DOCKETED

Docket Number:	16-OIR-04
Project Title:	Integrated Resource Plans (Publicly Owned Utilities)
TN #:	215163
Document Title:	Transcript of 12/13/16 Lead Commissioner Workshop on Renewable Energy and the Integrated Resource Plans
Description:	N/A
Filer:	Cody Goldthrite
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	1/5/2017 10:57:06 AM
Docketed Date:	1/5/2017

BEFORE THE

CALIFORNIA ENERGY COMMISSION

In the matter of,	)	
	)	Docket No. 16-OIR-04
	)	
Integrated Resource Plans	)	
(Publicly Owned Utilities)	)	

LEAD COMMISSIONER WORKSHOP ON RENEWABLE ENERGY

AND THE INTEGRATED RESOURCE PLANS

CALIFORNIA ENERGY COMMISSION

FIRST FLOOR, ART ROSENFELD HEARING ROOM

1516 NINTH STREET

SACRAMENTO, CALIFORNIA

TUESDAY, DECEMBER 13, 2016

1:00 P.M.

Reported By:
Kent Odell

APPEARANCES

Commissioners

David Hochschild, Lead Commissioner for Renewable Energy

Karen Douglas, Lead Commissioner for Siting

CEC Staff Present

Courtney Smith, Deputy Director, Renewable Energy Division

Presenters

Laura Wisland, Union of Concerned Scientists

Nick Schlag, Energy and Environmental Economics (E3)

Justin Wynne, California Municipal Utility Association (CMUA)

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P R O C E E D I N G S

DECEMBER 13, 2016 1:00 P.M.

MS. SMITH: Good afternoon, everyone. I think we're going to get started here. I'm excited to welcome everyone here, today, for the Energy Commission's Lead Commissioner Workshop, focused on renewable energy issues, as part of Local Publicly Owned Utilities Integrated Resource Planning.

I'm Courtney Smith. I'm the Deputy Director of the Renewable Energy Division here, at the Energy Commission.

So, before I go over today's game plan and turn it over to Commissioner Hochschild, for some opening remarks, I have a couple housekeeping things I have to go through. So, just bear with me.

So, for those of you who are not familiar with the building, the closest restrooms are located right outside these double doors, across the hallway. There's a snack bar on the second floor, under the white awning.

And, lastly, in the event of an emergency and the building is evacuated, please follow our employees to the appropriate exits. We actually convene at the Roosevelt Park, which is caddy-corner, across the street from this building. Please proceed calmly and quickly, again following the employees with whom you are meeting,

to safely exit the building. Thank you.

Okay. In addition to us, in the room, we also are joined by several folks remotely, through WebEx, including two of our presenters today. So, a couple of instructions for those who are joining us on WebEx.

Please keep your line muted during the workshop and keep your questions and comments until the public comment period, at the end of the presentation. You can participate through the chat feature, and make a comment during the public comment period.

When asking any question or comments, please identify your name or affiliation. If you'd like to ask a question or make a comment, you can also raise the hand function to notify us, and we'll unmute your individual line during the public comment section, and then ask you to comment.

So, again, please make sure all of the lines are muted from your end, as well. So that when staff unmute you, we don't get the background noise from individuals not intending to speak.

Participants can also type any questions they may have in the chat box. And, again, include your name and your affiliation.

If volume or presentation issues occur, please send a chat message.

Okay. For the game plan today, after Commissioner Hochschild shares some opening thoughts for today's proceedings, I'm going to walk through the policy landscape that we recognize POUs are facing, including requirements to submit IRPs. And I'll also provide the purpose of the workshop today.

That will be followed by two presentations, by energy experts, who will discuss the benefits of California's renewable energy targets, as well as some considerations on how to get there.

And then, for the majority of the day, we are going to be hearing from the POUs, themselves.

This will be followed by a public comment period. We have our Public Adviser's Office represented in the back of the room. So, if anyone would like to make a public comment, please pick up a blue card from Jocelyn. Jocelyn, is in the back of the room. We will collect those during the public comment period.

So, with that, I'm going to turn it over to Commissioner David Hochschild, who's the Lead Commissioner for Renewable Energy here, at the California Energy Commission, for some introductory remarks.

COMMISSIONER HOCHSCHILD: Great. Thank you, Courtney. Before I say a few words, let me just take a

minute, if we could just go around and everyone can just quickly introduce themselves. We have a small group here today. And then, would you just go ahead?

MR. CAMACHO: Emilio Camacho, Chief of Staff to Commissioner Hochschild.

COMMISSIONER HOCHSCHILD: Do you want to just stand up or quickly -- Laurie -- well, go ahead.

MR. SCHLAG: Hi. Nick Schlag, with Energy and Environmental Economics.

MR. BARNER: James Barner, with LADWP, Integrated Resource Planning.

MS. LEE: I'm Natalie Lee. I'm the Office Manager in the Renewable Energy Division.

MR. O'NEILL: Garry O'Neill. I work for the Energy Commission, in the Energy Assessments Division.

MS. WASINGER: Camille Wasinger. I'm with Recurrent Energy.

MR. ALVARADO: Al Alvarado, with the Energy Commission

MS. WISLAND: Hi, everybody. I'm Laura Wisland, with the Union of Concerned Scientists.

MR. WYNNE: Justin Wynne, on behalf of the California Municipal Utilities Association.

MR. TOMASHEFSKY: Scott Tomashefsky, Northern California Power Agency.

MS. HUGHES: Kathleen Hughes, Silicon Valley Power.

MR. SEVERSON: Dan Severson, Turlock Irrigation District.

MR. TUTT: Hi, Tim Tutt, SMUD number one.

(Laughter)

MS. DERIVI: Tanya DeRivi, Southern California Public Power Authority.

MR. HARDING: Scott Harding, Imperial Irrigation District.

MR. SWANN: Bryan Swann, SMUD number two, Resource Planning.

MR. MARTIN: Scott Martin, SMUD number three.

MR. SCHELL: David Schell (phonetic), with Roseville Electric.

MS. SICHON: Connie Sichon, Energy Commission.

MR. KASTIGAR: Ryan Kastigar (phonetic), Energy Commission.

MR. SMITH: Connor Smith, Energy Commission.

MS. GREEN: Lynette Green, Energy Commission, RPS Program.

MR. RIDER: Ken Rider, Advisor to Commissioner Hochschild.

MR. MATHIAS: John Mathias, Energy Commission.

MS. SAMRA: Mandip Samra, Edison.

COMMISSIONER HOCHSCHILD: Thank you. Is that everybody? Great, thank you all.

And, Tim, when you said SMUD number one, I don't know, did you mean SMUD is number one, or you're the number one --

(Laughter)

COMMISSIONER HOCHSCHILD: Well, welcome. Welcome to you all. I just want to just make a few very brief remarks. Just, obviously, we're in a very different landscape politically, with the election. And just to kind of reiterate the obvious, California's commitment, actually, to our clean energy goals is now stronger than ever. The Governor, and the Legislature, and all of us in the California energy community, and policy community are really doubling down. And the goal, right now, is really for California to succeed at every policy goal that we've set out, and to really be an international model.

I just returned, as part of the California delegation, to Marrakech, Morocco, for the follow up to the Paris agreement of last year. And people are really looking to our State for leadership.

And we've now signed, with the Governor's leadership, 166 agreements on this Under 2 MOU, with states around the world, representing 35 percent of

global GDP.

And, so, I think the general sentiment in the State is to put our foot on the accelerator, actually not the brake, in light of this new political landscape we find ourselves in. And we want to continue to partner with all of you to succeed.

That's the goal, we want all of you to succeed in meeting your goals, and to have as friction-free a process as we can possibly do. As, obviously, constraints around how much we are able to adjust as we move forward. But that's just the general sentiment I wanted to convey to you.

I also just wanted to, again, congratulate our new Division Director, Courtney Smith, who took over earlier this her. And her tremendous team, really working to make the Energy Division as modernized and streamlined in our process, as we possibly can.

So, I'll stop at that and we can pick it up as we go through the day. So, Courtney, back to you.

MS. SMITH: Great. So, I thought it would be useful to start with why we're here.

As many of you guys are already aware, SB 350 directs the Energy Commission to develop guidelines to inform the development of integrated resource plans by Publicly Owned Utilities.

And as part of that guideline development process, the Energy Commission has held a series of workshops and activities focused on the guideline development, and the process.

But in addition to that suite of activities that, really, are focused on developing guideline language, we are also holding three, topically-focused workshops that are really aimed at informing the guideline development process.

We had a workshop focused on the State's energy efficiency goals, in early October. Many of you were in attendance at our workshop focused on transportation electrification.

And today's workshop is the third of that series of three topical workshops. Today, we're really focused on the renewable energy issues that POUs will have to consider and address as they develop IRPs.

So, as we'll review today, POUs really will need to reflect a lot in their IRPs. A pretty aggressive renewable energy target, strategies to integrate that, as well as a whole host of other considerations.

So, the purpose for today, really, is twofold. First, we're hoping to get a better understanding from POUs, themselves, what they consider to be the barriers that they will have to overcome in achieving a 50-

percent renewable energy target. And, second, how that would be reflected in their IRP.

And then, the second major point of this workshop is a little more specific. We're really looking for POUs to let us know if there's any information or resources that we can provide to help, and to assist, as you go through the IRP development process.

So, for instance, would it be helpful for us to provide a standard set of assumptions around storage cost, for instance?

Those are really the two guiding objectives of today's workshop.

As we start our discussion today, I think it's important, really, to recognize the complex regulatory landscape that load-serving entities, and specifically, Publicly-Owned Utilities, have to face today. California's energy and climate policies, over the last ten years, really have dramatically shaped California's electrical generating system, while improving its environmental performance.

The State has implemented a whole host of policies that support the State's climate goals, that bring about more renewable energy, energy efficiency investments. We've been working to encourage

distributed generation and move away from high-emitting resources, such as coal.

Some of the State energy and climate policies that we've implemented to achieve this include the State's RPS, the Emissions Performance Standard, and California's Cap and Trade Program.

In addition to that, the State has also established policies that really are aimed at improving the environmental and public health impacts of our power systems. Including, policies aimed at reducing the transportation systems emissions, including strategies for electrification, and efforts to minimize negative impacts on resources. So, for instance, California's once-through cooling policy.

Implementing this suite of policies has helped California achieve a lot of its policy goals. It also has affected the customer side of things. So, there have been continued energy efficiency improvements, as well as the emergence of distributed generation.

At this time of rapid expansion of renewable resources in the last year, actually is starting to present some additional challenges, such as land use challenges, and environmental challenges that the State is working to address. So, this is a high level overview of State policy in the last 10 years. But I

think it's safe to say that adding to this legacy, the most recent advancement to State energy policy has, undoubtedly, been the enactment of SB 350, last year.

SB 350 is a landmark bill that really codifies a lot of Governor Brown's climate and energy goals. So, just a really quick overview of some of the main changes that it brings.

It extends California's RPS to 50 percent. It sets a goal of doubling energy efficiency savings within the same time period. It also requires the Air Resources Board, in consultation with the California Public Utilities Commission, and the Energy Commission, to set emission targets for both the electricity sector and for very specific load-serving entities to help achieve the statewide, 2030 GHG target.

And then, lastly, SB 350 requires retail energy sellers to develop integrated resource plans. And this is really to allow for a more cohesive examination of how utilities will be able to marry together the different policies and mandates, as well as some of their other driving policies, together.

And, to assist with that, the Energy Commission has been tasked with developing guidelines for the development of the IRPs for the requisite POUs.

Just to delve, quickly, into a little more

detail on what SB 350, how it impacts California's renewable policies. So, SB 350 really has made California's RPS one of the most progressive renewable energy policies in the nation.

Enacted by Senate Bill 1078, back in 2002, with bipartisan support, and expanded and accelerated with subsequent legislation, California's RPS essentially establishes increasingly progressive renewable energy targets that have to be met by load-serving entities. So, it requires both retail sellers, as well as local POUs, to increase their procurement of eligible renewable energy resources.

SB 350 built on the target of 33 percent, by 2020, and expanded it to 50 percent by 2030.

One quick note. In addition to expanding the State's RPS, it also introduced a couple of other requirements, including the long-term contracting requirement, and also increasing the program's portfolio balance requirements.

In terms of the State's progress to date, the Energy Commission estimates that about 26 percent of the electricity retail sales, in 2015, were provided by renewable energy sources.

The graph on the right here shows, essentially, from 2016 on what the expected RPS targets would be to

reach the SB 350 goal of 50 percent.

Really, the take home here is that given that we're currently, at 26, 27 percent, we effectively have to double the amount of renewable energy being used in this State between now and 2030.

This is a pretty ambitious target. And the path to achieving it is far from solved. To help chart a path for achieving this, essentially, doubling of renewable energy, as well as some of our State's other energy goals, SB 350 requires the largest utilities in the State to develop an Integrated Resource Plan.

So, an IRP is essentially a planning activity. It provides a roadmap for how a utility can provide reliable, least-cost services to their customers, while also meeting our State's policy goals by -- so, identifying and overcoming both physical and operational constraints, addressing customer preferences, and many other priorities.

But these plans don't only create a roadmap for utilities, it also really creates a framework for the State to be able to evaluate how utilities will choose to align with the State's greenhouse emission reduction targets, as well as other policies that are outlined in SB 350. So, including the State's RPS, energy efficiency, and transportation electrification targets.

Just one thing to note, IRPs are not static documents. They really are expected to change over time to reflect changing conditions. And, so, as such, utilities are required to update their IRPs every five years.

The POUs that are required to submit IRPs, according to statute, are those with an average annual load that's greater than 700 gigawatts, averaged over the 2013 to 2016 time frame. They're required to adopt IRPs by January 1st, 2019, and submit them to the Commission.

Based on historical data, the 16 POUs, that you see listed here, are expected to be required to file an IRP with the Commission.

As POUs are developing their IRPs, they're going to have a lot to think about. There really are no implemented models for how we reach a 50 percent renewables penetration rate. Meaning California really is uniquely grappling with how we get to the next level in terms of transitioning to a clean economy.

We anticipate that through this IRP process POUs are going to have to consider a whole host of issues. They're going to have to consider costs and mix of renewables, how to integrate those renewables, and account for mismatches in timing between supply and

demand. They're going to have consider provisions of ancillary services, the role of storage, how to accommodate DG, changing demand patterns with the electrification of the transportation system and, also, all of the transmission support that's going to be needed to support these changes.

So, no doubt, the issues that will have to be solved are complicated and they're really interconnected.

Given this complex landscape of issues, and also requirements POUs must satisfy as they develop IRPs, we're really hoping, today, to hear from you what you anticipate those challenges may be, as we move towards a 50 percent renewable energy target.

We also are hoping to hear a little bit about what you see the role of DG and storage playing, as we move forward.

And then, lastly, and I mentioned this earlier, but it's an important point, we want to know if there's any sort of information or resources that the Energy Commission could provide as you move forward in your IRP planning process.

This information will really help us to make sure you guys have the resources that you need, and that we're supporting you. But then, the information that we

gather here, today, will also inform and guide some long-term policy decisions.

Real quick, in addition to our discussion today, including a time for public comment at the end, we'll also encourage folks to submit written comment. Instructions for doing so are on this slide. Please note that there is a deadline of December 30th.

And then, all of today's presentations and comments are going to be made publicly available on the website.

And, finally, if you have any follow up on today's workshop, don't hesitate to reach out to myself, or my colleagues, with any questions or concerns you may have.

So, with that, I would like to now invite Laura Wisland, from the Union of Concerned Scientists, who will be kicking us off with an overview of the role of California's renewable energy policy, and the role it's played in achieving the State's climate and energy goals.

MS. WISLAND: Okay, thank you, Courtney, so much. Again, my name is Laura Wisland. I'm a Senior Energy Analyst with the Union of Concerned Scientists. We're a national, science-based nonprofit. Our headquarters is in Cambridge, Massachusetts, but I work

out of the Oakland office. I've been with UCS for about eight years, and focused, for a long time, on development and implementation of the RPS policies. Over the years, and more recently, doing some work integration. So, I really appreciate the opportunity to be here today, and especially to listen at the end of this session, about where the POUs are, the challenges they face, and how organizations, like ours, can help in the future.

So, with that, let me start. So, I'm here today to talk about the role of the RPS in California's climate and energy goals. But I think, before I get into that, I just wanted to mention that there are additional reasons why we're doing an RPS in California. In fact, in 2002, the most important reason to enact a policy that required utilities to source a greater percentage of their retail sales from renewables, was to provide greater resource diversity.

We all know that the more we don't rely upon one, single, individual source of electricity for generation, it makes our system overall more resilient, more cost effective in the long run. And I think that benefit of the RPS still exists today. I really do see renewables, over time, as an insurance policy for protecting the electricity system against situations

that we can't control, or we can't predict, necessarily. And I can talk about that a little bit later.

Also, economic development. I know that everybody throws out different jobs numbers, so I'm not going to quote one. But I think it's an indisputable fact that we have seen a lot really exciting economic development in the State, because of the RPS over time.

I was just looking through the CEC's table, in their tracking progress section, and it's amazing. There's this table, I think it's actually Table 1, that shows that there's at least one renewable energy project in every single county in the State. And for most of them, it's a lot more than that. So, that's certainly a benefit.

And then, we'll get to climate and clean air. So, for me, despite the potential shift in focus at the Federal level, on climate change and clean energy, the science on climate change has not changed, at all. The State, our country, our world is facing significant uncertainties with regards to how we're going to be able to maintain a lot of functions in our economy and our society, given the fact that the climate is warming.

In California, we know that climate change means that we're going to have less snow pack to rely on. So, our hydro supplies, which is an important aspect of our

electricity sector, is going to become more uncertain over time.

We also know that there's going to be an increased risk of significant forest fires, that has not only huge threats to people's homes, our economy, air quality, but also the ability of us to be able to utilize our transmission lines and keep our power plants online. So, I just thought that was worth saying. That even though it may seem as though California is moving in a different direction than some of the policies that we may see at the Federal level, I think that makes our job all the more important. That we're actually moving in the direction to ensure us against the risks of climate change going forward and that early action, I think, will pay off over time.

So, this is a slide from 2008. The point here is just that the RPS policy in California has historically played a really important role in the State's world class greenhouse gas emission policies, and our efforts to reduce carbon across the economy.

And, largely, the program has been a significant success. So, here, this is from the 2008 ARB AB32 Scoping Plan. You can see that the 33 percent by 2020 RPS was intended to account for about 15 percent of the emission reductions throughout the economy.

And I guess I want to say that the POUs have been a large role in procuring additional, new sources of renewables, has been a very important part of the success of the RPS over time.

So, in 2012, I took a look at the ten largest POUs in the State to understand what they've done on renewables so far, and where they're headed. And I was really, happily, surprised, actually, to find that those POUs, collectively, had had a greater impact on getting more renewable projects built in California, as a result of RPS compliance, than the three IOU counterparts. So, that's just to say that leadership on this issue has been very, very important, and I hope it continues.

This is a slide, just to make my point about the system wide insurance policy that I think renewables provide over time, if we can plan for them. So, what you see here is the orange line. This is the natural gas usage. The dotted red line is other imports.

I should say, this data came from the Energy Commission. So, other imports, I think some of that actually does include out-of-state renewables, but it's not parsed out. So, just keep that in mind.

My point here is that you can see that between 2011 and 2012 we saw a significant drop in both our nuclear generation, obviously, because of the unexpected

loss of San Onofre, as well as large hydro. And large hydro continued to decline because of California's historic drought.

Although we did see a pretty big spike in natural gas generation, in 2012, that was because we weren't planning for SONGS to go offline. And over time, the renewable energy generation has steadily increased. The usage of natural gas has not had to continue to be a much higher rate over time.

So, as long as we can plan for renewables, we can help make sure that in situations that we can't control, like a drought, we can continue to rely on clean energy and our emissions will not increase.

This is a graph, this is from the ARB, in 2016. This is from the draft scoping plan. It just shows that overall, our GHG intensity of electricity in California has declined over time. And that has been, in, large part, because of the RPS program to date.

So, I think we all know that we are facing fairly aggressive greenhouse gas reduction targets in California. This graph, also from the ARB, just shows us where we needed to be in 2020. We're on track to do that. And where we need to be in 2030 and, ultimately, in 2050, if we're going to reach the Governor's Executive Order. That's a very significant decline.

And even though the ARB, who's working on the scoping plan, has not yet finalized a plan for how we're going to get there, they have some drafts out there. I think E3's going to talk about this. We pretty much know that we're going to have to be relying on at least 50 percent of our electricity supply needs to come from renewables, if we're going to get there.

And the other, just quick point, I want to make about this is that the electricity sector, in general, is going to have a larger role to play in reducing our emissions throughout our economy, and that's going to bring additional benefits. So, we know that the RPS program, and other renewable energy programs, have helped to make sure that the existing electricity we use, more and more of it comes from clean sources.

In the future, we're also hoping that we're going to be able to take gasoline-powered cars off the road, which are significant sources of carbon pollution, as well as criteria air pollutants, which have significant public health impacts. And, instead, electrify those vehicles. And, obviously, to be the maximum benefit of that fuel switch, and that policy, we need those vehicles to be powered by clean electricity, as well.

So, let me just stop there. I'll let E3 talk

more about the details of what 50 plus looks like. And, again, I look forward to hearing from the POUs and starting a discussion about how we get there. Thanks.

MS. SMITH: Okay, great. Thanks, Laura.

I'd like to welcome Nick Schlag, from E3.

MR. SCHLAG: Okay. Thanks, Laura. That was a really interesting presentation on kind of where we've been. The work that I have to share today is a little bit more about where we're going with renewables.

So, again, my name's Nick Schlag. I'm a Consultant with E3. Just a quick introduction, E3's been responsible for a number of studies in the past five or so years, exploring renewable integration at much higher penetration of renewables, than we see on our system today. We've looked at 50 percent, even above 50 percent renewables, to explore what are the implications for how a system operates, and the challenges that you might face in operations. As well as how does it change your planning paradigm, as a utility, to know that you're going to be having to integrate such large penetrations of variable resources on the system.

So, I think Courtney invited me, today, to maybe share some of the lessons that we've learned in the course of our modeling experience over the past couple

years, looking into these questions.

So, Laura also showed a slide that looked like this. But I just wanted to start with the big picture, and the long term. We won't really get into the details of what this slide is showing. But the key here is to recognize that if we are going to hit our long-term, 2050 goals, we've got a very steep path ahead of us. No matter how you slice it, it's going to require a transformational effort of the economy and, specifically, of the electric industry, in order to meet the current 2030 goals, as well as the long-term, 2050 goals.

And, definitely, one of the most radical transformations that we can expect to see is within the electric industry. It's the necessity to de-carbonize electricity in order to provide a clean and carbon free supply of electricity to meet not only your traditional electric sector demands, but also increasing levels of demand related to vehicle electrification, and potentially electrification of other end uses.

I know this is probably a bit tough to see from so far away but, really, the key things to take a look at on this slide are the blue and the yellow wedges. Which represent, basically, the installed penetrations of solar and wind over the time period from the present

day through 2050, in order to meet, once again, those long-term GHG reduction needs.

2050, it probably feels like a little bit of a long time in the future, still. But, really, 2030 is now just around the corner, when you think about it in the context of the lifetime of the investments of new power plants that we're going to be making today.

And even by 2030, as Laura alluded to as well, the current RPS target is 50 percent. But in order to meet the 2030 goals, we're actually looking at potentially needing to go above and beyond 50 percent renewables. Up to, potentially, 60 percent, maybe even a little bit in excess of that, in order to meet the 2030 goals that the ARB has been looking into, recently.

So, what I wanted to touch on today is, basically, what does a 50 percent RPS penetration look like for California? What should we be thinking about as far as the challenges that we'll be facing in integrating such large quantities of renewables? And how can we start to think about planning a grid so that it's resilient enough, and flexible enough, to accommodate such high penetrations of renewables?

I think it's important to start by recognizing that this is a new challenge. There are a couple other countries out there that are really beginning to push

the envelope on renewable penetrations. A number of European countries have, close to 30 percent renewables, with large penetrations of wind and solar. But, 50 percent is just an entirely another challenge. It's a level that hasn't really been achieved anywhere in the world. And, so, this is really path breaking work. We're really breaking new ground to explore what this grid is going to look like in the next 15 years.

So, maybe I'll start with the good news. Which is that, renewable generation is cheap and has been getting cheaper, and continues to get cheaper. When we look at, basically, what the costs of renewable technologies have been doing over the past couple years, they've been coming down pretty considerably.

Solar PV is probably the poster child for this. When I started working on, renewable integration six or seven years ago, it seemed like solar PV was in excess of $200 a megawatt hour. Now, we commonly see contracts signed for $50, or even below that, in the markets today. So, this is kind of the encouraging side of things. That the market transformation, that we hoped to see in renewables, is in fact happening. And we have been able to drive down the market prices of renewables through some of our aggressive procurement of these technologies.

It's also comforting to see, or just striking to note, that renewables are now cost competitive with traditional generation sources, even in today's low gas price environment.

So, the cost of building new solar and new wind facilities, if you don't necessarily consider the cost of having to back those up, is actually comparable to the cost of building new, traditional gas resources. Which has kind of been a benchmark that people have been watching for quite a while.

So, how is California actually going to meet these aggressive, 50 percent renewable targets? What types of resources do we have available to us?

By our calculations, it's going to take somewhere on the order of 15,000 megawatts of new, renewable resources, above what we have today, to meet our 2030 goals. And you can imagine that actually being larger, if we're continuing to proceed up to 60 percent.

When we've looked at the renewable potential that's out there, within the State of California, we found a couple pretty striking things. First is that the potential of resources, like geothermal, and wind, looks like it's actually fairly limited.

There are a couple places in the State where there are high quality wind and geothermal resources

left, that can be developed. But when you compare these to the need for new renewables that we're facing over this long-term time horizon, they're actually fairly small quantities.

Solar, on the other hand, is sort of boundless in its potential. The costs for solar have come down so much that, it almost makes sense that you could put a solar panel anywhere in the State and have a reasonably sort of economic project to develop, from the perspective of renewables.

So, in our minds, a lot of the development is sort of pointing towards this world in which solar plays a very sort of central role in the achievement of our policy goals.

COMMISSIONER HOCHSCHILD: Can I just make sure I'm understanding this? When you say we need another 15 gigs of renewables to meet the RPS, is that -- obviously, the number of gigawatts depends on which technology assumption you're making. Are you assuming principally solar and wind for this? Or, what's the breakdown of this 15 gigs between technologies?

MR. SCHLAG: Yeah, it is principally solar and wind making up that 15 gigawatts. So, if you were to say we'll meet it all with geothermal, if you could find a geothermal resource, that gigawatt number would be

considerably smaller because of the higher CAP factor that you have for geothermal resources.

CAP factors for solar and wind, that we've seen in the State, are pretty comparable, on the order of 30 percent, plus or minus, a few percentage points. So, the mix that you assume for that doesn't have a huge impact on how this number shakes out.

COMMISSIONER HOCHSCHILD: Great. Thank you.

MR. SCHLAG: So, as we look towards a world in which we're basically relying, predominantly, on solar PV resources to meet our higher renewable goals, there are essentially a few challenges that we can imagine in terms of how we're going to balance the grid, and operate the grid flexibly enough to accommodate such high penetrations of solar.

You can think of the traditional challenges that people think of, when they allude to high penetrations of renewables. You've got variability and intermittency within the hour. So, you need to carry more reserves in order to balance the sort of sub-hourly variability that you expect from those resources.

But, really, the largest and principal challenge that we expect to see is related to the fact that in these high penetration worlds you have periods, or times, where you just have so much energy that you can't

actually squeeze it onto the grid.

And this is what's illustrated in this series of graphics here. Where you can see kind of from 33, to 40, to 50 percent, from top to bottom. That red, sort of hump that's growing over time is, essentially, the solar PV in the middle of the day, that we're not actually able to squeeze onto the system just because we don't have enough demand to fit it all onto the system.

So, this is really where things start to get tough as far as renewable integration. Because you can image that, if we're looking at that 50 percent world, if we want to keep building renewables on top of that, you're going to be building renewables on top of periods where you're already having to curtail some of your supply. And it becomes just sort of more and more of a challenge to squeeze everything onto the grid.

I'm going to skip this slide and then go straight to what can be done to sort of facilitate these integration challenges. I'll start by saying that the picture that we showed just a minute ago, it's not a static world and there are things that can be done to alleviate some of the challenges that we illustrated with that solar-heavy example. There are many steps that can be taken, both institutionally, and on the investment side, to mitigate the challenges of operating

a grid at 50 percent.

We've listed out a couple here. The interesting thing to note here is that the solutions, or the investments that are most valuable, from the perspective of renewable integration at high penetrations, are not the sort of traditional types of flexibility that you think of, when you think of operating a power system. It's not your fast start CTs, that you can ramp really quickly.

It's actually things that you can do that allow you to shift energy around from one period of the day to another. Whether it be through changes in demand, and when demand actually occurs, or through taking energy and actually moving it to another period of the day, using a technology like energy storage.

So, this sets up a touch challenge, basically. You've got many, many moving pieces. As Courtney alluded to, this is kind of -- it's a multi-dimensional problem, with many pieces. All of which are kind of playing off of one another and interacting, and, at face value it's really hard to think about how to balance all of these different steps that you might take to facilitate renewable integration, and to sort of plan your portfolio as you move through time.

What I wanted to sort of end with is a little

bit of an overview of how we've been thinking about this planning challenge in the future. And, of course, there are many more dimensions to this planning problem, than we're illustrating here. But I think this is kind of a useful representation, at least at a simplistic level, of how you can begin to think about balancing sort of your renewable integration challenges with the investment and solutions to help mitigate those challenges.

So, what you're seeing here is kind of three possible models for the future of the grid. On the far left, what you see is a grid that has essentially no investment in solutions for renewable integration. And in that world, curtailment, it becomes a very big problem. We basically have an oversupply of renewable resources. And in order to continue to meet, our investments and our goals of 50 percent or higher, you essentially have to over build your renewable fleet, so that it's capable of producing even more energy than you need to hit 50 percent RPS.

Those investments in the overbuilding the renewable fleet end up being pretty expensive because you're buying energy or you're paying for energy that could serve loads as renewables, but can't be delivered to the grid.

On the far right is another model for the electric system. This is a world in which you build energy storage up to the point where you can absorb all of the surplus energy that you might ever see on the system, and deliver that in other periods.

And you can imagine that also being very expensive. To basically make investments in energy storage so that every single megawatt hours of renewables that you could deliver to the grid, actually is delivered.

So, what we have in between is kind of the sweet plan, that's the plan in question, and what the plan in question seeks to identify. It's a world in which, basically, the integration challenges that you face in operations, and the costs of those challenges are actually balanced with the costs of new investments, and demand side programs. You have some curtailment. You have some storage. You have some electric vehicles. You have some of a little bit of everything. This gets to Laura's point about diversity. And that balance point kind of takes all of these potential solutions and finds the least cost possible combination of them.

So, that, in and of itself, is a really tough question. This is, again, a multidimensional sort of optimization problem, with very complicated interactive

effects between technologies.

This model that has existed in the past, of sort of siloed procurement, where you can look at each sort of individual area of procurement and kind of make a decision about that, independently, is going to begin to kind of disappear as we begin to have to bring these things together in an integrated resource planning framework.

What we've been doing, recently, at E3, is developing a linear programming model that's capable of this type of optimization. And we've been using this to look forward and think about what do -- what 2030 portfolios actually make sense as far as hitting our 50 percent, or higher, renewable goals.

So, this is my last slide to share with you guys. And just a few key takeaway points, summarizing what we've gone over today. The first is that achieving our goals is going to require large investments. It's going to require lots of new renewables, and it's going to be transformational for the electricity system.

The second is that we're looking forward to a grid that's going to be considerably different in how it operates. Those differences are going to impose new challenges on utilities within those grids, and it's going to require sort of careful thinking and planning

to sort of resolve some of those challenges.

But I guess the point that I'll leave you with, and this is kind of a takeaway from the modeling, is that it's definitely possible to achieve those high penetrations, particularly if you're beginning to consider the balance between all of the sort of integration solutions available to you as options to help facilitate the balancing of such high penetrations of intermittent renewables.

The last slide that I have, I won't go through this, is just for when this is posted, these are a few links to some of the key studies that we've done over the past couple years, that kind of relate to the presentation that I just went through.

So, thank you very much.

COMMISSIONER HOCHSCHILD: Thank you. That was terrific.

MS. SMITH: Great. Thanks, Nick.

So, we are now going to transition to our presentations by POUs, themselves. To kick that off, we're going to actually have a joint presentation by the POU representative organization. So, if you guys want to come and sit up here?

So, we have Justin Wynne from the California Municipal Utility Association, Tanya DeRivi, Southern

California Public Power Authority, and Scott Tomashefsky from Northern California Power Agency.

MR. TOMASHEFSKY: Thank you, Courtney. I hope you like our slide we have here. We're going to talk a little bit more today, than give you slides.

Definitely want to thank you all for the opportunity to speak this afternoon. And, actually, as kind of a plug for your staff, I will say through all of the RPS deployment, dealing with regulations past, present and future, the staff has been great to work with in terms of just dealing with a lot of the nuances of what public power's all about. Especially, when you consider there's 40 plus of us, depending on how you add us up. We all do have our operational issues. And having staff understand what we do is really important. And we try to reemphasize it every time we're here. So, I just wanted to throw that plug out there for the staff.

To that end, it's actually kind of interesting. The State talks about collaboration and takes a lot of pride in the fact that the agencies are collaborating. I will say that we do that quite a bit, as well. Which, kind of in an ironic sense, we have a weekly coordination meeting that we have among CMUA, SCPPA, NCPA, TID. SMUD's part of that and Modesto's part of

that, as well. And we actually have to reschedule that because that's scheduled for that right now, I guess it would be, right at 2:30.

So, just to kind of give you some context. There's a lot of stuff that goes on within our organizations, and to really get a grasp on, and stay in front of all these topic areas, it's really important for us to talk amongst ourselves. So, we do quite a bit of planning associated with that.

And I will say, the IRP discussions, not just this one, but the previous two, we've had quite a bit of conversation about that. So, coming here as a joint presentation is really important, and I think that that shouldn't be understated, at all, in terms of importance.

I know that this workshop is characterized as an IRP workshop. But I really would look at that as being a little bit too constraining. In the sense of I like Courtney's comments in terms of her depiction of what the IRP process is. I wouldn't say that we really disagree with that approach, in terms of it's designed to try to find out how we deal with planning.

I will say, and I'll say it again, we have been planning irrespective of an IRP mandate, and SB 350. That's something we all do in various forms. They may

not be called IRPs, but they are something we do.

This really gives us an opportunity to talk about renewables from our lens, and provide some context there. So, my punchline, if there's any here, is that we do have good stories to tell. I think our position, in terms of where we are vis-à-vis 2020, is not a bad story to tell. I will say, and you will hear that in the next 15, 20 minutes, that there are challenges about 2030. That's not to suggest that we are not an active partner in trying to help the State reach its objectives.

And I will say that it needs to be reemphasized that our role, as a stakeholder, is very different. We are very unique in that sense. Not only by our definition, in terms of our demographics, the environment that we live in, our each, individual communities, and the climate zones that we're in. We cover all 16 climate zones in various ways. We have different economic considerations. We have very poor communities. We have very, fairly wealthy ones. The community desires are very different.

And with all of that, not only does not one roadmap work for another, but we have to kind of make those decisions at the local level.

And to that end, we really are public stewards.

So, when we talk about the dollars that we spend in our local communities, we kind of look at it from a full city perspective. But then, what's equally important, is that we take the statewide objectives and find ways to filter that into the decisions that we make at the local level. So, when we do those things, we're making decisions based on being stewards of the public. No different than the State is. But we're actually doing that at the most local level. So, we have the same objectives when it comes down to those types of relationships.

Accountability is a big part of that. We're just sort of thinking along the lines of the boards, the advisory boards that serve our communities, the stakeholder groups that we have. We can -- you know, this is a rough estimate. There's probably in excess of 70, 75 public meetings that occur each month, within the public power community, in various cities that are out there. So, in terms of transparency, I don't think you can get more transparent than that. It may not come to certain elements within, you know, certain websites or whatnot, but the information is out there and the communities are engaged, or they have the opportunity to engage, when they want. So, we understand how those communities fit together. It's really important.

I will say, also, the decisions that we make are incorporating energy and non-energy decisions in everything we do. So, that actually gives us the opportunity to be even more optimal in terms of the things we do.

We do share those common goals, which is really, really important. And I think that gets lost a lot of times in the policy debates, because the conversation usually starts from the stand point of what are you guys not doing, and why aren't you doing it? Whereas, opposed to, how are you trying to help us meet our objectives? And I think there's a real nuance between that.

I will guarantee, though, that the solution that comes up, in terms of the one-size-fits-all construct, is not going to happen. So, straight lines never happen when you look at the public power community. It's certainly not going to happen as the utility gets smaller and smaller. So, we have a lot of fun doing the things we do and we're happy to be part of the conversation.

From an IRP perspective, again, reemphasizing what Courtney sort of said, I'll paraphrase it, that it's really a planning tool. It's not the end all solution for getting to 2030. It is the road to 2030.

What we shared in the first couple of workshops, especially in the first one, we basically had, I think, 13 of our 16 utilities provide a fairly extensive presentation, each one of them to talk about the things that they are doing. And there is a lot going on. And, again, it's not necessarily that they're called IRPs, but it is resource planning in every step of the way.

Guidelines from the Commissions perspective, I think those are very helpful for us to have. I think that they provide an opportunity to provide some insights and best practices, and how things can be looked at moving forward. But I'd be really careful about making them too constraining.

That's one of our major, I think, concerns as we've gone through this third IRP discussion, that's out there, seems to be a suggestion that the IRP has to be designed in a certain way. Templates will be designed and then, this is what we are going to do.

And I will say that once we get into that type of mode, it becomes less, potentially, the case that we can be creative in the way we do our resource plan. So, guidelines are great. Prescriptive guidelines are not quite as great as guidelines, in the purer sense.

The main thing for us, really, is about flexibility, program flexibility. You see it built into

the RPS program, the way the regulations are fit today. We spent a lot of time between, I can't even remember, it was 2009, '10, '11 and '12 in that period talking about flexible compliance, and ultimate compliance options.

The Commission's probably going to see a number of those compliance requests come up, in compliance period one, as the review of the first compliance period moves forward.

I would imagine, I'll speculate at this point, you'll probably find less claims for alternate compliance, in compliance period two, as we all get used to the program. Although, going forward, as the numbers start to get higher in terms of percentages, those alternate compliance tools become very important.

Because I think we've talked about, individually, that our mutual objective is to make sure that we're all successful. And we want to make sure that the rules don't constrain us from being successful. And I think that's a fair goal.

One other thing to note on the IRPs is that the fundamental requirements in the RPS program don't change, other than the IRP. From resource planning, we have to look at how we're dealing with the 50 percent renewable, but we also have to look at a lot of

different features, as well.

So, it just becomes really important to continue to stress how important flexibility really is to our programs, and to the extent that those are built into the requirements, whether they're guidelines that give us flexibility to think about things, or whether there's alternate compliance options that give us the ability to think about how to deal with the formal compliance of what we have to do, those are important to continue.

In terms of challenges, and I know, Tanya's going to expand on that more so, but I'm just going to touch on a few and then I'm going to make reference to a couple of nuances related to our three NCPA members that are not presented, specifically. So, not Palo Alto, but more from a Roseville, Redding, Santa Clara perspective.

In terms of challenges, I think the greatest challenge in terms of dealing with the RPS program, and everything else, is looking at these policies and making sure that they're aligned. And what we find ourselves, on the road to 2030, is that this conversation is actually an easier conversation for us to have at this point because a lot of the focus right now is dealing with carbon implementation post-2020, dealing with the scoping plan, Cap and Trade regulations. How we deal with protecting consumer interests going forward.

Looking at the cost implications of what's part of the next step.

And as Laura noted, there is a lot of work we're going to have to do to get to 2030, and we all recognize that. But we still have that public stewardship aspect of what we do, and, so, we will never go into that conversation without asking the question, how is that going to impact consumers?

Now, there's a financial aspect. There's an environmental side of that. But we have to think about all components of that conversation.

For us, specifically, we're looking at things like allowance value, associated with free allowances we get within the Cap and Trade program, which often feeds into a lot of the renewable procurement that a lot of our members do. It provides that additional revenue source to allow us to make those contributions and actually move up the curve a little bit more. So, it's all tied together. And we often have a tendency to kind of think about those in silos, which is problematic.

Second to that is, really, looking at the -- more of kind of a compliance operational stand point, is the synchronizing of reports and compliance periods. When you start to look at the thing, we have an IEPR every two years. We have the RPS compliance period,

three to four years. We have greenhouse gas compliance every three years. We have the IRP every five years. We have annual energy efficiency. We have four-year energy efficiency targets.

So, we're all in sort of different stages of evaluation through process. And within the Utopian dream sequence of things, wouldn't it be nice if we could all do our planning, evaluation, recommendations, and we kind of go through that. It's a long process that we've talked about for a long time, and it's a very difficult challenge to deal with it.

Along those lines, the notion of consistency and the definition of consistency, as it relates to implementation, as various agencies look at the things that are trickling down from State mandates, and directives, and programs. And we get into the question of what's really consistency? Does consistency mean exact or does it mean something else?

I would tend to characterize it as a bandwidth of acceptability. And when you start to look at consistency from a bandwidth you become -- it becomes more possible to deal with the nuances of smaller utilities, especially. But when you start to look at public power, in general, there's a notion of we can be within this range and that's an acceptable range. We

tend to try to get away from that when we get into regulations because we want to have a definitive answer.

And, unfortunately, some of this is a little bit interpretive, when it gets down to it. So, that's important, looking at things like the straight line increase versus the stair step approach in dealing with what the RPS percentage is. We've had those conversations before, and we're ready to have it again.

Within the long-term procurement world, dealing with soft targets, dealing with count and fold resources, how we deal with excess procurement. Again, a lot of alternate compliance options and flexibility have been built into the program. We don't want to see those things go away.

To the extent that you get to a 60 percent renewable conversation, which is a little bit scary in the sense that that's happening before we're even getting on a track to 50 percent, flexibility becomes really, really important in trying to deal with those type of things.

One other thing that I'll also give consideration to is looking at the definition of a California eligible resource. So, when we start to look at it from the grand scope of carbon, there's a lot of things within the renewables program that are good for

carbon, not necessarily considered to be good for the California eligible aspect of the RPS program.

We know we have, oh, about 5,000 megawatts, plus, now of rooftop solar that don't count. The questions become, well, what is the State's objective in terms of are we looking to promote rooftop solar in the future? And, if that's the case, then there's probably opportunities for it to be appropriately acknowledged into the RPS program. It's a tough task, because there's things related to the accounting for it. But it's something that needs to be considered.

To the extent that it's 7 or 8 percent of the State's renewable portfolio today, even though it's not California eligible, it's still significant.

COMMISSIONER HOCHSCHILD: I would just clarify. I mean, they count in the denominator, but they reduce the denominator of the -- so, it's 50 percent of a smaller number, right, because there's --

MR. TOMASHEFSKY: That's right.

COMMISSIONER HOCHSCHILD: -- consumption. But it's not fully counted. Your point's well taken.

MR. TOMASHEFSKY: Yeah, and I think along those lines it raises an even higher policy question on is our objective reducing reliance on the grid, or is it reducing reliance on the use of energy? It's just that

that's a much different question that pairs the energy efficiency and the RPS world against each other. But these are important things to really kind of think about. So, trying to figure out how that all fits into the policy equation is really important.

A couple other challenges and I'll kind of feed that into my discussions with Roseville, Redding, and Santa Clara. And, of course, those are three of NCPA's 15 members. Santa Clara is our largest member, about, a little over 500 megawatts on peak. They are definitely part of the early adopters. If you look at the NCPA'S family, a geothermal project in 1983. It makes us officially early adopters in terms of renewables. And it's been sort of a benchmark for a lot of the renewable work that many of our smaller members are actually a part of, and they rely on that.

Interesting challenge. We do get into the conversation of load going down in the State. The Air Resources Board, in looking at allowance allocation, has kind of concluded, roughly, that all utility loads are going down. Well, that's not the case for all, Santa Clara being one of them. And, actually, they find their loads going up. So, it does create some additional nuances for them to deal with, in terms of additional load growth. They'll have some other opportunities and

challenges to deal with there.

They have looked at storage. They're still evaluating how that's going to fit. That will also be part of the reports that come to the Commission, in early 2017, on the state of storage within the POU community. I know, within the last one there were concerns that there were a lot of utilities that were not looking at that, which I thought was a little bit of a mischaracterization. It wasn't that they were looking at it, they were just looking at the cost effectiveness of it.

And a lot of public power members are not early adopters, and they're kind of second adopters. So, to the extent that those technologies are moving forward, and costs come down, they certainly take advantage of that.

Uncertainty surrounding electrification. In Santa Clara, you've got 160 EV charging stations right now, 49 at the stadium.

You've also had the issue of what's the appropriate focus of electrification. And you start to look at it, is it looking at it from a residential public charging? Are you looking at from a commercial/industrial?

From their perspective, they are looking at it,

in the short term, as the dot.com companies are building -- they're developing infrastructure so that people go to work, they can charge up when they go home.

You've got other communities and it's very different. You get into that situation, as the technologies and the distances change with respect to some of the electric vehicles that are out there, that may change the dynamics. Now, you start to get into looking at distribution infrastructure and the costs associated with that. So, there's a couple things that are kind of interesting there.

From the perspective of Roseville, you've got one of the highest PV penetration rates in the county, in terms of the public power community. They've got five percent customer solar penetration. Which is not to be confused with the 5 percent threshold on net metering. But, you know, they're sort of somewhat related. But they're exploring community solar. So, how does community solar fit into the equation? How is that going to be treated in terms of comparisons to rooftop solar, and that kind of the -- you know, how it's being addressed?

They're also looking at the storage options. And they've been involved in partnering with potential DOE studies that are out there, where they're looking to

be part of that conversation.

What they are doing right now, similar to Santa Clara, who's in the middle of theirs, as they are about to start with AMI deployment. So, as the distribution system gets more complicated, they see the need, now, from a cost perspective, to have AMI installed. Whereas, maybe a few years ago they did not, now, as things get closer to the distribution level, this becomes more of an issue, and more of a need for certain utilities. It may not be for all. But for certain utilities, they're making those decisions, even though those were local decisions that were made.

One final point, from a Redding perspective, which is really, probably, one of the more interesting challenges. As we push forward with storage, they've actually come across a situation where storage is now becoming less of a cost effective option for them.

So, here's our one member that's really been gung ho in terms of i-Spare technology, dealing with thermal energy storage. Several years ago they actually had some of the assembling plants situated in the City of Redding, from a jobs perspective. Well, they've gone down to Glendale. And, so, the jobs aspect of it has gone away.

But also, the over-gen situation has created

different pricing nuances, where shifting load to chill at night is now not as cost effective.

And, so, the story line of evaluating storage, and looking how it fits into the renewable equation, the last thing we want to come back with and say, well, we used to do it. We thought it was good. Now, it's a problem. We need to make sure that those stories are understood because those are realistic perspectives on where things are going. And as much as it may be against the grain in terms of where the State would like to take the storage equation, it is a representative analysis of how things are going.

So, it's a different conversation that we need to have. It does make sense, in terms of how it fits into integrating renewables, from that stand point. But when you start to get down to the granular level of how a utility will use storage, it may not be that straight forward.

With that, I'll end my comments and I'll turn it over to --

COMMISSIONER HOCHSCHILD: Yeah, if I could just ask -- thank you, Scott. And, by the way, I see you had all these acronyms up there. We should give a door prize to whoever comes up with the best Scrabble word you can make out of all of these --

MR. TOMASHEFSKY: I think we got 47 points.

COMMISSIONER HOCHSCHILD: -- CMUA, SCPPA, NCPA. Not a lot of vowels to work with but --

(Laughter)

COMMISSIONER HOCHSCHILD: I just want to ask, and just going back to Nick's presentation, from E3, among the many pieces of news, over these last years, I think the cost reduction in wind and solar is really the most significant story of renewables. And, we're entering, now, the last month of President Obama's term in office. And just since he assumed office, just eight years ago, the price of solar has gone down almost 90 percent, and wind's gone down just over 60 percent.

And, we were fortunate to get these tax credits, both for wind and solar, extended with the commenced construction clause, which is, I think, really important. So, if you just initiate the project, you can still have a few years after the tax credit expires to make use of that.

I am just curious, when you out ahead at which renewable resources you expect to procure, do you expect principally solar and wind pattern, or are you looking at biomass, geothermal? I mean, how does that look, must generally speaking, for POUs, from your perspective?

MR. TOMASHEFSKY: Yeah, and I'll let Tanya and Justin comment on that, as well. But I think it's really all part of -- it's that, the proverbial, all-of-the-above strategy on things. And to the extent that the most cost effective solution is tied to solar and wind, then that's a place that we definitively are going to look at.

So, it has to be looked at from a pragmatic stand point. And it also has to be looked at operationally. And, so, contractually, if you're engaging in a solar contract, as long as you've got a guaranteed deliver, it really shouldn't matter what that resource is. It becomes a least cost decision.

And, so, you start to look at the public stewardship of dollars. And I'm sure Jim will talk about that, within the Palo Alto presentation. There's a lot of really good solar projects that they've negotiated, as part of their portfolio, starting next year. And, so, why wouldn't we go after those things, if they're cost competitive?

COMMISSIONER HOCHSCHILD: One thing -- first of all, I just want to welcome my colleague, Commissioner Douglas, to the stage.

We are actually, speaking of renewables, one additional resource that we're now looking at is

offshore wind. So, both Commissioner Douglas and I just visited the first offshore wind project, installed in the nation, which is off the coast of Rhode Island. it was just completed last month.

And, now, the cost of that project was quite high, about 24 cents a kilowatt hour. But they're down in Europe, now, to 6 cents a kilowatt hour. And, actually, the generation profile of that is considerably better than onshore wind. So, it's approaching 50 percent capacity factor, whereas onshore is about 35 percent.

Commissioner Douglas and I are participating in this regular, new, taskforce that's been set up with a number of the agencies working on that. And the first application for a lease has now been filed off the coast of Morro Bay, right.

So, anyway, you are done with your presentation?

MR. TOMASHEFSKY: Yeah.

COMMISSIONER HOCHSCHILD: Do you want to pass it to Justin or to Tanya?

MR. TOMASHEFSKY: To Tanya.

COMMISSIONER HOCHSCHILD: Yes, thank you.

MS. DERIVI: Thank you very much. I'm Tanya DeRivi, Director of Government Affairs with the Southern California Public Power Authority, or SCPPA.

I first wanted to thank the Commission for asking the question on what the obstacles are that POUs are facing in both developing, and integrating, a 50 percent RPS. I'll let some of our members directly address some of the integration challenges.

And, also, appreciate E3's presentation, earlier this afternoon, on what the State, overall, is facing as well.

So, I have several key points I wanted to go through on the challenges from. But also wanted to reiterate that our local public power utilities very much see ourselves as being a State partner in trying to reach the climate change goals of California. That's not to say that we aren't going to be faced with some challenges in doing so, through 2030.

One of the challenges we found ourselves facing, particularly over these last few years, is how to navigate what can sometimes be inconsistent and even, sometimes, contradictory policies under the climate change umbrella for California.

We're dealing with a lot of different policies amongst the four lead, State regulatory agencies. There are about 40 major proceedings going on at this time, right now, which we are collectively all trying to stay on top of, and meaningfully contribute to, as well. And

that's in addition to Federal requirements, and our own local requirements by our city councils and mayors.

One recommendation we would have, would be to have better and more meaningful coordination amongst the State agencies, in order to better align the climate change policies.

This could, potentially, include cross-education amongst the State regulatory staff. For example, ARB staff having a better understanding of fundamental issues associated with Renewable Portfolio Standard program, I think would be extremely helpful. In addition to CEC staff, for both the ARB Cap and Trade program, and the mandatory reporting rule, which our POUs are also subjected to.

And then, also, CAISO, as far as the operational challenges and market-related issues, as we move forward to 2030, would be pretty helpful, I think, for us.

We've also recommended earlier this year, we meaning NCPA and SCPPA, had recommended earlier that there be a task force created amongst the State regulatory agencies, that could also solicit input from stakeholders, to help align some of these policies under the umbrella of meeting the SB 32 and SB 350 goals, with climate change and renewables.

We can see, certainly, an important role for CEC

in helping to address some of these inconsistences. A few of which I'll just throw out there.

One is greater evaluation of the interactions between the Cap and Trade program and the RPS program, with the goal of aligning those two. Since those interactions can directly impact overall costs for both of the programs.

Right now, we're facing situations where it's cheaper for us to actually turn of renewables in the State of California, rather than paying someone to take it off of our hands. And even if we would try to sell to out-of-state marketers, we probably wouldn't be getting emissions credit, which Chairman Weisenmiller had noted in a Commission meeting a few months ago, as well. That's probably a problem that we would like to see addressed, both in the lead of the State regulatory agencies.

Another issue that we have found is the recent release of ARB's 2030 discussion draft, of its scoping plan. There's multiple references throughout that scoping plan that the State should preserve and protect natural and working lands from development, intensive development. Which, in our minds, could mean no renewables in some key areas of the State.

They also reference protecting offshore lands.

That's another issue. When we talk about offshore wind, particularly given the different geography of the outer Continental Shelf on the western coast, as opposed to the eastern coast, which could make it more difficult to build offshore wind here, off of California.

It also seems to contradict today's Interior announcement of the memorandum of understanding signed between the Obama Administration's Interior Department, and California, about trying to streamline and build renewables, both onshore and offshore here, for California, to help meet our climate goals.

Another concern that was raised in the scoping plan was working through local planning processes to help preserve open and natural working lands. One key example we have, down in Southern California, that raised a key concern for us, about a year and a half ago, was the further expansion of local ordinances that outright the development of renewable projects in the State of California.

Today, actually, the Los Angeles County Board of Supervisors, Item No. 58 on their agenda, is approval of the final ordinance that bans renewable development of large scale solar and wind in Los Angeles County close to load centers, that serve most of our members here, at SCPPA.

That was a big problem. We had testified before the L.A. County Board of Supervisors. Please don't do that. It doesn't help us trying to reach California's climate change goals. But we were severely outnumbered by a number of local residents who said that they did not want to suffer the scourge of large solar. And that solar belonged in urban cities which, of course, most people know, we don't usually get credit, under California's Renewable Portfolio Standards, for rooftop solar in California.

It also -- if that had happened -- that did happen -- just trying to reach California's 25 percent renewables target, it doesn't really bode well for trying to get to 50 percent renewables target, and trying to build renewable projects in the State of California.

It also doesn't bode well if we already have limits on the PCC2, out-of-state renewables, when the ARB has proposed to eliminate the compliance credit under the Cap and Trade program, which we've been fighting for about 14 months, now. Please don't do that because it would only drive up the costs of out-of-state renewables, which also doesn't lead well to regionalization.

Other issues that are facing is trying to figure

out, or at least slow down, how to do a GHG accounting mechanism that could be incorporated into the 2016 Cap and Trade program amendments. That could potentially also double, even triple the compliance costs for public power utilities. Particularly, those operating in the CAISO EIM, or looking to join that. It would be something problematic towards reaching California's climate change goals.

And, of course, there's the issue of trying to build transmission to bring renewables out of state, especially when some local communities would like to see those high voltage transmission lines undergrounded, which would make building them uneconomical.

The second major impact, of course, is customer rate impacts. Anyone who's ever been through a local, publicly owned utility ratemaking process, we hear loud and clear from a number of people, both our customers, our mayors, our city councilmembers, or commissioners, ratepayer advocates, and everyone else, with extreme scrutiny on multi-year processes to get rate increases through to help pay for, not just renewables, but everything else.

Some of our members, in particular, are already fully resourced in providing power to our customers. And it will take a significant amount of time to exit

long-term commitments that were made, particularly in our case, for out-of-state coal. For example, SCPPA had negotiated an early divestiture of the San Juan coal-fired power plant. It took three years, and one of my colleagues traveling back and forth to Albuquerque almost every single week, for three years, to negotiate an early divestiture of the San Juan coal-fired power plant.

Coal is now, therefore, running mostly at minimal capacity, but we are still required to pay the long-term costs associated with those long-term contracts.

There's a hugely unique issue, both for SCPPA and mostly the Northern California members. Our assets, and I'm going to say assets, not liabilities, associated with Federal hydropower contracts. This is something unique to public power utilities that can be even more complicated than that. Since it does work to help solve the 2030 challenge of meeting California's climate change goals, but also doesn't count towards California Renewables Portfolio Standard.

One key example we will have is the iconic, Hoover Dam, for SCPPA members. This is the only, of our almost 40 projects, now, that is all in by all 12 of our members, as one of the -- all have participant shares in

the Hoover Dam hydro power project.

In order to retain that project, it requires an Act of Congress. And having moved to Washington, D.C., in 2005, with the sole purposes of getting a bill through not one Congress, but it took two Congresses to get an Act of Congress, a once percent chance of approval, to the President's desk, and signed into law so that we could retain long-term Federal hydropower contracts, which are emissions free, and also extremely affordable, for 50 years. Beginning in 2017, for all 12 of our members.

We also have long-term stakes in the Palo Verdes Nuclear Power Plant, which is also emissions free, for -- I think we have a 12 percent stake amongst our SCPPA members, in that project.

Another concern is the future price of renewable energy and what will happen in the market. If, indeed, renewable projects do become more expensive, either driven because of SB 350, or because of what might happen with Congress and Federal tax investments, that could lead to even higher electricity rates that would impact businesses and jobs here, in California.

One example, I will point to, is that the last two days of the California State legislative session, this year, was a biomass procurement mandate that was

flipped into SB 859. The deal that spent nearly a billion dollars in climate change funds. That power we were looking at procuring is well over $125 a megawatt hour. Significantly more expensive than solar and wind. Far removed from the utilities in Southern California. And, really, no viable way to transmit it down to our customers.

So, we're going to be spending an exorbitant amount of money for renewable power that don't actually get delivered to our customers, for some of the largest POUs. So, carve outs like that only drive up the cost of renewables.

Third, recognize that POUs fund projects with municipally-backed financing. Something also very unique to public power. This creates special constraints and rules that we are required to follow. It exposes us to stranded costs, as in the case with our coal-fired power plants, that we are seeking to get out of early, and also has direct and adverse impacts on electric rates. Which can also, potentially, impact the general funds for local governments in the State of California.

And private use limitation on tax-exempt finance resources are imposed and enforced by the Internal Revenue Service. And these constraints are limited to

only 10 percent of the overall portfolio that we are required to meet.

And fourth is challenges with meeting State and Federal reliability requirements. Because we are required, fundamentally, to keep the lights on. This also includes future, flexible resource adequacy capacity requirements, and the fundamental need and consideration on how to address the famous duck curve, which we are all struggling to deal with on different operational planes for both peak and off peak hours.

Appreciative E3 having already mentioned the over-generation issue for renewables and, also, the need to address fast ramping, dispatchable resources in order to meet load and keep the lights on during that critical evening period.

Also, having increasing discussions on challenges, as we go towards 50 percent renewables, on system inertia issues. What happens when you start taking huge generators of the system, that the grid was built around, and then start replacing them with intermittent renewable resources scattered, pretty much, all the way across the west, for us.

So, there is certainly future uncertainty on what will happen on the renewable supply, and how that impacts the grid, that also needs to be addressed.

Retail load unpredictability. This is an issue that can spread across any number of issues, including distributed generation, transportation electrification, and what is going to happen, post-2020 or even post-2030, to the retail load for each of the POUs. Especially, when we are looking at entering into the multi-decade commitments to build upon our renewable resource portfolio, while also still having under contract other resources, like the Hoover Dams, that go for 50 years. That's something that also needs to be evaluated, as these long-term contracts expire or we enter into those.

Finally, I can't not say that there is the ever important Federal factor in all of this. There's a new President taking office at noon, on January 20th, so that can't be ignored. And what that impacts for both FERC, the Federal land management agencies for all of us out in the west, EPA, Department of Energy, all of which have extremely important roles to play in that.

One major concern that we have,well, we have a lot of major, a lot of concerns. But one major concern is what a Republican-controlled Congress and a Republican White House can do in terms of comprehensive tax reform. I think I've said it a number of times, already, that we do rely on municipally-backed financing

to pay for all these projects.

There's already, on the table, ways to either minimize, eliminate, somehow change municipal financing. Which we hope the State of California will vigorously defend the ability to pay for these projects using municipally-backed financing.

Any sort of detriment to that tax-exempt financing status would significantly drive up the costs for doing, not just renewable projects, but everything else that publicly-owned power utilities do. This issue doesn't look especially promising. If you look ahead to the 2018, midterm elections, that could very easily see a 60-vote Senate Republican majority that could pass through significant tax reform in two years' time, in the final two years of President Elect Trump's years in office.

That not only, then, impacts climate change policies, the EPA Clean Power Plan, and everything else beyond that, but also judicial appointments. So, that will be another major concern as we look forward to trying to reach a 50 percent renewables.

That's all I have.

COMMISSIONER HOCHSCHILD: Well, thank you for that comprehensive overview. Just before we move on, Commissioner Douglas, did you have any comments you

would add, particularly around the renewable siting, since you've worked so much on that?

COMMISSIONER DOUGLAS: I think this is a more general comment, or maybe it's not so general. First of all, I'm glad to be able to join you. Sometimes, we find ourselves in our own boxes here, at the Energy Commission, as much as we try to stay abreast of all of the issues around us. And, so, I'm really pleased to be able to be here.

And, of course, I've been involved in a lot of siting issues, and was involved, as were a number of us, on the MOU that was signed today. And I'm really pleased with it, as a really strong sign of the State's commitment to move forward, in partnership with Federal agencies. And that partnership has been really essentially in helping us coordinate on planning, and make these things come to fruition. We'll do our part to make these projects come to fruition on the ground.

As an aside, I'm sorry I couldn't join at 1:00, so I came in the middle of this presentation. I missed yours. But in any case, I did want to remark that I do recognize the challenges out there, and I want to be sensitive to them. At the same time, I think it's important to avoid overstatements of them, and to really look for how do we overcome these challenges, as well as

just listing them.

I mean, in particular, I'm very familiar with the L.A. County ordinance. It does ban large wind. It does not ban large solar, unless there's been a dramatic amendment that I'm not aware of.

So, I think it's really important to stick to the, very accurate descriptions of what the challenges and opportunities are that we face going forward. But I say that with an open mind, that I do recognize that it's a world that has a lot of moving pieces that you all need to navigate. And I think all of us, at the Commission, are very interested in hearing from you, and very interested in trying to better understand what we can do to make your jobs easier, not harder, as you move forward. So, I think that's all I'd like to say at this point, but thanks.

COMMISSIONER HOCHSCHILD: Thank you.

Justin.

MR. WYNNE: Thank you. Good afternoon, my name's Justin Wynne, and I'm here on behalf of the California Municipal Utilities Association.

And, so, just one point that Scott mentioned earlier, that I just wanted to reemphasize. It's that even though we're talking about the 16 largest POUs, they're still an incredibly diverse group. If you just

look at the size difference, from the largest of the 16 to the smallest, the largest, they're annual retail sales are 35 times greater than the smallest. If you look at the number of customers, the largest has over 860,000 customer accounts, whereas 10 of the other POUs have less than 80,000 customer counts. Some of them have a very small number of customer accounts.

They're spread out across five different balancing authorities, all different regions of the State, rural, urban. And they have different customer makeup. A different customer class makes it very dramatically different between the 16.

And I think one of the most important things is that when you look at the economics, some of these 16 serve areas of the State with some of the highest unemployment, and highest poverty rates. Others are serving areas with very strong, growing economies. And, so, all of those differences mean that the customer bases that they're serving have very different values. They have different goals for what their utilities should be doing.

I think we recognize that in the IRP process, the POUs and their governing boards need to adopt an IRP that meets the statutory requirements, but that these utilities need to do it in a way that is consistent with

what their local community's values and desires are.

So, I think I was given the more positive message, of the three. Which, I think looking at the POUs as a whole, in the aggregate, and particularly the largest POUs, they are on track to meet the near term RPS goals. So, particularly, the second and third compliance period, they're well on the way to doing that.

And I would say, in trying to figure out where the POUs are today, and where they'll be at in the near future, one caution I would have is in looking at some of the publicly available data, I think we need to be cautious not to draw too many conclusions from that.

I think a good example is the power content label. It adds very specific and useful information, but it doesn't do a very good job of conveying whether that utility is in compliance with the RPS for that year.

Similarly, the data you're pulling from the S2 forms, that's giving you real information and, also, projected information about resource mix and load. But the RPS is a very complicated program. There's a lot of specific rules that mean that if you're just looking at an annual resource, versus load mix, that might not be telling you the whole picture of whether that utility's

in compliance with the RPS. And there's a lot of examples of this.

One is the historic carryover provision. So, a number of POUs were able to take excess generation from the pre-2011 period, and they're able to use that in the post-2011 period.

And the similar in structure to the excess procurement, which allows carryover between compliance periods.

There's also the fact that these are multi-year compliance periods. So, a POU, for a variety of reasons, could dip down in one year and be up in the next year. And, so, in one particular year they may look like they're out of sync with meeting their goals whereas, for the entire compliance period they would still be on track to meet that.

It's also the fact that RECs have a 36-month shelf life, so you could procure RECs in one compliance, wait and then retire them in a subsequent compliance period.

And then, there's also the fact that bucket three RECs wouldn't necessarily show up in a resource mix. But in the first compliance period you had 25 percent, and then 15 percent in the second compliance period, and so that's another area where it's not

necessarily going to show up in like S2 data.

And then, finally, some POUs have very specific carve outs, for good reasons. I think a good example would be San Francisco. If you look at their RPS percentage, I think it's only 6 percent, or something like that, but they're almost 100 percent hydro. And, so, they're a zero GHG-emitting utility. But if you were just to try and factor in their RPS element, it might give you a different picture. And, especially, if you're factoring that in with other utilities, it could skew where the POUs are at, even though they're fully compliant with the RPS.

So, I also think it's important, if you're looking at where the POUs are, and where they're going, to put some context around the first compliance period. The POUs were moving from a voluntary RPS, where they had designed their own rules, and the structure for how they were complying with this. And even though a number of them were complying, were procuring a significant amount of renewables, the RPS program, put in place by SB2X, had a whole different set of structures. They were the bucket requirements and the interim targets.

And, so, moving from the prior voluntary program to the mandatory program had some -- there were some growing pains involved in that.

There was also the fact that how this played out, legislatively, we had the bill to -- it wasn't -- the actual bill, that succeeded, wasn't adopted into well into 2011. And then, the CEC was in the difficult position -- I believe the actual statute said that the CEC had to adopt its regulations by July lf 2011, when the bill wasn't effective until January 1st, 2012.

And, so, it was deep into 2013, the final year of the compliance period, before we actually had a set of regulations. And there were significant things that were still up in the air until the end of that process.

And, so, I think that it's important that the first compliance period was a transitional period. And I think that look at where the POUs will be in the second compliance period will give a much better picture of where we'll be moving forward.

So, with all the caveats around the S2 data, and I'm not an expert in this, but just my rough review of the most recently filed S2 information, if you look at the 10 largest POUs, and you're looking at their percentage of renewables as a resource mix, compared to the data that's in there, there's a clear trend line moving up, as you move forward. And I believe that the 10 largest are roughly at 29 percent, by 2019. And given that that's not taking into consideration all the

RPS factors of, bucket three, any excess procurement, and that puts them well on track to meet the compliance period three targets.

I think a lot of the challenges, that Tanya and Scott have discussed, are things that have taken place after that. And, so, I think that's where it becomes much more difficult in the post 2020 period. But on the near term, I think as a whole, in the aggregate, the POUs are well on their way to meeting the RPS targets.

There was -- one of the questions was things that the CEC could do to help with this. And, so, I think some of the other utilities, that talk later, will bring up some things. And, so, we'd sort of asked for some input. And I think we'll provide much more detailed responses and comments.

But some of the initial responses we got, I think the focus was on that the CEC could be a source of data that could help solve some of the problems. Some of the initial suggestions were about projected carbon cost scenarios through 2030. Projected ISO renewable integration costs, looking at different technologies. Assumptions and data around the GHG emission factor for ISO system power.

And then, also, and I know that this has been discussed, that there's publicly available data around

cost information, and performance metrics for different renewable types, that could be publicly posted by the CEC. That would also help, as well.

But like I said, we're get a lot more detailed on that when we actually file comments on this.

COMMISSIONER HOCHSCHILD: Great. Thank you, Justin.

One other thing I would just add to the mix. My staff and I, this morning, met for an hour with the head of our R&D Division, Laurie ten Hope. We're now planning the next, triennial investment plan. And that's $150 million a year for this suite of clean energy, storage, efficiency, technologies. And if anyone, over the course of the rest of this afternoon, has specific ideas on where research money could be best deployed -- I mean, we've already put money into offshore wind, into energy storage, into grid integration. But particular research needs, that's very timely right now.

So, well, let me thank all of you. Courtney, all yours.

MS. SMITH: Great. Okay, now we are going to transition to hearing directly from the POUs, themselves. So, I'd like to introduce and invite up Scott Harding, from Imperial Irrigation District.

MR. HARDING: Scott Harding, with Imperial Irrigation District. I just want to start off by saying thank you very much for the opportunity for IID to come, before you, and talk about where we're at, where we think we're going to be, and some of the challenges in meeting the State goals, both currently and post-2020, under SB 350.

Also, just to start off, I'd like to echo the message that the previous group has brought to us. Particularly, I want to especially thank SCPPA and CMUA. They've represented IID on a number of fronts, in such a great manner. And we really appreciate that, especially when it comes to interactions with CEC and State agencies.

I want to talk, briefly, about kind of our overall objectives in our current IRP, and how we think that will be adjusted under SB 350. And I also want to talk about our development process and some of the key drivers, again, that we think that will be driving us now, and also after SB 350 takes into effect.

And then, I'd like to address, specifically, some of the questions that you guys had for the utilities. I have a couple of slides on that. And I also want to provide a current status update and some of the next steps that we anticipate at IID.

So, just want to provide just a brief overview of what some of our objectives are in our IRP. Essentially, we have a number of different functions at IID, just as any other POU has. Each of those functions has different activities that they're involved with and different things that they have to comply with.

So, the goal of the IRP is to integrate all of those things together and move forward in the most optimal direction.

One thing that I do want to highlight, and one of the main reasons why IID is here, is that we are a balancing authority. So, balancing authorities have different requirements than other POUs, that don't. And, so, some of the activities that we have to do, as a BA, may be different and apply differently when complying with the various laws that are in the State, just because we're a BA and we have some overlap of Federal, and regional activities, and commissions, and so forth, and State commissions. So, that's something that I do want to make sure is a distinction with IID, compared to other POUs. And I'll kind of touch on that a little bit later on, in the presentation.

And by the way, just go ahead and interrupt me if you have any questions, happy to answer anything.

Our development process is to kind of gather key

assumptions and input from the various stakeholders, both internally and externally, at IID. IID is a balancing authority in Southern California that covers Imperial County. Which, as you probably all know, is a very high unemployment areas, between 25 and 30 percent, depending on the year. And, so, it's very important for IID to consider the situation with the economy.

And we think that RPS objectives help the local economy and we think that IID has a lot of abilities to help other POUs in meeting those objectives, as well, from our local area.

And then, we identify strategic alternatives and scenarios, and then we assimilate and study, and then present the final findings. This, we think, is a very complex process. As was mentioned before, by a couple of the other presentations, it's multi-layered. There's a lot of moving parts that are constantly changing, which make it difficult to make a plan, and then stick with a plan. And then, once you have a plan, find out that things are changing, so that we have to change our entire activities or one element of the activity that changes the entire activity. So, it's a very complex, multi-layered process.

And we think that it's important for us to have a very concise process, so that we can at least, at the

very least, stick to a plan to the best of our ability, while things change.

A couple of key drivers that we have in our IRP process that we, again, see now, and also under SB 350. One of them, again, that's very critical to us, is preserving our BA and making sure that we're maintaining system reliability as a BA.

And, of course, meet the environmental and regulatory responsibility, and even exceed it, where possible, and cost effective. And, also, we want to provide competitive rates.

The idea of this particular slide is to emphasize that each of those different drivers overlap with each other, and each of them are very important to the extent, almost to the extent that they are equally important.

But in the center of all those drivers is meeting our customer needs. So, we have our ratepayers which, in the end, own us. And, so, we want to meet their needs. So, linking the State requirements and customer needs is a difficult challenge that is an important focus for us, in our IRP process.

I want to talk a little bit about some of the questions that you guys had for us. We're expecting to be well above the 33 percent, 2020 target. We're very

proud of that. We've met all the targets to this point. And we're happy to announce that.

And I want to just kind of briefly show a graphical representation, here, of where we expect to be by 2020 and beyond. This particular graph is using all the renewable resources that we have approved, and contracted. And anything under that red line is being used to meet the goal.

In our particular case, however, because we're a BA, most of our -- in fact, all of our resources to this point have been portfolio content category one. And, so, in order to sustain ourselves as a BA, and preserve that BA, there are some definite challenges when you compare an annual requirement to the requirements we have as a BA on a monthly, daily, hourly, and intra-hourly basis.

So, in reality, this particular graph just shows what the State annual requirements allow us to do in terms of carrying forward, or not retiring, RECs until they're needed. And, so, 2020, for example, is when a resource comes online, where we'll have a lot more generation, than what is shown on this graph here, for renewable resources. We actually expect to be more like 40 percent for the year. For the year, itself. But thanks to current guidelines, we're allowed to push

those forward and roll them forward.

Another breakdown I'd like to show is the breakdown of all resource types. So, we have a good diversity mix of geothermal, biomass, solar, and small hydro. We expect to meet the 50 percent requirements with a continued diverse mix. And, so, I wanted to show that to you.

Going back to some of the major obstacles integrating to a 50 percent portfolio, we will meet that target, just to let you know. However, we do want to echo some of the challenges that some of the other folks have mentioned, already. That there are obstacles. there are challenges. First and foremost is cost and some of the risks involved in operations. There's a number of activities that are affected by resources that are not controllable. And, so, there's a risk to that. There's risks in terms of reliability. There's risks in terms of cost. There's risks even in terms of regulatory requirements that may be overlapping from the Federal and State levels, as a BA.

Another challenge is integration as a BA. Since we're a BA, folks look to sync to our system. And, so, we have to balance that with quick-responding generation within the hour, intra-hour and within the hour.

Also, one of the things that I do want to

highlight is the difference between 50 percent today and 50 percent in 2030. There is a very distinct difference in perception. It's kind of like money, if you will, something that's worth -- the dollar is worth something, now, and may be worth something different later.

In this particular case, our 50 percent perception, today, would represent 1,700,000 megawatt hours in 2020. Whereas, in 2030, because of low growth and other things happening, that's actually a couple hundred thousand more.

So, one of the things that we do want to emphasize is that if you have growth, which we think that a lot of other programs are promoting growth, if you have growth, then you also have to account for higher amounts of renewables in that growth. So, that's a challenge for us.

And then, in terms of process and timing, how will targets be administered? Emission targets and RPS, and the relationship between the two? I think, so far, a lot of folks have already mentioned that the minimum of 50 percent RPS will be needed and required to meet the emissions requirements. And even, furthermore, depending on what those emission targets are.

And then, determining the best mix, that may change as conditions change. And all these obstacles

kind of all are tied together in some way or another. I do want to emphasize that. And the best way to emphasize that is about the forecast.

So, we can look at a straight line graph all day long and say here's what we need to do, but there's a lot of things that can happen that can alter that. There's a graph that I want to show here, looking at the similar graph that we just looked at a few minutes ago but, rather, what happens when our load grows at a faster rate? And maybe we have higher production that what is expected, which is not within our control. It's a very minimal amount of control of how much is produced, or how little.

And then the other, orange line, that you see at the bottom part of the graph, is what if load grows faster than expected? Or what if -- and also combined with production levels being excessive.

And, so, you can see the distance between the orange line and the blue line, in meeting that 50 percent, it's several hundred thousand megawatt hours of difference. So that, as you can imagine, has a major cost impact. And, especially, when it comes to the IRP, it has a major impact on our planning process and how we need to meet those different goals and address the risk of forecast error.

And another thing I want to emphasize is the fact that when it comes to production, when you can't control the extraction of the fuel source you, essentially, have very little control over the resource of that is another -- that's a part of this particular illustration here, in that many of the resources that we have already signed, or that we will sign, have very little control in terms of being able to plan around the production of that resource. So, that's a major challenge for us. And that all can affect our abilities as a BA, our abilities to provide competitive rates, and some of the other aspects that are involved, as well.

Talking about the role of energy storage and meeting the 50 percent goal. Where flexibility is absent, we think that quick response is absolutely critical. Again, where you can't control the fuel source extraction, you have very little flexibility. And, so, when you're talking about lights turning on, and especially in Imperial County, the air conditioning is turning on and off, those are things where quick response is absolutely critical.

The degree of the role will depend on pricing, comparative alternatives at the time of the decision. So, again, if we decide something today for 2025, there's a lot of things that can happen between now and

2025. A lot of things that can change, that can make that decision today good or bad. So, that's something that we think has an effect on what happens with energy storage. We do think it can help integrate less stable resources.

And one note that we do want to make, and again emphasizing that the aspect of being a BA is that using common assumptions I think can be difficult to apply in the same manner for many different types of utilities.

And then, specifically in IID's case, we just recently installed, as of September/October, a 20-megawatt, 33 MVA, battery storage project, which we're very happy to have online. We already see its impact. But we still need to study things a little bit more in depth to really see its physical abilities to do things that we're hoping it will do. And we do think it's a very good resource to help us shave some of the impacts of intermittent resource integration, and help control our area control air.

Information from the CEC. We think that to address that question that you guys had, we think that close coordination is absolutely critical. I do want to point out that the coordination that we've had over the last couple of years, with the staff here, at the CEC, has been very good, very helpful. And Emily Chisholm's

group, and Courtney's group, and a number of different, other staffers that have just been really patient with us, explaining some of the things to us. And, also, just helpful overall. And we think that is absolutely critical to continue in the future in order to meet the 50 percent in a way that helps us with our goals.

Also, one thing that I do want to mention is that I think it's if you're looking at the CEC guideline, as somebody who has a reason to look at it, it's fairly easy to understand. But if you're somebody who is in the public and you hear just a generic comment about meeting the 50 percent, they just automatically think 50 percent is what it is. But, in reality, the guidebook does have a lot of other abilities for you to meet that 50 percent. But the public perception is not really aware of that.

And, so, we think that having clear pictures of compliance mechanisms is something that could be helpful in that process. It's both something that is a challenge to IID, to our public, and to our upper management, even, but also it's something that could be helpful from the CEC, as well.

In terms of DRs, we think it's important to evaluate each resource carefully. And, in terms of how those interact with the control of our system and the

customer side of the meter. Public programs that help us understand the customer side of the meter will help prevent the loss of reliability control. And that's, again, as a BA that's extremely critical to us. When you lose that control, on both the IID side of the meter and the customer side of the meter, that just makes outages more probable.

Smart metering and smart grid. We've already started looking at how that can be implemented into our system. We think that's extremely important. Again, when we're talking about both sides of the meter. And then, we've already started some system upgrades. As of now, we have some others planned, as well, to address those types of programs.

We actually have a draft of our current IRP, but it uses assumptions that we are just assuming. And we know that the guidelines under SB 350, to be released in mid-2017, will give us more specifics, and some of the guidelines as to how the metrics will work. And we think that that's important in order to create a good IRP, after the guidelines are released.

We will begin development of the next IRP as soon as those guidelines are released, and we'll kind of use the current IRP as a good starting point. We think we have some good studies that will apply to the next

IRP, or at least be a good starting point, or provide good methodology and approach to the next IRP studies.

And then, what we are already seeking to gain input and help, where necessary, in terms of both internal work and work to our stakeholders.

Again, thank you for the opportunity. Happy to answer any questions, but that's all I have for today.

COMMISSIONER HOCHSCHILD: Thank you.

MR. HARDING: Thank you.

MS. SMITH: Okay, great. Thanks Scott.

Next, I want to invite up James Barner, from LADWP.

MR. BARNER: Good afternoon, Commissioners. Thank you for having me here, today.

This is the seventh IRP I've been involved with. We started in 2010. we have a public outreach process every other year in our IRP process. This year, we just completed an extensive public outreach effort.

And I wanted to give you some of our draft results of our IRP. These are very, very new. They're draft recommendations at this point, but -- and you're some of the first to see this outside of our own management.

So, where are we today and where are we going in the future? Right now, we're about 37 percent coal. We

just completed the sale of Navajo, so that will be reduced by about a third in next year's power content label.

In the future, we'll be going to the 50 percent, meeting the SB 350 goal. And our natural gas percentage will be higher but, ultimately, our goal is to have the natural gas percentage be lower or lower than it is today.

To give you a little background, our city council just had a motion for us to study and develop research partnerships to determine what investments would be necessary to get up to 100 percent RPS. So, in light of that, I'll show you some of our plans going forward.

These are our major transformation elements. The top five, we've had for a number of years. The Power System Reliability Program, the fifth one down, is typically not part of IRPs, but it is part of our IRP. That's to basically replace the existing assets in the power system, the poles, transformers, cross arms, and so forth, and have key performance indicators on tracking the progress of that. Supporting electric vehicle expansion was added in 2014.

Our RPS standard in 2016, or accomplishments, we plan to reach 25 percent RPS in 2016. We also completed

the sale of Navajo, at the end of June. July 1st, actually, of last year, we completed that sale. So, we're out of that facility.

We also added another 480 megawatts of solar PPAs on our system, through SCPPA. We expanded our Charge UP L.A. EV Program. Placed into service a number of chargers and increased our budget, considerably, to $21 and a half million, through 2018. And we plan on increasing that program going forward.

We also completed our Barren Ridge Renewable Transmission Project, and added close to 2,000 megawatts of additional transmission capacity there. I'll talk about some of the challenges associated with that.

To date, we have about 1,000 megawatts of solar on our system, and 200 megawatts is local solar. A thousand megawatts of wind, 150 megawatts of geothermal. So, we're making good progress towards SB 350.

The key output of the advisory process is to develop the set of cases that we analyze in our production cost modeling, and come out with the results, that we'll show you here.

We had a set of 50 percent RPS cases, with low and high local solar amounts, low and high storage amounts, and electrification, low and high electrification.

We also had a set of 65 percent RPS cases, with low, and medium, and high local solar. High and low energy storage. And high EV for all of those.

The reason why we came up with the 65 percent RPS was to basically create a pathway towards that 100 percent. Since the IRP is a 20-year document, we would cut it off at the 2036 time frame. And that would be, basically, straight lining out from 2030, at 50 percent and going forward towards that 100 percent pathway.

One of the key outputs from our modeling is the resource adequacy. We changed our methodology pretty significantly this year, where we considered all hours of the 20-year period. Looked at the maximum dispatch that would be required from our dispatchable generation, minus the solar and wind. When you include the solar component here, the net peak load shifts downwards, and with wind it shifts down further. So, this is the 2017 look.

So, our peak load is typically around hour three to hour five, 3:00 p.m. to 5:00 p.m. What we found in our analysis is that with looking out to the future, with larger amounts of solar, it pushes this net peak load out even further. And we find that our peak hour shifts from about hour three to five, to about 7:00 to 9:00 p.m., at night. This is very significant because

this changes the way we look at our renewable resources in the future. Realizing that solar is not available at that time of the day, so that's changed our outlook.

The output of our modeling, in our resource adequacy, is shown here at the levelized cost of various resources. Here, including renewables, combined-cycle gas, simple-cycle gas, and the various energy storage technologies.

The capacity factors that are output from our modeling are shown here. We have the peak load dependable capacity. The next column, from 3:00 to 5:00 p.m., that's how we used to evaluate it in the past, before we considered the net peak load shift, with renewables. Now, we're looking at the 7:00 to 9:00 p.m. period, and you can see here that solar and wind basically provides little to no dependable capacity, without the additional energy storage that's necessary.

Here's our breakdown of our capacity and our resource adequacy. So, looking at this peak hour that occurs in the summertime, it just happened to occur in the summertime, like before, we found we have some capacity shortfall. In the future, we're not too concerned about this. We monitor this. We have various options at our disposable. Various distributed energy resources that we can implement. Additional gas-fired

generation, if necessary.

The problem being is that with the exception of geothermal, we have a very difficult time replacing that capacity.

Here, at the 65 percent case that we analyzed, we had less of a shortfall. That's because we had more storage in our modeling. We increased it from 178 megawatts to 404 megawatts. We did have some more contribution from renewable because we added some additional geothermal in there.

Our energy mix for our breakdown, for our renewables, is shown here. We have about 3,500 megawatts of solar on our system, shown here. The red line is the SB 350 targets that are mandated. In the 65 percent, we have the SB 350 targets here, again. But you can see that instead of leveling off over time it's continuing its upward trajectory. Here, we've added additional geothermal and wind in this scenario.

Battery-electrification forecast -- electric vehicle forecast, excuse me. We used the IEPR forecast that you provide us, which is very helpful. And I think that's one of those areas where we look forward to your expertise in that area. Our goal is to double that, which is the green line. So, we've evaluated all of these cases and the higher level of EV penetration, of

580,000 vehicles by 2030.

Greenhouse gas emissions output from our modeling, for this is for the 50 percent case. The gray line is the business as usual, no future investments in clean energy resources, energy efficiency, renewables, and so forth. And the red line is where our modeling shows we will be in the future, with a 50 percent RPS, meeting SB 350's goals.

The dashed line at the bottom is the 80 percent below 1990 target, set by AB 32. So, you can see we're above that. We'll be 40 percent below 1990 levels by at least next year, or the year after that, once we've had a full year pass by without Navajo in the mix.

With the additional electrification credit given, you can see our emissions forecast is lower there. That assumes that we get, basically, a four-to-one ratio from CARB, for that credit, for the electrification. So, we think that's very important to get to those higher levels of emissions reductions.

The next line here is the 65 percent. You can see the difference. It's pointing downwards, instead of continuing to grow, as the 50 percent levels off. And then, you have the electrification credit showing here, with the dashed line.

Transmission upgrade challenges. This is a 10-

year project. This is a $500 million project, increasing the transmission capacity from Barren Ridge, which is up above Edwards Air Force Base, there. We increased that line capacity from 150 megawatts to 2,200 megawatts. What we found is that became fully subscribed almost immediately. And, so, we basically maxed out the capacity of that upper end of the line.

What we realized was there was basically, a bottleneck at the end, below the Haskell Canyon facility, that you can see the green star down at the bottom. That facility, down lower, we realized we would need additional upgrades to reach the 50 percent RPS. So, we have started that process, after we've done the power flow analysis and so forth, to upgrade those lines. And that's a pretty extensive project. It won't be completed until 2022. So, we're kind of at a standstill with our solar projects at the moment. We can't put anymore solar projects online, in that area, until we complete those additional upgrades on our system.

We started, recently, getting all of our programs together, looking at a distributed energy resource integration study. We realized that the IRP sets a lot of targets for a lot of these programs. But, and the programs, themselves, kind of develop the

different measures that they have within those programs. But those measures, within those programs, aren't necessarily tied to our overall objectives. And one of those being reducing that net peak capacity on our system.

And, so, now, we've tried to align all of our project managers and planning staff towards that goal. We've started a -- kicked off, just last week, an integration study to look at where, on our distribution system, we can have the most value on our system.

Energy storage plans. We have a number of programs here to try out different things on the generation side, transmission side, distribution side, customer side, behind the meter, batteries, for instance. Also, at distribution stations. And then, we have a small project at our JFB. And this is part of the 178 megawatts that we responded to the AB 2514.

So, in summary, the challenges. I tried to list here some of the challenges. We have limited available transmission capacity for renewable projects. In addition to the Barren Ridge project, we have restrictions on our Victorville/L.A. transmission corridor. We have lots of transmission outside of there, but it all comes into a sort of a corridor where you have a maximum capacity. So, we're now having to go

through and upgrade that. And that will come in about the same time as the Barren Ridge/South Haskell upgrades, as well.

So, in the meantime, it would be helpful to have some flexibility in the RPS category two and three, to help out in that regards, so we don't need to build a lot more transmission, necessarily.

We're concerned about the disposition of our grandfathered RPS contracts. We have a lot of wind projects in the Pacific Northwest that are considered grandfathered. And once those contracts end, we're concerned that it may not be grandfathered, or we just don't know what the disposition of that will be. So, we'd like to have clarification on that.

We're concerned about the Cap and Trade post-2020 allocations. As currently proposed, they're looking at 2 million metric tons, and that's even lower than the AB 32 2050 target of three and a half million metric tons. So, it's almost even half of that. And that's in 2030. We did our own, internal analysis, based on the floor price of the Cap and Trade allocation prices, and came out that that would have a minimum effect of $500 million of revenue on our LADWP. So, we're concerned that that will affect our efforts, impact our efforts to implement more renewables in the

future, and clean energy programs.

The PV solar, and wind has very little dependable capacity, so we need to start looking at storage. And then, preferably, geothermal, which has that capacity benefit, as well.

We're concerned about the -- using rates, and the effectiveness that would have in the residential sector. We think it's effective in the commercial sector, industrial sector. But in the residential sector, there's a lot of investment, and AMI metering, that has high costs relative to the benefit, and it has relatively short lifecycles. And we don't know what the effectiveness of that is at reducing our net peak load.

And then, distributed generation deployment is challenging, especially within a dense, urban environment.

Opportunities. Improve coordination, and flexibility, and cooperation between the agencies and the POUs, recognizing our past and future investments, and good faith efforts by POUs to reach the State goals. Continue to recognize and grandfather RPS projects beyond the original contract term.

CEC forecasts, and especially electrification, is very helpful for the IRP planning process.

We'd like to have committed certification

process timelines, so we don't have a lot of variability in how long it takes to get our projects approved for certification.

And then, we'd like to have increased research funding for new RPS technologies and long-term energy storage. Since we're looking very far out in the future, we'd like to see more funding for enhanced geothermal systems. And then, also, production of hydrogen for long-term energy storage purposes.

And then, promoting batteries behind the meter, at the customer sites, along with net-metered PV systems. We think that will have a big benefit to meeting that peak load demand, net peak load demand.

And then, lastly, the energy storage needs being based on optimization, it's very complex to optimize energy storage resources. And, so, just prescribing them is not -- we don't believe is the solution. They have to be very carefully integrated to extract the most benefits and get the right mix of technologies in place.

Thank you, and if you have any questions?

COMMISSIONER HOCHSCHILD: Thank you.

MS. SMITH: Because James mentioned funding for geothermal, I thought I would give a small plug. The Energy Commission currently has a solicitation, out on the street, for $4.7 million to support geothermal

resource development. The deadline for application is January 20th. And it really is specifically focused for both local governments, as well as private businesses to apply and receiving funding for research, as well as the development of geothermal resources throughout the State of California.

So, if anyone has any questions on how to apply for that opportunity, please let me know.

Okay, with that, we are going to transition to an online presenter, Jim Stack, from Palo Alto.

So, Jim, we are going to unmute you.

MR. STACK: Great. Good afternoon. I hope you can all hear me okay?

MS. SMITH: Yeah, we can hear you great.

MR. STACK: Okay.

MS. SMITH: So, why don't you go ahead and just let us know when you'd like us to advance your slides, and we can do that for you.

MR. STACK: Okay, thanks. And thank you for the opportunity to be here or, well, to speak with you by phone, about Palo Alto's renewable energy experiences.

Most of the POU presentations you're going to hear today will probably touch on some broadly similar points. But one feature about this presentation, that's a little bit different, will be that Palo Alto has

effectively already met the State's 2030 RPS requirements, as of the end of this year.

The next slide. So, I'll be able to talk to you a little bit about what we had to do to accomplish that. But I want to point out that having already achieved the 50 percent RPS level, that simply takes care of the procurement part of the equation.

But looking forward, we're still going to be facing a lot of the same sorts of challenges that other utilities will, particularly in terms of costs. In fact, we probably have even more exposure to some of those challenges than other utilities.

So, I'll also touch on some of the roles of DERs, and storage in our plans, and some other aspects of our utility that are fairly unique.

The next slide. Palo Alto's been in the electric utility business since 1900. And the City now operates six utilities, with five of them being managed by the Utilities Department.

The next slide. So, this chart shows how Palo Alto's renewable energy procurement has progressed year by year. We started out, at the beginning of the 21st century, with just a little bit of small hydro in our portfolio, from decades ago. Then, in 2004, we started executing new PPAs for wind and then the ethanol gas

resources.

And then, of course, in the past few years, as solar prices have fallen, we've executed six PPAs for solar resources, now. And as of a week and a half ago, we now have five of those resources online. So, with those five resources all operating, we're projecting that we're going to reach an RPS level of 60 percent for 2017.

The next slide. So, how did we reach that level? As you all probably know, Palo Alto's a fairly progressive community, and in 2002, at about the same time that SB 1078 passed, which established the first RPS requirement for IOUs, Palo Alto voluntarily instituted its own RPS target. That was originally a 20 percent target by 2015, which was a couple of years earlier in the requirement for the IOUs. And then, it was later bumped up to 33 percent by 2015.

However, at the same time that we adopted that first RPS target, we also adopted a rate impact limit, or a cost limitation limit. We agreed not to exceed a certain rate impact on our customers in pursuit of that RPS target. So, it's never been a matter of pursuing renewables at any cost. Our costs have always been a pretty strong consideration for us.

As I mentioned on the previous slide, we began

executing PPAs in 2004, and we now have 13 of those in place, plus three more that we've terminated. We have six solar, five with ethanol gas and two wind PPAs in place right now. All those projects are now operating, with the exception of that last solar contract that we executed this year. That was the famous $36-a-megawatt-hour contract, which is supposed to start in 2021.

And then, we've also been very aggressive in pursuing energy efficiency measures which, of course, help reduce our load, therefore, reduce the amount of energy we have to procure. Like a lot of utilities, we've been seeing our load decreasing pretty consistently over the last five or so years.

So, overall, the point I'd like to really make here is that doing all of this stuff has required an extremely significant investment of resources on the City's part. Not just in terms of the cost of buying energy from these renewables plants, although that's certainly not an insignificant amount, but also in terms of the investment of staff time and legal resources. We've spent a lot of time going out and pursuing these resources through our own RFPs, as well as through FTPA's RFPs.

We did all of this because it was something that the Palo Alto community determined was worthwhile, not

because we were mandated to do it.

The next slide. So, this is just an illustration of where all of our renewable resources are located. Right now, all of them are located in California. But as you can see, they're fairly spread out, and there are very few that are in the greater Bay Area, where we are.

The next slide. So, we see a variety of kind of big picture challenges coming our way over the next 10 to 15 years. Even though we've already got enough contracts in place to satisfy our 2030 requirement.

The first three points on this slide are the most significant ones. Basically, as more and more intermittent resources, like ours, are getting built in the State to satisfy the statewide RPS mandate, we're seeing the grid getting built out in order to reach those resources. And, therefore, transmission costs are kind of going through the roof right now.

At the same time, we have so many new, solar resources getting built, LNPs for those resources are being driven way, way down, particularly in the spring and the fall, on low load days.

As the ISO struggles to integrate all these resources, we're seeing our RA requirements rising and constantly evolving, and from our perspective, none of

these trends looks like they're slowing down any time soon. So, even though we've got all these renewable contracts executed, and we think they're priced fairly attractively, frankly, we don't really know what our total financial exposure is as a result of them.

The last two points are just that at this point we don't really have any idea what the impacts of regionalization will be, and all the regulations we face, and that's kind of scary.

And, finally, to the extent that we have any DERs in our system, it all tends to be smaller, rooftop generation, so we're not able to count any of that towards our RA requirements, even though that's real generation that's located in one of the most transmission-constrained parts of the State.

The next slide. And since this is an IRP workshop, I certainly want to touch on some of our regulatory concerns. First of all, as Scott noted earlier, we already to produce an IRP in Palo Alto, although we call it something different than that.

Also, I wanted to emphasize that we're a community that went out and achieved the State's 2030 RPS mandate, and we did that not because we were told to do it, or instructed on how to do it, but because the community decided that we should. But we would really

like to see regulations that are flexible enough to allow communities, like ours, to be creative, and to be ambitious, and to meet the broader State goals in the manner that's best suited to us.

Also, and this is important to us, as a community that went out way ahead of almost everyone else, we'd like to see regulations that reward early action, rather than penalizing it.

For example, this is something we touched on in other forums, but most of our renewables contracts were executed prior to June 1, 2010. So, even though they're located in State, they're deemed to be PCC zero resources, rather than PCC one. And that means that we have relatively little room to procure any new PCC three resources. And we haven't procured any of those resources to date and, obviously, we don't have any need to procure them right now to meet our requirements. But we would like to have the ability or the option to do so which, right now, the regulations limit pretty severely.

I also wanted to make the point that all of the reporting requirements we face, as well as the time we spend kind of weighing in on the regulatory language, it really takes away from the time and the resources that we get to spend on going out and serving our customers, and working on satisfying these ambitious State goals.

So, to the extent that we can streamline regulations, and make them more consistent, and predictable, and avoid redundancy in reporting requirements, that would certainly be very helpful.

The next slide. In terms of storage, we recently completed our second storage assessments. And we determined, again, that it doesn't make sense for us right now because it's still not cost effective. But we're seeing storage becoming closer to becoming cost effective, and we think it might reach that point in the next five to ten years. So, we are considering moving forward with small scale, customer-sided storage projects in the next few years, in order to get some experience with that technology.

And we certainly think that when storage does become cost effective, it will be very useful for helping to minimize the curtailment of solar resources, mitigate some of the duck curve problems, satisfy our RA, and ancillary service needs, and improve the overall stability of the grid.

The next slide. In terms of distributed resources, Palo Alto is definitely a very built out community, so there's not a lot of open land available to build a decent size solar or wind project on the ground. So, although we have a lot of PV installations

in town, they're mostly pretty small, rooftop ones.

And right now, local solar is meeting around one percent of our total energy needs. But we do have a goal of quadrupling that amount by 2023. And we're going to try to do that partly through our own feed-in tariff program, which we launched in 2012, and partly through our community solar program that we're working to develop right now.

We also have an extremely high penetration of EVs in Palo Alto. But so far, we haven't really seen a big distribution system impact, either from the PV or the EVs, because our system is built pretty robustly to begin with.

And, lastly, we also are operating a voluntary demand responses program for our large, commercial customers, in the summertime. And we've seen the ability to reduce our peak demand by between 300 and 900 kilowatts through that program.

The next slide. Just a few notable characteristics about Palo Alto, in addition to our high RPS level. As I mentioned, we're a very built out community. There's limited potential for local distributed generation.

We also have a very high rate of uptake for both rooftop PV and electric vehicles. And that can make

both load forecasting and distribution system planning pretty challenging in the long term.

And, finally, in addition to our renewables, we have a very high concentration of large hydro resources in our portfolio. And hydro, of course, being so unpredictable year to year, and even month to month, and that can make managing our portfolio pretty challenging.

The next slide. And, lastly, Palo Alto also has some fairly unique goals. For example, a few years ago, our city council approved a carbon-neutral supply plan. And this program, it wasn't pushed on us by any mandates. It came about completely in a grass roots way, with a group of our local residents getting together and saying, we have a lot of hydro in our portfolio, and a lot of renewables, and our rates are still very low, so let's just finish the job and get to 100 percent carbon neutral. So, we've been doing that since 2013.

And, now, that same grass roots effort, that same push from residents has led us to some very aggressive local solar goals, and a big move into electrification, as well as some extremely aggressive GHG reduction goals.

And that's all I have, so thank you for your time.

COMMISSIONER HOCHSCHILD: Thank you.

MS. SMITH: Great. Thanks for patching in, Jim.

Next, I'd like to invite Bryan Swann up, from the Southern Municipal Utility District. Oh, Sacramento, wow.

(Laughter)

MS. SMITH: My utility. Sorry about that.

MR. SWANN: My name is Bryan Swann, with the Sacramento Municipal Utility District. Oh, did I do that? I'm the Manager of Forecasting and Economic Analysis at SMUD, also known as the Resource Planning Group.

First off, just want to thank the CEC staff for coordinating this, and Commissioners for being here to listen to our story, in meeting the 50 percent goal. So, thank you.

Presentation objectives. First, I'd like to just provide a brief overview of SMUD. Second, how is SMUD planning to achieve the 50 percent RPS goal. What obstacles do we anticipate in achieving the 50 percent RPS. And just some final, regulatory suggestions.

So, SMUD's the fifth largest California utility, with an all-time peak load of about 3,300 megawatts. And retail sales somewhere in the range of 10 to 11 thousand gigawatt hours a year.

SMUD is a publicly owned utility, not associated with a city or government, county government. It's governed by a seven-member elected board, of which the SMUD board has adopted several key environmental goals that help shape our resource plan forward.

For example, we've got a 33 percent and 50 percent renewable goal for 2020 and 2030, consistent with State policy. We also have one and a half percent annual energy efficiency goals, as well as 34 percent, and 90 percent greenhouse gas reduction goals for 2020 and 2050.

So, how is SMUD planning to achieve the 50 percent RPS goal? To start, we're well above where we need to be for 2020, the 33 percent RPS. And we've got a good foothold on the 50 percent, as well. We will need additional resources, starting sometime in the mid to late 2020s.

SMUD's IRP process has helped guide procurement decisions to this point and will continue as we reach towards 2030. As we work towards 2030, we plan to continue some of our key processes, including procurement development of utility-scale renewable projects, while relying on compliance categories for flexibility in meeting those obligations.

As well, we plan to continue promoting energy

efficiency in accordance with SMUD policy and State goals. We will continue expansion of DRs in our service territory. We plan on promoting, continuing promoting voluntary green pricing programs, such as Greenergy and Solar Shares. We plan on continuing promotion of low income and disadvantaged community focus programs, of which we have a few. Focused on solar programs for those communities, as well as energy efficiency, education and installation.

As well, in reaching towards 50 percent, we will use our transmission assets, as well as EIM participation, to support achieving the goal, as necessary.

The last point here, on this slide, is just we haven't determined a 2020 energy storage target as of yet, but we'll do so within the next year, or less than the next year.

This table just reports some of the latest renewable developments or contracts that we've been working on. As you can see, we've got a quite diverse mix of resources here. For example, we've got a geothermal contract that we've arranged for, to come online next year, in the Salton Sea area. As well, we've got a 200 megawatt wind project in the desert southwest, that we have planned online in 2019. We also

have some larger solar PV projects that we have in the works. Primarily, to feed our Solar Shares program.

This chart just illustrates where we are in reaching the 50 percent RPS, as can be seen here. It's not until compliance period five, where we actually need to go out and procure some additional renewable resources. And, you know, as we have in the past, we'll be proactive in procuring those resources in case the actual megawatts don't show up as expected.

So, what obstacles do we anticipate? SMUD's on path for 50 percent, but there are some obstacles that we might see. DRs, for example, are impacting load growth. With peak loads, we're expecting to be about flat. Energy loads are expected to actually have a negative growth over the next 10 to 14 years.

The whole duck curve issue, increasing levels of solar PV cause peak load shift, increasing ramping needs, and over-generation in low load periods.

Distribution system upgrade may be needed to prevent local voltage issues caused by clustering of rooftop PV systems. So, better planning at the distribution system may be needed.

And, finally, on this slide, just planning to meet load is difficult when DR adoption is largely up to a consumer. So, resource adequacy planning could be a

moving target.

This chart just illustrates one of the points I made on the previous slide. You have gross demand. These are gigawatt hours of retail sales. When we take into account the net effect of EV, PV and electric vehicle load, this is kind of where we see our net loads looking like in the next 10 to 14 years.

So, how can SMUD mitigate some of these potential issues? First, I'd like to mention that SMUD's system, between its UARP (phonetic) and thermal assets is -- has a high degree of flexibility. And, generally, we don't anticipate needing significant new capacity resources for the next decade. That's one interesting finding that we found as a result of the Iowa Hills study, that our current system was flexible enough to handle even a 50 percent RPS.

Curtaining solar PV will be key when penetration is high. Smart inverters could help integrate PVs. Energy storage can help manage over-generation caused by solar PV. However, costs are prohibitive at this point. I think that's a common theme that we're all hearing here, today.

Advances, technological advances in DMS and DRMS will help optimize the use of storage in solar PV. But to this point, our experience is that the technology's

not ready for market, yet.

EIM participation will provide access to more balancing resources for integrating renewables. The diversity of that market will just allow access to more ramping, and AS resources.

As many of you are probably aware, we're currently evaluating a transmission project that would allow greater access to regional markets, renewables, allowing for possible carbon reduction in SMUD, as well as a hedge against resources that don't actually materialize.

And the final point on this slide is just that SMUD's considering adopting planning guidelines, consistent with AB 327, that evaluate DR resources versus traditional distribution system upgrades. This may lend to better planning at the distribution system level and lend to DRs being implemented across SMUD's service territory in a more methodical approach compared to customer adoption.

SMUD requests a few considerations when talking about regulations, moving towards 50 percent. We ask that regulations be certain, while flexible, allowing confidence in resource decisions that are made years in advance, allowing for reasonable costs to comply. We ask that voluntary renewable programs, like SMUD's

Greenergy and Solar Shares programs continue to count towards RPS goals, and that the reasonable proximity requirement be broadly defined.

The proposed language, here, requires generation to be in service territory which, for SMUD, would restrict its ability to purchase competitively priced renewables, located throughout California.

We ask that more certified biogas count towards RPS obligations. Biogas lends to greater system reliability, given the generation can be shaped. So, it's kind of a -- with biogas, it's a two-headed, I guess, benefit for us in that it can help firm the issues seen with intermittent resources, while also contributing to our RPS obligations.

We ask that the CEC's IRP greenhouse gas planning targets are consistent with post-2020 ARB greenhouse gas reduction goals, so that POUs are not attempting to comply with dueling requirements.

And, finally, we ask for guidance in collecting and certifying residential SB1 RECs that, for SMUD total 60,000 RECs a year. Which due to the high admin costs of collecting and certifying, SMUD has not yet benefitted from. So, if there's any ease in the collection requirement, that would be appreciated on our part.

So, in summary, SMUD is positioning itself to meet the 50 percent RPS and is well on its way. Obstacles may be seen with high penetration of intermittent resources and lack of visibility of behind-the-meter distributed generation. Although SMUD's system has a high level of flexibility, which we'll be able to handle intermittency issues for some time, EIM and transmission plans will add to this flexibility.

Smart inverters and energy storage, along with DRMS will lend to optimized use of these DRs, though the the standardized technology for that application needs some work, we believe.

And, finally SMUD asks for regulatory certainty, flexibility, and consistency as the CEC develops regulations under SB 350.

COMMISSIONER HOCHSCHILD: That it? Thank you very much.

MR. SWANN: All right, thank you.

COMMISSIONER HOCHSCHILD: And this is our last speaker next. Right?

MS. SMITH: Okay, for our last formal presentation by POUs, we're going to turn to Lincoln, from Burbank. Lincoln, we're going to unmute you.

MR. BLEVEANS: Okay.

MS. SMITH: Oh, we can hear you.

MR. BLEVEANS: There we go. It looks like the presentation is up. Okay, this is Lincoln Bleveans from Burbank Water and Power. And as the other speakers have said, greatly appreciate the opportunity to speak with you this afternoon, and share our concerns and, hopefully, share some possible solutions to those concerns.

I'd like to echo everything that my colleagues have said. I thought it was very, very comprehensive. I'm going to be a little bit less comprehensive, and probably a little more high level, just to avoid repeating what's already been said.

So, if we could go to the next slide, please. So, first of all, just a quick introduction to Burbank Water and Power. Obviously, a municipal utility in California, down here in pretty much in Hollywood. Our customers are, by and large, well, we have a lot of residential customers, but also the big studios, Warner Brothers and Disney. We have, I think, the biggest IKEA in North America being constructed right now, in Burbank. So, we have a lot of large commercial customers who have very ambitious renewable energy goals and are very interested in getting out on the cutting edge of energy, and energy procurement.

So, we're in a position where I think, if we

don't drive the bus, they're probably going to drive it for us.

And, finally, we're in the L.A. Balancing Authority. We're not in the ISO. So, we are dealing with a portfolio of both fossil and renewable generating assets, and a finite transmission network to bring those back to Burbank. A lot of which is shared with Los Angeles Department of Water and Power. So, that market access, through that finite transmission system, and not having great access to the ISO, puts us in kind of a unique position.

The next slide, please. So, we have a, I love this slide. We have a very strong commitment to our customers, reliability, affordability, and sustainability, and those things go hand in hand. We've done very, very well, and I've not been here long enough to take credit for it. But we've done very, very well.

Reliability, we've been hanging five 9s at the distribution level, on a pretty regular basis. From an affordability standpoint, I think we're second only to Riverside in the region, in terms of low rates, all end, including energy.

And, finally, we've been at or above 33 percent, now, for a couple of years. So, we're really walking the walk. From a policy perspective, we see ourselves

as policy partners with the State of California. So, I think we're on the same team.

All of this doesn't happen by accident, though. This is really the result of a lot of very careful planning and a lot of very detailed analyses, and very difficult discussions over years, and years, and years to make sure that we hit these numbers year and year out. Obviously, our customers, our citizens of Burbank have benefitted from this, but you do it long enough and they start to expect it. And, so, we're in the position right now to meet our goals, and the State of California's goals, from a climate perspective, while still keeping reliability extremely high, and keeping rates extremely low.

So, that is our challenge moving forward. And for me, in particular, it's a planning challenge.

The next slide, please. So, we have three fundamental things that we're dealing with right now, from the long-term planning perspective. One is that our load is flat to declining. We have done a really good job with energy efficiency, and conservation, and rooftop solar to the point where organic load growth has basically been netted out to a flat or declining curve going forward.

We see some circumstances under which that might

change, but those are not base case sort of circumstances. Those are circumstances that would be a sensitivity, so to speak.

So, we do that, while adding energy to our portfolio in the form of additional renewable energy contracts. And, of course, heading towards 50 percent by 2030.

The next slide. The second of those fundamental challenges is instantaneous intermittency. This is a three-day chart of the Copper Mountain 3 solar project, that we share with Los Angeles, out in the Nevada desert. And, as you can see, when the skies are clear or when it's only moderately cloudy, it's a pretty easy asset to integrate. But when it gets cloudy, and it does out there, you get monsoonal moisture in particular, it gets incredibly hard. And because we're in the L.A. Balancing Authority, we're essentially treated as a sub-balancing authority and, therefore, responsible for matching the generation and load. And this would be generation on a real-time basis.

So, we end up with very, very fundamental economic and reliability challenges coming from the intermittency of renewable energy, solar in particular.

The next slide. Can I have the next slide, please? There we go. And the third is the duck curve,

and we've all seen this chart. We see our own version of the duck curve. We're already seeing it, both within our own system and out in the Western Power markets. And that is both the belly of the duck which is, of course, over-generation.

Most of all, though, it's that late afternoon ramp as solar switches off and our customers go home and turn their air conditioners on. That is an increasing challenge, especially with so much solar in our portfolio, already.

So, what we're trying to do is redesign our rates, in partnership with our city council, to change customer behavior. After decades of telling them that the middle of the day was the wrong time to run your dishwasher, now we've got to tell them that that's actually the perfect time.

And adding storage. And as I'll describe in a minute, we've been very aggressive in looking at that and trying to make that happen.

The next slide, please. So, the agenda said obstacles. I actually like challenges better. Because I really do think that's what they are.

We are a medium-sized utility, very leanly staffed, and all of us have multiple hats. Sometimes we have to write everything down just to remember all of

the hats that we each wear. So, we don't have people who can be dedicated, day in and day out, to resource planning. It's something that we do along with everything else that we do.

And, when you look at the SB 350 deadlines, the idea that everyone, every public utility has to have an IRP done, more or less at the same time, we have a significant concern that that is going to create a seller's market for IRP consultants, and perhaps a shortage of IRP consultants. Because everyone's going to want to do modeling and analysis at the same time, which will drive time longer, and costs up.

We're also over-resourced on the power generation. We have been, even before we started adding renewables back in 2004, in response to direction from our local policymakers. So, we're over-resourced on power generation. We don't have load growth. We have finite transmission coming in. So, from the supply perspective, it's a fairly complicated picture.

Within that, we have unavoidable legacy commitments. For us, the big one is Intermountain Power project. We have committed to exit that project, as the other participants have, and that is in line with the direction that we've received from our city council, and from our ratepayers, when those contracts expire. But

they don't expire until the middle of the next decade.

So, in the meantime, we are long energy. We have too much energy. Pretty much every hour, every one of the 8760 hours of the year. And that creates an affordability challenge, because we're invertedly selling that at less than we are paying for it.

And, finally, integrating renewables. This is a challenge. I really liked the E3 slide, earlier today, talking about the fact that this kind of renewable penetration is a case of first impression for the entire planet. We are truly learning globally and acting locally here. We don't know how to do it. We're not sure, staff, the consultants aren't sure. There are truly -- there's truly no one in the world who knows how to do this from experience. We're all figuring it out as we go.

In response to that, we have been incredibly proactive on storage. Trying to get, for example, a compressed air energy storage pilot project going at the Intermountain site, which happens to be perfect for it. And we're still hoping to make that happen and be able to look at that in the context of our overall planning needs.

So, we're looking at these challenges. We know what they are. And, now, we have to figure out how to

address them.

The next slide, please. So, and it all comes back, for us, to this commitment to our customers. Reliability, affordability, sustainability. We don't have shareholders. We don't even get bonuses, as staff. But this is our commitment. This is why we come to work every day, and this is what we measure ourselves against.

And as I said before, you don't hit the source of home runs every year without careful planning. Sometimes that looks like an IRP. Other times it doesn't. But now that we have SB 350, and as soon as I finish up our current IRP, next month, we are going to be going full bore on an SB 350-compliant IRP by Jan. 1, 2019. And look forward to support from the staff, probably a lot of interaction with CEC staff.

But as other speakers have said, given unique circumstances in every, single one of the POUs, and every, single one of the communities that the POUs serve, the less prescriptive that is, the better we will be able to hit the policy target. Which is, as I said before, our policy target, as well, with a policy partner with the State of California.

So, with that, I think that's my last slide, I'd be happy to take any questions.

MS. SMITH: Great. Thanks so much, Lincoln.

So, that wraps up our formal presentations. Unfortunately, Commissioner Hochschild had to step out to address a personal emergency that came up.

And we did just want to acknowledge that Dan Severson, from Turlock Irrigation District, is in the audience. We're glad to have you here. And, of course, if you have any comments you'd like to echo, of your colleagues, you're welcome to do that.

Otherwise, I think we can transition to the public comment period. Do we have any comment? Okay. We don't have any blue cards, but if anyone would like to make a public comment, you're welcome to do so, now.

If not, we also have, as I mentioned earlier, and I know that some of the rep organizations mentioned they're going to submit written comment. And, in fact, I peeked over and noticed that some of the Energy Commission staff, who are actually in charge of writing the IRP guidelines, were diligently taking notes when, Justin, you mentioned some of the types of data or information we could provide during that process that would be helpful. So, if you're able to submit that in written form, I think that would be helpful for us.

Okay, with that, we should probably turn to the WebEx, and open it up to see if anyone has any public

comment.

Oh, yeah, Justin, please.

MR. WYNNE: So, Justin Wynne for CMUA. I've been selected to go up here. So, the 30th is sort of a rough deadline, in light of the holiday, so I don't know if there's any flexibility around that, that deadline.

MS. SMITH: Yeah, I think we can revisit that. And we will post an updated deadline that might work better for the holidays.

MR. WYNNE: That would help us get input from the different utilities, so we'd appreciate that.

MS. SMITH: Okay.

MR. WYNNE: Thank you.

MS. SMITH: We can do that.

Okay, let's go to the WebEx. If anyone online has a public comment, please speak up. Yeah, go ahead. Speak now. No. Okay, we can close it.

Okay, with that, I'm going to turn it over to Commissioner Douglas for any closing remarks.

COMMISSIONER DOUGLAS: All right. Well, I'd just like to thank everybody for coming and participating in the workshop. It was particularly helpful for me to hear it, since I have not been steeped in the day to day of RPS. But I am steeped in the day, today, of finding ways of getting renewable projects in

place across the landscape.

So, anyway, I appreciated all of your time. I know our staff did and Commissioner Hochschild did, as well.

So, with that, we're adjourned.

MS. SMITH: Thank you.

(Thereupon, the Workshop was adjourned at 3:59 p.m.)

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

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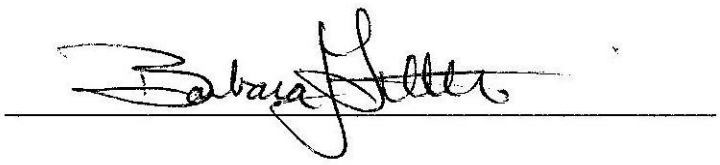

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