development permit for any project components in state waters.

In federal waters, the Commission generally has what's called federal consistency review, and I'll talk a little bit more about that in a moment.

If a project contains elements both in federal waters and in state waters then, generally, those reviews are combined and the Commission would issue a joint CDP, coastal development permit, and a federal

consistency certification.

Now, for both of these cases the standard of review would be the Chapter 3 Policies of the Coastal Act.

Now onshore, the Commission's authority is a little more location specific, or at least the nature of that authority is location specific. So, if the onshore components of a project are located in an area where the Commission has direct jurisdiction, then the Commission would be issuing a CPD, just like it would in state waters.

If the onshore components are located in an area where a local government has a certified local coastal program, that was certified by the Commission, then the local government would be responsible for issuing a CDP. And that CDP may be appealable to the Commission, itself.

Now, if the Commission is issuing a CDP, the standard of review, again, is the Chapter 3 Policies of the Coastal Act. But if the local government is issuing the CDP, then the standard of review would be the LCP policies that were certified by the Commission.

The next slide, please. So, I want to take just a second to get a little bit into the nature of the Commission's authority to review projects in federal

waters, under the California Coastal Zone Management Act. And I only have a little bit of time. This is a very complicated topic, so I'm going to give a real broad brush. But we're happy to talk more about it offline.

So, the CZMA provides the Commission the opportunity to do what's called a federal consistency review. And this basically allows the State to review federal projects or projects that are federally permitted, that our outside of the coastal zone. So, in federal waters, on federal lands, or on tribal-owned lands.

Now, the nature of this type of authority than our direct permit jurisdiction. The CZMA sets it up as a partnership between the federal government and the state government. So, it's not the federal government asking permission of the state. Instead, it's the federal government and the state government working together to find the project consistent with the California Coastal Act.

And, really, there's an emphasis on coordination and cooperation that's really a major focus of that component of the CZMA.

So, another important part is it's really the effect of the project and not the location that

determines whether the Commission have the authority to review. We, at the Commission, like to call this the fish swim test. So, just to illustrate, if a project in federal waters is determined to have an impact on a fish, or a population of fishes that would then, conceivably, swim into state waters, that is deemed or it could be deemed to have a spillover effect into the coastal zone. And it's that spillover effect that provides the Commission the authority to review the project.

So, again, that's just the very broad brush. I have the website here, especially for our federal consistency. It provides a little more information and I'm always happy to answer questions. Thank you.

MS. FOLEY GANNON: Thank you. And the fish swim test is a technical test, right?

MS. HUCKLEBRIDGE: Very technical.

MS. FOLEY GANNON: All right, great.

Next, we will turn to Lisa, from NOAA.

MS. WOONINCK: Good morning, Commissioners Douglas and Hochschild. Thank you for the invite. This will be a tag team effort from NOAA. NOAA is within the Department of Commerce, we're the National Oceanic and Atmospheric Administration.

I will be giving you a short overview from the

perspective of the Office of National Marine Sanctuaries, which is within the National Ocean Service. And Bill Foster, here, will be talking about some of the permitting and consistency requirements under the National Marine Fishery Service.

So, just briefly, NOAA, again, I think what you heard from the Coastal Commission, is there's the permitting requirements, but there's also consistency requirements that we seek under various acts.

So, next slide, please. So, I'm with the Office of Marine Sanctuaries. I'm Lisa Wooninick, I work -- I'm a policy coordinator at the West Coast Regional Office. We have five national marine sanctuaries on the West Coast, four of which are in California. And national marine sanctuaries are a type of marine protected area. The State of California has a network of marine protected areas within the coastal area.

We are in the coastal areas and within the federal area beyond 3 nautical miles. And national marine sanctuaries use place space management to protect and conserve special places within the environment for their aesthetic value, their biological or ecological value, but also for historical or archeological values.

If you were to compare us to what you find on land, we're not quite like a national park. We do allow

for multiple uses and, in fact, we promote sustainable uses. So, we're not quite wildlife areas, but we are interested in conservation.

So, here's my Haiku on the permit pathways. So, we have different types of permits. We have general permits for research, education or management. An example is we issue permits to researchers. And maybe I should back up, one of the -- or, two main regulations that we frequently have with the national marine sanctuaries, and they're all tailor made, they're not all the same. We have 13 across the country. We're designating one on the Great Lakes and one on the East Coast, and they each have their own suite of regulations.

But two types of regulations that you frequently find in national marine sanctuaries are a prohibition on disturbance of the seabed, with a host of exemptions. One of which is commercial fishing and recreational fishing is exempt because that's managed by the California Department of Fish and Wildlife, or by the National Marine Fishery Service. And we also have regulations that prohibit discharges, also with a whole host of exemptions.

So, we have these general permits for research, education and management. We imagine for this type of a

project, like an offshore wind project, that there could be a permit issued during the evaluation stage for research purposes, specifically if that research would also help inform something about the resources within the sanctuary. So, the research can't be any type of research. It does have to be research to help understand the resources within the sanctuary.

Then, we also have authorizations of another --

COMMISSIONER HOCHSCHILD: Well, actually, if I could just jump in there? So just for my edification, for example, if like an underwater, buried transmission cable from an offshore wind project to shore, going through a national marine sanctuary, is there any prohibition that would sort of permanently make that impossible or is that something that you could foresee happening if there was a site that it had to go through?

MS. WOONINCK: So, let me get to the next couple of permit options. There's also authorization. So, we could use authorization. And we, in fact, have used authorizations in the past for cable laying. And if you look at what we're experiencing right now, in the Monterey Bay National Marine Sanctuary, where we have several desalination plants that are being evaluated, and we're going through the environmental assessment for them, in that case we plan to authorize a coastal

development permit, from the Coastal Commission, for the cable laying. And then, I think we're going to be using a -- we're going to authorize a State Water Quality Control Board permit for the brine discharge. So, that's an NPDES permit. So, there are various options that we can use, various authorizations of another agency's permit. And we often work with the Coastal Commission to come up with those solutions.

COMMISSIONER DOUGLAS: So, these Haikus have been wonderful. And we've resisted the temptation to jump in until now, but I just wanted to ask, quickly, when you authorize another agency's permit do you do your own NEPA review of that, or how do you go about that?

MS. WOONINCK: So, in the case of the Coastal Commission, since we're sitting right here next to each other, because of the federal consistency we work together. So, as we are evaluating these permits, we streamline and we use the same environmental analysis. They're very aware of our standards. We're very aware of their standards. We're very aware of their statutes and their requirements.

So, we try to make this as sensible as possible and not duplicate, but also to try and find consistency, and coordination, and cooperation, and that we

communicate with each other. And we try to also make it that the permitting process is not onerous in terms of time, but also costs, and the analysis that goes into the environmental analysis.

Right? High five.

COMMISSIONER DOUGLAS: All right, thank you.

MS. WOONINCK: So, okay. So, then also at sanctuaries we have special use permits for a limited number of activities. I won't go into it.

And then we also have certifications. And this is a process where it's a type of authorization in that we authorize permits for uses that are already taking place or activities that are already taking place when a sanctuary gets designated.

So, an example of this is we just finished the expansion of the Greater Farallon National Marine Sanctuary, from sort of Bodega Bay area up to Point Arena. And there are several cables there, one of which is an 18-T cable. And we just finished certifying that cable, and we certified that it's there, but we also certified the maintenance of the cable. And what we were certifying was, I think, a State Lands Commission permit, a Coastal Commission permit, and another one related to energy, but I'm not clear -- I'm not sure. We just finished it.

And there, again, we try and find, you know, consistency, and we look at -- we are basically certifying another agency's permit. And as long as that permit is active and valid, we don't need to do anything. But if that permit were to not be renewed, then we would have an issue. Just like I think the permit-issuing agency would have a problem with the applicants or with the activity, if it weren't renewed.

So, that's my Haiku. And I'm sure I can answer more questions, when we get into the questions.

MR. FOSTER: Hi, my name's Bill Foster. I'm a Fishery Biologist with the National Marine Fishery Service, or otherwise known as NOAA Fisheries. And NOAA Fisheries -- you want to go to the next slide. Thank you. NOAA Fisheries is responsible for stewardship of the nation's ocean resources and the habitat associated with that.

And our basic role is to protect specifies and habitats, really all of them that exist, both within the 3 miles and into federal waters, as well. And we tend to follow this by following the various of the either processing or permitting processes that are out there under Bureau of Ocean Energy Management, the Federal Energy Regulatory Commission, U.S. Army Corps of Engineers, Department of Energy. There's various other

agencies, like that, that we would interface on.

And we ultimately would be consulting under various acts, with the actions that these federal agencies would be doing, which is basically issuing of their licenses and permits.

The Endangered Species Act, and it's associated critical habit with species, the Marine Mammal Protection Act, protecting all marine mammals. And some of those are also protected under the ESA.

And also, we work through the Federal Power Act, issuing, under various sections, either recommended terms or assessing, you know, mandatory terms. We don't have a mandatory conditioning authority. But under the FERC, the Federal Power Act authorized FERC to permit energy processes. And there's an understanding and an agreement between BOEM and FERC, that FERC tends to run the projects or oversee the projects, the licensing within the 3-mile limit, and then BOEM tends to do the federal waters offshore.

And then, we also have work under the jurisdiction of the Magnuson-Stevens Fishery Conservation and Management Act, which manages, basically, commercial fisheries through fishery management plans. And those commercial fisheries fish within those commercial fisheries, also have essential

fish habitat that we assess project impacts on.

The next slide, please. And again, basically, we're trying to protect or mitigate potential project effects on these species. And under the Endangered Species Act there's anadromous fish, your salmon, sturgeon, steelhead, trout. The anadromous meaning that they breed in fresh water and spend their lives in the ocean water.

And there's also some marine fish. There's sea turtles. There's interim tidal invertebrates, like abalone, that -- and as well as under the Endangered Species Act there's certain marine mammals that require protection.

And in addition, the Marine Mammal Protection Act also covers all of the rest of the marine mammals. The U.S. Fish and Wildlife Service manages sea otters, although we would coordinate with them on that.

And finally, like I said, the fish species within various fishery management plans for ground fish, pelagic fish. Salmon have their own fishery management plan. And the highly migratory species, for instance, are also included.

Can I go to the next slide, please. So, basically, there's basically, basic effects that we're concerned with regarding any of the offshore, either

offshore wind or marine hydrokinetic projects as have to do with the species getting entangled or colliding with devices, transmission lines or mooring lines. How their behavior might be altered by the presence of these devices or any noise generation during the construction of them.

There's potential for species and habitats to be disturbed or changed depending on, you know, what happens in the construction and ongoing maintenance of these projects.

And then some of these projects, either wave or -- mostly wave and current ones, can result in changes to water circulation, wave patterns. Not so much wind patterns. And those may have an effect on species, as well.

Then, the next slide, please. This is kind of a diagram of some of the effects that we're concerned with. That happens to be a wave energy converter picture. But, you know, if you put a big propeller on top of that, you'd have a wind one.

It's fairly self-explanatory. There's basic electromagnetic fields that might be generated by transmission cables. There's, you know, issues sometimes with marine mammals being able to haul out onto the surface of some of these structures, and other

things such as that. But basically, we try and account for all of that through our consultation under those various acts.

And then the last slide, please. Basically, there are still some sources of uncertainty, many of which can be reviewed by looking at information that's been generated in Europe and other countries where they're a bit farther along in terms of wind energy and wave or tidal energy.

But as we go through these processes, we'll develop more and more information. And again, a lot of that has to do with the economy of scale. You can look at one device or then does that multiply out over time if you have an array of devices? The impact may be vastly different in an array as opposed to a singular object.

But primarily, that's what we try and assess, basically projects' effects and, ultimately, consult under the various acts and issue take permits, basically, associated with -- to help mitigate the project effects.

And that's pretty much what I have to say.

COMMISSIONER DOUGLAS: Well, thank you. I'll just interject with a brief comment which is that it's really helpful that you point out where there are some

areas that we might need more research or more understanding. And I think that when we get to it on the panel discussion, it would be helpful to hear more perspectives on that.

MS. FOLEY GANNON: Thank you.

Next, we're going to hear from Noah Matson, who is on the WebEx, U.S. Fish and Wildlife Service.

MR. MATSON: Good morning. Can you hear me?

MS. FOLEY GANNON: We can, thank you. Go ahead. Go ahead and get started. Can you hear us, now? You can go ahead and get started, if you'd like. It sounds like we're having some trouble. We're not hearing you anymore.

MR. MATSON: Hello, can you hear me now?

MS. FOLEY GANNON: Yes, thank you.

MR. MATSON: All right, I will start. So, thank you for inviting me to participate. Sorry I could not be there. I'm in Washington, D.C. I am an adviser here at the Fish and Wildlife Service and I work a lot on renewable energy policy development.

I thought I'd start off with an official Haiku. Offshore wind power, avoid endangered species, migratory birds. There you go.

(Laughter)

MR. MATSON: Thank you, thank you.

Since none of the other federal agencies mentioned it, I do want to mention that the Administration puts a large, a huge priority on doing what it can, the federal family can to facilitate offshore wind development. The White House, itself, is leading interagency task force between the Bureau of Energy Management, the Department of Energy, other interior bureaus, and the list of agencies potentially involved in permitting is at least 10 or a dozen, if you can imagine that. And we only have a handful here.

But I just want to make sure people are aware that Administration does place a higher priority on it. We have regular interagency phone calls on checking in on what's going on, and how do we facilitate this really important technology.

So, for this part, I thought I'd start with the next slide. We have a project tool online, called IPAC. It's the Information for Planning and Conservation. And if you're a project proponent for any type of development across the landscape, you can go right to that website and create a shape of your project area.

And the next slide. It will spit out some potential resources that the Fish and Wildlife Service has jurisdiction on that your project might impact. And so, I just use that as an example of the types of

resources that we manage, that potentially overlap with offshore wind development.

Now, I drew a very large shape off the coast of California. Obviously, a single wind project won't affect that many resources. And at least half of those endangered species that were captured by my shape were on the Channel Islands, where endemic species, including endemic plants, would probably not be impacted by offshore wind.

But just to give you an example, it lists out the species, critical habitat, migratory birds, wildlife refuges, if you're near those, et cetera. So, this is a really useful tool.

Just like the National Marine Fishery Service, we administer the Native Species Act. So, the species that we cover, for offshore that's probably endangered birds, certain marine mammals, like sea otters, and the like. So, it's maybe about a dozen species that might overlap with some of the offshore wind development in California.

A lot of offshore wind development will be in federal waters, which will be subject to Section 7 of the ESA. And I think a lot of people are familiar with how the Endangered Species Act works. You know, it's pretty well established on how we try to avoid impacts

and minimize impacts to endangered species. Happy to entertain any technical sections in the Q&A section.

The next slide. What I did want to focus on, because I think this is where there's more uncertainty on the application of Fish and Wildlife jurisdiction in the coast is on migratory birds. This is a map of important sea bird areas from the Pacific Sea Bird Conservation Plan, which is getting a little dated. It's about 10 years old, now. But those important areas have not changed. They tend to be islands off the coast that concentrate sea bird nesting and breeding areas.

And so, you know, any development near those islands is going to be potentially putting the sea birds at risk. And sea birds, and other species that fly up the coast, are protected in the Migratory Bird Treaty Act. The MBT is one of our oldest conservation laws. It was -- in fact, this year is the 100th anniversary of some of the treaties that were signed, that the law implements.

And there are four different treaties between England, on behalf of Canada, Japan, Mexico, and Russia. And that basically prohibits the taking or killing of native species of migratory birds. And covers both intentional killing, as well as incidental take.

Currently, we do not have regulations

authorizing incidental take. Instead, we work cooperatively with industry and have voluntary guidelines for conserving birds for different industry sectors.

Unfortunately, this results in some regulatory uncertainty for project proponents. So, for example, we basically use our enforcement discretion on implementing the MBTA currently. I liken that to speed limits. So, most officers won't pull you over if you're going over five miles over the speed limit. But if you're going tell above the speed limit, you're being reckless and you might have an enforcement action.

And the same with MBTA. Most activities that incidentally take birds are relatively low impact, not going to raise our attention. But there are known hazards to birds, particularly ones that we know how to avoid, that we work with industry to minimize those impacts.

Still, that does create some uncertainty. And so, a few years ago we began a rulemaking process, which I will describe.

But, you know, a key example of how this regulatory uncertainty is playing out is in the courts, over the Cape Wind Offshore Project, which is probably one of the first commercial proposals for offshore wind

in the country. And one of the challenges to the Cape Wind Project is under the Migratory Bird Treaty Act. And during oral argument this past spring, the judges engaged a lot of questioning on how Cape Wind and/or Group Energy -- Ocean Energy Management could authorize the acknowledged impacts on migratory birds.

You know, the government tried to argue that it was our standard practice of trying to work with companies to avoid those impacts. The court might not have been very convinced. So, this summer the court is expecting to rule. And it could rule that an actual permit is required to authorize take. And given that we don't currently have a permitting program in place, it could have larger implications.

The next slide. So, before this stage of that particular case, we have been engaged in a rulemaking process to develop regulations for managing incidental take of migratory birds. So, almost a year ago we put out an NOI, which basically starting the scoping period, some type of comment, had that open for several months. And, you know, we'll be developing an environmental impact statement and some different options for regulating incidental take.

We hope to have a proposed rule and tracked EIS out this calendar year, with a final rule next year.

The next slide. So, some of the possible approaches we will be taking in that regulatory program, which could include all of these, are continuing our current program, with these alternatives, the voluntary items.

Or, two, establishing a process for general authorizations for industry hazards with known mitigation measures. And these would be designed to be basically self-permitting, self-reporting, self-registration. So, we work with a number of industries currently and we have for many years. So, power lines take a lot of birds and we've been working cooperatively with the power line industry for years, and have a set of best practices that we can enshrine in a general authorization. And so, industry can just sign up for those and implement those BMPs, and be a very little workload for the Fish and Wildlife Service, a pretty seamless process for industry. That's the type of thing that we would like to develop general authorizations for.

Through this whole program we're not trying to expand our authority or enforce under the MBTA. We're not adding an army of agents to now go give people tickets or throw them in jail for taking migratory birds. So, we're really trying to make this a very

seamless process, again just to provide that regulatory certainty.

Another potential process, path would be for individual permits. I think those would be more labor intensive on both industry and the Fish and Wildlife Service's part. So, we're trying to limit the application of those.

And then, finally, we might authorize incidental take through programmatic agreements with other federal agencies. So, for instance, we could work out a memorandum of understanding with the Bureau of Ocean Energy Management about how to authorize incidental take through their resetting and other actions.

And we've, in fact, already had some preliminary conversations with BOEM about how to do that.

The next slide. I guess that's the slide. Yeah, the last speaker mentioned research. You know, the good news is that we're at the very early stages of offshore wind development so we have time. And that's really helpful because we actually still don't know a lot about offshore wind development.

The Fish and Wildlife Service, in collaboration with BOEM and DOE, has conducted some research off the coast of the Atlantic and also off the Pacific. But the Atlantic research just produced a major report stack in

the fall. It's very helpful in trying to identify what are the marine resources, biological resources that could be at risk for a limited development to try to avoid concentration areas, and things like that.

And through that research, we've discovered things we didn't really know about. So, for instance, that research helped find bat species flying 50 miles off the coast, which I don't think we were really aware of in the past. That was a really surprising finding. So, there's a lot in the offshore elements, both above the surface and below the surface that we still don't know a lot about.

And so, you know, right now is the perfect time to be making those investments in research so that we plan this really critical development smart.

And from there I'll wrap it up, thank you.

MS. FOLEY GANNON: Thank you, Noah.

And finally, we'll turn to Becky, from Department of Fish and Wildlife.

MS. OTA: Yes, the best for last. My name is Becky Ota and I am with the California Department of Fish and Wildlife. It used to be called Department of Fish and Game, for some of you who are old enough to remember that, which is not that long ago. And I am the Program Manager for the Habitat Conservation Program

within the Department's Marine Region. So, that's where I fit into all these cogs in the wheel.

The Department has been around since dirt, almost. We were started in the mid-1800s, late-1800s, so we've been around for quite a while. We are stewards, basically, of the California's resources and the habitats that they depend on. We manage and protect the State's fish and wildlife, and native habitats, while overseeing their use by the general public.

So, it's a managing and regulatory role which, at times, gets very schizophrenic, but we manage that just fine.

So, given that we are also, again, a trustee agency and a responsible agency under various different laws and acts, particularly the California Environmental Quality Act, and as I go through this you'll see there's a lot of overlap with a lot of the agencies that have already been speaking. A lot of overlapping jurisdiction. And we're kind of like the glue. Although, some people might think of us as gluten, at times.

(Laughter)

MS. OTA: And even though I have a Japanese name, I don't have a Haiku. I'm terrible at it. So, hopefully, my whole presentation will be a Haiku.

So, essentially, we're the trustee agency managing all of those resources to the best of our ability, with help from partners and stakeholders, for sure.

Our authority, our jurisdiction is similar to State Lands Commission. Well, it's pretty much the whole State and everything that's in it, out to 3 miles. So, we have enforcement capabilities, regulatory mandates, all kinds of conservation and protection responsibilities for those resources of the State.

Our authority really comes from the Legislature. Our Fish and Game Code, I have it right here in case anybody wants to look at it. We have a Fish and Game Code, which is based on legislative law that has been mandated to us. And then, in addition to that, the Public Resources Code, the Environmental Quality Act, the California Environmental Endangered Species Act.

And then, any authority that the Legislature has delegated to us or to the Fish and Game Commission. So, we share these responsibilities with the Fish and Game Commission, as well, and work very, very closely with them.

We also work extremely closely with all of the agencies in the room and then some. Similar permitting issues in terms of -- and I'll get to our permits in a

second. But we coordinate and collaborate with our state and federal agencies on permitting, and what's needed. And we provide our expertise and knowledge on those resources and habitats of the State that we're concerned about in terms of being impacted as a result of any project. Whether it's offshore wind, onshore wind, any other projects in or around the State.

As far as permitting goes, under the California Endangered Species Act, incidental take permits for those listed species would be something that the Department would be definitely needing and wanting to provide. Whether it's in state or federal waters, fish got to swim, birds got to fly. So, as those go back and forth, we're going to be concerned about those and be on board with what's going on with monitoring those kinds of activities and species.

Scientific collecting permits may or may not apply. It depends on what the activity is for any of these projects. The Cal Wave Project might be one of those that a scientific collecting permit would actually fit into because they're doing the research, trying to figure it out. But that would be a discussion we would end up having with those different projects.

As offshore comes onshore, lake and streambed alteration permits would definitely enter in with my

colleagues in the other regions of the Department, in that regard. And that's pretty much it in terms of permitting. So, that's pretty Haiku, I think.

So, not many permits, but a lot of authority, and jurisdiction, and coordination that we would need to do with all of the permitting agencies, along with all of the project proponents.

COMMISSIONER DOUGLAS: So, I'll just ask, quickly, did you speak to incidental take permitting or is that not --

MS. OTA: That's the incidental take permit, yeah.

COMMISSIONER DOUGLAS: Okay, so you did.

MS. OTA: Yeah.

COMMISSIONER DOUGLAS: Okay, thank you. Great.

MS. FOLEY GANNON: All right. Well, first off, thank you all for that amazing Haiku round. That was really, really helpful.

So, what we're hoping to do now is just to have a little bit more discussion and focusing on some of the interactions between you, how you have overlapping authority. Some of how you anticipate addressing some of these unknowns that you've started to identify here, as we go into this new world.

And obviously, Commissioners, if you have

questions that you want to jump in with, you know, we want to make this as open a discussion as possible.

So, I guess, Joan, starting with you, assuming that we have a project that's located in federal waters, we would think that you're going to be the lead federal agency. And you've talked a little bit about the different boxes and how your permitting process goes through. But how do you anticipate, sort of in the high level, the interaction and the coordination with your sister federal agencies, as well as the state agencies, as well as the local agencies, and how does that play out?

MS. BARMINSKI: Well, I think that one of the main things is that that will be the most important thing to get started right now. We have an interest in talking with all of the state, federal and some other local agencies, as well, as the project comes in and is discussed.

We have a meeting set up for June 9th, and that is going to be here in Sacramento. It's federal, state and local agencies have been identified. We're trying to reach the same level of people and spectrum of people who would be involved in a task force. So, in anticipation or in advance of having a task force, we're going to start to have interagency coordination. And

that meeting will be here. It's open to the public.

MS. FOLEY GANNON: Oh, great.

MS. BARMINSKI: It is, though, an invited group of people to try and get the ball rolling. This is because we do have, you know, the interest from Trident Winds for a commercial scale project. And we, as a federal agency, have that responsibility to address and to move forward with working on that project.

MS. FOLEY GANNON: But would the task force or this meeting be focused on sort of a general task force for California, for any project, or is it focused specifically on the Trident Project?

MS. BARMINSKI: This is focused primarily on the Trident Project, but we also would potentially look at a draft of a charter of what a task force might look like, so we would put that forward, also, at that meeting.

MS. FOLEY GANNON: Okay.

MS. BARMINSKI: I know the agenda is under development, but we will have that available, too.

MS. FOLEY GANNON: Terrific, thank you.

MS. BARMINSKI: Yeah.

MS. FOLEY GANNON: So, Jennifer, from the State perspective, who do you think would be most likely to be the lead agency for a project that was in federal waters and what difference would that make who takes that role,

do you think?

MS. LUCCHESI: Yeah, of course. So, just to dive down a little bit more on our jurisdiction as it relates to projects that are cited in federal waters and those in state waters, as I mentioned, the State Lands Commission has jurisdiction from the mean high tide line out to 3 miles.

But beginning in the early 1900s, the Legislature also began granting some of these tide and submerged lands to local jurisdictions for their day-to-day management. There is approximately 70 of those grants.

And the State Lands Commission oversees the management of those lands for consistency with State objectives in these grants. But the day-to-day management is within those local jurisdictions.

So, just to put that in an example, the Ports of Los Angeles and Long Beach are on, occupy State property, but those are within the grant that are managed by those local municipalities and those Harbor Commissions. But we oversee that management.

So, to take it back out, location matters and in terms of our direct jurisdiction. For projects that are located in federal waters, they will necessarily have to have the transmission and other infrastructure that goes

through State waters. So, we would likely be the lead agency for those lands that we directly manage. And we have a history of doing joint documents with our federal sister agencies, like BOEM, Bureau of Reclamation. And we're actually doing one right now with the Monterey Bay National Marine Fishery Service for a desalination plant.

For those that are located directly in State waters we would, of course, likely be lead where we have direct jurisdiction.

And for those locations where it's within a grant, the local municipality would likely be the lead in a CEQA document. But we would be a responsible agency and likely oversee that project and CEQA analysis process.

MS. FOLEY GANNON: And do you think if it was a local agency, who was the lead agency, would that make a difference where there would be a joint document produced or would you think that would influence how it would be processed?

MS. LUCCHESI: I think that might be a question for Joan or for others on the panel. But I'm not -- go ahead.

MS. BARMINSKI: Well, you mentioned the joint document and I think that that's one of the things that

we would try to do just for all of our agencies' resources, you know, and people, and time to coordinate those documents and the reviews that go into the project.

So, I'd anticipate it be joint.

MS. LUCCHESI: Yeah.

COMMISSIONER DOUGLAS: I'm going to just jump in with a question on joint documents. You know, in the renewable energy world we've sometimes found it challenging to do joint CEQA/NEPA documents. Have you found the magic way to make that work well or what do you do?

MS. BARMINSKI: Well, I should talk with you more because we haven't actually done one, you know, for the renewable energy side. So, you know, we will be working on that.

COMMISSIONER HOCHSCHILD: I heard if you do it in the form of a Haiku, really --

(Laughter)

COMMISSIONER DOUGLAS: I don't think that's been tried, you know --

MS. BARMINSKI: That's the answer.

COMMISSIONER DOUGLAS: It may be the answer because brevity is not usually one of the --

MS. FOLEY GANNON: I would love to weigh in on

that if --

COMMISSIONER DOUGLAS: Go ahead, please.

MS. FOLEY GANNON: Our experience has been, you know, it really comes down to human factors. You build the right team on both state and federal side, with robust communication and those types of joint documents can be the most efficient, and well written, and a highly legally defensible document. But it's all about building the right team, with the right staff members, with exceptional communication abilities.

COMMISSIONER DOUGLAS: I think that makes sense. And I think experience helps, too. You know, my experience of the -- I mean, experience, having the right team that has done this before or knows how to mesh CEQA and NEPA documents.

Because in the solar permitting, you know, the Energy Commission embarked on a large number of joint documents with the Bureau of Land Management, and we embarked on joint process. So, our informational hearing was notices in NEPA scoping meeting, and on and on.

But the reality was that the processes were quite different. And between draft and final we split them out into separate documents because it was just decided that that was the most efficient way to ensure

that we could have sufficiency from the state and federal point of view. Because even though the CEQA and NEPA have similarities in -- very many similarities in purpose and intent, there are actually some marked differences in what these documents have to have or shouldn't have that we found challenging.

And I'm curious, I'd love to learn more about approaches that have been successfully implemented to address those challenges.

MS. BARMINSKI: In the offshore environment, it was a while back, but there were joint documents done for some of the offshore oil and gas development. And those were done in connection with the State Lands Commission and Santa Barbara County, in particular, and through a joint review panel.

So, there is history for an offshore environment type of work to be done in that respect.

MS. FOLEY GANNON: I think, also, there's some unique things about your NEPA process being a certified regulatory program, which made that particularly challenging, that you didn't see, I think, in the offshore oil and gas. And that we didn't see in some of the PV projects which were on BLM lands, or had transmission lines or things that went through it.

And part of it was just, I think, also the

timing and the process of it was really difficult.

Did you have something to add there?

MS. OTA: Yes. There is another example of a pretty successful NEPA/CEQA document within San Francisco Bay. It was for the long-term management of dredge materials in San Francisco Bay, between all the state and federal agencies to manage that process. And that was a -- it wasn't easy. But that's an example of one that actually worked pretty well.

MS. FOLEY GANNON: And maybe, the Coastal Commission also has a certified regulatory program maybe you can weigh in on. Does that play into the ability to do a joint document?

MS. HUCKLEBRIDGE: Not really in this case. We would generally defer to the other agencies to determine who would be lead. And as a responsible agency, we would work with whoever the lead was chosen to be.

You know, we do have a certified regulatory program. Our documents can be CEQA equivalent. But I can't imagine a situation where there wouldn't be a lead agency, such as State Lands, or a local government who would be the appropriate lead agency.

MS. FOLEY GANNON: Great, thank you.

Thinking about being able to bring these working groups together, there is the California Marine

Renewable Energy Working Group, which is already out there. And I know Fish and Wildlife is part of that. Can you speak to those efforts and maybe how that can play in as part of approving these projects?

MS. OTA: Sure. I mean, the marine region does have representation on that group. We have not had a lot of offshore energy to actually tackle on that group, yet. So, there's a lot of work that's been done that the Department's been involved in, of course, on onshore wind energy projects that everybody's aware of. But nothing has come up, yet, in the ocean environment to really dig into these issues at this point.

So, that workgroup will definitely be involved as we move forward. But as a part of that workgroup, you know, they'll march along as everybody else does on that. So, that's how we would end up plugging in.

But right now, there's nothing really to react to, yet, so we haven't had the opportunity.

MS. FOLEY GANNON: And is that working group working with BOEM, with your efforts, are you coordinating between that working group?

MS. BARMINSKI: Yes, we've been a member of that working group, as well, and it's been mainly a communications tool or forum, and been very effective that way for projects that have come in.

But now, with a larger-scale project on the horizon or on the table to be considered we, I think, are incorporating all the people, agency-wise, that are on that Marine Renewable Energy Working Group into the, you know, interagency meeting that we're having next month, as well as progress further on to the task force.

MS. FOLEY GANNON: Great. And on sort of a related topic, at least we've seen in the past, and I think you were referencing some of the ability to do MOUs as part of a permitting or an authorization process. How do you see that playing out here in the offshore renewable energy development process?

MS. WOONINCK: So, MOUs can be incredibly useful for defining roles and responsibilities. I think they're also really useful when you're first starting out a relationship or a partnership of coordination and cooperation. Once you've sort of gone through the fire sometimes they're not necessary.

But I think what they do is they also -- we do see uncertainty involved with some projects and uncertainty from the perspective of the agencies that are working on a project, the stakeholders, the developers, the investors. With having an MOU in place, you can have certain steps outlined that say that you will share information. The information, that you're

aware of each other's statutes and criteria. That can also help streamlining, then, the permitting process, having that awareness.

I think for the information sharing it's incredibly important, as we were just talking CEQA and NEPA. There's an enormous amount of analysis that needs to go into this and data of the environment. If we can all share the same concepts of how we are evaluating that environment, using the same data, using the same standards that is incredibly useful. And that also, again, reduces the uncertainty with the public, with the people who are working on this.

But again, you don't always need them if you already have a very good working relationship. Like, we have one with BOEM for energy projects in the offshore environment. But I think in the absence of that, we are already working with BOEM a lot. We're picking up the phone, we're talking with each other, we're sharing information, data. We're talking about communication. Also, the communication is important. You don't need to release public input or requests for public input multiple times from different agencies. It can just be all one public input.

Again, I think we can manage this better with more communication, more coordination, more

collaboration. And all of that can be somewhat memorialized within an MOU.

MS. FOLEY GANNON: Great. Turning to the species-related agencies and from the permitting side, maybe Bill, if you can answer first, and then Becky and Noah, if you can weigh in.

What do you think are the unique challenges associated with like mitigating the impacts associated with an offshore project?

You know, I think we all know when you're looking at terrestrial species, or you're looking at on-land projects you're looking and saying, you know, you replace the habitat or you preserve the habitat. That's not really an option when you're talking about an ocean environment.

So, how do you see that playing out and what are the unique challenges?

MR. FOSTER: Yeah, this is Bill Foster from NOAA Fisheries. Primarily, as far as the species goes, my experience has been that there's usually a permitting or a licensing process that goes on. BOEM is going to have like a final rule that will -- or a rule that will, you know, get put out there and then people comment on that.

The Federal Energy Regulatory Commission goes through, it has its own process, including a subprocess

for ocean energy projects.

But in California, I am the point of contact for NOAA Fisheries in California, for these types of projects. But there hasn't -- except for what FERC calls preliminary permits, which is a three-year process to lock an area or a zone in place, and then you can gather information. And you don't put anything in the water, but you're gathering information or studies.

In California, these projects haven't totally kicked off, yet. Or, if they did in the past, they only went so far and then kind of died on the vines for whatever reason.

And so, I envision when the projects get more involved and they actually get started with collaboration, I would be pulling in marine mammal experts, and commercial fisheries, essential fish habitat experts from wherever the local office is that's closest to those areas. Working with ocean science -- you know, Ocean Services, for instance, and working with BOEM, and as well as working with the other State agencies.

Because what I have found, and my experience has been much more in, say, for hydropower, you get a cadre of people from various agencies that all have input into protecting the species that they're concerned with. And

it tends to be the same people over and over, as you go on from project to project. And over time you build up a rapport, you know, who knows what, and who's the good modeling person, who's the person with the spatial habitat information, who's the person who knows a lot about, say, marine mammals. That develops over time.

And the formation of a task force type of concept is what would work the best.

Ultimately, we'll be consulting on the actions of the federal or state agencies in their issuing of a permit and how that might -- the natures of conditions within those permits or licenses help mitigate and protect. Not only the ESA listed species, but also all of the species that might be there.

MS. FOLEY GANNON: Do you want to weigh in on that, Becky?

MS. OTA: You bet. Talking mitigation in the ocean environment is extremely challenging and it's something that we grapple with. I mean the royal we, everybody in the room, that we grapple with all the time. There's not one type of mitigation. We're used to on land, and in estuaries, and in coastal zone areas with some pretty comfortable ways to mitigate for some of the more common impacts to the environments.

When it comes to the open ocean, even shallow

coastal ocean, it gets very, very challenging to determine what is adequate mitigation under the Environmental Quality Act, under the National Environmental Protection Act, under all of those myriad, very long list of acts I have here. It's very challenging.

So, going along the lines of what we just heard, that is going to be one of those gaps that we're going to have to work together with agencies, with the experts, with researchers, with stakeholders, with our recreational and commercial fishermen, users out there in terms of seeking creative ways and creative thinking. And then, being able to match that up with what is required under all of those state and federal acts, and laws, and regulations.

So, it is going to be a challenge. It's something that we've all been talking about, you know, at this table and people in the room, about where do we go with this? And there's been some discussion on what that might look like, but it's not congealed at all, yet.

So, that is going to be a real challenge on mitigation for not just these kinds of projects, but all kinds of impacts to our ocean environment. So, it's going to be a wild ride. So, fasten your seatbelt.

MS. FOLEY GANNON: Did you have something, Joan, to add?

MS. BARMINSKI: I just wanted to say something along the lines of what Becky's been talking about. I think there's also one of the benefits we have is that outside of the U.S. there is development that has occurred in the ocean environment, in these wind facilities. And that they have done work along these lines of figuring out how to address the environmental concerns.

So, do you see that as being -- I mean, it's translatable. We've had a couple of workshops on the Atlantic Coast, you know, in the U.S., to bring in what has been termed the European experience, and trying to get input there.

MS. OTA: This is California.

(Laughter)

MS. OTA: So, I think that's a unique challenge in and of itself. I mean, we can certainly draw on what's happening in other states around the country, or European nations, or what have you. And boiling that down to how it's going to apply to California is also going to be the challenge.

Because we have very unique situations, very unique different laws, very -- you know, I think we

should draw on what others have learned in these same types of projects, regardless of where that comes from. That is certainly going to help. Even from our land-based wind energy projects and renewable energy projects, we can learn from that in terms of the processes that they went through, you went through, and those kinds of things. And how that work, and how that might apply to completely different environment out in the ocean.

So, I think we can look at that and then, again, see where it fits and what we can maybe pick form that.

MS. FOLEY GANNON: And, Noah, do you want to weigh in on the mitigation question? As well as, you were talking about the MBTA permitting challenges, and the developing of the regulations, and that's obviously something that everybody who's involved in wind, I think is watching pretty anxiously, and wanting to see where this goes out.

Related to that, I'm wondering, so I'm going to give you a two-part question. The question, with the MBTA, what type of standard do you see being applied to like an incidental take permit?

Because under, obviously, the ESA, you have the jeopardy standard that's controlling. But it would have to be some sort of different standard in the MBTA

context because we're not talking about a listed species. So, do you have thoughts on kind of where that is going or what direction people are looking at that issue at, now?

MR. MATSON: Sure. So, in terms of mitigation I think, you know, there's a lot of parts of offshore wind development that are analogous to existing development in the ocean. So, offshore oil and gas developments, running cables to the systems. So, I think we all have experience on managing through those.

And the key to any developed project is to run through the hierarchy of mitigation. So, avoid, minimizing and compensate. So, I think that's where some initial research off the Pacific Coast could be really helpful, and what's started on the Atlantic Coast, as well, identifying areas that are biologically rich, which might have a lot of conflicts with this development.

So, you know, that map I showed of some of the sea bird concentration areas, probably a good idea to stay away from those. How far away from those, I couldn't tell you off the top of my head. Do we have enough science to determine how far off the coast those particular birds are flying? Again, I don't know off the top of my head.

So, we'd like to get a little more research there just to kind of avoid some obvious, sensitive areas.

For these birds, and particularly other species, there might be -- if compensatory mitigation would be required through our various authorizations, there could be some potential, depending on the species and some of the threats that they might face. So, a lot of sea birds face threats of invasive animal species on these islands. So, rats in particular, goats, pigs. You know, they eat their eggs or, you know, trample their eggs.

And so, you know, I can envision some compensatory mitigation to help reduce a different type of threat, if compensatory mitigation was even required through the permitting process.

In terms of the MBTA, it is a very different statute than the ESA. It's very short and definitely lists as you're not supposed to kill a bird. So, that's the standard. So, we would be looking towards avoiding take, minimizing take, and then compensating for take.

You know, we are exploring other, you know, di minimis take thresholds where compensatory mitigation might not be required. We're looking at that. It's hard to define that, objectively, and would definitely

differ between species. We're hoping not to manage that program through a lens of a thousand different species, which is how many species of migratory birds there are. So, we don't want to do that kind of deep analysis on the impacts as it's too complicated. So, we're still working through that.

And, of course, we will be seeking public comments for additional ideas on how to work through that.

MS. FOLEY GANNON: And I imagine you're going to get some public comments on that, too.

(Laughter)

MR. MATSON: Yes, I think we will.

MS. OTA: Ellen?

MS. FOLEY GANNON: Yeah.

MS. OTA: Over here.

MS. FOLEY GANNON: Oh, sorry.

MS. OTA: Just to pile onto that, you know, the Department does recognize and does more than recommend that adherence to that Migratory Bird Treaty aspect does. But we also have code sections of no take of migratory birds.

So, it's going to -- you know, for mitigation along those lines, as Noah was saying, that's going to be a little tricky in that regard.

The other thing I want to throw in here, and I think somebody mentioned it earlier, is fully protected species in the State. We do have fully protected species, as well, that there is no allowance of take for those fully protected species. And if there is any take, it's got very specific boundaries on what that looks like and what's that for.

So, just since we're on the bird issue, that is going to -- you know, that's a part of that mix.

MS. FOLEY GANNON: Right, good point.

Kate, turning to you, how is this -- you obviously have more authority over some of the online shore components than many, some of these other agencies do. How is this different than your usual permitting, other than, you know, with the consistency determination, but also as your actual CDP process? How do you envision it as being different or not?

MS. HUCKLEBRIDGE: I think that the main reason or one of the main ways that this is going to be unique is simply the scale that we're talking about.

As Noah mentioned, we have experienced the permitting, and determining impacts and mitigation for offshore oil and gas development. But there, the scale was a lot smaller. And here, we have a potential to be looking at development on a much larger scale. Much

more land area, ocean area. And I think that brings in a whole host of challenges when we're looking at determining impacts, mitigation, and coordination.

So, I think from our perspective that's going to be a huge challenge. I mean, again, you know, the farther offshore you get, the less we know about the environment. So, it is unique in that sense, too, in that there's, hopefully, going to be some new science coming out of this.

And then, finally, it's new technology. So, determining impacts associated with a technology that hasn't really been tested in California, in our unique environment, will pose additional challenges.

Now, we can rely on some of the studies coming out of Europe and from the East Coast, and I think we'll definitely do that. But it is -- I mean, it's going to be a challenge to really get our arms wrapped around the impacts and mitigation necessary on this large of a scale. At least what's contemplated at this point.

MS. FOLEY GANNON: And in addition, I mean, we have not done any offshore oil permitting in quite some time, right?

MS. HUCKLEBRIDGE: That's right.

MS. FOLEY GANNON: Right, so things have also evolved since the last time you actually had to do --

MS. HUCKLEBRIDGE: That is correct.

MS. FOLEY GANNON: -- one of the permits in this process.

So, going off of what you just raised, and I think this is something we've been kind of going back and around, all of you have mentioned, the data gaps. The stuff that we don't know, yet.

So, I mean, I'd like to hear kind of all of your input on what do you think are the biggest data gaps? And what do you think we need to do in the short term, and in the mid and longer term to start addressing those?

So, that's a huge question and, Joan, what do you think?

MS. OTA: Yes, Joan, what do you think?

(Laughter)

MS. BARMINSKI: Well, one part of the answer is that the Bureau of Ocean Energy Management does have an Environmental Studies Program that it has had for a long, long time. And we, over the past eight or so years, especially since the Energy Policy Act was enacted and we have renewable energy, and because it's a relatively static environment in the oil and gas sector, we have been realigning our studies to approach renewable energy needs, trying to identify those.

We have, in the course of doing that we have a way that we've gone out and asked constituents, whether they're universities, or other state agencies, other federal agencies for our ideas for our studies program. We manage it on an annual basis but, you know, it takes a little while. We're working on 2018, now. You know, so we try to anticipate needs.

For a while, we were focused on Oregon and that was very appropriate because we had a project that was proposed there. And we've been doing studies there, where we had not, in the past, had any information from our own studies program. Just had -- there's no oil and gas there, offshore.

So, we are trying, now, to look at California as well. And we've anticipated that. We've been working with State Lands, and then the Coastal Segment Working Group, and the Coastal -- the Mapping Group that's been set up, to look at where the priorities are for gathering data.

We're also trying to put all of that information into accessible databases. So that the Marine Cadastre, for example, which is a national map tool, has information, as well as the Ocean Data Portal, which is being organized by the West Coast Ocean Partnership, previously West Coast Governors Alliance.

So, those information sources are going to be out there for everyone. This is public data and we want to make it available.

So, I think that's what we're trying to do. But we are organizing a conference in the November time frame. We're nailing it down, now. We don't have it quite yet. But it would be in Northern California, as an area, the vicinity of Sacramento. So, that we could get people to come to that and it would be focused on two days. One on technology, so you'd hear more from people like Walt Musial, and NREL, as well as some project proponents. And a second day on environmental information sharing.

So that will be, I think, very important for us to try and get more information available to everyone. And it would be possibly a point where you can try and assess some of the additional needs.

MS. FOLEY GANNON: Great. Anyone else have thoughts on the data gaps or what we need to do?

MS. OTA: Yes. I think, and it's my perspective, maybe the Department's, I'm not sure, it's hard to identify what the data gaps are going to be when we don't know exactly, yet, which methodology -- and I thought I heard that the floating is maybe not right off the bat going to work. I guess, we'll see.

So, it is -- and Joan's right, there is a lot of information out there that we can draw on, whether it's mapping, whether it's work that was done for the marine protected areas, whether it's -- lots and lots of data out there about what exists, most of the way out to three miles, and some of what's out beyond that.

So, some of the data gaps are going to -- you know, related to the overall methodology that's going to be used, how that's going to be deployed, how it's going to be maintained, you know, what kind of -- and how that -- that is going to help us identify what some of those data gaps are. It is a very good start to go out there and almost like a pre-construction baseline look at what we know exists right there in terms of habitats, resources, you know, those kinds of things. That's going to be the first critical step.

And then from there we can go, okay, great, now we know. We've got this picture. And then you start putting the layers back on the onion, as it would be, to then try to identify where those data gaps might be. Particularly, as it refers to our California waters, our California coast, the California current, the different species. Taking information from other areas is great, but species in other areas may or may not react the same that they will here when these structures are put in.

So, you know, it's those kinds of things that we'll have to look at.

COMMISSIONER DOUGLAS: So, and Ella, I'll just quickly jump in and say that we will be hearing from some developers later today, who are proposing a project with floating technology today.

MS. OTA: Oh, good.

COMMISSIONER DOUGLAS: So, we will hear. You know, I think that that's a technology that's certainly before us as a State, so that raises the fairly distant from shore, as opposed to within three miles. But, of course, still with the onshore connection, the cable for example.

MS. OTA: Right.

MS. FOLEY GANNON: Lisa?

MS. WOONINCK: So, I think we have -- here, in California, we have a fair amount of knowledge about the resources. But I think where the data gaps are going to come from, and what I've been hearing people say is, what will the effect be of a project on those resources? That is where I think the data gaps exist.

And, yes, there are -- these technologies have been in the water in other places around the world. Knowledge of how we can use those studies, are they applicable to the California coast, that, we're not so

sure about. We can use some standard ecological principles, standard, you know, cause and effect. We can look at some of that. But, you know, real direct information, because it hasn't been in the water here, in California, and we don't have.

But I think BOEM has already invested a tremendous amount of resources, not just on the environment, knowing the environment, California, too, through the Marine Life Protection Act, out to 3 nautical miles. The sanctuaries, we have a lot of information.

The National Marine Fishery Service has been collecting data on essential fish habitat. So, we basically know what does the benthic habitat look like? And that would be the habitat that would be impacted by this type of a technology, through the anchors.

We have a fair amount of that information. We also have a fair amount of information on the human side. BOEM has done, has put together a human uses atlas. The National Marine Fishery Service has done the same. The National MPA Center has done something like that. So has California Fish and Wildlife.

So, we have a lot of data on the environment. But the impact, the effect of this type of technology, that is where I think the huge data gap is.

COMMISSIONER DOUGLAS: So, just as a quick follow-up question on that, even though we haven't seen this technology deployed in California, or offshore of California, do we have a sense, in some sense of inventory, of what we can learn about impacts from other kinds of technologies that are deployed off of California?

For example, I'm thinking back to the slides, the slide just showing pictures of different ways of designing a floating platform, and they all had some level of anchoring to the sea floor. And there's a question, well, does that cause vibration and noise? Does that have, you know, some number of effects?

And I'm be curious what other kinds of technologies have been deployed that can shed light on those kinds of questions, even though this particular application is not one we've got experience with.

MR. FOSTER: This is Bill Foster. I know the Department of Energy's put funding up to not only assist developers of actual energy-producing devices but also, and I think more importantly in our case, we know where the resources are. We have a pretty good understanding of that. But the remote sensing and monitoring of the existing habitat, to confirm our baseline estimates, as well as devices themselves, and how they interact with

that environment is an ever-growing, I think, industry in terms of submersibles and data collection systems.

Europe is a bit more advanced from us because they've got a more immediate head start. Some of that was because of their own federal funding that they put into those programs.

But I think one of the things that will really help us, technology-wise, will be an increased development in remote sensing capabilities. Making them smaller and easier to use, and get more bang out of your buck as far as data collected.

There's always going to be development, I think, on an ongoing basis for different types of devices to generate energy. As much as one can imagine and then build it.

But I think, equally, we're going to need the remote sensing capability's going to have to step up. And I think it has to some extent, in some of the universities and stuff like that.

MS. FOLEY GANNON: Kate.

MS. HUCKLEBRIDGE: Yeah, I just wanted to add, you know, I think that there are certain components of these types of projects that we feel pretty good about understanding impacts. I mean cables, we've all permitted tons of cable projects. So, we understand how

to determine impacts and make proper mitigation for laying of cables, for example. Anchors, somewhat similar.

Again, we're out in deeper water than really we've experienced before, at least from my understanding. So, there will be some elements which we're not quite -- you know, the habitat's going to be slightly different that deeper out, that we'll have to pay attention to.

But then I think it's the unique impacts that could be associated with this technology that will be harder. Things like what types of vibrations, or EMT, or noise associated with these types of floating turbines, for example. And we can rely on a lot of the European data to at least give us a start.

But to determine the impacts on the offshore California coast will be interesting.

And again, I want to piggy-back on what Bill was saying. I do think a challenge is going to be developing appropriate monitoring methods, and remote sensing being one of them. It is really difficult to do studies when you're that deep off water -- offshore, and so it's really difficult. I consider it a significant data gap in a way that we don't really have good methods developed for good monitoring that far offshore and in

that deep of water. So, I think that's also something that we'll need to step up, as well.

MS. FOLEY GANNON: And now, we're going to have a guest speaker give an answer, as well.

MR. TOMAN: Hi, this Bill Toman, again, from the previous panel. You know, having worked at developing California marine renewables over the past seven, eight years, I'd like to just point out the fact that the experience that we have the offshore oil platforms is substantial. These are, you know, thousand-foot tall, you know, thousand-of-ton structures have been out for 35 years. They are connected, almost all of them are connected by shore with power cables.

And that in the past couple of years there have been a couple of power cable replacements. And so, there is contemporaneous information about things associated with marine renewable projects that have already been done, and dealt with, and evaluated. And we'd just urge you to keep that experience in mind.

MS. OTA: That's exactly what I was going to say. I love it when people stay on my wavelength.

Because I think your question was what is out there that we can actually draw on that might help us, you know, look at some of the questions and get some of these questions answered. And that's exactly right.

That is the closest thing that I can think of right now, which is a long time ago but, you know, that is the closest thing of what is out there right now. Other than that, there's not a lot out there right now. I mean there's a lot of junk out there, but there's not a lot of projects that are going along these same lines.

So, I agree that looking at those platforms and the structure around those platforms will help us inform.

MR. FOSTER: This is Bill Foster, again. I think the other issue to -- that we may not only be able to understand until we have a project in the water, and there's monitoring and adaptive management, is the economy of scale. We have examples of similar items, structures, cables, but many of these devices are going to be in arrays, of huge numbers of arrays. And how that individual spacing and their impacts on the local environment from a much broader perspective, you can imagine -- you can imagine and scale up from, say, one or two devices, but it's still not the same until you actually start monitoring it.

And I think that's where we can best borrow some of the techniques that maybe they've done in Europe because they actually have arrays in the ocean. Whereas, we're still trying to figure out what that

means.

MS. OTA: Or what it looks like, yeah.

MS. FOLEY GANNON: And how have their monitoring programs been in the European experience? And you were speaking about that as being a challenge here. Is anyone aware of kind of what data we've gotten from monitoring, from those projects that are up and running?

MR. FOSTER: I don't have a lot of personal knowledge of it, but I know I've been -- I always try and check the Tethys website that was set up, I believe, by DOE.

And to the extent that it's updated, you get information, news reports, as well as industry reports, sometimes, about who's doing what, and who's combining with who, and kind of the who's who of the industry over there. But they're including more and more articles about, you know, what's happening here, too.

So, there is access to scientific reports and data. Not every single report is completely, immediately accessible, you know, but you can still -- once you've got the name and the author, you can usually find it, if you need to find it.

MS. HUCKLEBRIDGE: I've definitely reviewed a few scientific journal articles and there has been a series of journal editions that have focused on offshore

energy and monitoring. And I've only -- I can't say that I've really, fully delved into it. But from what I've seen, I think some of it will be definitely applicable.

But, I mean, the monitoring results have been really mixed and they've shown effects in some cases, and haven't shown effects in other cases. And I think in my mind, as I was looking through some of these, some of the places -- some of the design of this stuff is how are they designed, and how do they use it to do -- they're incredibly expensive to do these types of monitoring studies, so that's something to keep in mind.

But I do think some of the methodologies that they've started to get out there could be useful to us and it's definitely something that we should be looking into.

In terms of impacts and effects it may be less so, but we'll see.

MS. FOLEY GANNON: Okay, looking forward, Joan, you were talking about the efforts that you're starting to do to get ready to do the task force. So, based on your experience with the task force in the other states, in Oregon, in Hawaii, and other places on the East Coast, what benefit do you see is going to be derived from that? And kind of what's the main role that the

State agencies are going to play in that?

MS. BARMINSKI: Well, I think that it's a very well-defined benefit. I mean, you can't do it without it, without the coordination and the communication, and having all the right people at the table.

So, I think it's going to be, you know, the forum that it will provide for the data and information exchange, and then discussing all these issues and concerns is going to be really important. The state, federal, tribal and local governments would be involved at that table.

And, you know, the experience we've had, it shows that people will come, you know, and they will be engaged. They bring their information to the table in those task force discussions. So, it's a very open way of doing business and it something that we've found to be very helpful.

MS. FOLEY GANNON: Great. Looking along those same lines, with the large-scale solar and wind projects on the land, you know, there have been those programmatic EISs that have been conducted. There's also been, as you were referencing, the DRECP. You know, the habitat conservation planning and these efforts that have been undertaken on a programmatic level.

Do you see something like that happening in an offshore wind context in California, or maybe on the West Coast, or some subset of that?

MS. BARMINSKI: At this point, no. I think that it looks like more a project-specific or an area-specific look at things. So, I haven't anticipated a programmatic document like that.

MS. FOLEY GANNON: And I think they've been seen kind of as mixed blessings when they've happened. I mean, there's advantages and disadvantages when they have them.

Do you have something to add to that?

MS. LUCCHESI: I was just going to say I agree with that. But in terms of just, you know, just building off of what Joan said about the task force, having that governance structure in place, that there's a formal way of getting this all together, and increasing collaboration and communication, that then spins off into a more informal coordination role, and just the contacts and the networks that you're able to establish really helps facilitate progress an all these fronts, among the state and federal agencies, and the tribes and, of course, the local jurisdictions.

MS. FOLEY GANNON: Well, one of the -- at least one of the goals, originally, of the solar PIS was to

say let's designate the areas that are appropriate for it. And NOAA was earlier referencing, you know, you can identify these areas where there's going to be more Migratory Bird Treaty conflicts than there would be in others. And I'm sure that there's, you know, other areas that we could designate. And we have the sanctuaries and these other resources.

So is there an effort, other than just responding to a project application, to do something a little bit more proactively of saying, looking at what are going to be the areas that are most likely to have the least amount of conflict?

MS. OTA: I'll jump on that one. That would be fabulous if we did that kind of thing. An example of that is the Marine Life Protection Act process for establishing and designating the marine protected areas in California.

That was a multi-agency, stakeholder-drive, you know, public process whereby everybody came together to determine where would be, oh, the best places, but where can these areas be designated that's going to have, you know, the benefit that is required by the Act, but yet a minimal, hopefully, amount of impact on users, and so on and so forth.

So, it was a science-based, which is one thing I

forgot to mention, we really need to be science-based in this process. Everybody knows that, but I'm just going to throw it out there.

So, a science-based, fact-based, considering all the issues, and that process. Again, not easy. But we got it done, collectively, and that's one of those situations where it's that multi-agency, multi-stakeholder discussion and process. And how that gets set up and what that looks like is certainly going to be dependent on, you know, funding, pretty much so. And timing, and so on and so forth.

But that's one of those. And the Marine Life Management -- I'm sorry, the Marine, MLMA, the Marine Life Management Act process, in redoing the master plan is going to take a similar process. A little lower scale, but a similar kind of process to go.

There's a coordination, also, with the Pacific States Marine -- or, Pacific Fisheries Management Council, sorry, which was also a multi-agency, multi-state process, also with constituents that come together to help make decisions.

So, there are some templates out there that you can look at to see and see where it goes from there.

MS. BARMINSKI: I think one of the things you'll hear later, too, today, is that the potential for

development of energy offshore, in the renewable area, is also very resource dependent on that particular -- the wind resource. And it's not that, as Walt Musial from NREL showed the map, that shows the resource areas. So, it's not that it can't be done some other places, but it also is very particular to some locations where you have the resources, as well as the grid connections.

I mean, you're looking forward, maybe, to future offshore cabling. But right now, the infrastructure is onshore for transmission. So, it is trying to fit all of that together and looking at it. And the developers are certainly looking at, you know, where the resource is that they want to develop. It's driving it to some extent, as well.

COMMISSIONER DOUGLAS: So, I'm going to step in with a quick question and anyone can take this. But, you know, in the context in which we're working, whether we're analyzing individual projects or looking at programmatic, looking at impacts on a larger scale, or programmatic scale, one of the realities that we really have to deal with is that the environment's changing with climate change.

And, you know, certainly one of the biggest challenges we had, as we thought about conservation of desert species was what kind of desert are we planning

towards? And what are the -- what needs to be implemented in order to provide the greatest amount of resiliency and conservation over the long term, in light of the changing environment.

And I know that, at least from people who I have talked to, who have spent their careers in oceans, as I have not, but I can draw some comparison to the desert work that I have done. You know, the deserts are changing more, on average, than many other parts of California, for example. The models show the deserts getting hotter sooner. It shows potential rainfall changes, either wetter or drier, both of which could significantly impact species.

And my understanding is that the ocean environment is, if anything, changing more rapidly, both due to acidification and temperature changes, and maybe other stressors.

So, how do we -- you know, we are all speaking about this issue as agencies, with slightly different perspectives, and slightly different jurisdictions, and slightly different missions, but we're all talking about the same ocean. You know, we're talking about the same resource. And ultimately, at least in the case of some agencies, much of, but in the case of all of us, some of our missions have to do with the conservation of the

values, in addition to maintaining multiple uses of these resources.

So, in light of climate change, what do we do? Given that this is such a critical issue, in fact is what brings us all here today.

Any takers on that question?

MR. FOSTER: Oh, I'll take a brief crack at it. I know, NOAA Fisheries is extremely concerned about climate change and its effects. One of our foremost worries is the effects that it would have on the commercial salmon fishery. Which it has in the past, I believe, too. Because climate change is going to make more rain, less snow, more rain at the wrong time. And it's just going to get hotter and drier for, particularly, the anadromous fish. Of which the ocean conditions are rather important for their lifecycle.

Because as climate changes, they're going to get hammered in the freshwater environment, and then go out to the ocean and find out that they have to compete with tuna or, you know, something like that.

So, I mean I say that facetiously. But still, the experience we had with warmer waters in the ocean, farther north than they had, brings a whole array of different species with it that is also a concern, both from a resource, and commercial fishing, and sport

fishing impacts. As well as just the general, basic food web changes.

Now, as far as what you can do about that, the best thing you can do is probably to try and learn from past information and history, and see what you can do, and consider those other potential interactions that may occur, say, if the ocean conditions change due to climate change.

And then there's a whole suite of things you need to do, probably, for the anadromous fish, but that's outside this particular topic.

MS. FOLEY GANNON: Lisa?

MS. WOONINCK: Yes. So, at National Marine Sanctuaries, we are -- everything that Bill just said. We're extremely concerned about the ecosystem in general, the impacts from ocean acidification.

And as a program, we have typically prohibited offshore oil and gas development, and production. And we've also been very leery of industrial projects because of their impacts to the environment.

But I think with this -- it's not even an emerging threat. It is a threat to the environment, to the ecosystems within national marine sanctuaries. We, as a program, are also adapting.

And, hence, we were able to write that letter to

Ms. Alla Weinstein that said that we do not think that this type of a project would be incompatible with the values of a national marine sanctuary. And we think that there is the potential here, with very thoughtful planning, design, review, using marine spatial planning principles, where we can still conserve aspects of the environment, the fragile, very sensitive habitats and species in places within a national marine sanctuary, but still have the potential to site this type of a project, even within national marine sanctuaries. Again, with thoughtful planning, review, and evaluation of those resources and doing a robust tradeoff analysis.

But we need to do something to get us away from fossil fuel burning, to restore the ecosystem, and some of this damage that is going to be very hard for us to address unless we get away from fossil fuel burning.

MS. OTA: I have a clarifying question for you. So, your question, the way I interpreted your question is what do we do about climate change in -- with respect to what we're talking about right now in terms of offshore wind energy, and in general, is what I -- how I interpreted it.

However, what I was going to say is we're doing -- we're going in the right direction, you know, with renewable energy, and looking at that, and looking for

ways to increase that. And whether it's by legislation, or volunteering to do it that way, or whatever, that is a step in the right direction.

Because not only fossil fuels, but there are a lot of different variables that are affecting ocean health. Specifically, that are helping to exacerbate, and increase, and speed up the impacts as a result of climate change. Whether it's increase in temperature of waters in the ocean, or we've got hypoxia issues, ocean acidification issues, all kinds of things that definitely tie back to fossil fuel burning. But also, nutrient loads out of our watersheds and other places.

So, it is a very complicated quilt of variables that we all should be thinking about along those lines. And renewable energy is a step in the right direction in terms of trying to help reduce that impact of climate change.

Can we reverse climate change? I don't think so. I think it's been going on for a very long time. You know, have we helped it along? Pretty much, yeah.

So, I think in that regard this is a step in the right direction.

And as Lisa said, you know, looking, keeping that in mind as we go through and how to -- how these projects may be able to be put in place, keeping that in

mind, is important. And doing that, because we're all -- everybody in this room, all the agencies at the table have been involved in climate change. We are involved in climate change issues. The State of California is very involved in climate change issues.

So, we're in the center of that. And so, how we do that and keep our mandates, and our protections in place for those resources of the State, no matter where they are -- you've dealt with it in the inland portion, we're now talking about on the ocean side. How we balance that and the climate change issue is what we're going to be faced with in the future.

COMMISSIONER DOUGLAS: I think that's a great comment. And I'm just going to add, although I know it's lunchtime and people are hungry, so maybe not for a discussion realm. But I'm just going to add, another challenge is on the adaptation side. Looking at the real impacts we're experiencing today and asking the question, how do we inform our current planning and permitting decisions with this information?

Because we do have an understanding of what some of those changes are and what it might mean for some of the resources we care about. But connecting that to planning or to other kinds of decisions is not always easy. And I know that -- anyway. I know that all of us

grapple with that, you know, almost every day.

So with that, I want to thank this panel very much. You've been -- well, and I'm going to thank our Moderator, Ella, this was fantastic. The Haiku was wonderful. You know, it can be hard to sit through a bunch of agencies talking about, you know, their jurisdiction, and we do this, and we do that, and here's how it works. And you all made it informative, and brief, and interesting, and it was really, really good.

And the discussion was very helpful. I know, certainly on behalf of Commissioner Hochschild, and myself, and the Energy Commission, we look forward to working with all of you as these issues move forward. And just thank you very much for being here today.

And so, with that, we will go to lunch. And we will be back -- I'm going to pass this to Heather to tell us what time to be back. But I think we're on schedule.

MS. RAITT: Yeah, we'll be back at 1:45.

(Off the record at 12:50 p.m.)

(On the record at 1:48 p.m.)

MS. RAITT: Yeah, we can go ahead and get started.

COMMISSIONER DOUGLAS: Excellent. So, I just wanted to say, by way of introduction to the next panel,

we split out a couple agencies from the agency discussion in the morning. Both just to avoid having too many agencies talking at once, and also because, you know, we're going to hear from Ocean Protection Council, and Steve Chung, with the Department of the Navy, but here as part of an effort where he's helped coordinate our relationship, and planning work, and permit work with Department of Defense and the other services.

And so, we'll hear from both of them. And then, we're also going to hear from Thomas Gates, who's on our staff, speaking to the issue of tribal engagement and tribal participation. It was another area where, with the renewable energy projects permitted under the Recovery Act, you know, early on in that process there was not a formal State process with consultation with tribes. Although, there were relationships.

But by the end of that process, you know, at this point we now have an Executive Order regarding tribal consultation, and an Energy Commission consultation policy.

And so, he'll share his thoughts, both about the process for agency outreach with tribes and also some thoughts, I think, for how, with regard to this issue it can be both important and really helpful to do some of that early outreach.

So, with that we'll get started by welcoming Deborah Halberstadt here, with the California Natural Resources Agency, Ocean Protection Council.

MS. HALBERSTADT: Good afternoon. Thank you very much for having me today. I'm happy to be here representing the Natural Resources Agency and the Ocean Protection Council.

And I first wanted to give just a bit of background as to the Ocean Protection Council. We're kind of a unique State entity in that we do not have any permitting authority, but we do have a very strong policy role. So, we are tasked with protecting the ocean and looking at a systemic, ecosystem-based view.

We are tasked with protecting, conserving, restoring and managing California's coast and ocean.

And part of our role is to convene agencies together to look at those issues affecting the ocean and the coast, and have the opportunity to communicate and collaborate effectively.

So, one of the things we've done is, in 2010, we created the Marine Renewable Energy Working Group, which I'll get to in just a moment. But that was an OPC-convened working group that now is probably going to be melded into the new BOEM federal/state task force.

We also work very closely with scientists. So,

there is the OPC Scientific Advisory Committee -- or Science Advisory Team, which is comprised of 26 multidisciplinary, esteemed California scientists, who are convened by OPC to serve the science and policy needs of California in regard to ocean and coastal issues.

The members of that Science Advisory Team represent social sciences, natural sciences, environmental law, and tribal and cultural practices.

And we currently, through that Science Advisory Team, have a Mitigation Working Group, which I know is one of the issues that came up earlier this morning. That working group was catalyzed by the Refugio oil spill. But it's been expanded to address the broader focus on open coastal mitigation. So, I think that that will play a really important role in conversations going forward associated with marine renewable energy.

They're really thinking about the best science available and how to work outside the box for coming up with appropriate mitigation for open coastal ecosystems.

They also have the ability to help address data gaps. So, for example, with ocean acidification, through the Science Advisory Team, we now have this report that's across multi-state and international agreement on this report to identify where the data gaps

associated with ocean acidification, and what steps can be taken by policymakers to address that. So, that's just kind of an example of how the Science Advisory Team can be used.

We also -- I think it was Mr. Foster had mentioned how important it is to develop relationships, personal relationships, and that you keep seeing the same people come back over and over. And through our work on ocean health, and particularly through the marine protected area and climate work, we've developed very strong, active relationships with the scientific community that can help us integrate what we're learning from them into our planning processes.

So, as far as tribes, OPC has an important role in relation to tribes. I would say that we have worked very effectively and closely with a variety of tribes, throughout the State, on the OPA Partnership Plan, which lays out a roadmap for how our partners, including all the tribes, will work together to manage and steward the MPA network. And so, we work directly with them and have developed good relationships. And ensure that their feedback is incorporated into documents. That's a key part of it. It's not just that we're going out talking, but that we're helping to incorporate their concerns into our planning processes.

And one thing I think is important in looking at the planning for marine renewable energy, is how important it is to build sufficient time into the process to take into account tribal concerns. Because there are many tribes and each one has its own governmental and tribal processes. And the tribal representatives have to work with both the State agencies and then with their own tribal governments, and each one has its own perspective.

And that, you know, it's a separate sovereign entity and deserves that kind of respect. And so, we need to build time in for that sort of back and forth.

As far as the Marine Renewable Energy Working Group, as I mentioned that was convened in 2010. The groups or the agencies that were involved, and have been involved, are OPC, the State Lands Commission, the Coastal Commission, DFW, the Energy Commission and the CPUC.

And the goals of that working group have been to address uncertainties in the regulatory process, to address the information needs of State agencies and stakeholders, and potential impacts and conflicts that could arise through the development of renewable energy. And also, to facilitate development of agreements, like memorandum of understanding, or whatever types of

agreements need to happen, interagency or federal and state.

So, that kind of gives you an idea of what OPC has been doing and how we can be helpful in this process, even though we don't have any role in the permitting. So, thank you.

COMMISSIONER DOUGLAS: Well, thanks for being here. And obviously, you know, given the amount of interagency coordination that is essential in this area is one of the reasons we thought it would be really helpful to hear from Ocean Protection Council.

Can you, just before we go on, just briefly speak, also, to your involvement in some of the climate or climate adaptation work of the State, or research work of the State and just kind of how -- I guess I'd be hopeful that Ocean Protection Council would be in a place to help us connect some of these different, and very related and relevant parts of State work?

MS. HALBERSTADT: Absolutely. So, the Ocean Protection Council is very involved in climate change, particularly as it protects ocean health, and the local and coastal communities.

So, we have been working very closely with OPR in addressing sea level rise issues. We have convened a Coastal and Ocean Climate Action Team that meets quite

regularly.

We, again, convened the Ocean Acidification Panel to look at the impacts of ocean acidification and how those can be mitigated in the short term, at least, and hopefully in the long term.

And, clearly, you know, marine renewable energy is a way for us to decrease our reliance on fossil fuels and decrease emissions, greenhouse gas emissions, which will in turn have effects on the health of the ocean. Because the ocean, I think, you know, up until recently was kind of an ignored part of the climate picture, and the climate change picture, but it is bearing a huge burden. And it has been, up until recently, a massive carbon sink. And it can't absorb that carbon anymore and that's why it is becoming so acidic. And that is having a huge impact on the food web from the very bottom, you know, going up.

COMMISSIONER DOUGLAS: All right, thank you.

Can we go on to Steve, Steve Chung.

MR. CHUNG: Great. Commissioners, thank you very much for inviting the military to today's session. I think several of us are going to get satellite offices in Sacramento.

(Laughter)

COMMISSIONER DOUGLAS: I think you've already

got one.

MR. CHUNG: Well, we do. This is our sub-satellite office here, in the room.

My name is Steve Chung. I am the Department of Navy, Southwest Regional Community Plans and Liaison Office. I'm also joined by some of my colleagues from the Navy captain community, Dwight Deakin, Sarah Delisle, Scott Kiernan from the Air Force, and Ned McKinley from the Marines. Yes, we do travel in packs.

(Laughter)

MR. CHUNG: So, if you could put up the map, please? Now, they say a picture's worth a thousand words. And normally, a typically DOD or military brief would be infused with about a 50-page Power Point. That will come after this.

(Laughter)

MR. CHUNG: I'm kidding. I'm not.

What I'd like to do here and, again, without drilling down, there's three main things that we would like to share with not only all the stakeholders, and my colleagues from prior efforts for the State that are here, but three main and core elements.

The first item is to provide a general overview and a snapshot picture of the military equities that have cost service, that occur off the California coast.

The second item, and Commissioner Douglas referred to that, is in a quick, Reader's Digest footnotes version, explain some of our lessons learned and how we have evolved, together with our partners outside the fence line.

And then third, close it with a suggestion, borderline recommendation, since we have many of the stakeholders here today that I think, what we've heard so far, clearly there are vast, numerous, and diverse equities and stakeholders that exist off the California coast.

So, first, let me give you a quick snapshot, overview of our military equities that do exist off the California coast. They are shared across all services. Predominantly, services that operate off the coast will be the Navy, the Marine Corps, and the Air Force. Many of the areas that you see in purple, those are what we call our warning areas. Or, if you hear the term "whiskey" and followed by a number, they're referencing the warning areas where predominantly, but not exclusively and not entirely, our operations occur within the warning areas and from shore to the warning areas.

Much of our experience and collaboration that we've done with the State, with other federal agencies

over the past decade, and more, have been on land for the most part. And many of you have, I think, learned along with us, as we have learned, of some of our operational parameters that exist onshore. I will share with you those operational equities and more are occurring offshore. Whether they be on the water, below the water, or above the water. Every aspect, every element of training and testing operations that exist onshore occur offshore, from sea to land and land to sea.

For some of our stakeholders that have heard this one sound bite before, indulge me for a moment. But it is an important point. And that is, even though our installations, and our training and testing range areas, when you look at a map, seem to be separated by services, by land mass, I will absolutely highlight the point that they are all interconnected towards one common objective. And that is what my colleagues and I -- basically, that's why we exist for the most part. And that is to protect and ensure mission compatibility and to ensure we protect our national security interests. Plain and simple. It doesn't get more complicated than that.

But does that mean that, as we've experienced actions onshore that, when you see an area on a map that

means automatic no? Absolutely not. Absolutely not.

So, let me break into the second part of what I'd like to share with the group, which is our lessons learned over the past decade.

In the early 2000s, where California really began experiencing a huge push towards renewable energy, all facets of technology, whether it's solar, wind, we had a few offshore. We began evolving. One, by necessity. And two, because we were having our lunch handed to us. There was too much activity and we were playing, if you've heard the term, "whackamo", we didn't have enough arms. We could have been squiggly diddly with eight arms and it was just very difficult to manage.

Luckily, in concert with the State agencies, the Energy Commission, the Governor's Office of Planning and Research, several other agencies, the thought process began how can we be less reactive, avoiding the "whackamo", and how can we install a culture and a process to be more proactive? How can we educate not only our own internal team members, within the military, but also those external stakeholders that share the same areas that they have interest in?

What you see on the map, and it was deliberately placed there, is on the bottom right-hand corner, I know

it's hard to see, kind of in the -- like a salmon color, the DRECP planning boundary. In Central California, in the yellow, you'll see the San Joaquin Solar Initiative that recently wrapped up.

I share those two geographic areas and those two landscape planning efforts, while they had multiple different objects, the end state and the core driver that began those two initiatives were to do, collectively, with all the interested stakeholders, a landscape planning effort to identify areas of opportunities and areas of constraints.

One, the DRECP, very elaborate, very intensive, very long. About seven years. The San Joaquin process, not as long, not as complex, but nonetheless had the same fundamental principles that drove it. And that is, bring the stakeholders together, get ahead of the curve, conduct landscape level planning to identify areas of opportunities and areas of constraint.

Why do I emphasize and hit on those points? Part of our lessons learned over the last decade, predominantly, resided on the fact that whether you are a regulatory agency, whether you are a developer, and quite frankly, whether you're a homeowner that has interest someday to build something, the fundamental element that all these different individuals,

organizations, entities share commonly is they would like some sense of predictability.

And why is that critical? And likewise on the military, we'd like some level of predictability in working with our partners.

But when we're playing "whackamo" and the task force concept is terrific, we embrace it, we support it. However, taking some of the lessons learned and recently with the completion of the San Joaquin Valley Initiative, and the DRECP, if we had a stakeholder group, like the task force, that will react and assemble stakeholder groups together to tackle a proposal, evaluate a proposal, that is wonderful.

However, from our military perspective and from our shared lessons learned, we also strongly recommend that the same stakeholders come together and to embark on a journey, and maybe it's a process that's in between the San Joaquin and the DRECP. But we've already demonstrated, collectively, that it is doable. It is manageable. And it just requires a commitment and the willingness from the stakeholders.

The military will sign on board on this initiative. It is proactive, it is the right thing to do.

So with that I will pause and field any

questions anyone may have.

COMMISSIONER DOUGLAS: So, thank you, Steve, I appreciate that. And as you said, there's been a long road we've walked together on renewable energy projects. And suddenly, we're looking at a new area. And we hadn't been thinking about offshore, and we are.

And one theme I have heard from a lot of people, in preparation for this workshop, is that there is -- while there are data gaps, there is actually a lot of really good data and information that could be brought to bear.

You know, I will say that between the two processes, San Joaquin and DRECP, with my high level knowledge of the offshore issues, and they are high level, I think San Joaquin fits, at least initially, what we're interested in better in the sense that it was nonregulatory. It was a fairly quick time frame, start to finish. It was participatory, stakeholder-driven, but with a lot of agency, a lot of agency technical support.

And I think it would be helpful, to me, to better understand kind of the coordinating function, and the time frame, and the information from the Department of Defense perspective and the different services could be brought into this.

Because I take your point, and I don't doubt it at all, that offshore activities are as intensive and as varied, and in some instances as sensitive as some of the onshore activities.

And I guess I'll also take this chance to ask you, you know, one of the things we learned in working together on the desert projects is the importance of the testing function. And how, you know, even aside from training, you know, the sensitivity to certain kinds of activities interfering with testing was a really big deal.

You mentioned testing in the offshore context. I'd love to understand that a little better, too. I guess these are a couple questions thrown back at you.

MR. CHUNG: Well, let me go ahead and I think on the first one, on timelines and what would the expectations, could the expectations look like. If today is any indication of information that is already available, I've heard a number of my federal colleagues and a few of the other agencies provide and share with us information that they've either already collected, or already prepared with either areas of opportunities or challenge areas.

Likewise, there is much granularity that the military has, that we have, with regards to our

operational areas offshore. I think the first phase, as a suggestion, if we look at a path of similar to the San Joaquin Valley, probably similar objectives which was bring in, for all the stakeholders their areas. I think that was one of the questions. Their areas of constraints that they have. And then, upon compilation of that, and one of the things that, I'm not sure how many folks within the room here are aware, the State has already established a terrific foundation on where this data can be housed. It needs a little reorganization structure. It's called the Data Basin. The part of the infrastructure to enable this process is already in place.

So, do I think -- and again, I know some of my colleagues will say, Steve, no, that's too soon. But if it's a simple overlay exercise, six months to a year more than attainable.

Now, clearly, that's not the end all. That's phase one. But we need to have a starting point to start building that framework, to begin planning and laying out something on a landscape form. Albeit at a high level. But it's more than what we have today. So, that's your first question.

I think the second question is on the testing environment. And again, my colleagues are here if we

need to drill down further, because they're a lot smarter than I am. But if you look at the blue area, where it entails -- we call it the RAIMORA. I know, it sounds like a disease, but that's why I spelled it out, it's not. It's basically a Risk Adverse Impact on Military Operations Readiness Areas, and it's a mouthful.

But that area depicts two core components, majority driven by some of the sensitive testing that we do with the airborne radar. If you were to take this, and I will package the way it has been conveyed to me recently, that similar geographic area, that almost identical mission that's taking place onshore, flip it and bring it offshore.

Because as I've pointed out earlier, the training and testing that occurs onshore is also occurring offshore. And a driver and a majority of the reason for much of what we do, both on the training and testing front, is the interconnectivity between our installations, our ranges, and the platforms that we use. All the operations are interconnected. It is having complex operations that go from the sea to the shore and vice-versa.

Airborne radar occurs both onshore and definitely occurs offshore. Sensor operations,

likewise. So, it's not as if, well, this is very unique. We do have a unique mission. But when it comes to our operations within California on land, and offshore, they are very similar in type and form.

COMMISSIONER DOUGLAS: I've just got one other question and then see if Commissioner Hochschild has any questions. But could you describe, when we worked together on the DRECP, you know, you helped us -- you helped provide an appendix that basically described a process for developers, who were considering developing in areas that --

MR. CHUNG: Right.

COMMISSIONER DOUGLAS: -- maybe the military had flagged as potential issues, but potentially okay, and consult. And could you describe that process as it applies to offshore wind projects, for people who are considering or who want a better sense of what the process might be in California, if they were to consider projects?

MR. CHUNG: Absolutely, Commissioner. And that's an, actually, excellent question because that was part of the lessons learned. So, what we had onshore, through SB 1462, which the Governor's Office of Planning and Research established many years ago, it established a notification requirement with regards to any projects

or proposal that was presented to any cities or counties to provide the military notification that the project was in. That was a fantastic foundation.

But again, the point that, our lessons learned, that is reactive. When notification, when a developer, and I'm sure the developers will nod their head, by the time they make an application, they've already expended a tremendous amount of money, a tremendous amount of time.

And one of our lessons learned was how can we enable and foster an environment and a culture that is welcoming, with awareness and education, so a developer, industry representative, city or county, or other agencies can pick up the phone and say, you know what, it's 1-800-DOD. I'm proposing, I'm thinking about a project.

Well, it's hard to articulate that in a very simple manner. However, during the DRECP process we were able to meld the POCs, and there's only about there's only about four or five that OPR maintains for each service, that's a total, and meld that into a business process that was incorporated as part of the DRECP process that incurred and made two -- it made two key components, to key commitments. And that was if a DOD rep, that's identified under SB 1462, which I'm one

of them and my colleagues are the others, we are now committed to provide a response. It can be an informal, early consultation. Or, if you require something that's on a DOD letterhead, we provide the coordination, the communication with OSD. So, you can have that before. Because some folks will need it for financing. Some folks may need it for other purposes, we understand that.

But that early consultation process that was incorporated and built in, it's a double-edged sword. I'll tell you that, from our perspective, because we have limited bodies. But at the same time that opened up the door to -- I cannot explain to you, I can -- we track it. The number of calls and meetings that we are asked to participate in exponentially increased. But again, it's a double-edged sword. We'd much rather have that and put the time in to provide the education so a developer, or an industry rep, or a city or county, one, doesn't expend a lot of time and money on areas that are going to be very problematic to DOD.

But two, we also provide the communication, the education and the assistance to work with that industry rep or developer to site the project in a compatible manner. We work to get to yes. And that is critical because, quite frankly, our leadership is also aligned

with advocating and supporting both clean energy, renewables, and we have the policies to support it.

So, what may have been perceived 10 years ago as DOD's a very tightly locked vault, I would say the door's open and we absolutely foster, and the DRECP process that was incorporated absolutely enabled that. That has gone out. We need to do more educations so folks understand that those phone lines are -- I'm like a telethon, the phone lines are open. You know, find your PSA and contact them.

But we would very much like to establish a similar forward thinking, landscape planning initiative that's manageable, that's very specific in its initial target, and that's executable within and under a year.

COMMISSIONER DOUGLAS: Excellent. Thank you.

Deborah?

MS. HALBERSTADT: Thank you. I just wanted to tag onto what Mr. Chung has been saying. So, the OPC has actually created, funded and supported initiatives that are very much in line with what Mr. Chung has just been talking about. Particularly, data like sea floor mapping, and also the MPA monitoring data. Which, yes, it's nearshore, but it is comprehensive across species and habitat and will be important for infrastructure like, you know, transmission lines, cables, et cetera,

that are going to have to run closer to shore.

So that, I think, plays very nicely into what Mr. Chung was just talking about.

COMMISSIONER DOUGLAS: Yeah, I think it's a really interesting point. There's been a lot of investment in data, in this area. And it would be my observation, anyway, and I've talked to a number of people who have said, oh, yeah, we've got great data. It's not everything, it's this, that and the other, but it's really good. And it's really great to hear.

You know, as we talk about research needs, that's just another point from some of the desert experience. It lasted so long that we actually had time to do some cycles of research money, both out of the Energy Commission, but also out of other agencies, and being able to target that research both towards the impacts, or the issues, or the potential technology changes that can make a difference, but also towards the geographies that are most important to look at can help make research, you know, part of that cycle as well.

So, great, thank you. I'm going to go to Tom Gates, now, and let's talk a bit about tribal outreach and consultation.

COMMISSIONER HOCHSCHILD: Before we do that, just if I could just chime in really briefly. I just

really wanted to thank the Navy for really distinguishing itself, from my perspective, on clean energy initiatives. We've funded, now, 9 of the 30 military bases in California on various clean energy, clean transportation, energy storage initiatives.

I've had the opportunity to visit most of those. And I just really want to pay tribute to the Navy for really distinguishing itself in this arena in the very bold goal of 50-percent renewables by 2020, which is a stretch goal. But I really just want to acknowledge Admiral McGinn's work on this.

And just to restate the obvious, this endeavor we're embarked on, you know, to advance renewable energy, including offshore renewable resources, is in our nation's national security interests. As we increasingly power transportation from clean electricity we're producing domestically and reduce our reliance on imported oil, that is in the service of our country's national security objectives. And I just think bearing that in mind as we go forward.

I'm absolutely confident that there's a way forward here that can work for all the parties. So, I just wanted to close on that.

MR. GATES: Hello, my name is Thomas Gates. I'm the Cultural Resources Supervisor in our Siting,

Transportation and Environmental Protection Division, here at the Energy Commission. I work closely with Roger Johnson, our Deputy Director, who is our designated Tribal Liaison. And together, Roger, myself, and Karen, have conducted some of our tribal affairs with tribes.

I come from more than 25 years' background working mostly for tribe, but also now, in my capacity here, working with tribes. In my previous career I spent a long time on the North Coast, where it was interesting to see some of the maps this morning, where it looks like some of the offshore wind potential is the greatest. That's an area that I'm from.

We made an effort to get some tribes here to speak from their perspectives. We were not able to do that in some of the limited time. That's unfortunate. And I think going forward we should double our efforts to get more tribes to the table so they can speak directly from their point of view and not through a staff person. Although, I hope to be able to give us an idea of some of their concerns.

But once I learned, a few days ago, that I would be here, to get my head wrapped around this, I haven't been involved with ocean issues for some time, I called my good friend up north, a tribal elder, and for today

we'll call him Frank. And just to get my head wrapped around some of the issues that I used to rely on Frank to help me think through tribal values in relationship to the ocean.

And, you know, Frank has always been -- he's in his 80s, he's getting on in age. And he's one who always reminds me that, you know, he was born next to the ocean, behind a lagoon, right off of the ocean up north. And always said he was born with the sound of the ocean born in his house. And he comes from a long lineage of traditional women, medicine makers that gained their knowledge and power from the ocean.

And Frank is a guy, okay, and there's many Franks along the coastline, so he is representative in some ways. But he knows, specifically, maybe a mile of that ocean and that coastline. He knows specific stands of seaweed that his family has relied on for decades, if not centuries. He can tell you exactly where that little group of seaweed is and how it's doing today, how it was 50 years ago.

He can look out on that ocean and he can tell you, and he doesn't pay attention so much to the weather forecast, but he can tell you pretty much what's going to happen with the weather over the next three days just by looking at his window. And he's much more accurate

than what we would find from some of the other weather forecasts that we might rely on.

He can tell you how those ducks start to pull up and he can tell you that he knows a storm's coming in a couple of days. And he can tell you the magnitude of that storm. He can tell you that a certain bunch of sea lions that are laying on the beach before him, he can tell you which ones he thinks he's seen over the years and which ones seem to be newcomers.

He can tell you about how to carve a canoe and he can tell you how to paddle that canoe out to take sea lion. He can tell you if you get stranded out there, and you hit the certain current out there, where you'll land back along the seashore, some miles further down from him.

And he can tell you that's why his family had marriage relations with that other village down there, so that if they did get in that situation, they had family where they landed.

Frank knows his ocean. He knows it like the back of our hands for about a mile. And it starts to fade off from there. He can tell you some general, anecdotal things.

But the thing is, and I think I go to Frank because I want to say, as Deborah has potentially

mentioned, that there's a great challenge here because as we talk about data, and we talked about this this morning, and where the data gaps are, you've got people along that coast who can tap into thousands of years of history and knowledge, but it's very, very focused, and extremely focused.

Now, our agencies have data across the entire seascape, but there are lots of gaps and lots of unknowns. And so I think perhaps our solution is to put those two together, and that's the conundrum.

If we move away from Frank for a bit and we think about the number of tribes in California, roughly 184 entities in California. Roughly 100 and some, 109, 112 that are federally recognized and the rest are unrecognized. If we -- and I haven't looked at our tribal database to prepare for today, but if we genuinely want those into long sections up and down California, about a third are on the coast, about a third are in the middle part of the State, and about a third are on the eastern side of the State.

So, you're dealing, if you want to really deal with tribes along the coast, that first strip of ancestral affiliation, you know, you're dealing with about 60 tribes or so. And they're going to come, as Deborah said, with all kinds of different

understandings, capabilities, knowledge bases, ways of doing their government, ways of interacting with other governments. And some of them are not going to be prepared and some of them are going to be overly prepared. And that is both a welcome, because of the value and the breadth of knowledge they bring, but it's also a challenge.

And I think, while we might want to focus on those that have the direct affiliation with the ocean and the coastline, I want to remind us all that I think of some of my friends on the eastern side of California, mostly the Paiute Tribes. If we look at some of their creation stories, from all the way up in the north, Fort Bidwell Reservation, all the way down to Las Vegas and some of the reservations there, their creation stories have a personal named Ocean Woman. And they have a direct knowledge, through that creation story, to the ocean.

And so, while we want to focus on those tribes on the coast, we should not forget that just about every tribe in California and around California has some knowledge, some relationship to that vast resource.

It's no doubt you look at excavations in the Mississippi Delta you find artifacts, you find resources, abalone shell, stia (phonetic) type bowls

that were mined thousands of years ago on the Channel Islands, and were traded all the way to the middle of this continent.

And so there's even a broader knowledge. I remember years ago I was at a conference and a lady, I think from New Mexico, said, oh, you're from California. I need to get some of that abalone shell to make my regalia, who can I get hooked up with?

So, there's a knowledge across this country of the value of this ocean and what it provides for indigenous people.

I think I want to move on a bit. I wanted to particularly flag, as we talk about getting a grip on landscapes and a knowledge base that is landscape oriented, something that's been in the federal guidelines and statutes, and historic preservation for some time, and has now been clearly introduced into California State law, and that's the idea of a cultural landscape.

I want to point out that some of the agencies that were speaking earlier today were either funders or partners in a broad effort to identify ocean landscapes in relationship with tribes up and down the Pacific Coast Way. And some of the tribes that were involved in this actually, indeed, are in California.

And I think it's an excellent document. I think you can get it at the BOEM website. But it's entitled, "A Guidance Document for Characterizing Tribal Cultural Landscapes".

And I think a couple things I want to mention about that document, but I think if we were to try to get into the business of predicting where cultural resources and tribal values are offshore, nearshore, onshore, thinking about it from a cultural landscape perspective gives you the broadest context so that you can then understand how all the other specific sites or artifacts fit into that landscape. And that starts to give you a sense of the significance of something, compared to other, if you understand the larger context. So, I want to really push that. And I want to also flag this Seminole document that was just announced a couple months ago. And I can provide the exact title, if someone wants to, after I'm done speaking here.

I think offshore, far offshore, I think the values that tribes bring tend to be a bit more concerned with the natural environment and perhaps spiritual things. My good friend, Frank, always points to a trail, which any of us are beachcombers, or walk the beach, or stare at sunsets on the beach, if you watch that sun go down, it's one of the only parts of the day

we can actually look at the sun. And you'll see a trail that opens up. It's a light and a reflection, but it looks like a trail and it goes off directly to the west. That's a spiritual path for a lot of tribal people, and they point that out. And I don't want to really speak much to what it all means, but that's something.

Now, what's the impact of what we're discussing here to that, it's kind of hard to think about. And we don't have to also believe as those tribes believe about why that means, and why that's important, why it shouldn't be damaged and all of that. And, of course, it's the difficult one because anywhere along the coast you're going to see that trail, from that unique perspective.

But we do really need to understand that other people believe about these types of what we might believe to be esoteric thought. And that we had better understand their deep-seated beliefs, if we are to accommodate their interests in a way that allows us to go forward.

So, I think the further out you get, the more you get into these types of concepts and things that are hard to wrap your head around, and to think about mitigation and impacts.

I think as you get into the nearshore, you

need -- we all need to remember that a lot of that nearshore, at one point, was above water. And over the thousands of years now it is underwater. And I think in the last 10, 15 years marine archeology has really taken off as the technology's gotten better. And our marine archeologists, working with tribes, are actually beginning to do some very specific pinpointing of cultural resources on the ocean floor.

And I think there's some very interesting things that we might be able to do there to employ some marine archeologists to think about some, perhaps, cultural resource sensitivity mapping. So, as we're talking about laying cables, we can think about where there might be some places to avoid.

My good friend, Frank, points to a rock a couple hundred yards off the coastline up north, and says he remembers as a boy when that was connected to land. And so, he has this knowledge of how our coastlines, in some places, are eroding and have eroded. And there are some ways to pinpoint. By just looking at underwater geography, you can start to also identify some obvious areas where there might be some cultural resources located.

I think onshore, obviously there are challenges when you bring things onshore, whether it's facilities,

infrastructure, transmission linkups. A lot of the good places to bring things onshore are also good places where tribal people have lived over the centuries. And so, there could be onshore ground-disturbing impacts that we would want to think about.

Our friends here, that have put out this cultural landscape document, in certain sections actually have models for how to do some predictions about all of that, and how to do some cultural resource sensitivity for some of that onshore locations as well, and they've got some models.

And some models we, at the Energy Commission, have been employing in other projects, such as the DRECP, and a little bit in the San Joaquin Valley Project. And I think we could take some of that and turn it to the ocean, and probably come up with some successful predictions.

I think in all of this, the biggest thing, however you get the data, the data is only valuable as much as tribes endorse it, and come along with it, and speak from their perspective on what it means for their values.

That means that we have to be serious about our consultation with tribes. It means we have to bring them to the table, as Steve brings up and as Deborah

brings up, the sooner the better. Tribes are so used to us coming and knocking on their door when we have a crisis or we need them. And I think it's smarter to start the relationships before there is a project in front of us, before there is a crisis, and to develop those relationships in a meaningful way. So that when you do get to the tough questions, you can call on people and they will respond because they know that you are committed to something over the long run.

And I would encourage us all to think that through. That certainly is our philosophy here, at the Energy Commission.

I'll close here with talking with my friend, Frank, he said, yeah, okay, Tom, I know you're going to talk to all those guys. He wasn't quite sure who all those guys were. But he said, just remind them of this, and he said, no one owns nothing. And I said, well, you know, in this world everything can be bought and sold. And I know that's your belief.

And he says, yep, but if you think you've own it, you've already lost your ideas about sustainability. He says, if we could get a philosophy where no one owns anything and we think about it from our rights to responsibly use and take what we need, we'll be in a better place.

So, I'll close with that. I promised him I would bring that up. So, for whatever that's worth, that's what it is.

Thank you for your attention and I'm available if there are questions.

COMMISSIONER DOUGLAS: Thank you, Tom. I appreciate you stepping in on this and I appreciate the outreach you did around the workshop, as well.

So, I think we should move on because we're a little behind, mostly because I asked a bunch of questions. But in any case, I want to thank our panel. I really appreciate it.

And let's move on to the Offshore Developers and Service Providers Panel. And I think we're going to have Kevin Banister speak first, with Principle Power, and then Alla Weinstein with Trident Winds will be next.

MR. BANISTER: Okay, well, thank you, Commissioners, for the opportunity to speak here. And I must confess to some guilt. My Power Point here may have something of a military look to it. I think I've got 25 or 30 slides here. So, I promise to run through them quickly.

But actually, my intent in putting them all in here was knowing that they'd be produced here, so people can review them at their leisure afterwards. So, if I

do spin through some of these quickly, it's sort of intentional.

So, if you want to just move to the next slide, please. So, who is Principle Power? We're a technology developer.

And, actually, if you could go back to the previous slide really quickly. Our technology is, in fact, the yellow bit that you see on the screen there. I like to refer to it as the yellow floaty part. The floating offshore wind project.

This is an actual deployment offshore in Portugal. It's been in the water since about 2011. As I progress through this, I'll talk through a little bit more about that project and what its performances looked like. But suffice it to say, it is floating and it is perfectly suitable for deployments off the West Coast of the U.S.

So, now you can move to the next slide. So as a company, we're a technology developer and that is our product. Our mission is to develop a technology that can help us exploit that very powerful offshore wind resource and also change the way that we install, and simply think about offshore winds.

And I should say that our headquarters are actually just sort of down the road in Berkeley,

California. So, California is a market that is important to us for a couple reasons. Not only because of the potential, but became many, most of the employees of the company actually live and work not so far from here.

The next slide, here. So here -- well, I guess I'll repeat some of that. So, our corporate head office is in Berkeley. We also have offices in Southern France and in Portugal. Right now we're, you know, between 35 and 40 employees, and we've been growing pretty quickly. And as I progress through this and show you, and talk about some of what we've been engaged in around the world, you'll understand why we've been growing.

The floating offshore wind market really is coming. I think Walt Musial, from NREL, did a nice job of setting it up. And I'll talk some more about that here. But there is a lot of activity around the world. It's simply increasing for floating offshore wind.

And the trends in offshore wind, generally, if you can go to the next slide, are for projects that are in deeper waters. They tend to be further from shore and they tend to be larger projects. So, we're moving from -- you know, I think the first wind project back in 1991, off of Denmark, was -- somebody in here will know, but it was a pretty small project, 25, 30 megawatts,

something like that. And now, obviously, even here in the U.S. we're seeing proposals for a gigawatt. And some of the bigger projects in Europe are even larger than that, at least in the planning stages.

This is one slide that people can review later to read all of the little words on there. I won't read them all now.

You can go to the next slide. Again, I think Walt represented this pretty well. When you look at the deep waters around the world, you start to understand why something like floating solutions start to make sense.

And as we think about it, you know, these are the markets that we think about first. Europe, and that's actually not an entirely representative image of the markets that we think about in Europe. You know, the Far East, Japan, Korea and Taiwan, increasingly has become an interesting market.

Both coasts of the U.S. Obviously, the full West Coast of the U.S. and Hawaii. And even in some of the northeast projects that have been proposed, there are water depths that are really appropriate for solutions like the Wind Float.

And then, in the Med, there's maybe more deep water than people would expect. And in particular, in

the South of France, some really excellent wind resources that go along with that deep water. And the French Government has just recently, in the last year or so, embarked upon a pretty aggressive plan, and a lot of money, to look into floating offshore wind as a solution for their own climate goals.

And next, please. I won't belabor this. Walt Musial did a great job talking about the different technologies. But suffice it to say, as projects get deeper the technology requirements change. So, in the shallowest waters, we're accustomed to seeing mono-piles, sort of like really long pencils that are pounded into the seabed.

On this slide it says 0 to 30 meters. The mono-piles may be getting to a point where they can get a little bit deeper than that.

Jackets or tripods, more like probably 40 to 55 meters, or so, now, is what the technologies are reaching. And then from there, you get into the various floating concepts.

And the Wind Float is a semi-submersible platform.

You can move on to the next, please. So, again, what are we looking to do? We're addressing the emerging needs of the global offshore wind market by

enabling deployments further from shore, in deeper waters. And with a simplified deployment methodology, we can assist with larger farm deployments.

The next, please. So, here's what we call the Wind Float 1. It's been operating since 2011 offshore Portugal. In this case, it's about 5 kilometers from shore. As I look at it, it kind of looks like Santa Barbara, but it's not.

This particular project's in pretty shallow water. It's less than 50 meters of depth. But other projects that we're looking at and have planned for have been, you know, in waters as deep as 700 meters.

So for us, once we get deeper than about 40 meters, there's not a terribly difference in cost or deployment challenges in those different depths.

If you go to the next slide, please. A quick explanation of how this works. I mentioned that this is the semi-submersible type. This is a technology that's been in use for a long time. In particular in the oil and gas industry. Semi-submersibles are nothing new, they've been used for decades.

So the way that these -- that a semi-submersible performs in the ocean and the type of stability that they can provide is really, pretty well understood.

The innovation that Principle Power has brought

to this is the marriage of the, and the understanding of the performance when the aerodynamic forces and the hydrodynamic forces sort of come together. And that, obviously, is a very complex set of variables that we need to understand to assure that we get the most efficient production from the wind turbine that we can.

A couple key features for the Wind Float, we're turbine agnostic as a company. Meaning that we don't really care if we're using a Siemen's turbine, or a Vestas turbine, or even a Downwind turbine. Our preference is to allow the developer to make the choice around which turbine they use.

We do have a preference for the higher capacity turbines that are coming out to the marketplace today. And, in fact, we have designs for the big, 8-megawatt turbines that are currently available, if you care to place an order.

COMMISSIONER HOCHSCHILD: Just a quick question for you. I gather with this design and this type of application it's relatively stable. But in high seas, I mean how much sway is there that occurs?

MR. BANISTER: It's a very small amount, actually. And in the Portuguese project this -- and I'll show you some numbers in just a second, in the next slide. Do you mind if I just answer that in a second?

COMMISSIONER HOCHSCHILD: Sure, sure, sure.

MR. BANISTER: Well, actually, if you could go back, I'll finish this and then I'll get to that.

So, there are two ways that we keep the system stable. One is through, I'm going to number four here, the Heath Plates. And if you look on the bottom, there are these plates at the bottom of the structure. They're almost like, if you were to imagine lifting a plate out of a bathtub, the type of resistance that you encounter when you try to do that. They serve the same purpose, effectively adding to the mass as you try to move this structure up and down because of the resistance of the water above and below the plates.

And we also have two different kinds of ballast in the water. One is a permanent ballast or an operational ballast. In the columns that oppose the wind tower, there's an amount of water that is equivalent to the weight of the tower, and then the blades, keeping it under sort of zero conditions, keeping it entirely vertical.

And then we have an active ballast system, by which we're able to move water from column to column as wind speed and direction change. So, if the wind is really blowing from one direction, the whole system will want to heel just a little bit. And in that case, what

we'll do is we'll move water into the opposing column to bring it back to verticality.

And that's really not important for the safe operation of the system. Really, what that allows us to do is to maximize, as I said earlier, the efficiency of our production. Obviously, with a wind turbine, you want to maximize the swept area, the square footage from which you're extracting energy.

So, if you now go to the next slide.

COMMISSIONER DOUGLAS: So, just a quick question. So, when you talk about moving water from one side to the other, for example, is that done remotely or how is that done?

MR. BANISTER: It's done automatically.

COMMISSIONER DOUGLAS: Okay.

MR. BANISTER: So, there's a system in place that can sense -- like a typical turbine will have a lot of different controllers on it. You know, they're sensing the wind speed and direction, and they're feathering their blades, or do whatever they want the turbine to do under those certain circumstances. And it's a similar system that causes that to happen. It's entirely automatic. It's not like we have somebody on board, you know, physically pumping water from one column to another.

COMMISSIONER DOUGLAS: Yeah, that would be inefficient. Thanks.

MR. BANISTER: So, it's the plates on the bottom that really provide the stability for the waves. And with the -- I'll say, with the prototype that's been deployed for about five years, now, you know, we've been able to see its performance across all sorts of conditions. From wave events up to, you know, 16, 17, 18 meters, so we're getting close to 60-foot waves, now. And we've been able to observe how much the structure does heel.

And I'll just say that in every case it's stayed well within the turbine tolerances that are provided to us by the turbine OEMs. So, the amount that it has heeled back and forth has just not been an issue.

And I think that's partially demonstrated by, what is very hard to read on this slide, but on the lower left that is a power curve. And it's the published power curve of the turbine that has been used on the prototype, which is a Vestas V80, 2-megawatt turbine. A real workhorse in the offshore wind world, thousands deployed.

And overland, across the published power curve, is the actual power curve that this unit has experienced under a series of different wave conditions. So, you

can see all those little dots. That's in 2-meter waves, 6-meter waves, 7-meter waves.

So, we can see that even though it's deployed on a floating platform, the actual performance of the turbine hasn't been degraded in any way. So that's clearly a key finding for us.

The next slide. One of the things that we do that's different from, in particular, bottom-fixed foundations, is we tow out the fully assembled unit from the key side.

And I think Ms. Weinstein is going to show a short video, actually of the fabrication of the Wind Float. Of this Wind Float in Portugal, how it was built and then how it was towed out.

So, this really changes the type of vessels, and the risks and costs associated with installation for these projects. And it's the sort of thing that without this ability, you simply wouldn't be able to achieve here, in the West Coast.

The next slide, please. So, where are we as a company? So, we would say that we're in the pre-commercial phase. We have this single unit that's deployed today. I'll talk in a second about sort of where we are in terms of our next deployments.

What we need to do, now, is deploy projects in

small arrays, with a larger of what we really view to be the commercially scaled, you know, sort of best in class turbines, which are the 6- to 8-megawatt turbines today. We expect to see that happening in the 2018, 2019 time frame. And at that point, we would consider ourselves to have a commercially available product.

If you go to the next slide, please. These are a -- you can go to the next slide. I'll talk some about where we're active.

So, around the world today, on this slide I'll highlight the Wind Float Atlantic Project which is, arguably, our most mature project. It's also slated for deployment in Portugal, 2018 or 2019. It will be a 25-megawatt project, with three floating foundations, three turbines.

What's interesting and unique about this particular project is that it is following a sort of traditional finance model. Meaning that there's equity and then there also will be bankrolling the development, the CAPEX requirements for the project.

So, we think that this is a pretty significant milestone sort of on the path to demonstrating the technology's maturity. We've convinced -- I shouldn't say we've convinced. The insurers and the financiers have been convinced that the technology is going to

perform as we've described.

And where it is today is the equity is complete, the equity round is closed. The bank that is in diligent stages, now, we expect final investment decision end of this year, roughly.

We are also involved with a -- really, I would consider it to be a high profile consortium in France, responding to the French tender which was released last year. As a part of this consortium, which features Engie, which is a big -- which was formally GDF Suez, a big French utility, we submitted our proposal for an up to 40-megawatt farm. And we'll hear results back from that process in July.

We've been working in Japan with partners like Mitsui, and Hitachi, and actually completed a design for a downwind turbine.

In Scotland, we have a potential to deploy a project in the 2018 timeframe that would also be roughly 50 megawatts. And we've had some what looks to be light stage investors come into that project, which we're hopeful that means that that actually gets deployed, as well, as well as the others that we see here.

The Wind Float Pacific Project is the DOE-endorsed project that we've been seeking to develop off the Coast of Oregon. For those who follow offshore wind

closely, will have seen that there have been some challenges with that project associated with securing our purchase agreements. Truly, in Oregon, power prices are quite low, as you know.

But one of the things that we think that that project has really done, you know, we invested a lot in understanding the environmental conditions that are relevant to that project. It was sited 18 miles from shore, off the Coast of Coos Bay, which is about 100 miles north of the California border, in about 400 meters of water.

In that project, some of that environmental assessment was informed by an environmental framework document that was put together by the Pacific Northwest National Labs, amongst some others, which described expected environmental outcomes from a project. I guess, a case study project in the Northern Coast of California.

So, we do think that there are actually a lot of parallels between what we have learned about the ocean environment in Oregon and what we might expect to see here, in California.

And then, quickly I'll say that we've also been active in Korea, Taiwan, in Hawaii, and are really excited about what we're seeing on the East Coast of the

U.S.

Next.

COMMISSIONER DOUGLAS: Okay, and I was just going to ask if you could get through the slides quickly?

MR. BANISTER: Absolutely.

COMMISSIONER DOUGLAS: Thank you.

MR. BANISTER: These are some of the organizations that we've worked with. There are a lot of big, recognizable names there. I think that this just indicates that the type of interest that there is in growing in floating offshore wind.

The next, please. And I think this is one more important point. We're seeing the Wind Float is really gaining acceptance by the Certification Classification Society. So, we've approvals in principle from ABS on two different occasion, Bureau Veritas in France, and then ClassNK in Japan. So, there's real class acceptance for the technology.

And that basically means that they trust that the structure is going to do what it's described to do.

Next, please. This is one that's always very interesting to people and that's, you know, where we see costs going for this. I think Walt, again, really described well how expected costs for floating offshore

wind, we expect it to decline. We absolutely see that. There's some real -- you know, things like industrialization and the maturation of the industry overall really will lead to significant declines in costs for these projects.

Next. Just to talk about the California market, in particular, I think that this is a really interesting market for something like the Wind Float, and for floating winds, in general. We've seen the quality of the wind resource and we know the progressive natured and even ambitious goals that the State has set for itself.

There are a lot of advantages that I won't read here, but that floating offshore wind can bring.

Next. And some that also have the potential to reflect the costs that aren't always considered. And I think, again, Walt talked about some of that as the floating offshore wind has the potential to be a complementary or play a mitigating role against the duck curve. Others include avoiding transmission costs.

In Oregon, one of the features that was really interesting to some of the players, like the BPA, was the potential for a black start from that project, and system resilience that something on the other side of the grid could provide.

Next. So, I'll just wrap up here. So, the Wind Float we believe is a proven technology. We're moving rapidly down the commercialization scale. We think that the product really reduces costs and risk in a way that make it attractive for markets like this, and elsewhere around the world. And we're certainly seeing other jurisdictions move towards floating winds.

We've got several pre-commercial projects going worldwide that can inform development here. And, increasingly, we see the U.S. as a priority market for us. As a California company, moving into the California market and seeing it mature is something that's important to us.

So, I believe that that is it. Yeah.

COMMISSIONER DOUGLAS: Well, thank you very much.

MR. BANISTER: Sure.

COMMISSIONER DOUGLAS: Alla, you're on.

MS. WEINSTEIN: Thank you, Commissioner Douglas, Commissioner Hochschild. It's a pleasure to be here. It's a please to be here even with the fact that now we have a request from the Governor Brown to form a task force that I believe is going to be extremely necessary as we move from technology demonstration development to actual commercial exploitation of offshore wind

resources.

I'm going to talk about Morro Bay Offshore Project, a gigawatt of installed capacity proposed project. Whether we can or cannot deliver a gigawatt will depend on transmission lines. Not onshore, but actually on the backbone.

The project is going to reuse the infrastructure that was available from the gas-powered plant. And at some point in that life it did deliver about a gigawatt of capacity. But we are not sure whether the lines still have that capacity in it. So, we'll find out as we move along.

The next slide, please. So, we'll talk about who is Trident Winds? You know, we kind of appeared out of nowhere. Trident Winds is a gathering of people that have been in the industry, in a collective experience of over 120 years.

I, myself, started with renewable energy back in 2001, with the Wave Energy Project that was the first in the nation to be permitted for FERC, for the installation of a wave energy demonstration project, together with the Makah Indians, in Olympic Coastal National Marine Sanctuary.

I realized later on that probably I needed to move to something that would be commercial a little bit

sooner than the wave energy. And that led me to the floating offshore wind. So, I was the founder of Principle Power, which the company I left about a year ago, and then I turned around and said technology great, wonderful, it's maturing, and now we need to do a project. And that's how the whole project got conceived.

The other partners of the company come from utility, Eric Markell was the CFO of Puget Sound Energy, and Brian Walshe is a consultant to the power industry, participated in design, installation, development of over 200 power plants. And Jeff Bodington has been in the finance of power industry for over the last 25 years.

The next slide, please. So, why did this project come about? Well, you need three elements for the project to become a reality. It's like a stool, you know, that has three legs. One, you need a market. The market is there. California has a demand. California has a law that requires 50-percent generation. And in our opinion, you can get there, but I think you can get there with offshore wind.

Technology readiness. Technology has to be mature enough. And as you heard from Kevin, and as I will talk about the Statoil's development, there are two

technologies that are now coming to be commercially viable, and though they're not viable today, they will be by the time we get to the point of needing them to be selected and constructed.

And then, you need permitting. The Power Act of 2005 identified Bureau of Ocean Management as a permitting agency for siting and leasing the ocean floor for renewable energy. And that gave us the process which then has been validated through the Wind Float Pacific as how, and how long will it take to get through the process.

That is what we're following. Those three elements were important and that's why we're starting the project.

So I ask a number of times why now? Why today? Why here? Why this? We, as humans, I think realize, and you, Karen, said it very well, we cannot -- we don't have time to wait. We need to wean ourselves from the fossil fuel and we need to move to electrical energy generation using renewable sources. And as transportation will increase its demand for electricity, we need to do something different than what we're doing today.

So, we really need to impact the climate on a good side because, otherwise, our shoreline is going to

change significantly. And while we need to do it responsibly and in a protective manner, we also have to realize why we're doing what we're doing. And that is because we need as much renewable energy as possible.

The next slide, please. Today, there is 11 gigawatts. That's 11,000 megawatts of installed capacity of offshore wind in Europe. That's at the end of last year. There is a ton of information available on how devices operate, how they work, what the environmental impacts are, and we should be learning from that as much as possible. We know where to get the data. We know all the agencies or companies that collect the data, where it resides. European Wind Energy Association is a wonderful organization that has a lot of information that can be used by just about anybody who needs the data.

But it's important that Europe gives us the examples of the environmental impacts.

On the technology side, on the floating foundation side, we now have 15 megawatts of installed capacity around the world. The leader was Statoil, with the installation of High Wind in Norway, in 2009. It was followed by Wind Float in 2011, in Portugal. Then, it was followed by two installations in Japan in 2013. And the last installation, which was already 7 megawatts

installation, was done at the end of last year, also in Japan, by Mitsubishi Heavy Industry.

All the other four devices carry 2-megawatt turbines. The last one already went to the 7-megawatt turbine.

There is one more semi-submersible structure that is planned to be installed in Japan. Actually, it's a SPAR, it's a semi-submersible. They were have a little trouble appending it, but I'm sure in the next couple of months we'll see one more 7-megawatt installed in Japan.

So, it's important to realize that we may think the technology's not there but, in reality, it is there. And by the time we're going to be done or through the permitting regime, technology will be ready for commercial exploitation.

Today, two of those principle or two of those devises have progressed through the demonstration prototype and so. So, I'm going to show you two videos, so that you have an idea of what those devices look like.

The next slide, please. Oh, I see. Okay, the first one we're going to see High Wind. High Wind was installed, as I said, in 2009, in Norway. We're having a little trouble.

COMMISSIONER DOUGLAS: And how long are the videos, are they fairly --

MS. WEINSTEIN: Two minutes, less than two minutes.

COMMISSIONER DOUGLAS: Excellent.

MS. WEINSTEIN: Well, maybe -- no, that's Wind Float.

(Video playing)

MS. WEINSTEIN: Just to give you a reference point of the size -- (inaudible) -- as Kevin said, this device is installed five kilometers offshore, including five meter (inaudible) -- it has been in operation for the last six years, almost, five years. And has survived significant storms. I think the maximum storm was about 18 meters, which was about 2 meters longer than the High Wind, which survived about 20-meter storms in Norway.

(Video stopped)

MS. WEINSTEIN: And, hopefully, we'll see the High Winds video. High Winds was installed in 2009. It's a different principle of operation. It's a Spar. If you remember the picture that Walt showed, there are three different concepts for floating offshore wind. It's a Spar, semi-submersible and a tension-like. And High Wind is a Spar, which is basically a long cylinder.

The stability that High Wind derives, besides its own weighted bottom, there is a --

(Video playing)

MS. WEINSTEIN: -- controllers that maintain its pitch motion below the prescribed, turbine-prescribed motions. Well, maybe we'll not spend the time. You can find the High Wind video on the Youtube. But it was important to realize that between High Wind and the Wind Float -- there it is.

So, you can see that the High Wind structure is different. The bottom is the piece which is long and submerged, and the top is the turbine that, when it was installed, it was fully assembled. Which is actually a different methodology they used for fixed foundation offshore wind.

(Video stopped)

So, both High Wind and the Wind Float are now progressing to the multi-device installation. The High Wind will be installed in the 30-megawatt installation, using Siemen 6-megawatt turbines, in Scotland. And that would be installed in about two years.

Wind Float would be installed about a year or two later, with 8-megwatt Mitsubishi Vestas Turbine.

The next slide, please. Skip a couple of them. the next one.

Okay, so the Morro Bay Project was conceived with the fact or the knowledge that though the wind resource is best on the north side of California, transmission line limitations and other impact or, rather, constraints probably make the project very difficult to do on the first time around.

So, we decided to go to a different location and we chose Morro Bay for multiple reasons. One of them is the plant that's no longer in operation. And the picture on the bottom shows the infrastructure onshore that we can reutilize for bringing to the substation that's available onshore.

There is an outflow tunnel -- I'm sorry, an intake tunnel that brings the tunnel, itself, to the power plant. And that basically gives us only about 200 feet of onshore or underground connection that we need to put to the PG&E substation.

The plant is now owned by Dynergy and it is going through a sale process. So, once that sale is completed, then we'll know who the new owner is of the infrastructure. But from what we know, they're not planning to reuse the power plant for power plant use. And so, that basically gives us an infrastructure that we can reuse.

What does it mean or why is it important? It is

important because we basically will not be touching the shoreline. We can come with the horizontal drilling that would allow us to go under the bottom of the ocean floor and provide the minimal disturbance to the shoreline, which is very important.

So the picture on top, if you stand where that big rock is, is going to be exactly facing the installation that we're proposing to install in a northwesterly direction.

The next slide, please. When we went through the site selection, we've done a lot of filtering, trying to identify where we can put the project. You think that the ocean is very large, but once you start looking at the bottom of the ocean floor, you're finding a lot of constraints.

And so those constraints kind of led us to be where we are. As I mentioned before, we're following the Power Act of 2005, which means we have to work through BOEM. And the BOEM regime says that they cannot permit projects or they cannot consider aliquots that are included in the National Marine Sanctuary. So, that told us that we needed to be outside the marine sanctuary area.

We needed a wind resource greater than 8 and a half meters per second, and that was available further

offshore.

We needed a distance for sure, as such that it will not be visible. I think we heard a lot today about visual impacts, about historical preservation, tribal constraints and so on. So, we chose the location such that if you are an average human, standing onshore, you're only going to see the installation, it's going to be on the horizon. Even though the structures are over 400 feet tall.

So, the site was also optimized for fishing grounds and habits, offshore birds and mammals. We did sit down with NOAA and we went through a lot of GIS layers to make sure that we are out of sight, out of mind, out of bird's path and out of mammal's path. And, we're out of shipping lanes, as well.

So, we did try to do as much as we could with the data that we had available.

The next slide, please. So, this is the actual location of the proposed installation. You see the sheeted area to the right, that is the Monterey Bay National Marine Sanctuary. And because we're going through the BOEM regime, we had to make sure that no aliquots were in the sanctuary.

We also wanted to make sure that we're not going to fall, literally, into the Diablo Canyon, which would

be below the 1000-meter contour, and that's the contour to the left of the installation. And visually, we had to be farther onshore, and in the 8 and a half meter wind resources, that put is about 33 miles offshore, as the crow flies, to the tunnel where we can put the cable.

So, there will be one cable coming to shore, the export cable. A big, very large cable carrying all the power. With a floating offshore substation that would be located at the most southeastern corner from which the cable would go.

And then each unit, that would be situated facing the wind, which is in the northwestern direction, will be interconnected with the inter-array cables.

The next slide, please. We are very fortunate -- actually, can you go back one slide?

If you look in the left-side corner, you will see a little dot. It looks like a drop, right? It's a buoy, it's an old buoy. So, that is very fortunate to have an old buoy sitting as close to the installation as possible.

And if we go to the next slide, we took over 27 years' worth of data for wind and wave from that buoy, plotted out to see what our wind resource is. And what's interesting is that it's a very directional wind,

to the northwest. And it's also peaking in the summer months. So, the wind resource coincides with the demand profile of PG&E.

And if we go onto the next slide, not only does it coincide with the profile, it also coincides -- it's also very consistent. So, looking at this slide, you will see that the red line is solar profile. The middle line is the onshore wind. And the top line, not the shaded green stacks, but the top line, is the offshore wind at this particular location, from that buoy.

So, if you think about it, the green bars is the PG&E demand curve. The offshore wind can satisfy, not only solve the duck curve, but actually it comes to pretty much satisfying almost full demand of PG&E.

And that means that that resource can be, you know, one of the most valuable resources available to utilities that need to satisfy certain demand.

The next slide, please. The visual distance to site, and whether the installation will or will not be visible, we used the Coast Guard Guide. And the Coast Guard basically says that if you are 23.4 miles, for that particular region, because they have guides for just about every reason, 400-feet tall structures will not be visible from shore. That's why we did what we did, putting it as far as we did, to assure that there

will be minimal visual impact.

The next slide, please.

COMMISSIONER DOUGLAS: Okay, and I'm just going to ask that you move through fairly quickly because we've, despite our best efforts, gotten more than a little behind here. Thank you.

MS. WEINSTEIN: Two slides left.

COMMISSIONER DOUGLAS: Great.

MS. WEINSTEIN: So, what happened? We submitted our unsolicited lease request in January. In March, BOEM determined it qualified to hold the lease. So now, BOEM is conducting its outreach. And in about July, August time frame they will publish RFI. If there is no competitive interest, then we move to the NEPA process, starting sometime in the fourth quarter of 2016.

If there is a competitive interest, the whole process gets delayed by about 12 to 18 months because it's going to move into the auction, competitive auction process.

So accomplishments today, we have a cooperation agreement with the City of Morro Bay. We've done extensive stakeholder outreach with just about every agency we could reach. But we did not do as extensive outreach with DOD, which we've now started to do, as of this morning.

And we submitted the lease request and we're also securing exclusive rights to the grid connection that's available right now.

The next slide, please. So, the offshore wind, one the jackpots in the permits. You heard from Bill, earlier, that they got about 28 permits for wave agency, we got 33. It includes every -- just about every State agency, federal agency, and FAA, and the local agencies, and tribal consultation.

So, let's go to the next slide. Skip that one, that's more of the permits. And schedule-wise, we're looking at the COD, or commercial operation date around 2025, with installation and construction starting around 2021, 2022.

It is a long process. It is the first time in California and we expect it to be interesting. And, yes, it is a rollercoaster ride and we do have our seatbelts on.

The next slide. California offshore wind is a very wonderful resource. There is a recent publication from NREL. You can take a look at the link that's provided. That basically provided the study of economic benefit to California. I'm not going to read the numbers. They're large, they're big and the resources is something I believe is very important to California.

So, with that, thank you very much for your attention.

COMMISSIONER DOUGLAS: Thank you very much. Thanks for being here.

Let's go to Jim Lanard, Magellan Wind.

MR. LANARD: Thank you, Commissioners. Thanks very much for having Magellan Wind here. My name's Jim Lanard and I'm the CEO of Magellan Wind.

And I have two colleagues here that I'd like to briefly introduce. Jeff Kehne is the cofounder of Magellan, and Dan Reicher, from the Stanford Center for Energy Policy and Finance is our senior advisor.

Missing here, but residing in Demark, is Henrik Stiesdal. He's retired from Siemens as the Chief Technology Officer for Siemens Wind Power. He holds about 700 patents and he's been a very senior collaborator with us, and we're working to move offshore wind forward with a lot of his really creative and brilliant ideas.

I've been asked to basically wear hats today to speak with you today. The first is to talk about lessons learned from East Coast developers, based on my development work for Blue Water Wind, Deep Water Wind, and then as founder and first president of the Offshore Wind Development Coalition, the trade group.

And then, secondly, I've been asked to talk a little bit about issues as a developer. Most of that's been touched by some of these other colleagues, so I'll be able to abridge my comments for that.

Just a couple of perspectives. In 1991, the first offshore wind turbine was put in place, in Europe. It's still operating. There are now over 3,000 turbines operating at 84 offshore wind farms, in 11 countries.

We're really behind. And we're behind because in Europe we've got national energy policies, country by country. We don't have a national energy policy. The closest we've come is President Obama's Clean Power Plan, being challenged in the courts.

But we do have a sub-national energy policy, led by Governor Brown, under two MOU, signed on by 128 jurisdictions, in 28 countries, and six continents. So, congratulations to the Governor for leading something that our Congress and Washington wasn't able to take on.

So, the other difference between Europe and the United States is that in Europe almost every country issues both the lease and the revenue stream that's necessary to finance the projects.

In the United States, the federal government is our landlord and each state is the revenue stream creator. So, in the offshore wind industry, we deal

with 32 different states that border on different coastal waters.

We recognize that California is going to be the toughest State in the country to permit offshore wind. And to the agencies who were here this morning, while you may hear optimism from me, we're coming in with our eyes wide open.

So, a couple quick lessons. First, for the federal government, then the state government, and then a couple for the developers.

Right now, the federal government regulates us, the Bureau of Ocean Energy Management, the same way that oil and gas is regulated. But we are not the oil and gas industry, obviously. We certainly expect close scrutiny on all issues related to wildlife protection and worker safety. And the regs and the applications of these regulations don't need to anticipate oil spills, however, and they do. So, we need to get some flexibility out of the federal government.

I'm easy to see how they want to regulate a wind spill, but until we figure that out, we shouldn't be regulated for an oil spill, it's not going to happen.

On the State level, I do want to congratulate you, Commissioners, for bringing the panel together this morning. I've been to federal/state task forces on

offshore wind, in almost all the states on the East Coast that have them. I've never seen a conversation like this, in any of those, where there was real interaction, collaboration, sometimes a little bit of competition among the different federal and state agencies. But really, really important that that continue and it continue when BOEM and the states actually form the task force. We're really appreciative that Governor Brown wrote the letter last week, to Secretary Jewell, about that.

And something that I mentioned during the break, that I think is really critical, is that there be some consistency and ownership by these State agencies. It's really important, I think. And if I were you, at the Commission, I'd love to see almost a mandate that the State agencies appoint people who are going to be the owners of that issue for their agency. And not say, oh, I can't go today, I'm too busy, can my colleague go?

Because there's such a learning curve here. I've been doing this for ten years and I've learned even more today that we really need people to have -- to start creating an historical, institutional memory, as you heard Alice talking about 2025. Before we go forward, we don't want to see a lot of turnover in that period.

Last week I was invited to testify before the United States Congress on the President's National Ocean Policy. I was asked to support the President's position on that. And I think there's some lessons learned from there that I'd like to apply very quickly.

We have multiple conflicting uses in the ocean, military, commercial fishing and aquaculture, tribal nation, cultural issues, archeological issues, shipping, commercial, and recreational, international and national commerce, recreational uses, energy and natural resources, sand mining, oil and gas, wildlife protection, sea birds, mammals, fish and other marine life habitat, and view shed issues.

None of these groups think they're taking too much of the ocean up. In fact, none of them's offered to give any of it back. If anything, they're trying to stake out some option for access to larger and larger swaths of the ocean. We heard it from the military. New defense technologies are going to need more space. Expanded shipping lanes are being proposed on the East Coast. Fishing and aquaculture want more, more protected areas are being proposed.

Some people would like to expand oil and gas. That's not something that Magellan Wind is going to stand behind. But now, offshore wind and eventually

marine hydrokinetics. So, the state/federal task force really has an important role to play.

For the developers, two things. One, logistics is more important than you can ever imagine. And one of the most important hires you'll ever make is a logistics specialist that can really manage all the moving pieces as you start planning, and developing, designing a project. Safety goes hand-in-hand with that.

And then, what we've seen on the East Coast, on messaging, the message we like to give everybody is never over promise on promise. Don't promise too low a price.

Number two, don't over promise on when you're going to start delivering power.

And number three, don't ever tell anybody what you think your environmental footprint is. Let those stakeholders decide for themselves what they think it is by you providing good information.

So, we need to all work together, with all the stakeholders, on this.

Quickly, let me just go to some perspectives, as an offshore wind developer in California. Jeff Kehne and I came out in October '13, to the University of California, at Davis, for an offshore wind conference. I was a speaker there for the Offshore Wind Development

Coalition. And we learned very quickly that offshore was not going to help the State meet it's 2020 33 percent. We didn't know that coming out. We were really impressed. And congratulations to the Governor's Office for getting that in place with the IOUs and the POUs.

But we did see the demand going forward. Alla talked about that. And we do believe that we can play a role in helping the State meet these aggressive goals.

So, our approach was, what can we do as Magellan that's good, and then what expertise will we be missing? So, our core competencies, in our group, deal with the ability to get leases, the ability to work with state agencies on permitting, off take negotiations, interconnect and transmission.

But we also know what we don't know, which is we don't know engineering and design. We don't build things and we don't do operation and maintenance.

So, when we started Magellan in January of 2014, we started looking around for those experts. And in Europe we found a company that we've been working with since then. It's Stat Oil. I want to thank Alla for doing some of the commercial promotions for us, so we don't have to do it.

I want to introduce my colleague Mike Olsen,

from Stat Oil, who's here. Mike's been out with us to California many times. I think both of you have had a chance to meet Mike.

Commissioner Hochschild, you asked about the sway for the turbines on the semi-sub. I can't address it. But on the Spar buoy, the biggest sway that we would expect is about seven degrees. That's built within the tolerances of both the turbines, the blades, and the stress on structure that we feel for the Spar buoy. And we've not exceeded that with the Stat Oil High Wind, off of Scotland. That's in 600 feet of water.

As Alla said, Stat Oil is moving forward with five, 6-megawatt turbines off of Scotland. That will be a commercialized project in 2017, just next year. And we expect that you will be taking trips over there to see, firsthand, what offshore wind looks like in floating foundations, in deep water. And we think those fact-finding trips are going to be really interesting.

We also -- I said we come in with open eyes with this, and we do. We look at some of the market uncertainties and we're looking to you, and other State agencies, to help resolve some of these questions.

I'll just give you five or six. How does the duck curve get addressed? What's the timing and cost of

energy storage? What's the evolution of regionalization? We started with CAISO, with the Energy Imbalance Markets. Didn't really good success. SB 350, now, has called on CAISO to work on a draft plan for regionalization of the grid. We've seen a draft of that, now. There are some very interesting data points in there. That may affect how the market gets addressed from inside the State.

How do the renewable energy buckets get addressed? SB 350 follows the earlier protocol of keeping most of this in-state generated or directly interconnected to the grid. How does that get resolved?

We heard Commission Hochschild also ask about the demand of electrification, including electric vehicles. That's going to create new demand.

And then, what's the offshore wind LCOE? And we're very excited about some of the technology we're looking at, that we think that it can really bring it down.

So, let me talk about something that I think was discussed a lot in the earlier sessions today. And first, let me say that with Stat Oil we're investigating, we're understanding the market. We've had these numerous joint meetings. We have found that in most of the meetings we've had with the State

policymakers, from the Air Resources Board, to the Utility Commission, to the Energy Commission, to CAISO, to the Governor's Office and the Governor's Council. In our rollout of this, we were really making first impressions because people on the West Coast weren't thinking of offshore wind because the technology, floating foundations, wasn't being considered because it wasn't close to being commercialized.

It will be truly commercialized next year with the Stat Oil Scotland Project. And we've started to work, again, with all of these different State policymakers to introduce them to that. And we appreciate you holding this hearing today.

And we couldn't have done that without Stat Oil because we don't bring the technology and the expertise of building, owning and operating. So, we're delighted to have that relationship.

So, the unknowns are what are the effects, what kind of environmental effects. A lot of discussion on that. And for preconstruction studies, the BOEM regulations will require that we spend at least two years counting every bird we can find, every marine mammal, every type of marine life under the sea that we can find. That's millions and millions of dollars of studies.

Now, we're not just going to go out and do that. So, we've already met with the Center for Biological Diversity for Point Blue, some of the more national groups, like NRDC, EDF, and talked with them about collaborating to help us figure out what the right studies are. And so we've asked these groups, what data do you have that you can share with us? What are your data gaps and what do you want to know?

So that we're going to come up with study protocols and then we're going to take it back to the people, some of whom are likely to be litigants against us and say, look, here's our plan. Tell us what's wrong with it? And maybe you can even advise us on who we should hire to do those studies that we have to present for NEPA and CEQA review.

And we'll do that because we are interested in one thing, reducing risk to ourselves from a business point of view, and reducing risk for an environmental point of view.

Then we're going to do something else that I'm really proud of and we've worked this out with Stat Oil. We're going to make post-construction monitoring available to any state and federal agency using our powered systems out at the site to power data collection systems. Whether it's radar, sonar, something in the

water, figuring out how to assess bird strikes, for example. You can't count birds in the ocean that have been hit because they're not going to be there. But there are other ways to do this.

And the reason that we want to share all the -- and we've made this offer and we've extended this offer to the national and regional environmental groups. Let's collaborate, let's all look at this data. Because we're not here to build one wind farm. And the industry's not here to build just one of Alla's projects, or Trident Project or one Magellan Project.

We're here to serve a purpose. From the business point of view, again, it's to build multiple wind farms. From an environmental point of view, it's to contribute to the fight against climate change.

So to do that, with post-construction monitoring we can figure out if there are unintended consequences after the first, and we can figure out what the mitigation measures are. There might be adaptive management. I'm not committing to this. So, I want to be on the record, I'm not committing to this.

But our floating foundations are anchored. If we have a micro siting issue someplace, those anchors could be moved and that turbine could be towed away. That's different from a land-based turbine. Fixed, it's

fixed.

And then, also, we want to work with the utilities. On the East Coast, I negotiated the first offshore wind farm PPA with Delmarva Power, in Delaware. It was a slugfest. In fact, the Utility Commission had to appoint not only a facilitator, but a moderator and a peacemaker because it was so tense between the two.

We learned our lessons from that. We eventually kissed and made up with the utility and, eventually, the Blue Water Wind Company that I was working for was bought by NRG, and they decided to let that PPA lapse.

So, we understand the first movers are going to be high. But we need to be able to show you and everybody else in the State that projects 2 through N won't be.

So, I have three challenges that I think we need to address. For the developers, we have to convincingly make that we can reduce our cost.

But State policymakers and regulators have an obligation, too. And your obligation is twofold. One, to make a case to the development community, these are really, hugely expensive projects to develop. Not just to build, but to develop. That the State is open for business for offshore wind.

And number two, that you can create a regulatory

framework that will be established to allow offshore wind to move through the decision making process. We're not asking you to pull any punches. We're not asking you to be anything less than the most stringent State in the nation permitting offshore wind. But we need to see a regime. You don't have one, you shouldn't be expected to have one, we're just commercializing the technology.

And then to developers, to the federal government and to the state government, we all have to work closely with all the other stakeholders. Because if we don't, there's just going to be sand thrown in the air. We're going to see litigation that's not necessary. Instead of moving to the benefits of offshore wind, 400 construction jobs over two to three years, for fabrication, installation, eventually manufacturing, 40 maintenance and operation jobs for 20 to 25 years.

And environmental benefits that I'm really proud of. I've spent my whole career in energy and environmental issues. A wind farm will power maybe 175,000 homes and will avoid 1.3 billion pounds of carbon dioxide emissions each year for traditional utility-scale wind farm.

So, we're really appreciative that you let us come today and look forward to partnering and

collaborating with you and your colleagues. Thank you.

COMMISSIONER HOCHSCHILD: Thank you, Jim. You know, as I look at the potential for the resources, and there's obviously pros and cons to any new technology. And, you know, I would say dealing in a marine environment, generally, is a challenge. Obviously, servicing the turbines, themselves, is a challenge.

But one of the potential benefits is just the size of the turbines can be much, much larger, right? Your typical wind turbine on land today in California is, you know, a megawatt and a half or 2 megawatts. And I know, Alla, you mentioned getting up to 8 megawatts.

And, obviously, there's a real economy of scale there that's possible because you don't have to have the constraint of trucking the equipment to the site. You can take it out in a large ship.

What is the sort of theoretical size limit for the turbines that we could eventually get to or are we close to that, now. What would you say to that?

MR. LANARD: Well, I turned to my expert, Henrik Stiesdal, who's working and advising with us. And he, at Siemens, he was responsible for designing the 10-megawatt turbine. In fact, the first offshore wind turbines in the world are Henrik's turbines. His design. First at Vestas, and then at Bonus Energy, and

then at Siemens. So, he's designed the 10. He sees -- and others talk about, behind the curtain, 12-, 14-, 15-megawatt turbines. But it's all dependent on the wind regime. And there are some counter intuitive arguments that in some cases smaller may be better.

So, what we want from an offshore wind farm, I believe, is to be away from migratory flyaways. So, we want to be at least 15 miles off the coast. We want to, obviously, pay attention to the pelagic species that are out there. And we want to make sure that we're addressing view shed issues.

I was really touched by Thomas' comments about tribal nations and the cultural values that they attribute to so much of the ocean on land, at the coast, and further out with the pathways to the sunsets. These are very important issues. But distance will help with that and the size will depend a lot on the wind regime.

COMMISSIONER DOUGLAS: Okay. Well, thank you very much. Your comments are really helpful, thoughtful, and appreciated.

Let's go to Doug Davy, with CH2M Hill.

MR. DAVY: Good afternoon. Thank you, Commissioners, for the opportunity to address the workshop. I will be brief.

And Kevin Banister apologizes he had to leave

the meeting.

Most of my career I've been a permitting project manager for energy facilities of all different types, including thermal, thermal solar, solar photovoltaic, onshore wind, and also wave energy projects, including the PG&E Humboldt Wave Connect Project. And now, we're starting permitting again on the Cal Poly Cal Wave Project.

So, much of what I've said -- I just want to say what a terrific session I think we had with the regulatory agencies today. That was really helpful. It was really good to see that.

And, you know, some of what I'm going to say was covered there and so I'll just go through it a little more quickly than otherwise, and kind of hit the high points. But which, some of the same themes are collaborative process, regional planning and baseline data. So, that's kind of my Haiku.

But first, I just wanted to talk very briefly about some issues that are unfamiliar in ocean energy permitting, just at a very high level. Here's some things that come to the fore for ocean energy that we're not quite as used to seeing. And they're not brand-new issues. But they're somewhat new and they're prominent issues with wave and offshore wind.

And Bill Foster mentioned some of these, also, so I'll just list them briefly. And there is -- the West Coast wave energy permitting experience here is the Wave Connect Project, ongoing Cal Wave, the Ocean Power Technology's Reed (phonetic) Support Project, and Alla's at Morro Bay. And currently, the Pacific Marine Energy Center is undergoing permitting up in Oregon.

So, what are some of these issues that, really, the agencies are kind of grappling with, and the owners that we haven't really encountered. There are some uncertainties and, you know, so there are concerns about the uncertainties, how do you resolve them.

EMF, electromagnetic frequencies, one of those power cables. Power cables have been around a long time. But we know that there are a few species of marine life that sensitive to EMF and can detect it. What we don't know is what's the effect on their behavior.

Biota interactions with devices and cables. Do the whales hit the cables? All of the offshore wind, floating offshore wind, wave energy converter devices are all moored with a catenary mooring, with some pretty big cables. You know, are the whales going to bump into those and become entangled, or other marine life?

Does derelict fishing gear get caught in the

cable and then diving birds get caught in that?

For wave energy converters, in particular, the purpose of the device is to remove energy from the waves. So, you kind of have the question, really depending on how close to shore it is, is what happens to the shoreline? What happens to geomorphology? You're removed some energy. Sediment transport up and done.

And also, you have surfers who want to surf the waves, you know, and believe me, they're concerned about that.

Competing uses on land. Of course, there may be competing uses in the marine -- competing uses of the marine space. The most important one that we've found so far is commercial fishing. That's a really, really big and very, very important issue.

Then there's some other issues here that are familiar issues from terrestrial permitting, but it's a different medium. It makes them look a little different. So, obviously, there are marine species that are listed in the marine habitat and you have that dimension of the ocean that's really different. You have species that migrate twice a year from Alaska. The gray whales, for example, to Mexico and back. You have other whale species that migrate all across the Pacific

Ocean.

It provides some different challenges in addressing the potential effects of a project.

Noise is a -- marine hydrokinetics can generate noise in the water. And so, you need to address the way in which noise travels in water, which is very, very different. It travels faster. It's actually measured in reference to a different sound level pressure in the water.

And we're just beginning to learn how marine biota perceive noise and what the thresholds of harm might be. So, that's kind of an ongoing issue.

Visual resources always is important. It's interesting to hear that offshore wind projects are siting very far out so that they won't be seen. And the difference is here, you have sensitive observers, but they're all on the land and the devices are out in the water.

We've heard a lot about solar today and, Commissioner Douglas, you talked about solar, kind of what I'm calling the sol rush or the sun rush.

ARRA funding and the Renewable Portfolio Standard really fostered this pulse of solar energy development. Well, what does that have to do with marine energy?

There are some interesting similarities. I think with solar in the desert and marine renewables you have a wilderness setting, it's kind of similar in that way. You have public ownership of the resource, by and large, and you have a vast, untapped energy resource.

And we've heard -- I'll go through this quickly because we've heard a lot about it today and I think it's very, very important.

The public policy initiatives that came forward in response to the sun rush were things like interagency, effective interagency coordination. We had the Renewable Energy Action Team. The Energy Commission and BLM came to an agreement, an MOU, about how to do a combined environmental permitting. And, you know, you had some struggles with that, but it worked out.

And you're probably glad that you went through that, rather than everybody, rather than the CEC and the BLM going their own direction that way.

Another, long-range planning is another one. The Solar Programmatic EIS looked at the entire southwestern United States. And it was an initiative to identify where solar energy made sense on public land, and where the transmission corridors might be, and where the key exclusion areas might be.

I really liked what Mr. Chung said, the way he

put it, landscape-level planning, identify areas of opportunity and identify areas of concern.

Also, proactive regional environmental analysis with the Desert Renewable Energy Conservation Plan. We've heard about that a few times today.

And, you know, really the point is we've got to start now. Those public policy initiatives are effective, they're going to be essential. There's a lot we can learn from the sun rush. And some of this is already going on.

For example, I really commend BOEM and FERC. We haven't heard a lot about the FERC process because there's been a lot of talk about offshore wind, and FERC isn't involved in that. That is the exclusive authority of BOEM. But FERC has exclusive authority to permit wave energy projects. Not to lease. And BOEM has the exclusive opportunity to lease. So, you have overlapping jurisdictions. And really, that's where the friction comes in, you have overlapping jurisdictions.

And there are places where we have overlapping jurisdictions and we heard a little bit about that. And developing the collaborative process to work through that is absolutely key. And BOEM and FERC did that. They came up with -- before they came up with their agreement on how to permit marine hydrokinetics, if you

looked at the regs and you really read them, to do a wave energy project you might have had to do NEPA three times for one project.

And they took all of that away. They have a great structure for cooperating. And BOEM does leasing and FERC does permitting.

There's been long-range planning. You've probably seen it on the East Coast. To some extent, I mean just developing the wind lease blocks is a form of planning.

Oh, and then the regional baseline data gathering, we heard a lot about that. As a permitter, you have to be able to say we know what's out there, so that we can -- the agencies can have confidence that we know what the effect of the project is going to be.

And, you know, data standards is really a very important issue. How do you set data standards? The data gathering that's going on is really good, but there are some major gaps. The CDFW, for example, does regular transects, gathering ocean data.

And the USGS has been doing the Sea Floor Mapping Project, which is another thing I really want to commend because it's really phenomenal what they're doing. They are mapping the entire territorial sea. And they're doing multi-beam scanning maps. They're

doing a sub-bottom profiling. They're developing habitat maps from that. And I think the Ocean Protection Council is funding a lot of that.

So, you'll be able to say, yeah, I know what's on the sea floor here. You know, they're even taking videos of what's down there, the ground truth, and posting those.

So, to summarize, that's where we should be going, a more collaborative approach to regulatory permitting, get more baseline data. Because, for a particular project, you're not -- you know, a project owner shouldn't be responsible for gathering baseline data for a region. Yeah, for their site, maybe, and the rest is up to the rest of us, I think.

And maybe we can move towards long-range planning here, in California. Thanks very much.

COMMISSIONER DOUGLAS: Well, thank you. Thanks for your comments and your observations, especially tying back to other -- to themes in the workshop and experiences with the solar projects. Which I do agree we can learn from.

And thank you for offering a Haiku, the second Haiku of the day. And we'll see if we get any more on our last panel.

Beginning with Chris Shutes, with the California

Sportfishing Protection Alliance.

MS. RAITT: Actually, Commissioners, we just need a moment for, I think, folks to come up to the table.

COMMISSIONER DOUGLAS: Oh, of course. Why don't we take a moment for folks to come up to the table. Sorry, Heather. You know, these important details.

I'll just say, generally, as our panelists get settled, we asked a number of stakeholders, from a fairly broad range of perspectives, that we know are very interested in this issue, to provide us not specific reactions to any particular project, for example, but general comments about issues of concern, potential opportunities, potential collaboration. You know, generally, whatever you would like to raise towards the general issue.

And with that, if we could start with Chis Shutes, thank you.

MR. SHUTES: Hi, thank you very much for the opportunity to speak to you today. I'm Chris Shutes, with the California Sportfishing Protection Alliance.

Let's go to the next slide, please. I'll sort of explain who I am with the slides, and some of my background and my interest.

CSPA is a nonprofit that was formed in 1983 to

represent anglers in regulatory processes. And that's, I think, going to be one of the themes today is that many of the sportfishing folk who will be affected by some of these offshore projects are not particularly interested in or proficient in regulatory processes. And that makes it challenging, especially in light of the fact that this is a new set of issues, without clearly defined regulatory processes, sort of different and overlapping jurisdictions, as one of the folks just mentioned earlier, in the previous panel.

And so, it becomes a challenge for those of us who speak on behalf of many of the stakeholders to try to figure out how to crank up and be effective.

CSPA is part of the California Hydropower Reform Coalition. And I'm going to talk a little bit about that and how that may have some application. And we are very interested in and active in hydropower relicensing that's regulated by FERC. That's part of the connection, too.

The next slide, please. I am the FERC Project's Director for CSPA. I've been doing it since 2006. Prior to that, I was involved as a volunteer, for five years, in hydropower relicensing. I'm the Vice-Chair of the Hydropower Reform Coalition in California. And I'm on the Steering Committee of the National Hydropower

Reform Coalition.

I'm also a lifelong California fisherman. I have fished oceans fairly extensively. Not as extensively as I'd like to. And I've fished in most of the rivers and streams from Merced north.

The next slide, please. So, when we're dealing with hydropower, we're dealing with a mature technology. We're dealing with, basically, things that are pretty well known. We have two different kinds of basic structures to hydropower generation. They're stated up there. And it's a known entity.

The next slide, please. Now, in 2006 to 2008, and those dates might not be exactly right, but roughly that's something we saw. We saw a new interest, for those of us working in FERC, in hydrokinetic energy. And this was defined as wave, tidal and ocean current generation.

There were a lot of untested technologies. The economics were very unclear. And it was also unclear who would regulate ocean generation. FERC and the Department of Interiors, Minerals and Management Service, sort of had a competition going.

And it was hard for us, who were interested in this, also interested in the river part of it because some of the technology was similar, and we work in

rivers primarily, to understand sort of how all of this was going to shake out.

The next slide, please. Well, what happened was that in a lot of senses the first generation, if you want, of hydrokinetic energy didn't really pan out. We were interested in many of the preliminary permits that were filed for ocean energy projects. A lot of them were filed in -- several of them were filed in Oregon. I think one was filed in California.

Preliminary project permits are issued sort of a site banking, on a short-term basis for FERC projects. And that offered us a heads up that something was going on, but it also created a concern, and we didn't really know how -- we didn't really have the capacity or resources to be extensively engaged. But we were concerned that some of the marine resources that we were trying to protect in rivers might be affected when they got to the ocean.

In 2009, as some folks have talked about before, DOI and FERC created an MOU and divided up the jurisdictions. It's listed up here. FERC can issue licenses and exemptions for hydrokinetic types of projects that are under 10 megawatts.

And so, that's sort of where we come in. And basically, they're proposing to use the integrated

licensing process, which is the same as we encounter in hydropower.

DOI retains its authority to do leases, easements, rights of way for offshore development. And FERC has, interestingly, jurisdiction in state waters.

And one of the decisions they made at that time was that FERC would cease to issue preliminary permits. And I think the rationale there was that the leasing part was devolving to DOI and, in some sense, FERC would be kind of making a quasi-lease, or staking out some territory, if they issued a preliminary permit. So, that part goes away.

Sort of the opposite of what I said before or a different way of looking at it, is that now we don't sort of have a heads up in the same way. Whenever something is proposed at FERC, it comes across a docket. We can see it, we get notification. And those of us, who live in that world, have a -- are noticed. That's something that may not happen here in the same way and we're all going to have to get used to finding out sort of what's going on in different fashions.

The next slide, please. In 2012, MMS had been superseded by the Bureau of Ocean Energy Management. But the MOU continued. It defined sequencing. First, you have to get a lease and then you can apply for a

license.

And I should say it's not just a license, there's also, in FERC world, something known as a license exemption, which is something that used to be under 5 megawatts, but I believe the limit is 10, now. We'd have to check that because it's changed recently, in the last couple of years.

The non-marine hydrokinetic projects need to file a construction and operation plan with the Bureau of -- with BOEM or with BOEM. And hydro projects have to have both. So, if you have wind and some kind of kinetic generation, wave, you'll have to get a license and comply with the BOEM requirements.

And the guidelines also allow limited pilots and test projects without having a FERC project license or exemption issued. So, that's something that's sort of a gray area and that's done on a case-by-case basis. I'm not aware of whether that's happened, but it's something that we may have to deal with.

So, moving on to the next slide, one of the things that's really good about FERC is that we have a really clearly defined process. And one of the concerns that I have now, looking at this new ocean energy, the interest in ocean energy, is that it's becoming somewhat more clear for developers, in some regards, than it is

for advocates of the public interest. The agencies may be catching up.

But for those of us who are working for nonprofits or who have a specific interest in a specific project, it's pretty hard to understand even which entity we're going to be dealing with in terms of regulation, under what auspices we would be collaborating, if we were collaborating with anybody, and what our role would be.

FERC tends to define a greater role for agencies than for NGOs and others. And it's been by scraping and scrabbling, and gaining experience, and working in a coalition that's organized, funded and effective that many of us have been able to engage in FERC and kind of put us somewhat close to an equal footing with the agencies.

But that is -- when we're starting from scratch in a new process, that's going to be more challenging for us.

In addition, there are really clearly defined roles for agencies within the FERC process, for hydropower. The Forest Service and the Bureau of Land Management have mandatory conditioning authority for areas where a project is on their land, and there's an ongoing fight about how far that extends. But at least

it's a pretty firm thing. And if the agencies require a condition in order to protect some aspect of the environment or recreation, the FERC has to include that in the project license.

It's not so clear that we have anything like that here. And so, the agencies are kind of putting in the position of making up their authorities as they go along. And exactly how they will be able to effect new projects is a lot less clear.

The same thing is true with other agencies, like the Department of Fish and Wildlife, that have advisory authorities. They don't have mandatory authorities but, nonetheless, FERC pays pretty close attention to what they say. So, one of the concerns that we have is that we don't have these defined roles.

Some of the folks in the earlier panels, and I didn't catch all of them, but I caught quite a few, talked about landscape kind of views. One of the problems for recreational fisherman and fishers, in general, is that they don't have a landscape point of view. They have a very limit point of view and in terms of geography. It's not cohesive. And they won't have any kind of institutional memory or regulatory experience coming into these kinds of processes, as they develop, as new projects are proposed and permitted.

The next slide, please. So, when we're dealing with hydropower, we're talking about impacts to aquatic species, function, recreation that have been observed for a century, and that we've studied intensively for the last 25 years. And there's basically a suite of studies. It's not exactly the same in every one, but there are accepted types of studies and subject matters that are included in FERC licensing. It's not exactly like Mr. Phelps, and his cast of characters that he flips through and goes, okay, well, we're going to choose this guy, and this guy, and this guy, but it's pretty defined.

For offshore energy, we don't even know what the projects are going to look like or what the technology is. Now, many of us in hydropower understand how the system works. We understand how it all fits together from energy, to water, to grid, to the river, all those different things. When you work on it for a long time, you get to understand the system pretty well.

But we don't have that kind of legacy in these new technologies. And we don't even know what studies we want to propose in order to evaluate impacts.

The next slide, please. And one of the disadvantages of going last is that people have already talked about a lot of the things that I could mention

here. There are some pretty obvious impacts. Many folks, and to their credit, have already talked about many of them, and anticipated them.

I think one that's important to highlight is the fragmentation of accessible areas for recreational and commercial fishing. Not all fishermen are wild about the marine protected areas. There's a lot of disagreement about whether it's a good thing or not.

And one of the concerns, frankly, is that you need to know with a GPS, or something, where you are and whether you can fish there. Access, and as a correlator to that, navigation are restricted. And it's becoming more and more complicated to simply go out in the ocean and go fishing.

Another point that I think it's important to talk about, and I'm sure my colleague from PCFFA will discuss this a little, is that we're already dealing with fishing industry that's weakened. And that's really gone downhill in the last few years. That's true of recreational fishing, too.

The next slide, please. So, again, there's a number of impacts we know about. What I hear from my colleagues in Washington, who followed this pretty extensively in the earlier period, is that noise is really a concern and vibration of machinery.

It's not always the obvious things that are going to be a problem. And when we're dealing with something new, we just don't know what we're going to be looking for. And there's a big concern that by the time we figure it out, it will be too late. And how you can go back and undo, or get a redo is pretty hard to understand.

The next slide, please. Visual quality is also something that is obviously a concern. I'm kind of heartened to hear that a lot of the developers are looking at areas that are quite far offshore. I think that will help with a lot of things. I don't know, there may be unintended impacts of that. But from recreational fishing's point of view, I think that will probably help.

The next slide, please. So, I was impressed by the woman from the Morro Bay Project, who talked about optimizing her project, and I think there's a lot of good things to be learned from that.

One of the problems, though, is how many projects can you optimize? If it's you're the first person or entity that's sort of doing this, that's one thing.

One of the documents that I reviewed, earlier, suggest that there might be as many as 6,500 different

sites or projects that may be developed off the California Coast. It gets harder to optimize. Just like with hydropower, boy, some of them got the really good, choice spots. And now, people are scrambling around, looking for little things that have a marginal benefit. It gets harder to optimize once you have a lot of development.

One of the things FERC really isn't very good at is addressing cumulative impacts. And dealing with the landscape kind of view, in a regulatory process is not always an easy thing to do. So, there is a concern that I would have that if projects are licensed or permitted sort of one by one, FERC at least has the propensity to look at just that one project and say, we don't want to look at the rest. That's not our concern right now.

And it's left to NEPA or CEQA to deal with that. But in terms of a strict regulatory process and defined criteria for evaluating those things, that isn't really part of the picture as a general rule.

And looking at this from the perspective of a fisherman going out and trying to figure out where he's going to be able to go, and what the impacts are going to be as time goes by, and how to respond to different proposals, that's going to be a real challenge.

The last slide. So, the ocean energy is a new

technology and the impacts aren't that well understood. It's news to me that there's this great interest in offshore wind. That isn't something we'd heard of much before. And partly, that's my bias from living in the world of FERC and FERC wouldn't regulate that.

But partly, it's because things are changing. And as they change, we may find that both the regulatory processes may have to change and that first generation technology may have impacts that we really haven't thought about. So, addressing that kind of thing is really important, particularly in a time when opportunities and resources available to fishing, and people who fish, have become more and more challenged.

Thanks very much.

COMMISSIONER DOUGLAS: Well, thanks for your comments. Thanks for being here. And I do want to give you at least some small amount of reassurance that the purpose of this workshop is to get ahead of the curve, so to speak. And so, I hope that we will all have an opportunity to do that and do that collaboratively.

So, the next speaker on this panel is John Mellor, with Pacific Coast Federation of Fishermen's Associations. Thank you for being here. I know it wasn't easy to get here for you, and I understand that a lot of your members who might have come are out fishing.

So, thanks for being here.

MR. MELLOR: Yeah, thank you very much. Yeah, I literally got in from crab fishing night before last. And I had a -- as soon as I got in phone range I had a text message asking me to come and talk, so here I am.

It will be extremely short. Obviously, I didn't have time to really prepare anything except for stuff that I just had in my mind.

And I did get a crash course in the finer points of overlapping agencies. And I was trying to follow it all and I think I sort of got it.

Just quickly, I just want to say there's, you know, fishing communities in every major port on the West Coast. And, you know, every community, which also includes not just fishermen, but processors, wholesalers, restaurants, fish markets, the people who eat fish throughout the country and the world.

Each fishing community has its own specific cultural identity. You know, there's people that have been doing it for two, three generations, families and that sort of thing. And each fishing port has its traditional fishing grounds and places that they rely on in order to be able to make a living.

And, you know, we've had over the years lots and lots of closures that have sort of been put on top of us

that make it very difficult. Because, really, for fishing to be sustainable, there has to be kind of a diffusion of effort. You can't just force everybody into one area and expect it to be viable for them.

So, you know, we have various kinds of closures. There's the marine protected areas, which are fixed in perpetuity. They're there forever, I guess. And, you know, they were voted by the public, they want it, and so we understand that.

And then there's also the Rock Fish Conservation Area, which was a result of the ground fish disaster. And that goes from -- it's the fathom curve, but it goes from 30 fathoms out to 150 fathoms. So, you know, there's certain types of fishing you can't do there. And there's certain types that you can. However, we're required to have a vessel monitoring system, you know, basically a satellite that shows where we're at all the time, if we want to transfer through these areas.

And so, it's all very complex. And, you know, you get used to it and you learn how to deal with it and do what you have to do.

But I mean, just quickly looking at some of these shapes on these maps, where they want to put all these big rigs and that sort of thing, you know, to us that just represents more closed areas. Because, I

mean, it's hard to really imagine us being able to fish around those rigs because, you know, a lot of our gear is bottom contact or various up-and-down in the water column.

So, if they put like a 100-square-mile area below the Monterey Bay Marine Sanctuary, you know, that's going to have a heavy impact on the coastal communities that depend on that area. Like, even though it's what has been called further offshore, I mean that's still on the continental shelf. And so, there's various fisheries going right out to the edge, where it drops off into the abyss.

And, you know, a real important one is the Sable Fish Fishery, which is -- we have to fish outside 150 fathoms, but it goes all the way to 500 fathoms. So, I mean, there's no way that we can fish around those rigs, in those fisheries. Because like, you know, for example I fish long lines for sable fish. I have permits for that. And, you know, one of our sets is about three or four miles long. And, you know, we fish around the clock. We fish at night in the dark.

And, I mean, you can sort of know where those things are. But I mean, if you snag one of them, you have the potential to lose eight or ten thousand dollars just in the blink of an eye. So, obviously, we couldn't

fish there, even if it was open. So, you know, I guess we're really, really concerned about that. That, you know, one more layer of closure, it just reaches the point of absurdity for us. And, you know, we're really struggling.

But then we also -- you know, we're walking a fine line because the effects of carbon emissions and that sort of thing have a huge effect on us, you know, in terms of ocean acidification, which I just read a paper where they did a study that it affects the larvae of crabs, and the survivability of the larvae of crabs. And, you know, Dungeness Crabs is the only fishery that really is keeping everybody going on the whole coast. It's the most important fishery on the coast.

And, you know, we know that we just had this big disaster with Domoic acid, which basically took away about half of my yearly income this year. And that's also an effect -- I'm pretty sure it's an effect of climate change and carbon emissions, as well. You know, just the severity of it.

So, I mean we understand all these issues. But the reality of more closed areas would have a more immediate effect, I think, and be very hard for us to support.

And, you know, another thing that occurred to me

in looking into those wind turbines is, you know, we've done a lot of work to try to mitigate sea bird mortality with our long line fishery. I did some collaborative research to try and prevent catching albatross and that sort of thing. And, you know, it's voluntary.

But, you know, basically we were told that if three of this one species of albatross, called short-tailed albatross were taken, then the entire West Coast ground fishery, the whole fishery would be shut down. It would trigger an automatic shutdown. So, I can't imagine. And, you know, the albatross are cruising up and down, out in that depth range. You know, anywhere from 10 or 15 miles, all the way out to Hawaii, basically. So, how are they going to prevent these things from killing a few short-tailed albatross and what would be the ramifications of that?

Yeah, I mean, I think that's pretty much it. I'm just trying to wrap my head around all this and --

COMMISSIONER HOCHSCHILD: If I could speak to that. I just want to, first of all, thank both of you gentlemen for coming here and sharing your perspective. I'm a fisherman myself. I grew up fishing. I do deep sea fishing every year with my daughters. And, actually, last time they both caught salmon and I did not, which they have not let me forget.

(Laughter)

COMMISSIONER HOCHSCHILD: But I will just say, you know, I think if there's one thing that all the stakeholders here can take away is just an appreciation of just how multi-dimensional this challenge and this subject is. We're dealing with, you know, Navy roots, we're dealing with Coast Guard, we're dealing with tribal issues, and concerns about fisheries.

But I would just say, at a high level, you know, in general the trend in energy generation in California is moving from high impact to lower impact. And, you know, the biggest impact that I can see on the fisheries have been the effect of large hydro. And you look at some of the very recent successes in the Pacific Northwest, where some dams are being removed. I think that's clearly a good thing.

I think to the extent we have more non-large hydro renewable resources available, it will help. And I guess, you know, my hope going forward is that all of us can participate in good faith and have a real honest and comprehensive discussion where the goal is really shed more light, than heat, on the issue. And really understand, precisely, the impacts.

Because every form of energy generation does have impacts, but there are gradations. And that's what

we're going to be getting into as we dig deeper into this.

COMMISSIONER DOUGLAS: So, I just -- I have a follow-up question. And, you know, I really appreciate your comments on just seeing the impacts of climate change, and those are economic impacts, too. And yet, there are people trying to make a living and they're carrying on cultures and traditions. And it's how do we make this sustainable.

And I wanted to ask, because you made a number of comments about -- that I just wanted to make sure that I understood. Because I interpreted what you said as saying that in shallower water there are more concerns, it's more likely to interfere with fisheries compared to, say, some of the floating turbines that might be in deeper water.

But I wanted to make sure that maybe I wasn't taking that away right. Like, if you're talking about something that's 15 miles offshore and it's, you know, deep.

MR. MELLOR: Yeah.

COMMISSIONER DOUGLAS: As opposed to closer to shore. Can you give me a sense or is it really location specific?

MR. MELLOR: Well, it is location specific.

Well, it's fishery specific. So, I mean, in the summertime I make most of my money offshore. I fish for sable fish pretty much all summer. And that, like I said, is off -- they call it the slope. So, the shelf is out to 150 fathoms, and then the slope drops down to 400 or 500 fathoms. Which is, you know, roughly 20 to 30 miles offshore. I mean, that's my whole summer business is that.

So, I mean, and there are very few viable fisheries left. I mean it used to be, when I started fishing, 37 years ago, I mean all you had to have was a $50 State Fish and Game Permit and you could do pretty much anything.

And now it's, you know, yeah, I mean there's just very few species that we can rely on. Which, of course, is very troubling because if those things don't pan out, we basically starve to death.

But yeah, I mean the shallower water fisheries are more like salmon fishing, or crab fishing, which would also be affected by these if, you know, we couldn't fish around them for whatever reason.

But I think, you know, I think the fishing community realizes that this is going to happen and we are going to have to deal with it. But I think it's important that we're involved, you know, in the nuts and

bolts of just how the designs of these things are going to work. And figuring out how we can, you know, mitigate the results as far as us, and that kind of thing.

And it was the same thing with the MPAs. You know, I was on the regional stakeholder group to design those. And, you know, it's hard to take time away from working and go to these meetings and stuff. And, you know, we don't get paid for it. It's like everybody else gets paid but us, basically, and we do it on our own dime. But, I mean, gosh, if I wasn't there who knows what areas they would have closed, and what effect it would have had. So, you have to do it on a case-by-case basis. And you have to do it on a port-by-port basis because I couldn't really speak for fishermen down in Morro Bay, I've never fished down there.

But, you know, I know the Gulf of Farallons, maybe not as well as Frank knows his mile, but I know it pretty well. And so, you know, I would like to be involved with that.

COMMISSIONER DOUGLAS: Well, thank you. And thanks again. I know that it was, as I said, not easy for you to get here and we really appreciate you being here.

MR. MELLOR: Thank you.

COMMISSIONER DOUGLAS: Let's go to Jennifer Savage, with Surfrider Foundation.

MS. SAVAGE: Hi. I'm the California Policy Manager of the Surfrider Foundation. And thanks, Commissioners, for having us here today.

I wanted to echo your appreciation for my fellow stakeholders, especially the folks who make their living on the water, because they're a relatively small group of people and it's definitely hard to get here. So, I want to say that.

Also, yes, dam removal, good thing. I live up on the North Coast, so live and breathe that issue.

Also, as somebody who lives up on the North Coast and has worked quite a bit with the tribes on ocean issues, it was great to hear the discussion around the tribal issues. And I would just encourage you to really try to ensure that tribal representatives are a part of the conversation. I know you are and I'm just saying that that's a really good thing and I would hope it continues.

So, for us, for Surfrider, one of our main priorities is coastal preservation. So we, of course, are very interested in the impacts of climate change and sea level rise from that. And so, we recognize the potential for renewable energy to have great impact in

offsetting and reducing greenhouse gases.

So, we really strive to support projects that are clean, and low impact, and beneficial to our environment.

However, while we all would like to see a magic bullet, we know that they are very rare, indeed. And, you know, I was up in Humboldt for the PG&E Wave Connect Project, and chairing the Surfrider chapter up there at the time. We had representatives on the stakeholder group. So, I've heard a lot of concerns over the years. I've heard many of them echoed again here, today.

And I was also involved in the MLPA process and many of the same stakeholder groups. So, you know, there's a lot happening out there on the ocean which, of course, you realize once you start convening these kinds of workshops.

And I will go ahead and just briefly enumerate some of the concerns, you know, with Surfrider, when we are judging a project, that we go through in response to what our members care about.

And I should note that Surfrider has 20 chapters in California and a large, and vocal, and active grassroots community.

So, we look at the impacts to the environment. We look at impacts to public safety. We want to ensure

that there's adequate baseline data. We also are very big on monitoring. You know, I think that that is a component that you don't hear enough about is there's all this work done on the front end, but what's the safeguards as far as making sure that the impacts, that we may or may not have predicted, are being captured.

You know, we also, of course, look at ocean recreational opportunities. In most of these cases, that I've seen, the different projects most likely won't have an impact on the waves as they come in. But there is a redistribution on the wave energy. And so, while a singular project or a singular proposal might not have a profound impact, the cumulative effect could be more than we think. And keeping those things in mind, as well.

We obviously have a lot of members who like to surf. And if you tell them that their waves are going to be reduced or go away, they are a limited resource. And with sea level rise, that's going to change dramatically, as well. So, it is a significant concern with our recreational enthusiasts.

We also do care, we have a lot of members that fish, and we are very concerned about the impact it might have on our fisherman.

And we encourage, you know, proceeding with

caution. We know that there's a long history of projects on our coastline that, after the fact, turn out to not have been good ideas. Not to keep invoking my Humboldt lifestyle but, you know, we have the nuclear power plant that we've been decommissioning. We have new desal plants going up that are costing the taxpayers a lot of money and are not energy efficient.

And again, a clean, low-impact, renewable source of energy would be a great thing. But we really ask that we proceed with all due caution.

And that includes having meaningful community input and a lot of transparency in how the decision making is made.

So, a quick list of things we would like to see is to continue to involve stakeholders in the conversations. This has been a great workshop. It's been fantastic to hear all the different agencies talk about the regulations, all the different project proponents talk about their projects, to really get a sense of all the moving pieces that are involved in going forward with this offshore renewable energy.

And so, having that continue and having it continue in a way that's easy for, I would say, real people, not just policy wonks, and agency folks, and people who do this sort of thing for a living. But to

have workshops where the language is clear, the language is accessible, they're held during times that working people can get to them. So that the information, which is incredibly complex, is able to be conveyed in a way that the average person, who's working 40, 50 hours a week, and trying to make dinner for their kids, can come to a one-hour meeting and at least get a fundamental grasp of what is being proposed, and have the chance to have their voice heard. That's really important to us.

And that's -- that pretty much sums up -- I was trying to be quick there, so I think that sums up all of our immediate concerns and historical perspective.

COMMISSIONER HOCHSCHILD: Thank you. I apologize, I have to -- I have a 4:30 meeting. But thank you for your comments.

COMMISSIONER DOUGLAS: All right. Well, yeah, thank you for your comments. And I also want to say that I am -- I'm really impressed with both the participation and the speakers that we've gotten, but also the fact that so many people -- while we've had some late-in-the-day attrition, and that's why I wanted to speak now and not hold this comment until later because, you know, we may lose a few more, even in the next 10, 15 minutes. But it's been very clear to me that this has been the sort of workshop where people

have come as much to hear and listen to each other, as to, you know, say their 15 minutes and run to the next thing. And, of course, sometimes we have to do that because we're so overbooked. But I have seen and appreciated that. And we've got a lot of people still in the room for 4:30.

Which is 15 minutes after our agenda said we would finish, but we knew that we weren't going to finish at 4:15, we just didn't quite know. I think we will finish by 5:00. Even with public comment, that is what I think will happen.

But I will have to ask our last two speakers to not skip important things, but try to be brief and not repeat.

So, we've got Garry George on WebEx and Elizabeth Murdock in the room. And Garry, if it's all right with you, I'll go to Elizabeth and then we'll shift to WebEx, and then we'll go to public comment.

MR. GEORGE: Sure.

COMMISSIONER DOUGLAS: Thank you, Garry.

MS. MURDOCK: Sure, thank you, Commissioner, too. And thank you, Garry.

My name's Elizabeth Murdock. I'm the Director of the Pacific Ocean Initiative, at the Natural Resources Defense Council. And I'm honored to be able

to participate in this workshop today and thank you very much for the opportunity.

I would also like to commend the California Energy Commission for coordinating this workshop at this particular time, because we're just beginning to look more seriously at the prospect of developing renewable energy off the California Coast.

Accurately assessing the benefits, challenges and impacts of offshore renewable energy development is essential to ensuring the long-term protection of our marine resources, from marine wildlife, to fragile ocean ecosystems, to the human communities that depend upon them.

It's important to take the time to identify and understand these processes that are needed to ensure that offshore renewables are developed in the most environmentally responsible manner.

And it will also be important to identify, as people have noted already today, what we do not know, and determine how to obtain the best scientific information to inform site selection, project scale, project design and mitigation strategies.

NRDC supports the development of offshore wind because of its environmental and economic benefits. We see the availability of offshore wind as key to

facilitating our country's move away from fossil fuels, which have caused and continue to cause devastating damage to the environment.

We also strongly believe that offshore wind can and should be developed in an environmentally responsible manner that protects vulnerable species and ocean habitats.

Because development of offshore renewable energy is new to the West Coast, many of us are just beginning to examine the issues associated with this development, from responsible siting, to potential impacts to wildlife habitats and recreational and commercial fishing.

On the East Coast, NRDC has been actively engaged in the emergence of offshore wind energy. We've been strong advocates for responsible development, as well as for federal policies to promote responsible siting and minimize impacts.

In California, NRDC has also been deeply engaged both in advancing California's Renewable Portfolio Standards, and in responsible development inside of terrestrial wind energy.

So today, I was hoping to highlight some of the ways NRDC has worked to promote responsible wind development in the Atlantic Ocean, and then share with

us some of our policy priorities and lessons learned from our work, in the hopes of informing the process here, in California.

So, first to the East Coast. NRDC has played a leading role there in helping to shape federal policies to promote responsible wind energy development. On the East Coast, BOEM facilitated a stakeholder process to identify and designate wind energy areas that were smart from the start. A process that evaluated areas in the ocean where wind energy was viable against other factors, such avoiding sensitive ocean habitats, avoiding conflicts with shipping lanes, fishing areas, and DOD restricted areas.

Once a wind area energy has been designated, BOEM holds auctions for the right to develop and offshore project within these areas. Prior to leasing, BOEM prepared environmental assessments. Lessees then produced a site assessment plan, which BOEM has to approve. Then, subsequently, it conducts site assessments, develops construction and operations plan, which BOEM must also approve. And then, ultimately, lessees can submit a final proposal to BOEM, which the agency can either approve, modify or deny.

This process has allowed the public to be involved, both from the broader assessment of where it's

appropriate to consider developing wind energy, as well as in response to specific proposed projects.

And I also want to just note here, really quickly, that the MidAtlantic and Massachusetts Wind Energy Area processes, in those initial environmental assessments were regional and focused just on site assessment and characterization. And they went for an EA, because it was a little more streamlined. Others here can probably speak in more depth to that.

And additional environmental review will then be required prior to construction and operation. So, those things were bifurcated.

NRDC has advocated that BOEM develop standardized best management practices and mitigation for these wind energy areas, including extensive communication and consultation during WEA identification, project design, and site characterization and site assessment activities.

We have also advocated for mandatory lease terms that require specific protections for species, like the critically endangered North Atlantic White Whale, such as seasonal prohibitions that can cause acoustic disturbances, vessel speed restrictions to reduce the likelihood of a ship strike.

In addition to exclusion zones, mandatory

observers and aerial surveys at limited times of the year.

We've also completed agreements with some wind developers to secure additional, voluntary mitigations to protect endangered whales.

And finally, while our work thus far has focused on mitigating impacts from the site assessment and characterization of offshore wind development, we have begun a conversation with the East Coast development community about construction and operations.

The work that NRDC and other environmental organizations have done on the East Coast has been integral to promoting smart siting and minimizing impacts from wind energy development.

As we consider the possibility of developing wind and other offshore renewables in California, NRDC offers the following recommendation.

First, renewable energy will always have some types of environmental impacts. In the ocean, these can include acoustic disturbances that might injury, or temporally or permanently interfere with marine mammal's ability to communicate or process sound. It can also affect other marine life, such as sea turtles and fish.

Acoustic disturbances that displace marine mammals, shifting them to areas where they're at higher

risk of ship strike or predation. Bird and bat mortality, due to collision with wind turbines, vessels strikes that can kill or injure marine mammals, potential impacts from cables associated with turbines, and impacts to ocean ecosystems, important habitats and sensitive marine life. Including, significant geological features, fragile reefs and ancient corals.

For these reasons, sound siting of any wind energy project is paramount. Siting decisions must be made based on best available scientific information about the wildlife and environmental resources present, and the best strategies to avoid and then mitigate impacts.

Second, conducting comprehensive environmental review of any proposed project is critically important so that we have a strong understand of what the environmental impacts may be.

Environmental review should examine a full range of potential impacts, including potential harm to marine mammals, sea turtles, fish, birds and bats.

Agencies should also adopt appropriate mitigation measures, where necessary, to avoid threats to vulnerable species, including mandatory lease conditions to protect sensitive species.

Third, the process of developing offshore

renewables should be guided, to the greatest extent possible, by a holistic, science-based process that identifies areas of high environmental importance and/or sensitivity, as well as areas of potential conflict.

In an ideal world, this holistic landscape level, science-based would happen first, rather than developing renewables in reaction to specific, proposed projects.

NRDC has been deeply involved in regional ocean planning efforts on the East Coast, which seeks to collect and integrate broad data to help inform ocean management. At its best, regional ocean planning can also provide comprehensive, science-based information to help identify which areas are appropriate for industrial activities, such as offshore wind energy, and which are not.

And just a brief side note, and I can tell you more about this offline, but the Commission may also be interested to note that the State of Rhode Island implemented its own targeted planning process to assess where offshore wind would or would not make sense, by creating a Special Area Management Plan under the state's CZMA.

And through this process, they look not only at state waters, but also at federal waters, and ultimately

were able to obtain federal approval for their State Area Management Plan.

So, this was a very public process and was driven by the state, which might provide an interesting model for California to consider, because there's the state water/federal water issue.

Back to this issue of holistic science-based planning, however. On the West Coast, regional ocean planning efforts are only in the earliest stages, so this process will not be able to inform some of the first generation offshore wind project proposals that are under consideration today.

However, we still believe this planning process should be done and it can inform later wind development processes as they unfold on the West Coast.

Above all, in the absence of a comprehensive science-based ocean planning effort, conducting scientific monitoring, data collection and evaluation is crucial.

Four, ensure early and ongoing input from stakeholders. Because a lack of early public input can result in significant investments, as we try to resolve conflicts later in the process.

Fifth, ensure the quality and consistency of environmental reviews. It's important that the NEPA

process encompass strong, data-based evaluation of impact, including analysis of cumulative impacts. So NEPA analysis, again, should include that full range of alternatives, including proposed project, no-action alternative sites, reducing sizing configuration of the project, or alternatives that might even include phasing the project based on successfully meeting benchmarks before proceeding.

Sixth, establish strong monitoring processes that can identify impacts and enable ongoing improvements in project design and development. This should also include post-construction monitoring, so that we can have a better understanding of actual impacts during assessment, construction and operations. And have the opportunity to manage adaptively in order to reduce future and/or ongoing impacts.

In summary, we commend the CEC for beginning this process now, of identifying what processes, data, and other information that will be required to support responsible development of offshore wind, and other renewable energy along the California Coast.

While it's still early days for offshore renewables on the West Coast, it's not too early to be asking these questions.

Most importantly, we urge the Commission to

leverage its role in the future development of offshore renewables to ensure that California promotes comprehensive, science-based processes that can identify and protect our most precious marine life and habitat, and thus ensure the development of offshore renewables is a net benefit for the State and for the oceans.

Thanks again for the opportunity to comment.

COMMISSIONER DOUGLAS: Thank you for your comments. We'll go to our last speaker, Garry George, with Audubon. I think he's going to talk about birds.

MR. GEORGE: That's right. Thank you. And thank you -- I don't know if Commissioner Hochschild has left, but thank you, Commissioner Douglas for convening this workshop and for keeping California in the vanguard of renewable energy planning and low-conflict areas, thank you.

I know I'm standing between all of you and the question and answer period, as well as happy hour, so I'll be very, very brief.

(Laughter)

MR. GEORGE: And I've prepared a short presentation of only eight slides, so you'll be happy to know about that.

I'm the Renewable Energy Director for Audubon California. We're the State program of the National

Audubon Society, with 48 chapters and over 100,000 members and supporters in California.

We're stakeholders in the DRECP, in the San Joaquin Solar Siting, and also we have been stakeholders on the PG&E Wave Connect pilot, on the Central Coast, a few years ago. All of these, with our chapters giving us plenty of input on the ground.

And we've worked on issues of wind and solar conflicts with birds in California, since 2003.

The next slide, please. So, here's how the offshore renewable energy planning intersects with Audubon. We have, as you know, in September 2014 we released Climate Science, some models that showed that of the 500 and something species that were modeled, 317 of them would suffer serious declines in their breeding or wintering habitat from the effects of climate change, unless we reduced emissions as soon as possible.

That's the most important interest for us to is transform our energy and, actually, our marine transportation system in order to reduce the impacts of climate change on our birds.

We also have a Pacific Flyaway Seabird Program. And these birds often travel through California, on their way from Alaska to places as far as South America. So, these aren't our birds. These are birds, as Noah,

from Fish and Wildlife Service mentioned earlier, are actually part of treaties that we share with other countries. We have this international partnership program with South American conservation organizations and Central American conservation organizations.

We have an Important Bird Areas Program with the national -- the North American partner, for Bird Life International, that identifies bird areas of highest conservation interest. And we have a new Marine IBA Initiative.

We also have 12 Audubon Coastal Chapters that are some of our biggest chapters and that are very, very interested in offshore renewable energy issues.

And, of course, we have the program which I lead, with a team of scientists and conservation folk, who focus on renewable energy here, in California, and also some in the west.

The next slide, please. The scope of the conservation that we're thinking about, when we think about renewable energy offshore, is that we have 216 new marine important bird areas throughout the Pacific Flyaway. These are those important areas for conservation of birds. It's 150 species of birds in the Pacific Flyaway. And more than 33 million seabirds.

If anybody asks you what the most common bird in

California is, you could say, actually, it's the Shearwater. And big, huge rafts of loons and sea ducks move in great numbers offshore and far offshore. So, these are some of the species of conservation concern. We have two federally seabirds, the Short-tailed Albatross and California Leaf Tern.

Over the taxonomic groups of species, seabirds are one of the most threatened, with 27 percent of the species currently listed as species of special concern.

The marine ecosystem complexities, for these seabirds fish matter. So, if you're looking at areas to develop, you have to also look at the fish, as well as the birds.

Also, the offshore rocks and islands where the seabirds breed are critical, as you know.

The next slide, please. These are some of the marine important bird areas that Audubon and our partners have identified in California, all the way from Humboldt Bay, as you can see, all the way down through the islands and the San Francisco Bay. So, there's all of these are marine important bird areas for us, and areas of concern for conservation of birds.

The next slide, please. You also know about the Marine Life Protection act. I think you've heard about that earlier, so here's some of those marine protected

areas that are along the coast.

The next slide, please. Our concerns are with seabird collision with turbines, disruption of the migratory patterns of these seabirds, disruption of their foraging habitat. Again, the fish. And also disruption of their protected areas from not only the turbines, perhaps the turbines, but also the transmission lines in the ocean. And as they come out of the ocean and on to the shore for shorebirds. Also, the disruption of the forage fish, as I mentioned. The impacts on seabirds and shorebirds for the infrastructure as it comes onto the coast and is transmitted to the energy centers.

The monitoring technologies are not quite developed, yet, for this offshore energy, both wave and wind. And also, the precedence that we're setting, as we move forward for pre-construction studies of analysis as well as monitoring regimes.

The next slide, please. Here's some quick recommendations from Audubon. When you think about areas for development, for offshore renewable energy, is to approach it as an ecosystem that includes the fisheries and other human uses of the marine system, so it's comprehensive. Those comments of April 23rd, 2014, by the Pacific Fishery Management Council to BOEM, and

here's the docket number, in Oregon, they made recommendations on special marine planning for offshore areas to identify zones for offshore energy.

We also support a process, like the San Joaquin Solar siting process, to identify the areas of least conflict offshore, in a programmatic way, rather than project by project.

We also think that BOEM might conduct another PACC assessment. The assessment that's currently being used is from Fort Bragg north, through Oregon. And we need another assessment south, in California, especially through the area of the proposed wind projects.

BOEM has already done this with the help of NOAA and USGS, and so we suggest that that be done again. The protocols are there, they could follow them, they're standardized.

The next slide. Here's some additional resources for thinking about offshore renewable energy, both wave and wind, that may be good resources to look at. We've looked at these, ourselves.

And most importantly, the next slide, is the PACC assessment that BOEM did from Fort Bragg north, in 2011 and 2012. Our National Director of Bird Conservation was actually one of the scientists that is the author of that. So, we would recommend actually

doing that assessment before we go much further with permitting.

And that's it.

COMMISSIONER DOUGLAS: All right, Garry, thank you very much. Really appreciate your comments and your work, as well as many others through a lot of the renewable energy policy debates in California.

I have one blue card. We're now to public comment. I have a card from Erica Brand, with the Nature Conservancy.

If anyone else would like to make a public comment, you are welcome to please grab a blue card and fill it out. If you can't find one, just stand up and start walking towards the podium and we will notice.

Erica, go ahead.

MS. BRAND: Thank you, Commissioner Douglas, for holding today's workshop. My name is Erica Brand. I'm the California Energy Program Director for the Nature Conservancy.

So, I want to emphasize three key points in what will, hopefully, be brief remarks.

The first is that California continues to make real progress on ways to protect natural resources, while moving to a clean energy future.

The second is that landscape scale, science-

based spatial planning has been an important approach on land to aggregate data, catalyze stakeholder collaboration and support good siting decisions of renewable energy.

And third, the Nature Conservancy is supportive of expanding this approach to the marine environments to ensure that offshore renewable energy development is done in a smart way, and sited to avoid and minimize impacts to ocean resources, and the communities that depend on them.

The first point in making real progress on ways to protect natural resources, while moving to a clean energy future, I think some of the key planning processes have been discussed today. The Desert Renewable Energy Conservation Plan and the solar in the San Joaquin Valley planning that Garry mentioned.

And to expand on that second point, some of the things from the San Joaquin solar planning that I think are important to consider in the marine environment are really the robust stakeholder collaboration that was part of that process, and bringing in folks from different industries to be part of that discussion, and identification of least conflict lands.

With the rise in renewable energy interest, how and when do we take that regional, least conflict

approach offshore.

So, as I mentioned in the third point, we're supportive of a marine spatial planning process and we think that stakeholder collaboration is essential, given the multiple uses in the ocean that you heard today. Uses that move depending on the resources. So, different fisheries, crab, squid.

And my colleagues, that work in our Ocean Program, often mention to me that we're seeing that climate dynamics are already shifting those resource patterns.

So, there's offshore data that can be pulled together, now. We've heard about multiple sources today. And I'll add that our Ocean Team has done extensive marine spatial planning work in Central California, where much of the interest in marine renewable energy is touching down.

So in closing, we think that proactive spatial planning is needed. Offshore renewable energy applications are hitting stakeholders piecemeal, like we saw with solar back a few years ago. And many of the stakeholders are not prepared, nor aware of the best avenues to make their interests heard in the myriad of permitting processes.

And so, given CEC's leadership in convening and

catalyzing planning processes for renewable energy, we recommend that the 2016 Integrated Energy Policy Report consider marine spatial planning as a recommendation.

Thank you.

COMMISSIONER DOUGLAS: Thank you for your comments. Thanks for being here.

Is there anyone else in the room who'd like to either fill out a blue card, or stand up and walk towards the podium? Going once -- oh, please.

MR. HANSEN: Hi, my name is John Hansen. I'm the Coordinator for the West Coast Regional Planning Body.

My comment is simply just to say that the Regional Planning body for the West Coast exists. Some points were made earlier about the National Ocean Policy at the federal level. The West Coast RPB, as it's called, is meant to help implement that by using partnership building between federal agencies, the three West Coast States and tribal governments.

I'm happy to talk more with folks that might be interested in that. But marine renewables is a key issue that's come up for the West Coast Region. And it's a very new group. We've just had a charter finished and we're getting signatories from federal agencies, along with West Coast States, and tribes. And

so, this is something that we're looking to interface, if there is a link. As you heard, there are many layers and efforts around this. So, the RPB is not meant to get in the way of that. But if there is ways to enhance that and use the national policy to enhance that approach, the RPB is there to do that. So, just wanted to mention that's out there.

The East Coast is working on this and working on it, and the West Coast is just getting started. But we're excited to see these developments in California, and see where we can help. Thank you.

COMMISSIONER DOUGLAS: Great, thank you. Thanks for making comment.

At this point, let's turn to the phone lines and WebEx. Heather, do you want to take it from here?

MS. RAITT: Sure, we're go ahead and open up the phone lines. So, if you're on the phone and wanted to make comments, this will be your opportunity.

And if there's no one there, I think we're done with public comments.

COMMISSIONER DOUGLAS: All right. Well, I want to thank everyone, again, for your participation, for a really great, not just one way, but multi-way dialogue that we've had the opportunity to have today.

Certainly, here at the Energy Commission, we

look forward to working with all of you and more, as this issue moves forward. As I said before, we pulled this workshop together in order to give everyone an opportunity to get ahead of the curve, and start some early dialogue.

And there is, as was discussed earlier, there is a project proposed and there's also, in the way of context, a research facility proposed.

So, we certainly see that this is an industry that is developing, and moving towards commercialization, and moving towards at least the potential to play a role in California.

And at the same time, I suppose this is where I say that we have a pretty competitive market. And we have policies that, as one earlier speaker mentioned, we have policies that, you know, as we look at what we've procured already to go 33 percent, and what it will take to go to 50 percent and higher renewables, you know, we're going to have to, ourselves, grapple with how we get to those numbers.

And then we've got a market. And there's the question of procurement.

So, I don't think that it's a done deal that offshore wind or wave energy is going to play an important role in the California market. But I think

that it could. And I think that it has some attributes that position it well if it could get, you know, as many speakers have said, down the cost curve, and address some of the both permitting, and environmental, and stakeholder unknowns.

And one of the ways that we may be able to help, I mean we can't take the cost curve down. That, as has been said, is industry's job, you know, for the most part, with some research support, and so on, from DOE and others.

But we certainly can help facilitate discussion and help begin the discussion about -- you know, between permitting agencies and with stakeholders about how do we go forward, eyes wide open, and collaboratively to put ourselves in the best possible position to get real benefits from this technology should it develop in a way that it proves to be competitive.

And, you know, it has attributes and it has challenges, like everything else.

And so, just with that I want to thank everyone again. I really appreciate your participation and look forward to working with you, going forward.

(Thereupon, the Workshop was adjourned at 4:57 p.m.)

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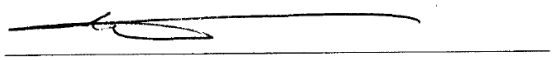

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