

BEFORE THE  
CALIFORNIA ENERGY COMMISSION

In the matter of )  
 ) Docket No. 09-RENEW EO-01  
Desert Renewable Energy )  
Conservation Plan (DRECP) )

CALIFORNIA ENERGY COMMISSION  
FIRST FLOOR, HEARING ROOM A  
1516 NINTH STREET  
SACRAMENTO, CALIFORNIA

FRIDAY, JULY 13, 2012  
9:00 A.M.

Reported by:  
Kent Odell

APPEARANCESCommissioners Present:

Robert Weisenmiller, Chair, CEC  
 Karen Douglas, CEC

Michael Florio, Commissioner, California Public  
 Utilities Commission

Staff Present:

Kristy Chew

Also Present: (\* Via WebEx)

Jim Kenna, California State Director, Bureau of  
 Land Management

Dennis Peters, External Affairs Manager, California  
 Independent System Operator (CAISO)

Nancy Ryan, Deputy Executive Director, Public  
 Utilities Commission

Neil Miller, Executive Director of Infrastructure  
 Development, California Independent System Operator

Mark Rothleder, California Independent System Operator

Aaron Johnson, Director of Renewable Energy Policy and  
 Strategy, Pacific Gas and Electric

Juan Carlos Sandoval, Assistant Manager, Energy  
 Department, Imperial Irrigation District

Katie Sloan, Manager of Regulatory and Legislative Affairs,  
 Renewable and Alternative Power, Southern  
 California Edison

Jan Strack, Grid Planning Manager, San Diego Gas &  
 Electric Company

Michael Webster, Assistant Director, Power System Planning  
 and Development, Los Angeles Department of Water  
 and Power

Jonathan Weisgall, Vice President of Legislative and  
 Regulatory Affairs, Mid-American Energy Holdings Company

\*Fred Morse, Chair, Utility-Scale Solar Power Division,  
 SEIA; Senior Advisor for U.S. Operations, Abengoa  
 Solar

Mark Tholke, Vice President, Origination - Southwest,  
 Enxco

Thomas Starrs, Sun Power Corporation

V. John White, Executive Director, Center for Energy  
 Efficiency and Renewable Technologies (CEERT)

Laura Wisland, Senior Energy Analyst, Union of Concerned  
 Scientists

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APPEARANCES (Continued)

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Natural Resources Defense Council  
Stacey Crowley, Director, Nevada State Office of Energy  
Scott Haase, Senior Engineer, National Renewable  
Energy Laboratory  
Andrew Mills, Research Associate, Lawrence Berkeley  
National Laboratory  
Edgar DeMeo, National Renewable Energy Laboratory (NREL)  
\*Maureen Hand, National Renewable Energy Laboratory  
Arthur Haubensstock, BrightSource Energy

Public Comment

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Nancy Rader, Executive Director, California Wind  
Energy Association  
Sarah Friedman, Sierra Club  
Wayne Stevens, Critical Path Transmission  
Leslie Barrett, Mainstream Renewable Power and  
Wind Energy, Inc.

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<b>Energy Panel Discussion Topics and Questions</b>	
The roundtable discussion will be organized into three primary topics:	
• Infrastructure Planning;	126
• Development and System Costs; and	198
• Energy Markets	256

For each topic, participants will be asked to address the specific questions identified below from the perspective of their organization. Participants will also be asked to identify high-level principles for consideration in the DRECP development process that may strengthen the ability of the DRECP to complement existing or future planning processes; serve as a framework for reducing development and system costs; and help meet state energy policy goals in a dynamic market environment. In addition, panelists will be asked to identify additional work that may be needed to achieve these goals. At the end of the discussion, for each topic, key points will be summarized.

#### *Infrastructure Planning*

Planning for energy infrastructure takes place at multiple levels. From developers, who seek to select potential project sites and compete for contracts, to utilities and governmental agencies, energy infrastructure decisions are made within the context of current planning processes. These existing planning processes seek to achieve, and sometimes reconcile, important policy or institutional goals.

With this in mind:

- Please describe the energy planning processes your organization undertakes or participates in, and how those processes affect infrastructure decisions?
- What goals do these processes seek to achieve?

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- How does the DRECP further (or possibly conflict with) the goals that currently underlie these processes?
- How should the DRECP be incorporated into these existing processes?
- What factors related to infrastructure planning should be taken into consideration when identifying the location, scale, and distribution of renewable energy development areas in the DRECP?

*Development and System Costs*

One important state policy goal is to reduce the costs of meeting California's renewable energy and climate goals, while realizing the many benefits of renewable energy. The DRECP has the potential to reduce renewable energy development costs by streamlining permitting, incentivizing transmission investments in strategic areas, and providing more certainty and predictability around environmental mitigation requirements.

The DRECP also has the potential to reduce system costs associated with future ambitious renewable energy goals by creating a framework that may facilitate optimizing transmission investments for renewable energy, reduce integration costs, and reduce the extent of fossil back-up of the system needed.

To this end:

- How might the DRECP reduce or increase development costs?
- How might DRECP reduce or increase system costs, e.g. by affecting the need for transmission, storage, back-up generation, or other infrastructure?

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*Markets*

Project procurement and electricity dispatch take place within a market environment. While it is impossible to predict exactly how electricity markets will function decades in the future, it is important for us to consider how the DRECP may interact with electricity markets today and throughout the life of the plan.

- How might existing and potential new market structures influence the way in which we meet electricity system needs in high renewable energy penetration scenarios?
- To what extent should long-range planning efforts such as the DRECP account for the existing and potential new market structure and anticipated changes in market rates in high renewable energy penetration scenarios? Should these considerations influence the plan, if at all?
- How might the DRECP affect electricity markets and market rates?
- What factors related to the market environment should be taken into consideration when identifying the location, scale, and distribution of renewable energy development areas in the DRECP?

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1 P R O C E E D I N G S

2 JULY 13, 2012 9:10 A.M.

3 COMMISSIONER DOUGLAS: All right, we'll go ahead  
4 and get started. This is Karen Douglas, I'm a  
5 Commissioner at the California Energy Commission and I  
6 want to thank everybody for being here, the participants  
7 in our roundtable discussion this morning and those of  
8 you who have come to hear the discussion and possibly  
9 comment on the discussion.

10 We're going to start with a round of  
11 introductions and then we'll get into the agenda. And  
12 so I think that I'll just say before we do the  
13 introductions that I'm really pleased and we're really  
14 honored to have our Chair, Bob Weisenmiller, here and  
15 also Commissioner Florio from the PUC and Jim Kenna who  
16 is a California State Director for the Bureau of Land  
17 Management. And so I just wanted to thank, in  
18 particular, them for being here and being part of this  
19 discussion. So, with that, we'll go around maybe.

20 CHAIR WEISENMILLER: I certainly want to thank  
21 people for being here. One of the more important  
22 projects we have and actually more challenging is DRECP.  
23 I think we've certainly learned from the siting process  
24 a couple of years ago when we did the four gigawatts  
25 that location really matters and that we would like to

1 provide better guidance on where development should  
2 occur and where conservation should occur. Obviously,  
3 it's a heavy lift. I think we're getting close to the  
4 end game and appreciate people's willingness today to  
5 provide us with some perspective on some of the broader  
6 issues.

7 MR. WHITE: I'm John White with the Center for  
8 Energy Efficiency and Renewable Technologies.

9 MR. WEISGALL: Good morning. Jonathan Weisgall  
10 with Mid-American Energy Holdings Company. We started  
11 many years ago as a little company called Cal Energy  
12 developing geothermal here in California, still have 10  
13 geothermal plants down at the Salton Sea with about 340  
14 MW, and then, in late 2011, formed a platform called  
15 Mid-American Renewables, and have a very strong interest  
16 and have made a major investment into big solar projects  
17 in the California market, as well, so have a very strong  
18 interest in renewable energy development and DRECP, in  
19 particular. I look forward to the day.

20 MR. STARRS: Good morning. I'm Tom Starrs with  
21 Sun Power Corporation. Sun Power is a California-based  
22 publicly traded solar photovoltaic company that is both  
23 an upstream manufacturer and a downstream marketer of  
24 solar photovoltaic systems, really in every market,  
25 residential, commercial, and utility power plant.

1           MR. HAASE: Long reach here. Good morning, my  
2 name is Scott Haase. I'm a Senior Engineer with the  
3 National Renewable Energy Laboratory. I also, for the  
4 past going on three years have been managing our  
5 relationship with the Department of Interior through a  
6 series of interagency agreements between NREL and DOI,  
7 and I spend about 25 percent of my time working in the  
8 Secretary's Office at Interior on all of these different  
9 projects, so happy to be here.

10           MR. STRACK: Jan Strack with San Diego Gas and  
11 Electric Company. We obviously have a major interest in  
12 renewable development in the desert regions of the  
13 Southwest, principally; and, of course, we are  
14 interested in the transmission that has to go along with  
15 that.

16           MS. SLOAN: Hi. My name is Katie Sloan,  
17 Southern California Edison, Renewable Power. I work in  
18 the regulatory area. And Southern California Edison is  
19 one of the largest purchasers of renewable power in the  
20 country, so we have a vested interest there, and we also  
21 build transmission lines, so we're very interested in  
22 this process. Thank you.

23           MR. SANDOVAL: Good morning. My name is Juan  
24 Carlos Sandoval. I work as System Manager for the  
25 Imperial Irrigation District and we, as the largest

1 irrigation district in the nation, we cover a large area  
2 of the desert, about 6,000 square miles, and we have  
3 been working with the State, you know, for over 10 year  
4 and one of the initial efforts, which was Imperial  
5 Valley study work group, RETI, and now this effort, and  
6 we have vested interests in developing all the resources  
7 in our service area. So we are glad to be here.

8 MR. WEBSTER: My name is Michael Webster. I'm  
9 with Los Angeles Department of Water and Power. I'm  
10 responsible for the Renewables Programs, the Integrated  
11 Resource Planning, Transmission Development, and  
12 Transmission Contracts. And L.A. Water and Power has  
13 tremendous transmission reach and our goal is to hit our  
14 renewables targets, making maximum use of the  
15 transmission that we do have.

16 MR. MILLER: Thank you. Neil Miller, Executive  
17 Director of Infrastructure Development with the  
18 California ISO. My role there includes both the  
19 transmission planning and generator interconnection  
20 process and, in both of those activities, we see this  
21 work really critical to informing the long term  
22 transmission planning exercises. Thank you.

23 MR. KENNA: Jim Kenna, State Director for the  
24 Bureau of Land Management here in California. I just  
25 want to again thank Karen for the invite. I'm very very

1 pleased to be here. I expect to learn a lot today with  
2 the kind of knowledge that's in the room.

3 I think we're at a very timely point in the  
4 process. We're dealing with some very very complex  
5 issues and questions, and it's very important, I think,  
6 that we get the benefit of all of what people know in  
7 terms of the interface of all the complex systems; that  
8 includes the transmission, the various elements of a  
9 portfolio that create a reliable system, and the  
10 interface of that with the very complex conservation  
11 kinds of questions that we have. So those are the  
12 things that I'm interested in hearing a lot about today.  
13 Glad to be here.

14 COMMISSIONER FLORIO: Mike Florio, Public  
15 Utilities Commission. Also a pleasure to be here today.  
16 I'm looking forward to learning a lot and wishing we had  
17 done this 10 years ago, we probably would have been a  
18 lot farther ahead. It's an important effort and I think  
19 very promising for a better future for California, so  
20 looking forward to the discussion.

21 COMMISSIONER DOUGLAS: Thank you. We also --  
22 I'll note that when people are on WebEx and not muted,  
23 we can hear discussions. So please do mute yourselves  
24 if you're not planning on speaking. We do have one  
25 participant who we invited to participate by WebEx, Fred

1 Morse. Are you here?

2 MR. MORSE: I am, yes.

3 COMMISSIONER DOUGLAS: What we -- we asked Fred  
4 to go ahead and make some kind of broader opening  
5 comments at this point just because we recognize that  
6 the WebEx participation may be difficult, and we will  
7 have Arthur Haubensstock, I think, sitting in for Fred  
8 during some of this discussion. So go ahead, Fred.

9 MR. MORSE: Okay, thank you very much. Well, I  
10 am Fred Morse. I chair the Utility-Scale Solar Power  
11 Division of SEIA, and I'm the Senior Advisor for U.S.  
12 Operations for Abengoa Solar, which is one of the  
13 developers of utility-scale concentrating solar power  
14 plants in the U.S.

15 I'm very pleased to have this opportunity to  
16 join the discussion and offer some perspective from the  
17 developer's point of view and to try to set the stage  
18 and context for the energy aspects of the DRECP.

19 I would first like to thank Commissioner Douglas  
20 for her leadership in making sure that energy issues are  
21 adequately developed in the DRECP. And, Commissioner  
22 Douglas, you may recall that we met at a DOI conference  
23 about a year ago where we chatted about many things,  
24 including thermal energy storage.

25 I was part of a very committed group of solar

1 developers and environmental organizations who worked  
2 day and night over a two-week period to develop joint  
3 input to the SPDIS. I am very familiar with and respect  
4 the concerns of the environmental organizations.

5 I would like to make a few brief comments. The  
6 first is we have the opportunity to move in the  
7 direction of a more reliable, cost-effective, and least  
8 emissions grid if we do two things; we need a diversity  
9 of renewable resources in California, not just  
10 geothermal, wind, and solar, but PV and CSP and  
11 specifically CSP with thermal storage for reasons I'll  
12 comment in a moment. We also need a diversity of  
13 locations so that weather dependent variability is  
14 minimized. If we don't do that, then we simply will  
15 build more natural gas-fired back-up units, which will  
16 be in place for 50 years or so, and they will add costs  
17 and emissions to the grid. The desert that we're so  
18 focused on provides a uniquely valuable solar energy  
19 resource, it has more sunny days, less rain and less  
20 clouds in other areas, which means more energy generated  
21 per acre in the desert, more reliable energy output,  
22 less need for conventional backup, and for concentrating  
23 technologies that require direct beam radiation, which  
24 is found in the desert regions, the desert becomes an  
25 ideal place to site these plants.

1           Turning to CSP, specifically, CSP with very  
2 cost-effective thermal storage offers many ancillary and  
3 reliability services. In particular, there is a gap  
4 that occurs as you get more and more photovoltaics on  
5 the system. The photovoltaics production drops off in  
6 the afternoon as the sun sinks in the horizon. And  
7 before the wind picks up in the evening, there is a  
8 demand gap that needs to be filled, that will either be  
9 filled with conventional power plants and their  
10 emissions and cost, or it could be filled with CSP with  
11 thermal storage.

12           Regarding zones, both CSP and utility-scale  
13 solar need significant areas of contiguous land, which  
14 we're now calling zones. The size and number should be  
15 adequate to support enough renewable energy to meet  
16 California's 33 percent goal and beyond. The land needs  
17 to be relatively flat. The land for CSP needs high  
18 direct normal solar radiation. The land should not have  
19 competing or conflicting demands, including DOD,  
20 environmental, cultural issues, and it certainly should  
21 not include sensitive habitats. It needs access to  
22 transmission for both energy and capacity, or resource  
23 adequacy values, it needs access to water, which is  
24 relatively minimal, by the way, compared to many other  
25 water demands when dry cooling or hybrid cooling is

1 used, and last, but not least, the lease rates on  
2 Federal lands should be comparable to those on private  
3 land.

4           The benefit that utility-scale PV or CSP  
5 provides more than outweighs its relatively minimal  
6 impact for only a small fraction of the land used by  
7 DOD, or set aside for conservation, would be needed to  
8 satisfy California's RPS.

9           Abengoa has a project in California, the Mojave  
10 project, 280 MW, and it was sited on disturbed land with  
11 very low biological and species impacts and is often  
12 used as an example of responsible siting. The solar  
13 developers would like to see one of the proposed zones  
14 on BLM land be located in the West Mojave. This area  
15 has some of the highest solar installation in the nation  
16 and is close to the communities it needs to serve.

17           If done right, the DRECP can facilitate the  
18 siting of projects in appropriate areas where they will  
19 attract the transmission that is needed to support them,  
20 and this will minimize the cost of and the amount of new  
21 or upgraded transmission to allow solar to contribute to  
22 California's goals.

23           The solar developers are very optimistic and  
24 hope the DRECEP planning process can successfully  
25 support the right kind of renewable energy development.

1 During those intense discussions related to the SPDIS,  
2 it became very clear to me that the solar developers and  
3 the environmental organizations share exactly the same  
4 end objective, and we need to understand and listen to  
5 each other's concerns and needs, and we need to support  
6 each other.

7 I very much look forward to the conversation  
8 today and I intend to stay on through the whole meeting.  
9 Thanks for the opportunity to speak.

10 COMMISSIONER DOUGLAS: Thank you, Fred. We've  
11 been joined by two more panelists. Mark Tholke, would  
12 you like to introduce yourself? And Stacey Crowley?

13 MR. THOLKE: Hi. Thank you. I apologize I was  
14 late; I was meeting with a supervisor from Solano  
15 County, which is where we have some wind projects. I'm  
16 with Enxco, we are wind develop that is also in the  
17 solar business. Briefly, last year we had a 100 MW  
18 project in Solano, this year we have another 100 MW  
19 Solano, as well as a 140 MW wind project in Kern, and a  
20 solar project in Kern, as well. So I appreciate the  
21 invitation to be here. Thank you.

22 COMMISSIONER DOUGLAS: Thank you. Stacey?

23 MS. CROWLEY: Thank you, Good morning. Stacey  
24 Crowley. I'm Governor Sandoval's Energy Advisor and the  
25 Director of the Nevada State Office of Energy. Thank

1 you for including me today.

2 COMMISSIONER DOUGLAS: Thank you. We're now  
3 moving to some very high level DRECP background and just  
4 a little bit more information about the format and flow  
5 of the panel. Let me ask, Kristy, if you can maybe just  
6 mute them at WebEx right now because --

7 MS. CHEW: Yes, Scott and I are working on that.

8 COMMISSIONER DOUGLAS: Oh, good. That's good to  
9 hear. It's in good hands and I know that we'll have  
10 some presenters on WebEx in just a moment.

11 But just briefly in terms of the format of the  
12 panel, after putting some thought into this we decided  
13 to make this a roundtable, and I know it's a bit of an  
14 imposition on everyone's day to ask you to be here for a  
15 day, but what we really wanted to do was not only create  
16 the space for us to hear from participants, but also to  
17 create the space for you to be able to talk to each  
18 other. And in that kind of context, the roundtable  
19 discussion made a lot of sense. We've got room built  
20 into the agenda to have some discussion. You should  
21 feel not only free, but very much invited to ask each  
22 other questions for clarification, or to better  
23 understand perspectives.

24 And what we're really trying to do through this  
25 discussion is also to arrive at some potential for

1 synthesis for kind of hearing what people have to say  
2 and trying to derive some high level principles or input  
3 into the DRECP so that we can take in, as we think about  
4 the energy aspect of the plan.

5           Most of the organizations here -- hi, Carl --  
6 Carl Zichella with Natural Resources Defense Council has  
7 joined us -- most of the organizations here are  
8 participating in one way or the other in the DRECP  
9 process, not all of them are, so I wanted to keep the  
10 overview on DRECP very short and very high level, and  
11 that's why, after thinking about it, I ultimately  
12 decided to just give the overview myself, but we do have  
13 staff in the audience who can step up if anyone has  
14 questions that are more technical than I want to answer;  
15 I doubt that will happen.

16           And one more thing about the format before I go  
17 there, I really want to make sure that we set aside the  
18 questions of today, we're not really here to talk about  
19 33 percent; 33 percent is something we're working on in  
20 other forums. We're not really here to talk about the  
21 issues and controversies around how we get to 33  
22 percent. What we really have asked you to come here to  
23 do is to help us think about long term planning, help us  
24 think about how the DRECP, as a tool that looks out to  
25 2040 and beyond, and tries to assess development areas,

1 and identify the best places for development areas given  
2 the other potential conflicts in the region, and given  
3 the State's long term energy goals, how can the DRECP be  
4 a constructive force? How can the DRECP help us get  
5 beyond, or solve for, some of the problems and concerns  
6 that we face today in moving forward with implementation  
7 of 33 percent. So I'm going to be asking also that we  
8 take the long term view and that we learn from the  
9 issues that we face today, but we also think about how  
10 the DRECP helps us solve for those issues so that we are  
11 not necessarily presented with them, or not presented  
12 with them in the same way for the long term plan.

13           As I just said, at the very high level, the  
14 purpose of the DRECP is to identify sufficient  
15 development areas to meet the State's long term climate  
16 goals and, of course, with the context of a conservation  
17 plan, so that we can meet these goals in a way that is  
18 consistent with long term preservation of species in the  
19 desert region, which is a very sensitive and very  
20 biologically diverse region with a lot of endemic  
21 species, a lot of rare plant and habitat communities,  
22 and so it's a great resource for renewable energy and  
23 it's a very important resource environmentally, and  
24 that's where this effort really comes in because we know  
25 that we want to do -- need to do -- significant amounts

1 of renewable energy in order to meet our long term  
2 climate goals, and we're interested in trying to find  
3 and identify the lower conflict, or the highest  
4 potential, most important areas to do that and kind of  
5 plan around it.

6           One of the tools that we developed in the  
7 process of doing a DRECP, through a number of very  
8 iterative stakeholder meetings, is called the Renewable  
9 Energy Acreage Calculator. The calculator is basically  
10 a spreadsheet model developed by staff at the Energy  
11 Commission, and the purpose of the calculator is to  
12 allow stakeholders and our staff to test a range of  
13 variables that can affect how much renewable energy the  
14 state will need in 2050, in order to ascertain generally  
15 what amount of development the DRECP should seek to plan  
16 for.

17           We keyed the calculator to keep in California on  
18 its greenhouse gas trajectory of 80 percent below 1990  
19 levels in 2050. Through the stakeholder work, we  
20 ultimately settled on 2040 as the target date for the  
21 planning, but I want to note and emphasize for people  
22 here that the renewable energy -- the need for  
23 incremental renewable energy that we calculated  
24 literally doubled between 2040 and 2050 through the way  
25 the calculator works, so that we know that a 2040

1 number, while for various reasons we settled on that as  
2 our planning target, we know that that is probably low  
3 in context of California's long term goals, and that's  
4 one of the understandings that needs to inform our work.

5           One of the purposes of the calculator was just  
6 to understand and identify and help stakeholders see  
7 what some of the big swing variables were in helping the  
8 number to shift in substantial, as opposed to  
9 incremental ways, and it probably won't surprise some of  
10 the people at the table, especially people who have more  
11 of the planning function, but of course the economic  
12 demographic numbers, or assumptions you make matter a  
13 lot. Electrification -- electrification of the State's  
14 transportation fleet is a big factor. The  
15 transportation fleet, ports, high-speed rail, there's a  
16 significant potential for fuel shifting to electricity  
17 that can help drive the renewable energy need much  
18 higher.

19           Energy efficiency was a big factor; nuclear  
20 energy was a big factor. As we looked forward, over the  
21 horizon of the plan, we ultimately decided through the  
22 stakeholder process to assume that there would be a need  
23 to backfill the nuclear plants with zero carbon  
24 generation at some point in that range, and so even the  
25 2040 number pulls out the nuclear plants; that's not a

1 prediction, it's just a planning assumption based on the  
2 acknowledgement that this is a long term plan. Out of  
3 state numbers, of course, mattered and so we used 25  
4 percent, which is set out in the Renewable Energy bill  
5 and assumption of a 25 percent out of state number.

6           The calculator essentially gives us a statewide  
7 number for needed incremental energy, different  
8 technologies, you know, we then look at different  
9 technologies and say, well, you know, concentrating  
10 solar is probably going to be 100 percent in the desert,  
11 that's different for geothermal, that's different for  
12 wind, and so we look at the technologies, and we created  
13 various portfolio mixes, and we do a number of  
14 portfolios in order to test the planning assumptions and  
15 ensure that we were generally in the ballpark with the  
16 amount of renewable energy that we thought we were  
17 planning for. So we got a lot of stakeholder input in  
18 this process that was very helpful.

19           There were a couple things that we did to factor  
20 in integration, but I'll be the first to say that, you  
21 know, we did not do -- well, we did not do the sort of  
22 thing that one would do if one were seriously planning  
23 on how to run the system at these high levels of  
24 renewables. We varied other technologies, but we held  
25 geothermal constant throughout kind of all the different

1 iterations of maps that we're working on because of the  
2 acknowledgement that geothermal resources are going to  
3 be extremely important for the system, particularly with  
4 the assumption of backing out the nuclear plants, and  
5 moving towards such a high renewable generation system.

6           We also assumed at 10 percent storage added, so  
7 in terms of the electricity demand, so that 10 percent  
8 of the renewable energy generated would be stored, and  
9 so we factored that in. We didn't say stored how, or by  
10 what technology, or anything like that, but that was  
11 just an assumption we put in to acknowledge the need for  
12 some storage. But beyond that, we did not attempt to  
13 develop a system that a group like this could sit down  
14 and say, "Oh, yeah, I see how we would integrate the  
15 renewables." And one of the areas that we really want  
16 some input from you all is in how, knowing what we know  
17 today, how we can possibly use the DRECP and think about  
18 the DRECP in order to make the integration problem  
19 smaller, not larger, in the future as we think about  
20 what the system might look like and what, therefore, it  
21 might need to consider.

22           So that's really all I thought I need to provide  
23 in DRECP background. We're going to produce some maps  
24 showing different iterations and variations of  
25 development areas with accompanying conservation next

1 week, so people will have a chance to look at that. The  
2 development areas that are proposed in those maps come  
3 from industry stakeholders, they come from other  
4 stakeholders, they come from agencies sometimes just  
5 looking at -- just thinking there's a low conflict area  
6 here, I wonder if anyone is interested in it, so it  
7 comes from all of those sources.

8           We have been working very closely with the  
9 Department of Defense and the different branches of the  
10 military in California, so we've got two  
11 representatives, Major Garza and Steve Chew are here in  
12 the room today, and so if there are any questions for  
13 them and their role in working with us in the planning  
14 process, they're here and they'll be able to answer  
15 them.

16           So with that, I'll let Laura and Carl -- I don't  
17 know if anyone else came in -- Dennis, he was here, of  
18 course, before but he didn't know we had a name tag or a  
19 spot for him, so I'll let you introduce yourselves and  
20 then we'll go on to some of the presentations.

21           MS. WISLAND: Good morning. I'm Laura Wisland  
22 and I'm an Energy Analyst with the Union of Concerned  
23 Scientists. UCS is not a part of the DRECP, but has  
24 been involved in other renewables planning proceedings  
25 in different venues, so I appreciate the opportunity to

1 be here.

2 MR. ZICHELLA: This is Carl Zichella with the  
3 Natural Resources Defense Council. We've been  
4 participating in the DRECP and basically all other  
5 transmission planning activities here in California  
6 across the board, and actually across the rest of the  
7 Western U.S., as well.

8 COMMISSIONER DOUGLAS: Thank you. All right, so  
9 with that, let's go on. We asked NREL and LVNL to make  
10 some presentations on very recent research that I think  
11 can help us very much in informing some of the questions  
12 that we've asked. So let's see, Kristy, can you get  
13 Andrew on the line here?

14 MS. CHEW: Yes. Scott will unmute him.

15 MR. MILLS: Can you hear me okay?

16 COMMISSIONER DOUGLAS: Yes, we can.

17 MR. MILLS: Okay, great. All right, so I am  
18 Andrew Mills and I'm a Research Associate at Lawrence  
19 Berkeley National Lab and I work there with Ryan Wiser  
20 and we just did a study looking primarily just at the  
21 economic value of variable generation. We're  
22 particularly interested in looking at how the value  
23 changes if you put a higher penetration of (inaudible).

24 And we started off with a case study of  
25 California (inaudible) -- and the motivation for this

1 actually, we were involved with the Western Renewable --  
2 COMMISSIONER DOUGLAS: Andrew? Andrew, this is  
3 Commissioner Douglas. We're having some problems with  
4 the connection. Maybe if you could start again and  
5 speak slowly, let's see if that will work.

6 MR. MILLS: Sure, yeah. So as I said, I'm  
7 Andrew Mills and I'm from Lawrence Berkeley National  
8 Lab, and I work there with Ryan Wiser. And we just  
9 completed a study looking just at the changes in  
10 economic value of variable generation, and we were  
11 particularly interested in understanding what causes  
12 changes in the value of renewables as you go to higher  
13 penetration levels; and so, if you could go to the next  
14 slide?

15 We were involved with the Western Renewable  
16 Energy Zone Initiative which was very similar to the  
17 RETI Initiative in California, and that process used a  
18 similar rank methodology that moved away from just a  
19 simple levelized cost comparisons of different renewable  
20 technologies. We tried to account for the values of  
21 different resources or the utility based on generation  
22 profile. But in those processes, the method used for  
23 estimating the values was fairly simple, but didn't look  
24 at how that value might change with penetration and so  
25 we did sort of a follow-on study where we looked just at

1 the question of the value, and we looked at trying to  
2 estimate that value with a much higher level of detail  
3 in the time resolution and also trying to account for a  
4 lot of the operational constraints that exist in  
5 conventional generation in managing the output of  
6 variable generation.

7           And we tried to do this in a coherent economic  
8 framework that would account for both new investment  
9 decisions in the power system and these operational  
10 constraints in one model so that you have -- the way  
11 that the system is operating, affecting the decision  
12 that investments would have for building a new power  
13 plant, and we used this framework to look at the  
14 economic value of four different renewable energy  
15 technologies. We looked at wind, single axis tracking  
16 PV, and then CSP with and without six hours of thermal  
17 storage. So go ahead and go to the next slide.

18           I'll just summarize briefly the key findings and  
19 I'll step through some of the results that show this.  
20 One of the primary things that we found is that the  
21 value of solar in terms of dollars per unit of energy is  
22 quite high at low penetration levels, and this actually  
23 agrees real well with the findings and the more simple  
24 framework used both in REZ and RETI; but we did see  
25 that, as you increase the value of the penetration of PV

1 with or without thermal storage, the value does start to  
2 decrease, and that's the value of adding additional PV  
3 or storage. We found --

4 COMMISSIONER DOUGLAS: Andrew?

5 MR. MILLS: Yes?

6 COMMISSIONER DOUGLAS: This is -- sorry -- so I  
7 think that when -- we just lost a few words there. I  
8 think that when you speak slowly, it works better.  
9 Andrew is WebExing in from China, so there may be some  
10 distance in effect here; it's also very late at night  
11 for him, which is why we put him first. So, go ahead  
12 and keep going on this slide.

13 MR. MILLS: I'll try to slow it down.

14 COMMISSIONER DOUGLAS: Okay.

15 MR. MILLS: Sure, yeah. And please interrupt if  
16 I do start to get muddled again.

17 So what we found is that the decrease in value  
18 that we saw for PV and CSP was primarily driven by,  
19 first, a decrease in the capacity value, and that's  
20 essentially the ability of solar plants to offset the  
21 need to build other sources of capacity, and then at  
22 higher penetration levels, a decrease in the energy  
23 value.

24 We accounted for day-ahead forecast errors and  
25 ancillary service impacts, but we saw that those costs

1 were somewhat modest and didn't change as dramatically  
2 with changes in penetration levels.

3           Another key finding was the value of CSP with  
4 six hours of thermal storage, although it started off  
5 about the same level of value as the other solar  
6 technology, it did not drop to the same extent with  
7 increasing penetration and, so, as you go to those  
8 higher penetration levels you start to see a gap in  
9 value between the technologies with and without thermal  
10 storage.

11           The value of wind started off lower in solar,  
12 but it doesn't decline as fast with penetration. Once  
13 we felt that we did have quite a bit of geographic  
14 diversity as we go to higher penetration levels, and  
15 we're actually getting more and more resources from out  
16 of state from the wind.

17           And then finally, we saw that if you're just  
18 adding one variable generation technology at a time, in  
19 most cases that doesn't necessarily change the value of  
20 additional power from a different technology. So, for  
21 example, if you go to 10 percent wind penetration, that  
22 doesn't affect the value of adding PV at all, so that  
23 makes it easier to get the higher penetration level with  
24 a combined mix of resources than trying to get to that  
25 high penetration level with just one technology at a

1 time. So if we go to the slides now, the next slide,  
2 I'll show you some of these results.

3 First off, just a couple of quick notes. We are  
4 just pushing in one technology at a time and seeing  
5 what's happening in the system around that variable  
6 generation. This is not a study that tries to optimize  
7 all of the mix of renewable energy and we're focusing  
8 primarily just on avoided costs from conventional  
9 generation; we're not focusing on (inaudible) effect.  
10 And when I talk about the value of renewable, I'm always  
11 meaning the marginal value of adding an additional unit  
12 of renewable energy beyond the level that I'm showing,  
13 so it's always the value of that next increment of  
14 renewables. And there's also a number of--

15 CHAIRMAN WEISENMILLER: Andrew? This is Bob  
16 Weisenmiller. What is the size of the increment? Is it  
17 megawatt hour, or 100 megawatts?

18 MR. MILLS: I just mean that if you were to add  
19 more of a technology with that same profile --

20 CHAIRMAN WEISENMILLER: Right, but again, what  
21 is the "more?"

22 MR. MILLS: -- that what I'm showing is the  
23 value of that additional --

24 CHAIRMAN WEISENMILLER: What is the "more?" Is  
25 it a single megawatt hour? Or is it a single kilowatt

1 hour? Is it 100? Or what is the unit? What is the  
2 scale size?

3 MR. MILLS: When I show these results, we step  
4 through at situation levels that are about going from  
5 increasing it by increments of five percent of the total  
6 California energy amount, but when I say "marginal," I  
7 mean sort of right there at the margin, so it's the  
8 value of that next increment sort of just right at the  
9 edge, basically, is what I'm saying.

10 CHAIRMAN WEISENMILLER: Yeah. Well, the five  
11 percent will give you start-up and no load effects,  
12 where if you were doing one kilowatt hour, you'd only be  
13 looking at what System Lambdas, so there would be  
14 substantially different results. It sounds like you're  
15 more like picking up an overall system effect.

16 MR. MILLS: Yeah, it's the System Lambda  
17 approach at each individual penetration level. It would  
18 be sort of the System Lambda at that penetration level.  
19 And maybe that will become clearer in the slides, so we  
20 can come back to that. Okay, so if you would go to the  
21 next slide?

22 So this is now just showing those results at  
23 those particular different penetration levels with just  
24 increasing the amount of PV and, from the left-hand it's  
25 just showing the total investment in capacity from

1 adding PV, and then, on the right-hand side, it shows  
2 penetration with conventional resources in the system.  
3 And so one way to measure what the ability for PV to  
4 offset the need to build other units is just to look at  
5 -- now, this is more just saying from zero to five  
6 percent penetration how much PV did I add, and then what  
7 was the change in the total amount of non-PV actually  
8 that I had to build, and then coming up with that ratio  
9 is the effective capacity credit. So for PV, it starts  
10 off at a fairly high level of about \$.50, but then if  
11 you go to higher penetration levels, that same size  
12 increment of PV there doesn't offset the need to build  
13 (inaudible) as much as (inaudible). So we did the same  
14 sort of looking at this for these different penetration  
15 levels for all the different four technologies that I  
16 mentioned, and in each case we were at that penetration  
17 level coming up with the absolutely long-run prices that  
18 would tell you basically that System Lambda at that  
19 particular penetration level, that would tell you what  
20 the incremental value of adding that mix of renewable  
21 energy. So if you go to the next slide?

22           That's what is now shown by the blue line here  
23 and this is the marginal value of wind on the top left,  
24 then PV on the top right, then CSP without thermal  
25 storage on the bottom left, and CSP with thermal storage

1 on the bottom right. And the green line in each case  
2 shows what the hourly average -- sorry, the annual  
3 average -- of the day-ahead forecast price -- I'm sorry,  
4 the day-ahead wholesale power price. And as we increase  
5 the penetration, and there's a couple of animations  
6 here, so I'll just step through it. As you increase the  
7 penetration level, what first happens is that you see a  
8 decline in the capacity value of wind, followed by a  
9 decline in the energy values, and the same thing for PV  
10 and the other solar technology; you can identify what  
11 component is due to the capacity value or the energy  
12 value. So go ahead and flip through those animations.  
13 Go ahead, please.

14           So then to sort of explain that, this slide then  
15 shows what the peak days look like, these are three peak  
16 days in the summer where we have increasing amounts of  
17 PV penetration and the net load shown on the top chart,  
18 then down below is that System Lambda, or that hourly  
19 long-run marginal price at each of those different  
20 penetration levels. And what this is showing is that,  
21 as was mentioned earlier, as you increase the  
22 penetration of this PV by itself, the net load peak  
23 shifts into the early evening and those high-priced  
24 grids also start to shift into the early evening. And  
25 that's what causes that decline in the value of PV at

1 low penetration. Okay, go to the next slide.

2 This is now showing that same sort of chart, but  
3 for solar thermal with six hours of thermal storage.  
4 Again, as mentioned, that ability to continue to produce  
5 a small amount into the evening, a few hours into the  
6 evening, you maintain the capacity value of solar  
7 thermal with thermal storage, and the prices continue to  
8 line up with times when (inaudible). So if you go to  
9 the next slide?

10 I'll show just a couple brief results here that  
11 are some preliminary results that are not in our full  
12 report just looking at some of the particular ways to  
13 mitigate some of the changes that we see from  
14 penetration and I'll focus just on geographic diversity  
15 and technological diversity in these slides.

16 So in this case, that yellow line there is  
17 showing the same value of wind as we saw before, but in  
18 the background you can see the value of wind at a bunch  
19 of different sites and I mean a bunch by 10,000  
20 different sites that were selected around the West, and  
21 looking at their generation profile and comparing that  
22 to the hourly prices as you increase the penetration of  
23 wind in California, and this shows the difference in  
24 value at those other sites, relative to adding wind just  
25 there in California. And so you can see that, as you

1 get to these higher penetration levels, the value  
2 doesn't drop at all sites around the West, and if you  
3 were to at least spread out the wind more, you could  
4 capture perhaps another \$10.00 worth of value. But if  
5 you were to really concentrate the wind in more  
6 concentrated regions, you could decrease the value by a  
7 small amount also. But at that high penetration, there  
8 is an increasing benefit to geographic diversity  
9 (inaudible). And next slide?

10 I did the same thing for just PV sites, so again  
11 the yellow line is showing what I had showed before  
12 (inaudible) around the West, primarily the Southwest.  
13 And looking at the value at those sites, we can see that  
14 the value declined at all of these sites and that's  
15 primarily because its lower value at high penetration  
16 has to do with just the overall position of the sun and  
17 the sky, and since that's going to be the same at all of  
18 these sites, there is not going to be as big of a  
19 benefit of geographic diversity at those very high  
20 penetration levels. Next slide.

21 And these now show the findings for  
22 technological diversity and what it shows is, if you  
23 were to increase this wind penetration, how does that  
24 affect the value of PV or CSP as you're increasing the  
25 amount of wind? So those green lines show, as I

1 increase wind, that does sort of change the value, of  
2 course, of (inaudible), and those are shown by those  
3 green lines. If I'm increasing the penetration of PV,  
4 on the other hand, the value of wind in the top left,  
5 the yellow line, actually increases; so the value of  
6 wind as I increase the amount of PV actually goes up  
7 some and that has to do with that shift in the early  
8 evening of high prices when the wind does start to blow  
9 more, so it does increase the value of wind by a small -  
10 - and there isn't really an effect as much for the value  
11 of CSP. And if I just increase the amount of CSP  
12 penetration, I don't have an effect on the value of  
13 wind, but that does sort of start to impact the value of  
14 PV, so there is sort of a  
15 -- you just start to squeeze one technology with the  
16 other if you're increasing the value of CSP.

17 Okay, and then finally just some slides showing  
18 computing (ph) in (inaudible). I won't go into these in  
19 too much detail, but we'll leave them for reference for  
20 you. I think the key points are just that there is that  
21 high value of solar at low penetration levels, and what  
22 we saw was the value of solar thermal storage really  
23 starts to show up at high penetration levels, and that  
24 this is primarily driven by the capacity value, the  
25 energy value issue and not as much driven by day-ahead

1 forecasters or ancillary service impacts. Next slide.

2           And finally, I think the other important point  
3 is that we did see that you're not necessarily losing  
4 one technology outlook with the other (inaudible), high  
5 penetration is going to be easier with mixed technology  
6 rather than just --

7           COMMISSIONER DOUGLAS: Andrew, we're losing you  
8 on the conclusion slide. If you could just do that  
9 again?

10           MR. MILLS: All right. So the main point there  
11 is just that one technology doesn't necessarily squeeze  
12 out the other technology, so if I'm increasing wind,  
13 that's not going to decrease the value of PV. So if I  
14 want to get to 20 percent total renewables, I can start  
15 to add more and more wind and that doesn't make it  
16 harder for me to add PV, and so it's going to be easier  
17 to hit that high penetration target with a mix of  
18 renewables rather than just trying to do that with one  
19 technology alone.

20           And the final slide is just, if you'd like to  
21 follow-up, there's a full report that we have on our  
22 website. My email is referenced up there; please feel  
23 free to email me or Ryan. And there's a webinar that we  
24 did earlier and you can look into a longer version of  
25 that. Thanks.

1           COMMISSIONER DOUGLAS: Thanks, Andrew. I think  
2 we may have some questions around the room. I just  
3 wanted to ask you two things, one is whether -- is if  
4 you could describe -- my understanding is you were  
5 looking at the California market, or you're looking  
6 fairly closely at California in terms of the economic  
7 work that you've done, and so I'd like if you could  
8 describe that and then, secondly, if you could talk  
9 about kind of future research directions in terms of how  
10 to -- you know, what you're looking at in terms of how  
11 to maintain the value of renewable technologies at high  
12 penetrations, or mitigate the effects that you've  
13 discussed here, that would be helpful, too.

14           MR. MILLS: Sure. I'd say primarily, just with  
15 the interest in California, I think, is primarily just  
16 to make sure that important issues are being considered,  
17 I think this study is just maybe kind of trying to pull  
18 out what are some of the important buckets to consider  
19 when you're looking at the issues around integrating  
20 more and more renewables. And so one important part in  
21 this is to make sure that capacity value is getting a  
22 lot of attention, it seems like that low penetration and  
23 high penetration is an important factor and should be  
24 looked at in detail, and in more detail than we look at  
25 in just the study alone.

1           And as far as what our -- we have done some  
2 similar analysis just looking at adding wind in the  
3 Wyoming region and trying to add that to load centers  
4 around Wyoming, like primarily in Colorado. And there  
5 we see two different results where we're just adding  
6 wind, very concentrated in Wyoming and to try to absorb  
7 that because of Colorado, but because of the wind  
8 resources up there can be very concentrated with those,  
9 we do see a decline that's larger for wind up there, and  
10 bigger issues with forecast errors in that case than  
11 what we saw in California where the wind is more spread  
12 out.

13           And then in terms of the mitigation work that  
14 we're continuing to do, we'll be looking more at these  
15 technology diversity cases and then we also have cases  
16 where we're making the cost of bulk power storage lower  
17 than we do in our reference case -- the reference case  
18 has allowed storage to be built if it was cost effective  
19 if we had a very high pumped hydro storage cost from  
20 EIA --

21           COMMISSIONER DOUGLAS: Can you say that again?  
22 Andrew, can you say what you were saying about storage?

23           MR. MILLS: Sure. Yeah, so storage was an  
24 option in this model, that it could be built. But the  
25 cost was based on EIA estimates and it was quite high

1 and so it was never built in any of these cases; that  
2 was bulk power storage. We do a sensitivity case where  
3 we decrease that cost more towards the low ends that  
4 we've seen in some other studies and see what happens to  
5 the value of these renewables as we have cheaper bulk  
6 power storage. And for solar, that has a much more  
7 important effect than we saw for wind, so we saw that  
8 the benefits of solar, of having bulk power storage, was  
9 greater than we saw for wind. And then the other one is  
10 that we look at price responsive demand, and then also  
11 looking at more flexible thermal technology. And price  
12 responsive demand also shows fairly important increases  
13 in the value of solar and wind at higher penetration  
14 levels. And we'll be doing a report on that hopefully  
15 in the near future, so analysis primarily (inaudible),  
16 putting that through our review process.

17 CHAIRMAN WEISENMILLER: This is Bob Weisenmiller  
18 again. A couple questions. The first one is, do you  
19 maintain the same reserve margin as you go to higher  
20 penetrations? Or do you just have increasing reserve  
21 margins as you go to higher renewable penetration?

22 MR. MILLS: So it's actually a long-run  
23 investment model that is basically doing the investment  
24 decisions based on prices spiking up. And so the way  
25 that it works is that, if you don't have sufficient

1 capacity built in the model, and the prices rise to very  
2 high levels --

3 CHAIRMAN WEISENMILLER: Right.

4 Mr. MILLS: -- and the model finds that it's  
5 worthwhile to build more capacity, and that if you build  
6 too much capacity, then the prices collapse and that  
7 capacity doesn't cover its cost, and so it no longer  
8 gets built. So it basically tries to find the right  
9 amount of capacity to add using that sort of approach,  
10 and that leads to a constant amount of high-priced hours  
11 across all scenarios. So there's a few hours that  
12 remain high-priced in all scenarios, even with  
13 increasing penetration levels. And that sort of is our  
14 proxy for basically keeping the reliable contribution of  
15 your total generation base constant.

16 CHAIRMAN WEISENMILLER: Okay, that's great. So  
17 basically you've done capacity expansion so the results  
18 are sort of apples to apples. The other question that  
19 really emerges from this --

20 MR. MILLS: Right.

21 CHAIRMAN WEISENMILLER: -- which is probably one  
22 of our key challenges for today is, you know, the value  
23 of a portfolio and basically, as we're going forward,  
24 trying to come up with the long term energy mixes.  
25 Obviously, no one's forecasts are going to be

1 particularly good over the long term, but trying to have  
2 the right policies and the right zones so that we  
3 actually can get a pretty healthy diversity of  
4 development that reflects more of a portfolio, as  
5 opposed to really over-emphasizing the specific  
6 resource.

7 MR. WHITE: This is John White from CEERT. Oh,  
8 do you have a comment?

9 CHAIRMAN WEISENMILLER: Yeah, so go ahead if you  
10 have any comments on how we can do a portfolio. We're  
11 also going to keep asking that same question.

12 MR. MILLS: Yeah, my only few thoughts on that  
13 is that, when we look at these cases where we ask how  
14 much does the value of adding wind change if we add PV,  
15 or do those sort of things, so that's sort of asking  
16 what impacts does doing a portfolio have versus just one  
17 technology at a time. So at that particular penetration  
18 of wind, for example, if I go to 10 percent penetration  
19 either by itself, or with a portfolio of other  
20 resources, it seems like that only changes by around,  
21 you know, somewhere in the neighborhood of \$10.00 a  
22 megawatt hour, and that's sort of what we've seen is  
23 that sort of one technology impacting the value of  
24 another one are somewhere in that \$10.00 a megawatt hour  
25 range. So one important question that we're not looking

1 at in that we weren't doing a portfolio analysis like  
2 that, is what's the difference in your busbar costs  
3 between those technologies? So you don't want to pay a  
4 very high price for one technology to get a higher value  
5 of wind, for example, -- if it far exceeds that \$10.00 a  
6 megawatt hour benefit (ph) of the portfolio. So I think  
7 this just sort of needs the consideration both of  
8 levelized costs of each technology and (inaudible).

9 CHAIRMAN WEISENMILLER: Okay, and so the \$10.00  
10 per megawatt hour, roughly across your cases what  
11 percentages of that is of the total marginal value?

12 MR. MILLS: So that's going to depend on your  
13 penetration level, but that's somewhere in probably like  
14 a 16 percent or so of your total value.

15 MR. WHITE: Andrew, this is John White from the  
16 Center for Energy Efficiency and Renewable Technology,  
17 and I want to thank you for this presentation and for  
18 this work. I think it has some important implications  
19 for how we begin to think about cost versus value, as  
20 well as what might be a true way of looking -- a truer  
21 way of looking at least cost/best fit because it seems  
22 to me at the moment we have least cost, least cost, is  
23 the priority and seeing how these things fit together, I  
24 think can help us and also it's intuitively correct that  
25 a balanced portfolio, to take different technology

1 strengths, play off of each other. But I'm curious as  
2 to why there is no mention of geothermal or biogas  
3 baseload technologies. It seems to me that,  
4 unfortunately, that's sort of symptomatic of one of the  
5 problems we have at the moment; we haven't added any  
6 geothermal to the California grid, except for a new  
7 project in Imperial that's actually exporting to  
8 Arizona. So this resource is extremely valuable, I  
9 would think, particularly in light of what's happening  
10 in Southern California with the loss of San Onofre. So  
11 I'm wondering, do you have plans to -- it may be that  
12 this work was organized around the idea of variable  
13 renewables, but the other renewables that are either  
14 storage with solar thermal is dispatchable, which is a  
15 unique value among all the renewable technologies, but  
16 geothermal, it would seem to me, to be an interesting  
17 addition to the mix, and to see if maybe more geothermal  
18 would enable more of the variable resources by having  
19 another way to absorb some of the reliability issues.

20 CHAIRMAN WEISENMILLER: Although certainly  
21 geothermal can be dispatchable, you know, for Unocal  
22 proposing to PG&E to make all geysers dispatchable.

23 MR. WHITE: All the more reason, then, to see if  
24 we have a way of examining that in future work.

25 MR. MILLS: So I only have a couple of brief

1 comments and, so, your point about -- it is basically  
2 just a study that was focused on trying to understand  
3 variable generation, that's the main (inaudible) full  
4 report, a case where we just compare these four  
5 technologies. We do the same type of analysis for what  
6 we call just a flat block of power, which is mainly  
7 basically a base source of it running full on, the  
8 entire year, (inaudible). Did that come through?

9 COMMISSIONER DOUGLAS: It didn't.

10 MR. MILLS: I'm sorry. So in our report, we  
11 have a case that just looks at a flat block of power by  
12 itself, as a comparison to the variable generation  
13 technology, and that's not meant to completely be a  
14 geothermal unit or anything, but it sort of helps to  
15 understand, just putting it into context what would this  
16 look like if we were just to preclude the penetration of  
17 a secure baseload technology. So that's just maybe  
18 helpful for understanding the other results in the  
19 report. And as far as (inaudible) showed a high  
20 penetration of renewables, one of the issues that does  
21 start to pop up at high penetrations is you do start to  
22 find curtailment due to starting to sort of run out of  
23 load in some hours, that can confuse because you  
24 dispatch down all of your plant, and then you get to  
25 lower and lower prices during those hours because it's

1 marginal fuel that you're avoiding, it becomes cheaper  
2 and cheaper, so one issue is that, if you're backing  
3 down a geothermal plant, even if that's possible, you  
4 might not be saving much in terms of avoided -- there  
5 isn't really an avoided fuel cost unless you're able to  
6 sort of store geothermal heat that would then be  
7 consumed later, you're not really getting benefit out of  
8 that geothermal plant (inaudible) starts to become a  
9 conflict in particular hours, so there are some  
10 challenges, but both having a unit and turning it all  
11 baseload and a unit that is variable.

12 COMMISSIONER DOUGLAS: All right. Thanks,  
13 Andrew. We've got Mike Webster and then Nancy Ryan, and  
14 then Arthur.

15 MR. WEBSTER: This is Mike Webster from Los  
16 Angeles Department of Water and Power. On your slide  
17 11, you point out that solar, you don't get a lot of  
18 benefit from geographic diversity, and from an  
19 operational perspective, is that -- when you think about  
20 cloud cover, geographic diversity really does make an  
21 impact on operations because, if I get thunder showers,  
22 they're going to be in a localized area, and so from an  
23 operational perspective, I would encourage further study  
24 because when you're trying to keep the lights on,  
25 looking at items like reserves, regulation -- we call it

1 generation regulation now because we're actually  
2 regulating for generation -- is that that's going to  
3 have a whole additional layer of analysis. So while I  
4 agree geographic diversity for solar on a very high  
5 level planning level probably doesn't provide value;  
6 from our perspective, operationally, we very much want  
7 to diversify geographically. And if I had this study 10  
8 years ago, it's just is brilliant and it's really very  
9 very helpful, but it really comes back to common sense,  
10 and we probably did exactly what we were supposed to do  
11 as we were developing our portfolios. So this just  
12 helps justify that. And L.A. is a big supporter of  
13 looking at value, and about three years ago, we're doing  
14 exactly what you're modeling here. So I think you're  
15 definitely on the right track.

16 COMMISSIONER DOUGLAS: Thank you, Michael, and I  
17 think that's a really good point about cloud cover. Go  
18 ahead, Andrew.

19 MR. MILLS: Yeah, and I agree that's a very good  
20 point, and a couple things to just clarify. So we went  
21 down to hourly time of emission and included day-ahead  
22 forecast errors, and then to account for anything that  
23 was sub-hourly was purely by this ancillary service  
24 requirement adder that we have, it increases as you add  
25 more local technology. And we based some of our

1 understanding of what that adder might look like, it's a  
2 fairly simple type based on some more detailed analysis  
3 we had done before on looking at the impact of  
4 geographic diversity specifically on that short time  
5 resolution, so sub-hourly benefit of geographic  
6 diversity, and we did find that sub-hourly there's a  
7 massive benefit to geographic diversity. But we also  
8 found you don't have to go very far to get that on a  
9 sub-hourly basis. You don't have to move hundreds of  
10 miles, for example, before putting one plant here and  
11 then another plant down the road has already some  
12 benefit to that. So the time -- the distant scales for  
13 those short timescale variability issues start to become  
14 closer and closer. And so, in this case, when we were  
15 looking at 100 megawatt PV plant scattered throughout  
16 the deserts in California, we sort of assume that that  
17 would kind of get washed out quite a bit just from that  
18 degree of geographic diversity alone. If you were to  
19 really try to concentrate all of your PV, for example,  
20 you know, 5,000 megawatts in one plant, you might get a  
21 very different answer in terms of the challenges being  
22 much more due to those ancillary service impacts than if  
23 you had 100 megawatt plants sort of scattered in many  
24 different locations.

25 COMMISSIONER DOUGLAS: Thank you. Nancy.

1           MR. MILLS: I think that that's actually an area  
2 where there's a lack of data for it, too, so that's  
3 something that we're hoping to see more and more  
4 analysis to sort of back up some of that intuition on  
5 this moving from sub-hourly geographic diversity.

6           COMMISSIONER DOUGLAS: Great. Go ahead, Nancy.

7           MS. RYAN: Hey, Andrew. Nancy Ryan with the  
8 California PUC. Very interesting study, I'm still  
9 trying to wrap my head around it. Two questions. The  
10 first one, I think you blew past this pretty quickly, so  
11 if you could just explain again, what else have you got  
12 in the model that essentially provides balancing  
13 services in terms of other storage technologies beyond  
14 storage that's integrated with solar thermal -- and  
15 then, I think you made some reference to price  
16 responsive load?

17           MR. MILLS: Yeah. In all of the results that  
18 you've seen so far, none of those had price responsive  
19 load, it was all done sort of assuming that you had to  
20 meet a load in every hour, or else the prices would go  
21 to very high levels. We did include -- I think it was  
22 about four gigawatts of incumbent pumped hydro in  
23 California that was dispatched within the model, so that  
24 was providing some balancing. We had incumbent  
25 combustion turbines that we assumed would still be

1 around in 2030. We had existing combined cycle plants  
2 and, then, the model was building a lot of new combined  
3 cycle plants, and then in some cases it would build new  
4 combustion turbines. And then there's also existing  
5 California hydro that was moving around quite a bit in  
6 the model, also.

7 MS. RYAN: Okay, so the model does build -- use  
8 of the model does build some CTs for balancing purposes?

9 MR. MILLS: Yes, only in -- we did -- so the CTs  
10 only got built, again, in a sensitivity case; otherwise,  
11 it was building CCGTs in most cases.

12 MS. RYAN: Okay.

13 MR. MILLS: It was just, if we brought down the  
14 cost of CTs by a small amount, we were using (inaudible)  
15 estimate, and the CT and CCGT costs are quite similar,  
16 so their capital cost, and so it was leaning more  
17 towards combined cycle rather than CTs, but if you just  
18 changed that by a small amount, then it's like for a CT.

19 MS. RYAN: Do you have a sense of what one might  
20 change if you add in additional flexible resources,  
21 either price responsive load, or some different energy  
22 storage technologies?

23 MR. MILLS: Yeah, so it does mitigate the  
24 decrease that we saw in the value of wind and of PV and  
25 CSP. The degree to which the value changes in higher

1 penetration levels does vary by those different types of  
2 flexible resources, and in general, again, it was  
3 something kind of in that \$10.00 a megawatt hour range  
4 where you would increase the value, for example, of PV  
5 by \$10.00 a megawatt hour above what we saw in this  
6 reference case if you had price responsive demand, and  
7 we modeled that by having a constant elasticity with  
8 about a negative .1 elasticity.

9 MS. RYAN: Okay. Another question --

10 MR. MILLS: So those numbers are somewhere in  
11 that \$10.00 a megawatt hour exchange.

12 MS. RYAN: Okay. Another question, I think this  
13 is mainly a clarification. So what your model  
14 effectively does is you have this kind of multi-  
15 dimensional surface that reflects different compositions  
16 of portfolios, and you kind of pick some point on that  
17 surface and then do incremental movements away from that  
18 and look at how it changes the overall value of the  
19 portfolio. Is that generally correct?

20 MR. MILLS: Yes, I would say that's a good way  
21 to characterize that.

22 MS. RYAN: Okay. So what that means, though, is  
23 it doesn't compare kind of -- so it tells you how the  
24 value of the portfolio changes for different  
25 compositions in the portfolio, but does this model

1 provide any insights on the overall value of different  
2 portfolios and support that kind of comparison?

3 MR. MILLS: No, it doesn't. It is just looking  
4 at the incremental change around that point that we sort  
5 of -- we don't actually know the full shape of that  
6 surface, so we kind of pick a point on that surface and  
7 then look at how it changes around it.

8 MS. RYAN: Okay, thanks.

9 COMMISSIONER DOUGLAS: Great. I'll invite more  
10 questions, but also point out that we're behind on the  
11 agenda and we've got one more presentation. Oh, go  
12 ahead, Jim. Jim, then Arthur, and then Tom.

13 MR. KENNA: Thank you, Karen, and I'll keep it  
14 brief. I'm just interested in application of this  
15 information, or this model and the last couple of  
16 questions triggered this question for me. Are there any  
17 cautionary notes in terms of thinking about this in  
18 terms of scale? When we're in the DRECP, sometimes  
19 we're thinking at the scale of the West Mojave, and  
20 sometimes we're thinking at the scale of the whole plan.  
21 And so I'm curious as to the applicability of these  
22 concepts; they seem intuitively right, but as scale  
23 changes in terms of the issue that's facing us.

24 COMMISSIONER DOUGLAS: Yeah, I think, Jim, I was  
25 going to ask a similar question, or make a note that it

1 would be really helpful to us to get a sense of -- I  
2 think Andrew raised the concept -- the distant scales  
3 for the value of geographic and technology diversity as  
4 relevant to the DRECP. And it sounded like he was using  
5 relatively large distant scales on wind and he was  
6 saying that, for the kind of operational concerns that,  
7 Mike Webster brought up, relatively smaller distance  
8 scales on PV related to cloud cover would be correct.  
9 And I don't know if Andrew wants to speak to that, but  
10 it does seem to me that this would be an area -- one of  
11 the things I want to identify in this day is areas where  
12 stakeholders can help us refine our understanding, and  
13 the distance scales question, I think, is a really  
14 important one.

15 MR. KENNA: Thank you.

16 COMMISSIONER DOUGLAS: Thank you. Okay, let's  
17 see, we've got Arthur. Who else do we have? And  
18 Arthur, Tom, and then Carl.

19 MR. HAUBENSTOCK: Great. So, Andrew, I'll  
20 follow up on that last question. First of all, thank  
21 you so much for staying up so late in China and  
22 contributing these very interesting results. At this  
23 rate, we're going to keep you up until tomorrow morning,  
24 but thank you very very much, this is very interesting.  
25 I was curious about the geographic diversity results and

1 you mentioned this with respect to PV and I don't know  
2 if you looked at CSP, and I'm wondering to what extent  
3 this may be an artifact of the level of aggregation of  
4 weather data that you have. Because when we look from a  
5 solar development perspective, the weather data we look  
6 at that is important to our performance is very highly  
7 localized, and I don't know how much information you had  
8 available to you on that and whether, you know, the  
9 geographic scale that you're looking at, whether it's  
10 for PV or for CSP, may relate to, as I think you alluded  
11 to, how much data you have available. And I have two  
12 other questions, so I'll give them to you all at once so  
13 you can take them.

14           The other is regarding ancillary services and  
15 integration costs, and the extent to which you were  
16 looking to solar thermal to provide AS, and whether  
17 those values, you know, we saw the energy values and the  
18 capacity values, we didn't see AS values, and I don't  
19 know whether you were including those values in your  
20 analysis, as well. And one of the things I was  
21 wondering about is whether you'd looked at the work that  
22 NREL had done on CSP with storage and its ability to  
23 increase the penetration of PV that they found, I think  
24 it's mostly Paul Denholm and others' work, that CSP with  
25 storage would actually enable greater integration of PV

1 at lower cost overall.

2           And the last question is really whether you're  
3 considering an optimized portfolio, following up on  
4 Nancy's question from a few minutes ago, are you  
5 considering in next stages how you might optimize the  
6 portfolio value? Because when we look at these results  
7 and the results of others, what we see is there's less a  
8 particularized value that we can count on going forward,  
9 but a relative value. And it looks as if there are  
10 opportunities for these renewable resources to enhance  
11 the values of others, taking into consideration  
12 geographic diversity and what that might -- what further  
13 work in that area might be able to do to help guide  
14 procurement?

15           MR. MILLS: So I think I'm going to kind of  
16 answer these in a roundabout way, but I think to start  
17 off, so on the Ancillary Service cost question, I think  
18 our intention here was to try to capture a very wide  
19 range of different components all in one model to kind  
20 of get almost like a ballpark estimate of what the  
21 relative importance of these different issues and, so,  
22 that's the number that comes out of it. I would put a  
23 lot less weight on than sort of how do these things  
24 compare to each other and how do they change with  
25 different penetration levels? And so we did see that

1 the big numbers, kind of most around the capacity value  
2 and energy value numbers, and we saw both there, the  
3 largest changes there. So to really get down and answer  
4 the ancillary service questions correctly, I think, and  
5 if you really want to get into those right numbers, I  
6 think that really requires kind of a much more detailed  
7 level of modeling, more on the operational issues. And  
8 so, you know, we don't have any plans to use this model,  
9 for example, to answer those questions in a lot of  
10 detail, but there are tools out there and I think a lot  
11 of the work that NREL is doing is really a good example  
12 of using those detailed models like *Plexos* that can  
13 really handle some of -- and actually that CAISO has  
14 been involved with, too, in California -- that can  
15 handle a lot of those questions specifically on the  
16 ancillary service question. So I think that that's  
17 probably going to be where you're going to find a better  
18 sense of impacts and numbers just on ancillary services,  
19 but my word of caution is just to make sure that those  
20 are still thought about in the context of potentially  
21 bigger numbers like capacity value and energy value. We  
22 did include some ability for thermal storage, plant to  
23 thermal storage, to provide ancillary services and they  
24 did get chosen to do that, and did add a small amount to  
25 their revenue stream, but it wasn't very large. And I

1 think part of the issue (inaudible), that adds to the  
2 other power plants (inaudible).

3 COMMISSIONER DOUGLAS: Andrew, we're losing your  
4 last thought. If you'd just summarize it really quickly  
5 again?

6 MR. MILLS: Yeah, so the ancillary service cost  
7 at very high penetrations of renewables actually started  
8 to go down some during the times when you had a lot of  
9 renewable resources because you were sort of adding head  
10 room on the conventional power plants; they had room to  
11 move up because they were back down because of the  
12 energy coming from the renewable plant. So that's  
13 something to maybe look at in a more detailed model.

14 COMMISSIONER DOUGLAS: Uh-huh. Thank you.

15 MR. MILLS: The other thing, in terms of the  
16 portfolio question, the portfolio question, I think one  
17 of the next things that we're doing is, rather than  
18 trying to keep expanding our own modeling capabilities,  
19 or expand this model, is to use what we're learning from  
20 this type of framework to see if we can compare this to  
21 some of the ongoing portfolio analysis, primarily an  
22 integrated resource plan, and just see if there's any  
23 sort of lessons learned where there might be ways to  
24 improve or other factors to include into ongoing  
25 integrated resource plans around the West and even the

1 models used like in the California long term planning  
2 process, and so I think, going forward for us, it's more  
3 kind of engaging with those forums, rather than trying  
4 to do that modeling on our own.

5 COMMISSIONER DOUGLAS: Thank you. We've got Tom  
6 and then Carl, and then we'll see if anyone else has any  
7 burning questions. But if not, we'll go on to the next  
8 presentation. Go ahead.

9 MR. STARRS: Thank you. Hi, Andrew. It's Tom  
10 Starrs. It's good to hear your voice again. I've just  
11 got a quick question back on the storage topic and it  
12 sounds like you assumed that the storage was integrated,  
13 essentially co-located with the CSP plant, and I'm  
14 wondering if your model had the resolution to assess  
15 whether the storage would have the same value if it were  
16 located, you know, elsewhere in the system basically,  
17 either more pumped hydro, for example, or even the  
18 ultimate form of distributed storage, in thousands or  
19 hundreds of thousands of electric vehicles? Would those  
20 alternatives provide that same value? Or not?

21 MR. MILLS: So the location of the storage --  
22 basically the thermal storage is constrained by its only  
23 resource that can add to it is solar thermal insulation,  
24 I mean, you know, the insulation coming in. So that's a  
25 constraint on the thermal storage dispatch. But in

1 terms of other locational components, we don't include  
2 anything there, so the bulk power storage could be fed  
3 by renewables, or it could be fed by the hydro, or by a  
4 nuclear plant, or any other resource can provide energy  
5 that goes into the storage at any time. And so the bulk  
6 power storage, one of the issues there, and then it can  
7 also be dispatched any time, so one of the issues there  
8 is that it actually becomes even more valuable, I think,  
9 for that reason because it can provide -- it can absorb  
10 power from many different resources and it can provide  
11 at any different time, so it has fewer constraints on  
12 it, and so it's a very high value for full power  
13 storage. But I think, as was mentioned earlier, there's  
14 just such a low cost associated with thermal storage,  
15 that it makes thermal storage very attractive  
16 (inaudible) and that the costs need to come down on both  
17 power storage for that high value to be realized.

18 COMMISSIONER DOUGLAS: Okay, thanks. Carl.

19 MR. ZICHELLA: Thanks, Karen. Thanks, Andrew,  
20 it's a really really interesting and valuable study.  
21 Just a quick comment on the distances aspect of it,  
22 while it is really true there's geographic diversity on  
23 a local scale, there's also some really important  
24 diversity benefits, geographic diversity benefits, from  
25 larger distances, too. With solar, sunrise is

1 significantly earlier east of us and one of the big  
2 challenges for -- and ISO, we just did a presentation on  
3 some of this yesterday at their Board meeting -- is  
4 those morning ramps that we have to integrate for, it's  
5 very rapid, a lot of power, and we have people with a  
6 similar challenge, with a time differential that could  
7 provide some value to us, too. We never talk about  
8 that, we need to think about that, that's part of the  
9 value proposition of geographic diversity for solar.  
10 It's more important to us in the morning. In the  
11 evening, we have lots of value for our evening power, we  
12 don't necessarily have to send that elsewhere. But we  
13 could, if there was a need and a market for it, and we  
14 are market constrained, or we'll talk about that, I  
15 guess it's on the agenda, for later.

16           The second thing about distance is correlation  
17 is as important as distance. It's not just being far  
18 away, it's does your generation profile help? If all  
19 the variability is at the same time, it doesn't help  
20 that much -- look at what happened to BPA, all their  
21 variability is at one flow port on the Columbia River,  
22 so they had to curtail wind because they're often over-  
23 supplied with resources from their hydro and wind  
24 resources. Well, that's right, John, that's their take  
25 on it, not necessarily the universally accepted one.

1           However, we also know, and there's recent  
2 information coming out of University of Wyoming about  
3 generation characteristics of wind there and how that  
4 matches other parts of the west, which I don't think  
5 that study is actually released yet, so it couldn't be  
6 part of what we just discussed, but it shows good  
7 uncorrelated variability with San Geronio Pass, for  
8 example, in California. So I think we do need to think  
9 about how the resources stack up, the forecasting of the  
10 resources, etc., and we're getting much better at this  
11 with the variable generation rule from FERC and require  
12 more of this kind of direction and I think we're going  
13 to a place where not just distances, but actual  
14 generation characteristics, whether or not the  
15 variability correlates to our own.

16           CHAIRMAN WEISENMILLER: Carl, this is Bob. I  
17 think the part on correlation is very good. I think we  
18 do need to stay focused on DRECP and, so, the question  
19 certainly for the energy panels is the degree of  
20 correlation among that geographical zone. Obviously, in  
21 PEIS and other forums, you know, the broader correlation  
22 issues are important.

23           MR. ZICHELLA: That's right. I do think that,  
24 even in-state, we do have somewhat of an interest here,  
25 too, in terms of outside of the DRECP area, transmission

1 and generation that benefit those resources within, and  
2 I often like to talk about the Central Valley resources  
3 and how good they are, it provides us geographic  
4 diversity in terms that we talked about earlier from  
5 Michael's comment about cloud cover, etc. It does give  
6 you that; it also gives you more access to balancing  
7 resources like a better utilization of Helms, for  
8 example, which is factored into this report, I believe.  
9 So if we think about it that way -- we need to think  
10 about the DRECP plus in a way, outside -- what do we  
11 have to do outside of the DRECP to help the integration  
12 challenge inside the DRECP?

13 COMMISSIONER DOUGLAS: All right. Well, thank  
14 you. This has been a really good discussion. Andrew,  
15 thank you so much for agreeing to do this from China  
16 late in the night for you.

17 MR. MILLS: Yeah, I've enjoyed the feedback,  
18 too. Thanks so much.

19 COMMISSIONER DOUGLAS: You know what? We have  
20 one question from one of our DRECP stakeholders, so even  
21 though we're 45 minutes behind our agenda or so, why  
22 don't I ask, Barbara Boyle, you have a question?

23 MS. BOYLE: Yeah, this is really quick. I  
24 unfortunately don't -- I'm not able to see the previous  
25 slide, but I just wanted to confirm that this is all

1 about supply -- are we just talking about storage to  
2 some degree? I didn't hear your discussion on how  
3 energy efficiency works into this. And that was my  
4 question.

5 COMMISSIONER DOUGLAS: This is the renewable --  
6 this is just an analysis of relative value of variable  
7 generation at different penetration levels. I mean, I  
8 answered the question for Andrew.

9 MR. MILLS: So we've got a load forecast, yeah,  
10 we've got a load forecast that was sort of taken as  
11 given, and then we just saw what happened as we changed  
12 renewable penetration, and we didn't account for  
13 anything like changes in energy efficiency or -- in the  
14 base case, we did not account for demand response, but  
15 that is one of the sensitivity cases that we do, really,  
16 when we make the demand side the more price responsive  
17 and try to show an increase in the value of renewables  
18 with higher penetration when you do have that more price  
19 responsive demand.

20 COMMISSIONER DOUGLAS: Okay, all right. Thank  
21 you, Andrew. All right, so with that, if the panelists  
22 are okay and don't mind waiting on the break for another  
23 20 minutes or so, let's go to the NREL presentation.

24 MS. HAND: During the day --

25 COMMISSIONER DOUGLAS: Maureen?

1 MS. HAND: Yes.

2 COMMISSIONER DOUGLAS: This is Karen. We just  
3 started being able to hear you, so --

4 MS. HAND: Sorry, I didn't realize that I was on  
5 mute. Okay. So, Commissioner Douglas, thank you very  
6 much for inviting me to talk about renewable electricity  
7 futures. My colleague, Ed DeMeo, I believe he is there  
8 in the room and he was also on the Project Leadership  
9 Team for this project, he is going to be with you, I  
10 believe, for the whole day; he's got a lot of experience  
11 in the electricity industry and can help answer  
12 questions after the presentation.

13 So I'm Maureen Hand. I'm at the National  
14 Renewable Energy Laboratory in Colorado. And today I'm  
15 going to talk to you about renewable electricity  
16 futures, which is a project that we looked at nationally  
17 in trying to understand how renewables could contribute  
18 -- next slide, please.

19 So as many of you are aware, renewable capacity  
20 has been growing substantially in the United States and  
21 today we --

22 COMMISSIONER DOUGLAS: Maureen, this is Karen.  
23 Apparently Andrew's WebEx issues had nothing to do with  
24 him being in China because we're also hearing it here.  
25 When you speak slowly, the system generally seems to be

1 able to manage it. Go ahead.

2 MS. HAND: Okay. All right, sorry about that.  
3 Okay, so renewable energy today produces about 10  
4 percent of our annual generation and you're all aware of  
5 many of the attributes of renewables that make them  
6 technologies we're considering. But what we wanted to  
7 do with this was really try to understand what extent  
8 could renewable technologies that are commercially  
9 available today (inaudible) U.S. electricity band (ph)  
10 out to the future of 2050. Next slide.

11 The report we just published last month is in  
12 four volumes and you can download that from the NREL  
13 website. Everything that I'll be speaking about today  
14 is in Volume 1, all of the analysis looking at these  
15 scenarios for high penetration renewable electricity  
16 futures. Volume 2 goes into detail around each of the  
17 renewable technologies and the storage technologies  
18 covered in the study. Volume 3 discusses our end use  
19 electricity demand. We did assume a demand projection  
20 through 2050 that included significant adoption of  
21 energy efficiency, as well as a demand projection that  
22 is a more typical growth in electricity demand. And  
23 Volume 4 provides an overview of the bulk electric power  
24 system operation and some experiences specifically  
25 around variable generation. This was a very big study

1 with over 100 different contributors with 35 different  
2 organizations. It was sponsored by the U.S. Department  
3 of Energy. So I'm speaking here today with reference to  
4 a large number of other experts that contributed to this  
5 study. Next slide, please.

6           Before we get too far into it, I'd like to say a  
7 little bit about what we did versus what we did not do.  
8 Whenever you do these kinds of studies, there are a lot  
9 of different options, different approaches that one can  
10 take, and you have to scope your study in a way that  
11 makes sense. So what we did try to do in this study was  
12 to look at commercially available renewable generation  
13 technologies. We were looking at a range of generation  
14 levels in 2050 and we did some additional analysis at 80  
15 percent renewable electricity in 2050. We did not look  
16 at the policies, or operating procedures, or business  
17 models that would be needed to facilitate this kind of  
18 growth.

19           We were focused in looking at the technical  
20 characteristics around high levels of renewable  
21 generation. We did analysis at the hourly level, but  
22 this study is definitely not a full power system  
23 reliability study looking at all of the sub-hourly  
24 ancillary services that would be needed, as well. We  
25 looked at a variety of scenarios, none of these should

1 be considered a forecast or a prediction. We estimate  
2 electric centered carbon emission reductions, but our  
3 scenarios are not optimal pathways to the key specific  
4 low carbon target. We look at some economic,  
5 environmental, and social impacts, but it's not a  
6 comprehensive cost benefit analysis across all  
7 generation options.

8           So what we do is illustrate a renewable specific  
9 pathway that helps provide a picture out 2050 for the  
10 kinds of issues that one might see around renewable  
11 technologies. This is definitely not the last word and  
12 does indicate other areas for future presentations (ph).  
13 Next slide, please.

14           We used the NREL modeling tool called ReEDS, the  
15 Regional Energy Deployment System model. It was  
16 designed to be used in the study of renewable technology  
17 to capture many of their unique aspects. We took the  
18 input from all of our experts to help provide the  
19 context and the input assumptions to the model. The  
20 ReEDS model provides the capacity expansion from 2010 to  
21 2050, and this is the generation capacity selection that  
22 leads to these futures of different renewable generation  
23 levels in 2050.

24           We used the NREL Solar DS model to estimate the  
25 capacity of rooftop solar PV that would be installed

1 between 2010 and 2050, and then we used the commercially  
2 available ABB GridView model to look at the hourly  
3 operation of this future 2050 electric system at  
4 different levels of renewables.

5           So this series of models gives us unprecedented  
6 geographic and time resolution for the contiguous United  
7 States. And we looked at over two dozen different  
8 scenarios, again, it is U.S. electric sector only, and  
9 we're looking at the year 2050. Next slide, please.

10           So these are the renewable technologies and  
11 resources that were included in the study. We again  
12 were focused on commercially available technologies and  
13 we really wanted to focus on the unique aspects of  
14 renewables, so obviously geographic location is what  
15 those -- you can see that there are renewable resources  
16 throughout the United States, but their strength varies  
17 with their particular location. And as we just  
18 discussed earlier in Andrew's presentation, the  
19 geographic diversity and correlation of output from  
20 these resources is important and that's an element that  
21 is included, considered in the ReEDS model.

22           Technical resource potential is another unique  
23 aspect, both wind and solar have tremendous potential in  
24 the 10,000 gigawatts; our electric system today is about  
25 1,000 gigawatts. Some of the other renewable resources

1 are somewhat more limited in their technical potential.

2 Another really important characteristic of  
3 renewable resources is their output characteristics.  
4 Obviously, wind and solar PV are variable operators, but  
5 the other renewable technologies can operate more  
6 similarly to a conventional power plant. Next slide,  
7 please.

8 So when we look at the transformation of the  
9 electric sector from 2010 to 2050, for a scenario that  
10 would include 80 percent renewable electricity  
11 generation in 2050, we can see the kinds of things that  
12 might have to change. For example, you see a lot more  
13 transmission shown there in the red lines on the right,  
14 this is associated largely with the geographic location  
15 and accessing these renewable resources, as well as  
16 moving the power around to help provide system  
17 flexibility. You also can see that there are renewable  
18 resources that would be used throughout the United  
19 States in all of the different regions.

20 Our primary conclusion from the study is that  
21 there are commercially available technologies today,  
22 that when combined with the more flexible electric  
23 system, could supply 80 percent of our electricity in  
24 2050 and, again, we did look at an hourly analysis, an  
25 hourly operation of this system. Next slide.

1           The map shows by region the generation and  
2 capacity for each of the regions in the United States.  
3 The bars on the left are showing the generation in  
4 terawatt hours and the bars on the right show the  
5 capacity installed in each region. The black line shows  
6 the electricity demand in that region. And so some of  
7 the regions are exporting electricity, the Great Plains,  
8 for example, has a tremendous wind resource, and a lot  
9 of that energy might be exported to other regions.  
10 Other regions in the Southeast Florida, for example,  
11 they require energy to be imported, although every  
12 region does have substantial renewable generation  
13 capacity installed. Next slide, please.

14           One of the most important results from the study  
15 is that there are a number of different technology  
16 pathways to achieve these very high levels of renewable  
17 generation. As I mentioned, most of our scenarios were  
18 done using what we called the "Low Demand Electricity  
19 Growth Scenario," and this scenario assumes that,  
20 through energy efficiency, demand growth is relatively  
21 flat between now and 2050, so very little growth in  
22 demand. And the blue bars represent the scenarios and  
23 show the range of technology capacity and generation  
24 associated with those scenarios. And the diamonds are  
25 showing the high demand scenario -- again, that scenario

1 had a more typical demand growth between 2010 and 2050.

2           So the range of capacity that could be installed  
3 for each of the renewable technologies depends  
4 significantly on the assumptions about the future costs  
5 and performance of those technologies. It also depends  
6 upon the growth in electricity demand. And finally, it  
7 is also heavily dependent upon the presence of  
8 constraints, so we looked at some scenarios for 80  
9 percent renewable generation where we limited the amount  
10 of transmission that you could build. We looked at  
11 scenarios where we limited the flexibility within the  
12 operation of the grid, and we looked at scenarios where  
13 we limited the quantity of renewable resources.

14           So one of the important things to think about is  
15 that, for example, if you limit the quantity of  
16 transmission that you can build, you tend to increase  
17 the capacity from more local generation, technologies  
18 like solar PV, or offshore wind; whereas, when you're  
19 allowing more transmission to be built, then you  
20 increase the capacity of onshore wind, or solar CSP, as  
21 they tend to be more location dependent. Next slide,  
22 please.

23           This slide is showing a range of generation  
24 levels to 2050, but for our baseline, as well as for 30  
25 percent and 90 percent renewables, and so you can see

1 how the generation mix changes as you increase the  
2 amount of renewables that you add, and the conventional  
3 technologies that produce less energy in each of these  
4 scenarios. It's really important to remember that  
5 renewable electricity comes from a number of places and  
6 it is wind and solar PV that are your variable  
7 generation. So in the scenarios that we conducted, up  
8 to about 50 percent energy came from variable  
9 generation; the other renewable technologies (inaudible)  
10 additional energy beyond that.

11           So as your variability increases, you increase  
12 the challenges to your system, but there are a variety  
13 of supply and demand side options along with new  
14 transmission that can mitigate that. Next slide,  
15 please.

16           So here is an example of an 80 percent renewable  
17 scenario, looking at peak demand periods, with the  
18 summer afternoon peak which is one of the most  
19 challenging parts of the year to operate the system  
20 today. And so you can see that there is sufficient  
21 capacity installed in this scenario to meet that peak  
22 demand. You're trying to use many of your firm capacity  
23 resources and those do include renewable technologies  
24 like geothermal, biopower, or hydropower, or CSP with  
25 storage, to provide that firm capacity. Next slide,

1 please.

2           When you look at scenarios with very high levels  
3 of renewable generation, particularly variable  
4 generation, then there are other times of the year that  
5 become very challenging such as in the low demand  
6 periods in the spring months. So here's an example of  
7 how, nationally, the system could operate in the spring  
8 months when you have a lot of excess generation from  
9 your variable renewables. There are a lot of different  
10 flexibility options within the system that can be used  
11 to meet load for every hour, and these include your  
12 flexible generators, both conventional and renewable  
13 generators. You have flexible load on the demand side,  
14 you can shift the load in order to accommodate this  
15 variability. New transmission and coordination over  
16 large areas also allow you to move power around and  
17 reduce the amount of resources that you need in small  
18 geographic areas. Next slide, please.

19           The growth in the renewable industry that would  
20 be required to achieve these levels of generation by  
21 2050 is pretty substantial. We're looking at 20  
22 gigawatts per year of U.S. installation over the next  
23 decade, up to 40 or more gigawatts per year. However,  
24 many of these technologies are, while we're seeing  
25 growth in these technologies like PV and wind, you can

1 see the global PV capacity in 2010 was a little under 20  
2 gigawatts, and global wind capacity in 2010 was 40  
3 gigawatts. So we're seeing global numbers that are on a  
4 level comparable to what the United States would need to  
5 do to achieve these high levels. We did not find any  
6 insurmountable constraints that would prevent this kind  
7 of growth. Next slide, please.

8           Increasing renewable generation to 80 percent  
9 renewables by 2050 would reduce carbon emissions  
10 nationally by about 80 percent reduction in GHG  
11 emissions. It would also lead to a reduction in water  
12 use in the electric sector, both with withdrawals and  
13 consumption, so about 50 percent reduction in water use.  
14 Next slide.

15           A planned use is, of course, something that I  
16 believe all of you are interested in. When we look at  
17 the gross land area required to support these 80 percent  
18 renewable scenarios, you can see that, well, it's less  
19 than three percent of the total U.S. land area, about  
20 half of the total area would be needed for biopower for  
21 dedicated costs for biopower. The other half of the  
22 area for all the other renewable technologies is largely  
23 associated with wind plants, but in a wind plant, only  
24 about five percent of the area is actually disrupted.  
25 There are some other comparisons up there for roads or

1 golf courses, to give you an idea of the total land area  
2 that might be associated with these renewable generation  
3 sites. Obviously, there are a lot of challenges in  
4 trying to find the best places for siting all generation  
5 technologies, and these considerations of wildlife and  
6 habitat disturbance, the public impacts of the  
7 generation and transmission all need to be considered in  
8 ultimately choosing individual sites. Next slide,  
9 please.

10           If you look at the incremental cost of the  
11 renewable scenarios, in our scenario, and we compared  
12 our incremental cost with the cost of other scenarios  
13 that have been conducted to look at similar  
14 transformation of the electric sector to achieve similar  
15 levels of (inaudible) in the future. So the gray band  
16 shows the range of incremental costs for the 80 percent  
17 renewable scenarios, and then the lines and the dots are  
18 showing scenarios conducted today or the EIA. So our  
19 scenarios are comparable to these other highly  
20 transformative scenarios and the range for 2050 is  
21 driven very strongly by the assumptions about the cost,  
22 the future cost and performance of the renewable  
23 technologies. Next slide.

24           So just in summary, there are four primary  
25 results from this study, first of all, that commercially

1 available technologies, again, combined with the more  
2 flexible electric system, are adequate to supply 80  
3 percent U.S. generation; this increased system  
4 flexibility is really important and there are both  
5 supply and demand side options available, there are a  
6 lot of different ways of increasing system flexibility  
7 that could be used. The renewable resources in the U.S.  
8 are abundant and there are a number of combinations of  
9 technologies, all of which could result in deep  
10 reductions in electric sector greenhouse gas emissions  
11 and water use.

12           And finally, the incremental cost of the high  
13 renewables scenario is similar to other clean energy  
14 generation scenarios, and the technology cost and  
15 performance assumptions are very important in reducing  
16 that incremental cost. Next slide.

17           So there is the website for the study. And if  
18 you have another minute, I forgot, I do have an  
19 animation that shows how this operates, the animations  
20 are on the website, but if you have a minute, Kristy --

21           COMMISSIONER DOUGLAS: All right, go ahead,  
22 let's see the animation. We like animations.

23           MS. CHEW: Maureen, this is Kristy. What slide  
24 does your animation start?

25           MS. HAND: It's -- you'll have to give me

1 control and I can -- I didn't include it, unfortunately,  
2 I should have. We should have done that in advance.

3 Well, can you --

4 COMMISSIONER DOUGLAS: While Maureen is looking  
5 for the control, let me just look around the room and  
6 see who has questions. Okay, we've got a couple  
7 questions. I've got Bob and Laura. Does anyone else  
8 have questions for Maureen right now? Mike? Okay.

9 MS. HAND: Can you see the animation?

10 MS. CHEW: Maureen, this is Kristy. Did you  
11 select the "share my desktop" button your screen?

12 MS. HAND: I did the share application, but --  
13 so you're not seeing anything?

14 MS. CHEW: No, but I believe some people can, so  
15 maybe our system is just a little bit behind, give it  
16 one second.

17 COMMISSIONER DOUGLAS: Ah, we see it.

18 MS. HAND: Okay. So the dispatch stacked on the  
19 right is showing, by hour, which generation technologies  
20 are producing energy in any given hour, and the light  
21 part is showing the daytime period. And on the map, you  
22 can see the generation, you can kind of see the  
23 photovoltaics come on in the morning and go off in the  
24 evening, kind of the orange, lighter orange colors. You  
25 can see the wind throughout more in the northern part of

1 the country. And if I move over here to the summer  
2 months, now we're looking at July, and so you see a  
3 greater peak in your peak demand, you see the solar  
4 generation, of course, a little bit stronger than you  
5 did in the winter months.

6 MR. STRACK: I see a lot of mold.

7 (Laughter)

8 MS. HAND: So I'm happy to answer any questions  
9 if you like.

10 COMMISSIONER DOUGLAS: Great. Go ahead, Bob.

11 CHAIRMAN WEISENMILLER: Okay, so I have three  
12 questions. The first -- and two of them are dealing  
13 with the demand forecast -- the first one is, in a  
14 demand forecast, is there any ZEV penetration? As you  
15 know, our Governor has a very aggressive call,  
16 particularly going out to 2050, and that can either, we  
17 hope, complement the renewables, but it would always be  
18 good to see some modeling exercise confirm or contradict  
19 that.

20 MS. HAND: Yes, we did include Plug-In Electric  
21 Vehicle component in the electricity demand projection.  
22 I think it's about half of the light-duty vehicle demand  
23 associated with Plug-In Electric Vehicles.

24 CHAIRMAN WEISENMILLER: Okay. Another question  
25 is, one of the other things we're finding in California,

1 and I think it's a grid level phenomena, is climate  
2 change is occurring and it is certainly affecting our  
3 energy system, and we're certainly seeing components of  
4 it in the areas of peak and sales in California at this  
5 point, and certainly by 2050 those impacts will be very  
6 pronounced. So I was trying to understand how much any  
7 climate change implications were taken into account in  
8 your assessment.

9 MS. HAND: So we did not include any assumptions  
10 about how climate change might affect the hourly profile  
11 of electricity demand. That is obviously a very  
12 important next step, I think, for this kind of analysis.  
13 Primarily, we wanted to be able to demonstrate, or to  
14 explore the use of commercially available technologies  
15 in meeting our electricity demand and how that would  
16 work, what the technical characteristics would be like.  
17 I think that, by looking at the different constraints  
18 that we did and providing some of these different ranges  
19 of technologies that it appears that this would be very  
20 robust. So it would be really useful to try to  
21 understand how the climate might change, both the  
22 resources --

23 CHAIRMAN WEISENMILLER: Sure.

24 MS. HAND: -- as well as electricity demand.

25 CHAIRMAN WEISENMILLER: Yeah. The other

1 question, or final question, you say that your cost  
2 estimates are similar to other clean energy scenarios,  
3 so I guess the two questions there become one, which are  
4 those specific studies? I mean, certainly you can  
5 provide those later. And also, how do they compare to,  
6 let's say, less clean energy scenarios, or more the  
7 business as usual case?

8 MS. HAND: Well, the comparisons that I showed  
9 were incremental cost, so it was the cost of a clean  
10 energy scenario relative to a business as usual type of  
11 case. And the studies that we compared with were  
12 conducted by the EPA and the EIA, looking at different  
13 clean energy legislation that had been proposed. And  
14 it's all in the report, it's described there, or I could  
15 send you the citations for those studies, as well.

16 CHAIRMAN WEISENMILLER: Okay, thanks.

17 MS. WISLAND: Hi, Maureen. This is Laura  
18 Wisland with UCS. Thank you so much for your  
19 presentation, it's a really exciting study. My question  
20 has to do with your sources of biopower. You mention  
21 dedicated energy crops and it looks like most of this  
22 stuff is popping up in the middle of the country, and  
23 I'm just curious to know whether everything that you  
24 assumed in terms of biopower was dedicated energy crops,  
25 or whether you did look at some agricultural waste or

1 biogas.

2 MS. HAND: We did include a lot of different  
3 biomass or bio feedstock sources, a lot of different  
4 waste products, as well as dedicated crops. So the  
5 dedicated crops only go into the land use assumptions.  
6 We assumed that the land use for the waste products  
7 wouldn't count towards the total footprint of the area,  
8 but the bio energy that is used comes from a variety of  
9 resources and not strictly dedicated crops.

10 MS. WISLAND: Just one follow-up. So the land  
11 use numbers that you have on Slide 15 is for the 80  
12 percent scenario, so for the biomass column, do you know  
13 what percentage that accounts for in terms of the  
14 biomass that's built in for that scenario?

15 MS. HAND: I'm afraid that I do not recall the  
16 exact number, so I'll have to get back to you on that.

17 MS. WISLAND: Okay, thanks.

18 COMMISSIONER FLORIO: Yes, this is Mike Florio  
19 from the California PUC. I'm interested in the  
20 balancing issues like flexibility and integration. You  
21 say supply and demand are balanced in every hour of the  
22 year. To what extent -- is each hour modeled  
23 discretely? Or do you take into account like ramps  
24 between hours and whether, you know, there's the system  
25 flexibility to make those transitions?

1 MS. HAND: So we're using the GridView model  
2 from a production cost model, and it does look at the  
3 hourly transitions. So obviously, a sub-hourly analysis  
4 is a follow-on work that would be needed. However, we  
5 do make some statistical assumptions about the amount of  
6 operating reserves that should be held in order to meet  
7 the anticipated variation within those hours. Because  
8 we have statistically represented the quantity of those  
9 resources, but the more detailed time series analysis  
10 really would give you the precise answer.

11 COMMISSIONER FLORIO: Okay, thank you.

12 COMMISSIONER DOUGLAS: Okay, we've got Carl, and  
13 I thought I saw someone else, too. Okay, Nancy, did you  
14 have a question, too? Go ahead. So we'll go with  
15 Nancy, then Katie, then Carl.

16 MS. RYAN: Hi, Nancy Ryan with the CPUC. I  
17 noticed that the regional analysis that you have on your  
18 Slide 8 is really interesting. First, I note that  
19 California is the only region that you've got in there  
20 where demand and generation actually are matched, I  
21 assume that's an actual finding and not a constraint you  
22 imposed on the model.

23 MS. HAND: Yes.

24 MS. RYAN: But elsewhere, I mean, basically  
25 you've got Northwest, Great Plains, Mid-Atlantic, and a

1 little bit of the Central and Southwest all exporting  
2 mainly -- I guess you would characterize that as all  
3 exporting wind to other regions to balance out their  
4 deficits. So I guess two questions; first, I mean, is  
5 that a fair interpretation? Or is that conclusion just  
6 an artifact of how you constructed your -- is that  
7 conclusion I drew is just an artifact of how you  
8 constructed your bar charts? And if it's not, what are  
9 the implications for financing the transmission  
10 necessary to make that possible? Is this transmission  
11 that is supporting wind, just a few hours, or like not  
12 all hours of the day, is this transmission that's not  
13 fully utilized?

14 MS. HAND: Well, let's see, so the first  
15 question, let's see, so the resources are selected to  
16 optimize it at the national level to meet your -- well,  
17 within each of the regions, you have to meet your demand  
18 and your reserve requirements, so the (inaudible) for  
19 the resources that are available. So the reason,  
20 because California does come out, happens to have the  
21 demand and capacity match, is not a constraint, that is  
22 just a result of the study. It would not necessarily  
23 mean that you're exporting wind from one part of the  
24 country to another, it could be other generation  
25 technologies. The transmission linkages throughout the

1 country are really important in providing reserve  
2 bearing, so that you can have the necessary reserves in  
3 order to maintain reliability, as well as the ability to  
4 move power from one place to the next, in order to meet  
5 that.

6           So I think that -- and I think another  
7 interesting point that I didn't really make in the  
8 presentation is that we do allow increased transfer of  
9 power across the interconnects; we maintain the  
10 interconnects, but we do allow increased (inaudible)  
11 connections to transfer power and we do see a lot of  
12 power that moves generally west to east, not only, but  
13 generally. So I think that what this kind of study does  
14 is it helps put out a picture of what the electric  
15 sector -- what characteristics the sector might need to  
16 have for high renewable generation. And we do estimate  
17 the cost of transmission in our (inaudible), and it's a  
18 small part of your total investment for all of the  
19 generation and fuel and operating cost. But as you say,  
20 there is an important question about how would you  
21 finance that, how do you create the market? We hope  
22 that this study provides pictures so that other people  
23 can begin to try to understand some of those questions  
24 about how to make this happen.

25           COMMISSIONER DOUGLAS: Thanks. So I see that,

1 Ed, did you want to clarify something?

2 MR. DEMEO: Am I on here?

3 COMMISSIONER DOUGLAS: Yes.

4 MR. DEMEO: Hi, Maureen.

5 MS. HAND: Hi, Ed. You're there.

6 MR. DEMEO: Yeah, just to add one little bit of  
7 clarification in case it wasn't clear, the capacity  
8 expansion that's done in the ReEDS model is done on a  
9 truly national basis. You're assuming it's one huge  
10 power system for the entire country. And similarly, the  
11 dispatch that's done with the ABB model, that's also  
12 done on a national basis. So that's quite different  
13 from the way we operate right now.

14 COMMISSIONER DOUGLAS: Absolutely. Okay, Katie.

15 MS. SLOAN: Hi, this is Katie Sloan with  
16 Southern California Edison. I just had a clarifying  
17 question on Slide 13 where you were talking about the  
18 amount of installations per year, and it looks like  
19 today we're around less than 10 gigawatts per year in  
20 the U.S., and you're looking at going to 20 or 40  
21 gigawatts per year into 2050. And the comment you made  
22 was that you didn't see any insurmountable long term  
23 constraints, and just looking at the note here, it says  
24 that that is in regards to manufacturing, supplies and  
25 labor. I'm wondering if you looked at any constraints

1 around siting and permitting, and do you think we can  
2 actually get to these amounts per year based on kind of  
3 the transmission and project buildout and siting and  
4 permitting that we see today.

5 MS. HAND: We did not specifically look at  
6 siting and permitting. I guess, you know, when we're  
7 thinking about long term futures, and long term  
8 constraints, many of those kinds of things don't really  
9 pose a technical issue, it's more of perhaps a  
10 motivation or an ability, a process, the development of  
11 a process in order to move in a direction. And so when  
12 you think about the long term, there's no technical  
13 reason why these levels of installed capacity couldn't  
14 be achieved.

15 COMMISSIONER DOUGLAS: Okay, thank you. And of  
16 course, just bringing the discussion back to the DRECP,  
17 which I'm going to do continually throughout the day in  
18 order to help get us through the agenda, you know, one  
19 of the primary reasons we're doing the DRECP is to  
20 grapple now with some of those siting and permitting  
21 issues, so that we do not find them to be insurmountable  
22 in the future, but that of course is a regional  
23 California effort right now with great partnership from  
24 Federal agencies and Department of Defense that is  
25 making it possible.

1           Now, let's see, I had Carl, did I have anyone  
2 else on this topic? John, did you have something, or  
3 did you change your mind? Okay, good. Go ahead, Carl.

4           MR. ZICHELLA: Yeah, my question actually  
5 overlapped with something that Ed was saying and some of  
6 what Nancy raised, but more generally, the assumption  
7 here is a lot more flexibility in the operation of the  
8 Grid that permits this to happen. That actually does  
9 affect California and the DRECP pretty directly in that  
10 we operate our system not as an integrated whole within  
11 the state, where we have other balancing area  
12 authorities that are not directly coordinated with the  
13 Independent System Operator. So I just wanted to sort  
14 of maybe ask Ed, being you're sitting right here, and  
15 Maureen, thank you for the great presentation, maybe you  
16 could take us over the hurdles. I realize that Section  
17 4 of the report, and we were just talking about Section  
18 1, but it seems to me, one of the real issues in a DRECP  
19 we're wrestling with is ensuring adequate transmission  
20 for the zones that will be created. So if you can maybe  
21 give us an idea of the kinds of improvements in Grid  
22 operations that are recommended as being necessary  
23 changes to facilitate such large penetrations of  
24 renewables. I would appreciate it.

25           MR. DEMEO: Sure. Well, as Maureen said, in

1 order to achieve the kinds of results that we're talking  
2 about here, there has to be a greatly increased  
3 flexibility throughout the entire power system, so,  
4 yeah, we would need -- the system would need better  
5 conductivity from one region to another, the ability to  
6 share reserves over larger regions, the ability to share  
7 energy over larger regions, to be able to take advantage  
8 of the diversity both in the resources and in their  
9 temporal characteristics.

10           And also, as Maureen has said, we're allowing a  
11 lot more transfer of energy from one interconnect to the  
12 other with the three interconnects in the country. So  
13 these are huge increases in flexibility that are central  
14 to allowing anything like this to happen.

15           MR. ZICHELLA: Yeah, and if I could just point  
16 out, I mean, it's a big reliability benefit here, too,  
17 our blackout last September largely occurred because of  
18 a lack of conductivity, a lack of transparency and  
19 situational awareness between balancing area  
20 authorities, both in the state and with our neighboring  
21 balancing area authorities. Not only does it help  
22 renewables integrate, it gives us a major benefit in  
23 avoiding blackouts in our own state. You don't have the  
24 same kinds of cascading failure, at least you avoid a  
25 significant amount of it, and you can figure out how to

1 bring the system back up faster by having these  
2 benefits, and you have a huge ability to share resources  
3 which now you really don't.

4 MR. DEMEO: Uh-huh.

5 COMMISSIONER DOUGLAS: Thank you.

6 MS. HAND: I'd just like to add that we also did  
7 find that there can be significant enhancement through  
8 demand response to add some of that flexibility, as  
9 well.

10 COMMISSIONER DOUGLAS: Right. Good. Mike.

11 COMMISSIONER FLORIO: Yes, looking at the map, I  
12 see the red lines that I assume represent transmission.  
13 Is the width of the line reflective of the amount of  
14 power that's moving? Or -- I am just trying to get an  
15 understanding of what the transmission implications are  
16 here.

17 MS. HAND: Yes, so the width does reflect the  
18 power being transferred. But it is important to note  
19 that these are notional lines --

20 COMMISSIONER FLORIO: Yes.

21 MS. HAND: -- based on our regions, so it just  
22 gives you kind of an idea of where power is moving.

23 COMMISSIONER FLORIO: Okay, thank you.

24 COMMISSIONER DOUGLAS: Great. So at this point,  
25 we have reached our break a little bit late. We have a

1 time constraint where we've got to get to Neil in the  
2 next panel before noon, and I don't think that's going  
3 to be before 11:30 -- before 11:30. No break. So I'm  
4 sorry to do that to everybody, but we'll do no break so  
5 we can make sure that Neil doesn't miss his airplane.  
6 So let me just help us transition here.

7           We've just heard from some of the lead  
8 researchers and some very interesting new research that  
9 is helping us build the body of understanding of how to  
10 deal with these large renewable energy penetrations that  
11 we are planning for in the DRECP, and that we strive to  
12 achieve in California, but on the horizon are not what  
13 we're imminently are implementing with the 33 percent,  
14 or above the 33 percent. The rest of the agenda segues  
15 into a discussion, and really hones in on the DRECP now,  
16 and so at this point we're really kind of focused on  
17 understanding the different processes in the state, the  
18 different ways that we currently do planning, the market  
19 structure, the cost implications of everything that  
20 we're trying to do and relate that to the DRECP.

21           And the first topic that we're going to cover  
22 today is the planning topic. And I'm going to ask,  
23 because we have lots and lots of time, what I'm going to  
24 do kind of procedurally is generally go around the room  
25 counterclockwise just because the agency folks are over

1 here and I want to generally start with them on some  
2 topics, and so we'll go to Neil and then we'll go to the  
3 PUC, we'll go to Stacey, and then we'll kind of work our  
4 way around. You know, I think the agencies have a  
5 different -- have one story to tell around planning, and  
6 we'll get one from the utilities, and we'll get one from  
7 the developers in terms of how the planning processes  
8 affect them; how does the DRECP relate to the planning  
9 processes that are going on? So with that, go ahead,  
10 Neil.

11 MR. MILLER: Thank you. And I do want to  
12 apologize for my time constraint. I should also mention  
13 Dennis Peters' thing through the session, beside me, and  
14 also Mark Rothleder is joining us around 11:30, who has  
15 actually been leading the ISO work on the renewable  
16 integration efforts, themselves in terms of the flexible  
17 requirements and so forth. So, for that part of the  
18 discussion, I think it'll be better represented when  
19 Mark gets here, as well. Thanks for giving me a chance,  
20 though, to make a few comments and, again, I apologize  
21 for having some flight constraints.

22 A few points I just wanted to make about the  
23 transmission planning process for the ISO part of the  
24 system is that, for better or for worse, we do think we  
25 have a fairly clear and generally well understood annual

1 transmission planning cycle. And even people that might  
2 prefer to see that process adjusted one way or the other  
3 generally acknowledge that at least it provides a  
4 transparent and a clear timeline for how the different  
5 planning activities are going on. So it does give a  
6 good baseline for other coordination work to take place  
7 around, recognizing that we do have certain lines in the  
8 sand for where we have to make certain decisions on an  
9 annual basis, and that we're driving towards. So that  
10 does actually help other people understand where input  
11 can really be beneficial in getting on the table for  
12 consideration.

13           Now within that framework, there has been a huge  
14 frustration, I think, within industry that major network  
15 upgrades for making renewable energy deliverable could  
16 either fall out of our transmission planning process, or  
17 through the generator interconnection process, and we do  
18 have a filing in front of FERC at the moment to better  
19 align those two processes so that, in the future, we  
20 expect to see basically all of the major network  
21 upgrades that are required for renewable generation to  
22 be discussed, debated, and advanced through the annual  
23 transmission planning process, instead of having these  
24 major network upgrades being identified through the  
25 generator interconnection process, as well, which tends

1 not to be as transparent because it's generally dealing  
2 with more customer confidential material. So we do see  
3 that as an improvement.

4           The other comment I'd like to make is I'm really  
5 encouraged by the longer term look in this activity.  
6 Our current transmission planning cycle now focuses 10  
7 years out, which for some kinds of projects could be  
8 considered just in time, with it taking some -- a  
9 considerable number of years -- to site and permit and  
10 build some of the major transmission we're talking  
11 about.

12           With the huge amount of uncertainty on where  
13 some of these resources are going to develop in the  
14 state, that does push us into having to fall back to a  
15 more conservative, shorter time frame and also what  
16 we've referred to as our "least regrets transmission  
17 planning process" as a way to manage the huge amount of  
18 uncertainty. We do see that uncertainty right now  
19 really being highlighted by the fact that, you know,  
20 when we look at our 2020 objections and a net short  
21 position of somewhere between 12,000 and 15,000  
22 megawatts, despite some activity we still have over  
23 40,000 megawatts of renewable resources competing to be  
24 part of that 12,000 to 15,000. That level of  
25 competition, on one hand, market competition is always

1 good, but that still highlights that there's still a  
2 significant level of uncertainty as to where some of  
3 these projects will actually materialize, and we're not  
4 that far away from 2020 anymore.

5           So through activities like this, we see some of  
6 the uncertainty bandwidth being narrowed, that would  
7 also allow us to move a bit more aggressively on some of  
8 the longer term projects. And we really do turn to the  
9 State agencies for these key forecasting inputs, both  
10 load and generation forecasting efforts. So the longer  
11 term focus here really will allow us to also step out of  
12 the box a bit more, both on the timeframe of our  
13 planning cycle, as well as perhaps being a bit more  
14 aggressive than a least regrets process, which also  
15 raises some concern for industry. But I believe right  
16 now, it's the only appropriate way to handle the  
17 uncertainty we're living with today.

18           Those are sort of the key points I saw that  
19 directly affect the longer term DRECP work. We do see  
20 the diversity, the geographic diversity even within the  
21 DRECP preferred areas, to generally address a lot of the  
22 operational diversity requirements, you know, too much  
23 clustering is obviously bad, but I was encouraged by the  
24 comments I heard that it didn't take a huge geographic  
25 diversity to take care of a lot of the very intermittent

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1 fluctuation requirements. So we see that as being good  
2 news, that that helps manage that concern.

3 COMMISSIONER DOUGLAS: Great. Thank you, Neil,  
4 that's very helpful. Let me see, questions for Neil  
5 before he leaves. Go ahead.

6 CHAIRMAN WEISENMILLER: Neil, given the DRECP  
7 focus, I guess one question that I'm not sure everyone  
8 here is as familiar with the efforts we've had to try to  
9 connect DRECP in with your transmission planning, and  
10 then with the LTTP. Obviously we're taking it step-by-  
11 step, but it would probably be good for you to give some  
12 description of that.

13 MR. MILLER: Sure. I would be glad to. So I  
14 think the last year's efforts that led to the portfolios  
15 that were turned over to the ISO in May, really  
16 highlighted a huge step forward on the coordination  
17 between all of the entities involved. The DRECP work  
18 was the key environmental input for the desert area into  
19 the CPUC's Portfolio Calculator. There is still a huge  
20 amount of effort required, especially on the CPUC stuff,  
21 that's the part to marry the environmental data, the one  
22 level of environmental data from the DRECP, with how do  
23 you assess that against disturbed lands, or non-  
24 disturbed lands that are outside of the desert and  
25 aren't included in the program?

1           So, as that work was married and certain  
2 decisions were made about how to line up relative  
3 waiting, that enabled us to put all of that information  
4 into the calculator and produce a set of CPUC developed  
5 portfolios that really were able to take advantage of  
6 much better quality of information coming out of the  
7 DRECP. I think there are still more refinements going  
8 on that will improve the quality of that work in future  
9 cycles, so it's not -- we've got it done once so we're  
10 done -- and we can also continue to refine the  
11 transmission information that feeds into the calculator  
12 to help assess the transmission cost implications. We  
13 may also be seeing other operational requirements  
14 needing to be fed in as a cost parameter, but I think  
15 that will be a judgment call based on do we have enough  
16 geographic diversity that it's an issue or not. And I  
17 don't think we're seeing yet that there is a geographic  
18 concern that would actually drive incremental operating  
19 reserves between one portfolio vs. another; either way,  
20 we have some very significant integration challenges,  
21 but I'm not seeing a cost differentiator there. So that  
22 three-stage process of marrying the DRECP analysis into  
23 the CPUC Calculator, lining it up with the transmission  
24 costing information that we have available, I think,  
25 could really improve the quality of the portfolios this

1 year and made everyone much more comfortable with the  
2 underlying data.

3 CHAIRMAN WEISENMILLER: I guess the other policy  
4 issue, again, that we need to struggle with today is  
5 just obviously one of our objectives is to maximize the  
6 use of the transmission that we're building --

7 MR. MILLER: Uh-huh.

8 CHAIRMAN WEISENMILLER: -- and not, say, build  
9 twice as much given just based on the fact people  
10 propose projects hither and yon. And so basically the  
11 question comes back to how do we really focus  
12 development first around the existing transmission, and  
13 then, as we build out, again not build out excessive  
14 amounts. So I don't know if you have any suggestions on  
15 that idea, again, that's a general question for people  
16 as we go into the afternoon.

17 MR. MILLER: Well, for me, I think it's really  
18 the evolution of the different parameters that drive  
19 where, from a state perspective, we want to see  
20 resources inside this stage and to what extent we want  
21 to pursue additional resource procurement outside of the  
22 state. I think at this point, we have a lot of data for  
23 inside the state, but when it comes to the outside of  
24 the state, the imports, that's really where we have to  
25 follow the lead of the people actually doing procurement

1 to this point. There may be ways to improve that  
2 modeling, as well, but that's -- trying to come up with  
3 an environmental parameter across all of the U.S.  
4 doesn't look too practical. So I think that is going to  
5 have to be more tied to the commercial interests that  
6 procurement staff can bring to the table as opposed to a  
7 state policy perspective of which in-state resources  
8 should be pursued. But I think that scenario, we're  
9 going to have to give more thought to in the future.

10 In terms of maximizing the use of the existing  
11 grid, as we come to terms with a better understanding of  
12 the sweet spots, the grid locations inside the state,  
13 that also really helps us refine the cost data and the  
14 cost implications to get the pencils a little sharper on  
15 making the best use of the facilities we have. Right  
16 now with at times huge ranges of uncertainty, it makes  
17 it much more difficult to pin down, to really fine tune  
18 the transmission application. So I think we're on the  
19 right track; I don't have a silver bullet solution, but  
20 I think we're on the right track with the hard work  
21 that's gotten us to this point, to continue to refine  
22 those efforts.

23 COMMISSIONER FLORIO: Just kind of thinking out  
24 loud here, I was struck by the point that I think it was  
25 Nancy observed in the NREL study that we have California

1 roughly in a load and resource balance, but I guess  
2 that's on an annual basis, and it would be very  
3 interesting to get the sense of what the flows in and  
4 out are throughout the year, out of this model. It  
5 doesn't seem to show a lot of additional transmission  
6 coming into California, but I do see a line from Wyoming  
7 to California in here, so, you know, just interesting  
8 information as we go forward.

9 I think the process this year was, I suppose,  
10 better than the past, and it still had its bumps, and I  
11 think probably was a little short on the transparency  
12 for people outside the group that was working on it, but  
13 I think one of the big advantages of looking farther out  
14 is that, when we're dealing with these near term things,  
15 we have real people with real projects that they've  
16 invested in, who, win or lose, depending on how it goes  
17 when you look out, you know, multiple decades like this,  
18 it takes that set of concerns away and allows us to give  
19 some signals upfront to people. So, I mean, I think  
20 this work, combined with what we're doing, is very  
21 encouraging and certainly look forward to doing even  
22 more and better in the future.

23 MR. MILLER: And I should just mention, one  
24 emerging concern for us, a lot of work has been put  
25 obviously on meeting peak load, providing a reliable

1 system; the next stage is the day to day operation of  
2 the integration issues and I think one area that is  
3 going to be getting a lot more attention over the next  
4 few years is the off-peak hours of managing under the  
5 extreme light load conditions, and still providing a  
6 system that is stable and reliable. We should have the  
7 tools in the toolbox to get there, but it's going to  
8 need a lot more effort over the next few years to be  
9 managing the late load periods.

10 COMMISSIONER DOUGLAS: Transmission planning is  
11 a big topic and we've got a lot of cards up, and you've  
12 got a plane to catch. So let me ask the people with  
13 cards up, questions for Neil in particular -- or  
14 comments for Neil, in particular, let's do now and you  
15 should feel free to tell us when you really need to walk  
16 out the door.

17 MR. MILLER: Okay, thank you.

18 COMMISSIONER DOUGLAS: So, John, I saw your  
19 card. You're going to wait, okay. So who would like --  
20 Carl.

21 MR. ZICHELLA: Yeah, if you don't mind, I'll  
22 just jump in real quickly. I think one of the things  
23 we've suffered from is the siloing between the different  
24 balancing area authorities in California, and that's  
25 really led to duplication going into the Chairman's

1 point on using the grid more, more effectively. I think  
2 we've made some progress there, too, and first of all I  
3 want to commend everybody for the progress that has been  
4 made; having been a critic, I think, you know, things  
5 are changing. I think they need to change more, to be  
6 honest with you, to have our statewide planning be less  
7 trifurcated, if you will, right now, and put into a  
8 context in which larger system issues can be looked at,  
9 that make all of this easier.

10 Right now, I think we kind of miss things just  
11 simply because we're trying to coordinate much better,  
12 and I want to give a shout out to Nancy for her work in  
13 trying to pull these efforts together, it's really  
14 important and helps set the tone for a lot of this.  
15 But, you know, a couple things I want to point out where  
16 IID, signing a Memorandum of Understanding with San  
17 Diego Gas & Electric to share its lines and build line  
18 together, I don't know how many people noticed that.  
19 What Juan Carlos said is a big deal to me and to NRDC  
20 and I think to those of us who care about being  
21 efficient. When we did RETI, the Imperial County REZ  
22 was one of the most expensive and environmentally  
23 impactful, even though it was one of our best zones, and  
24 that was simply because of the duplication in the lines  
25 there, people insisting upon having their own systems.

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1 We have to get over what my friend John White calls  
2 "religious differences" between public and private  
3 utilities, and think about the reliability and  
4 efficiency of the system more.

5           It strikes me when we talk about SONGS coming  
6 offline that we're not talking about better dynamic  
7 connections with LADWP, for example, and the ISO system,  
8 and I want to give credit to LADWP for getting more  
9 connected in the past year with the ISO system, but we  
10 need to be better about this, it's costing us money,  
11 it's increasing the environmental challenges, and  
12 conflicts with the environmental community, it's  
13 inhibiting our ability to import power if we decide to  
14 go that route more efficiently, and it's making our  
15 choices more difficult. I see progress happening there  
16 and I really want to encourage it, and I want to thank  
17 IID for doing that with San Diego Gas & Electric, I know  
18 that was somewhat controversial, but it's an important  
19 step, a very important step, and the closer we can come  
20 to bringing our balancing area authorities in a much  
21 more coordinated way, looking into the grid system  
22 operator, the better off we're going to be in getting  
23 the most out of our system and being able to coordinate  
24 with our neighbors down the road.

25           COMMISSIONER DOUGLAS: We've got John, Mark, and

1 Arthur, and hopefully we can -- and Laura, okay, go  
2 ahead, Laura?

3 MS. WISLAND: Just a quick question for Neil.  
4 So it sounds like the agencies have come a long way in  
5 terms of developing consistency throughout the planning  
6 processes, but one of the homework assignments I gave  
7 for myself before this was reading the planning  
8 assumptions for the 2012 LTTP. And in the intro it  
9 makes the point that the ISO's transmission planning  
10 assumptions and LTTP are still not lined up, and I'm  
11 just curious, it seems like there is a lot more that is  
12 consistent, so what still is not lined up? And are  
13 there important reasons why that's the case?

14 MR. MILLER: I'll touch on it into two parts,  
15 one, the coordination with other balancing authority  
16 areas. There was an effort, or there is an effort  
17 called the California Transmission Planning Group that  
18 was put in place on a voluntary basis to improve the  
19 alignment to coordination between the different planning  
20 entities. That work was making, I think, some really  
21 good progress; it went into a bit of a pause, it wasn't  
22 terminated, but went into a pause while people had to  
23 step back and get working under FERC Order 1000  
24 requirements, which is a tariff to redesign, really  
25 focusing on improving regional and interregional

1 coordination, but a number of parties indicated they  
2 just didn't have the resources to be in both  
3 conversations at the same time. So, ironically, a  
4 tariff design change that is meant to improve  
5 coordination actually created a bit of a pause on some  
6 of the activities while everyone is off designing their  
7 tariffs. So we are hoping that, as we come out of that,  
8 with better, stronger coordination and frameworks, that  
9 allows us to make up for the lost time. But there was  
10 an impact there, we can't deny that.

11 In terms of the coordination on some of the  
12 input assumptions, I think -- and to things like LTTP,  
13 for us it's more of a case of there are a number of  
14 different tools available, different forecasts with  
15 different parameters, and it's really a case of do we  
16 agree on what is the right forecast to be using for the  
17 particular application? You know, if you've got a  
18 hammer, the nails are more valuable than the screws. So  
19 for us, it's a case of lining up the right tool with the  
20 right job, and there are times where -- we've seen some  
21 encouragement to use one particular forecast for all  
22 applications, and even within the ISO we use higher,  
23 more conservative demand forecasts when we're doing a  
24 reliability analysis; we use more middle of the road  
25 assumptions if we're doing economic analysis. But

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1 there's a 50-50 chance that our economic analysis is  
2 high or low, but we're obviously much more conservative  
3 when it comes to the odds that the lights will come on;  
4 that's not a 50-50 conversation.

5           So in that conversation, the devil is in the  
6 details. A quick high level answer, I think, is always  
7 wrong, we do have to use the right tool for the right  
8 job, and I'm not sure we've necessarily coordinated and  
9 really understood how everyone is using the different  
10 forecasts for what purpose. So I think that's more just  
11 getting through the detail on an understanding basis, as  
12 opposed to there being a religious difference, I think I  
13 heard it described earlier, as to what people should be  
14 using.

15           CHAIRMAN WEISENMILLER: I think the other  
16 reality, Laura, is that each of the three agencies have  
17 different processes, and we all say, okay, assuming we  
18 can get it done in about a year, and assuming you need  
19 this, this and this, and get everything sort of synched  
20 up, and you turn your back a year later and you discover  
21 everything slid around, and you can't -- we were in the  
22 process of trying to do some evaluation of the PUC's  
23 conservation stuff and they have a decision that they  
24 just adopted, they have a potential study, they're doing  
25 a goal study, it's sort of like how do you make any

1 sense out of that until that's done, frankly. So that  
2 synching up, we try periodically to re-synch the  
3 process, and you turn your back and it starts sliding  
4 apart, as the bottom line.

5 MR. MILLER: And I have to apologize, but I'm  
6 afraid I really have to run now. But thank you very  
7 much.

8 MR. WHITE: Neil will be leaving the door, but  
9 maybe he can think about the answer he might give to the  
10 question that I have as he goes out. First of all, I  
11 want to thank Commissioner Florio and Commissioner  
12 Weisenmiller, and Commissioner Douglas for being here  
13 together, and to have Jim Kenna, because I think the  
14 connectivity begins at the top, okay? And I think the  
15 slip sliding away kind of has, so from the staff, so  
16 that's -- we're better off partly because you all are  
17 hanging out together, and I want to thank you for coming  
18 up here today, Mike. Neil, the thing I wanted to have  
19 you think about is, when we talk about not over-building  
20 transmission, one of the issues we've discovered that's  
21 relevant for that is the question of full deliverability  
22 vs. partial deliverability, and having the resources be  
23 considered together, you know, in places like Tehachapi  
24 and the West Mojave, you've got coincidence between wind  
25 and solar, and yet our application-based interconnection

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1 process has a tendency to not allow folks to consider  
2 who else might be able to use a line complimentary-wise,  
3 and that leads to some over-building potentially. So  
4 this is an area where we hope, as we go forward, we can  
5 work on to give you the comfort you need, but also to  
6 create a limit on how much transmission we actually have  
7 to build when we consider the resources we're actually  
8 going to be using.

9 MR. MILLER: And we're really up for that  
10 conversation. I think there are other aspects to the  
11 deliverability issue that really need to be looked at  
12 because I think there's also a question of how much  
13 deliverability do we really need from all the resources  
14 that are seeking to interconnect. So I think there's a  
15 methodology issue that I would be more than happy to  
16 talk about, but also the requirement issue that needs to  
17 be revisited, as well. We'd like to see both of those  
18 move forward. Thank you.

19 COMMISSIONER DOUGLAS: Thank you. Mark.

20 MR. THOLKE: Safe travels. I wanted to respond  
21 to Chairman Weisenmiller's question, how do we -- what I  
22 thought I heard was how do we know that the developers  
23 will develop where we put these transmission lines. And  
24 my opinion is that, if you build the transmission, the  
25 developers will come. So, for example, the Tehachapi

1 region, I mean, this project that we have coming online  
2 next month has 230 individual parcels and over 300  
3 landowners, which nobody in their right mind would try  
4 to do something like that; you'd either have to be a  
5 real dummy, or you have to be following the  
6 transmission, and I hope that it's the latter. So I  
7 wanted to make that point. The other one is that, you  
8 know, as we move towards a more -- I'm going to use the  
9 word "centralized planning process," not to be  
10 provocative, but to try to call a spade a spade, as  
11 we're drawing away from taking input from the individual  
12 generators and moving toward a process where we're  
13 picking where the transmission is going, that's fine,  
14 but that also means there's a real obligation and we  
15 need to make sure that we get that right. So the annual  
16 planning process, and this is for Neil, but for Dennis,  
17 as well, for Neil and Dennis, I mean, there's a big  
18 obligation and responsibility on that planning process.  
19 So the developers will be happy to participate.

20 MR. HAUBENSTOCK: I would certainly second what  
21 Mark just said about transmission being the rate  
22 limiting step, you know it's pretty clear I think across  
23 the board that, where you have transmission  
24 availability, renewable energy developers will fight all  
25 over each other to get on to it. And that's clearly

1 what our customers want and what we want, as well.

2 I don't know whether Dennis might have the  
3 answer to this, or maybe this is something we can take  
4 back, but I don't know the extent to which the ISO is  
5 taking into consideration, or the transmission operator  
6 owners are taking into consideration, the extent to  
7 which weather variability could impact reliability. And  
8 it's certainly true that, within the Desert Renewable  
9 Energy Conservation Plan, on average, the weather  
10 variability is less than it might be elsewhere in  
11 California, you know, within the micro areas, it still  
12 can be quite variable, you have cloud formation that  
13 appears and disappears, and there is a tremendous  
14 difference when it comes to the intra-hourly situation  
15 than it might be on the hourly situation, as Andrew  
16 Mills was alluding to, and Michael Webster was also  
17 alluding to. And so, when we're thinking about how  
18 we're going to be operating the system, and how to do so  
19 reliably, and how to average out those variabilities, as  
20 Carl was alluding to earlier with respect to correlating  
21 different areas, is that something that the ISO is  
22 starting to think about as we're starting to think about  
23 how large penetrations of renewables are going to occur  
24 within the DRECP planning area?

25 MR. PETERS: Yeah, I think you heard from Neil

1 before he stepped out, he said that we are starting to  
2 look at that. Now, and John was talking about the  
3 complementary aspects of wind and solar, so I think we  
4 are starting to look at that, but currently the way that  
5 the rules -- and he mentioned the rules -- are set up is  
6 it requires a study at full capacity, it also requires  
7 us to do that analysis for deliverability, too. And the  
8 whole deliverability situation is kind of an interesting  
9 one for, you know, Arthur, you may be a little more  
10 familiar than probably others here, too, but we're  
11 looking in terms of procurement, the procurement IOUs  
12 are asking for full deliverability and our  
13 deliverability analysis is for essentially one peak hour  
14 of the year, so you might be fully deliverable for, you  
15 know, the majority of hours of the year, but not that  
16 one hour, so there maybe needs to be some additional  
17 thinking around that, too, in terms of procurement.

18 COMMISSIONER DOUGLAS: Jon.

19 MR. WEISGALL: Just a really quick follow-up,  
20 also in responding to Chairman Weisenmiller's point  
21 about existing vs. -- I mean, trying to maximize  
22 existing lines, and actually a point for Commissioner  
23 Florio, as well. If you think about, as transmission  
24 proceeds, especially as you look at that NREL map and  
25 you're thinking 2030 and thinking 2040, which is

1 probably, I think, the most valuable thing we're all  
2 doing here today, and what the DRECP does very  
3 effectively, think about upsizing new lines. This is  
4 something we explored as a company trying to do it with  
5 Stimulus funding, we were not successful; but the basic  
6 idea is, if we as a utility need to build new lines with  
7 a capacity of X and can get cost recovery of X because  
8 we can get subscribed at X, why not build a new line at  
9 X plus Y? Eventually, you're going to get that Y coming  
10 on board, probably from renewables. You obviously  
11 conserve transmission corridors that way. So it's a  
12 thought to keep in mind going forward, which responds  
13 somewhat to your question, Bob, but it's an idea that  
14 ought to be looked at, and it was given some thought in  
15 the early days of the Obama Administration, it should be  
16 given some more thought, as well. You've got cost  
17 recovery issues, obviously, you're not going to recover  
18 as a builder if you can't utilize those lines, but over  
19 time, you know, you could have a government entity pay  
20 for that extra cost, and developers could then come on  
21 board, pay with interest, and the government could be  
22 made whole, taxpayers could be made whole, and you could  
23 conserve transmission corridors.

24           CHAIRMAN WEISENMILLER: Yeah, obviously you're  
25 the one watching the pocketbook, trying to make sure the

1 investments are wise, but this does seem --

2 COMMISSIONER FLORIO: I'm not sure about the  
3 government having the money to pay, in the mean time.  
4 But I do think there are obvious things that can be done  
5 like building a system that you can add additional  
6 conductors later, I mean, and if you can do it once, the  
7 big part, and leave something fairly less expensive for  
8 later, that makes a lot of sense, and I think that's  
9 happening.

10 MR. WEISGALL: In a nutshell from an engineering  
11 point of view, it's a lot easier to do it upfront at the  
12 beginning and super size early.

13 COMMISSIONER FLORIO: Yeah. Uh-huh.

14 MR. PETERS: Just a comment. I think you're  
15 starting to see some of that occurring in terms of some  
16 of the projects that are being built or are in the  
17 permitting process where, for example, a line is built  
18 to be able to eventually be run as a 500 KV line, and  
19 yet being run as a 230 KV line, so taking advantage of  
20 those opportunities, I do see that happening.

21 COMMISSIONER DOUGLAS: Juan Carlos, go ahead.

22 MR. SANDOVAL: Yeah, I was going to add to what  
23 Jonathan said, you know, IID is in a strategic location,  
24 you know, very close to load, very low load centers like  
25 San Diego and L.A. Basin, and we have participated in

1 multiple forums and put a lot of effort in transmission  
2 plans, we already have a very detailed plan, but it gets  
3 to the point of funding, you know, this is one of the  
4 issues that we have, cost recovery. IID had proposed,  
5 you know, for the IOUs to pay for operation, and I think  
6 as we supported that, IID is fostering, trying to foster  
7 the development of renewables in our area because this  
8 is very important for economic development, and so I  
9 think we need support in terms of policy, you know, to  
10 make this happen because we can go in multiple planning  
11 cycles, come up with the best plan, but we need that  
12 push, you know, that extra effort.

13 CHAIRMAN WEISENMILLER: Yeah, but we really need  
14 reliability benefits. We're not going to pay for your  
15 lines unless we get reliability benefits and I know that  
16 when I met with FERC, obviously very worried about the  
17 summer of 2012 issues, I urged them to take actions to  
18 make sure every one of the recommendations in the outage  
19 report are implemented for this summer. If we have an  
20 outage at N minus 1, going into a stress situation, we  
21 really have to be prepared. And so any of those  
22 recommendations, and certainly IID has its share of  
23 those recommendations, have to be done quickly.

24 MR. SANDOVAL: Oh yeah, IID has been working  
25 proactively on those recommendations. You know, an

1 extra point to our plants is this transmission line that  
2 we are trying to connect, you know, trying to complete  
3 from north to south, Devers to Imperial Valley, if that  
4 transmission line would exist in September '08, this  
5 wouldn't happen, because that is needed transmission.  
6 So our plans improve the reliability of the system,  
7 that's why --

8 MR. DEMEO: Yeah, on the upsizing question, the  
9 discussion always fascinates me and I can't figure out  
10 why we don't do that because, if you take the highway  
11 analogy, you know, if we build highways the way people  
12 build transmission, the instant they opened it up, all  
13 the lanes would be full of cars, you know, we don't do  
14 it that way. So why do we do transmission that way?  
15 I've just never been able to understand that.

16 MR. HAUBENSTOCK: Yeah, and I think looking  
17 again at what Mark was saying, on the model, if you  
18 build it, they will come, you know, it seems pretty  
19 likely that these transmission lines would be used and  
20 useful. But when we're thinking about long term  
21 investments through 2040, 2050, and transmission lines  
22 generally are many many decades long, for the most part,  
23 it's relatively rare to find a transmission investment  
24 that has not paid for itself over time. And so it does  
25 become something that could be a good target for

1 government funding, which would be reimbursed, which  
2 makes one think about where sources of government  
3 funding could come from in this day and age, and one  
4 source of government funding that's intended to be  
5 dedicated to providing for renewable energy and clean  
6 emissions system, are cap and trade revenues. Which  
7 makes one think about whether, you know, I know there's  
8 been an awful lot of competing demands on that, but a  
9 revolving fund that returned an investment that could  
10 potentially return better than cap and trade revenues  
11 might otherwise be spread to, could really provide a  
12 much more clean energy future and also revenues to meet  
13 payers overall that would be better than just giving the  
14 money back.

15 MS. CROWLEY: Thank you. We -- Nevada is  
16 looking at the say notion of how to develop transmission  
17 for the long term, we've been told we're the hole in the  
18 doughnut in terms of the Western Grid and the State used  
19 some Stimulus dollars to look at transmission planning  
20 without project specific issues, but how in a highly  
21 constrained border between California and Nevada, how we  
22 can get transmission to increase the capacity of the  
23 Western Grid. And I think that helped us understand  
24 what our capacities are. That was done through the  
25 State. Now, the State, through a task force that I run,

1 is looking at how do we entice developers or utilities  
2 to take advantage of these corridors that we discussed,  
3 and do that, perhaps oversize the transmission lines to  
4 not just take project-by-project issues, but Western  
5 Grid issues into consideration.

6           Certainly, the process with the DRECP has helped  
7 us really understand that we need to refine our planning  
8 tools. We had Renewable Energy Zones created a couple  
9 years ago and they were conceptual, at best. The DRECP  
10 process has helped us look at maybe how we can refine  
11 our studies and really start overlaying some of the  
12 environmental concerns that really don't end at the  
13 border as we've talked about. And perhaps the DRECP  
14 model can bleed into and across our borders, we share  
15 some environmental issues, as well as economic issues,  
16 that we can work on together.

17           COMMISSIONER DOUGLAS: Thanks, Stacey. These  
18 are definitely topics we've discussed and want to  
19 discuss more. So I don't see anyone -- oh, Carl, go  
20 ahead.

21           MR. ZICHELLA: Yeah, just one quick thought  
22 about sort of duration of planning. If we start talking  
23 about right-sizing lines, I don't like the term "super  
24 sizing" too much, but if think about it as sort of right  
25 sizing and building them for future needs, when looking

1 past a 10-year horizon, it's really important, there's a  
2 process now at Plech (ph) doing that, using scenarios to  
3 sort of come up with possible futures that you would  
4 look at what sort of transmission needs you would have  
5 based upon the mix of both economic drivers, technology  
6 drivers, innovation, and there's so much happening in  
7 the innovation space right now. McKinsey came out with  
8 a report this week positing that bulk electricity  
9 storage costs are going to decline by 80 percent, I  
10 don't have the report in front of me, so I hesitate to  
11 give you the timeline for that. But I have to say, you  
12 know, we're seeing solar prices fall off the end of a  
13 cliff, we're seeing gas prices changing dramatically,  
14 you know, the ability to look beyond the very immediate  
15 short-term needs that we have and thinking about right  
16 sizing lines, the most precious thing we have is a  
17 transmission corridor and right of way, those are going  
18 to be the toughest part of getting any future  
19 transmission needs being done. We now have conductors  
20 that can operate at more than one voltage rating; we  
21 didn't have that 10 years ago, you know? So we need to  
22 start thinking more about these sorts of applications,  
23 even if they're a little bit more expensive. It ties  
24 back into the conversation we just had about the value  
25 of different renewable energy resources providing system

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1 services, in addition to generation. So if we think  
2 about transmission in the same way, I think we start to  
3 come to a point where the value proposition is more  
4 important than the short term cost of some of these  
5 technologies. And whether or not you build a tower that  
6 can accommodate a 500 KV circuit, or add a 500 KV  
7 circuit at some later time, which is where I think you  
8 were going, Mike, this idea of scalability, even, is a  
9 really good idea, it's outside of the box from  
10 traditional thinking, though, and the timelines we tend  
11 to operate in.

12           COMMISSIONER FLORIO: I just wondered, Carl, I  
13 know you've been doing a huge amount of work with WECC  
14 on the environmental data task force. How similar is  
15 that to what California is doing with the DRECP? Or are  
16 they quite distinct?

17           MR. ZICHELLA: Well, I think it's very similar.  
18 You know, we're not looking at generation zones, I think  
19 the Western Governors Association is doing that. But  
20 what we have been looking at at WECC is just spatial  
21 information and on environmental and cultural risk for  
22 transmission line siting, it's the first time it's ever  
23 been done and the way that it's been done, but it's  
24 lacking, really, in the way I think many of us have been  
25 critical, it's pretty much again because of the

1 traditional silos that WECC has populated, the Western  
2 Governors have been much more willing to look at joint  
3 procurement where we would look basically backing into  
4 renewable energy zones, where in the DRECP where I think  
5 is doing it properly, you're looking at the areas that  
6 can be developed quickly, rationalizing a transmission  
7 to those areas, you know, understanding what sort of  
8 scale and capacity you're going to need, I think, you  
9 know, as we mentioned earlier, the out-of-state  
10 component of that needs refinement. But I think the  
11 DRECP is a great model for really rational thinking  
12 about this kind of infrastructure, and it is driving the  
13 way other people look at it. You know, there are all  
14 sorts of areas where people's walls sort of collide and  
15 BLM actually has been participating, WECC too, in a  
16 Solar Programmatic Environmental Impact Statement, a  
17 member of the Transmission Expansion Planning and Policy  
18 Committee of WECC, while we're doing our plans for our  
19 study cycle, we didn't include initially the BLM solar  
20 zones as part of the study. And I said, "Are you nuts?"  
21 I mean, here we have a major Federal effort, in  
22 combination with the State of California and other  
23 states, and we're not going to prioritize the study  
24 request? Everyone agreed once it was raised that, you  
25 know, that was stupid and we had to go back and say,

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1 "Okay, we're going to prioritize these things,  
2 especially given the timelines that we're under for the  
3 programmatic...", I only relate that in terms of conveying  
4 that, you know, we have to consistently think about  
5 doing these things better and more coordinated, and  
6 putting the pieces together at once, which is why NRDC  
7 has been advocating for a single transmission planning  
8 process in California, so we don't have these  
9 asynchronous things, despite people's very sincere  
10 efforts to coordinate as well as possible. I think we're  
11 victims of our processes and systems, as you pointed  
12 out, Mike. And we can fix that if we want to, but it  
13 does take a significant shift in the way we're thinking  
14 and people having to give up a little bit of their  
15 independence in fulfilling their missions.

16 CHAIRMAN WEISENMILLER: Carl, I should say, as  
17 we were walking through the transmission portfolios, and  
18 that again was sort of Mike, myself, obviously Karen  
19 Edson, also, and Mike Peevey, we sort of started with  
20 the mention we really wanted to build DRECP into that,  
21 you know. And having said that, I forgot exactly where  
22 in the process of our struggling along, it was like,  
23 well, what about the rest of the state? And what about  
24 the rest of the west? And, you know, it was relatively  
25 late and, as you know, we were struggling in terms of

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1 trying to be more transparent. And so we took some  
2 shorthand, you know, disturbed land, or whatever,  
3 assumptions, but certainly going forward one of the  
4 hopes we would have is a more consistent environmental  
5 evaluation, other than just in very good DRECP, you  
6 know, less good elsewhere. I should obviously give a  
7 lot of credit to Roger Johnson for really driving the  
8 environmental part of that.

9 COMMISSIONER FLORIO: I mean, Roger pulled  
10 together an enormous amount of information in literally  
11 one week, and that was --

12 MR. ZICHELLA: I refer to him as the hardest  
13 working man in renewable energy, he's sort of the James  
14 Brown of renewable energy.

15 MR. WHITE: This is John White from CEERT. I  
16 wanted to follow-up on one of Mike's questions, was the  
17 Federal EIS does have zones in other states, but  
18 unfortunately those zones are far less developed with  
19 respect to transmission than even our zones are, and so  
20 I think that's where there's going to need to be some  
21 further work on the BLM zones in the other states that  
22 hopefully can sync up with some of these other  
23 processes.

24 I also wanted to caution on the comment that my  
25 friend Carl just made, is that I think the promise of

1 the DRECP is that we can have it be a model, but it is  
2 not yet there because, at the moment, it looks to me  
3 like the DRECP is headed for a lot more conservation  
4 areas and reserves, and now we also understand there are  
5 military constraints to be managed. And we still have  
6 not solved the problem that Mark Tholke said about, of  
7 having the places that we are enthusiastically sending  
8 people to be, in fact, places where business is viable  
9 and that depends upon the availability of transmission.  
10 And this gets to where there is a synch-up problem,  
11 which was vividly illustrated in the dispute over the  
12 West Mojave transmission that was made. And I think we  
13 have to remember the lesson of Tehachapi was that we had  
14 to build it for them to come, okay? And in the same  
15 case, we have that same phenomenon in Imperial, where we  
16 have -- and so the DRECP is headed to send people  
17 towards environmentally preferred areas like Imperial  
18 and, in theory, the West Mojave, but in the regulatory  
19 process there is reluctance to advance those  
20 transmission projects ahead of so-called commercial  
21 interests, okay? The commercial interest isn't there  
22 because the zone hasn't been yet identified, or made  
23 available. So this gets to be a nightmare for a  
24 developer who wants to move into low conflict areas, but  
25 who can't get the business done if the transmission

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1 isn't there also, and so this d-siloing effect is more  
2 than just a desire for order and uniformity, it's  
3 critical if the DRECP is going to be more than an  
4 exercise in identifying more places for us not to be  
5 able to go. So I think the promise of the DRECP as a  
6 process is in your hands, and whether we can execute in  
7 terms of having both enough areas that are promising and  
8 have transmission to match, will determine whether this  
9 is an exercise in success, or whether it's something  
10 else.

11           CHAIRMAN WEISENMILLER: One of the things I  
12 really would like to hear from today from the  
13 development community is the proverbial -- obviously,  
14 the more acreage you put in -- you know, how much  
15 acreage you need in the zone to get the acreage  
16 developed. And obviously, the more acreage you need in  
17 the zone, the more mitigation measures there are and the  
18 more compact that is, or the higher the success rate  
19 between, you know, what's been put in the zone and what  
20 can actually be developed, you know, then the less the  
21 mitigation is. But, again, that's a very central  
22 tradeoff to DRECP is trying to understand that, and  
23 certainly that's one of the things I'm hoping this panel  
24 can help us understand some of those tradeoffs.

25           COMMISSIONER DOUGLAS: That's absolutely right,

1 and when we get to that panel, we'll put the question to  
2 you again directly. So -- I think that's our cue to go  
3 to lunch. Thank you all for working through the break.  
4 We'll start with Nancy and planning and the PUC  
5 processes and go from there. We'll be back, if you  
6 could, please come back for a 1:00 start and thank you  
7 very much. Let's go to lunch.

8 (Recess at 12:05 p.m.)

9 (Reconvene at 1:11 p.m.)

10 COMMISSIONER DOUGLAS: Okay, so we're continuing  
11 with the infrastructure planning topic and we were going  
12 to start with Nancy and we need to get to Nancy as soon  
13 as we can because she has a time constraint, as well.  
14 However, oh, look at that, so Nancy, if you're ready,  
15 you're on, otherwise I'll go to Stacey first.

16 MS. RYAN: You can go to Stacey.

17 COMMISSIONER DOUGLAS: All right. So at this  
18 point, we're just kind of going around the table and  
19 I'll just say, kind of high level, I'm not necessarily  
20 asking every single person on the panel to respond in-  
21 depth to every single question we put in the agenda,  
22 particularly as we go around the table, I'm sure people  
23 will begin getting to the point where you can build off  
24 of what other people are saying, or go into a focused,  
25 hone in more on a certain area, or something like that.

1 But anyway, go ahead Stacey. You can, if you don't  
2 mind, share any thoughts you want to communicate with us  
3 on some of the infrastructure planning questions.

4 MS. CROWLEY: Certainly. Well, we look at a  
5 couple things. I break them down into a couple  
6 categories, the process, and certainly we're learning  
7 about the California processes in terms of  
8 infrastructure planning, both in terms of the  
9 procurement side, as well as the transmission side. So  
10 that certainly has been helpful to understand that. We  
11 certainly think -- we've been following the hearings on  
12 the PEX (ph) and understanding how that works.

13 Nevada looks to California for many things, but  
14 certainly our economies are very similar, we have  
15 wildlife and environmental issues that are the same, and  
16 certainly we have geothermal resources that are  
17 considered attractive in the market that we are trying  
18 to really understand how we can help aggregate those  
19 geothermal resources and bring them to the market in  
20 kind of a larger capacity since right now it's 20 to 30  
21 megawatts at a time. And transmission will help that.  
22 Some of Nevada's developers have been able to get  
23 contracts in California, and that certainly helped.  
24 CAISO has an interconnection in Las Vegas Valley, so  
25 there's definitely relationships there.

1           So, as I mentioned before, through some State  
2 work, transmission corridors were developed really to  
3 carry the massive transmission across -- not the gen-  
4 ties and that kind of thing, but certainly we think that  
5 those corridors, along with a couple of others, are  
6 really the only ways out of the state or into the  
7 Western Grid. There are advantages, I think, when we  
8 talk to California, both developers, utilities, State,  
9 with understanding the mutual benefits of developing  
10 either shared resources, joint transmission projects,  
11 etc., and our state is trying to understand them from an  
12 economic standpoint, how do either Nevada transmission  
13 or generation projects into California, or even  
14 California resources such as the wind that we've talked  
15 about before, into Nevada stimulate the economy on both  
16 sides -- jobs, tax base, all that kind of stuff. And  
17 before the end of the year, we hope to have some numbers  
18 around that, that we can show to our Governor and say,  
19 "Governor, this is showing promise and, in that case,  
20 we'd like to put some effort behind that work." And  
21 that's what we're looking at now, is what effort do we  
22 put behind the State, put behind transmission planning,  
23 aggregation resources, shared resource discussion, and  
24 so we have kind of a spreadsheet going of pros and cons,  
25 and I'd love to share those with you when we get a

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1 little bit more defined.

2 But, as was talked about this morning, Nevada  
3 wants to avoid this spaghetti transmission issues that  
4 we're finding. We've got some constraints in the Las  
5 Vegas area and many of our neighboring states are  
6 looking at building transmission lines down through a  
7 very congested area, it's around Lake Mead and that  
8 area, and if we can look at it a little bit more  
9 holistically, maybe long term, 2040, 2050, how can those  
10 corridors be utilized in the most effective way possible  
11 to open up that Western Grid, whether it's -- whatever  
12 direction it happens to be.

13 So the process, if I can bring it back to DRECP,  
14 that is sort of defined, your constraints, at a pretty  
15 detailed level from what I can tell, is something that  
16 we'd like to look at, especially where those corridors  
17 are concerned. And I think I'll add one additional  
18 point, is the water issues that we see in our Southern  
19 Nevada areas, and how the discussion, which is larger  
20 than Nevada can extend back and forth between California  
21 and Nevada to understand how renewable energy,  
22 transmission projects, and water issues can be  
23 thoughtfully planned between the two states.

24 COMMISSIONER DOUGLAS: Thanks, Stacey. I mean,  
25 we definitely recognize when there are projects proposed

1 close to the border, there's definitely no boundaries  
2 for the species, and we have talked before about wanting  
3 to work together and I think the DRECP process is going  
4 to be a really good way of kind of working with all of  
5 the stakeholders here to get a handle on what we see as  
6 the long term perspective in our desert region, and  
7 obviously also thinking about other regions in the  
8 state, and then how does that best make sense in light  
9 of some of Nevada's corridors and some of the broader  
10 perspective, as well. So thank you very much for that.  
11 I'll -- I don't see anyone waving their name card in the  
12 air, oh, John, I'm sorry. Oh, there you go. So go  
13 ahead, Nancy.

14 MS. RYAN: Okay. For those on the phone, Nancy  
15 Ryan, CPUC. So I think I'll offer some more high level  
16 comments. Commissioner Florio is here, he's the  
17 assigned Commissioner for the LTTP proceeding and also  
18 the designated Transmission Commissioner, and so at this  
19 point he's actually way more knowledgeable in the  
20 current state of affairs in these proceedings than I am,  
21 so you can direct your questions and your barbs at Mike,  
22 although I've been Saint Sebastian before, I can do that  
23 if necessary.

24 So anyway, probably the most important thing  
25 about the DRECP is the long term nature of this effort

1 and the direction to where, or perhaps not, the easy  
2 ways to develop the resources, but at least the not so  
3 hard ways of places to develop resources over this very  
4 long term planning horizon in a time period in which we  
5 recognize in California that we have to move to  
6 something, you know, 80 percent or more, of renewable  
7 energy. So we're aggressively pursuing a 33 percent RPS  
8 today, but the Governor has already indicated that he  
9 sees no reason not to stop there and to blow past  
10 towards '40, but '40 is a way station to '80 and beyond,  
11 so it's very valuable to have these areas designated in  
12 the desert. And I would hope, over time, we can expand  
13 that effort and particularly as we anticipate California  
14 and the West, generally, filling up over these few  
15 decades and will be more and more important in the near  
16 term to designate areas, and a big theme that I really  
17 like to stress in most settings when we think about the  
18 long term out towards -- is the importance of not just  
19 the things that we do today, the actions that we take  
20 like the 33 percent RPS, or siting individual  
21 transmission lines, and so on and so forth, but also the  
22 things that we do that preserve and create options for  
23 the long term, or the things that we don't do that  
24 foreclose options for the long term. And I think that  
25 this type of effort really fits squarely in the camp of

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1 creating and preserving options.

2 COMMISSIONER DOUGLAS: Can we mute?

3 MS. RYAN: I'm so glad that wasn't me. It  
4 actually makes me think about when I was sitting in this  
5 hearing room one time and a phone started to ring, and I  
6 thought, "What jerk left their phone on?" And then I  
7 realized it was my phone, so I'm particularly  
8 sympathetic.

9 Anyway, so I think I've made my point there.  
10 And I'll agree with somebody who remarked -- I think  
11 there was some valuable discussion about transmission  
12 before lunch and I know we've had conversations over the  
13 years about the notion of designated transmission  
14 corridors and, again, more than we need today and  
15 probably more than we think people will use in the  
16 foreseeable future, which will lead into, I guess, my  
17 second major point which, as an economist trained in the  
18 discipline of industrial organization, I think a lot  
19 about not just what it costs to do things, but what  
20 prices are actually realized in the marketplace because  
21 that determines the costs that consumers ultimately pay  
22 in their power bills.

23 And models like we saw this morning -- and they  
24 were great examples of models -- I mean the NREL model  
25 and its scope, and the LBL model and its creativity and

1 kind of different perspective that it offered us, an  
2 important thing about those models is that they are  
3 models that kind of assume that markets are frictionless  
4 and that competition occurs. But it's choices that we  
5 make in terms of the breadth of options that we consider  
6 in solicitations, and that we envision or make it  
7 possible to have in our portfolios, that really  
8 determine the price that's actually realized in the  
9 contracts, the prices on the contracts that ultimately  
10 come in front of the Public Utilities Commission -- and  
11 that's for generation as well as for CPC and for  
12 transmission.

13           And so an important dimension of preserving  
14 those options over time is ensuring that we also  
15 preserve competition within and between areas and  
16 recognize that not every space in any of these areas is  
17 likely to be developed; and, if it is, we're going to  
18 pay a painfully high price to develop them. So I think  
19 that the DRECP designations will be valuable for  
20 potentially lowering the cost for individual projects  
21 that are located there, but we continue to need  
22 competition within that area enabled by transmission,  
23 and competition between areas to ensure that the  
24 potential savings to consumers are actually ultimately  
25 realized.

1           So I think that's a factor that needs to -- we  
2 have to be careful. I mean, I think it can be, well,  
3 I'll just say that we need to continue to build that  
4 slack in because that slack is really valuable to  
5 consumers, and it may mean that there's apparently  
6 unnecessary effort by some developers whose projects  
7 don't get funded, but that's a necessary social -- in my  
8 book, that's a necessary social cost to ensure that the  
9 prices the consumers ultimately pay are as low as they  
10 can be.

11           I think I understood the LBL report; again, it  
12 was a little challenging to wrap my head around it, but  
13 I think I understood that report to really say that  
14 there is a fair amount of latitude for substitution  
15 between regions and different resources at any give  
16 place that you are, sort of within any given portfolio  
17 configuration. And I think that was a useful message.

18           I think those are really the main points that I  
19 wanted to make. I'll just close by saying a few things  
20 about the more mundane issue of interagency  
21 collaboration. I thought that Neil from the ISO  
22 actually did a great job of laying out what the linkages  
23 are today between the different planning exercises of  
24 the PUC and the ISO, and how the DRECP feeds into them.  
25 I think that his remarks elicited comments from some of

1 the participants here that ring a bell; it's funny, I  
2 haven't really been involved in these issues very much  
3 for the last year and a half and at first I thought, oh  
4 my God, I don't know what's being -- I don't know  
5 anything about this -- and then I came in and I thought,  
6 "Well, these are the same discussions we had a year  
7 ago." (Laughing) You know, there are new facts on the  
8 ground, but there's a lot of the same tension. And I  
9 think one of the fundamental issues is simply that the  
10 shelf life of knowledge about the state of the biology,  
11 or the state of the technology, the shelf life is pretty  
12 short compared to the pendency of all the, you know,  
13 processes of these various institutions, and that  
14 there's this tension between, I think, all of us wanting  
15 to have the same set of facts, or that the same analysis  
16 be used to inform each of these different processes, and  
17 yet they unfold over time at different places in a way  
18 that that's not really realistic.

19 One thing I'll note, and I'm hoping to get some  
20 vigorous nods from Commissioner Florio, is that it is  
21 the case that, even though information that is perceived  
22 -- is, or is perceived -- as stale ultimately is used in  
23 the processes that are at the end of the line at the  
24 PUC, like the CPC in evaluations, or the evaluation of  
25 contracts. The Commissioners aren't bound to only

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1 consider that set of facts, they can and will consider  
2 new information, even though it may not be explicitly  
3 the basis for what's written into the decisions. So I  
4 think there's more flexibility in the system than is  
5 apparent from the kind of stringent processes that  
6 actually occur on paper and over time.

7 So I will close with those remarks and would be  
8 happy to take your questions, or selectively direct them  
9 to my esteemed colleague.

10 COMMISSIONER DOUGLAS: Thank you, Nancy.  
11 Questions?

12 CHAIRMAN WEISENMILLER: Actually, more of a  
13 comment here. I thought Nancy's point on using  
14 competitive forces was very important, you know, and  
15 again, the short term/long term issues here, but I know  
16 we are in this weird position in the short term where we  
17 have tons and tons of projects in the ISO queue, a  
18 number of things contracted, but the mythology  
19 throughout the West seems to be, "Well, they really need  
20 help getting to the 33 percent." And obviously, you  
21 know, we're certainly open for business to do things  
22 that benefit both regions, but certainly the dynamic  
23 would be much much different if, in fact, the only way  
24 we could get the 33 percent was by building someone  
25 else's transmission line, be it Imperial Valley, be it

1 Wyoming, be in Nevada. And we don't need that, you  
2 know, as a bottom line, and everyone has to be pretty  
3 competitive and getting into the market, and having the  
4 portfolios large enough that those competitive forces  
5 are in play is very important for California. And  
6 again, certainly in the old utility paradigm you look at  
7 stuff and say, "Well, what's the right reserve margin?"  
8 But for competitive forces to be successful, you know,  
9 without going through HHI analysis or something like  
10 that, you've got to have enough competition to really be  
11 able to manage prices. So as we look forward in  
12 developing the portfolios, again, it can't be --

13 MR. WHITE: I agree, except that there are  
14 invisible thumbs on the scale that impede competition,  
15 that are creatures of ourselves, and I would point to  
16 the fact that, despite all the promise that we've heard  
17 about on Imperial County, and despite that this is a  
18 preferred resource area in the DRECP and the PEIS, and  
19 in fact is thought to have both excellent quality  
20 resources, enormous economic development challenges, a  
21 lot of poor people, a lot of degraded land, we haven't  
22 build or bought anything from within the balancing  
23 authority of IID, we've got some PV on the outskirts  
24 that are causing some of these extraordinary joint  
25 partnerships to be needed, and we're glad that they're

1 sort of coming together, not completely smoothly,  
2 there's some bumps in the road, even this week, but it  
3 is the case that the way those resources are  
4 characterized under our own processes such as resource  
5 adequacy, they are effectively excluded economically and  
6 from a regulatory standpoint. So the openness of  
7 competition between regions needs to be thought of as  
8 not just a function of excess market participants, but  
9 also the removal of barriers and constraints that  
10 artificially impede those resources from being built and  
11 being delivered and made part of the system, and so it's  
12 not a good outcome and we're now hearing that we're 33  
13 percent and some of the utilities, "We're all done, we  
14 don't need anymore," and here we have this area that was  
15 thought to be crucial and valuable in the bread basket,  
16 and it's not happening. And so I agree with you about  
17 the need for competition between and among regions, we  
18 know that monopoly rents are going to be swapped  
19 wherever anybody can find them; on the other hand,  
20 Government has to be sensitive to its role in impeding  
21 competition.

22 MS. WISLAND: I just wanted second Nancy's  
23 points on maintaining competition and not overly  
24 prescribing the system because none of this stuff is  
25 going to happen unless there continues to be public

1 support for mitigating climate change and building  
2 renewables as a way to mitigate climate change, and I  
3 work for an organization that's very concerned about the  
4 waning public support for paying for cleaner energy  
5 systems, and so anything that we can do to keep the  
6 prices down goes way beyond just building projects in  
7 California, but actually just maintaining support for  
8 the industry and this being part of our fight to lower  
9 greenhouse gas emissions.

10 MR. WEBSTER: Yes, Mike Webster for LADWP. And  
11 I was going to make this comment later, but I think it's  
12 pertinent now, is that the zones can't be exclusionary  
13 because, as smart as everyone is in this room, and  
14 everyone who is working on renewables, we are going to  
15 get it wrong, and 20 years from now. And so we need to  
16 make sure that the areas that are identified in the  
17 DRECP don't focus all the attention only on those areas,  
18 and if you're outside that area, you're not going to get  
19 your project built because I think the entrepreneurial  
20 spirit of our developers are much quicker, much more  
21 creative, and they need to have the opportunity to find  
22 those creative areas that they can continue to build.  
23 And that's how we're going to keep competition. It's a  
24 guidance document, let's make sure it's not exclusionary  
25 so that our developers can't really go out and get that

1 least cost project built.

2 COMMISSIONER DOUGLAS: Arthur.

3 MR. HAUBENSTOCK: I was taken, Nancy, with your  
4 description of the economic value of slack in the  
5 system, and I'm familiar with national studies that show  
6 the economic benefits that come with transmission and,  
7 anecdotally with California and the tremendous expense  
8 that the lines to and from the Pacific Northwest were at  
9 in the '70s, and how those ended up being a tremendous  
10 benefit to the California system, although at the time  
11 they were largely decried. So I'm just wondering  
12 whether you're familiar with any analyses specific to  
13 California and have any sense of the extent to which  
14 building transmission that is larger than what we have  
15 currently anticipated really would create more of a  
16 benefit than its actual cost.

17 MS. RYAN: I'm not familiar with those studies.  
18 I'm going to agree with you on theoretical grounds, that  
19 I wouldn't be surprised if there was a case to be made  
20 -- an economic case to be made -- that over-building  
21 transmission yields sufficient benefits in terms of  
22 putting downward pressure on project costs, that it  
23 might actually pay off. But I haven't seen that  
24 empirically demonstrated, but I could believe that  
25 somebody could get a result like that.

1           MR. HAUBENSTOCK: There are some Brattle Group  
2 studies and others that I can -- it's done on a national  
3 basis as opposed to looking at the California system.

4           CHAIRMAN WEISENMILLER: Jus on competition, just  
5 so we don't get too confused, I would note that  
6 everything I've heard on the existing RFOs that the bid  
7 to ask ratios are like 10-20:1, which is certainly  
8 indicative of very competitive markets.

9           COMMISSIONER DOUGLAS: Okay, great. I don't see  
10 any other cards, so -- oh, go ahead, Ed.

11           MR DEMEO: I just put one up, yeah. Just to  
12 follow-up on Arthur's point of a minute ago, I will  
13 relate something that probably most of you know, and I  
14 apologize if you do already know it, but an interesting  
15 thing happened in 2003, there was a Northeast, very  
16 large blackout that occurred, it affected I don't know  
17 how many millions of people and a bunch of states, and  
18 billions and billions of dollars of loss as a result of  
19 it. It turns out there was one area back there in that  
20 region that was an island and it stayed up during that  
21 whole blackout, and it was the area served by American  
22 Electric Power with their 765 KV backbone system that  
23 they had installed in the '60s in order to service the  
24 nuclear plants, or large coal plants that were going in  
25 at the time. So what they got, in addition to what they

1 built it for, is they got a huge reliability benefit in  
2 that location. That was worth I don't know how much,  
3 you know, but it shows the unexpected value that can  
4 come from having a robust transmission system and, you  
5 know, we don't see that kind of thing valued enough, I  
6 don't think.

7           COMMISSIONER DOUGLAS: Thank you. Other  
8 comments on this -- okay, good. So let's move now off  
9 of the agency planning processes unless, I don't know,  
10 Commissioner Florio, if you want to add anything on the  
11 PUC, LTTP, or anything else?

12           COMMISSIONER FLORIO: We're struggling again  
13 with the issue of how to put together the portfolios to  
14 provide to the ISO for the future round of TPP, but  
15 we're struggling with it a heck of a lot earlier than we  
16 did last year, and there's an ambitious plan and there's  
17 a fallback plan, and we're not sure which one we're  
18 going to be able to act on, but I don't think it will  
19 take until May to get a final result next year, and  
20 that's a good thing.

21           Our immediate focus, and we have hearings  
22 starting August 7th, is on local reliability needs in  
23 light of the once-through cooling requirements, and  
24 that's the first thing that we'll take up, but we've got  
25 a lot of issues on the plate and certainly welcome the

1 participation of all the parties in helping us grapple  
2 with some really tough issues there.

3 COMMISSIONER DOUGLAS: All right, thank you. Go  
4 ahead.

5 CHAIRMAN WEISENMILLER: I was just going to note  
6 that I think, certainly, one thing that's on the agenda  
7 of all three of our agencies is coming up with the post-  
8 or 2013 and beyond issues for Southern California  
9 dealing with the realities of San Onofre. And that's  
10 got to be factored into the OTC decisions and every  
11 other decision we're making this year.

12 COMMISSIONER FLORIO: The ISO is doing some  
13 technical work on that right now that will probably be  
14 done around the end of the year and will feed into our  
15 proceeding next year to try to get a better handle on  
16 what it really means to have a future without San  
17 Onofre, which, you know, we don't know if or when that's  
18 going to happen, but we know someday it's going to  
19 happen, it's not going to run forever. And so we've  
20 probably waited too long to start that process, but it's  
21 certainly going on in earnest now.

22 And another thing that may be worth saying,  
23 because I learned through sidebar conversation that some  
24 folks don't realize -- I realize this -- is that, you  
25 know, the Renewable Portfolio Standard is a portfolio

1 standard, and while least cost is an important factor,  
2 the portfolio diversity issues that were brought out  
3 this morning are very apparent to me, I don't expect  
4 every type of resource to cost the same. And you know,  
5 while I compare things, I tend to compare within the  
6 same technology rather than across technologies because  
7 there are these complimentary aspects that are extremely  
8 important. So, you know, I don't expect wind, PV and  
9 solar thermal and biomass to all cost the same, and  
10 sometimes you don't take the cheapest thing because it's  
11 not what you need to have an optimal portfolio. So I am  
12 Dr. No on the PUC sometimes in terms of, you know,  
13 voting against some things that I believe are too high-  
14 priced, but that doesn't mean that I don't recognize  
15 this diversity value. So, you know, it's not just a  
16 race to the bottom.

17           We were talking on Monday about energy  
18 efficiency and I pointed out that I have a bag full of  
19 burned out compact fluorescents at home that are  
20 evidence of what a race to the bottom can get you, so  
21 quality, complementarity, and all of these things are  
22 very important and certainly is not lost on me.

23           COMMISSIONER DOUGLAS: Well, thank you. And  
24 we're partnering very well with the PUC on our LAD  
25 lighting standard, which I hope will help us with that,

1 as well. Carl, go ahead.

2 MR. ZICHELLA: Great observations. One of the  
3 things I just want to touch upon; we talk about reducing  
4 the cost of all of this, there is a cost attendant to  
5 being inefficient in the way that we approach the  
6 planning and, again, I said earlier, the siloing that we  
7 have. If every balancing authority had to do all of  
8 their own reserves, all their own balancing, all of  
9 their own storage, and looked at each of their parts of  
10 the system in isolation to the others, everything is  
11 going to be more expensive -- for everyone. And it will  
12 make renewables look a lot more expensive than  
13 renewables really should look.

14 We have a lot of duplication of infrastructure.  
15 We'll be building stuff that we don't necessarily need  
16 if we're not doing it collaboratively to meet joint  
17 needs. And the reserve margins, in and of themselves,  
18 can have huge benefits -- excuse me, reserve supplies --  
19 not having to have duplicative reserves -- for air  
20 pollution in the State of California, if we're going to  
21 go with conventional resources, or if we're going to go  
22 with other means, storage or other means, we should be  
23 doing it strategically.

24 If everybody is building storage, storage is  
25 going to -- it's good for the storage companies, but

1 it's not necessarily good for the ratepayers, it's not  
2 necessarily good for the system because we may not be  
3 putting storage in the right places to get the maximum  
4 benefit out of it.

5           So now, I just want to encourage this cross-  
6 pollination that we've all been talking so much about,  
7 and we really need to be more methodical about how we go  
8 about it because we're missing -- or we stand a chance  
9 of missing -- real cost-saving opportunities, and these  
10 are real. WECC studied the Western interconnection and  
11 determined that, if we were to consolidate balancing  
12 area authorities across the west, the savings west wide  
13 would be between \$450 million and \$600 million a year.  
14 Well, California has five balancing area authorities and  
15 I surmise that, without having the benefit of a similar  
16 study, there are some pretty good cost savings there in  
17 terms of operational benefits. You know, California ISO  
18 is the Cadillac of how to operate a big system in the  
19 west, and if we're able to do better and make more  
20 congruent the systems that we have in our state, with  
21 neighboring states, there's a huge benefit here to  
22 ratepayers. It's not free to do it, but the benefits  
23 accrue each and every year after you do it, so getting  
24 over the capital cost, it's a lot like getting  
25 renewables in the system, at first -- high capital

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1 costs, zero fuel costs. So, you know, it's how you're  
2 going to hedge your bets and how you're going to look at  
3 it over time, it seems to me that there's a lot of low-  
4 hanging fruit here that we can take advantage of if  
5 we're willing to do it.

6 COMMISSIONER DOUGLAS: Thanks, Carl. So let's  
7 go on to Aaron now and address some of the same planning  
8 concepts and questions.

9 MR. JOHNSON: Okay, Aaron Johnson with PG&E in  
10 our Wholesale Procurement Department. So what I was  
11 actually hoping to do is, I think perhaps stopping here  
12 to talk about the planning process that we go through,  
13 the LTTP, I think most folks are fairly familiar with  
14 that in this room, so rather than detailing that, what I  
15 was hoping to do is answer some of these questions  
16 through basically talking about the way we've been  
17 thinking about and approaching the DRECP.

18 So the first observation I would make about it  
19 is I'm glad the conversation is moving to the long term  
20 because, when the effort started, and I was one of the  
21 people going to some of the first stakeholder meetings,  
22 you know the thought was how is this going to help us  
23 meet, you know, 20 percent by 2013, even 33 percent by  
24 2020? "This is going to be much harder; we need  
25 renewables tomorrow." We're out of that mode now, in

1 large part thanks to the credit of many people in this  
2 room for either succeeding with their projects, or  
3 agencies pulling through and getting projects permitted,  
4 so it's a very good story. But where it's led us to now  
5 is we are looking much longer term and what we've been  
6 saying in our RFOs and to counter-parties that they come  
7 in to talk to us, is that we're looking to buy towards  
8 the end of the decade, and that's really when the need  
9 is, so we've got the compliance periods on 33 percent,  
10 we're pretty good in the near term, in the medium term  
11 we're really looking longer term now, that last  
12 compliance period, 2017 to 2020.

13           This has changed very much the dynamic, I think,  
14 around procuring renewables, much for the better because  
15 it was a very challenging environment for the last few  
16 years and now we're able to be much more selective and  
17 to look at projects much more thoroughly than we did in  
18 the past.

19           So, you know, you may hear the IOUs are done,  
20 we're not done, we're not anywhere near done, but we're  
21 done in the near term, and so we're now looking much  
22 longer, out a little bit further at projects. As a  
23 sidebar, I think one of the issues when you start really  
24 looking at need in California is going to be the issue  
25 of re-contracting because what you're going to see on

1 all three IOU portfolios, I don't want to speak for my  
2 sister utilities, but you know, we look at all the  
3 portfolios, is we've got a lot of existing resources  
4 that are going to be expiring, and in some cases those  
5 existing resources look like they may be more expensive  
6 than new resources, which is sort of counter-intuitive.  
7 And so the question is going to be, "What do we want to  
8 do with that dilemma?" So that's another one of the  
9 challenges when we look at what could the DRECP provide  
10 in the long term?

11           So what is the work in the DRECP providing?  
12 Well, we do a fairly rudimentary -- I wouldn't call it  
13 rudimentary -- I'm denigrating my colleagues' work, but  
14 we do a look at the environmental impacts of projects,  
15 and it's really a pass/fail screen. So when we do an  
16 RFO, we don't necessarily develop an environmental score  
17 for a project, but we do look at projects and say, "You  
18 know what? That's one that has enough issues that we  
19 don't want to go there," so we're going to kick it out  
20 of the process. Not a lot of projects did that happen  
21 to, most are able to get through that screen. And what  
22 the folks that do that at PG&E are saying is that all of  
23 the work that started to come forward with the mapping  
24 and stuff in the DRECP is really providing a lot more  
25 information to be able to do that a lot more

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1 effectively. So, even though we don't have the plan in  
2 place yet, the work that has gone on is really improving  
3 the quality of our ability to look at projects.

4           Ultimately, you know, when the DRECP started a  
5 couple of years ago, PG&E was pretty active in the  
6 development space for a variety of reasons, principally  
7 our need. We are no longer seriously looking at  
8 renewables development, so we are finishing up our PV  
9 program and we hope to complete that in the next couple  
10 of years, but we're not actively looking certainly in  
11 the south like we were at the time, we had a 750 MW  
12 solar thermal project we were looking at doing down  
13 there, so we're now more of an interested observer than  
14 as much of an active participant, as an active  
15 developer. But we like the idea that something like the  
16 DRECP in the long term can ultimately just reduce the  
17 risk around projects. If developers have a better sense  
18 of where they should go, ultimately, you know, our goal  
19 is to not have to sign up so many projects to get some  
20 to succeed, we'd like to be able to have a better sense  
21 of what the good projects are and the projects are that  
22 are going to be clean environmentally in order to get  
23 permitted. So, to the extent that that process creates  
24 certainty around the development that does take place  
25 down there, that's a huge win from our perspective.

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1           So I did just want to finish on this idea of  
2 markets because we were sort of talking about it and I  
3 thought I would wait to jump in here, but I think -- I'm  
4 still struggling with -- and we struggle with this  
5 internally with all of our renewables procurement when  
6 we participate in processes like the LTPP, the DRECP,  
7 all these planning efforts -- is we are still -- we have  
8 adopted a procurement structure in California that is  
9 entirely based on competitive solicitations, and I  
10 haven't seen somebody figure out a way to really connect  
11 a planning process with a full market process. And, you  
12 know, they're helpful, it's good, maybe it will get  
13 better projects there, but we can do the best DRECP in  
14 the world, and if suddenly somebody discovers a ton of  
15 geothermal up in Northern California, we may end up  
16 doing a ton up there and almost nothing will get built  
17 in the Mojave. So, I'm sure for some folks, they would  
18 prefer it would go that way.

19           But that's the challenge that we face on the  
20 markets issue and, you know, I think there certainly are  
21 questions to be raised and we're not particularly  
22 interested in being entirely transparent on what we  
23 factor in, into what we take into account in terms of  
24 when we look at projects, but we provide a general sense  
25 of that and, at the end of the day, I'm struggling with

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1 how we're going to connect that planning process with  
2 those competitive processes, and I don't have an answer,  
3 but I think it's something we need to think about in  
4 terms of that planning effort and having that manifest  
5 itself in projects that ultimately come forward.

6 COMMISSIONER DOUGLAS: Thank you. That's very  
7 thoughtful and helpful and an important question that I  
8 think we've all been thinking about.

9 CHAIRMAN WEISENMILLER: A couple questions that  
10 I have for you is how does PG&E assess the overall  
11 portfolio of renewables putting together in terms of any  
12 attributes, or also obviously PG&E is developing some  
13 fairly sophisticated groups for risk management on its  
14 procurement after things blew up, and so the question is  
15 what type of analysis you're doing for this part of your  
16 portfolio.

17 MR. JOHNSON: So I'll start with the second  
18 question, so in terms of the risk assessment of our  
19 projects, it's pretty extensive, you know, we do monthly  
20 calls with every developer who has a PPA with us to  
21 track all their particular milestones, we have call  
22 scripts we run through with them that we've built up, we  
23 have a construction monitoring team and, once the  
24 projects start construction, they're out on site once a  
25 month walking through on the projects. We also do some

1 shadow due diligence just in the public record, going  
2 around and looking and seeing what we're hearing about  
3 what's going on with projects.

4           So we feel like we've gotten a pretty good  
5 handle on where projects are succeeding and where  
6 they're failing; financing can be the hardest part for  
7 us to get an insight into, but, you know, generally we  
8 have, we think, pretty good frank dialogue with the  
9 developers there.

10           CHAIRMAN WEISENMILLER: I guess part of what I  
11 was trying to understand is, if you're looking at your  
12 portfolio saying, "Okay, if we had more geothermal and  
13 less PV, what does that mean in terms of...?"

14           MR. JOHNSON: Right, right, so the first  
15 question was sort of -- okay, so one of the things that  
16 I think I would candidly admit, and when I arrived in  
17 the Procurement Department four years ago at PG&E, we  
18 were buying pretty much most good renewable projects  
19 that we could agree, if we could come to terms and  
20 conditions on somebody and the price we could live with,  
21 we were signing contracts. We did a lot of bilateral,  
22 we did some solicitations, solicitations weren't fast  
23 enough, so we were doing a lot of bilateral, you know,  
24 we have a lot more projects and a lot less need than we  
25 did then, and frankly, I think a little of this is in

1 hindsight, but what I would say is the deficit was so  
2 big for renewables in terms of what we needed, and we  
3 were really planning for 33 percent, we were never just  
4 planning for 20 percent, was that we were just sort of  
5 filling up a hole and it didn't matter what we filled it  
6 up with, we just knew we needed to fill it up. And  
7 then, we're now getting to the point where we're  
8 becoming much more sophisticated and concerned about  
9 like, does it make sense now that we're getting closer  
10 to these goals, how would you optimize the portfolio?  
11 You know, how much geothermal would you put in? How  
12 much PV should you have? We don't have a target that  
13 says, you know, "Here's what we think is the optimal  
14 answer."

15 CHAIRMAN WEISENMILLER: Right.

16 MR. JOHNSON: And so we really do base it on,  
17 you know, we have these different factors that we weigh  
18 in, you know, about things like what's the capacity  
19 worth? Where is it located in the state? How does that  
20 have an impact? Is it going to be affected if it's down  
21 south, if we buy all our renewables down south, or do we  
22 actually have enough transfer capacity to get RA credit  
23 for that, to actually move energy? So we're looking at  
24 all of those kinds of factors in now to optimize, we're  
25 looking at issues like running models to look at over-

1 gen from solar in the middle of the day, that's a big  
2 concern now, you know, we've signed up 5,000 MW of solar  
3 on a 20,000 MW peak system, plus customer solar on top  
4 of that. So you know, we're beginning to build models  
5 and sort of look at that, but it doesn't necessarily  
6 lead to a definitive answer and so, you know, my  
7 perception, how I would describe it is we've got sort of  
8 a range of outcomes that we can see as possible, and  
9 we're sort of moving within that, but that's sort of  
10 shifting over time as we add new resources. But we are  
11 trying to be a lot more sophisticated about looking at  
12 fit concerns, not just lowest market value.

13 CHAIRMAN WEISENMILLER: Yeah, and I think,  
14 obviously in the financial world, people try to  
15 different types of risk assessment, you know, we've all  
16 put portfolio theory into different indices, and it  
17 seems like a part of the question I'm just sort of  
18 struggling, trying to figure out if there's any  
19 analogues here as we look at renewable portfolios in  
20 terms of, again, I'm not even sure we know at this point  
21 how to think about the right characteristics for a  
22 portfolio.

23 MR. JOHNSON: Did you mean in terms of like, you  
24 know, catastrophic failure of PV or -- I mean, I'm  
25 trying to think of like a financial analogy, I mean,

1 it's not -- I wouldn't say it's terribly sophisticated,  
2 but there is really just a diversified portfolio.

3           You know, we've tried not to use the same  
4 counterparties, we've tried not to necessarily use the  
5 same technology, we have mixed things, I mean, the  
6 elephant in the room is PV right now, right? That's the  
7 challenge is, on a pure cost basis, it's beating the  
8 pants off everything. And so what do you do? Does that  
9 mean we're going to fill up the entire rest of our  
10 portfolio with PV? I don't think that's the answer, but  
11 right now the way that we look at resource selection, it  
12 wins. So you've probably got to find another way to re-  
13 look at that issue of least cost, best fit, unless  
14 you're comfortable with that outcome.

15           MR. WEBSTER: Mike Webster, L.A. And we started  
16 an Integrated Resource Planning process that occurs  
17 annually now, so we started that three years ago, and  
18 the reason we do it annually is so that we can assess  
19 the market conditions. So we see all of these RFP  
20 responses, we can look at that, and then build that into  
21 our planning process. And it really has to be an annual  
22 process. And so the reason I bring that up is, one, I  
23 like the idea that Andrew brought up of integrate -- you  
24 know, connecting local jurisdictions, IRPs, with an  
25 overall planning process because we see the RFPs, we are

1 responding, and then collectively coming up with an  
2 overall plan. But to refer to what you were suggesting  
3 is how does an RCDCP [sic], how does that -- how can  
4 that be responsive enough to recognize those changes?  
5 And so maybe this needs to be a regular planning  
6 process, as well, that, like I said, we're not smart  
7 enough to lock it in forever, but if we start to move to  
8 a geothermal strategy, or a concentrating solar  
9 strategy, or a solar thermal strategy, that it moves  
10 with the industry on a regular basis, and to allow that  
11 flexibility in your planning so that it's -- it's  
12 obvious it's not going to be every year, but maybe it's  
13 every few years, or every five years, to go back in and  
14 take a look based on IRP high level planning, and then  
15 roll that in.

16 COMMISSIONER DOUGLAS: Yeah, thanks for that  
17 suggestion. You know, we've thought a lot about the  
18 adaptive management, which is a term usually applied to  
19 species, but in this case there is so much that is not  
20 known about how the electricity system will unfold  
21 between now and 2040, let alone the interim steps along  
22 the way, and so some ways of dealing with that in the  
23 DRECP have been to look for areas that could accommodate  
24 multiple technologies, for example. And in that way  
25 providing for room for more competition, and another

1 way, as you say, is not prohibiting development outside  
2 of the zones, not being too restrictive, but really just  
3 trying to shine a spotlight and some streamlining on  
4 areas that really appear to make a lot of sense based on  
5 the process. I think those are really helpful  
6 suggestions.

7 Let me see, we've got a couple more cards up,  
8 and then what I was going to suggest we do is go through  
9 all of the utilities and let them all speak, and then we  
10 can ask questions and direct them. So if that's all  
11 right, so let's go to Mike next.

12 MR. WEBSTER: Okay, so when we started our  
13 renewables planning process, we actually set up a list  
14 of criteria, or policy principles that guided our  
15 direction; we talked about geographic diversity. We  
16 also established a policy of technological diversity not  
17 only within types of wind, but between wind and solar  
18 and types of solar. Then what we did is, within the  
19 geographic diversity, we established the idea of cluster  
20 zones, so for example, in a certain area that we're  
21 going to develop, if we could get the projects as close  
22 together as possible so that we could practically O&M  
23 those projects because our business model, being a  
24 vertically integrated utility, is to own and operate  
25 projects. So we wanted to cluster them as close

1 together within that principal geographic diversity.

2           And then we wanted to make the maximum use of  
3 existing infrastructure and, really, the two pieces of  
4 infrastructure is any property that we had, could we  
5 maximize the use of that property, and an example would  
6 be our Pine Tree Wind Farm, we built a project, but we  
7 also had a property that we could build a solar farm on,  
8 so we just started construction of that solar farm. We  
9 had the DC station at Adelanto, and we had property next  
10 to it, and so we just built the largest municipal-owned  
11 solar PV project in the country and that was  
12 commissioned about three weeks ago. I know it's a  
13 shameless plug, but we're very very proud of it and we  
14 used federal funding to get that done, and we helped  
15 California use the QECBs that were allocated to them  
16 based on that project and the Pine Tree project, and we  
17 hired a lot of new labor to give them work force  
18 experience and maybe get them into craft jobs. But the  
19 idea behind that thought was to maximize all of our  
20 property.

21           Now, transmission was also very important. This  
22 is about the repurposing of transmission, so we built  
23 transmission in the Pacific Northwest when it made sense  
24 to take coal, and we had these seasonal exchanges, you  
25 know, when they were short during certain times of the

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1 year, and we had coal and nuclear, and we could ship it  
2 up north, they were long during certain times of the  
3 year and they could ship it south, well, that's changed.  
4 And so we could repurpose this transmission that our  
5 forefathers built 20, 25, 30 years ago, and so we were  
6 able to build 600 megawatts of wind up there and that  
7 was one way to repurpose the transmission.

8           We then looked at our transmission out of the  
9 Intermountain Power Project and, by making some very  
10 very limited investments, we were able to upgrade the  
11 southern transmission system to DC and upgrade that so  
12 we could build another 300 megawatts of wind in the Utah  
13 area and use that transmission.

14           And we talked a little bit about, then, the last  
15 principle is really looking to the value to our system,  
16 so I won't talk about that anymore. So we built Pacific  
17 Northwest, we built Utah, and then we built some of the  
18 projects near Mojave, and then local projects were  
19 important with our Solar Incentive Program and the Feed-  
20 in Tariff Program. But as we looked towards the future,  
21 the Desert Southwest is critically important to us,  
22 repurpose the Navajo Transmission System as we start to  
23 exit coal and make that transmission available, we can  
24 repurpose that for potentially wind and solar and  
25 geothermal resources.

1           We also have quite a footprint in the Boulder  
2 City area with a long commitment to Hoover, back from  
3 the very earliest days when we commissioned that  
4 project, so that makes sense, and we have the Mojave  
5 Generating Station site, well, what are we going to do  
6 with that? There's a beautiful piece of transmission  
7 that goes there, so we want to repurpose that for  
8 renewables, as well. And then, if you think about new  
9 transmission, is we are building transmission to the  
10 Barren Ridge Area, so we could expand the Mojave  
11 footprint, but also look beyond Mojave into the Owens  
12 Valley Area, where we've got a couple of ideas, 1) there  
13 is obviously some existing land, quite a bit of existing  
14 land for some tremendous solar, but also we're doing a  
15 test case right now on the dry lake bed, and we actually  
16 install solar and have it stick to the ground during the  
17 high wind events; that's not an easy question to answer  
18 and we are in the process of testing that.

19           And then lastly, we are trying to build a  
20 relationship with Imperial and we have some foundations  
21 in place that we hope can improve for this relationship  
22 to build geothermal amongst municipal utilities that are  
23 SCPPA members, to get that built, participating in  
24 transmission projects that they have planned, and even  
25 building some day, we hope, more transmission into the

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1 Imperial area. And then who knows what's next?

2 But we look to use these principles as we think  
3 about our future and, so, what we'd like to do is make  
4 sure the DRECP is really looking at our integrated  
5 resource plan and addressing those zones where we're  
6 already planning to move forward, so that they're fully  
7 incorporated into the plan. And it's not just about the  
8 renewables, but it's also about the transmission that  
9 goes with it. That has to be facilitated, as well.

10 COMMISSIONER DOUGLAS: Thank you. Very helpful.  
11 Juan Carlos.

12 MR. SANDOVAL: Yeah. In terms of IID, how we  
13 have approached, you know, to accomplish this 20  
14 percent, or RPS. IID recently contracted some 10  
15 megawatts of geothermal from some of the new geothermal  
16 plant that it was recently installed in IID, combined  
17 also with another PPA, a Power Purchase Agreement, with  
18 biowaste -- an existing biowaste plant, a 50 megawatt  
19 plant in IID service area.

20 Also, IID contracted and recently, well,  
21 completed this solar power plant in IID lands, a 23  
22 megawatt plant that is also going to help us. We  
23 already have a second phase of this, another 23  
24 megawatts of solar coming. So that is going to give us  
25 pretty much about 20 percent of our goals, you know, we

1 have been actively pursuing these contracts. But on the  
2 other hand, you know, we have been working with LADWP  
3 and SCPA in trying to develop the thermal power plants  
4 in lands that we have, and in the proximity of the  
5 Salton Sea. So it has been a continuous effort.

6 Obviously, there is almost 3,000 megawatts of  
7 geothermal, more than IID could ever use, you know, and  
8 we have been not stagnant in the area of interconnection  
9 planning. We have already almost completed the  
10 development activities for the 200 megawatt plant that  
11 we have, our IID Transmission Expansion Plan. We are  
12 ready to go out to bid on this next week. So we are  
13 already doing all the work, all this transmission  
14 siting, environmental, it is almost done for all those  
15 projects, minimum impacts on the environment, only one  
16 mile of new right of way, so we have been working very  
17 actively in that area.

18 So, again, on the other hand, we also have been  
19 working on the permitting of a 500 KV line from very  
20 close to the Salton Sea to mid-way to the Devers area,  
21 so again, we have been investing time and effort, you  
22 know, in trying to get all these projects, you know,  
23 delivered. But, again, we're getting to the point of  
24 finding out what is going to be the next step, which is  
25 going to be the construction of those projects.

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1 COMMISSIONER DOUGLAS: Okay, Katie.

2 MS. SLOAN: Hello, Katie Sloan, Southern  
3 California Edison. We're in a similar situation, as  
4 Aaron mentioned, with PG&E. We've been procuring to 33  
5 percent and, at the moment, in our RPS Procurement Plan,  
6 we stated that we are in the near term long and actually  
7 entering into sales and we're going to be seeing a need  
8 in around 2017, or the third compliance period. So  
9 we've had quite a bit of aggressive procurement in the  
10 last few years and what we've seen from that is that  
11 there still continues to be an issue with permitting and  
12 sitings, so to the extent that the DRECP effort can lead  
13 to streamlined permitting and siting, that will lead to  
14 environmentally responsible development in a timely  
15 fashion, we see that that would help because, even  
16 though we've procured to that amount, not all those  
17 projects are actually online today. Also, to the extent  
18 that the DRECP can help regulatory assurances reduce  
19 litigation, we see that all of this really leads to  
20 certainty on how this impacts the planning process is  
21 that we can look and we can say, "Okay, the people that  
22 are in this zone that have been determined by the DRECP,  
23 we know that they have a more likelihood of coming on-  
24 line." So we can see that actually playing into our  
25 procurement strategies and, also, that leads directly

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1 into the Long Term Procurement Plan, the transmission  
2 planning process.

3           You know, one thing that I don't think has been  
4 mentioned today was that there's been an effort at the  
5 CPUC in the RPS proceeding to look at the way net short  
6 is calculated in kind of all three areas, and the CPUC  
7 actually came out with a proposal yesterday; I haven't  
8 looked at it in detail, but they were looking at, okay,  
9 we're looking at net short in all these various areas,  
10 how should we be calculating and is there a way to  
11 calculate it similarly across areas? And they actually  
12 got into the issues of project viability; we're looking  
13 at it one way in transmission planning and another way  
14 in the LTTP, and to the extent that DRECP does increase  
15 certainty, that would help in all those various areas  
16 and be a way that DRECP could actually, you know, could  
17 get into these planning processes. I think for the  
18 DRECP to be able to be useful, something that V. John  
19 mentioned earlier, was that we needed to take all the  
20 good biological work that's been done and really  
21 interlay the procurement and the transmission, and we  
22 need to see where that will all overlay, and we need to  
23 just not focus on the biological aspect. And we also  
24 need to include fuel source data, everything to say  
25 where these areas that are going to be the most

1 effective, obviously, and that's probably something that  
2 everyone knows, but I think it's worth repeating that we  
3 want something useful to come out of this.

4           We mentioned earlier that there's a WECC-wide  
5 transmission planning process and I think that's  
6 something you mentioned, that the more focus on  
7 California and DRECP, but I think it's also worthwhile  
8 to maybe inform the WECC what you're doing because that  
9 could lead to some regional benefits. So we'd like to  
10 see that. And overall, we're very supportive of this  
11 process and, to the extent that it can lead to actual  
12 permitting that is shortened, that would be really  
13 useful.

14           I think another thing, just stepping back, we're  
15 making great strides towards 30 percent and looking at  
16 40 percent farther, and we really need to consider the  
17 cost of the programs to date. We haven't seen the full  
18 impact of the 20 percent, nor the 33 percent, and we  
19 need to not just look at the cost of it, but also the  
20 integration costs. I know in our Tehachapi area, we've  
21 seen congestion prices basically triple from 2010 to  
22 2011, and the congestion, there were six percent of the  
23 hours in Tehachapi, there was congestion in 2010, and  
24 it's risen to 20 percent by 2011. So we need to look at  
25 the integration costs and I just want to lay that kind

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1 of boundary out there, that even though it's feasible,  
2 we need to have a balanced approach.

3 COMMISSIONER DOUGLAS: So I said we'd get  
4 through everybody and then we'd ask questions, but I  
5 just wanted to make sure that you address, and maybe  
6 we'll go back to Juan Carlos, when you raise integration  
7 costs, what are the things that you think about? I  
8 mean, do you think about things the way Mike was  
9 describing of procuring in some way a balanced portfolio  
10 that helps you reduce those integration costs? What are  
11 some of the factors you look at? And I'll ask the same  
12 thing to make sure everyone addresses that.

13 MS. SLOAN: Yeah, we're actually doing an  
14 internal study right now to include integration costs in  
15 our portfolio going forward so that we can -- so we're  
16 basically working out that analysis, but getting to the  
17 question of looking at a balanced portfolio. For  
18 Southern California Edison, we've been kind of blessed  
19 with a lot of geothermal resources, so just a few years  
20 ago we had 60 percent of our renewable portfolio was  
21 geothermal, it's down to 42 percent now that we're  
22 bringing on more solar and wind. But we've been in a  
23 pretty good position, I think, as that geothermal slice  
24 starts to get smaller and smaller, we're going to be  
25 doing more analysis as to what we should have as a

1 balanced portfolio.

2 COMMISSIONER DOUGLAS: All right, thank you.

3 Jan.

4 MR. STRACK: So I actually have a farm in

5 Illinois --

6 COMMISSIONER DOUGLAS: Do you have a mic?

7 MR. STRACK: -- where it's green from horizon to  
8 horizon, so I came to California as a little, kind of a  
9 shock at first, but I've grown to really love the desert  
10 and I like the wide open vistas, and I like the pockets  
11 of vibrant light that pop up here and there, so I'm  
12 really happy about the DRECP effort, personally. My  
13 company thinks there's a lot of promise there, too, that  
14 there's an opportunity to reconcile our energy needs  
15 with the need to conserve our natural resources.

16 So just as that sort of overlay, I agree with  
17 what Katie and Aaron said, actually, on a lot of this  
18 procurement activity. On a contract basis, we're fully  
19 resourced pretty much out through the year 2020. Now,  
20 obviously there's contract failures built in there, and  
21 I think this is an area where DRECP is going to be  
22 helpful and, as Aaron said, there's a lot of contract  
23 certainty that gets put into the process with this kind  
24 of a mechanism, and I think that's going to really help  
25 us move forward to our renewable goals.

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1           One of the things I think DRECP does, at least  
2 in terms of the RESAs, the Renewable Energy Study Areas  
3 that have been identified, I think we're going to find  
4 it's going to tend to start -- and it already has to a  
5 large extent -- but I think it will help concentrate the  
6 renewable generation in somewhat smaller pockets. Now,  
7 I know people are a little concerned about the diversity  
8 and all that, and I think that's a legitimate concern,  
9 although the ISO has sort of indicated it's a manageable  
10 issue and, if I think we open our eyes and look broader  
11 across the whole WECC, I think those diversity issues  
12 start going away really quickly because the wind in  
13 Wyoming is going to blow at a different time than the  
14 wind in the Tehachapi's.

15           It was going to concentrate, I think, generation  
16 along some of the existing transmission corridors, which  
17 in itself is an inherent good thing. If you look at the  
18 RESAs, almost all of them, with perhaps the exception of  
19 the Owens Valley, but even there, it's along existing  
20 transmission corridors. And I think that's important  
21 because we can take advantage of some of the existing  
22 capability of the grid, which we need to understand is  
23 not static because, as we add these renewables, you're  
24 displacing a lot of fossil generation. Not all of that  
25 displacement takes place in California, a lot of it is

1 going to take place outside of California. You're  
2 actually going to change the pattern of power flows on  
3 the existing grid. I think there's going to be more  
4 room available to bring these renewables on the existing  
5 grid. So that's a good thing just in terms of  
6 efficiency and minimizing adverse environmental impacts.

7           The other thing is that, when we get into the  
8 new stuff, because inevitably there's going to be  
9 locations where we need new transmission, and by  
10 concentrating renewables in small areas, I think we get  
11 some economies of scale with this new transmission, and  
12 the Transmission Technical Group has kind of got into  
13 some of those issues, identified where and when and how  
14 much new transmission we're going to have to add. But I  
15 think that helps to be minimized when it's not spread  
16 out all over the world, your gen-ties tend to be  
17 shorter, so I think that's going to be another benefit  
18 of the DRECP.

19           And then I would just add that there was some  
20 comment about "build it, they will come." Now, I know  
21 there's a lot of people that think that's a really good  
22 idea, I guess I'm a little -- I guess I'm not a big fan  
23 of "build it, they will come," because I think there's a  
24 lot of natural concern, understandable concern, by  
25 regulators. You don't want to build something and then

1 find out that they didn't come. These projects are  
2 large, they're environmentally disruptive, so we need to  
3 make sure we make the right decision. So I think what's  
4 important is that the commercial end of the business,  
5 the generation end of the business, in a large measure  
6 has to drive where and when we build these large  
7 facilities.

8           And then, lastly, I wanted to just throw out a  
9 little suggestion about where we might take the DRECP as  
10 sort of an enhancement, if you will. And this is in the  
11 area of transmission siting, and what might make sense  
12 here is to think about -- and this is going to require  
13 some additional work because we definitely haven't got  
14 there yet on the transmission analysis side. But if we  
15 could actually get down to the point where we can  
16 identify at least on the bulk part of the grid, specific  
17 routes where, "Gee, this looks like a pretty logical  
18 place to add new transmission, and it's pretty likely  
19 we're going to need it in this area," we could build  
20 that into the Programmatic EIR/EIS proceedings. Now  
21 you've got the purpose and need established upfront, and  
22 I'm not saying it's going to be easy to do it upfront,  
23 but once it is established upfront, now it makes it a  
24 lot easier subsequently, when we come in with a specific  
25 project, which will then of course have to be reviewed

1 in terms of the exact tower locations, and the heights,  
2 and the conductor size, and the construction impacts, so  
3 you still have to go through all that, but at least  
4 you've got some upfront certainty on the purpose and  
5 need part of that for the route, just for the route  
6 part. So I think it is something we ought to think  
7 about, it might advance the ball a little bit further in  
8 terms of actually making new transmission when you need  
9 it a little more practical.

10 COMMISSIONER DOUGLAS: Great, thank you. And  
11 I'll ask just the same question. When, just talking  
12 about procurement for a minute and the same challenges  
13 of dealing with 33 percent, when you look beyond 33  
14 percent, what sorts of things do you think about in  
15 terms of reducing integration costs, or making the  
16 integration challenge and the operational challenges  
17 more manageable?

18 MR. STRACK: Well, I think in large measure, you  
19 know, we're following what the ISO and the PUC are doing  
20 in these, there's the Flexible Capacity Procurement  
21 Proceeding, I think, that started. I think that's where  
22 our focus is going to be, but if you look at our own  
23 portfolio, we're already adding, or we're seeing  
24 actually Commission approval to add some flexible  
25 generating capacity. Seeing that the once-through

1 cooling units it going to retire and we're going to lose  
2 a lot of that flexibility, so you know, we're trying to  
3 get ahead of that ball. I guess I wouldn't comment  
4 beyond that.

5 COMMISSIONER DOUGLAS: All right, other  
6 questions?

7 CHAIRMAN WEISENMILLER: A couple questions, one  
8 is just I guess back on the, well, if you go to "they  
9 will come," what's been your experience so far in  
10 Sunrise?

11 MR. STRACK: With the -- oh, well, I hope this  
12 is not a poster child for "build it, they will not  
13 come," but you've got to remember on Sunrise that the  
14 majority, the vast majority of the benefits that the  
15 Commission relied on when they improved that line  
16 actually were not renewable, most of the economic  
17 benefits came through reliability. And that was the  
18 basis upon which the line was built, and as we see today  
19 with both SONGS units down, you know, it was -- we got  
20 lucky, if you will. So I think that's the important  
21 thing to keep in mind with Sunrise. I'm not sure how  
22 well that really fits into sort of this longer term  
23 DRECP horizon.

24 CHAIRMAN WEISENMILLER: Okay, and then the other  
25 question, obviously for all of you, is in terms of,

1 again, how much thinking have you done on what the  
2 optimal portfolio mix is for renewables? Obviously, we  
3 have to do some of that in the DRECP context, so I'm  
4 trying to figure out if there's anything we can tap into  
5 in terms of thinking.

6 MR. STRACK: I suppose I'm less concerned about  
7 sort of optimizing a portfolio. I think the commercial  
8 activities are going to actually, in effect, end up --  
9 would tend to optimize your portfolio. I agree with  
10 Aaron, I think initially we sign anything we can get;  
11 now, we signed up some stuff that, in the end, it just  
12 didn't cut it technology-wise. But I think now that  
13 we've kind of filled the portfolio, I think now there's  
14 a greater focus on the economics and the cost of this  
15 stuff, which I think makes sense, and I think that's  
16 largely driven by commercial activity out there. So, I  
17 suppose personally I'm not as concerned that we need to  
18 spend a huge effort sort of on a planning basis  
19 optimizing portfolios. I think the commercial realities  
20 will sort all that stuff out.

21 CHAIRMAN WEISENMILLER: Yeah, but again, in  
22 terms of the current mix of PV versus everything else, I  
23 mean, are you giving any thinking to how much PV is  
24 enough, or too much?

25 MR. STRACK: I don't have a comment about that,

1 no, sorry.

2 MR. WEBSTER: When the grid operators scream,  
3 you've gone too far.

4 MS. SLOAN: I would just say that we would agree  
5 with San Diego, that we're going to be looking to the  
6 market, we aren't necessarily optimizing for a certain  
7 percentage of PV or wind. But we'll just have to look  
8 and see what happens as we go forward if there's  
9 operating conditions that are something that we can't  
10 deal with, then maybe we'll look at that more in the  
11 future.

12 MR. JOHNSON: I would say on that issue, one of  
13 the things that's helpful to keep in mind is we're not  
14 optimizing a renewables portfolio, we're optimizing an  
15 entire generation portfolio, so frankly maybe it makes  
16 sense to just go ahead and sign up all that PV, but then  
17 we're going to have to do some more storage, or  
18 something else that fits with it better and when you  
19 pencil it out that's cheaper than doing geothermal, not  
20 to pick on any technology or something, but it may just  
21 work out that way better than somehow optimizing or  
22 minimizing integration costs.

23 And the other factor on integration is, if we  
24 really want to look at that issue constructively, we  
25 have to move beyond where we are currently in the

1 solicitation, which is we are forbidden from factoring  
2 in integration costs in the valuation of our projects.  
3 And there's nothing nefarious about that, I think  
4 Commission staff just didn't know how to do it, so they  
5 said, rather than let you make up something, let's put  
6 that issue off, but we've put it off a few cycles now  
7 and we need to get it in there because right now we  
8 don't have a license basically to figure out, you know,  
9 let's really start looking at one technology versus  
10 another.

11           CHAIRMAN WEISENMILLER: Okay, but basically all  
12 your contracts go to the Risk Management Committee,  
13 although it sounds like, again, just sort of a classic  
14 risk management assessment at that stage for the -- in  
15 other words, the portfolio.

16           MR. JOHNSON: I don't feel like I answered your  
17 question fully earlier in terms of a Risk Management  
18 Committee. Can you give me -- what is the function that  
19 you are --

20           CHAIRMAN WEISENMILLER: I was talking about  
21 PG&E, the guy down the hall was running a Risk  
22 Management Group and that was -- obviously you were in  
23 bankruptcy at that point, so there was a lot of  
24 appreciation of the risk of procurement and a lot of  
25 sensitivity in terms of how to evaluate that and run

1 procurement contracts through that sort of screen. I'm  
2 just trying to understand if that's, you know, how that  
3 factors into the tradeoff between -- if at all -- again,  
4 it might be simply let's look at the credit worthiness  
5 of the entity, you know.

6 MR. JOHNSON: I think those are much more the  
7 traditional -- those are the econometrics, I mean, the  
8 fact that we do have a Risk Policy Committee and they do  
9 approve all the contracts, the fact that we're signing  
10 contracts will hopefully solve the problem, which is why  
11 we have the Risk Policy Committee in the first place, is  
12 that we wouldn't try to do it all out of a spot market.  
13 But you know, generally it's more looking at things like  
14 credit and those kinds of factors.

15 MR. WEBSTER: Yeah, and in my wholesale days, we  
16 did do the efficient portfolio theory in risk management  
17 and tried to pick that bright point, but that's -- the  
18 wholesale market is incredibly liquid and it allowed you  
19 to do that; the renewables market is not liquid. So we  
20 really can't apply that theory to renewables, and I  
21 think you're hearing that all the way across the board,  
22 is sort of, "Well, it's lumpy and we've got to look at  
23 transmission and all these other factors," so we try to  
24 have a little geothermal, a little wind, a little solar,  
25 that's the best that we can do right now. Now, if the

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1 renewables market ultimately becomes extremely liquid,  
2 which I don't think it will because it's so project  
3 dependent, then you could start to move into those other  
4 portfolio theories. That's my view.

5 MR. KENNA: Yeah, I was just -- and I think  
6 (inaudible) appreciate the point, recognizing that in  
7 the DRECP, that we're planning out to 2040 and thinking  
8 about the presentations we had this morning about what  
9 happens over time as penetration increases, does that  
10 change any of the comments we've heard? .

11 MR. WEBSTER: From L.A.'s perspective, we do  
12 think about that because, as we start to get more and  
13 more penetration of solar PV, you start to ask the  
14 question, is what will ancillary services actually cost  
15 in the future. And if you have a view that those  
16 ancillary service costs are going to go up for  
17 regulation, for generation following, then you're going  
18 to put more value on technologies that actually provide  
19 that service, so anything that is a solar thermal type  
20 system, you put more value on that. And so we do think  
21 about that, and so we do see the question is how do we  
22 define what those costs are so we can pinpoint it, and  
23 we just aren't good enough today, so all we can say is,  
24 "You know what? We think we need about this much solar  
25 thermal in our portfolio in three to four years to make

1 up for that." And I hope someday we have a better  
2 market, and I know we're going to talk about markets  
3 because that will really help us do that analysis. I  
4 don't know if that was helpful or not, but...

5 MR. KENNA: Yeah, I think so. The microphone --  
6 I'm sorry, I was just trying to suggest that over time  
7 the equation might change on this, although what I'm  
8 hearing, you say is yes?

9 MR. JOHNSON: Well, yes, it will. I mean, one  
10 example I would give you is right now we pay --  
11 basically in our contracts, we pay a time of day -- time  
12 of delivery factor for projects, and for solar it's  
13 generally above one, around average, you know, they get  
14 certain times of day, certain seasons, they get really  
15 high payments, but it averages out to about 1.2 times  
16 whatever they bid in price, we end up paying them on  
17 average because of the solar. And we're internally  
18 doing a study right now to look at, with all the solar  
19 that's on our portfolio, maybe it doesn't make sense  
20 incrementally to pay solar more for the times that it  
21 delivers power because we're going to be long in those  
22 times. But it takes a lot of modeling, a lot of  
23 resources to sort of figure out the answers to these  
24 questions and, you know, the real challenge is there's  
25 so many uncertainties and so many assumptions you make

1 when you run these that, you know, you start tweaking  
2 those a little bit and you get really different  
3 outcomes, so it makes it hard to do really concrete  
4 planning with that kind of -- you want to do this, you  
5 want this information, and you want the intelligence,  
6 you want to try and understand, but you end up, as all  
7 my colleagues are kind of saying, we end up kind of  
8 going back to the market and trying to just fit those  
9 things together and make it work.

10 MR. KENNA: One follow-up question. Is any of  
11 the difference that I'm hearing reflective of -- the  
12 presentation we heard this morning, I think, was very  
13 much at the macro level thinking about large systems. Is  
14 any of this reflective of the difference in perspective  
15 at the balancing utility level?

16 MR. WEBSTER: There's a couple balancing  
17 utilities here. It really is consistent with the  
18 thinking that we go through because we are trying to  
19 look at that value, and how we did that is that we  
20 looked at every hour over the last five years, and the  
21 value and the cost to our system, and then modeled that  
22 against different types of renewables technology, and so  
23 we did it at that level so we could make those  
24 decisions, say that we would pay this much more for  
25 solar PV, or we'd pay this much more for another

1 technology. So we probably didn't do quite as  
2 sophisticated an analysis, but we did do it based on  
3 actual data that we had to come up with those  
4 conclusions.

5 MR. KENNA: Thank you. This was really helpful  
6 to me and probably these folks knew all that stuff  
7 already, but I didn't.

8 MR. SANDOVAL: Yeah, just back to -- IID is a  
9 small utility, balancing authority, we follow more the  
10 traditional integrated resource planning, you know, we  
11 go through the model and analyze the type of resources  
12 that we are going to insert, you know, that's why we  
13 require a little bit of baseloading or geothermal,  
14 biomass, you know, we are trying to be careful in our  
15 own peaking, like solar, so again, we follow those  
16 traditional models.

17 COMMISSIONER DOUGLAS: Okay, thank you. So  
18 we've got Mark, John, Arthur, Carl. Go ahead.

19 MR. ROTHLEDER: Mark Rothleder, California ISO.  
20 I've been doing the studies for the renewable  
21 integration, at least the in the California ISO  
22 footprint, for a couple years now, and we've compared  
23 different portfolios of renewables and you don't  
24 actually see a large in absolute terms differentiation  
25 between how much additional flexibility need when you

1 compare the scenarios to each other, but you do see a  
2 general need for more flexibility when you integrate  
3 more renewable resources. What you do see is when you  
4 need that flexibility, it kind of shifts around,  
5 depending on which portfolio you're looking at.

6 I think part of our concern, more recent  
7 concern, is that there may be a masked over-generation  
8 issue and especially in the higher solar case, where we  
9 are seeing large amounts of export out of the system,  
10 which we haven't traditionally seen in our footprint.  
11 And the question is, will we really see the ability to  
12 turn down resources in the rest of the West to  
13 accommodate that sell-off? And it's not just an off-  
14 peak situation, it's during peak situations, traditional  
15 peak situations, during the day situations. So when we  
16 go and talk to the other balancing authority areas,  
17 they're all kind of saying the same thing, that, "Well,  
18 we're not going to be able to absorb it at that time,  
19 we're in over-generation too."

20 So I think we do have an over-generation issue  
21 that is potentially being masked that does lead itself  
22 to say, "Does storage play a role shifting that peak,"  
23 or shifting when you can have this over-generation  
24 issue.

25 So in terms of costs and the market, I think the

1 ISO is trying to position itself with new products and  
2 allocation of those products in such a way that it does  
3 send signals to both resources that can provide the  
4 services, but also sends signals to the resources that  
5 are maybe exacerbating the need for those services, so  
6 that they can incorporate those costs going forward and  
7 incorporate those market costs. At the same time, we're  
8 not suggesting that the resources that can -- renewable  
9 resources that can actually help solve the problem, they  
10 should also be compensated for solving those problems,  
11 and we're not just one-sided, saying it has to be a  
12 thermal resource, we're looking at all resources should  
13 be able to help participate to the extent they  
14 exacerbate it, they should be allocated to those costs.  
15 And I think that will help send some signals back that  
16 you're looking for.

17 COMMISSIONER DOUGLAS: Thank you.

18 MR. ROTHLEDER: Thanks.

19 COMMISSIONER DOUGLAS: Go ahead, Laura.

20 MS. WISLAND: A clarifying question. When you  
21 were talking about the potential over-gen during peak  
22 time, so are you thinking about a 33 percent scenario?  
23 Or what world is this?

24 MR. ROTHLEDER: Yeah, I'm talking, yeah, I  
25 haven't gone beyond 2020 yet, my mind is still stuck in

1 2020, 33 percent, but in the high solar cases, you can  
2 get into situations where we see large amounts of  
3 export, even during daytime periods, not just off-peak  
4 areas where you traditionally see a large amount of wind  
5 basically pushing the balancing issue. So we do believe  
6 that there may be challenges, even during -- I shouldn't  
7 say "peak," but during daytime periods where we will be  
8 turning resources down to minimum loads, trying to shut  
9 down as much capacity internal to California, and then  
10 potentially a few hours later need that capacity right  
11 back to meet the load when the sun starts to come down,  
12 so it's a very different pattern than we see today.

13 COMMISSIONER DOUGLAS: John.

14 MR. WHITE: Thank you. As I listen to this very  
15 very constructive and helpful conversation, I have a  
16 couple thoughts, one is that our siloing problem  
17 extends, it seems, to our friends in the utilities  
18 sector where the RPS procurement team has a pretty  
19 narrow focus, you know, it's kilowatt hours and price.  
20 But now we're hearing the ISO saying we have to worry  
21 about integration costs that we're going to put on after  
22 the fact on the generators that have been brought to the  
23 table through this solicitation process. At the same  
24 time, we have a resource adequacy process that is  
25 overdue for a tune-up and a change from an annual game

1 of musical chairs where everybody waits and sees how  
2 they do, but what we're hearing from the fossil people,  
3 as well as from the regulators, we need a multi-year  
4 resource adequacy mechanism, and we need linkages  
5 between both to the long term procurement, which has to  
6 do with what kind of gas resource we need, and I'd like  
7 to suggest -- and I find it hard to believe that the  
8 utilities are prohibited, particularly when there are  
9 close calls among resources, from thinking about things  
10 other than price. And I think if we need to make it  
11 more explicit, perhaps a policy that we could begin  
12 envisioning is that, when buying new resources, we  
13 procure for greenhouse gas, renewables, and resource  
14 adequacy all at the same time, and get a look at what  
15 the resource mix is through multiple lenses, instead of  
16 simply the lens of "am I filling in my hole in the RPS?"  
17 Because I think it's clearly not satisfactory to hit a  
18 project with integration costs at the end of this  
19 process; it seems to me it belongs more in the  
20 procurement process. And I understand it's got to be  
21 probably qualitative and informal and the fact, Aaron,  
22 that you said we're probably going to rethink, or relook  
23 at the time of day rate, that I've heard Mark Goldberg  
24 say the same thing, and so that means that even within  
25 the existing siloed process, it's evolving. But I do

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1 think, as we look to try to be more efficient and more  
2 unified, I mean, the one theme about all of this, I  
3 think, is a lesson of the wildlife work that we've been  
4 doing in the DRECP, and some people heard me say this  
5 before, is that connectivity matters in almost  
6 everything, you know, it matters for the species, but it  
7 also matters for the agencies and for the internal  
8 processes of the utilities themselves, and I don't want  
9 to reopen the RPS quite yet, I think it's maybe time to  
10 let it sit for a little while, although it may be that  
11 there will be an appetite at some point to consider  
12 things, but maybe one way to be able to go further up  
13 the mountain of renewable procurement is to have the  
14 renewables we buy do more than just be green. If we are  
15 buying renewables that can also help us meet these other  
16 targets, and displace other things that we would  
17 otherwise have to be buying, by the attributes that they  
18 have, then we might have a more cost-effective renewable  
19 program, we would begin to maybe address some of our  
20 other problems that the system planners have,  
21 particularly acute now as we look at Southern California  
22 in the light of the loss of San Onofre. I'd also like  
23 to say that flexibility on the system is not needed just  
24 for renewables, you know, compared to other places, we  
25 have a remarkably inflexible system because, you know,

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1 at PJM they have a traditional of a market and people  
2 depending on the market for their prices, whereas here,  
3 everybody wants to be "must take," you know, everybody  
4 in California wants to be "must take," nobody wants to  
5 be waiting and uncertain and not be sure that they're  
6 going to bid in, and as a result the system isn't very  
7 flexible, except in ways that we can enhance it.

8           And lastly, I think if we're going to look for  
9 the future beyond 2020, and planning for beyond 33, then  
10 we have to be conscious of what decisions we might make  
11 today that would foreclose those options in the future,  
12 such as buying more gas than we might otherwise be able  
13 to manage if we get creative. So I think that's the  
14 other reason to think about these things holistically,  
15 is that we want to not have to have things so separated  
16 that we end up having to, you know, mitigate a problem  
17 on a secondary basis that we might have solved by  
18 looking at it more directly on the front end. And,  
19 again, I think some of this is a function of our  
20 success, right, there's nobody else in the Continental  
21 United States that is this far along with this level of  
22 penetration, so we are learning from what we're finding,  
23 and I think we have to be prepared to make some  
24 adjustments in the way we do things going forward, both  
25 from a planning standpoint, but also from a procurement

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1 standpoint.

2 COMMISSIONER DOUGLAS: Thanks, John. Go ahead.

3 COMMISSIONER FLORIO: You make really good  
4 points and, you know, I think we all try to take that  
5 holistic view, but it's hard once you see the whole  
6 gambit of what's out there, your head kind of explodes  
7 and that's --

8 MR. WHITE: Imagine trying to follow your  
9 proceedings from outside.

10 COMMISSIONER FLORIO: Yeah. It's not a whole  
11 lot better inside. But you know, I think this issue of  
12 the net peak moving from the kind of 4:00 p.m. to maybe  
13 6:00 p.m., over time, is a really profound change that  
14 is something that bears a lot of hard thinking about  
15 because we've -- I mean, we've built our system, we've  
16 conceived of what we do for years along this, well, the  
17 hot summer afternoon is the thing you think about, and  
18 build for, and plan for, and if that starts to shift --  
19 and I think there's a good chance it will -- you know,  
20 that raises a whole set of issues.

21 I mean, one of the things that's occurred to me  
22 in the resource adequacy context is, you know, for  
23 decades we've talked about peak load plus 15 percent, 20  
24 percent, pick your number, and with the system as it's  
25 evolving that may not be the constraint anymore; we may

1 have plenty of power available on peak, but it's going  
2 to be these flexibility products that Mark is looking at  
3 and, you know, meeting the ramp from one hour to the  
4 next may be the constraint and that changes the way  
5 we've thought about this industry for a hundred years  
6 and it's really significant and I think it's why it's  
7 such hard and difficult work, because we don't even have  
8 the tools yet, or we're making the tools as we're doing  
9 the analysis to figure this out. But it is a measure of  
10 our success in some respects.

11           COMMISSIONER DOUGLAS: So we had a couple people  
12 wanting to speak on this point, so John, Carl and Thomas  
13 sort of waved right on this point, and Arthur is also  
14 patiently waiting with the card up. So go ahead.

15           MR. WEISGALL: Just a very brief comment to make  
16 your life even more difficult, Commissioner Florio, I  
17 would augment. I think John identified three targets in  
18 terms of solving for renewables/RPS, greenhouse gases,  
19 resource adequacy, and I would add reliability. And I  
20 think if you have the IOUs solving for all four, I think  
21 they get out of these silos and I think the "P" in RPS  
22 then stands more for "Portfolio" than for "Price," it's  
23 that simple.

24           MR. HAUBENSTOCK: Very well said and -- Arthur  
25 Haubenstock, BrightSource Energy -- there's an

1 interesting confluence between the range of time that  
2 we're talking about for the DRECP and the length of the  
3 contracts that you folks are signing, you know, for the  
4 infrastructure that we're building for the next 20  
5 years. And so, when we talk about what the market is  
6 bringing to you and what the economic signals are of  
7 today, we have to ask ourselves whether those signals  
8 are backwards looking or whether they're forward  
9 looking, and whether they're considering the kinds of  
10 questions that Commissioner Florio was just talking  
11 about where you're having a very significant change in  
12 the nature of our infrastructure, very different than  
13 the last 100 years. And are the resources that we're  
14 buying today providing as optimal a portfolio as it  
15 might be? And there's certainly a great deal of benefit  
16 in diversifying after you've made sure that you've  
17 actually reached your immediate goal of compliance. You  
18 know, first you need to comply, completely understand  
19 that, and then you have to think about, okay, well, if  
20 you're not really quite sure what the answers are, you  
21 have to make sure you've diversified the answers. But  
22 we're starting to get a lot of information about what is  
23 necessary to optimize, both in terms of the economics  
24 and in terms of emissions and in terms of reliability.

25 You know, NREL came out with a study in November

1 of 2011 that showed that, with CSP with storage, you can  
2 actually enhance your ability to have more PV online  
3 because you can start to address some of the shifting,  
4 these questions, you can start to provide the functions  
5 that, for example, flexing ramp that the FBISO (ph) is  
6 proposing can provide, but you can do it from a  
7 renewable energy resource.

8           So unless we're trying to solve for the four  
9 items that Jonathan Weisgall just identified, the  
10 concern is that the resources that we're buying today  
11 are going to be answering the wrong questions, and so  
12 that goes to the DRECP planning, as well. You know, as  
13 we're planning today for the next 20 years, have we  
14 given ourselves enough latitude to solve those questions  
15 in a way that we're going to be happy with? And I think  
16 that Andrew Mills' study that he talked about earlier,  
17 the study that NREL has done, the information that is  
18 coming out of academia and the national labs, should be  
19 providing us with a great guidepost to figuring out how  
20 to get from where we are today to where we need to be 20  
21 years from now.

22           COMMISSIONER DOUGLAS: Thanks. Okay, so we'll  
23 go Carl and then Tom and then Ed.

24           MR. ZICHELLA: Yeah, and I would -- building on  
25 both Michael and Arthur's comments, I mean, we also have

1 a pool of experience now to build upon, too, which I'd  
2 like to talk about in just a second. But the grid of  
3 the future isn't going to be the grid we have today.  
4 There's so many things changing right now, this is the  
5 first time in maybe many decades that the electricity  
6 industry is confronting changes of this rapidity and  
7 scale, both in terms of how we plan, whether it's Order  
8 1000, whether it's the DRECP, whether it's whatever the  
9 WECC and TEPPC are doing, and there's innovation in  
10 planning, there's innovation in technology, there's  
11 innovation in business models, it's all happening in  
12 real time, it's what makes looking forward so exciting  
13 right now -- and a little bit risky, but you have to  
14 adjust; you just don't make one 40-year forecast, you  
15 have to come back in a couple years and say, "Were we  
16 right?" It's like with greenhouse gas emissions, were  
17 the models right? Well, yeah, they were. But now we  
18 have two decades, or three decades of actual experience  
19 on which to look back and say, "The models say we'd be  
20 here and we're here. Guess what? We've got a problem."  
21 And it's proving itself out. Well, for us it's not a  
22 problem, it is the benefit of the experience that we're  
23 gaining. The performance and the equipment is getting  
24 better, the resources we're trying to integrate are not  
25 as hard to integrate as they used to be. Wind

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1 generators can now provide reactive power and they  
2 couldn't a few years ago and that makes them a lot  
3 easier to integrate into the system.

4           You know, it reminds me of the old statement  
5 about the Department of Defense, you know, the old war  
6 horses of the Department of Defense were always gearing  
7 up to fight the last war instead of the war that was  
8 coming. We have the ability to look forward now and try  
9 to align ourselves where things are going. We'll have  
10 better information about how the grid operates, which  
11 will make it easier to control. There's a \$60 million  
12 synchrophasor project going on right now in the Western  
13 United States, you know, it's not done yet, but it's  
14 well along, it's a little behind schedule, but it's  
15 happening. We are going to have more information in  
16 real time about what's going on in the grid. That's a  
17 good thing, it's going to enhance reliability, as  
18 Jonathan Weisgall was talking about, and it's also going  
19 to help us integrate renewables.

20           Just operational improvements to take a one-time  
21 upgrade, at least initially on software, training, and  
22 equipment to do sub-hourly scheduling by part of the  
23 grid in California and elsewhere that isn't part of ISO  
24 for those who are not doing it, which I don't know how  
25 everyone in the public sector is operating their systems

1 right now, but the idea of just doing basic improvements  
2 that make integration cheaper and easier. This isn't  
3 rocket science, we know it works, we've seen it work  
4 elsewhere, it's just something that's coming along.

5           Improving situational awareness and transparency  
6 between balancing area authorities, crucial for  
7 renewable integration, going to make it cheaper, it can  
8 help us prevent blackouts like we had last year. These  
9 are all things that are in progress right now, new  
10 market opportunities like the Energy and Balance Market  
11 that Western Public Utilities Commissioners are  
12 considering right now.

13           New technology for the grid, you know, we talked  
14 about more efficient conductors, that's all here now and  
15 we need economies of scale to get some of those things  
16 in the mainstream. Super conductors probably aren't  
17 going to happen unless we build a project like Tres  
18 Amigas to really get a large enough scale happening that  
19 the costs will come down more, but we're seeing more  
20 proposals to underground transmission lines right here  
21 in California that we weren't seeing a couple years ago.

22           McKinsey and others have forecasted dramatic  
23 price drops for energy storage, both for regulation  
24 services, but also load following, and they also have  
25 projected grid parity for solar, despite everything

1 that's happening in that space, by 2020. So, you know,  
2 a lot of things are occurring here that are going to  
3 make our challenges -- I won't say less difficult, we're  
4 going to still have to stretch to do many of these  
5 things -- but we can't think about the system as it was  
6 even five or 10 years ago, it's different than it was  
7 then, it's going to be a lot different over the coming  
8 decades and, you know, for people that have been in the  
9 electricity industry for a long time, this is really a  
10 revolutionary period, I think, nothing like it since the  
11 wave of nuclear plants came in in the '80s.

12 COMMISSIONER DOUGLAS: Tom.

13 MR. STARRS: Thank you. Tom Starrs from Sun  
14 Power. Commissioner Florio, I wanted to get back to  
15 your point about peak shifting, just to note that, you  
16 know, this may be hypothetical here, but it's very real,  
17 actually, in Germany and you're probably well aware of  
18 this, but I'll just note for the rest of the folks in  
19 the room that, you know, Germany has actually dealt  
20 quite well with the technical integration of very high  
21 penetration of renewables, but they have what I'll call  
22 an economic integration challenge, right? And in  
23 particular, you know, there are now periods of the day  
24 and certain times of the year when they're seeing a  
25 majority of the total load being served by intermittent

1 renewables, by wind and solar, in particular. And one  
2 result is that the market prices for power have dropped  
3 down to zero in some instances. And, you know, that's  
4 not a very pretty picture for the incumbent utilities  
5 with baseload coal and, at least until recently, nuclear  
6 facilities that we're having to deliver power into that  
7 kind of market environment. So it is hypothetical here,  
8 and I think we saw some indication from Andrew's study,  
9 for example, that it does have very real impacts, but  
10 we're seeing it actually in other places around the  
11 world already.

12 COMMISSIONER DOUGLAS: Thank you. Ed, did you  
13 still have something?

14 MR. DEMEO: I was going to, but now I have an  
15 even different question, actually. Yeah, the question  
16 that keeps running through my mind as I listen to all of  
17 this is, and it's probably a dumb question, but why  
18 doesn't California operate as a single system? So many  
19 of these problems would be --

20 COMMISSIONER FLORIO: All messy (ph).

21 MR. DEMEO: You will? (Laughing) Okay.  
22 Anyway, just looking at it from 30,000 feet, you say,  
23 you know, "Why don't we do this? There's a whole lot of  
24 things that would be easier." So -- I mean, it's the  
25 story of the electric utility industry in the country,

1 really, it is. But somehow we've got to get a little  
2 bit beyond all that.

3           COMMISSIONER DOUGLAS: All right, so you all  
4 have done me a big favor because I let us get behind on  
5 the agenda, but you have talked about really two panel  
6 topics in one, which is great, you've talked about  
7 integration and you've talked about cost. So I want to  
8 thank you for that. I want to note that, you know, just  
9 kind of going back to John's comments for a minute, I am  
10 really kind of intrigued by -- and I kind of expected to  
11 see some of this difference in perspective at the table  
12 that talking to some of the procurement folks at the  
13 utilities -- wow, if we could mute the WebEx, it would  
14 be great -- talking about some of the procurement folks  
15 at the utilities, you know, I expected and anticipated  
16 hearing about the very strong focus on meeting the  
17 regulatory requirement of procuring renewable energy and  
18 having to look very very very hard to get enough  
19 contracts that you thought would hold up, and therefore  
20 having to sign a lot of contracts, and that's a very  
21 different mentality, it's sort of a regulatory  
22 compliance and "there's a certain amount of this that  
23 I've got to get, and we're going to get it," and one  
24 thing that I've been thinking for some time and that  
25 John articulated, maybe in a different way, is that

1 that's one thing at 33 percent, and that probably gets  
2 hard at the upper end of 33 percent, and when you're  
3 talking about 40 percent or you're talking about some of  
4 the higher amount of renewables that we heard from the  
5 NREL study today, or that we're thinking about in the  
6 DRECP, as Commissioner Florio said, it leads us to a  
7 completely different way of thinking about how the  
8 system works and, you know, there is -- I really  
9 understand the value and outlook that some of the  
10 utilities have expressed around, "Well, we'd like to  
11 solve that through market mechanisms and not figuring  
12 out ourselves," and I hear you because it's a hard thing  
13 to figure out yourselves, but maybe the issue of solving  
14 for multiple problems through the process, as opposed to  
15 solving for the one problem, and then letting people  
16 come in with proposals and seeing how they fit is  
17 something that might help towards that.

18           In any case, my selfish motive for bringing you  
19 all together has been to understand how, with all of  
20 these dynamics and all of these factors, what does that  
21 mean for us in terms of what we should try to do in the  
22 DRECP. I'm going to let you think about that because  
23 we're definitely going to have a round on markets and a  
24 round on -- tell me what else you think -- but I want to  
25 get back to that question and some of you have given us

1 a lot of input, and some of you might think of more.

2 But let's now turn to the developers, and I'm  
3 going to ask you to combine, just as we have been doing,  
4 the questions around cost -- and project cost, system  
5 cost, planning -- what do you think about when you're  
6 trying to bring a project to market? You're trying to  
7 choose a site; how does the DRECP affect that? How  
8 might it affect cost? So that sort of thing. And let's  
9 just go to Arthur and we'll just work our way around.

10 MR. HAUBENSTOCK: Karen, I've got to leave in  
11 about a half an hour, so --

12 COMMISSIONER DOUGLAS: I do, and I definitely  
13 don't want you to leave before giving some -- why don't  
14 you go ahead?

15 MR. HAASE: So, yeah, maybe I'll -- and I won't  
16 take long. Scott Haase from NREL. I appreciate this.  
17 Just sitting here listening, you talk about stove piping  
18 and it just makes my head spin around, so I want to  
19 stress that I'm going to wear two hats here today, one  
20 is the NREL hat, and one is the work that I'm doing with  
21 the Department of Interior, and try to separate those,  
22 but they're combined.

23 We talk about stovepiped organizations, NREL is  
24 a stovepiped organization, there's 1,800 people that  
25 work there, we've got multiple groups and multiple

1 departments. The Department of Energy is a stovepiped  
2 organization, and the Department of Interior is another  
3 organization where we don't always talk to each other.  
4 So one of the roles that I was brought in to help the  
5 Department of Interior was to try to help them  
6 understand DOE and NREL and where we can help bring some  
7 of the technical resources to bear, to help the agencies  
8 meet their objectives. So I guess, kind of keep that in  
9 the back of the mind.

10 I've just been making some notes here on a  
11 couple things. So the technologies that are out there,  
12 the studies that we heard about this morning, the 80  
13 percent scenarios, obviously we don't have the grid  
14 technologies to do that, but DOE and NREL are working on  
15 that. Right now, there's a \$60 million facility called  
16 the ESIF -- because we have to have an acronym for  
17 everything -- but it's the Energy Systems Integration  
18 Facility, so it's under construction right now, it's  
19 coming on line, there will be 200 researchers in this  
20 facility, but it's going to be a state-of-the-art super  
21 computers, labs, to look at how do we combine these  
22 multiple technologies together -- storage, grid  
23 integration, grid control, solar, wind, fuel supplies,  
24 thermal energy systems.

25 So DOE in its wisdom, about three years ago it

1 said we're going to fund this facility and it's coming  
2 on line, it should be on line in 2013, it will be open.  
3 So it will start looking at some of these high  
4 penetration levels, how do we get to those, what  
5 technologies do we need to develop?

6           One of the other things that I think NREL can  
7 add and bring some value here is that we are working  
8 across a number of organizations, and not necessarily  
9 all on some of these issues, for example, I know we work  
10 with CEC quite a bit, but it's almost all on liquid  
11 fuels technologies, so we're not really being devoted or  
12 asked to help with some of these issues, where I think  
13 there might be some good synergies. I saw some DOD  
14 people here, I don't know if they're still here, but  
15 we're doing a lot of work right now at DOD helping them  
16 meet their gigawatt mandate, so the Energy Integration  
17 Task Force that they've developed, where is the best  
18 spot for DOD to deploy renewables? We're working with  
19 the Army and the Navy, trying to help them identify  
20 where those projects are and what those projects look  
21 like.

22           Until recently, we weren't even talking to the  
23 folks in NREL who were doing the DOD work, the folks who  
24 were doing the BLM work weren't talking to each other,  
25 so this is another problem. Even DOI and DOE weren't

1 necessarily talking to each other about some of these  
2 issues, but they are now quite actively doing that. I  
3 know DOD has been brought into the DRECP process, so I  
4 think it's a good opportunity with multiple owners, or  
5 multiple landowners, to start talking to each other.

6           Someone talked earlier about reliability and  
7 security. DOD, if you talk to them, why they're doing  
8 this, it is almost all for reliability and security, why  
9 they want to deploy renewables on their own site, so  
10 enhancing the value of renewables for their own internal  
11 uses, as well as supplying to the grid.

12           Let me talk a little bit just about my work with  
13 the Interior. I do work for Steve Black, I know many of  
14 you know him, but I met with him yesterday and he did  
15 want to stress that he's sorry he couldn't be here, but  
16 that the Department is fully committed to this effort,  
17 and Jim is sitting over there and he said any hard  
18 questions, just point to Jim and he'll answer those  
19 directly.

20           CHAIRMAN WEISENMILLER: I would say I got an  
21 email from Steve saying he listened in this morning and  
22 thought the workshop was very good.

23           MR. HAASE: Okay, great. I know the Secretary  
24 is committed, Steve briefs the Secretary every week on  
25 this process as it goes forward, what the challenges are

1 and how it goes, and the Secretary is very committed to  
2 renewables, in fact, he was at NREL today visiting and  
3 doing a tour of the lab, talking about this partnership  
4 that we've got with them and how we might move forward.

5           So I just want to say that -- and the other  
6 issues that we've been looking at is how we help  
7 Interior better understand some of the issues that have  
8 been talked about here, so someone talked about markets,  
9 that you've got all these zones out there, but how do  
10 they fit within markets? So some of the stuff we've  
11 been doing internally for BLM, as well as do some  
12 studies is we've got these 17 zones coming on right now,  
13 what are we going to do with those now? The PEIS is  
14 going to be completed very shortly here, we know where  
15 the zones are, but what now? What steps do we take now?  
16 And where does industry want to go out and build  
17 projects in these zones? So we've been helping BLM try  
18 to figure out internally a roll-out structure  
19 essentially of where do we devote some additional  
20 resources, perhaps do some additional NEPA work on the  
21 ground, which zones do we start with, where does the  
22 transmission go?

23           The thoughts this morning about the longer term  
24 and the portfolio effects, I think, were very  
25 interesting of, you know, right now the zones in

1 Colorado might not look so interesting, but 10 years  
2 from now, 20 years from now, they might. The Afton Zone  
3 in New Mexico, right now it's kind of a stranded zone  
4 out there, but if Sun Zia or the Clean Line come in and  
5 can begin delivering that power, it begins tying the  
6 transmission together.

7           Some of the other things we're working -- I know  
8 they're not represented here, but the Bureau of  
9 Reclamation, which moves a lot of the water in the  
10 Western United States, they're now developing a  
11 renewable energy program and looking at how can they  
12 integrate renewables into their critical infrastructure.  
13 So, again, an area to provide additional value. Someone  
14 talked about Navajo Generating Station and there's a lot  
15 of issues with that plant, huge coal plant in the  
16 Western United States, the EPA and the BART decisions  
17 coming down for that, what's going to happen to the  
18 future of that plant? Will it be there 10 years from  
19 now, 20 years from now, or what configuration would it  
20 look like? So we've been helping the Bureau of  
21 Reclamation at least analyze, "Can you put solar  
22 directly at its pumping stations for the Central Arizona  
23 Project?" And these are very large pumping stations,  
24 200, 300 MW, so are there opportunities to co-locate  
25 solar in an area where you can get additional value out

1 of it besides just perhaps putting it into the grid? So  
2 can you pump water during the day to offset coal  
3 generation? It's difficult questions economically to  
4 talk about when you're talking about how that affects  
5 the cost of water for the tribes and the irrigation  
6 users in Arizona, but it is something that at least the  
7 agencies are looking at.

8           We are doing a study -- we've done one study for  
9 Navajo looking at -- kind of documenting some of the  
10 baseline issues of that plant. A Phase 2 study is going  
11 to look at a renewable energy generation alternatives  
12 for that plant, so we'll be looking at things like co-  
13 locating CSP at Navajo, perhaps as a way to offset some  
14 of the emissions and not require the most stringent  
15 emissions control requirements on there, so could you  
16 put some level of CSP and not require selective  
17 catalytic reduction as one example. Could you  
18 distribute out a lot of renewables for that plant as a  
19 way to meet some of the environmental needs? So that's  
20 work that's going on that we're working on and so the  
21 DRECP, I think longer term, thinking about how we think  
22 about expanding that process is one of the issues I  
23 think Nevada talked about, you know, can we start doing  
24 that. Arizona, I know, has done the restoration design  
25 project trying to look at lot there, but these have all

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1 kind of taken place in isolation, this ability to try to  
2 bring those in, I think, is an area to work with going  
3 forward.

4           And the other hat I wear, and I won't say too  
5 much about this, but I am on the independent science  
6 panel review team for the DRECP, which was recently  
7 convened, so I know there's been some discussion there,  
8 but just thinking about some of the challenges of, you  
9 know, making sure the plan is underpinned with strong  
10 science, you've got competing agencies and objectives,  
11 and missions in trying to balance all that. It's really  
12 hard. And my hats off to everybody in this room who is  
13 actually trying to do this and pull it together. When  
14 you start thinking about expanding to Nevada, Arizona,  
15 or other places, or regionally, you know, it even makes  
16 your head want to spin more.

17           But one last thing, the adaptive management plan  
18 we talked about for species conservation, as well as for  
19 energy, you know, I think it's very important to think  
20 about 20 years from now, what are the technologies going  
21 to look like. When I started at NREL 20 years ago, a 10  
22 kilowatt PV system was big, and it was really expensive.  
23 Right now, everyone says, "Oh, it's just a one megawatt  
24 system, you know, that's a small little system that's  
25 out there and it's \$2.00 to \$3.00 a watt installed," so

1 thinking about that, what our technologies are going to  
2 look like 20 years from now, and having that plan in  
3 place to be responsive to that, I think, is very  
4 important.

5           The one other piece I would mention there is I  
6 have met with the Bureau of Ocean Energy quite a bit and  
7 they were kind of wondering where they fit in with  
8 perhaps some offshore wind turbines or MHK technologies,  
9 and I didn't see that in any of the Commission  
10 calculators, so I'm just going to put in a plug for them  
11 to think about that. And I know that the floating wind  
12 turbines are not here yet, commercially, but this issue  
13 of 20 years from now, what will that look like? And  
14 will there be floating wind turbines off the coast of  
15 California? Something to think about.

16           COMMISSIONER DOUGLAS: Thanks, Scott. I really  
17 appreciate that. And, you know, we have from time to  
18 time had conversations about the offshore energy or  
19 tidal energy and my conclusion is that I really hope our  
20 friends on the East Coast help pioneer some work in  
21 that, that someday we may be able to take advantage of.  
22 But between having shallow water and having generally  
23 fewer renewable resources to rely on, except potentially  
24 the ocean resources, I think they've got a lot of  
25 incentive and ability to do some pioneering work there.

1           CHAIRMAN WEISENMILLER: In the IEPR, we had a  
2 workshop on research issues and we did have a panelist  
3 talk about offshore technologies.

4           COMMISSIONER DOUGLAS: But, anyway, thank you  
5 for being here. I know you had to fly and get here  
6 late, fly back now, but really appreciate you taking the  
7 time.

8           MR. HAASE: Have a good weekend -- I'll be able  
9 to rest.

10          COMMISSIONER DOUGLAS: Absolutely, okay. Go  
11 ahead, Arthur.

12          MR. HAUBENSTOCK: Great, thank you very much. I  
13 know that Fred Morse spoke to some of the needs of solar  
14 thermal, and so I don't want to take up too much time,  
15 but I do want to talk about a little of the tradeoffs --  
16 sorry, there's my phone -- at least it's on mute, but  
17 that doesn't help me with my notes.

18                 So what does solar thermal need? It needs  
19 significant areas of contiguous land. Now, for  
20 BrightSource, at least, you know, we find there are  
21 significant economies of scale if we have at least two  
22 units, and preferably three units, on a single project.  
23 You know, can we do something smaller? Sure. But the  
24 cost goes up and it creates other issues. So we like to  
25 see very large areas, at minimum 4,000 to 5,000 acres,

1 it's preferable to have more, but again, the question is  
2 what the tradeoff is.

3           There are height restrictions that we have to  
4 address. By going from the 450-foot tower at Ivanpah to  
5 the 750-foot tower that we're proposing for Rio Mesa  
6 Solar in Hidden Hills, we're able to cut down the land  
7 that we do need by about a third. That creates some  
8 conflicts, some complications with the Department of  
9 Defense and the FAA, there are places where that's  
10 acceptable, but it's, again, one of these tradeoffs --  
11 do we use more land and have a smaller tower, or less  
12 land and have a larger tower?

13           There are cultural issues that come up with  
14 land, as well, and oftentimes that's not determined  
15 until you're in construction. I know that some of our  
16 friends in the solar thermal world have had problems in  
17 finding cultural resources, and then having to stop  
18 construction and then change what their layout is, and  
19 so, when we're thinking about a development focus area,  
20 we have to account for the fact that there are things  
21 that we're just not going to know and we have to be able  
22 to give ourselves the flexibility to adjust to those  
23 things when we go out and find them. We need land that  
24 is relatively flat. It's true, I think, with both PV  
25 and with solar power towers, you know, the heliostats

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1 can go up to fairly significant slopes, up to even 10  
2 percent, this is again a cost land use tradeoff; there  
3 are things that one can do if one is forced to do it,  
4 and we don't want to take land off the table because  
5 there's increased slope. We also think that -- there  
6 are occasionally environmental issues with increased  
7 slope, that's not necessarily the case, but it is one of  
8 the things that raises an issue.

9           When we're thinking about planning for a 20-year  
10 horizon, we want to maintain flexibility, but also  
11 recognize that those areas that have greater development  
12 hurdles are probably less likely to have as high a  
13 percentage of actual projects on them, so it gets back  
14 to Chair Weisenmiller's question earlier, do we want  
15 larger development focused areas, recognizing that we're  
16 going to have some ability to move within them, and then  
17 have the coordinate mitigation responsibilities  
18 associated with that? Or do we want smaller areas,  
19 recognizing that even not all that very focused area is  
20 going to be usable and will we need more land later? I  
21 think that's a tradeoff we have to focus on.

22           There are lots of other issues in terms of  
23 access to transmission, access to roads, access to the  
24 minimum quantity of water that solar thermal needs, I  
25 think those are all the things that we're working

1 through on the DRECP area, but very appreciative of the  
2 discussion that NREL and LBNL had earlier today about  
3 the role that these various turbine technologies  
4 provide. I think as we're looking for the DFAs in the  
5 DRECP, if we're providing for sufficient land to  
6 accommodate these very different technologies, then  
7 we'll be able to allow the utilities to select those  
8 resources that do provide that portfolio and that, at  
9 the end of the day, be successful on our RPS and GHG  
10 goals.

11           COMMISSIONER DOUGLAS: So, Arthur, there are two  
12 questions that I'm going to ask all of the developer  
13 reps to address, and so I'll ask you that and everyone  
14 else can hopefully take note. You know, one is, as we  
15 really get down to the bottom line in terms of drawing  
16 up what alternatives should look like for the DRECP, I  
17 think that we'll find that some of them may have smaller  
18 areas in lower conflict, parts of the desert that would  
19 be easier to streamline in a practical perspective, the  
20 permitting process would take less time. The agencies  
21 would have more certainty, saying, "Yes, you can go here  
22 and you can get through our process quickly." There's  
23 also been some push, and so you'll probably see some  
24 alternatives that will reflect larger areas, some of  
25 which have more conflict, which as a whole may be harder

1 to guarantee the same level of streamlining, but will  
2 provide you with more flexibility for site selection and  
3 for dealing with everything the developers need to.

4           And so, the first question I'd like kind of all  
5 of you to talk about is, between those two, is there a  
6 strong preference? Or is it we need to see what they  
7 look like? Or how do you help us understand what is of  
8 more value to you between those two kind of extremes?

9           And the second question I have is just kind of a  
10 discount rate. We know that, when we draw a development  
11 area in DRECP that it cannot possibly be fully developed  
12 because there may be mountains, or sand dunes, or just  
13 connectivity issues between projects, or potentially  
14 different landowners, or various other reasons why  
15 you'll never ever ever get 100 percent. And so we  
16 tended to come down and say, "Well, maybe a third, or  
17 maybe a fifth of this area would be developed." And so  
18 this is a question that varies -- I think the answer may  
19 vary by technology, but it would help us to get your  
20 insights into whether that kind of rule of thumb could  
21 make sense, you know, what sort of factors would go into  
22 your thinking about the percentage of the development  
23 area that is developable.

24           MR. HAUBENSTOCK: So I think the answer is yes.

25 (Laughing) This is a question we've been wrestling

1 with, all of us have been wrestling with, for a while.  
2 And ultimately what we're talking about is trying to  
3 lasso down some degree of certainty in a world where we  
4 haven't adequately characterized the risk. You know, in  
5 the solar PEIS, for example, when zones were initially  
6 proposed, the idea was to so reasonably characterize the  
7 zones that you could tier off of the Environmental  
8 Impact Statements and have a very simple environmental  
9 document that you could use to permit projects within  
10 those zones. It very quickly came to everybody's  
11 realization that the resources weren't there, the time  
12 wasn't there, that to go out there and determine what  
13 was out there so that you could have a programmatic EIS  
14 that would allow you to tier off of it to that degree.  
15 Even though the DRECP is far smaller than the Solar PEIS  
16 area, it still is enormous and it still is a huge area  
17 to characterize, and I don't anticipate that the DRECP  
18 is going to come out with a document that's going to  
19 allow you to do an EA off of the decision documents,  
20 that's just not going to happen.

21           So when we ask for what the percentage of land  
22 is going to be developable, the answer has to be how  
23 well do you know the land that you're looking at. You  
24 know, in my mind, when we're looking at development  
25 focus areas, there are some areas that we're going to

1 know pretty well, we'll have a sense of what the  
2 question marks are, and the likelihood of increased  
3 penetration of development there is going to be very  
4 high. And so, for those areas, I can see a smaller  
5 tighter focus. Other areas, we don't know as well. We  
6 may have some question marks associated with the  
7 likelihood of cultural impacts, the likelihood of  
8 conflicts with other interests. For those areas, it  
9 would make sense to me to have a larger area and assume  
10 a smaller penetration, giving yourselves the flexibility  
11 to adjust as time goes on.

12           You know, when we first started this process, I  
13 talked with our development team and they scratched  
14 their heads and we all came up with 10 percent, and I  
15 went back to them and they said the same thing. And I  
16 think that's probably a good rule of thumb generally  
17 without giving yourself more data, but I do think there  
18 are areas where we've done enough work and we could do  
19 enough work where we can narrow it down.

20           COMMISSIONER DOUGLAS: Mark.

21           MR. THOLKE: Okay. I want to make two sets of  
22 comments and then answer the questions. The first set  
23 of comments is on the procurement strategy, the second  
24 is on the land side of the DRECP. So on the procurement  
25 activity, let me first say that the policies that the

1 State of California have put together are working. I  
2 mean, there are projects going on the ground, this is a  
3 great success story. And I know we want to, in the  
4 spirit of continuous improvement, improve upon that, but  
5 we should recognize when we see success and I think it's  
6 important to recognize.

7 I appreciate all of the comments on diversity  
8 value, the value of diversity. I don't -- my own  
9 opinion, as I said, that doesn't come by mistake, you  
10 don't get diversity just by luck. We need to plan for  
11 diversity. And there may be ways to do this that we  
12 haven't thought of, for example, in the Tehachapi area  
13 we have a wind -- I'm trying to put together a wind  
14 project, so it's early stage -- but we've done some  
15 studies, it's a 200 megawatt wind, it's a 200 megawatt  
16 interconnect, it's a 60 megawatt solar, so it's a 200  
17 megawatt pipe for the interconnection, 200 megawatt  
18 wind, solar right next to it, and the amount of hours,  
19 megawatt hours, that are curtailed, that would need to  
20 be curtailed, is less than one percent. So what that  
21 says is that there's a lot of benefits to utilizing the  
22 transmission, there's a lot of benefits to the  
23 reliability of even power flow when you need it.

24 So I want to move from procurement, but before I  
25 do, I do want to say that I have a request that we find

1 a way to get rid of the projects that are not viable.  
2 We've heard that everybody -- that the utilities feel  
3 that the IOUs have procured through this compliance  
4 period, oh, and there's the side comment that, well,  
5 assuming that those all come on line, so if there's a  
6 way to just drop the ones that are not properly sited,  
7 or are not going to make the cut economically, it would  
8 be great to just move on and get rid of them, and clear  
9 the way for real projects. I know that's easy to say,  
10 but that's the request. I've got my wind tie-on, I'm  
11 representing the wind point of view at this. Even  
12 though we do do solar, my comments are intended as a  
13 wind IPP.

14           Second set of comments is on the land side. You  
15 know, the DRECP, tremendous ambition, I mean, we're  
16 talking about something over 20 million acres, a huge  
17 number of variety of stakeholders, and from a  
18 developer's perspective, there is real value in the  
19 DRECP because an estate like California where we have to  
20 get a specific -- you know, we have to go through the  
21 permitting process for each individual project, I mean,  
22 I have five projects that are almost adjacent to each  
23 other, and each one has to go through a full on process,  
24 this is down at Tehachapi, again, we came when the  
25 transmission was built, but that has a real value. One

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1 comment I do want to make on the DRECP is that we were a  
2 little late in addressing the avian impact for wind. I  
3 do rather feel like it's been driven by solar and that's  
4 not a bad thing, but we do need to recognize that solar  
5 and wind are not the same. A wind project, after the  
6 temporary impacts are remedied, for example, 98 percent  
7 of that land is still usable for farming. Now, I know  
8 we're talking about the desert, but that gives you some  
9 idea of the terrestrial impacts are just an order of  
10 magnitude or more different. That says we do have  
11 different concerns, which is avian concerns.

12           So, getting to Commissioner Douglas' questions,  
13 the first thing I want to say is, well, I want to take  
14 the second question first, which is larger -- well, I  
15 guess that was the first question -- larger versus  
16 smaller. For wind, I would suggest that we do have a  
17 larger area because what we'll need to do is avoid areas  
18 with Eagle presence. And if we start with a larger  
19 area, we can then collapse in on a small percent area  
20 and cluster the wind projects.

21           So for example, in the Tehachapi's, the projects  
22 are pretty well clustered. The same thing with Solano,  
23 I was just there, I mean, that wind resource -- we're  
24 waking each other's projects, it's so clustered, which  
25 causes its own commercial issues, but that's not your

1 problem, that's ours. So that would be my comment from  
2 the wind perspective. It would be good to start larger  
3 with the flexibility to then condense it once we  
4 understand a bit more about the Eagle populations, etc.,  
5 and suitability for projects, and then cluster the  
6 projects there. That would be my comments. Thank you.

7 COMMISSIONER DOUGLAS: Thank you. And that  
8 idea, that preference obviously also acknowledges that  
9 that means it's more of a project by project review in  
10 that sense. I mean, there's more site analysis that  
11 might need to occur when you start with a larger area  
12 and work your way down, but on the other hand, I also  
13 personally think that is a practical approach for wind  
14 and, as you mentioned, Eagle avoidance and other avian  
15 issues. I agree it's a practical approach. Okay, Tom.  
16 Oh, is there a question?

17 MS. SLOAN: Oh, I just had a clarifying comment  
18 for Mark's statement that, when we say that we are  
19 looking at having near term meeting our goals, that's  
20 including a 60 percent success ratio, not 100 percent,  
21 so just to clarify that we're not saying -- if we get  
22 everything, we're taking into account what we think  
23 liability is.

24 COMMISSIONER DOUGLAS: Okay, good. Thank you,  
25 Katie. Tom.

1           MR. STARRS: Thank you. So first of all, I  
2 wanted to apologize in advance, I'm going to have to  
3 leave at about 4:00. So I'm going to try and cover  
4 quite a bit of territory here.

5           COMMISSIONER DOUGLAS: Please do.

6           MR. STARRS: And also, in the interest of being  
7 concise, not surprisingly I'm largely in agreement with  
8 the comments that we have heard, or that I expect to  
9 hear from some of the other industry folks. So what I'd  
10 like to do with your consent is to focus on some of the  
11 areas where I think Sun Power has some distinctive  
12 interests and just focus on some of those areas of  
13 difference.

14           So one thing that I think you and others in the  
15 room and the rest of the audience may not know is that  
16 Sun Power actually has very little stake, direct stake,  
17 in public lands, at least with respect to project  
18 sitings, so we made a conscious decision some years ago  
19 to focus our development efforts on disturbed private  
20 lands, previously disturbed private lands, and that's --  
21 we have almost a gigawatt of power plants under contract  
22 right now that are all on private land, we don't have  
23 any of those PPAs that are associated with public land  
24 projects. We do have a stake in public lands, and  
25 therefore in the DRECP with respect to transmission

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1 siting. And I just have to say, without further  
2 elaborating on this, that I'm delighted to see the level  
3 of interest and engagement on transmission issues as  
4 part of the DRECP today because, in my fairly limited  
5 experience, I haven't seen as much focus previously as  
6 we've had today, and that's really encouraging in my  
7 view.

8           With respect to siting, whether on private or  
9 potentially on public lands, I think we do have a lot  
10 more siting flexibility than for PV technology than we  
11 do for some of the other technologies, even some other  
12 solar technologies, as Arthur pointed out. You know, we  
13 can do a 30 megawatt project on a quarter section of  
14 land, on 160 acres of land. So you know, a previously  
15 disturbed agricultural parcel that is typically  
16 sectioned off in that way, you know, we can fit a nice  
17 tidy little project on a portion of that land.

18           We -- another distinction I think that's  
19 important to note for this audience is that Sun Power  
20 gets roughly half its revenue, not just domestically,  
21 but globally, from distributed applications of PV, and  
22 I'm a huge proponent of distributed PV, but I do want --  
23 and it's a big part of our business now and in the  
24 future, it has tremendous potential, but it's not a  
25 silver bullet, and I don't think I'll surprise anyone in

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1 the room by saying that we don't see it as the solution,  
2 and there is no way we're going to meet even our current  
3 goals, much less any increased goals, by relying  
4 primarily on distributed rooftop solutions; it's just we  
5 have to solve these problems with respect to ensuring  
6 adequate access to larger land areas, including public  
7 land areas, in order to meet our long term carbon  
8 reduction goals.

9           Another point I want to make is that because we  
10 have more flexibility in terms of siting, I think we  
11 have a bit of a different position with respect to DRECP  
12 and I want to put even more emphasis than has already  
13 been placed on the importance of having this process  
14 result in something that provides tangible benefits to  
15 the development community in terms of what you called  
16 "streamlining."

17           If we have an outcome from this process that  
18 results in the designation of zones that make it less  
19 complicated, less cumbersome, less expensive, to site in  
20 these particular areas, then we will be the first  
21 company to focus our development efforts there. If the  
22 opposite happens and we don't see any incremental  
23 benefit to locating in these areas, then we're going to  
24 be, you know, opponents of the process, and if we don't  
25 prevail in that respect, then we're going to be

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1 directing our efforts elsewhere outside of the DRECP  
2 planning area. So I don't mean to sound like a jerk,  
3 but fundamentally that's where our interests are and if  
4 that's where our business interests lead us, that's what  
5 we're going to have to do.

6           So I do think it's very important, I mean,  
7 Arthur noted a few minutes ago that he's sort of given  
8 up on being intentionally provocative -- he didn't put  
9 it that way -- but basically given up on the idea that  
10 we could have a process that ends up with significant  
11 areas defined, where you could essentially rely on an EA  
12 rather than a full EIS process in order to get your  
13 project permitted. And, to me, that's the kind of  
14 incentive we need to have associated with this process  
15 in order to make it work. I'm not saying that specific  
16 goal has to be *the* goal, but I just think in general  
17 that we're going through an awful lot of work, everyone  
18 in this room, everyone at these various agencies, and  
19 that, if one of the outcomes is not to make the process  
20 simpler as a result of the outcome, as a result of this  
21 full process, then I don't think we will have met the  
22 goals of achieving the kind of balance that I think more  
23 or less everyone in the room is interested in achieving.

24           And then finally, on what I hope will be a  
25 lighter note, I think some of you probably expected me

1 to say that this should be all about lowest cost  
2 incremental resource and forget all this portfolio  
3 theory stuff, and we don't need a balanced mix of  
4 resources. You have not heard me say that and I would  
5 never say that because I don't believe that. I will  
6 note that, you know, there are some unique attributes  
7 associated with PV that, besides a low price that do  
8 make it, merit its being considered as an important part  
9 of the mix.

10           And again, I said a light note, I'm going to  
11 finish with a brief anecdote from one of my heroes, the  
12 former head of R&D for Pacific Gas & Electric Company,  
13 the legendary Carl Weinberg, who I interviewed when I  
14 was doing my work for my PhD dissertation, what seems  
15 like many years ago. And I said, "Carl, why do you have  
16 this whole team of people at PG&E's R&D facility  
17 focusing on PV technology? I mean, I know why I'm  
18 interested in it, but why are you interested in it?"  
19 And I expected some, you know, engineering answer,  
20 "Well, we're convinced that we can find a way to squeeze  
21 an extra...", you know, "...2.2 percent conversion  
22 efficiency out of the technology." But, no, in typical  
23 Carl fashion, he looked at me and his eyes got big, and  
24 he said, "Because it's magic!" (Laughing) And I  
25 laughed and I said, "Well, what do you mean?" And he

1 goes, "Well, look, you've got this technology that, you  
2 know, it's like manufacturing a window, except you stick  
3 that out in the sun and there's no noise, there's no  
4 moving parts, there's no emissions, and it generates  
5 electricity. It's magic." And I just wanted to end on  
6 that note to remind people, there are other reasons why  
7 we have an interest in favoring PV technology. Thanks.

8           COMMISSIONER DOUGLAS: Well, thank you. Thank  
9 you, Tom. And it's possible that some of the difference  
10 in perspective about streamlining that you expressed  
11 versus Arthur expressing, and I'm hypothesizing, but the  
12 difference in the technologies is very important. You  
13 know, the tower projects tend to, as Arthur mentioned,  
14 involve a lot of land, possibly multiple units, and so  
15 it might very well be a different equation between the  
16 areas that towers would be attracted to going to in the  
17 areas that might be streamlined, that would be more  
18 likely that PV would go to. And so I don't know, but  
19 I'm suggesting it's a possibility. John.

20           MR. WEISGALL: Yeah, it is magic. If I'm not  
21 mistaken, I think Einstein did get his Nobel prize for  
22 discovering that photovoltaic effect in 1905, so behind  
23 the magic there was something. While Kristy sets up a  
24 Powerpoint that I'm going to race through, I'm going to  
25 make four very quick comments, all unrelated -- Jonathan

1 Weisgall, Mid-American Energy Holdings Company.

2           In the Midwest, we've got a utility in the  
3 Midwest, Mid-American Energy, we joined MISO several  
4 years ago because we had built over 3,000 megawatts of  
5 wind in Iowa, overtaking California. We now sell that  
6 into a balancing authority covering 12 states, which is  
7 MISO, from the Gulf of Mexico up to Canada. We're at  
8 about 30 percent wind in terms of installed capacity as  
9 a utility, and we can handle that intermittent challenge  
10 very effectively. Just following up as a comment here,  
11 I have a slide which I would have liked to have included  
12 in my Powerpoint, but there are 37 separate balancing  
13 authorities in the West, and I'm not talking west of the  
14 Mississippi, I'm talking in the West, 37.

15           Point two on transmission, I think there's a  
16 need for a middle ground here between *Field of Dreams*  
17 and *Jerry McGuire*, I mean, something between Kevin  
18 Costner and "Build it and they will come," and "Show me  
19 the money," which, you know, "show me the money" is  
20 really kind of the model for gas pipelines, but, yes,  
21 there's a need for some sort of middle ground.

22           Third comment, back to those points I mentioned  
23 earlier, solving for reliability, RPS, resource  
24 adequacy, and greenhouse gases. If you can solve for  
25 those four, I really think the RPS can move from a

1 regulatory process to an infrastructure process, which  
2 is really what it should be, from a program to a real  
3 infrastructure project. And then lastly, on diversity  
4 following up on Mark's comments just now, one resource  
5 has not been mentioned since 9:00 this morning, and it  
6 is one of the other 800 pound gorillas out there, which  
7 is natural gas. And I think there's a real -- there's a  
8 specter of natural gas crowding out renewables, and that  
9 really calls for more of a need for you as regulators to  
10 continue the renewable energy procurement process  
11 because I think we have been successful as a country,  
12 not just in California, as a country, by maintaining a  
13 diversity of electricity resources throughout our  
14 history. Yes, we had a dash to nuclear, we've made  
15 mistakes, but when you look, whether it's coal, natural  
16 gas, renewables, nuclear, it works when we've had a good  
17 diversity and there is a danger in the dash to gas right  
18 now and something that we all need to be aware of.

19           Moving through, and I'll move through this very  
20 quickly, I prepared this not really knowing exactly what  
21 you wanted to cover, Karen, now I'm going to turn on and  
22 just sort of wear my geothermal necktie; this is really  
23 Geothermal for Dummies, absolutely no modeling here,  
24 there's no matrix, this was prepared with a very  
25 generous grant from Mrs. Weisgall -- (Laughing) who

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1 let me do this. But this is not rocket science, let's  
2 go to the first slide.

3           This, if a picture is worth a thousand words,  
4 this will tell you a little bit about the geothermal  
5 footprint. Here is 50 megawatts on about 20 acres and  
6 you've got farm -- that's the Salton Sea in the  
7 background, and by the way, it never looked quite so  
8 good, you can't smell it from this slide, you've got  
9 farmers farming right up, much like we have in wind, so  
10 you can get a sense of that footprint. Next slide, if  
11 you would.

12           Another aerial view, that's water vapor, and  
13 you've got about six plants there and, again, you get a  
14 sense of the footprint. By the way, geothermal kind of  
15 seems a bit of a stepchild and people are asking, well,  
16 what's happening with geothermal? Let me just share  
17 with you a statistic, the production tax credit, which  
18 began for wind in 1992, didn't really come into effect  
19 for geothermal until November of '05, so let's begin  
20 with January of 2006; since then, 28 new geothermal  
21 plants have been built or have had additions to them --  
22 by the way, not California, I'm saying -- and geothermal  
23 is pretty much in the west -- but 28 new plants with a  
24 combined -- in nine states -- with a combined output of  
25 over 500 megawatts -- by 14 different developers, by the

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1 way, and by the end of 2013, when the production tax  
2 credit will expire, or be renewed, there will be about  
3 another 200 megawatts. So geothermal is alive and well.

4           John White referred earlier to the one  
5 geothermal plant that has just come on-line, only one in  
6 the last 10 or 15 years in California, the Hudson Ranch  
7 plant and, yes, it is ironic and perhaps sad, that it is  
8 selling into Arizona and not into California --  
9 symbolic, at least. Due a little bit to transmission  
10 constraints and the like. What Energy Source did was  
11 build about a 2.5 mile upgrade and then go briefly  
12 through WAPA, and then into APS, and is selling to Salt  
13 River. So that's what they are doing. Okay, next  
14 slide.

15           Attributes, okay, well, we know all the  
16 attributes of geothermal is really, well, let me just go  
17 through one point here, high number of jobs per  
18 megawatt, that does set geothermal off from other  
19 resources, we've got 340 megawatts at the Salton Sea  
20 with 240 employees, that's a lot of local sourcing,  
21 that's a lot of local work, that certainly is important.  
22 The high upfront capital cost, well, we see that with  
23 others, with other renewables, as well, but that again  
24 leads to a lot of local economic development. Next  
25 slide, please. And obviously the capacity factor is

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1 obvious.

2           The longevity, okay, nothing important there.  
3 The -- I'm trying to go through it quickly, folks --  
4 what is the footprint, we've covered -- there is a good  
5 BLM study out there and it shows that an average  
6 geothermal plant would be a surface disturbance of  
7 between 53 and 300 plus megawatts, but in California  
8 that number is much less. In terms of the long term  
9 contract, by the way, back to natural gas, I haven't yet  
10 found a developer of a natural gas plant who is willing  
11 to offer a fixed price 20-year contract for its  
12 resource. Wind, solar, geothermal, we can do that  
13 because we know the price of the fuel. Next slide,  
14 please.

15           Barriers, we don't need to cover that, we know  
16 there are lots of barriers to geothermal development,  
17 good technology cost, but that's there -- next slide.

18           Government policies, that's not relevant for our  
19 discussion this afternoon, let's go to the next slide.  
20 The drivers will clearly, you know, we don't know how  
21 long the San Onofre issue will last, but when you look  
22 at the once-through cooling policy, LADWP backing out of  
23 a lot of coal, and San Onofre, there is a baseload  
24 challenge in California and certainly geothermal can  
25 help solve that issue. Next slide, please.

1           Your maps are pretty good. A point here is that  
2 the geothermal resources really are located where you  
3 find them. Aside from the footprint, I guess the other  
4 key point to make here is there's not a whole lot of  
5 optionality, if you will. It's not as if with that  
6 smaller footprint combined with the low habitat issues  
7 in Imperial, it does make geothermal -- at least in  
8 Imperial -- an environmentally preferred resource, but  
9 the optionality is limited, even within a known  
10 geothermal resource such as the one at the Salton Sea,  
11 there are areas of very high temperature, there are  
12 areas of lower temperature, and the difference is huge  
13 in terms of the output that you're going to get for the  
14 same amount of capital investment. But you've mapped  
15 most of what's there. Next slide.

16           Well, this just shows the Salton Sea, there are  
17 other areas of California. Of course you've got the  
18 geysers, you've got Mono Lake and other areas, but as  
19 you can see, the major source of geothermal is down at  
20 the Salton Sea, that's where the new plant, the Hudson  
21 Ranch plant that I mentioned earlier is located, and  
22 that is a reservoir that has a minimum of 2,000  
23 megawatts of proven reserves, probably closer to 3,000,  
24 to develop. Next slide. Do we know where the untapped  
25 reserves are located? Yes, pretty much. Near term

1 potential, at least that 2,000, probably other resources  
2 in the DRECP areas still to be discovered. We don't  
3 really have much certainty. There hasn't been -- the  
4 U.S. Geological Survey just has not done a lot of work  
5 in this area over the years, but I think we certainly  
6 know where the near term development is -- long term,  
7 yes, there may be other areas we don't know about. Next  
8 slide.

9           The risks, yeah, these reservoirs are  
10 geologically complex, so you -- and certainly one of the  
11 biggest challenges with geothermal, speaking as a  
12 company that does wind and solar, as well, we can pretty  
13 much cost out wind and solar within one or two  
14 percentage points. We could start drilling for  
15 geothermal and you could drill four wells and be out \$20  
16 million and have no resource, that's a challenge; that  
17 could be one reason there is less geothermal  
18 development, but, again, that goes into the costing and  
19 the cost and the prices if not radically different from  
20 the other resources. Next.

21           That will just show you in detail, it's not a  
22 great slide to see across the room, but it just shows  
23 the future geothermal potential in Southern California,  
24 that's a report from the Geothermal Energy Association.  
25 Again, we're not looking at numbers like either wind or

1 PV, but you certainly can see there upwards of 2,800 to  
2 3,000 megawatts of geothermal that can easily be  
3 developed and would be consistent with the DRECP as it  
4 stands now. Next slide.

5 Resource economics, that's logical, no surprises  
6 there, transmission has been addressed enough, I don't  
7 need to address that again. I guess, by the way, in  
8 terms of public/private, following up on Tom's comments,  
9 Stacey, I think you would agree, in Nevada, the  
10 geothermal is probably at least 80/20 federal/private  
11 land, something like that? Yeah, very heavily  
12 concentrated on public lands. California is closer to  
13 50/50, a little bit different. Next slide.

14 Nothing there that we need to cover, just one --  
15 a good link you can go to. Next slide. And that's the  
16 land use intensity chart, not mine, someone else's, but  
17 it does show -- I mean, it's the obvious, the footprint  
18 of geothermal is certainly pretty effective. So  
19 addressing a couple of other points, percentage of  
20 development area, that question of yours, very very low  
21 percentage, and that goes to the small footprint,  
22 itself, so I think significantly lower, even than a 10  
23 percent figure that you heard from the others.

24 As far as what you're doing with the plan, I  
25 don't know if you can apply some of the principles to

1 geothermal where you could say, "Look, let's get a  
2 little bit -- let's go somewhere where the resource may  
3 be a little bit less valuable, but there will be zero  
4 conflicts." I think that's a little bit harder to do  
5 with geothermal, but I think the tradeoffs there are,  
6 certainly at Imperial and I can't speak for the whole  
7 industry, but certainly in Imperial County, you're  
8 dealing with land that simply already has less  
9 environmental impacts.

10           Last point I'll make, just something that  
11 actually came up in a couple of conversations since I've  
12 been out here the last few days, I was asked about could  
13 you do energy storage with geothermal. Real interesting  
14 idea, in other words, I mean, that would be kind of base  
15 load plus storage. There are two companies that are  
16 looking at that concept. You could do, you know, solar  
17 thermal on geothermal land, and that would be a real  
18 interesting concept, it would be quite extraordinary,  
19 something to think about, yeah, you would just do your  
20 molten salt with geothermal and then you could store  
21 some of that power and not have to worry about having  
22 all that baseload power. And it really goes to another  
23 point that I've noticed as our company, which has been  
24 going gangbusters on wind and gangbusters on solar, has  
25 not been going gangbusters on geothermal at all, with a

1 lot of intermittence in the mix. There's also a lot of  
2 peaking in the mix and I'm just wondering if baseload is  
3 a little bit less important going forward in California.  
4 I don't know the answer. I don't think it should be,  
5 but it's been frustrating developing the geothermal.  
6 But, again, when I look at San Onofre, once-through  
7 cooling, and DWP's imperative, I've got to think there's  
8 a strong need for baseload and, if you can get that in a  
9 renewable resource that, I think, creates a home run  
10 combined with the other renewable resources.

11           CHAIRMAN WEISENMILLER: Yeah, I was going to say  
12 I know I've heard people always argue about, say,  
13 biomass being a baseload and it isn't that great, but I  
14 always point out at the last PG&E of our RFO asked for  
15 up to 300 starts a year, which is certainly not a  
16 baseload resource. Obviously, if you take San Onofre  
17 out of the mix, so -- yeah, at least one a day -- so I'm  
18 saying, again, just given, if anything, we tended to  
19 have too much baseload, particularly once you have all  
20 the wind production at night.

21           MR. WEISGALL: Uh-huh.

22           CHAIRMAN WEISENMILLER: So, again, taking San  
23 Onofre out certainly affects that, but certainly the  
24 PG&E system, you know, looking at the RFO's, were not  
25 even close.

1           MR. WEISGALL: No. I mean, and going back to  
2 those factors from earlier, the flip side of those four  
3 factors, Commissioner Florio, is you've got a system now  
4 that I think the Commission is solving for solar  
5 because, to begin with, you've got a resource that has  
6 come down dramatically in price, whether that's due to  
7 the Chinese or anti-dumping, who knows? The fact of the  
8 matter is, it's a low cost; number two, you've got the  
9 time of day factor multiplier, and Aaron quite covered  
10 that quite well. And then you've got this third factor  
11 of not including the integration costs. So that is  
12 tilting, I think, some of the results the way they are  
13 today. Anyway, I hope that gives some perspective on  
14 geothermal.

15           COMMISSIONER DOUGLAS: Thank you, Jon. I see  
16 some cards up and I also realized that I neglected to  
17 ask Tom and Mark just a question about the 20 percent,  
18 or 10 percent, or 33 percent of a development. Or is it  
19 too abstract a question to ask without actually seeing  
20 areas?

21           MR. THOLKE: So for wind --

22           COMMISSIONER DOUGLAS: You said less, actually,  
23 you said bigger area and --

24           MR. THOLKE: Yeah, I said -- if it's possible  
25 for wind, we could have a big area, like 50 percent and

1 then, once we decide on the area, three, or two.

2 COMMISSIONER DOUGLAS: Okay.

3 MR. THOLKE: So we can avoid those Eagle areas  
4 and topographical areas --

5 COMMISSIONER DOUGLAS: I see.

6 MR. THOLKE: So once we settle in from the big  
7 area, it's actually very small, maybe one percent or  
8 something.

9 COMMISSIONER DOUGLAS: I see, okay. That's  
10 right, you did answer that. Okay, so we've got a number  
11 of cards up and I lost track of who raised it first, so  
12 Aaron --

13 MR. JOHNSON: I just had a quick question,  
14 Jonathan, and it kind of gets to the baseload question  
15 you were having there. I think the Chair corrected me  
16 at a previous hearing about the non- -- about the  
17 ability of geothermal to not necessarily be restricted  
18 to being a baseload facility. Is there kind of a rule  
19 of thumb of what you think it would cost -- and I'm  
20 assuming it's more expensive to design it that way, or  
21 operate it that way -- if geothermal were to be bidding  
22 in not as a baseload resource, but as a dispatchable  
23 resource?

24 MR. WEISGALL: I wish I knew, Aaron. I don't  
25 have a good number for you, no. I can't answer that

1 here, but I can -- let me ask our folks and if I could  
2 communicate with you, Karen, I will get an answer.

3 CHAIRMAN WEISENMILLER: Yeah, no, I was  
4 surprised. Basically it was in the '80s where Unocal  
5 basically said the geysers he had dispatch. The  
6 negotiations fell apart because geothermal was capital  
7 intensive load variable cost, and so, to the extent that  
8 you were somehow trying to say, okay, you're going to  
9 operate, say, the geothermal half as much, and here's  
10 the PG&E adder for the dispatchability is relatively  
11 small, that you just couldn't pencil it out.

12 MR. WEISGALL: You can't turn it on and off and  
13 Mother Nature doesn't turn on and off, so you're dealing  
14 -- you're trying to turn a horse into a camel. So I  
15 mean, I could try to come up with a cost number as far  
16 as feasibility is concerned, I would just about have to  
17 rule that out. I'm more intrigued by the storage  
18 concept. But don't -- can't help you there.

19 COMMISSIONER DOUGLAS: Okay, Ed.

20 MR. DEMEO: Yeah, two comments based on the  
21 points Jonathan raised. First of all, on the baseload  
22 question there, at least to some degree, and maybe to a  
23 large degree, the need for, the desire for more  
24 flexibility in the power system is just not compatible  
25 with more baseload. So as time goes on, it seems to me

1 we're going to go -- baseload is going to go down, and  
2 almost just about everything else is going to go up,  
3 that's, by the way, what happens in the 80 percent  
4 renewable futures program, also. And the second thing  
5 is, on your point about natural gas, the juggernaut  
6 today of natural gas crowding out renewables, I think  
7 the other side of that is that there's this wonderful  
8 synergy between natural gas and the renewables,  
9 particularly the variable renewables, so to some degree  
10 at least it's a win/win for both renewables and natural  
11 gas working together a little bit better than they are  
12 now. Now, the natural gas people might say, "Well,  
13 we're not so interested in that argument because what we  
14 want to do is sell natural gas." Now, in high  
15 renewables, we might have a lot of gas generation  
16 installed, but we don't run it a whole lot, so they  
17 would say, "Well, we're not selling enough natural gas."  
18 But, you know, if we take a longer term view as a nation  
19 here, future generations are going to want that stuff to  
20 do something more important with than just burn it, you  
21 know, make plastics, or whatever. So, anyway, it is in  
22 my mind, anyway, a nice synergy between the renewables  
23 and natural gas.

24 COMMISSIONER DOUGLAS: Great, thank you. All  
25 right, I think that we're going to move to -- so I'll

1 just say quickly, we'll move to John, Laura, and Carl,  
2 on these two questions and then what I'm going to do,  
3 because time will be limited, is kind of throw the floor  
4 open and talk about the market section.

5 MR. WHITE: Do you want me to go first?

6 COMMISSIONER DOUGLAS: Yeah.

7 MR. WHITE: Thank you, Commissioners. And I  
8 really want to express my appreciation to all of you and  
9 also to Jim Kenna for taking the time to spend all day  
10 here with us and it really shows the working together  
11 lessons that we've been learning and those new muscles  
12 of coordination that we've been exercising are staying  
13 in shape, so I really thank you for coming. I've had a  
14 good bit of time to speak already today, so I just want  
15 to really talk about the importance of planning for  
16 beyond the next horizon, beyond 33 percent, and well  
17 beyond 2020. And I want to illustrate the importance of  
18 that by illustrating a little touch of the history. We  
19 had the first renewable development in the world,  
20 really, in California in the '80s, and we did the first  
21 wind plants, and the first solar fields, and the first  
22 geothermal fields really in the world on the scale that  
23 they were done. But for a variety of reasons, we  
24 stopped. And we didn't just stop acquiring or procuring  
25 renewables, we stopped planning for renewables. And we

1 then got taken up with this false promise of  
2 deregulation where we didn't need to do need assessment,  
3 we didn't need to do integrated resource planning,  
4 because the market would provide all of the planning  
5 that was needed.

6           And the combination of those two developments  
7 ended up leaving us in a very difficult place when we  
8 started up again. And the place where this difficulty,  
9 to me, has been most vividly illustrated is in the  
10 desert because, during the period of our slumber, two  
11 very important and consequential processes were  
12 undertaken and completed, the first was the California  
13 Desert Protection Act authored by Senator Feinstein,  
14 which was very important and Senator Cranston actually  
15 helped long before Senator Feinstein was elected, and  
16 this was a 20-year effort, but during this period, for  
17 some reason there was very little thought given to the  
18 role of renewables in the desert, particularly solar.  
19 Unfortunately, this was also the case in the West  
20 Mojave, which was a planning effort led by BLM that was  
21 actively participated in by the conservation community,  
22 by the mining community, the military community, the  
23 off-road vehicle community, but there wasn't a renewable  
24 community, most of the refugees from California's '80s  
25 development had gone back to Europe and Israel and other

1 places and, so as a result, we made decisions in both of  
2 these plans that were quite consequential in terms of  
3 taking land off the table. We have more than three and  
4 a half million acres available for military reservations  
5 and that number is expanding. For some reason, we seem  
6 to live in a time of total war and we have to plan for  
7 always being at war in the desert, which I hope someday  
8 is not the case, but -- so the military appetite for  
9 land is expanding, the off-road vehicle folks have been  
10 remarkably resourceful in securing large amounts of land  
11 for their interests. The mining interest was also well  
12 represented, and the environmental interest was also  
13 well represented and, through land reserved for the  
14 desert tortoise and land reserved for other species, as  
15 well, including the State protected species, the Mojave  
16 Ground Squirrel. And as a consequence, I remember  
17 sitting in the Berkeley house of a dear friend of mine  
18 who was a solar scout and pioneer who was coming back to  
19 California after the Diaspora of solar in the '80s, and  
20 was coming back via Spain to say, "Time to come back to  
21 California." And in the mean time, I remember sitting  
22 in his living room looking at the map and he's showing  
23 me, "Look, all of this land in the West Mojave that is  
24 perfect, better than any other place in the world,  
25 almost, certainly better than anyplace within 100 miles

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1 of 10 million people," okay? With radiation at a level  
2 even better than the radiation just 50 miles east in the  
3 Eastern Mojave, and yet, because of the planning process  
4 not being informed by this interest, this is gone  
5 virtually.

6           And so our focus, as all of you know, has been  
7 to try to readdress that problem in this planning  
8 process because, in our view, planning for the future  
9 needs to include not just the more species protection in  
10 conservation areas that we know we need, but we need to  
11 have some good land of this very high quality included  
12 not for immediate development, but for the long term.  
13 And all the conversation that we've had today has  
14 reminded us that, while we may be thinking that DG and  
15 PV and wind and other resources will be important, we  
16 also know that solar thermal has unique and very very  
17 important advantages and it is uniquely needful of this  
18 high quality land. This land is otherwise not  
19 unsuitable, there is -- it's largely degraded and the  
20 area around China Lake, it's even got bombs around there  
21 that are buried in the ground, and there's garbage dumps  
22 and there's illegal off-road vehicle places that people  
23 use and don't get cited for.

24           And so it seems to me that, while we do have  
25 issues to resolve with the Fish and Wildlife Service and

1 Fish and Game about how to protect the species, the  
2 decision in the West Mojave was to basically expand the  
3 areas that would be protecting the Ground Squirrel  
4 because the counties basically said, "We don't care  
5 enough about this to take it upon ourselves." And this  
6 was through no fault of anybody's or any malintent,  
7 absolutely none of that, it was that nobody was there  
8 talking about this at the time.

9           And so, to me, in addition to trying to  
10 reconcile and revisit some of those decisions in this  
11 new planning process, it illustrates to us the  
12 importance of this longer term horizon and the need to  
13 not try to minimize how much we need to do right now  
14 because we don't want to make hard choices, but  
15 recognize that we have to provide a plan that's robust  
16 enough to support all of these goals and objectives, and  
17 I am confident, particularly with sustained leadership  
18 on the part of the folks here, particularly Commissioner  
19 Douglas and all the efforts that you've made, but also  
20 the other stakeholders in the community that are  
21 affected, that we can figure out a way to make this work  
22 and make it better, but we also should be reminded the  
23 consequences of stopping and thinking that we're done  
24 when, in fact, we have maybe much more that we need to  
25 do. And so, with that, I'd let that go and be the end.

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1           COMMISSIONER DOUGLAS: Great. Thank you, John.  
2 Laura.

3           MS. WISLAND: It's always hard to follow John  
4 with his vivid historical perspective. I'm going to try  
5 to work the word Diaspora into my comments somehow.

6           MR. WHITE: I had to learn how to pronounce it,  
7 though.

8           MS. WISLAND: I wasn't sure what to prepare  
9 today, so I've just been taking notes and reflecting on  
10 things that other people have said, and like I said, the  
11 Union of Concerned Scientists has not been involved in  
12 the DRECP, but we have been involved in the RPS  
13 proceedings, we have been involved in the Long Term  
14 Procurement Planning proceedings, and so my perspective  
15 is really, you know, looking from outward into the DRECP  
16 and seeing how it can add value, and so I would echo  
17 what John said. I think it's really really important  
18 and really helpful that you are looking at 2030 and  
19 2040. You know, I'm a little concerned -- I understand  
20 the importance of the Long Term Procurement Planning  
21 process and needing to come up with the system plan, and  
22 needing to come up with a bundle plan, and looking out  
23 10 years, but at the same time, if we don't start  
24 looking a little bit longer term, I'm worried things are  
25 going to be expensive and I'm worried we are going to

1 get into the same -- I wouldn't say "mess," but  
2 situation that the utilities were describing a couple  
3 years ago where they were just signing up any kind of  
4 project they could because they know they needed to meet  
5 a mandate, and I don't think that's really good for  
6 anybody, even the developers who want to get their  
7 projects signed.

8 I like the fact that we have a little bit of  
9 space to take a step back and figure out what the  
10 lessons learned are from siting issues, so we don't make  
11 those mistakes again, figure out what actually is a  
12 viable project, and so unless we start really thinking  
13 about what the next step is in terms of how many  
14 renewables we want to put on-line, we're going to push  
15 that off, and then we're just going to have to rush and  
16 do it, and probably not do it very well, so...

17 And then my other comment, which is also  
18 probably not of great value to you guys thinking  
19 specifically about the DRECP, but I've just been  
20 thinking a lot about renewables potential in other parts  
21 of the West and I only work on California, but I'm  
22 looking at this map, the NREL map, and there's a lot of  
23 renewable energy potential outside of California, but  
24 not too far away from us, and I'm just wondering if  
25 we're going to be the state that's going to be hungriest

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1 for that, the soonest. You know? Because we have a  
2 more mature industry here, because the politics might be  
3 more favorable towards renewables, and I just hope that  
4 we can continue to talk about ways to break down  
5 barriers between sharing electricity with other states.  
6 It becomes a very political issue very quickly when we  
7 start talking about increasing the RPS, and it just  
8 seems like, if we only think about what we can do in  
9 California, we're going to miss a big opportunity, it  
10 seems very evident from this map that that would be the  
11 case.

12           COMMISSIONER DOUGLAS: Thanks for your comments,  
13 Laura. Just briefly on the out of state issue, I think  
14 I mentioned earlier when I talked about just some stage  
15 setting that we assumed a 25 percent out of state, which  
16 comes out of the 33 percent law, but also as we talked  
17 about it among Energy Commission staff, in particular,  
18 we wondered if it would even be feasible to import more  
19 than 25 percent, or even 25 percent of a portfolio in  
20 2040 that was -- or 2050 -- that was a very high  
21 renewable portfolio, particularly in a world in which,  
22 you know, let's take a step back now and think about the  
23 NREL Renewable Energy Future Study and let's imagine  
24 that the East Coast and Denver and, you know, big load  
25 centers throughout the country are also competing with

1 us for those renewables. So I have come around to the  
2 perspective that the 25 percent assumption is reasonable  
3 for planning and, if anything, might be a bit high for  
4 planning -- and the other thing that we've discussed,  
5 and Stacey Crowley has left, but we've talked a lot to  
6 her and she has learned very quickly how to talk to us  
7 in terms of how do we work together, you know, what  
8 sorts of things can we do that are mutually beneficial,  
9 what sorts of things can we do that make sense for both  
10 of us? And I really like the way that she is thinking  
11 about -- you know, the way she thinks about partnership  
12 is sort of similar in that respect, you know, less the  
13 one-way straw to California, and more the fact that  
14 we're going down a road together that involves a lot of  
15 changes in the way we think about how we do things, and  
16 how might it be possible to attain some mutual benefit.

17 CHAIRMAN WEISENMILLER: Yeah, I think trying to  
18 look for that Western synergy is important. I think  
19 probably the thing I keep pushing back is I remember in  
20 the first Brown Administration where we made very -- I  
21 mean, the traditional wisdom was that we had to build a  
22 lot of coal plants, we had to build a lot of nuclear  
23 plants, but we didn't, and the rest of the West said --  
24 and we relied on our geo-efficiency renewables and co-  
25 gen, and the rest of the West said, "God, this Governor

1 is making a stupid moon-beam approach, and they're  
2 really really going to need this nuclear power plant  
3 that we're building at Palo Verdes, or wherever," and  
4 they lost their shirts. And so my basic message to the  
5 other states is not to bet on this Administration's  
6 policies on energy efficiencies and renewables not  
7 happening. I mean, you can make that bet, but, again,  
8 you got really burned the last time.

9 COMMISSIONER DOUGLAS: Carl.

10 MR. ZICHELLA: Thank you. And I was going to  
11 try to avoid that topic at the advice of the  
12 Commissioner, but I have to say that, you know, all of  
13 our climate policies in California, and including the  
14 RPS, are intended to lead the rest of the country. And  
15 they're intended to lead the rest of the country for a  
16 really important reason, we can't stop climate change by  
17 ourselves. And as big as we are, eighth leading economy  
18 in the world, or whatever it is right now, it  
19 fluctuates, eighth, seventh, whatever, we can't do it  
20 ourselves.

21 We have some of the best renewable energy  
22 resources in the world within our reach in other parts  
23 of the West. Using that energy will displace coal  
24 resources in other parts of the West. We can take, as  
25 we heard earlier, the infrastructure that that

1 technology has been using and convert it for renewables.  
2 We know the geographic diversity strengthens our own  
3 system, improves reliability, and makes renewable  
4 integration cheaper.

5 I think we get too stuck in the notion that, you  
6 know, everybody is trying to drop power at our door,  
7 instead of looking at it in terms of how do we create a  
8 regional energy market of sorts, realizing that regional  
9 transmission organizations are anathema to a lot of the  
10 West, but nevertheless, people are really exploring and  
11 regulation is requiring greater coordination all the  
12 time; we shouldn't be afraid of it, California can do it  
13 on its own terms, it can participate in it and in ways  
14 that cause us to build less transmission, less reserves,  
15 to not have duplicative transmission, to be able to more  
16 strategically locate things like large-scale energy  
17 storage as it becomes more available and on-line. So,  
18 just given all of that, I just had to at least say that,  
19 climate, you know, let's keep our eye on that ball,  
20 that's the one that really matters, that's causing sea  
21 levels to rise, that's what's causing snowpack in the  
22 Sierra to decline, that's what's causing the water  
23 crises that we're going to be confronting in the same  
24 time horizons that we're talking about with the DRECP  
25 planning. So that's what our goal ought to be is

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1 remediating climate change. California has exerted all  
2 of its policy leadership in this arena, I view this  
3 attitude as a real retreat and a threat to the state,  
4 and we ought to keep that in mind, not saying we make  
5 bad bets, or imprudent relationships, but that we do  
6 things on our terms, we cooperate with others for the  
7 benefit of all of us in getting integration to occur  
8 cheaper, in the best locations, with the best resources,  
9 and we have market relationships with the rest of the  
10 West. They're not just leaving power off at our door,  
11 we're already selling geothermal to Arizona; Washington  
12 State wants our peak solar, Oregon wants our peak solar,  
13 we can fix the grid linkages to permit more robust  
14 exchanges of that kind, and there's no reason, I think,  
15 why we should be so hooked up on just doing it all --  
16 all here. And I realize there are commercial and  
17 actually economic and employment imperatives here in the  
18 state, and I'm very sensitive to those, but I also think  
19 that the opportunity is big enough to accommodate those  
20 goals, too.

21           Getting back to the DRECP, which is why we're  
22 here, and I promised, Karen, I would stay off my high  
23 horse, but I'm sorry, I get the last word on that one,  
24 and I apologize, Karen.

25           COMMISSIONER DOUGLAS: You did promise me you

1 would stay off your high horse and then stick to the  
2 DRECP.

3 MR. ZICHELLA: You should have known me better  
4 than that.

5 COMMISSIONER DOUGLAS: I think I do.

6 MR. ZICHELLA: But anyway, on the DRECP, I just  
7 want to talk about how remarkable this effort is. It is  
8 the kind of innovation I was talking about earlier, and  
9 we have to innovate in technology and markets, in  
10 business models, and in policy. And bringing together  
11 the various agencies and entities at all levels of  
12 government, I realize the counties are kind of hedging  
13 their bets, to be kind, but we need them, too. And to  
14 the extent that we have a model like this that can find  
15 resource areas with low conflicts that can be  
16 streamlined in getting projects on-line, that can help  
17 us rationalize the transmission for it, so we can truly  
18 be efficient in building only what we really need to do,  
19 sizing it correctly, accommodating future needs, this  
20 kind of thinking is essential to that and the DRECP is a  
21 great example. And it's so freaking hard -- pardon the  
22 expression -- to do this; I want to just say right off  
23 the bat how grateful I am to everyone for the work  
24 that's going on, and I barely dipped my toe in the  
25 water, my colleagues, Joanna Wald and Helen O'Shea have

1 been working on this for NRDC more than I have, but I  
2 attended enough meetings to really be able to get a good  
3 sense of just how difficult this is, and I want you to  
4 know that not only is NRDC grateful, I'm personally  
5 grateful for the effort. I think it helps us also to  
6 think about and address the benefits of geographic  
7 diversity. We heard a lot about that today, it's a very  
8 important factor for us in terms of getting this done  
9 right.

10           One of the key things, and NRDC has done a lot  
11 of work with the investment community on how to  
12 stimulate investment in renewable energy development as,  
13 in particular, we're seeing the possibility of the tax  
14 credits and other incentives, the Treasury grants phase  
15 out and cycle out, and the idea of getting more  
16 certainty on permitting and citing is critical to them.  
17 And the investment community has stepped forward, and in  
18 a pretty public way, some of you may have seen Nancy  
19 Pfund's op ed to the *Sacramento Bee* some time ago about  
20 the Programmatic EIS, in particular, but it's the same  
21 idea, that if we can locate projects in this way and  
22 guarantee more likelihood of them getting to permit  
23 success in a reasonable period of time, that it's going  
24 to greatly increase the investment community's interest  
25 in putting forth capital on that. And I think the

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1 private capital markets, you know, equity, tax capital,  
2 direct investment, you know, the initial investments  
3 that the venture capitalists are putting in, all of this  
4 is stimulated by having a good plan like a DRECP. It  
5 helps us to think about scaling resources, as  
6 Commissioner Florio talked about and others have talked  
7 about, in terms of having flexibility not only in the  
8 operation of the system, but in the future upgrading of  
9 the system, sharing technology and optimizing the  
10 operations. By bringing all these people together to  
11 think about these things upfront and having the  
12 relationships -- public/private utilities having a part  
13 in identifying the design of the transmission as the  
14 DRECP has done, it really helps us to make the next  
15 steps in that process. It doesn't lead you  
16 automatically there, it doesn't require anything, but it  
17 gets people thinking in ways that they're not accustomed  
18 to thinking when they are stuck in, by no fault of their  
19 own, but by all the reinforcement in their industry to  
20 stay in their silos. And breaking out of those silos is  
21 absolutely important for California in terms of having a  
22 better, more efficient, cheaper system with less  
23 environmental impacts. So, you know, every step forward  
24 in that direction needs to be encouraged.

25 One other part of it, and it's particularly

1 important to me, I am extremely sensitive to the notion  
2 that John White put forward that we need good land with  
3 good DNI for the great resources, and NRDC does support  
4 opening up the West Mojave, you know, we have been very  
5 concerned about the natural resources there, too, but  
6 you cannot keep the best areas off the table, it means  
7 less land, frankly, gets developed overall. A lot of  
8 that landscape is disturbed, it's not that it's a free  
9 ride environmentally, but in addition to that it does --  
10 the DRECP helps us preserve our options for climate  
11 adaptation. And as Commissioner Weisenmiller, Chairman  
12 Weisenmiller, pointed out early on, things are changing  
13 now. We're seeing the migratory behavior of birds  
14 changing in California, it gives me goose bumps to think  
15 about this. We're seeing changes that happened over  
16 many centuries happen in decades. We are seeing in a  
17 forecast in this state for snowpack in the Sierra Nevada  
18 is for 80 percent less at the end of the century if we  
19 don't slow this juggernaut down.

20           And I think the idea of having the development  
21 located intelligently preserves ideas for climate  
22 adaptation that allows us to pass on the natural  
23 heritage of the state to future generations  
24 substantially unimpaired. And that, to me, is an  
25 unbelievable responsibility we've taken on and a gift to

1 future generations that I'm quite proud the DRECP has  
2 initiated. We have the second highest level of an  
3 endemism, species that only exist here in the entire  
4 country after Hawaii, it's an extraordinarily hard place  
5 to build projects because of that. We also have a real  
6 responsibility not to waste that patrimony, if you will,  
7 we've been awarded and we can pass on to others.

8           And finally, for those huge amounts of resources  
9 and financial resources that developers are putting  
10 forward to provide mitigation, and I think, you know,  
11 we'll look at something like Ivanpah and BrightSource  
12 having to pay into the tens of millions of dollars,  
13 Tom's company, and to the tens of millions of dollars,  
14 and their project is on private land up in the Carrizo  
15 Plain, for mitigation. This helps us get mitigation  
16 that matters, this helps us get mitigation and  
17 conservation that actually does something. So I think  
18 the DRECP is the full package as far as I'm concerned in  
19 terms of the right approach.

20           Now, John is right, we're not at the finish  
21 line, there's a lot of work that needs to be done yet,  
22 but I do think, as was said also earlier, I'm not quite  
23 sure I remember by who, I guess it was Mark, that we  
24 need to celebrate the success of putting steel in the  
25 ground even as we do this. And I think California

1 through the DRECP is really living up to its  
2 responsibilities to citizens now and in the future, and  
3 I'm proud of the effort, NRDC is proud to be helping  
4 with the effort, and I want to see it get to the finish  
5 line and be the success that it can be because it is  
6 influential, the work I've been doing across the rest of  
7 the West is looking at this, a lot of the work we've  
8 been doing in WECC has chipped away at it and stolen  
9 some of the ideas, and I'll be the first to say I  
10 plagiarized it myself to help us. So, the reach of this  
11 project is far beyond just the State of California and  
12 it's incredibly important, it's helping people re-think  
13 the way you do this kind of work en toto, and as we also  
14 said earlier, and I think Mark and others would agree,  
15 this is a huge shift in an industry that has not changed  
16 very much in a very long time.

17           You know, someone said if he came back today,  
18 Thomas Alva Edison would completely recognize our  
19 electricity system, it looks a lot like it looked when  
20 he died, you know? And the grid of the future isn't  
21 going to look like the grid we have today, and we're at  
22 the cutting edge of that change. So I'll stop there and  
23 again thank everybody for their work on the DRECP.

24           COMMISSIONER DOUGLAS: All right. Thank you,  
25 Carl. Now we're going to just probably spend some time

1 on markets and, you know, Mark, we would ask you to come  
2 and -- this and the infrastructure costs, you know, and  
3 other topics were some of the driver for that, so I'm  
4 going to ask you, if you don't mind, to open up on that,  
5 to kick us off on that topic.

6 MR. ROTHLEDER: I'm not sure I'll have a lot to  
7 say because in the end I was trying to think about, when  
8 I think of markets, I think of the markets that ISO  
9 runs, but the market is really much bigger than that.  
10 And frankly speaking, the market that the ISO runs I'm  
11 not sure has significant tie-in to DRECP; but the larger  
12 market, how do you get to capacity, what projects do you  
13 contract for, does have more of a direct impact under  
14 DRECP, from my understanding. And so I think from that  
15 perspective it's a matter of how do we send the right  
16 market signals for the overall optimal procurement that  
17 then can send the right signals for proper use of land.  
18 And I think the market that I'm involved with is just  
19 probably one very small piece of that in terms of how we  
20 can operate the grid in the most efficient way, with the  
21 resources that we do have. And we can hope that we can  
22 send the right signals of what the right resources are  
23 of the future, balancing all the interests.

24 COMMISSIONER DOUGLAS: All right, thank you.  
25 Other -- you know, markets came up, too, over the course

1 of the day, but let me just ask if there are any other  
2 comments on markets. Go ahead.

3 CHAIRMAN WEISENMILLER: Well, obviously there's  
4 lots of different things you could mean by "markets,"  
5 but one of the obvious ones is financial markets and, at  
6 the end of the day, what we are trying to do is attract  
7 investment to California and that ties back to  
8 regulatory stability. And I talked to Jonathan last  
9 night, who was saying that the thing was, you know,  
10 obviously you can look at various areas of relative  
11 risk, but that we have had a great amount of continuity  
12 and policy in this area between the Davis,  
13 Schwarzenegger, and Brown Administrations. And  
14 obviously DRECP started under the Schwarzenegger  
15 Administration. And so, again, that providing -- what  
16 we're hoping to do through this is to provide the sort  
17 of regulatory signals on where to develop, or where not  
18 to develop that may facilitate investments in  
19 California.

20 MR. HAUBENSTOCK: A couple things. First of  
21 all, I want to thank Carl for his comments and express  
22 my remorse in not mentioning that, when we look at the  
23 DRECP, and certainly we look at permit streamlining and  
24 like the idea of trying to have greater certainty with  
25 permitting, that's very important and would love to see

1 that happen. The proof is going to be in the pudding,  
2 you know, I think people won't rely on that. Absence of  
3 real structural certainty where we see that there's  
4 going to be something like an EA, whether it's actually  
5 faster to do something in the zone or not is something  
6 that will take some time to develop. But the certainty  
7 that Chairman Weisenmiller was just referring to, in  
8 terms of California showing its resolve and saying that  
9 it does expect to see substantial development in  
10 renewable energy, in these areas, and transmission will  
11 go to those areas, is very important as well. That's  
12 going to help all of us in gathering the investment that  
13 we need to make renewables happen and to make it less  
14 expensive. But mitigation, and this is what Carl was  
15 talking about, is a very significant part of that, as  
16 well. Mitigation is a significant part of our budget.  
17 We want those dollars to count and we want those --  
18 we're not the experts on where mitigation is needed,  
19 we're not the experts on not only where the habitat is  
20 today, but where the habitat needs to be tomorrow, where  
21 the migration pathways are going to be, how that's all  
22 going to tie together, and the opportunity to  
23 participate in a regional mitigation plan that uses  
24 federal lands where a lot of the habitat and corridors  
25 are, that uses private lands, that pulls this all

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1 together and makes every single dollar count, is a  
2 benefit to ratepayers, it's a benefit to us, it's a  
3 benefit to California's natural environment. So that, I  
4 think, is one of the best things that the DRECP can  
5 deliver.

6 I appreciate Mark's comments and I think maybe  
7 you're selling the ISO a little bit short in a way. We  
8 were talking earlier in your response to one of the  
9 other questions about how you look at different  
10 portfolios, and the different portfolios show that you  
11 need different flexibility at different times, I think  
12 if you look at different buildouts of the DRECP planning  
13 area, that's going to start to inform what the needs of  
14 the grid are going to be, exactly as you said, and  
15 having that kind of input into what the alternatives are  
16 going to be. And in less than a week, we're going to be  
17 looking at draft alternatives for the DRECP that's going  
18 to show different areas where renewable energy  
19 development can happen. The ISO has, I think, a unique  
20 perspective on what that's going to do to our grid, what  
21 that's going to do to the needs we're going to have for  
22 different kinds of resources, and ultimately on what the  
23 costs are going to be. That's information that the  
24 utilities, I think, very much need in order to figure  
25 out what their procurement should be because, in the

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1 absence of an economic signal today, we have to guess at  
2 what the economic signal is going to be tomorrow.

3           And the work that you're doing, which is  
4 incredibly important, you've been working on the  
5 renewables integration for quite some years now, is I  
6 think an essential ingredient when we look at these  
7 alternatives to figure out are we going to ultimately  
8 succeed in the objectives of the DRECP on the renewable  
9 energy side, as well as on the conservation side. Is  
10 that something that, I mean, without putting you too  
11 much on the spot, you know, I don't know the extent to  
12 which the ISO has the resources to be looking at the  
13 alternatives that are going to be coming out of the  
14 DRECP, and guessing -- educated guessing -- what that  
15 might do, you know, what different types of buildout  
16 might do for the grid, positively and negatively?

17           MR. ROTHLEDER: I think we would be stretched  
18 right now to expand our work to -- beyond the 2020 time  
19 period. If you're look at 30 to -- 30 and 40 years --  
20 it would be a challenge for us and, frankly speaking,  
21 from our perspective, it would be a lot of assumptions  
22 that will all change, and so how much we would invest in  
23 that long a term look forward, we may not be the best  
24 entity to look at that far ahead.

25           CHAIRMAN WEISENMILLER: Yeah --

1           MR. ROTHLEDER: It goes kind of beyond the  
2 operational timeframe of need.

3           CHAIRMAN WEISENMILLER: Yeah. I think one of  
4 the things that's important to understand is the long  
5 term studies have greater and greater uncertainties.  
6 And you know, I've obviously made a very good living for  
7 30 years during these sort of forecasts, I never did one  
8 past 10 years, but even the ones I did, looking back at  
9 those, they certainly instill some humility in one, and  
10 so the notion of doing 20 or 30 years strikes me as, oh,  
11 my God, how crazy can you get?

12           And it is interesting, when you look at where  
13 the studies worked or didn't work, I think actually one  
14 of the -- Edison did a very good study at the end of the  
15 '80s and they looked back at the resource planning, I  
16 mean, it was a simpler time, and they had a number of  
17 problems. They did not realize the disruptions that  
18 were going to occur in the world oil markets, which  
19 really had substantial implications on the resource  
20 plans. They did not realize the coming wave of the  
21 environmental movement and the Clean Air Act, and what  
22 that meant for the coal commitments. They obviously did  
23 not realize, you know, TMI was going to occur, they  
24 didn't realize the runaway inflation that came in, and  
25 what that did to their nuclear investments.

1           And so these weren't necessarily technology-  
2 types of stuff in a way, but just these sort of macro  
3 events just sort of came in and just sort of blew away  
4 everything they were doing, and I mean, again, you could  
5 ask for why didn't they understand the environmental  
6 movement was coming and making out of state coal  
7 commitments was going to look fairly whatever; but you  
8 do have to ask yourself, looking out, you know, 20 or 30  
9 years from now, what are those sort of trends, you know,  
10 that are going to occur?

11           I will just close by saying a friend of mine  
12 once did a study of energy investments, how they worked  
13 out. And he ultimately described it to me as like  
14 California housing, you know, that there were some years  
15 you could have bought a house, you could have had a bad  
16 location, a bad financing, whatever, and just did  
17 phenomenally well, and other times nothing. And when  
18 you looked, it was like the economic conditions of the  
19 country, the tax laws changing, I mean, all these things  
20 really drove this sort of -- you know, the micro stuff,  
21 and sort of swamped that. So, again, as we're going  
22 forward, you know, by the nature of things, we have to  
23 forecast the future for this type of plan and we have to  
24 recognize the uncertainties, but generally they're much  
25 bigger than we tend to think of in this era. And,

1 again, as I said, as I've looked back on these things,  
2 again, it's not necessarily the nuts and bolts stuff  
3 that swept things away, but, you know, for example, we  
4 were looking at avoided cost projections. Obviously in  
5 the '80s, we never knew 1890 was coming, for example,  
6 you know, those types of things which, again, really  
7 bolt into what you're doing to sort of swamp the things  
8 as you go further and further in time.

9 MR. HAUBENSTOCK: Uh-huh. There are some --  
10 there are lots of interesting parallels, yeah. Every  
11 once in a while, I will have the occasion to teach and  
12 whenever I teach, the people that I'm teaching always  
13 want to know how things are, and I'm always very  
14 interested in telling them how things change because,  
15 however they are today, they're going to change  
16 tomorrow, and if you understand the dynamics of today,  
17 then you have some decent chance at surviving in the  
18 future. And so what I find really interesting about  
19 what the ISO is doing with their study of 2020 is to  
20 identify the dynamics that are happening in the grid  
21 that we can expect will cast shadows in the decades to  
22 come, that are covered by the DRECP. And that's  
23 something that the NREL studies are terrific, as are the  
24 LBNL studies, but I think the ISO going into a depth,  
25 especially in the intra-hourly issues, that have

1 tremendously valuable lessons for us, so we have to  
2 think about recognizing the projections are going to be  
3 wrong, we can at least identify what the dynamics might  
4 be.

5 MR. ROTHLEDER: Yeah, and those we'll continue  
6 to do. I mean, we have done some distributed generation  
7 studies, we've done some studies around dynamics, we've  
8 done studies around frequency response, and we're doing  
9 the renewable integration studies for 2020, as well as  
10 we finished our study for 20 percent. So we'll  
11 continued to do that work and continue to disseminate  
12 the information, share it where necessary, but like I  
13 said, going out a longer term would be a challenge for  
14 us and probably not the best use of our resources. But  
15 in the technology space, learning and understanding  
16 operationally the impact of things, we're definitely  
17 committed to that.

18 MR. KENNA: I was going to just add something on  
19 behalf of Karen and I, just to say that we are  
20 interested in, you know, recognizing the difficulty and  
21 acknowledging the humility that we have to adopt when  
22 we're trying to think in these timescales, we are  
23 talking about those questions and we are interested in  
24 the ISO's perspective, for sure, but I think other  
25 perspectives, as well. So I guess the thing - the plea

1 I would make is that that's part of what this process is  
2 for, there are going to be parts of this process that  
3 are very much a small "p" political part, where it's  
4 intended to be an interactive discussion about those  
5 kinds of questions, and I'm a believer that the wisdom  
6 of a lot of those voices interacting might be better  
7 than we think it is.

8           COMMISSIONER FLORIO: I think one thing that  
9 strikes me about this, as a PUC Commissioner and as a  
10 PUC practitioner for most of my adult life, we spend an  
11 awful lot of our time allocating costs and allocating  
12 risks, and it's just moving things around, and what I  
13 see is the enormous promise of this effort is that it  
14 can reduce risk, and reducing risk benefits developers,  
15 it benefits utilities, it benefits consumers, and there  
16 are no losers in that. I mean, we may be more or less  
17 successful in the effort, but directionally, I think  
18 it's all a win. You know, the easier we make it for  
19 people to successfully develop projects in the state,  
20 with less delay and less uncertainty, it's all good.  
21 It's the difference between good and being great is what  
22 we're working on, and that's fun.

23           MR. WEBSTER: I just wanted to comment. Because  
24 we cannot predict the future, that balanced portfolio is  
25 our hedge into the future, and if nothing else, we've

1 learned that being committed to just oil, or just coal,  
2 is not the right strategy, so we do need to look at that  
3 balance.

4 MR. DEMEO: This is probably an obvious comment,  
5 it's sort of the 30,000-foot comment on markets, you  
6 know, I'm moved by some of the things that Carl was  
7 saying, this is really the main objective here, the  
8 thing that's driving us is climate. So whatever we do  
9 with markets, however we set up those markets, it seems  
10 to me we've got to set them up in such a way that they  
11 encourage the minimization of carbon emissions.

12 MR. ZICHELLA: Yeah, one thing I wanted to say  
13 about long term planning. We're engaged in 20-year  
14 transmission planning at WECC right now and it's been,  
15 you know, everything that was just discussed, difficult,  
16 impenetrable in many ways, humility inducing, all of  
17 that and more. But what I think everyone is engaged in  
18 it, including transmission engineers who don't usually  
19 think very beyond the technical aspects of how the grid  
20 works to the new stakeholders they have to work with,  
21 we're all seeing this enormous value in trying to  
22 understand what our future needs are going to be. And  
23 we're only looking out 20 years, but I think the  
24 importance of this is, our climate goals are, oh, an 80  
25 percent reduction in CO<sub>2</sub> emissions, at a minimum, by

1 2050. In fact, SMUD's goals are 90 percent by 2050.  
2 So, you know, we have to think about the road we have to  
3 go and the trajectory to get on that road, so if we just  
4 stick with 10-year planning, I think it might have been  
5 you, Mark, or it might have been Neil, who said earlier,  
6 you know, 10 years is almost just in time planning for  
7 transmission. And practical -- and that's a really  
8 insightful thing to say, and I think we can do better  
9 and must because we have to close the gap between  
10 transmission development and generation development.  
11 But the idea of being able to think bigger than that,  
12 yeah, you are projecting a lot of things, and scenario  
13 planning is one way to get at that and to have a range  
14 of possible futures that are populated by assumptions  
15 that are credible, that are possible -- I guess if  
16 you're credible, you're possible -- but to sort of  
17 create that trajectory, "If these things occur, we could  
18 wind up here." "If in a different scenario those things  
19 occur, we end up here." In either case, what sort of  
20 transmission will we need to accommodate that energy  
21 future? Or, if the bottom falls out of the economy and  
22 it's all sort of a *Blade Runner* future, you know, what  
23 do we get? You know? If we come out of this swoon that  
24 we're in and the economy starts to grow, and the  
25 population starts to grow, we need a lot more renewables

1 to have that carbon impact we've been talking about,  
2 what would we build? And, you know, I think the term  
3 "least regrets," it's an unfortunate term, but it was  
4 used earlier. In any kind of range of scenarios, what  
5 are the things you'd build no matter what? That's  
6 basically what that means. And you can at least  
7 identify trajectories to get on that would accommodate a  
8 range of futures that are credible and possible, and  
9 that sort of can dictate an ending point. They all have  
10 differing impacts on your carbon profile in the future  
11 and you have to accommodate that in your planning. It's  
12 not to say it's going to happen the way you think, and  
13 it's not the end of the conversation, right? It's  
14 something you come back and adjust once you have  
15 experience. I mentioned the climate modeling before  
16 because, you know, people could run climate models to  
17 say, "If all these things occur in the atmosphere, we'll  
18 have these concentrations." Well, we've been keeping  
19 track since we started doing that, they started  
20 measuring CO<sub>2</sub> on Mount Kilauea, you know, over 60 years  
21 ago. Now we know that they were right, you know? We  
22 know what those concentrations look like. We're  
23 starting to see the temperature effects they predicted.  
24 And it's not just based upon somebody's model anymore,  
25 it's based upon what's actually occurring. Well, that's

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1 how I think you stay on top of the disconnect between  
2 the impossible prognosticating of long term planning and  
3 long term planning and checking your trajectories as you  
4 go. And I think that is something we have to build in  
5 as those periodic checks. And the good news in  
6 California, we sort of have that -- again, we have a  
7 trifurcated way of doing it, we may want to combine that  
8 somewhere along the line -- but if we can pull up -- and  
9 we have great talent and intellect here in looking at  
10 these things and, you know, the IEPR is one of the truly  
11 remarkable documents anybody puts out about this kind of  
12 thing, and you have at least a mechanism that you can  
13 use to check how you're doing on your forecasts and  
14 adjust because nothing is going to occur as we plan.  
15 You know, there will be disasters, there will be the  
16 kinds of things we've seen in the Middle East, for  
17 example, or in Arab Spring, or something else that you  
18 can't predict. But other things we can get a pretty  
19 good idea on and maybe establish what the trajectory may  
20 look like.

21 COMMISSIONER DOUGLAS: I'm just going to look  
22 around and see if there are any other volunteers on  
23 markets, and if there aren't, we'll go to public  
24 comment. And before we even go to public comment, I  
25 want to start by just thanking everybody for hanging in

1 here with us for a long day and a really productive day.  
2 When we asked you to come here and participate in an  
3 all-day roundtable on a Friday, some of you had to  
4 travel some distance to do so, as well, I know that  
5 we're asking a lot, and as I said at the beginning of  
6 this, the reason to do that was because of the value we  
7 saw in having a space for people to talk to each other.  
8 And as Jim said, sometimes that's really what we need,  
9 sometimes that's really what is most helpful at helping  
10 us not only to hear different perspectives, but have  
11 some help from you all in integrating those perspectives  
12 in a way that we can bring back and that we can make use  
13 of in the DRECP, but also that we, in our own worlds, as  
14 we work together to move along -- move California energy  
15 policy forward, can work on, on other tracks, as well  
16 because I think one thing that's very clear to me is  
17 that the DRECP is a very important tool for achieving  
18 some of our goals, but many many many of the things we  
19 talked about today are things that we work on every day  
20 and need to continue to, outside of the DRECP as we move  
21 forward with California energy policy and the many  
22 partnerships that we have here.

23           So anyway, thank you. I did ask earlier, I  
24 invited anyone who wanted to add on a "therefore, this  
25 is what you should think about in the DRECP," let me

1 provide one opportunity for remaining panelists to do  
2 that, and then we'll go to public comment. If anyone  
3 feels as though there's a -- I don't see anyone jumping  
4 for the opportunity, so with that, then let's go -- oh,  
5 Arthur.

6 MR. HAUBENSTOCK: Just -- I can't help myself,  
7 but let me say very quickly, first of all, thank you  
8 very much, Commissioner Douglas, for the tireless  
9 efforts that you put into putting this panel together.  
10 I know I found it very illuminating and I'm sure many  
11 others did, as well. This is, I think, incredibly  
12 important information that is the underpinning of what's  
13 going to make the DRECP successful, so thank you very  
14 very much, thanks to Chair Weisenmiller, and  
15 Commissioner Florio, and to Jim Kenna for putting so  
16 many hours when I know there are so many demands on your  
17 time, you know, I think Commissioner Florio put it very  
18 well, this directionally can't be beat, this is an  
19 opportunity to tremendously reduce the risk that we are  
20 all facing and that ultimately redounds to everybody's  
21 benefit. So I think that's a very important lesson to  
22 think about going towards the DRECP. And I think this  
23 asks the right questions. Jim kind of did a terrific  
24 job of summarizing them earlier, and I meant to write  
25 them down, so I think I'm going to go back and look at

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1 that and what was said.

2 But, you know, those are the questions we need  
3 to come back to when the alternatives come out, to think  
4 about whether those alternatives are going to put us in  
5 the best paths for success. Thanks again.

6 COMMISSIONER DOUGLAS: Great. Thank you. So  
7 Chairman Weisenmiller reminded me that sometimes we  
8 offer an opportunity for written comment after  
9 workshops, but I think I should do that, given the fact  
10 that not everybody who might want to comment on this is  
11 necessarily still in the room. So is Kristy here?  
12 Kristy, is it at all reasonable to -- what about a week  
13 from today?

14 CHAIRMAN WEISENMILLER: I was going to say just  
15 a week, yeah.

16 COMMISSIONER DOUGLAS: Yeah, so maybe Friday,  
17 close of business, we can post, or however, notice or  
18 maybe this is notice, we will accept comments up to  
19 close of business on Friday if anyone wants to make any  
20 additional written comments and at this point, let's go  
21 to public comment. Please come forward, and just go  
22 ahead and sit down and --

23 MS. ROBIN: Okay, let's see if it is on, it is.  
24 Hi. Hello, my name is Renee Robin and I'm with Sun  
25 Power, I'm going to put my Tom Starrs hat on for just a

1 moment. I'm Sun Power's counsel for Regulatory Affairs  
2 and I direct our large-scale permitting and commercial  
3 permitting and siting. So I've been a stakeholder  
4 representative on the DRECP, so I'd like to just offer  
5 three small specifics that I think might be helpful as  
6 you're going through your process. Tom wasn't here when  
7 you asked the question about larger versus smaller, and  
8 about percentage, so I would share some of our thoughts  
9 on that.

10 I guess I would say, and it's really been -- the  
11 extraordinary effort in terms of data collection has  
12 been unprecedented, I've been involved in NCCPs and HCPs  
13 and it's really an incredible amount -- wealth of  
14 information that we have that's guiding us.  
15 Nevertheless, I think we all know that it is still not  
16 perfect and it is still at a macro level, and as a  
17 result of that, I think that we can't expect, even with  
18 the best of intentions, the kind of streamlining that  
19 might really be different between some of these  
20 alternatives. And even in the smallest of alternatives,  
21 I think we're anticipating having to do additional  
22 rigorous environmental assessment. And so therefore,  
23 from our perspective, we really need to go in favor --  
24 or we would favor -- a larger envelope in order to make  
25 sure that we don't preclude the kinds of opportunities

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1 that we need for the different technologies.

2           So to the extent that larger versus smaller  
3 meant that we might have a different kind of process, I  
4 wish that were so, and it doesn't mean that the effort  
5 to gather that data wasn't superb; but I think it just  
6 doesn't quite -- I don't expect that to be the outcome.  
7 So that's one of the reasons.

8           I think the second is, knowing, in particular,  
9 some of the land use data, whether it be farmland, urban  
10 fringe areas, parts of Imperial County and other things  
11 like that, we know that the total number of acres has  
12 some real feasibility issues. And so the discounting in  
13 terms of numbers of acres, I think we would go higher  
14 than what Arthur had suggested in the 10 percent, and  
15 closer towards a 20 percent number. And I'm not -- just  
16 because I know the data and have heard the scientific  
17 panels in their discussions, and so on. So that's the  
18 second thing I wanted to share.

19           I think the third thing is that, this is really  
20 a conservation plan and it has an incredible future in  
21 terms of guiding that which we want to preserve as part  
22 of this. When you do these kinds of processes, the cost  
23 of that conservation is extraordinary. And so, as this  
24 starts to unfold, and I mentioned this when we met with  
25 Jim Kenna yesterday, what it would actually cost to

1 perfect the conservation plan that's in this program,  
2 and what that plays out to be in terms of new additional  
3 cost for utilities to site these renewables, we may find  
4 ourselves in a prohibitive per acre situation where, as  
5 Tom said earlier, it will start to push the industry  
6 outside of the DRECP if they can't see some even  
7 marginal, if not particular, benefit for being inside.  
8 We want to support the DRECP areas, we want to site  
9 there, we want our mitigation to do there, we want our  
10 mitigation funding to go there, but if the cost of it is  
11 not something different than what we're experiencing  
12 now, or if we were to go two miles out of it and still  
13 be close enough to transmission, it's not going to be  
14 able to succeed. So I guess I just would put that out  
15 there as we start to do the economic analysis of it,  
16 which will be the next phase of this as we go forward in  
17 the alternatives. So that's what I wanted to offer and  
18 I'm available at any time to dig into this and look  
19 forward to being helpful.

20 COMMISSIONER DOUGLAS: Thank you, Renee. And  
21 thanks for being here. Nancy.

22 MS. RADER: Thanks, good afternoon. Nancy  
23 Rader, Executive Director of the California Wind Energy  
24 Association. This has been a fantastic day. I think  
25 it's a real big success in bringing out many of the

1 issues that we have not been able to address at all in  
2 the DRECP process. And specifically, I was thrilled to  
3 hear some of the points I've been trying to interject,  
4 get more full discussion here. So I'm very happy with  
5 the record that we've produced today.

6 I just had a few thoughts, one is in response to  
7 Commissioner Florio's comments, hopeful comments at the  
8 end about how the process can reduce risks by making it  
9 easier for developers and reduce costs to consumers. I  
10 think we're pretty far from there right now. I was  
11 really happy to hear Nancy Ryan's comments about the  
12 importance of competition and I'm, you know, very  
13 nervous that this is going to constrain the development  
14 area to such an extent that we're not going to have a  
15 lot of competition, that we're going to create market  
16 power and it's going to end up increasing costs to  
17 consumers. So I'm very eager to see the next set of  
18 scenarios for wind, at least, and hoping they include  
19 much larger areas and, frankly, the best wind resource  
20 areas, that they are capture all of this wind resource  
21 areas in the state, outside of the military red and new  
22 red zones.

23 So then I also wanted to get back to this issue  
24 of optimizing the portfolio. I wanted to marry the  
25 comment that Aaron Johnson made with the one that Laura

1 Wisland made. Aaron said, "We don't optimize for  
2 renewables, PG&E doesn't optimize for renewables, we  
3 optimize the portfolio." And Laura said the cost  
4 matters in achieving greenhouse gas goals and in terms  
5 of the public's appetite to pay to achieve our climate  
6 change goals. So I think, between those two comments,  
7 we do need to be looking at the entire portfolio to  
8 optimize renewables and particularly because, you know,  
9 if renewables can provide ancillary services and  
10 capacity value at least cost, great, but if we can find  
11 other ways to provide those values that gets to our goal  
12 in a lower cost way and it frees up money for more  
13 renewables. That's what we should be doing. Gas is  
14 cheap right now and it looks like it's going to stay  
15 cheap for a while and I think we should be looking to  
16 take advantage of that.

17           The NREL study, I don't think the slide was  
18 thrown up today, but they have two nice slides that  
19 show, on the one hand, as you reach very high  
20 penetrations of renewables, gas goes way down, but the  
21 capacity actually stays about the same. And as you do  
22 that, you increase the availability of ancillary  
23 services and capacity to complement renewables, even as  
24 you are using a lot less gas. So I think that's  
25 something we need to keep in mind. So my takeaway for

1 the DRECP is that there are a lot of different ways to  
2 reach our overall portfolio goals, I mean, through  
3 greater transmission connections that Carl Zichella has  
4 been mentioning, to flexible gas, to storage, to  
5 renewable technologies; we don't really know which one  
6 of those are going to play out to be our best bet over  
7 the next 30, 40 years, so my -- what I've been stressing  
8 in the DRECP from the beginning is that we need to not  
9 over-plan, what we need to do is build in flexibility,  
10 so that we can go down the path that proves to be the  
11 most promising, the least cost as the decades go by. So  
12 that's my message is options, flexibility, don't over-  
13 plan. Thank you very much.

14 COMMISSIONER DOUGLAS: Thank you. Go ahead.

15 MS. FRIEDMAN: Sarah Friedman, Sierra Club. I  
16 want to thank everyone for a great panel and a really  
17 interesting presentation. And I had a few thoughts kind  
18 of related to biological considerations and the way it  
19 plays in.

20 First off, in terms of siloing I think it's  
21 really interesting and important that, in the same way  
22 we think about flexibility and integration, in both the  
23 long term procurement and transmission planning  
24 processes, we're also taking biological considerations  
25 and environmental impacts into these processes. You

1 know, the work of the DRECP is really great, but it's  
2 not a substitute for that and, you know, we need to  
3 integrate these considerations forever through these  
4 processes, you know, both because the DRECP is at this  
5 point and probably not in the future at a super granular  
6 level, but also, every step of the way we need to use  
7 those safeguards. And I think, from what I've been  
8 hearing about some of the great work that's been going  
9 on to reduce those silos, you know, we'll start to see  
10 more of that.

11           And then the second, I think I've heard a lot in  
12 this processes, in particular, you know, when the  
13 utilities were speaking, you know, a lot of thoughts  
14 that in some cases competitive markets can fix some of  
15 these issues that we're thinking about. And I think  
16 that's generally true for many issues, and I think  
17 biological considerations is one of the points that it  
18 actually doesn't particularly fix that, you know, I  
19 think as we've all kind of discussed and dealt with, you  
20 know, mitigation is a proxy for that, but it's often  
21 inaccurate and we don't have enough information, and  
22 it's a surprise at the end, and taking biological  
23 considerations into the procurement and transmission  
24 planning processes at all stages of the way, you know,  
25 will keep these surprises that are often not the best

1 fit for what we're trying to fix.

2 COMMISSIONER DOUGLAS: Thank you. Thanks for  
3 being here. Go ahead.

4 MR. STEVENS: Hi. I'm Wayne Stevens. I'm with  
5 Critical Path Transmission. We're the private industry  
6 partner of the High Desert Power Authority that's  
7 developing the AV Clear View Transmission project in the  
8 Western Mojave. I wanted to make a couple quick  
9 comments because I think I'm the only person standing  
10 between us and us leaving for Friday afternoon in July.

11 We feel, having been a solar developer in the  
12 past, I feel very strongly that the whole attitude of  
13 build it and they will come is absolutely true, and you  
14 can see that in where currently most of the construction  
15 of solar projects are being done right now in  
16 California. It's basically being done on the west side  
17 of the Antelope Valley. And that's because -- that's  
18 not where the best solar resource is, but that's where  
19 the Antelope Substation is, and the Whirlwind  
20 Substation, and the Windhub Substation, and that's where  
21 the transmission capacity is and that's where the  
22 renewables is being built.

23 So the High Desert Power Authority feels that  
24 it's true that if you build it and they will come, but  
25 they're not just going to come anywhere, so where this

1 project is being done in the Western Mojave has  
2 basically -- and it's been discussed all day today --  
3 the best solar resource, a large amount of private  
4 previously disturbed land, a community that -- it's a  
5 slight exaggeration, but many of the communities there  
6 have the attitude of, "Yes, in my back yard," they're  
7 very supportive of renewable generation, but there's a  
8 lot of -- the wind resource -- I'm sorry, the best solar  
9 resource, but the wind resource nearby in the  
10 Tehachapi's is great. So the project will appeal to  
11 developers, the project, because of the way it was  
12 designed, much of it is underground where it makes sense  
13 to be underground, it's built on existing utility right  
14 of way along county roads to minimize the impact, the  
15 environmental impact, so it also appeals to the  
16 regulatory agencies and the environmental groups. But I  
17 think, most importantly, the elements of the AV  
18 Clearview Transmission Project are basically the  
19 electrical equivalence of the solution that the CTPG  
20 developed for addressing both the reliability and the  
21 policy driven issues in the Western Mojave; in fact,  
22 it's pretty much the equivalent, the electrical  
23 equivalent, but a little bit better.

24           So the High Desert Power Authority views this  
25 project as a solution for developers, a solution for

1 regulatory agencies, and a solution for the ISO to  
2 address the issues that the CTPG has addressed in their  
3 findings.

4           So I think that's it. The project is moving  
5 forward. Last month, the High Desert Power Authority  
6 submitted a Franchise Application to Kern County to  
7 start the environmental permitting process, so CEQA has  
8 started and we anticipate a Notice of Preparation in a  
9 few weeks, the environmental permitting process is  
10 anticipated to go through the third or fourth quarter of  
11 next year and allow construction to start in January of  
12 2014, construction to finish in mid to late 2016, in  
13 time to address the deliverability issues of generation  
14 that needs to be on-line by the beginning of 2017.

15           COMMISSIONER DOUGLAS: Thank you. Go ahead.

16           MS. BARRETT: Good afternoon. I'll be very  
17 brief and my name is Leslie Barrett from Mainstream  
18 Renewable Power and Wind Energy, Inc. Commissioner  
19 Douglas, thank you so very much for putting this  
20 together and for all your hard work on the DRECP, as  
21 well, it's been a tremendous amount of workload you've  
22 taken on and it's truly appreciated, and for all others,  
23 as well.

24           I'll be very brief. With almost a dozen  
25 utility-scale projects within the DRECP area, I've come

1 to realize over the last three years that coordinating  
2 with all the different entities that have a specific  
3 interest in land use within the DRECP area is critical.  
4 And on just this last Wednesday, we had a presentation  
5 from the Military, which seemed to indicate that much of  
6 the DRECP area would not be available to wind  
7 development, and that's unfortunate, but it's something  
8 that we've realized for some time. And in working with  
9 the DOD, and working with various environmental groups  
10 and regulatory agencies, cities, and counties, and with  
11 the BLM, we've come to realize that, as these plans get  
12 closer and closer to a presentable format, we all must  
13 remain flexible as much as we possibly can with respect  
14 to the particular land use hand that's being proposed.  
15 I know that from a wind perspective, it's difficult to  
16 imagine how wind development can coexist with some of  
17 the many other types of constraints, but we think with  
18 enough studies and with additional effort in that area,  
19 it can, and we look forward to being able to work with  
20 many of our environmental friends to try and figure out  
21 how to best do this, and the same with solar.

22           And so all I would do is encourage that, when  
23 you look at ideas that, oh, whether OHV can work with  
24 wind, and perhaps the initial concept is that it can't,  
25 we have reached out to the OHV groups and we found that

1 they were very open to work with us in specific areas,  
2 and we're finding a great amount of -- a very good  
3 response from them. And the same with the environmental  
4 issues which affect a specific terrestrial species,  
5 we're finding that, once again, that wind may have some  
6 ability to work with these various constraints. And so  
7 all I ask is that, as we come closer to developing new  
8 scenarios that we give ourselves the flexibility to be  
9 able to discuss this and work some degree of compromise  
10 out, and you'll find that I think we can meet the goals  
11 that we've presented here today as being so much  
12 required in this area. This area is by far the best for  
13 resources from a solar and a wind perspective within the  
14 State of California, but it's also very unique from an  
15 environmental, and from a military perspective, and I  
16 think with hard work we can all make this work for all  
17 of us. Thank you again.

18 COMMISSIONER DOUGLAS: Thank you, Leslie. Other  
19 public comment? You know, I think that, let me see if  
20 Chairman Weisenmiller or Commissioner Florio, or if Jim  
21 Kenna want to make any closing comments.

22 CHAIRMAN WEISENMILLER: I'm going to be very  
23 brief and just say, again, I wanted to thank everyone  
24 for their participation today, to reiterate that this is  
25 a very high priority for this Administration.

1 Obviously, we're moving forward into the end game,  
2 everyone is not going to be happy with all the details,  
3 but we expect your support.

4 (Laughing)

5 COMMISSIONER FLORIO: I guess just the one  
6 thought that occurred to me in listening to all of this  
7 is, you know, the one thing we're not making anymore of  
8 in this country is land, except for the big island of  
9 Hawaii, and that's not going to be usable for a few  
10 hundred years, and to the extent that we can, through  
11 this process, you know, identify and preserve areas for  
12 future development, I mean, as I think about the  
13 challenges of possibly having to replace San Onofre,  
14 there's just nothing -- it's virtually impossible to  
15 find a place to site replacement facilities for that.  
16 And had we had the foresight 30 years ago to think,  
17 well, this is not going to last forever and what are we  
18 going to do when it's gone, we'd be far better off  
19 today. And to the extent that we can through this  
20 process, you know, preserve precious land for future  
21 generations to make use of, I think, we will have  
22 accomplished a lot.

23 MR. KENNA: I also will be very brief. Mostly,  
24 I wanted to say thank you for the invite to participate.  
25 This has been very useful to me, a lot of really useful

1 information and insights, and appreciate the tolerance  
2 from those of you who have much better technical  
3 background for my questions, which may have been naïve  
4 in one way or another. But I would only add a couple of  
5 thoughts, one is that this is really really important  
6 work and so I think it is worth the investment of your  
7 time, that certainly is why I went to some effort to  
8 carve out -- I didn't carve out all of today, but I did  
9 pretty well -- to make sure that I had the opportunity  
10 to listen to what happened here today.

11           And the second thing is, and I mentioned this a  
12 little bit before, that I think good government benefits  
13 from the participation of citizens and this has been a  
14 very good example of that for me here today, so thank  
15 you all for what you've done.

16           COMMISSIONER DOUGLAS: All right, so with that  
17 we will free everybody up to begin their -- hopefully to  
18 begin their weekend. Thanks for being here.

19                           (Adjourned at 5:13 p.m.)

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